Chee Yen Choong, Rory A. Dow & Yong Foo Ng

Additional records of Odonata from Kelantan and Terengganu, Malaysia

Published: 10.01.2020
The International Dragonfly Fund (IDF) is a scientific society founded in 1996 for the improvement of odonatological knowledge and the protection of species. Internet: http://www.dragonflyfund.org/

This series intends to publish studies promoted by IDF and to facilitate cost-efficient and rapid dissemination of odonatological data.
Additional records of Odonata from Kelantan and Terengganu, Malaysia

Chee Yen Choong¹, Rory A. Dow²,³ & Yong Foo Ng¹

¹ Centre for Insect Systematics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. Email: cychoong@ukm.edu.my
² Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, The Netherlands.
³ Sarawak Museum Campus Project, Jabatan Muzium Sarawak, Jalan Barrack, 9300 Kuching, Sarawak, Malaysia. Email: rory.dow230@yahoo.co.uk

Abstract
We report here the results from field trips to collect Odonata in the north-eastern parts of Kelantan state and the north of Terengganu state, Peninsular Malaysia. Eighty four species were collected, and four of these are new records for the state Kelantan and 10 are new records for the state of Terengganu. Notable records obtained from the field trips were Euphaea masoni, Coelicia sameerea, Pseudagrion halmakense, Leptogomphus tioman and Macromia cupricincta. Checklists for Kelantan (140 species) and Terengganu (132 species) are given in an appendix.

Abstract in Malay

Key words: new records, Odonata checklist, Peninsular Malaysia

Introduction
Kelantan and Terengganu are two large states located at the northeast of Peninsular Malaysia bordering with Pahang and Perak states in the west and south, and Thai Peninsula in the north. Parts of the states face the South China Sea. The south eastern part of Kelantan and the western part of Terengganu contain parts of Taman Negara National Park, the main conservation area in Peninsular Malaysia.

Checklists of the Odonata known from Kelantan and Terengganu were provided in Choong et al. (2017) and Choong et al. (2012) respectively. Later on, Choong (2020) added data, including new records for the state, from Ulu Sat Forest Reserve in Kelantan.
Amirrudin et al. (2011) published records from Jambu Bongkok Forest Reserve in Terengganu that were omitted in Choong et al. (2012) because they were not aware of the publication. Choong & Ng (2014) added more species for the state from Gunung Tebu. The latest published records for Terengganu came from Gua Bewah (within Taman Negara Terengganu) (Choong et al. 2018), again more species were added. All of these additions are considered in more detail in the Discussion below and updated checklists for both states are given in the Appendix.

We conducted a short field trip to north-eastern Kelantan and northern Terengganu to collect Odonata on 16–20 May, 2018. Collecting in Terengganu was conducted at and near to Hutan Lipur Jeram Linang (see Choong et al. (2017) for other results from this location). Additionally the second author conducted some limited sampling in the same part of northern Terengganu, on 29 November – 2 December 2016; however adverse weather conditions severely limited what could be accomplished. The results from these collecting trips are reported here; the general areas of the states where the sampling conducted are indicated in Fig. 1.

![Map showing the sampling locations. See text for habitat details of each location.](image)

**Figure 1.** Map showing the sampling locations. See text for habitat details of each location.

**Odonata recorded**

**Locations**

Habitat photos from some of the locations are shown in Fig. 2.

**Kelantan.**

K1. Hutan Lipur Jeram Linang:

   a. main stream and trailside [Coordinates just inside gate: 5.74209N, 102.37368E].
   
   b. tributary entering below waterfall [upstream coordinates: 5.73992N, 102.3703E].

K2. Downstream of Hutan Lipur Jeram Linang as far as 5.75212N, 102.37433E.

Figure 2. Habitat condition for some of the sampling locations.

**Terengganu**

T1. Hutan Lipur Lata Belatan.
   a. main stream [representative coordinates: 5.63103N, 102.59612E].
   b. tributaries.
   c. pond.

T2. Main stream downstream of Hutan Lipur Lata Belatan [representative coordinates: 5.65574N, 102.58475E].

T3. Hutan Lipur Lata Tembakah.
   a. main stream below first waterfall.
   b. main stream further up [representative coordinates: 5.58983N, 102.44099E].
   c. tributaries.
   d. trailside.
T4. Unfinished road from Jerteh to Gua Musang:
   a. small stream in logged forest just after end of road from Jerteh to Gua Musang [5.42852N, 102.52128E].
   b. drains and pools near a.

T5. Unfinished road from Jerteh to Gua Musang:
   a. low gradient stream before end unfinished road from Jerteh to Gua Musang [5.45192N, 102.51592E].
   b. small pools near a.

T6. Unfinished road from Jerteh to Gua Musang:
   a. Tributary to penultimate stream (Sg Mio?) on road from Jerteh to Gua Musang [representative coordinates 5.47094N, 102.52343E].

T7. Pond near unfinished road from Jerteh to Gua Musang [5.4574N, 102.5183E].

T8. On way to Lata Tembakah:
   a. large pond [5.63014N, 102.48061E].
   b. rice fields opposite a.
   c. drains and marshy areas adjacent to b.
   d. very slow stream and marshy areas near b.

T9. Muddy pools on track in rubber at end of small road running past Lata Tembakah [5.57203N, 102.47228E].

T10. Seasonal swamp and drains near road from Jerteh to coast [5.77873N, 102.56092E]. This location was extensively flooded in late 2016 but completely dry in May 2018.

T11. At lights at Lilly Budget Hotel, Jerteh [5.7372N, 102.50087E].

T12. Pond and adjacent rice field on kampung road not far from Jerteh [5.73132N, 102.56092E].

New records for Kelantan and Terengganu are indicated by a bold K or T respectively after the species authority.

