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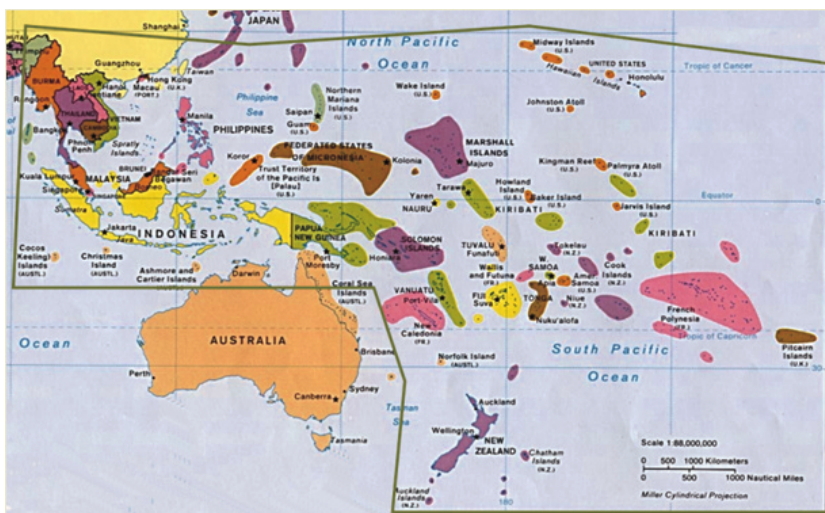
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Records of Odonata from Perlis, Malaysia in August 2015, with a checklist of species recorded from the state

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Abstract

The results of a short collecting trip to Perlis in the north-west of Peninsular Malaysia are reported. Eighty three species were collected, at least 61 of these are new records for the state, and three species are recorded from Malaysia for the first time: *Euphaea masoni* Selys, 1879, *Archibasis oscillans* (Selys, 1877) and *Paracercion calamorum* (Ris, 1916). A checklist of the Odonata recorded from Perlis is given in an appendix.

Bahasa Melayu Abstract

Hasil daripada kerja lapangan ke negeri Perlis yang terletak di barat laut Semenanjung Malaysia dilapor di sini. Sebanyak 83 spesies telah dikutip, dan sekurang-kurangnya 61 spesies merupakan rekod baru bagi negeri Perlis. Tiga daripadanya merupakan rekod baru bagi Malaysia: *Euphaea masoni* Selys, 1879, *Archibasis oscillans* (Selys, 1877) and *Paracercion calamorum* (Ris, 1916). Satu senarai semakan Odonata bagi negeri Perlis disediakan dalam lampiran.

Key words: Malaysia, Perlis state, new records, *Euphaea masoni*, *Archibasis oscillans*, *Paracercion calamorum*

Introduction

Perlis, in the north-west of Peninsular Malaysia on the border with Thailand, is the northernmost state of Malaysia, and the smallest. Figure 1 shows the location of Perlis in Peninsular Malaysia. It is also one of the least studied states for Odonata. We are aware of records of Odonata from Perlis in: Che Salmah et al. (2005), Fraser (1942), Furtado (1974), Laidlaw (1931), Orr (2008) and Seehausen & Dow (2016); however it is possible that there are additional relevant publications in the Malaysian literature of which we are unaware. These papers contain records of only 21 identified species and a further eight taxa identified only to genus (one from the Platystictidae, six from the Gomphiidae and one from the Macromiidae).

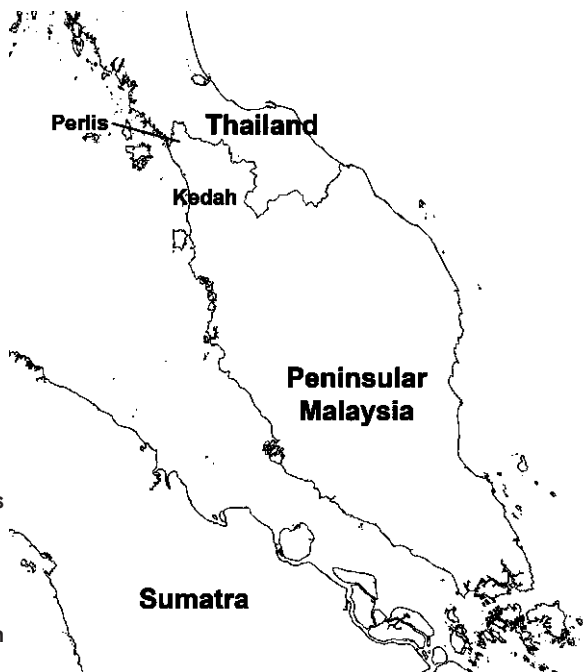


Figure 1: Location of Perlis in Peninsular Malaysia.

