



IDF

International Dragonfly Fund - Report
Journal of the International Dragonfly Fund

1- 24

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Published: 09.09.2017

108

ISSN 1435-3393

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..

Editorial Work: Rory A. Dow, Milen Marinov and Martin Schorr
Layout: Martin Schorr
IDF-home page: Holger Hunger
Printing: Colour Connection GmbH, Frankfurt
Impressum: Publisher: International Dragonfly Fund e.V., Schulstr. 7B,
54314 Zerf, Germany. E-mail: oestlap@online.de
Responsible editor: Martin Schorr

Cover picture: ***Pseudagrion coomansi***
Photographer: Akbar Alfarisyi

Odonata survey on Belitung (Indonesia)

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Abstract

A survey of Odonata on the Indonesian island of Belitung is reported. The work of Belitung Biodiversity Observer on Odonata is briefly outlined. Sixty four species were recorded during the survey, including two new records for the island. A checklist of the known odonate fauna, consisting of 105 species, of the island is given in an appendix.

Key words: Indonesia, Belitung Island, checklist, *Oligoaeschna buehri*, *Tyriobapta laidlaw*

Introduction

Belitung, or Billiton, is an Indonesian island (area ca 4,800 km²), located at the northern extremity of the Java Sea, between Sumatra and Borneo (see Fig. 1). Much of the terrain of the island is relatively flat, but there are a number of hills, the highest of which is Gunung Tajam with an altitude of ca 460m a.s.l. The largest town is Tanjung Pandan on the north-west coast. Administratively Belitung is divided into two regencies, Belitung Regency and East Belitung Regency. Belitung is separated from Sumatra by the island of Bangka, together with some much smaller islands these two form the province of Bangka-Belitung. There is a long history of tin mining on the island, which has had a significant impact on the habitats for Odonata there. Nowadays, the tin mining is controlled by PT. Timah Persero, and some areas already worked by the mining company are re-used by locals to mine the remaining tin. Although important for the economy of the island, the tin mining activities often lead to the destruction of river and lakes, and cause changes in water chemistry by adding dangerous materials.



Figure 1. Belitung Island and small surrounding islands (source: Google Earth).

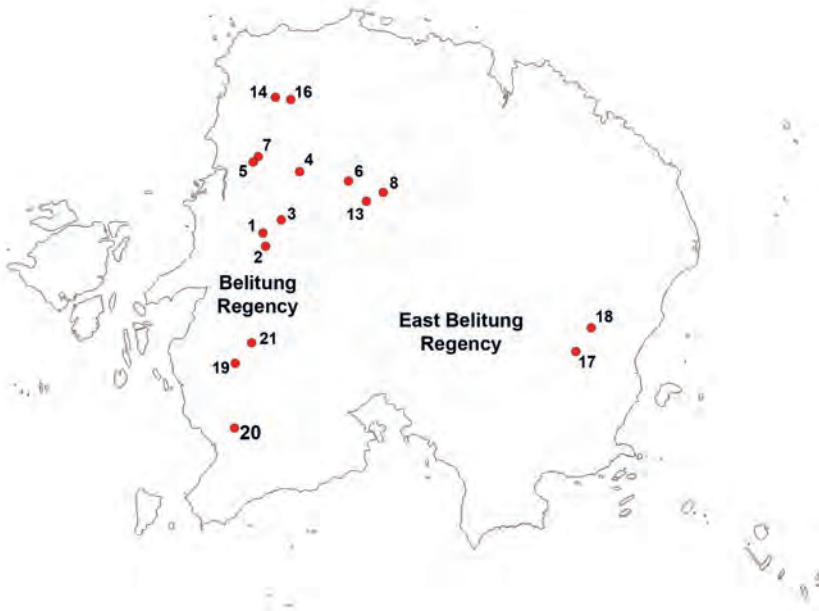


Figure 2. Some of the sampling locations from the December 2016 survey.

Until recently our knowledge of the Odonata of Belitung was based almost entirely on collections made by F.J. Kuiper in the 1930s. M. A. Liefstinck identified most of Kuiper's specimens, the majority of which are now in the collections of the Naturalis Biodiversity Center (RMNH) in the Netherlands. There are several species of Odonata, described by Liefstinck, that appear to be endemic to Belitung: *Amphicnemis billitonis* Liefstinck, 1940, *Amphicnemis kuiperi* Liefstinck, 1937 and *Mortonagrion appendiculatum* Liefstinck, 1937. However, details of locations etc. were published for only a minority of the species collected by Kuiper, most species are merely recorded in Liefstinck (1954) as occurring in Billiton without further details. Moreover Kuiper's collections were not completely determined, for instance the first author found an unidentified female of *M. arthuri* Fraser, 1942 collected by Kuiper in RMNH (Dow 2011), a species that had not been listed from Belitung by Liefstinck; other surprises may still remain in Kuiper's material.