**Species collected**

**Zygoptera**

**Platyictidae**

All taxa collected from this family are from the Drepanosticta quadrata-group. This species group is proving to be highly problematic but we are working towards a revision of it.

*Drepanosticta* sp. cf *fontinalis* Liettink, 1937 K, T


*Drepanosticta* sharpi (Laidlaw, 1907)


*Drepanosticta* sp. cf *sharpi* (Laidlaw, 1907) K, T

Calopterygidae

*Echo modesta* Laidlaw, 1902

- **T1a** – ♂, 16.v.2018, CYC; ♂, 16.v.2018, RD.

*Neurobasis chinensis* (Linnaeus, 1758)


*Vestalis amethystina* Leftinck, 1965


*Vestalis amoena* Hagen in Selys, 1853


Chlorocyphidae

*Aristocypha fenestrella* (Rambur, 1842)


*Heliocypha biforata* (Selys, 1859)

Figure 4. Libellago aurantiaca male at location T6a, photograph by C.Y. Choong.


Heliocypha perforata (Percheron, 1835)


Libellago aurantiaca (Selys, 1859)


Libellago lineata (Burmeister, 1839)


Sundacyphea petiolata (Selys, 1859)


Devadatitidae

Devadatta argyoides (Selys, 1859)

Euphaeidae

Dysphaea dimidiata Selys, 1853


Euphaea impar Selys, 1859


Euphaea masoni Selys, 1879 T


Euphaea ochracea Selys, 1859


Philosinidae

Rhinagrion macrocephalum (Selys, 1862)

Rhinagrion viridatum Fraser, 1938


Platycnemididae

Coelicia albicauda (Förster in Laidlaw, 1907)


Coelicia sameeræ Dow, Choong & Ng, 2018

See Dow et al. (2018) for records from location K1 in 2016.


Copera marginipes (Rambur, 1842)


Copera vittata (Selys, 1863)


Indocnemis orang (Förster in Laidlaw, 1907)


Onychargia atrocyana Selys, 1865

T1c – ♂, 16.v.2018, YFN.

Prodasineura collaris (Selys, 1860)

T3c – 3 ♂♂, 17.v.2018, RD.

Prodasineura humeralis (Selys, 1860)


Prodasineura laidlawii (Förster in Laidlaw, 1907)


Prodasineura notostigma (Selys, 1860)

T3c – ♂, ♂+♂, 17.v.2018, RD.

Pseudocopera ciliata (Selys, 1863)

Coenagrionidae

*Agriocnemis femina* (Brauer, 1868)

- **T8d** – ♀, 30.xi.2016, RD.

*Agriocnemis pygmaea* (Rambur, 1842) **T**


*Agriocnemis rubescens rubeola* Selys, 1877

- **T9** – ♂, 30.xi.2016, RD.

*Agriocnemis* sp.


*Coenagrion aurantiacum* Fraser, 1922


*Coenagrion cerinorubellum* (Brauer, 1865)

- **T1c** – ♂, 16.v.2018, CYC. **T8a** – ♂, 30.xi.2016, RD.

*Ischnura senegalensis* (Rambur, 1842)


*Pseudagrion australasiae* Selys, 1876

- **K3** – 2 ♂♂, 18.v.2018, RD. **T8a** – ♂, 30.xi.2016, RD.

*Pseudagrion ?lalakense* Orr & van Tol, 2001 **T**

- This was a highly surprising find. *Pseudagrion lalakense* has been considered to be a species endemic to Borneo. A male *Pseudagrion* collected at a largely tree-lined...
pond in the expectation that it would be *P. microcephalum* has anal appendages agreeing well with *P. lalakense* but differences in its markings. Further material and, ideally, molecular data are needed to be sure of the status of this taxon but if it does prove to be *P. lalakense* then that species is far more widely distributed than previously thought.

**T7** – ♀, 20.v.2018, RD.

*Pseudagrion microcephalum* (Rambur, 1842)

**T8a** – 2 ♀♂, ♀, 30.xi.2016, RD. **T10** – 3 ♀♂, 2.xii.2016, RD.

*Pseudagrion pruinum* (Burmeister, 1839)


*Pseudagrion rubriceps* Selys, 1876

**T4b** – 2 ♀♂, 19.v.2018, CYC.

*Pseudagrion williamsoni* Fraser, 1922


**Anisoptera**

**Gomphidae**

*Gomphidia abbotti* Williamson, 1907 **T**


*Ictinogomphus decoratus melaenops* (Selys, 1858)


---

**Figure 7. Gomphidia abbotti** male at location T6a, photograph by C.Y. Choong.
Leptogomphus tioman Choong, 2016 T


Megalogomphus sumatranus (Krüger, 1899)

K2 – ♀, 18.v.2018, RD.

Microgomphus ?chelifer Selys, 1858

T6a – ♀ (teneral), 20.v.2018, RD.

Macromiidae

Macromia cupricincta Fraser, 1924 T

T6a – ♂, 20.v.2018, RD.

Synthemistidae

Idionyx sp.

K1b – ♀, 18.v.2018, RD.

Libellulidae

Acisoma panorpoides Rambur, 1842


Aethriamanta brevipennis (Rambur, 1842) K


Aethriamanta gracilis (Brauer, 1878)


Agrionoptera insignis (Rambur, 1842)

T5b – ♂, 19.v.2018, RD.

Brachydiplax chalybea Brauer, 1868


Chalyybeothemis chini Dow, Choong & Orr, 2007 T

T7 – 2 ♂♂, 20.v.2018, RD.

Cratilla lineata (Brauer, 1878)


Cratilla metallica (Brauer, 1878)

T6a – ♂, 20.v.2018, RD.

Crocothemis servillia (Drury, 1773)

T8a – ♂, 30.xi.2016, RD. T8d – ♂, 30.xi.2016, RD.