Figure 2: Sampling sites in Perlis.



In August 2015 we made a short trip to Perlis, staying in Perlis State Park at Wang Kelian, near to the border with Thailand in the extreme north of the state. Collecting was carried out on 25-29 August. At the time of our visit it was unsafe to go far into

the forest in the part of the state park where we were staying because of concerns that murderous people smugglers (for instance see www.bbc.co.uk/news/world-asia-32863514) were still operating in the area, so our activities there were limited. However we were able to sample at some other locations in the north of the state, and made numerous new records for Perlis, and some for Malaysia. The first two authors collected Odonata, the third Thysanoptera. The odonatological results of the trip are presented here.

Odonata recorded in August 2015

Locations

The sampling locations are indicated in Fig. 2.

1. Streams at Perlis State Park at Wang Kelian (6.69944°N, 100.19772°E).
2. Other habitats at Perlis State Park at Wang Kelian.
3. Small stream and freshwater swamp forest at the base of limestone near to the entrance to Perlis State Park (6.69535°N, 100.19149°E).
4. Largely open stream near Kampung Wang Kelian, running past the ponds listed under 5 below.
5. Ponds near Kampung Wang Kelian (6.68318°N, 100.18838°E), and roadside drains in same area.
6. Rice fields at Kampung Wang Kelian (6.67414°N, 100.1823°E). Only sampled late in the day after visits to other sites.
7. Meranti Lake and out/in flow streams at same altitude, plus swampy areas in adjacent forest (6.64783°N, 100.1791°E). A large lake formed by long ceased mining activities, surrounded by forest and an abandoned resort.
8. Stream flowing out from Meranti Lake at lower altitudes (coordinates at car park adjacent to stream: 6.65219°N, 100.18573°E), and amongst limestone on trail up to lake.
9. Stream crossed by road to Meranti Lake just inside Hutan Simpan Tasik Meranti (coordinates someway upstream: 6.65763°N, 100.18399°E). Mostly running through forest, with some open areas and agricultural areas.
10. Miscellaneous habitats just inside and outside Hutan Simpan Tasik Meranti.
11. Streams and marshy areas in rubber at Hutan Simpan Mata Ayer (6.66042°N, 100.22799°E).

Odonata collected

First records from Perlis are indicated by a *, first records for Malaysia by a **. The first two authors' names are abbreviated as RAD and CYC. ♂+♀ indicates a pair in tandem.

Zygoptera

Lestidae

Lestes praecellens Lieftinck, 1937*

This seems to be a very local and uncommon species, the only other published record from Peninsular Malaysia of which we are aware is that in Hämäläinen (2000). Fig. 3 shows a male from location 3.

2 – ♂, 26.viii, RAD. **3** – 2 ♂♂, 25.viii, CYC; 3 ♂♂, 25.viii, RAD; ♂, 26.viii, RAD.



Figure 3. *Lestes praecellens* male, photograph by C. Y. Choong, taken at location 3.

Lestes praemorsus decipiens Kirby, 1894*

5 – 6 ♂♂, 25.viii, RAD; 3 ♂♂, ♀, 26.viii, CYC.

Orolestes wallacei (Kirby, 1889)*

3 – ♂, 25.viii, CYC; ♂, 25.viii, RAD.

Platystictidae

Drepanosticta sharpi (Laidlaw, 1907)*

1 – 2 ♂♂, 26.viii, CYC; 2 ♂♂, ♀, 26.viii, RAD. **8** – 2 ♂♂, 27.viii, RAD. **9** – 4 ♂♂, 2 ♀, 29.viii, CYC; 3 ♂♂, 29.viii, RAD.

Protosticta species

These specimens belong to the same species group as *P. curiosa* Fraser, 1934 and *P. foersteri* Laidlaw, 1902, both recorded from peninsular Malaysia, but since one is extremely teneral and the other is female, they cannot be reliably identified to species at this time.

1 – ♂ (teneral), 26.viii, RAD. 8 – ♀, 27.viii, RAD.

Calopterygidae

Neurobasis chinensis (Linnaeus, 1758)*

4 – 2 ♂♂, 25.viii, CYC; 2 ♂♂, ♀, 25.viii, RAD. 7 – 2 ♂♂, 27.viii, CYC. 9 – ♂, 29.viii, RAD. 11 – ♂, 28.viii, CYC.