The second author and his associates have formed a foundation, Belitung Biodiversity Observer (BBO), with the goal of documenting and conserving the biodiversity of the island. They have been conducting Odonata surveys across the island since January 2015 and are still exploring the habitats of Odonata of Belitung and its satellite islands. An introduction to BBO can be found in Alfarisyi (2017). In December 2016 the International Dragonfly Fund supported the first author of this report to visit Belitung and make an Odonata survey with Belitung Biodiversity Observer. This survey took place in the period December 6th-18th, with Tanjung Pandan as our base. Sites were spread across the island, but the majority were in Belitung Regency because of the travel time from Tanjung Pandan to East Belitung Regency.

Sites surveyed

Odonata were searched for at sites covering a wide variety of habitat types; most of the sites are indicated in Fig. 2. The dates on which each site was visited is indicated in square parenthesis; coordinates at a representative point or access point are also given.

- 1:** A black water stream with much Pandanus, and its surrounds, in highly disturbed forest/scrub at Mempiu village [7/12; 2.837S, 107.69277E], Fig. 3.
- 2:** Swamp and stream in forest not far from Mempiu village, at the border between the lands of Mempiu village and Air Malik village [7/12; 2.855S, 107.696E], Fig. 4.
- 3:** Ponds at ex-tin mining site at Air Mungkui village [7/12; 2.819S, 107.718E].
- 4:** Stream in a strip of swampy forest at Buluh Tumbang [8/12; 2.752S, 107.743E], Fig. 5.
- 5:** Marsh at Air Sagu at Air Raya Village [8/12; 2.731S, 107.686E].
- 6:** Forest stream at foot of low forested ridge at Tungkusan [9/12; 2.765S, 107.811E], Fig. 6.
- 7:** Pond at Air Sagu at Air Raya Village [9/12; 2.739S, 107.679E].
- 8:** Stream below Gurok Beraye Waterfall, and tributary, at ca 200m on Gunung Tajam [10/12; 2.781S, 107.859E], Fig. 7.



Figure 3. Habitat at Air Pute, a black water stream and surrounded by *Pandanus* species, located at Mempiu Village (location 1) (Photo: J. F. Bilitoni).



Figure 5. Swampy forest at Buluh Tumbang Village (location 4) (Photo: J. F. Bilitoni).



Figure 4. Swamp habitat at location 2 (Photo: J.F. Bilitoni).



Figure 6. Forest stream at Tungkusan (location 6) (Photo: J. F. Bilitoni).



Figure 7. Stream below Gurok Beraye Waterfall on Gunung Tajam (location 8) (Photo: Akbar Alfariysi).



Figure 8. Large stream in the forest at Batu Mentas Tarsier Sanctuary (location 11). (Photo: J. F. Bilitoni).



Figure 9. On a trail at Batu Mentas (location 12) (Photo: J. F. Bilitoni).



Figure 10. The authors at the lake near Air Seruk Village (location 15); the lake is surrounded by Water Chesnut "*Eliocharis dulcis*" (Photo: J. F. Bilitoni).

Figure 11. Air Kepang swamp habitat at Membalong Village (location 20); conected and close to Membalong bay, this swamp ia also a Natural Estuarine Crocodile habitat. (Photo: J. F. Bilitoni).



Figure 12. Swamp and stream at Air Mira Village (location 21) (Photo: J. F. Bilitoni).



- 9: Forest stream at ca 170m on Gunung Tajam. Not shown in Fig. 2, close to location 8 [10/12; 2.775S, 107.851E].
- 10: An old concrete tank with water at mouth of a small forest stream, and on road, on Gunung Tajam. Not shown in Fig. 2, close to location 8 [10/12].
- 11: Batu Mentas Tarsier Sanctuary: a large stream in forest, not shown in Fig. 2, between locations 8 and 13 [11/12, 14/12; 2.793S, 107.849E], Fig. 8.
- 12: Batu Mentas Tarsier Sanctuary: along trails, not shown in Fig. 2, between locations 11 and 13 [11/12, 14/12], Fig. 9.
- 13: Batu Mentas Tarsier Sanctuary: pond/swamp at sanctuary building [11/12; 2.793S, 107.836E].
- 14: Ponds at Air Seruk, including pools on a trail leading to location 15 [12/12; 2.649S, 107.710E].
- 15: Lake and surrounds at Air Seruk including an inflow stream, not shown in Fig. 2, close to location 14 [12/12; 2.648S, 107.702E], Fig. 10.