Diplacodes trivialis (Rambur, 1842)

T8a – 2 ♂♂, 30.xi.2016, RD. T12 – ♂, 2.xii.2016, RD.
Lathreista asiatica (Fabricius, 1798)


Lyriotheimis biappendiculata (Selys, 1878)


Nannophya pygmaea Rambur, 1842 K


Neurothemis fluctuans (Fabricius, 1793)


T8a – ζ, 30.xi.2016, RD. T10 – ζ, 2.xii.2016, RD.

Onychotheimis culminicola Förster, 1904

T5a – ζ, 19.v.2018, RD.

Onyrotoxus testaceus Laidlaw, 1902


Orchilotheremis pulcherrima Brauer, 1878

T6a – ζ, 20.v.2018, RD.

Orthetrum chrysis (Selys, 1891)


Orthetrum glaucum (Brauer, 1865)


Orthetrum sabina (Drury, 1773)


Orthetrum testaceum (Burmeister, 1839)


Potamarcha congener (Rambur, 1842)


Rhyothemis obsolescens Kirby, 1889


Rhyothemis phyllis (Sulzer, 1776)


Rhyothemis plutonia Selys, 1883


Rhyothemis triangularis Kirby, 1889


Tetraphthemis hyalina Kirby, 1889

K2 – φ, 18.v.2018, RD.
Tholymis tillarga (Fabricius, 1798) T
T11 – ♀, 29.xi.2016, RD.

Trithemis aurora (Burmeister, 1839)

Trithemis festiva (Rambur, 1842)

Tyriobapta torrida Kirby, 1889

Urothemis signata (Rambur, 1842)

Zygonyx iris Selys, 1869

Figure 8. Zygonyx iris male at location T1a, photograph by C.Y. Choong.

Discussion
We spent nine sampling days (29 November – 2 December 2016; 16 – 20 May 2018) to collect Odonata in Kelantan and Terengganu. The sampling data for the trip in 2016 (for locations in Terengganu) was poor due to the bad weather condition. Therefore, most of the records presented in this study are from the sampling trip in 2018. It is noted that the 2018 trip consisted of five sampling days, and that four days were spent at locations in Terengganu and only one day was at locations in Kelantan. Therefore,
we do not have any intention to compare the species richness between the sampling in the two states.

The two sampling trips yielded a total of 84 species – Kelantan with 44 species and Terengganu with 80 species. Even though the sampling periods were short, we still managed to add four new records (Drepanosticta sp. cf fontinalis, Drepanosticta sp. cf sharpi, Aethriamanta brevipennis and Nannophya pygmaea) for the state of Kelantan and ten new records (Drepanosticta sp. cf fontinalis, Drepanosticta sp. cf sharpi, Euphaea masoni, Agriocnemis pygmaea, Pseudagriorn ?lalakensis, Gomphidia abbotti, Leptogomphus tioman, Macromia cupricincta, Chalybeothemis chini and Tholymis til-larga) for the state of Terengganu.

Choong et al. (2017) produced a checklist for Kelantan with 131 species, and then Choong (2020) added five additional species (Libellago aurantiaca, Rhinagriorn macrocephalum, Pseudagriorn australasiae, Hydrobasileus croceus and Rhothothemis triangulatis) from Ulu Sat Forest Reserve to the checklist. With the four new records from this study, the number of species known to the state of Kelantan now stands at 140 (see Appendix). Coeliacia cf erici in the checklist by Choong et al. (2017) was described as Coeliacia sameerae in 2018 (Dow et al. 2018).

On the other hand, the checklist for Terengganu produced by Choong et al. (2012) consisted of 107 species. Coeliacia erici in the checklist (Choong et al. 2012) is a misidentification of C. sameerae, this was clarified in Dow et al. (2018). Neurothemis terminata, a species no longer considered to occur in Peninsular Malaysia (see Seehausen & Dow 2016), was in the same checklist (Choong et al. 2012), this species had been recorded by Wahizatul-Afzan et al. (2006) from Sekayu Recreational Forest. We communicated with one of the authors of the paper (Amirrudin per. comm.), and we were informed that Neurothemis fulva was misidentified as N. terminata. Therefore, we remove N. terminata from the current checklist for Terengganu. We also found five records (Ceriagriorn olivaceum, Aethriamanta brevipennis, Chalybeothemis fluvialitis, Diplacodes nebula and Rhothothemis aterrima) from Jambu Bongkok Forest Reserve (Amiruddin et al. 2011) which were not included in Choong et al. (2012). A further nine records (Libellago hyalina, Sundacypha petiolata, Rhinagriorn macrocephalum, Elattoneura analis, Prodasineura notostigma, Archibasis rebecca, Archibasis viola, Macrogomphus thoracicus and Idionyx yolanda) were added by Choong & Ng (2014). The latest published records from the state were in Choong et al. (2018), which added two additional species (Rhinocypha pelops and Phyllothemis raymondi) to the Odonata fauna of Terengganu. Our field trips in 2016 and 2018 yielded ten new records. All of these records bring the number of species currently known from Terengganu to 132 (see the Appendix).