Vestalis amethystina Lieftinck, 1965*

1 – 3 ♂♂, 26.viii, RAD.

Vestalis amoena Hagen in Selys, 1853

1 – 2 ♂♂, 26.viii, CYC; ♂, 26.viii, RAD. 4 – ♂, 25.viii, CYC; 2 ♂♂, 25.viii, RAD. 9 – ♂, 29.viii, CYC; ♂, 29.viii, RAD.

Vestalis gracilis (Rambur, 1842)*

4 – ♂, 25.viii, CYC; 2 ♂♂, 25.viii, RAD. 11 – ♂, 28.viii, CYC; ♂, ♀, 28.viii, RAD.

Chlorocyphidae

Aristocypha fenestrella (Rambur, 1842)

1 – ♂, 26.viii, CYC; ♂, 26.viii, RAD.



Figure 4. *Libellago stigmatizans* male, photograph by C.Y. Choong.

Heliocypha biforata (Selys, 1859)*

3 – ♂, 26.viii, RAD. **4** – ♂, 25.viii, CYC; ♂, 25.viii, RAD. **7** – ♂, 27.viii, CYC; ♂, 27.viii, RAD. **9** – ♀, 29.viii, RAD. **11** – 2 ♂♂, 28.viii, RAD.

Libellago lineata (Burmeister, 1839)*

4 – 2 ♂♂, 25.viii, CYC; 4 ♂♂, ♀, 25.viii, RAD.

Libellago stigmatizans (Selys, 1869)*

Fig. 4 shows a male.

8 – 2 ♂♂, 27.viii, RAD. **9** – ♂, 29.viii, CYC; ♂, 29.viii, RAD.

Devadattidae

Devadatta argyroides (Selys, 1859)*

1 – 2 ♂♂, 26.viii, CYC; 2 ♂♂, 26.viii, RAD.

Euphaeidae

Dysphaea dimidiata Selys, 1853

1 – ♂, 26.viii, RAD. **9** – ♂, 29.viii, CYC; 2 ♂♂, 29.viii, RAD.

Euphaea impar Selys, 1859*

1 – ♂, 26.viii, RAD.



Figure 5. *Euphaea masoni* male, photograph by C.Y. Choong, taken in Perlis.

Euphaea masoni Selys, 1879**

This species had not been recorded in Peninsular Malaysia before this, but its presence in the north of Malaysia is not surprising, given its known distribution in Thailand. Fig. 5 shows a male from Perlis.

8 – 5 ♂♂, 27.viii, CYC; ♂, 27.viii, RAD. **9** – 2 ♂♂, 29.viii, CYC; 7 ♂♂, 29.viii, RAD.

Euphaea ochracea Selys, 1859

1 – ♂, 26.viii, CYC; 3 ♂♂, 26.viii, RAD. **7** – ♂, 27.viii, CYC. **9** – ♂, 29.viii, RAD.

Philosinidae

Rhinagrion viridatum Fraser, 1938*

Kalkman & Villanueva (2011) revised the genus *Rhinagrion* Calvert, 1913 and removed *R. viridatum* from the synonymy of *R. mima* (Karsch, 1891). Based on known records, Kalkman & Villanueva (2011) gave the distribution of *R. mima* as Myanmar, Sumatra and Thailand, and that of *R. viridatum* as Myanmar, Peninsular Malaysia, Thailand and Vietnam, noting that “the distribution of *R. mima* is strange; it occurs in two areas broadly separated by an area where *R. viridatum* occurs”. Kosterin (2014: 26–28) already commented on problems with delimiting mainland *R. mima* from *R. viridatum*. Even within peninsular Malaysia considerable variation occurs in the abdominal markings of *R. viridatum*; some specimens collected in Perlis come close to *R. mima* as defined by Kalkman & Villanueva (2011). It seems quite possible that *R. viridatum* is a synonym of *R. mima* after all, or that only one species (*R. viridatum*) occurs in mainland Asia, but that the Sumatran species is separate.

7 – 3 ♂♂, ♀, 27.viii, CYC; 2 ♂♂, 27.viii, RAD. **9** – ♂, 29.viii, CYC; ♂, 29.viii, RAD. **11** – ♂, 28.viii, CYC; 3 ♂♂, 28.viii, RAD.



Figure 6. *Coelliccia albicauda* male, photograph by C.Y. Chong.

Platycnemididae*Coeliccia albicauda* (Förster in Laidlaw, 1907)*

Fig. 6 shows a male.