- 16:** Swamp and stream at a farm at Air Seruk [12/12; 2.652S, 107.731E].
17: Swamp and stream at Batu Penyu [13/12; 3.001S, 108.126E].
18: Open swamp and marsh at Gantong [13/12; 2.968S, 108.147E].
19: Stream and swampy backwater at Air Batu [15/12, 16/12; 3.017S, 107.654E].
20: Swamp and margins of river at Air Kepang. Little was done close to the river because of the hazard posed by Estuarine Crocodiles in the waist deep water [15/12, 16/12; 3.107S, 107.653E], Fig. 11.
21: Swamp at Air Mira [16/12; 2.989S, 107.677E], Fig. 12.

Species recorded

Zygoptera

Lestidae

Three species from three genera were already known from Belitung, two were recorded during the survey reported here.

Lestes praemorsus decipiens Kirby, 1894

Previously reported from Belitung in Lieftinck (1954). Fig. 13.

Loc. 3, 14.



Figure 13. *Lestes praemorsus decipiens* Kirby, 1894 (Photo by Akbar Alfarisyi).

Orolestes wallacei (Kirby, 1889)

Previously recorded from Belitung in Lieftinck (1939a).

Loc. 14, 19.

Argiolestidae

There are only published records of one identified species from the Argiolestidae from Belitung (but see Alfarisyi 2017 and the appendix to this publication).



Figure 14. *Podolestes orientalis* Selys, 1862 (Photo by Akbar Alfariysi).

Podolestes orientalis Selys, 1862

Previously recorded from Belitung in Lieftinck (1935). Fig. 14.

Loc. 2.

Calopterygidae

Only one species has been recorded from Belitung, curiously *Vestalis amaryllis* Lieftinck, 1965 has been recorded from neighbouring Banka (Lieftinck 1965), a species otherwise known from Borneo and the Palawan region of the Philippines, but there is no sign of this species on Belitung.

Vestalis amoena Hagen in Selys, 1853

Previously recorded from Belitung in, for instance, Lieftinck (1965). Common on forested streams in Belitung.

Loc. 1, 4, 6, 8, 11, 12.

Chlorocyphidae

There are published records of three species of Chlorocyphidae from Belitung.

Heliocypha biforata (Selys, 1859)

Previously recorded from Belitung in Lieftinck (1954).

Loc. 6, 8, 12.

Libellago aurantiaca Selys, 1859

Previously recorded from Belitung in Lieftinck (1954).

Loc. 4, 6.

Libellago hyalina Selys, 1859

Previously recorded from Belitung in Lieftinck (1954).

Loc. 1, 2, 4, 15, 16, 17, 19, 20.

Euphaeidae

Only one species has been recorded from Belitung.

Dysphaea dimidiata (Selys, 1853)

A species of larger forest streams, material from Belitung in RMNH was listed in Hämäläinen *et al.* (2015).

Loc. 8, 11.

Platycnemididae

Belitung is rich in members of the Disparoneurinae with six species recorded from the subfamily, but, remarkably since species of *Coelliccia* are known from Sumatra and Borneo and apparently suitable habitat occurs on Belitung, no member of the Calicnemiinae has been from the island, despite searches by BBO members and during the survey reported here. There are previously published records of eight species from Belitung, all except *Onychargia atrocyana* Selys, 1865 (recorded in Lieffinck 1954) were found during our survey. One additional species had already been recorded by the second author and was also found during this survey.

Copera vittata (Selys, 1863)

Previously recorded from Belitung in Lieffinck (1940b).

Loc. 6, 16, 19.

"*Elattoneura*" *aurantiaca* (Selys, 1886)

First recorded from Belitung in (Lieffinck 1937).

Loc. 1, 2, 4, 14, 16, 17, 19, 21.

"*Elattoneura*" *coomansi* Lieffinck, 1937

Part of the type series comes from Belitung (Lieffinck 1937). Fig. 15.

Loc. 20.

"*Elattoneura*" *longispina* Lieffinck, 1937

Part of the type series comes from Belitung (Lieffinck 1937). Fig. 16.

Loc. 17, 20.

Prodasineura collaris (Selys, 1860)

Recorded from Belitung in Lieffinck (1954). At Batu Mentas (location 12) females were found foraging by a trail, but no males were found at this location.

Loc. 1, 12, 16.

Prodasineura interrupta (Selys, 1860)

Recorded from Belitung by Lieffinck (1954). This is a common species at forest streams in Belitung.

Loc. 1, 4, 6, 14, 19, 21.