It is worthwhile to mention a few notable records yielded from the sampling trips – Euphaea masoni, Coeliacia sameerae, Pseudagriorn ?lalakense, Leptogomphus tioman and Macromia cupricincta. Euphaea masoni is recorded for the first time in Terengganu, and it now appears to be a rather common species in northern Penin- sular Malaysia, making it all the more surprising that it was only recorded in Malaysia for the first time in 2015 (Dow et al. 2016). Coeliacia sameerae is a recently described species, and it has been so far found in three states (Kelantan, Terengganu and
Pahang) in Peninsular Malaysia (Dow et al. 2018). The discovery of what appears to be *Pseudagrion lalakense*, which had been considered to be endemic to Borneo, in the north of Peninsular Malaysia is remarkable, and serves to illustrate the fact that much remains to be learned about even pond species in this region. After its discovery in Tioman Island, *Leptogomphus tioman* was recorded in Kelantan in 2016 (Choong et al. 2017), and now it is known to be present in Terengganu, indicating a wider distribution range in Peninsular Malaysia than was imagined when it was described. *Macromia cupricincta* is a new record for Terengganu, and it is interesting to note that it is so far the only member of family Macromiidae known to Terengganu, although this might suggest that the family is poorly represented for the state, it is just as likely that it is simply the result of insufficient sampling and the difficulty of capture of most species in the family.

**Acknowledgements**

We are grateful to the Forestry Department Peninsular Malaysia for granting us a permit to collect Odonata from forest reserves in Peninsular Malaysia. The field work was financed by the Mohamed bin Zayed Species Conservation Fund. The second author’s flights to and from England in 2016 (as part of a longer fieldwork period) and to and from Kuching in 2018 were covered by parts of grants from the International Dragonfly Fund.

**References**


Appendix: Checklists of Odonata recorded from Kelantan and Terengganu

Kelantan Checklist (140 species)
Where the first record from Kelantan is not in this publication, a citation to the first record is made in square parenthesis after the species name.

Zygoptera
Lestidae
Lestes dorothea Fraser, 1924 [Choong 2013]
Lestes praemorsus decipiens Kirby, 1894 [Laidlaw 1902b]

Platystictidae
Drepanosticta fontinalis Lieftinck, 1937 [Lieftinck 1937]
Drepanosticta sp. cf fontinalis Lieftinck, 1937
Drepanosticta sp. cf pan Laidlaw, 1931 [Choong 2013 as D. pan]
Drepanosticta sharpi (Laidlaw in Laidlaw & Förster, 1907) [Laidlaw & Förster 1907 as Platysticta quadrata Selys, 1860]
Drepanosticta sp. cf sharpi (Laidlaw, 1970)
Protosticta curiosa Fraser, 1934 [Choong et al. 2017]
Argiolestidae
Podolestes orientalis Selys, 1862 [Choong et al. 2017]

Calopterygidae
Echo modesta Laidlaw, 1902 [Laidlaw 1902a]
Neurobasis chinensis (Linnaeus, 1758) [Laidlaw 1902a]
Neurobasis longipes Hagen, 1887 [Hämäläinen et al. 1996]
Vestalis amethystina Liettinck, 1965 [Hämäläinen et al. 1996]
Vestalis amoena Hagen in Selys, 1853 [Hämäläinen et al. 1996]

Chlorocyphidae
Aristocypha fenestrella (Rambur, 1842) [Laidlaw 1902a]
Helicypha biforata (Selys, 1859) [Laidlaw 1903]
Helicypha perforata (Percheron, 1835) [Laidlaw 1903 as Rhinocypha apicalis Krüger, 1898]
Libellago aurantiaca (Selys, 1859) [Choong 2020]
Libellago lineata (Burmeister, 1839) [Choong 2007]
Libellago semiopaca (Selys, 1873) [Laidlaw 1902a as Micromerus affinis Laidlaw, 1902]
Libellago stigmatizans (Selys, 1869) [Liettinck 1937]
Sundacypha petiolata (Selys, 1859) [Laidlaw 1902a as Rhinocypha karschi Krüger, 1898]

Devadattidae
Devadatta argyoides (Selys, 1859) [Hämäläinen et al. 1996]

Euphaeidae
Dysphaea dimidiata Selys, 1853 [Laidlaw 1902a as Dysphaea limbata Selys, 1859]
Euphaea impar Selys, 1859 [Laidlaw 1902a]
Euphaea masoni Selys, 1879 [Choong et al. 2017]
Euphaea ochracea Selys, 1859 [Laidlaw 1902a]

Philosinidae
Rhinagrion macrocephalum (Selys, 1862) [Choong 2020]
Rhinagrion viridatuma Fraser, 1938 [Laidlaw 1902b as Amphilestes mima Karsch, 1891]

Platycnemididae
Calicnemia chaseni (Laidlaw, 1928) [Choong 2013]
Coeliccia albicauda ( Förster in Laidlaw, 1907) [Laidlaw 1902b as Trichocnemis borneensis (Selys, 1886)]
Coeliccia didyma [Selys, 1863] [Choong 2013]
Coeliccia sameerae Dow, Choong & Ng, 2018 [Choong 2013 as C. erici]
Copera marginipes (Rambur, 1842) [Laidlaw 1902b]
Copera vittata (Selys, 1863) [Laidlaw 1902b as Copera atomaria (Selys, 1886)]
Elattoneura analis (Selys, 1860) [Hämäläinen et al. 1996]
Indocnemis orang (Förster in Laidlaw, 1907) [Hämäläinen et al. 1996]
Onychargia atrocyana Selys, 1865 [Choong 2017]
Prodasineura collaris (Selys, 1860) [Laidlaw 1902b]
Prodasineura humeralis (Selys, 1860) [Laidlaw 1902b]
Prodasineura laidlawii (Förster in Laidlaw, 1907) [Hämäläinen et al. 1996]
Prodasineura notostigma (Selys, 1860) [Choong et al. 2017]
Pseudocopera ciliata (Selys, 1863) [Choong et al. 2017]