2 – ♂, 25.viii, RAD. **3** – 2 ♂♂, 26.viii, CYC; ♂, 26.viii, RAD. **7** – ♂, 27.viii, RAD.*Coeliccia didyma* (Selys, 1863)***1** – ♂, 26.viii, RAD.*Copera marginipes* (Rambur, 1842)***4** – ♂, 25.viii, CYC; ♂, ♂+♀, 25.viii, RAD. **7** – ♂, 27.viii, RAD. **11** – ♂, ♂+♀, 28.viii, RAD.*Copera vittata* (Selys, 1863)**3** – ♂, 26.viii, CYC; 3 ♂♂, 26.viii, RAD. **5** – ♂, 25.viii, RAD. **7** – ♂, 27.viii, RAD. **11** – 2 ♂♂, 28.viii, RAD.*Indocnemis orang?* (Förster in Laidlaw, 1907)*

Male specimens were found at water containing cavities in rocks in karst terrain, one of these cavities was in a rock in a stream, another beside a steep trail well away from flowing water. The males are unusual in having extremely reduced markings on the dorsum of the synthorax: in one short, narrow antehumeral stripes are present on the anterior part, with a small patch present at the other end, in another these marking are reduced to an even shorter anterior stripe, and in the third (that from the trail-side rock cavity) they are even further reduced to small approximately tear drop shaped patches adjacent to the mesostigmal plates. However these specimens are structurally identical to typical *I. orang*. They might represent a separate species, but the differences in markings could also be an example of phenotypic plasticity, possibly the result of the limestone habitats. Asahina (1997) illustrates *I. orang* from Cuc Phuong, also a karst area, in Vietnam with dorsal synthoracic markings reduced to narrow antehumeral stripes; Tom Kompier (personal communication 26 September 2016) has found specimens of the kind that Asahina illustrated at Cuc Phoung, but nowhere else in Vietnam, even though "In Vietnam "normal" *orang* is common and widespread".

8 – ♂, 27.viii, RAD. **9** – ♀, 29.viii, CYC; 2 ♂♂, 29.viii, RAD.*Prodasineura humeralis* (Selys, 1860)**1** – 2 ♂♂, 26.viii, RAD. **4** – 2 ♂♂, 25.viii, CYC; 5 ♂♂, 25.viii, RAD. **7** – ♂, 27.viii, CYC; 2 ♂♂, 27.viii, RAD. **9** – ♂+♀, 29.viii, RAD. **11** – 3 ♂♂, 28.viii, RAD.*Prodasineura laidlawii* (Förster in Laidlaw, 1907)**1** – 2 ♂♂, 26.viii, CYC; 6 ♂♂, 26.viii, RAD. **7** – ♂, 27.viii, CYC; 4 ♂♂, 27.viii, RAD. **9** – 2 ♂♂, 2(♂+♀), 29.viii, RAD.**Coenagrionidae***Agriocnemis femina* (Brauer, 1868)***6** – ♀, 27.viii, CYC; ♂, 27.viii, RAD; ♂, 29.viii, CYC; ♂, 29.viii, RAD.

Agriocnemis pygmaea (Rambur, 1842)*

7 – 2 ♂♂, 27.viii, CYC.

Archibasis oscillans (Selys, 1877)**

Another species that had not been recorded from Peninsular Malaysia until now, but its presence could have been predicted based on its known occurrence in Sumatra and Thailand. It was abundant in vegetation around parts of the margin of the Meranti Lake.

7 – 3 ♂♂, 27.viii, CYC; 9 ♂♂, 27.viii, RAD.

Archibasis viola Lieftinck, 1949*

3 – 2 ♂♂, 25.viii, CYC. 11 – ♂, 28.viii, CYC.

Agriocnemis rubescens rubeola Selys, 1877*

3 – 3 ♂♂, 25.viii, CYC; ♂, ♂+ ♀, 25.viii, RAD; ♂, 26.viii, RAD. 5 – 4 ♂♂, 25.viii, RAD. 10 – 2(♂+♀), 27.viii, RAD; ♂, 28.viii, RAD.

Ceriagrion cerinorubellum (Brauer, 1865)*

6 – ♀, 29.viii, RAD.

Ceriagrion chaoi Schmidt, 1964*

5 – ♂, 25.viii, RAD.

Ischnura senegalensis (Rambur, 1842)*

10 – ♂, 26.viii, CYC.

Mortonagrion aborense (Laidlaw, 1914)*

7 – ♀, 27.viii, RAD.



Figure 7. *Paracercion calamorum* male, photograph by C.Y. Choong, taken at location 5.