Prodasineura verticalis (Selys, 1860)

This species, which also occurs in Borneo and mainland Sumatra, was already recorded from Belitung in Lieffinck (1954). Common on many forest streams on the island.

Loc. 1, 4, 6, 8, 12, 21.



Figure 15. "*Elatoneura*" *coomansi* Liefinck, 1937 (Photo by Akbar Alfariysi).



Figure 16. "*Elatoneura*" *longispina* Liefinck, 1937 (Photo by Akbar Alfariysi).



Figure 17. *Aciagrion hisopa* (Selys, 1876) (Photo: Akbar Alfariysi).



Figure 18. *Amphicnemis kuiperi* Liefinck, 1937 (Photo: Akbar Alfariysi).

Pseudocopera ciliata (Selys, 1863)

Already found on Belitung during BBO surveys, and it was also found during our survey.

Loc. 14, 19.

Coenagrionidae

Seventeen members of the Coenagrionidae are now known from Belitung, currently placed in nine genera.

Aciagrion hisopa (Selys, 1876)

Previously recorded from Belitung in Lieftinck (1954) as *A. aciculare* Lieftinck, 1929. Fig. 17.

Loc. 3, 11.

Agriocnemis minima (Selys, 1877)

Previously recorded from Belitung in Lieftinck (1954).

Loc. 5, 7, 18.

Amphicnemis kuiperi Lieftinck, 1937

Two *Amphicnemis* species have been described from Belitung (Lieftinck 1937, 1940a), *A. kuiperi* and *A. billitonis* Lieftinck, 1940. Both fall into the *wallacii*-group as defined in Dow (2014). During our survey and the surveys of BBO we found only *A. kuiperi*, which was common at many locations and occurs both in swamps and at streams. Fig. 18.

Loc. 1, 2, 6, 8, 9, 16, 17, 19, 20, 21.

Archibasis tenella Lieftinck, 1949

Part of the type series comes from Belitung (Lieftinck 1949).

Loc. 1, 4.

Archibasis viola Lieftinck, 1948

Recorded from Belitung in Lieftinck (1949). *Archibasis viola* is a common species on the island, and was particularly abundant in the flooded forest at Air Keping (location 20).

Loc. 2, 16, 17, 19, 20.

Ceriagrion cerinorubellum (Brauer, 1865)

This very common species was already recorded from Belitung in Lieftinck (1954).

Loc. 3, 5, 7, 14, 16, 17, 18.

Mortonagrion aborense (Laidlaw, 1914)

A single female was found during our survey. The species had already been found in Belitung during other BBO surveys. Note that we do not yet know if the taxon found in Belitung is the true *M. aborense* or the allied form reported in Dow (2016: 7).

Loc. 17.

Mortonagrion appendiculatum Lieftinck, 1937

This species was described from Belitung (Lieftinck 1937) and is still only known from the island. During our survey only a single individual was found in swamp near Mempiu village (location 2) but it was moderately common in swamp at Air Sagu (location 16); however the habitat at this site was lost to oil palm after our survey was made. Fig. 19.



Figure 19. *Mortonagrion appendiculatum* Lieftinck, 1937 (Photo: Akbar Alfariysi).



Figure 20. *Pseudagrion coomansi* Lieftinck, 1937 (Photo: Akbar Alfariysi).

Loc. 2, 16.

Mortonagrion falcatum Lieftinck, 1934

Previously recorded from Belitung in Lieftinck (1954). During our survey it was found at ponds at an old tin mining site.

Loc. 3.

Pseudagrion coomansi Lieftinck, 1937

Part of the type series comes from Belitung (Lieftinck 1937). This is a common species on the island. Fig. 20.

Loc. 3, 4, 5, 7, 13, 15, 18, 20.

Pseudagrion microcephalum (Rambur, 1842)

Recorded from Belitung in Lieftinck (1954). During our survey we found it much less common than the preceding species.

Loc. 7, 20.

Anisoptera

Aeshnidae

With 11 species from five genera now known from the island, Belitung is relatively rich in Aeshnidae.

Gynacantha bayadera Selys, 1891

Recorded from Belitung in Lieffinck (1954). A single immature female was found during our survey.

Loc. 3.

Gynacantha maclachlani Förster, 1899

Recorded from Belitung in Lieffinck (1954).

Loc. 17.

Oligoaeschna buehri (Förster, 1903)

This is the first record of any species of *Oligoaeschna* from Belitung. A male was found in scrubby forest near Mempiu village. Fig. 21.

Loc. 1.



Figure 21. *Oligoaeschna buehri* (Förster, 1903) (Photo: Akbar Alfariysi).

Gomphidae

Seven members of the Gomphidae, from four genera, are known from Belitung; the genus *Macrogomphus* is particularly well represented.

