IDF

Faunistic Studies in South-east Asian and Pacific Island Odonata

Journal of the International Dragonfly Fund

1-66

Rory A. Dow, Stephen G. Butler, Graham T. Reels, Philip O.M. Steinhoff, Frank R. Stokvis & Joanes Unggang

Previously unpublished Odonata records from Sarawak, Borneo, part IV: Bintulu Division including the Planted Forest Project and Similajau National Park

published 07.05.2019

No. 27

ISSN 2195-4534

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 contribute to the knowledge of the regional Odonata fauna of the Southeas-tern Asian and Pacific regions to facilitate cost-efficient and rapid dissemination of faunistic data.

Southeast Asia or Southeastern Asia is a subregion of Asia, consisting of the countries that are geo-graphically south of China, east of India, west of New Guinea and north of Australia. Southeast Asia consists of two geographic regions: Mainland Southeast Asia (Indochina) and Maritime Southeast Asia.

Pacific Islands comprise of Micronesian, Melanesian and Polynesian Islands.

Editorial Work:	Martin Schorr, Milen Marinov and Rory Dow
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:	*Lestes praemorsus decipiens*, Bintulu
Photographer:	Graham T. Reels

Published 07.05.2019

Previously unpublished Odonata records from Sarawak, Borneo, part IV: Bintulu Division including the Planted Forest Project and Similajau National Park

Rory A. Dow[1,2], Stephen G. Butler[3], Graham T. Reels[4], Philip O.M. Steinhoff[5], Frank R. Stokvis[1], Joanes Unggang[6]

[1]Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, The Netherlands. Email: rory.dow230@yahoo.co.uk

[2]Sarawak Museum Campus Project, Jabatan Muzium Sarawak, Jalan Barrack, 9300 Kuching, Sarawak, Malaysia.

[3]Red Willow, All Stretton, SY6 6HN Shropshire, UK. Email: sgbutler15@gmail.com

[4]31 St Anne's Close, Winchester SO22 4LQ, Hants., UK. Email: gtreels@gmail.com

[5]Zoological Institute and Museum, General and Systematic Zoology, University of Greifswald, Loitzer Str. 26, 17489 Greifswald, Germany. Email: philipsteinhoff@gmail.com

[6]Conservation Department, Grand Perfect Pusaka Sendirian Berhad, Bintulu, Sarawak, Malaysia. Email: junis_sp@yahoo.com

Abstract

Records of Odonata from Sarawak's Bintulu Division are presented. One hundred and sixty-six (or more) species are listed, of which three (*Oligoaeschna amata* (Förster, 1903), *O. buehri* (Förster, 1903) and *Oligoaeschna* (?) species) had not previously been recorded in Sarawak and *Macromia* species cf *dione* Lieftinck, 1971 had not previously been recorded from Borneo. Additionally this is the first published record of *Prodasineura tenebricosa* Lieftinck, 1937 from Sarawak, although it had been found at another location in the state prior to its discovery in Bintulu, and the first published record of *Phyllothemis raymondi* Lieftinck, 1950 from Borneo, although specimens from Kalimantan are present in the collections of the Naturalis Biodiversity Center, Leiden. Other notable records include "*Elattoneura*" *longispina* Lieftinck, 1937, *Pericnemis dowi* Orr & Hämäläinen, 2013, *Linaeschna polli* Martin, 1909, *Burmagomphus arthuri* Lieftinck, 1953, *Heliogomphus borneensis* Lieftinck, 1964, *Merogomphus femoralis* Laidlaw, 1931, *Chlorogomphus* species, *Macromidia genialis erratica* Lieftinck, 1948 and *Tetrathemis flavescens* Kirby, 1889. Altogether there do not appear to be any previous published records from Bintulu Division of 52 of the species listed in this paper. The status of *Rhyothemis fulgens* Kirby, 1889 is discussed and illustrations of its anal appendages and those of *R. pygmaea* (Brauer, 1867) are provided. Illustrations of the anal appendages of *Tetrathemis hyalina* Kirby, 1889 and *T. irregularis* Brauer, 1868 are also provided. Identification problems when using COI-based DNA barcoding with some species of *Archibasis* are discussed, and the nuclear marker ITS is shown to be a successful alternative in these cases; COI and ITS gene trees for part of the genus are included. Some COI data for *Macromia* species are published and the

marker is used to identify larvae of *M. corycia* Laidlaw, 1922 and establish the relationship of another *Macromia* larva with *M. dione*, a very poorly known species from Sumatra. *Macromia euterpe* Laidlaw, 1915 is considered to be the same species as *M. westwoodii* Selys, 1874 and dropped from the list of species known from Sarawak, however formal combination of the two species is left for a peer reviewed publication. A detailed list of previously unpublished specimens from the locations covered is given in an appendix. Concise checklists for two of the locations covered - Similajau National Park (54 species) and the Bukit Mina Wildlife Corridor (84 species) - are given in another appendix.