Paracercion calamorum (Ris, 1916)**

There are no published records of this species from Malaysia, but there is an unpublished record from Langkawi made in 2011 (R. Ngiam, personal communication). The specimens from Perlis seem to agree best with Fraser's taxon *dyeri* (*Coenagrion dyeri* Fraser, 1919), usually treated as a synonym or subspecies of *P. calamorum* in recent years. Specimens from Perlis were identified on the basis of the male anal appendages; they differ somewhat in general appearance from specimens from, for instance, Hong Kong. They also differed in behaviour from that recorded from Hong Kong, males perching almost horizontally, clinging onto stems of emergent vegetation fairly low above the water surface, rather than "flat on horizontal vegetation" as occurs in Hong Kong (Wilson 2004). Fig. 7 shows a male from location 5.

5 – 7 ♂♂, 25.viii, CYC; 8 ♂♂, 25.viii, RAD.

Pseudagrion australasiae Selys, 1876*

5 – 2 ♂♂, 25.viii, CYC; 7 ♂♂, ♀, 25.viii, RAD. 6 – 2 ♂♂, 29.viii, RAD.

Pseudagrion microcephalum (Rambur, 1842)*

7 – 3 ♂♂, 27.viii, RAD.

Pseudagrion pruinosum (Burmeister, 1839)*

4 – 2 ♂♂, 25.viii, RAD. 9 – 2 ♂♂, 29.viii, CYC; ♂, 29.viii, RAD.

Pseudagrion rubriceps Selys, 1876*

7 – 2 ♂♂, 28.viii, CYC.

Anisoptera

Aeshnidae

Gynacantha basiguttata Selys, 1882*

3 – ♂, 25.viii, CYC; ♂, 25.viii, RAD. 11 – ♀, 28.viii, RAD.

Gomphidae

Burmagomphus williamsoni Förster, 1914*

9 – ♂, 29.viii, CYC; ♂, 29.viii, RAD.

Gomphidia abbotti Williamson, 1907*

Figure 8 shows a male.

9 – ♂, 29.viii, RAD.

Ictinogomphus decoratus melaenops Selys, 1857*

5 – ♂, 25.viii, CYC; 3 ♂♂, 25.viii, RAD. 7 – ♂, 27.viii, RAD.

Macrogomphus parallelogramma (Burmeister, 1839)*



Figure 8. *Gomphidia abbotti* male, photograph by C.Y. Choong.

9 – ♂, 29.viii, CYC; ♂, 29.viii, RAD. 11 – ♂, 28.viii, RAD.

Macrogomphus thoracicus McLachlan, 1884*

10 – ♀, 26.viii, CYC.

Megalogomphus sumatranus (Krüger, 1899)*

9 – ♂, 29.viii, CYC; 2 ♂♂, 29.viii, RAD.

Microgomphus chelifera Selys, 1858*

9 – ♀, 29.viii, CYC.

Macromiidae

Macromia callisto Laidlaw, 1902*

A single female, readily identifiable amongst species known to occur in peninsular Malaysia by its small size and structure of its vulvar scale (see Lieffinck 1971: 25). *Macromia callisto* is very similar to *M. calliope* Ris, 1916 known from China, Laos and Vietnam; their relationship may need to be re-examined.

9 – ♀, 29.viii, RAD.

Libellulidae

Acisoma panorpoides Rambur, 1842*

6 – ♀, 29.viii, RAD.

Agrionoptera insignis (Rambur, 1842)*

3 – ♂, 25.viii, RAD. 10 – ♂, 26.viii, CYC.

Brachydiplax chalybea Brauer, 1868*

5 – ♂, 25.viii, RAD.



Figure 9. *Brachydiplax farinosa* A male, photograph by C.Y. Choong.

Brachydiplax farinosa Krüger, 1902 A*

Two species are currently being treated under this name: a common species that can be found in habitats such as open ponds in peninsular Malaysia and Thailand, and a more specialised, slightly larger on average, species that is found in freshwater swamp forest in peninsular Malaysia and Borneo. Aside from size and habitat differences there are subtle morphological differences between the two, and they are well separated in the molecular barcoding marker COI (Naturalis unpublished data). We also have material of the swamp species from Pahang and Selangor. The pond species does not appear to occur in Borneo, so that all Bornean records refer to the swamp species. There are also records of *Brachydiplax farinosa* from Burma (e.g. Ris 1910), Vietnam (e.g. Asahina 1969), Laos (e.g. Yokoi 1999), Cambodia (e.g. Kosterin 2014) and China (e.g. Wilson 2005); we will not attempt to determine to which species such records really refer here. The type of *B. farinosa* is from Sumatra and is presumably now with much of the rest of Krüger's Sumatran types in a collection in Poland;