Macrogomphus decemlineatus (Selys, 1878)

Already recorded from Belitung in Lieffinck (1954).

Loc. 4, 21.

Macrogomphus parallelogramma (Burmeister, 1839)

Already recorded from Belitung in Lieftinck (1954).

Loc. 6, 11.

Macrogomphus quadratus (Selys, 1878)

Already recorded from Belitung in Lieftinck (1954).

Loc. 4, 11.

Megalogomphus ?icterops (Martin, 1902)

Megalogomphus icterops was already recorded from Belitung in Lieftinck (1954).

A female *Megalogomphus* with thoracic markings resembling those of *M. icterops* was seen perched high in trees along a trail at Batu Mentas.

Loc. 12.

Macromiidae

Three species from two genera have been recorded from Belitung.

Epophthalmia vittigera (Rambur, 1842)

Already recorded from Belitung in Lieftinck (1954).

Loc. 2, 20.

Macromia cincta Rambur, 1842

Already recorded from Belitung in Lieftinck (1954), and likely to be common on the island, since much suitable habitat for it exists there.

Loc. 4.

Libellulidae

Thirty-three genera and 47 species have now been recorded from Belitung.

Acisoma panorpoides Rambur, 1842

Already recorded from Belitung in Lieftinck (1954).

Loc. 4.

Aethriamanta gracilis (Brauer, 1878)

Already recorded from Belitung in Lieftinck (1954).

Loc. 15.

Agrionoptera insignis (Rambur, 1842)

Already recorded from Belitung in Lieftinck (1954).

Loc. 1, 19.

Agrionoptera sexlineata Selys, 1879

Already recorded from Belitung in Lieftinck (1954). During our survey we found it in a variety of habitats: an old concrete tank at the mouth of a stream on Gunung Tajam, swamp at Batu Penyus, and at a stream at Batu Mentas.

Loc. 10, 11, 17.

Brachydiplax chalybea Brauer, 1868

Recorded from Belitung in Lieftinck (1954). Common at marshes and ponds on Belitung.

Loc. 5, 7, 13, 14, 18, 20.

Brachygonia oculata (Brauer, 1878)

Recorded from Belitung in, for instance, Lieftinck (1954), common at swamps and swampy stream habitats across the island.

Loc. 1, 2, 16, 17, 19, 20.

Chalybeothemis fluviatilis Lieftinck, 1933

Already recorded from Belitung, details of material in RMNH can be found in Dow *et al.* (2007). A female found at Gantong (location 18) was being eaten by *Orthetrum sabina*.

Loc. 18.

Diplacodes nebulosa (Fabricius, 1793)

Already been recorded in BBO surveys.

Loc. 3, 5, 18.

Diplacodes trivialis (Rambur, 1842)

Recorded from Belitung in Lieftinck (1954).

Loc. 12.

Nannophya pygmaea Rambur, 1842

Recorded from Belitung in Lieftinck (1954) and common across the island.

Loc. 3, 5, 7, 13, 15, 17, 18.

Nannophyopsis chalcosoma Lieftinck, 1935

Nannophyopsis chalcosoma was described from Belitung (Lieftinck 1935), the type locality is (or was) at Gantong. This poorly known species also occurs in Borneo, but is very rarely recorded there. BBO recorded this species at a pond in the Air Sagu

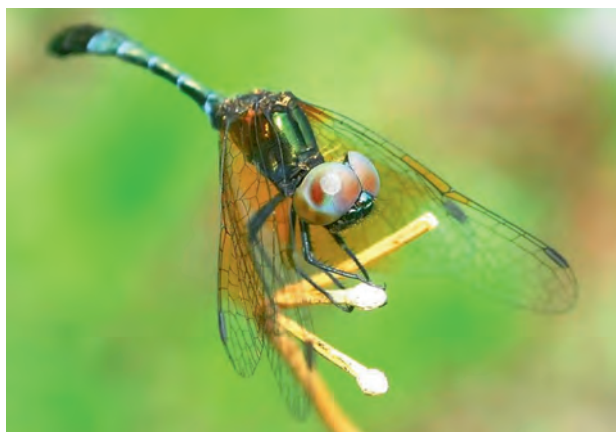


Figure 22. *Nannophyopsis chalcosoma* Lieftinck, 1935 (Photo: Akbar Alfarisyi).

area, in Perawas village in 2015. However after the local government built a dam on its pond in December 2015, the species disappeared from the site. BBO later found this species in September 2016 at loc. 5; unfortunately the species could not be found there during the survey in December 2016. Additionally, the species was found at loc. 2 in 2016, but again was not found during the December survey. Fig. 22.