Coenagrionidae
Aciagrion borneense Ris, 1911 [Asahina 1966]
Agriocnemis femina (Brauer, 1868) [Laidlaw 1902b]
Agriocnemis minima Selys, 1877 [Asahina 1966 as Agriocnemis d’abreui Fraser, 1919]
Agriocnemis pygmaea (Rambur, 1842) [Asahina 1966]
Archibasis rebecca Kemp, 1989 [Hämäläinen et al. 1996]
Argiocnemis rubescens rubeola Selys, 1877 Laidlaw 1902b
Argiocnemis species [Choong 2013]
Ceriagrion auranticum Fraser, 1922 [Laidlaw 1902b as Ceriagrion erubescens Selys, 1891]
Ceriagrion cerinorubellum (Brauer, 1865) [Asahina 1966]
Ceriagrion fallax pendelburyi Laidlaw, 1931 [Hämäläinen et al. 1996]
Ischnura senegalensis (Rambur, 1842) [Asahina 1966]
Mortonagrion aborense (Laidlaw, 1914) [Choong et al. 2017]
Pseudagrion australasiae Selys, 1876 [Choong 2020]
Pseudagrion microcephalum (Rambur, 1842) [Norma-Rashid 2010]
Pseudagrion pruinose (Burmeister, 1839) [Hämäläinen et al. 1996]
Pseudagrion rubriceps Selys, 1876 [Choong 2017]

Anisoptera
Aeshnidae
Amphiaeschna ampla basitincta Lieftinck, 1940 [Choong 2013]
Anax guttatus (Burmeister, 1839) [Laidlaw 1902a]
Gynacantha basiguttata Selys, 1882 [Laidlaw 1902a as G. rosenbergei Kaup in Brauer, 1867]
Gynacantha bayadera Selys, 1891 [Choong 2007]
Gynacantha limbalis Karsch, 1892 [Choong 2007]
Indaeschna grubaueri ( Förster, 1904) [Choong 2013]
Perieschna laidlawi ( Förster, 1908) [Choong 2013]
Tetracanthagyna plagiata (Waterhouse, 1877) [Laidlaw 1902a]

**Gomphidae**
Burmagomphus divaricatus Lieftinck, 1964 [Lieftinck 1964]
Burmagomphus insularis Laidlaw, 1914 [Choong 2007]
Gomphidia abbotti Williamson, 1907 [Hämäläinen et al. 1996]
Gomphidictinus perakensis [Laidlaw, 1902] [Choong 2017]
Heliogomphus kelantanensis [Laidlaw, 1902] [Laidlaw 1902a as Gomphus consobrinus]
Ictinogomphus decoratus melaenops Selys, 1857 [Hämäläinen et al. 1996]
Leptogomphus tioman Choong, 2016 [Choong et al. 2017]
Macrogonomphus parallelogramma albardae Selys, 1878 [Choong 2007]
Macrogonomphus quadratus Selys, 1878 [Choong 2007]
Megalogomphus sumatranus (Krüger, 1899) [Hämäläinen et al. 1996]
Merogomphus parvus (Krüger, 1899) [Hämäläinen et al. 1996]
Microgonomphus chelifer Selys, 1858 [Choong et al. 2017]
Nepogomphus walli (Fraser, 1924) [Norma-Rashid & van Tol 1995]
Onychogomphus castor Lieftinck, 1941 [Lieftinck 1941]
Onychogomphus thienemanni Schmidt, 1934 [Novelo-Gutierrez & Salmah 2013]
Paragomphus capricornis (Förster, 1914) [Choong 2007]
Phaenandrogomphus asthenes Lieftinck, 1964 [Choong et al. 2017]
Stylogomphus ?malayanus Sasamoto, 2001 [Choong et al. 2017]

**Macromiidae**
Macromia callisto Laidlaw, 1902 [Laidlaw 1902a as Macromia gerstaeckeri Krüger, 1899]
Macromia cydippe Laidlaw, 1922 [Hämäläinen et al. 1996]
Macromia gerstaeckeri Krüger, 1899 [Laidlaw 1902a]

**Synthemistidae**
Idionyx montana Karsch, 1891 [Choong 2013 as Idionyx sp.]
Idionyx yolanda Selys, 1871 [Laidlaw 1902a as Idionyx dohmi Krüger, 1899]
Macromidia genialis Laidlaw, 1923 [Choong et al. 2017]