it is entirely possible that both taxa occur in Sumatra, and the type must be examined to determine which of the two is the true *B. farinosa*. However the other species may already have a name. *Brachydiplax pruinosa* Laidlaw, 1902, type series from Kuala Aring in Kelantan (Laidlaw 1902: 67), was synonymised with *B. farinosa* by Ris (1910: 361), apparently without viewing the types of either species. *Brachydiplax sollarti* Lieftinck, 1953, apparently only known from the holotype from Sumatra (Lieftinck 1953: 262–264), should also be considered. Here we designate the pond species as A and the swamp species as B. A male of species A is shown in Fig. 9.

5 – ♂, 25.viii, CYC; 3 ♂♂, ♀, 25.viii, RAD.



Figure 10. *Brachydiplax farinosa* B male, photograph by C.Y. Choong.

Brachydiplax farinosa Krüger, 1902 B*

See under the previous species. A male from Selangor is shown in Fig. 10.

3 – ♂, 25.viii, RAD.

Camacinia gigantea (Brauer, 1867)*

5 – ♂, 25.viii, CYC.

Cratilla lineata (Brauer, 1878)*

7 – ♂, ♀, 27.viii, CYC. **10** – ♂, ♀, 29.viii, RAD.

Crocothemis servilia (Drury, 1770)

5 – ♀, 25.viii, CYC, 2 ♂♂, 25.viii, RAD. **6** – ♂, 27.viii, RAD. **7** – ♂, 27.viii, CYC.

Diplacodes nebulosa (Fabricius, 1793)

6 – 2 ♂♂, 29.viii, RAD.



Figure 11. *Lathrecista asiatica* male, photograph by C.Y. Choong.



Figure 12. *Onychothemis testacea* male, photograph by C.Y. Choong.

Diplacodes trivialis (Rambur, 1842)

6 – ♂, 27.viii, CYC; ♀, 27.viii, RAD. 7 – ♂, 27.viii, CYC; ♀, 27.viii, RAD.

Indothemis limbata (Selys, 1891)*

5 – 4 ♂♂, 25.viii, RAD.

Lathrecista asiatica (Fabricius, 1798)*

Fig. 11 shows a male.

5 – ♀, 25.viii, CYC; **2** ♂♂, **2** ♀♀, 25.viii, RAD. **7** – ♂, 27.viii, RAD. **10** – ♂, 26.viii, CYC.
11 – ♂, 28.viii, CYC.

Lyriothemis biappendiculata (Selys, 1878)*

2 – ♂, ♀, 26.viii, RAD.

Neurothemis fluctuans (Fabricius, 1793)

3 – ♂, 25.viii, CYC. **5** – ♂, 25.viii, RAD.

Neurothemis fulvia (Drury, 1773)

5 – ♂, ♀, 25.viii, CYC; **4** ♂♂, 25.viii, RAD.

Neurothemis tullia (Drury, 1773)

5 – ♂, 28.viii, CYC. **6** – ♀, 28.viii, CYC.

Onychothemis testacea Laidlaw, 1902*

Fig. 12 shows a male.

9 – ♂, 29.viii, CYC.

Orchithemis pulcherrima Brauer, 1878*

3 – ♂, 26.viii, RAD.

Orthetrum chrysis (Selys, 1891)*

5 – ♂, 25.viii, RAD.

Orthetrum sabina (Drury, 1770)

5 – ♂, 25.viii, RAD; **7** – ♂, 27.viii, CYC. **9** – ♀, 29.viii, RAD. **11** – ♂, 28.viii, RAD.

Orthetrum testaceum (Burmeister, 1839)*

5 – ♂, 25.viii, RAD.

Pantala flavescens (Fabricius, 1798)

6 – ♂, 28.viii, CYC.

Potamarcha congener (Rambur, 1842)

5 – ♂, 25.viii, RAD; ♂, 25.viii, CYC. **6** – ♂, 29.viii, RAD.

Pseudothemis jorina Förster, 1904*

5 – ♂, 25.viii, RAD. **7** – ♂, 27.viii, RAD.

Rhodothemis rufa (Rambur, 1842)*

11 – ♀, 28.viii, RAD.

Rhyothemis phyllis (Sulzer, 1776)*

5 – ♂, 25.viii, CYC.