Loc. 1.

Nesoxenia lineata (Selys, 1879)

Recorded from Belitung in Lieftinck (1954).

Loc. 19.

Neurothemis fluctuans (Fabricius, 1793)

Recorded from Belitung in Lieftinck (1954).

Loc. 1, 5, 7, 12, 14.

Orchithemis pruinans (Selys, 1878)

Recorded from Belitung in Lieftinck (1954) and seemingly moderately common on low gradient streams there.

Loc. 1, 4, 14, 21.

Orchithemis pulcherrima Brauer, 1878

Recorded from Belitung in Lieftinck (1954).

Loc. 2, 4, 14.

Orthetrum chrysis (Selys, 1891)

Recorded from Belitung in Lieftinck (1954).

Loc. 4, 10.

Orthetrum glaucum (Brauer, 1865)

Recorded from Belitung in Lieftinck (1954).

Loc. 12.

Orthetrum sabina (Drury, 1773)

Recorded from Belitung in Lieftinck (1954).

Loc. 5, 7.

Rhodothemis rufa (Rambur, 1842)

Recorded from Belitung in Lieftinck (1954).

Loc. 7, 14, 18.

Rhyothemis obsolescens Kirby, 1889

Recorded from Belitung in Lieftinck (1954).

Loc. 2, 15, 21.

Rhyothemis phyllis (Sulzer, 1776)

Recorded from Belitung in Lieftinck (1954).

Loc. 3, 5, 7, 18.

Risiophlebia dohmi (Krüger, 1902)

Recorded from Belitung in Lieftinck (1954).

Loc. 6.

Tetrathemis flavescens Kirby, 1889

Recorded from Belitung in Lieftinck (1954). In Borneo the first author has only ever encountered solitary individuals of this species, but a small colony was present in a swampy stream backwater at Air Batu. Fig. 23.

Loc. 15.

Tholymis tillarga (Fabricius, 1798)

Recorded from Belitung in Lieftinck (1954).

Loc. 18.



Figure 23. *Tetrathemis flavescens* Kirby, 1889 (Photo: Akbar Alfarisyi).



Figure 24. *Tyriobapta laidlawi* Ris, 1919 (Photo: Akbar Alfarisyi).

Tamea phaeoneura Lieftinck, 1953

Until now this species had been considered endemic to Borneo, but a female was found at Batu Mentas and it had already been recorded by BBO (Alfarisyi 2017). The presence of this species in Belitung makes it likely that it also occurs in southern Sumatra.

Loc. 12.

Tamea transmarina euryale (Selys, 1878)

Recorded from Belitung in Lieftinck (1954).

Loc. 12, 15.

Tyriobapta laidlawi Ris, 1919

Another new record for Belitung, *T. laidlawi* had been known from Borneo (e.g. Orr 2003) and Peninsular Malaysia (Dow *et al.* 2012). In Borneo and Peninsular Malaysia this species is normally associated with low pH sites, chiefly peat swamp forest; the site in Belitung is a stream backwater, not obviously low pH. As with

Tramea phaeoneura, its presence in Belitung makes it likely that it also occurs in Sumatra. Fig. 24.

Loc. 2.

Tyriobapta torrida Kirby, 1889

Recorded from Belitung in Lieftinck (1954).

Loc. 4.

Urothemis signata insignata (Selys, 1872)

Recorded from Belitung in Lieftinck (1954).

Loc. 5, 7, 15.

Discussion and Conclusions

Sixty four species were recorded during our survey, representing somewhat less than two thirds of the 105 Odonata now known from the island (see the appendix). Two species recorded during the survey are new records for Belitung: *Oligoaeschna buehri*, and *Tyriobapta laidlawi*. Additionally there had been no published record of *Pseudocopera ciliata*, *Mortonagrion aborense*, *Diplacodes nebulosa* or *Tramea phaeoneura* from Belitung, but they had already been recorded by BBO and were listed in Alfariysi (2017).

Although many species collected by Kuiper were not found during our survey, a number of these had already been recorded in BBO surveys; these are indicated in the checklist in the appendix. However quite a number of species recorded in the 1930s have not been found during any of the recent surveys. Probably the most significant of these is the endemic *Amphicnemis billitonis*. The type series (Lieftinck 1940a) of *A. billitonis* comes from Pulau Aur (a small island) and Tjeroetjoek, a location close to Tanjung Pandan and many sites surveyed either in December 2017 or in other BBO surveys; it is surprising and concerning that this species has not been rediscovered. Many of the other species not yet rediscovered on the island are rather local in occurrence (e.g. *Pornotheis serrata*), or more likely to be found along deeper streams where a boat is required (e.g. *Ictinogomphus acutus*), or are only rare, wind-blown visitors to the island (e.g. *Tramea virginia*); it is not surprising that some such species have yet to be re-located on Belitung. BBO surveys are ongoing, and it is to be hoped

Table 1: Kuiper's collecting locations compared with our survey sites.