**Libellulidae**
Acisoma panorpoides Rambur, 1842 [Laidlaw 1902a]
Aethriamanta gracilis (Brauer, 1878) [Choong et al. 2017]
Aethriamanta brevipennis (Rambur, 1842)
Brachydiplax chalybea Brauer, 1868 [Laidlaw 1902a as Brachydiplax maria Selys, 1878]
Brachydiplax farinosa Krüger, 1902 [Laidlaw 1902a as Brachydiplax pruinosa Laidlaw, 1902]
Brachythemis contaminata (Fabricius, 1793) [Laidlaw 1902a]
Camininia gigantea (Brauer, 1867) [Laidlaw 1902a]
Chalybeothemis chini Dow, Choong & Orr, 2007 [Choong et al. 2017]
Cratilla lineata (Brauer, 1878) [Choong 2007]
Cratilla metallica (Brauer, 1878) [Laidlaw 1902a]
Crocothemis servilia (Drury, 1770) [Laidlaw 1902a]
Diplacodes nebulosa (Fabricius, 1793) [Laidlaw 1902a]
Diplacodes trivialis (Rambur, 1842) [Laidlaw 1902a]
Hydrobasileus croceus (Brauer, 1867) [Choong 2020]
Lathrecista asiatica (Fabricius, 1798) [Laidlaw 1902a as Lathrecista terminalis Kirby, 1889]
Lyriothemis biappendiculata (Selys, 1878) [Laidlaw 1902a]
Lyriothemis cleis (Brauer, 1868 [Laidlaw 1902a as Lyriothemis priapea (Selys, 1878)]
Macrodiplax cora (Brauer, 1867) [Laidlaw 1902a as Macrodiplax vittata (Kirby, 1893)]
Nannophya pygmaea Rambur, 1842
Neurothemis fluctuans (Fabricius, 1793) [Laidlaw 1902a]
Neurothemis fulvia (Drury, 1773) [Choong 2013]
Neurothemis tullia (Drury, 1773) [Laidlaw 1902a]
Onychothemis coccinea Lieftinck, 1953 [Lieftinck 1953]
Onychothemis testacea Laidlaw, 1902 [Laidlaw 1902a]
Orchithemis pulcherrima (Brauer, 1878) [Choong 2013]
Orthetrum chrysis (Selys, 1891) [Hämäläinen et al. 1996]
Orthetrum glaucum (Brauer, 1865) [Laidlaw 1902a as Orthetrum nicevillai Kirby, 1894]
Orthetrum luzonicum (Brauer, 1868) [Hämäläinen et al. 1996]
Orthetrum pruinum schneideri Förster, 1903 [Laidlaw 1902a as Orthetrum prinosum (Burmeister, 1839)]
Orthetrum sabina (Drury, 1770) [Asahina 1966]
Orthetrum testaceum (Burmeister, 1839) [Laidlaw 1902a]
Orthetrum triangulare malaccensis Förster, 1903 [Hämäläinen et al. 1996]
Pantala flavescens (Fabricius, 1798) [Asahina 1966]
Phylothemis raymondi Lieftinck, 1950 [Choong 2017]
Potamarcha congener (Rambur, 1842) [Laidlaw 1902a as Potamarcha obscura (Rambur, 1842)]
Rhodothemis rufa (Rambur, 1842) [Norma-Rashid 2010]
Rhyothemis obsolescens Kirby, 1889 [Choong et al. 2017]
Rhyothemis phylis (Sulzer, 1776) [Ris 1913]
Rhyothemis plutonia Selys, 1883 [Choong et al. 2017]
Rhyothemis triangularis Kirby, 1889 [Choong 2020]
Tetrathemis hyalina Kirby, 1889 [Hämäläinen et al. 1996]
Tetrathemis platyptera Selys, 1878 [Hämäläinen et al. 1996]
Tholymis tillarga (Fabricius, 1798) [Asahina 1966]
Tramea transmarina euryale Selys, 1878 [Choong 2017]
Trithemis aurora (Burmeister, 1839) [Laidlaw 1902a]
Trithemis festiva (Rambur, 1842) [Hämäläinen et al. 1996]
Tyriobapta torrida Kirby, 1889 [Laidlaw 1902a]
Zygonyx ida Hagen, 1867 [Ris 1912]
Zygonyx iris Selys, 1869 [Laidlaw 1902a as Zyonidia malayana Laidlaw, 1902]

Terengganu Checklist (132 species)
Where the first record from Terengganu is not in this publication, a citation to the first record is made in square parenthesis after the species name.

Zygoptera
Lestidae
Lestes praemorsus decipiens Kirby, 1894 [Choong et al. 2012]

Platystictidae
Drepanosticta fontinalis Lietinck, 1937 [Choong et al. 2012]
Drepanosticta sp. cf fontinalis Lietinck, 1937
Drepanosticta sp. cf hamadryas Laidlaw, 1931 [Choong et al. 2012 as Drepanosticta sp.]
Drepanosticta ?quadrata (Selys, 1860) [Choong et al. 2012]
Drepanosticta sharpi (Laidlaw in Laidlaw & Förster , 1907) [Choong et al. 2012]
Drepanosticta sp. cf sharpi (Laidlaw in Laidlaw & Förster, 1907)
Protosticta curiosa Fraser, 1934 [Choong et al. 2012]

Argiolestidae
Podolestes orientalis Selys, 1862 [Wahizatul-Afzan et al. 2006]

Calopterygidae
Echo modesta Laidlaw, 1902 [Choong et al. 2012]
Neurobasis chinensis (Linnaeus, 1758) [Wahizatul-Afzan et al. 2006]
Vestalis amethystina Lietinck, 1965 [Wahizatul-Afzan et al. 2006]
Vestalis amoena Hagen in Selys, 1853 [Choong et al. 2012]
Vestalis gracilis (Rambur, 1842) [Choong et al. 2012]
Chlorocyphidae

Aristocypa fenestrella (Rambur, 1842) [Choong et al. 2012]
Heliocypa biforata (Selys, 1859) [Wahizatul-Afzan et al. 2006]
Heliocypa perforata (Percheron, 1835) [Wahizatul-Afzan et al. 2006 as Rhinocypa sp.]
Libellago aurantiaca (Selys, 1859) [Choong et al. 2012]
Libellago hyalina (Selys, 1859) [Choong & Ng 2014]
Libellago lineata (Burmeister, 1839) [Wahizatul-Afzan et al. 2006]
Libellago stigmatizans (Selys, 1869) [Wahizatul-Afzan et al. 2006]
Rhinocypa pelops Laidlaw, 1936 [Choong et al. 2018]
Sundacypha petiolata (Selys, 1859) [Choong & Ng 2014]

Devadattidae

Devadatta argyoides (Selys, 1859) [Choong et al. 2008]

Euphaeidae

Dysphaea dimidiata Selys, 1853 [Wahizatul-Afzan et al. 2006]
Euphaea impar Selys, 1859 [Choong et al. 2008]
Euphaea masoni Selys, 1879
Euphaea ochracea Selys, 1859 [Wahizatul-Afzan et al. 2006]

Philosinidae

Rhinagrion macrocephalum (Selys, 1862) [Choong & Ng 2014]
Rhinagrion viridatum Fraser, 1938 [Choong et al. 2012]