Tetrathemis irregularis hyalina Kirby, 1889*

2 – ♂, 26.viii, RAD. **3** – 2 ♂♂, 25.viii, RAD. **11** – ♂, 28.viii, RAD.

Tetrathemis platyptera Selys, 1878*

3 – ♂, 26.viii, RAD. **7** – ♂, 27.viii, CYC. **11** – 2 ♂♂, 28.viii, CYC; ♂, 28.viii, RAD.

Tramea transmarina euryale (Selys, 1878)*

5 – 2 ♂♂, 25.viii, CYC; 3 ♂♂, 25.viii, RAD.

Trithemis aurora (Burmeister, 1839)*

5 – ♂, 25.viii, RAD. **7** – ♂, 27.viii, RAD. **10** – ♂, 26.viii, CYC.

Trithemis pallidinervis (Kirby, 1889)

6 – ♂, 28.viii, CYC.

Tholymis fillarga (Fabricius, 1798)*

7 – ♀, 27.viii, CYC.

Urothemis signata insignata (Rambur, 1842)*

Fig. 13 shows a male.

5 – ♂, 25.viii, CYC; 2 ♂♂, 25.viii, RAD.

Zygonyx iris Selys, 1869

1 – 2 ♂♂, 26.viii, RAD.



Figure 13. *Urothemis signata insignata* male, photograph by C.Y. Choong.

Discussion

Despite the short duration of our trip to Perlis, we were able to collect 83 species in the state. Three of these were new records for Malaysia: *Euphaea masoni*, *Archibasis oscillans* and *Paracercion calamorum*. Of these, at least *Euphaea masoni* and *Archibasis oscillans* could have reasonably been predicted to occur in Peninsular Malaysia based on their previously known distributions, and it is perhaps surprising that they had not been recorded already. It is particularly striking that of the 83 species collected, no less than 61 appear to be new records for Perlis (although possibly there are records in the Malaysian or maybe Japanese literature that we are not aware of), indicating just how poorly known the Odonata of the state are. With the new records, 91 species have been recorded in Perlis; a check list is provided in an appendix.

Acknowledgments

Jabatan Perhutanan Negeri Perlis granted permission for us to sample Odonata in Perlis State Park and various Forest Reserves in the state. Tom Kompier provided information about *Indocnemis orang* in Vietnam. Robin Ngiam kindly allowed us to mention his record of *Paracercion calamorum* from Langkawi.

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Appendix: Checklist of Odonata recorded from Perlis

Where the first record from Perlis is not in this publication, a citation to the first record is made in square parenthesis after the species name.

Zygoptera

Lestidae

Lestes praezellens Lieftinck, 1937

Lestes praemorsus decipiens Kirby, 1894

Orolestes wallacei (Kirby, 1889)

Platystictidae

Drepanosticta sharpi (Laidlaw, 1907)

Protosticta species [Che Salmah et al. 2005]

Calopterygidae

Neurobasis chinensis (Linnaeus, 1758)

Vestalis amethystina Lieftinck, 1965

Vestalis amoena Hagen in Selys, 1853 [Che Salmah et al. 2005]

Vestalis gracilis (Rambur, 1842)

Chlorocyphidae

Aristocypha fenestrella (Rambur, 1842) [Che Salmah et al. 2005]

Helioocypha biforata (Selys, 1859)

Libellago lineata (Burmeister, 1839)

Libellago stigmatizans (Selys, 1869)

Devadattidae

Devadatta argyoides (Selys, 1859)

Euphaeidae

Dysphaea dimidiata Selys, 1853 [Che Salmah et al. 2005]

Euphaea impar Selys, 1859

Euphaea masoni Selys, 1879

Euphaea ochracea Selys, 1859 [Che Salmah et al. 2005]

Philosinidae

Rhinagrion viridatum Fraser, 1938

Platycnemididae

Coeliccia albicauda (Förster in Laidlaw, 1907)

Coeliccia didyma (Selys, 1863)

Copera marginipes (Rambur, 1842)

Copera vittata (Selys, 1863) [Furtado 1974]

Indocnemis orang? (Förster in Laidlaw, 1907)

Prodasineura humeralis (Selys, 1860) [Che Salmah et al. 2005, as *P. autumnalis* (Fraser, 1922)]

Prodasineura laidlawii (Förster in Laidlaw, 1907) [Fraser 1942]

Coenagrionidae

Agriocnemis femina (Brauer, 1868)