Kuiper's locations	Corresponding locations in this publication
Gantong	Gantong: location 18
Gunung Tadjem	Gunung Tajam: locations 8, 9, possibly also the sites at Batu Mentas
Kepang	Air Kepang: location 20
Seroe	Air Seruk: locations 14-16
Tandjong Pandan	Tanjung Pandan: any of the sites close to the town could have been included under this location by Kuiper

that most or all of the species recorded in the 1930s will eventually be found on Belitung again.

A number (but not all) of Kuiper's locations, where they have been published, correspond with areas surveyed by us, these are listed in Table 1. However it is doubtful that most of our locations correspond exactly to Kuiper's sites, and until complete lists of Kuiper's material from each site are published, there is limited value in trying to compare the fauna found now with that in the 1930s.

Acknowledgements

Martin Schorr and the International Dragonfly Fund provided the funding which made the survey reported here possible; all of us are extremely grateful for their support. The first author thanks the other authors and members of BBO for their hospitality and assistance during his stay in Belitung. All of wish to thank the following: Budi Setiawan, owner of the Tarsier Sanctuary of Batu Mentas, for his hospitality; Kurdi Elfarabi and his family who gave us the permission to survey their plantation at Tungkus Village; Virandy Putra and his family for their support and giving us permission to survey their plantation at Air Seruk Village; Dewi Arliani Savitri who supported us by following us at the Odonata survey at Batu Mentas; Mr. Nasirun who provided us the homestay where the first author stayed during the survey, for his hospitality. Also Pungki Lupiyaningdyah for her acceptance of our specimens for the Odonata collection at LIPI.

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Appendix: checklist of species recorded from Belitung

This checklist updates and compliments that in Alfarisyi (2017). Where a species was not definitely recorded in our survey, a reference to a record from Belitung is given; cases where these species have been found during other BBO surveys are marked with a * (these records are all included in Alfarisyi 2017). Note that *Megalogomphus icterops* is listed as not recorded by us because it is not certain that the female seen at location 12 in December 2016 was actually this species.

Zygoptera

Lestidae

Lestes praemorsus decipiens Kirby, 1894

Orolestes wallacei (Kirby, 1889)

Platylestes heterostylus Lieftinck, 1932 [Lieftinck 1960]*

Argiolestidae

Podolestes orientalis Selys, 1862

Podolestes species [Alfarisyi 2017]*

Calopterygidae

Vestalis amoena Hagen in Selys, 1853

Chlorocyphidae

Heliocypha biforata (Selys, 1859)

Libellago aurantiaca (Selys, 1859)

Libellago hyalina (Selys, 1859)

Euphaeidae

Dysphaea dimidiata (Selys, 1853)

Platycnemididae

Copera vittata vittata (Selys, 1863)

"*Elattoneura*" *aurantiaca* (Selys, 1886)

"*Elattoneura*" *coomansi* Lieftinck, 1937

"*Elattoneura*" *longispina* Lieftinck, 1937

Onychargia atrocyana Selys, 1865 [Lieftinck 1954]*

Prodasineura collaris (Selys, 1860)

Prodasineura interrupta (Selys, 1860)

Prodasineura verticalis (Selys, 1860)

Pseudocopera ciliata (Selys, 1863)

Coenagrionidae

Aciagrion hisopa (Selys, 1876)

Agriocnemis femina (Brauer, 1868) [Lieftinck 1954]

Agriocnemis minima Selys, 1877

Amphicnemis billitonis Lieftinck, 1940 [Lieftinck 1940a]

Amphicnemis kuiperi Lieftinck, 1937
Archibasis melanocyana (Selys, 1877) [Lieftinck 1949]
Archibasis tenella Lieftinck, 1949
Archibasis viola Lieftinck, 1949
Ceriagrion cerinorubellum (Brauer, 1865)
Ischnura senegalensis (Rambur, 1842) [Lieftinck 1954]
Mortonagrion aborense (Laidlaw, 1914)
Mortonagrion appendiculatum Lieftinck, 1937
Mortonagrion arthuri Fraser, 1942 [Dow 2011]
Mortonagrion falcatum Lieftinck, 1934
Pseudagrion coomansi Lieftinck, 1937
Pseudagrion microcephalum (Rambur, 1842)
Teinobasis ruficollis (Selys, 1877) [Dow 2010]