Platycnemididae

Calicnemia chaseni (Laidlaw, 1928) [Choong et al. 2012]
Coeliccia albicauda (Förster in Laidlaw, 1907) [Choong et al. 2008]
Coeliccia didyma (Selys, 1863) [Choong et al. 2012]
Coeliccia sameerae Dow, Choong & Ng, 2018 [Choong et al. 2012 as Coeliccia erici]
Copera marginipes (Rambur, 1842) [Wahizatul-Afzan et al. 2006]
Copera vittata (Selys, 1863) [Choong et al. 2008]
Elattoneura analis (Selys, 1860) [Choong & Ng 2014]
Indocnemis orang (Förster in Laidlaw, 1907) [Choong et al. 2012]
Onychargia atrocyana Selys, 1865 [Wahizatul-Afzan et al. 2006]
Prodasineura collaris (Selys, 1860) [Wahizatul-Afzan et al. 2006]
Prodasineura humeralis (Selys, 1860) [Choong et al. 2012]
Prodasineura laidlawii (Förster in Laidlaw, 1907) [Choong et al. 2008]
Prodasineura notostigma (Selys, 1860) [Choong & Ng 2014]
Pseudocopera ciliata (Selys, 1863) [Choong et al. 2012 as Copera ciliata]

Coenagrionidae
Aciagrion hisopa (Selys, 1876) [Choong et al. 2012]
Agriocnemis femina (Brauer, 1868) [Choong et al. 2012]
Agriocnemis nana (Laidlaw, 1914) [Choong et al. 2012]
Agriocnemis pygmaea (Rambur, 1842)
Amphicnemis gracilis Krüger, 1898 [Choong et al. 2008]
Archibasis melanocyana (Selys, 1877) [Wahizatul-Afzan et al. 2006]
Archibasis rebecca Kemp, 1989 [Choong & Ng 2014]
Archibasis viola Leflinck, 1948 [Choong & Ng 2014]
Argiocnemis rubescens rubeola Selys, 1877 [Choong et al. 2012]
Argiocnemis species [Choong et al. 2012]
Ceriagrion cerinorubellum (Brauer, 1865) [Choong et al. 2008]
Ceriagrion chaoi Schmidt, 1964 [Choong et al. 2012]
Ceriagrion olivaceum Laidlaw, 1914 [Amirrudin et al. 2011]
Ischnura senegalensis (Rambur, 1842) [Choong et al. 2008]
Mortonagrion aborense (Laidlaw, 1914) [Choong et al. 2012]
Pericnemis sp. [Choong et al. 2012]
Pseudagrion australasiæ Selys, 1876 [Choong et al. 2012]
Pseudagrion ?lalakensis Orr & van Tol, 2001
Pseudagrion microcephalum (Rambur, 1842) [Laidlaw 1902b]
Pseudagrion prunorum (Burmeister, 1839) [Choong et al. 2012]
Pseudagrion rubriceps Selys, 1876 [Choong et al. 2012]
Pseudagrion willaimsoni Fraser, 1922 [Choong et al. 2012]

Anisoptera
Aeshnidae
Gynacantha bayadera Selys, 1891 [Wahizatul-Afzan et al. 2006]
Gynacantha dohrni Krüger, 1889 [Wahizatul-Afzan et al. 2006]
Heliaeschna crassa Krüger, 1889 [Wahizatul-Afzan et al. 2006]
Indaeschna grubaueri (Förster, 1904) [Wahizatul-Afzan et al. 2006]

Gomphidae
Burmagomphus sp. [Wahizatul-Afzan et al. 2006]
Gomphidia abbotti Williamson, 1907
Ictinogomphus decoratus melaeonops Selys, 1857 [Wahizatul-Afzan et al. 2006]
Leptogomphus tioman Choong, 2016
Macrogomphus thoracicus McLachlan, 1884 [Choong & Ng 2014]
Microgomphus chelifer Selys, 1858 [Wahizatul-Afzan et al. 2006]
Paragomphus capricornis (Förster, 1914) [Choong et al. 2012]

Macromiidae
Macromia cupricincta Fraser, 1924

Synthemistidae
Idionyx yolanda Selys, 1871 [Choong & Ng 2014]

Libellulidae
Acisoma panorpoides Rambur, 1842 [Choong et al. 2012]
Aethriamanta brevipennis (Rambur, 1842) [Amirrudin et al. 2011]
Aethriamanta gracilis (Brauer, 1878) [Choong et al. 2012]
Agrionoptera insignis (Brauer, 1878) [Choong et al. 2012]
Brachydiplax chalybea Brauer, 1868 [Choong et al. 2008]
Brachydiplax farinosa Krüger, 1902 [Choong et al. 2012]
Brachygonia oculata (Brauer, 1878) [Choong et al. 2008]
Brachythemis contaminata (Fabricius, 1793) [Laidlaw 1902a]
Chalybeothemis chini Dow, Choong & Orr, 2007
Chalybeothemis fluviatilis Lieftinck, 1933 [Amirrudin et al. 2011]
Cratilla lineata (Brauer, 1878) [Choong et al. 2012]
Cratilla metallica (Brauer, 1878) [Wahizatul-Afzan et al. 2006]
Crocothemis servilia (Drury, 1770) [Wahizatul-Afzan et al. 2006]
Diplacodes nebulosa (Fabricius, 1793) [Amirrudin et al. 2011]
Diplacodes trivialis (Rambur, 1842) [Choong et al. 2008]
Hydrobasileus croceus (Brauer, 1867) [Amirrudin et al. 2011]
Indothemis limbata (Selys, 1891) [Choong et al. 2012]
Lathrecista asiatica (Fabricius, 1798) [Amirrudin et al. 2011]
Lyriothemis biappendiculata (Selys, 1878) [Choong et al. 2012]
Lyriothemis cleis Brauer, 1868 [Choong et al. 2008]
Nannophya pygmaea Rambur, 1842 [Choong et al. 2012]
Nesoxenia lineata (Selys, 1879) [Choong et al. 2012]
Neurothemis fluctuans (Fabricius, 1793) [Wahizatul-Afzan et al. 2006]
Neurothemis fulvia (Drury, 1773) [Wahizatul-Afzan et al. 2006 as Neurothemis terminata]
Onychothemis culminicola Föster, 1904 [Wahizatul-Afzan et al. 2006]