[Che Salmah et al. 2005 list an *Agriocnemis* species from a grassy area beside a small stream, this could be any of *A. femina*, *A. minima*, *A. nana* or *A. pygmaea*; we list the record under *A. femina* because it is the most commonly recorded *Agriocnemis* in Peninsular Malaysia]

Agriocnemis pygmaea (Rambur, 1842)

Archibasis oscillans (Selys, 1877)

Archibasis viola Lieftinck, 1949

Argiocnemis rubescens rubeola Selys, 1877

Ceriagrion cerinorubellum (Brauer, 1865)

Ceriagrion chaoi Schmidt, 1964

Ischnura senegalensis (Rambur, 1842)

Mortonagrion aborense (Laidlaw, 1914)

Paracercion calamorum (Ris, 1916)

Pseudagrion australasiae Selys, 1876

Pseudagrion microcephalum (Rambur, 1842)

Pseudagrion pruinosum (Burmeister, 1839)

Pseudagrion rubriceps Selys, 1876

Anisoptera

Aeshnidae

Gynacantha basiguttata Selys, 1882

Heliaeschna simplicia (Karsch, 1891) [Orr 2008]

Gomphidae

Acrogomphus species [Che Salmah et al. 2005]

Burmagomphus williamsoni Förster, 1914

Gomphidia abboti Williamson, 1907

Heliogomphus species [Che Salmah et al. 2005]

Ictinogomphus decoratus melaenops Selys, 1857

Lamelligomphus? species [Che Salmah et al. 2005]

Macrogomphus parallelogramma (Burmeister, 1839)

[Che Salmah et al. 2005 list one or more *Macrogomphus* species on the basis of larval records; it is not possible to say which species these records refer to.]

Macrogomphus thoracicus McLachlan, 1884

Megalogomphus sumatranus (Krüger, 1899)

Microgomphus chelifera Selys, 1858

Ophiogomphus? species

[Che Salmah et al. 2005. Larval record, *Ophiogomphus* is a northern genus never recorded in Peninsular Malaysia; it is likely that this record refers to some other genus.]

Stylogomphus? species [Che Salmah et al. 2005]

Macromiidae

Macromia callisto Laidlaw, 1902 [Che Salmah et al. 2005 list one or more *Macromia* species on the basis of larval records; it is not possible to say in any of these is *M. callisto*.]

Synthemistidae

Macromidia genialis Laidlaw, 1923 [Che Salmah et al. 2005]

Libellulidae

Acisoma panorpoides Rambur, 1842

Agrionoptera insignis (Rambur, 1842)

Brachydiplax chalybea Brauer, 1868

Brachydiplax farinosa Krüger, 1902 A

Brachydiplax farinosa Krüger, 1902 B

Brachythemis contaminata (Fabricius, 1793) [Che Salmah et al. 2005]

Camacina gigantea (Brauer, 1867)

Cratilla lineata (Brauer, 1878)

Crocothemis servilia (Drury, 1770) [Fraser 1942]

Diplacodes nebulosa (Fabricius, 1793) [Che Salmah et al. 2005]

Diplacodes trivialis (Rambur, 1842) [Che Salmah et al. 2005]

Indothemis limbata (Selys, 1891)

Lathrecista asiatica (Fabricius, 1798)

Lyriothemis biappendiculata (Selys, 1878)

Neurothemis fluctuans (Fabricius, 1793) [Seehausen & Dow 2016]

Neurothemis fulvia (Drury, 1773) [Fraser 1942]
Neurothemis tullia (Drury, 1773) [Che Salmah et al. 2005]
Onychothemis testacea Laidlaw, 1902
Orchithemis pulcherrima Brauer, 1878
Orthetrum chrysis (Selys, 1891)
Orthetrum sabina (Drury, 1770) [Che Salmah et al. 2005]
Orthetrum testaceum (Burmeister, 1839)
Pantala flavescens [Che Salmah et. al 2005]
Potamarcha congener (Rambur, 1842) [Fraser 1942]
Pseudothemis jorina Förster, 1904
Rhodothemis rufa (Rambur, 1842)
Rhyothemis phyllis (Sulzer, 1776)
Tetrathemis irregularis hyalina Kirby, 1889
Tetrathemis platyptera Selys, 1878
Tholymis tillarga (Fabricius, 1798)
Tramea transmarina euryale (Selys, 1878)
Trithemis aurora (Burmeister, 1839)
Trithemis pallidinervis (Kirby, 1889) [Laidlaw 1931]
Urothemis signata insignata (Rambur, 1842)
Zygonyx iris Selys, 1869 [Che Salmah et al. 2005]

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