Anisoptera

Aeshnidae

Anax guttatus (Burmeister, 1839) [Lieftinck 1954]
Anax panybeus Hagen, 1867 [Alfariysi 2017]*
Gynacantha basiguttata Selys, 1882 [Lieftinck 1954]
Gynacantha bayadera Selys, 1891
Gynacantha dohmi Krüger, 1899 [Lieftinck 1954]
Gynacantha maclachlani Förster, 1899
Gynacantha subinterrupta Rambur, 1842 [Alfariysi 2017]*
Heliaeschna crassa Krüger, 1899 [Lieftinck 1954]
Heliaeschna idae (Brauer, 1865) [Lieftinck 1954]
Oligoaeschna buehri (Förster, 1903)
Tetracanthagyna plagiata (Waterhouse, 1877) [Lieftinck 1954]

Gomphidae

Gomphidia maclachlani Selys, 1873 [Lieftinck 1948]
Ictinogomphus acutus (Laidlaw, 1914) [Lieftinck 1954]
Ictinogomphus decoratus melaenops (Selys, 1854) [Lieftinck 1954]
Macrogomphus decemlineatus Selys, 1878
Macrogomphus parallelogramma albardae Selys, 1878
Macrogomphus quadratus Selys, 1878
Megalogomphus icterops (Martin, 1903) [Lieftinck 1954]

Macromiidae

Epopthalmia vittigera (Rambur, 1842)
Macromia cincta Rambur, 1842
Macromia cydippe Laidlaw, 1922 [Lieftinck 1950]

Synthemistidae

Idionyx yolanda Selys, 1871 [Lieftinck 1939b]

Libellulidae

Acisoma panorpoides Rambur, 1842

Aethriamanta brevipennis (Rambur, 1842) [Alfarisyi 2017]*

Aethriamanta gracilis (Brauer, 1878)

Agrionoptera insignis (Rambur, 1842)

Agrionoptera sexlineata Selys, 1879

Brachydiplax chalybea Brauer, 1868

Brachygonia oculata (Brauer, 1878)

Brachygonia puella Lieftinck, 1937 [Lieftinck 1937]*

Brachythemis contaminata (Fabricius, 1793) [Alfarisyi 2017]*

Camacinia gigantea (Brauer, 1867) [Lieftinck 1954]

Chalybeothemis fluviatilis Lieftinck, 1933

Crocothemis servilia (Drury, 1773) [Lieftinck 1954]

Diplacodes nebulosa (Fabricius, 1793)

Diplacodes trivialis (Rambur, 1842)

Hydrobasileus croceus (Brauer, 1867) [Lieftinck 1954]*

Lathrecista asiatica (Fabricius, 1798) [Alfarisyi 2017]*

Lyriothemis magnificata (Selys, 1878) [Lieftinck 1954]

Nannophya pygmaea Rambur, 1842

Nannophyopsis chalcosoma Lieftinck, 1935

Nesoxenia lineata (Selys, 1868)

Neurothemis fluctuans (Fabricius, 1793)

Macrodiplax cora (Brauer, 1867) [Alfarisyi 2017]*

Onychothemis testacea Laidlaw, 1902 [Alfarisyi 2017]*

Orchithemis pruinans (Selys, 1878)

Orchithemis pulcherrima Brauer, 1878

Orthetrum chrysis (Selys, 1891)

Orthetrum glaucum (Brauer, 1865)

Orthetrum luzonicum (Brauer, 1868) [Lieftinck 1954]

Orthetrum sabina (Drury, 1773)

Pantala flavescens (Fabricius, 1798) [Lieftinck 1954]

Pornothemis serrata Krüger, 1902 [Lieftinck 1954]

Raphismia bispina (Hagen, 1867) [Lieftinck 1954]

Rhodothemis rufa (Rambur, 1842)

Rhyothemis fulgens Kirby, 1889 [Lieftinck 1954 as *R. pygmaea* (Brauer, 1867)]

Rhyothemis obsolescens Kirby, 1889

Rhyothemis phyllis (Sulzer, 1776)
Risiophlebia dohrni (Krüger, 1902)
Tetrathemis flavescens Kirby, 1889
Tholymis tillarga (Fabricius, 1798)
Tramea phaeoneura Lieftinck, 1953
Tramea transmarina euryale (Selys, 1878)
Tramea virginia (Rambur, 1842) [Lieftinck 1942]
Trithemis pallidinervis (Kirby, 1889) [Lieftinck 1954]
Tyriobapta laidlawi Ris, 1919
Tyriobapta torrida Kirby, 1889
Urothemis signata insignata (Rambur, 1842)
Zyxomma petiolatum Rambur, 1842 [Lieftinck 1954]

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