IDF-Report 144 | 25
Onychothemis testacea Laidlaw, 1902 [Choong et al. 2012]
Orchithemis pulcherrima Brauer, 1878 [Choong et al. 2008]
Orthetrum chrysis (Selys, 1891) [Wahizatul-Afzan et al. 2006]
Orthetrum glaucum (Brauer, 1865) [Wahizatul-Afzan et al. 2006]
Orthetrum luzonicum (Brauer, 1868) [Choong et al. 2012]
Orthetrum sabina (Drury, 1770) [Wahizatul-Afzan et al. 2006]
Orthetrum testaceum (Burmeister, 1839) [Wahizatul-Afzan et al. 2006]
Pantala flavescens (Fabricius, 1798) [Wahizatul-Afzan et al. 2006]
Phylothemis raymondi Lieftinck, 1950 [Choong et al. 2018]
Potamarcha congener (Rambur, 1842) [Choong et al. 2012]
Pseudothemis jorina Förster, 1904 [Amirrudin et al. 2011]
Rhodothemis rufa (Rambur, 1842) [Amirrudin et al. 2011]
Rhyothemis aterrima Selys, 1891 [Amirrudin et al. 2011]
Rhyothemis obsolescens Kirby, 1889 [Choong et al. 2008]
Rhyothemis phyllis (Sulzer, 1776) [Laidlaw 1902a]
Rhyothemis plutoiia Selys, 1883 [Choong et al. 2012]
Rhyothemis triangularis Kirby, 1889 [Wahizatul-Afzan et al. 2006]
Risiophilebia dohni (Küger, 1902) [Choong et al. 2008]
Tetrahemis hyalina Kirby, 1889 [Wahizatul-Afzan et al. 2006]
Tetrahemis platyptera Selys, 1878 [Choong et al. 2012]
Tholymis tillarga (Fabricius, 1798)
Tramea transmarina euryale Selys, 1878 [Choong et al. 2012]
Trithemis aurora (Burmeister, 1839) [Wahizatul-Afzan et al. 2006]
Trithemis festiva (Rambur, 1842) [Wahizatul-Afzan et al. 2006]
Tyriobapta torrida Kirby, 1889 [Wahizatul-Afzan et al. 2006]
Urothemis signata insignata (Selys, 1872) [Choong et al. 2012]
Zygonyx iris Selys, 1869 [Wahizatul-Afzan et al. 2006]
Zyxomma petiolatum Rambur, 1842 [Wahizatul-Afzan et al. 2006]
INSTRUCTION TO AUTHORS

International Dragonfly Report is a journal of the International Dragonfly Fund (IDF). It is referred to as the journal in the remainder of these instructions. Transfer of copyright to IDF is considered to have taken place implicitly once a paper has been published in the journal.

The journal publishes original papers only. By original is meant papers that: a) have not been published elsewhere before, and b) the scientific results of the paper have not been published in their entirety under a different title and/or with different wording elsewhere. The republishing of any part of a paper published in the journal must be negotiated with the Editorial Board and can only proceed after mutual agreement.

Papers reporting studies financially supported by the IDF will be reviewed with priority, however, authors working with Odonata from the focal area (as defined on the back page of the front cover) are encouraged to submit their manuscripts even if they have not received any funds from IDF.

Manuscripts submitted to the journal should preferably be in English; alternatively German or French will also be accepted. Every manuscript should be checked by a native speaker of the language in which it is written; if it is not possible for the authors to arrange this, they must inform the Editorial Board on submission of the paper. Authors are encouraged, if possible, to include a version of the abstract in the primary language of the country in which their study was made.

Authors can choose the best way for them to submit their manuscripts between these options: a) via e-mail to the publisher, or b) on a CD, DVD or any other IBM-compatible device. Manuscripts should be prepared in Microsoft Word for Windows.

While preparing the manuscript authors should consider that, although the journal gives some freedom in the style and arrangements of the sections, the editors would like to see the following clearly defined sections: Title (with authors names, physical and e-mail addresses), Abstract, Introduction, Material & Methods, Results, Discussion, Acknowledgments and References. This is a widely used scheme by scientists that everyone should be familiar with. No further instructions are given here, but every author should check the style of the journal.

Authors are advised to avoid any formatting of the text. The manuscripts will be stylised according to the font type and size adopted by the journal. However, check for: a) all species names must be given in italic, b) the authority and year of publication are required on the first appearance of a species name in the text, but not thereafter, and c) citations and reference list must be arranged following the format below.

Reference cited in the text should read as follows: Tillyard (1924). (Tillyard 1924), Swezey & Williams (1942).

The reference list should be prepared according to the following standard:

Citations of internet sources should include the date of access.

The manuscript should end with a list of captions to the figures and tables. The latter should be submitted separately from the text preferably as graphics made using one of the Microsoft Office products or as a high resolution picture saved as a .jpg,.tif or .ps file. Pictures should be at least 11 cm wide and with a minimum 300 dpi resolution, better 360 dpi. Line drawings and graphics could have 1200 dpi for better details. If you compose many pictures to one figure, please submit the original files as well. Please leave some space in the upper left corner of each picture, to insert a letter (a, b, c,...) later. Hand-made drawings should be scanned and submitted electronically. Printed figures sent by the post could be damaged, in which case authors will be asked to resubmit them.

Manuscripts not arranged according to these instructions may also be accepted, but in that case their publication will be delayed until the journal’s standards are achieved.