Key words: *Archibasis*, *Macromia*, DNA barcoding-based identification, *Phyllothemis raymond*i, taxonomic status of *Rhyothemis fulgens* Kirby, 1889 vs *R. pygmaea* (Brauer, 1867),

Introduction

Since 2005 some of the authors have been engaged in an ongoing survey of the Odonata of Sarawak in Malaysian Borneo. The present paper is the fourth of a series of publications in which we hope to list all the Odonata records we have made in Sarawak since 2005 which have not previously been published and which are not scheduled to be published elsewhere. In this fourth paper of the series we present records from Bintulu Division of Sarawak, made up to 2017. Fig. 1 shows the position of Bintulu Division in Borneo.

Bintulu is a large division (ca 12,166 km^2) but it had been poorly surveyed for Odonata prior to 2005, when we started working in the area. Most natural history orientated visitors to Bintulu Division only visit Similajau National Park, situated close to Bintulu town (see Dow & Reels 2010 and below), but there are many other interesting locations. Much of the division is now occupied by the Planted Forest Project (PFP). The PFP is a large area of Industrial Tree Plantation (*Acacia* plantation), with sections of original forest, albeit disturbed: the Bukit Mina Wildlife Corridor, several conservation areas, and buf-

Figure 1. **Location of Bintulu Division in Borneo**.

fers of original forest around streams in *Acacia* plantation. Most notable of the conservation areas are Binyo Penyilam, part of which has now been gazetted as Danau Mujan National Park, and Bukit Sarang (a proposed National Park). The Odonata of Binyo Penyilam were discussed in Dow & Unggang (2010) and are not dealt with further in this publication; although new information is available it will be published separately. See Dow & Unggang (2010) for more background information on the PFP.

Records of Odonata from Bintulu Division can be found in Butler 2011, 2013; Butler & Orr 2013; Butler, Steinhoff & Dow 2016, Dow 2008, 2010a, 2010b, 2010c, 2011a, 2011b, 2013, 2017; Dow, Choong & Orr 2007; Dow & Hämäläinen 2008; Dow, Hämäläinen & Stokvis 2015; Dow & Orr 2012; Dow & Reels 2010, 2011; Dow, Stokvis & Ngiam 2017, Dow & Unggang 2010; Hämäläinen, Dow & Stokvis, 2015; Hincks 1930; Laidlaw 1915a, 1920; Seehausen & Dow 2016. Dow 2008 contains records from location 2a (defined below); unfortunately part of the species list was missed out in the published version, also detailed records were not given, so all material covered (or that should have been covered) by that publication is listed in full in Appendix 1. The holotypes of *Libellago orri* Dow & Hämäläinen, 2008, *Telosticta tubau* (Dow, 2010) and *Devadatta clavicauda* Dow, Hämäläinen & Stokvis, 2015 are from Bintulu Division.

This paper is divided into two parts and two appendices. In the first part we list 166 species of Odonata collected from locations spread across Bintulu Division. A detailed list of material not published previously is given in Appendix 1, along with a few additional records (mostly of larvae) that cannot be definitely assigned to any of the species in the main list. For 52 of the species recorded there was no published record from Bintulu Division until now, although a few of these should have been included in Dow (2008) (see the previous paragraph). *Macromia* species cf *dione* Lieftinck, 1971 and *Phyllothemis raymondi* Lieftinck, 1950 are recorded from Borneo for the first time. *Prodasineura tenebricosa* Lieftinck, 1937, *Oligoaeschna amata* (Förster, 1903), *O. buehri* (Förster, 1903) and *Oligoaeschna* (?) species are recorded from Sarawak for the first time. Concise checklists for Similajau National Park and the Bukit Mina Wildlife Corridor are given in Appendix 2.

Some molecular data are included in the second part of the paper. Data for *Archibasis* are included as all species known from Borneo are listed here it is an opportune time to discuss issues with DNA barcoding-based identification of some members of the genus. Data for *Macromia* are included because DNA barcoding has been used in some of the identifications, but some discussion of issues beyond this is also made.

It was originally intended that this paper be finished and published before the end of 2017, but it was delayed for various reasons. During 2018 new data were generated from Bintulu Division but we have decided not to include these here to avoid complications and further delays.

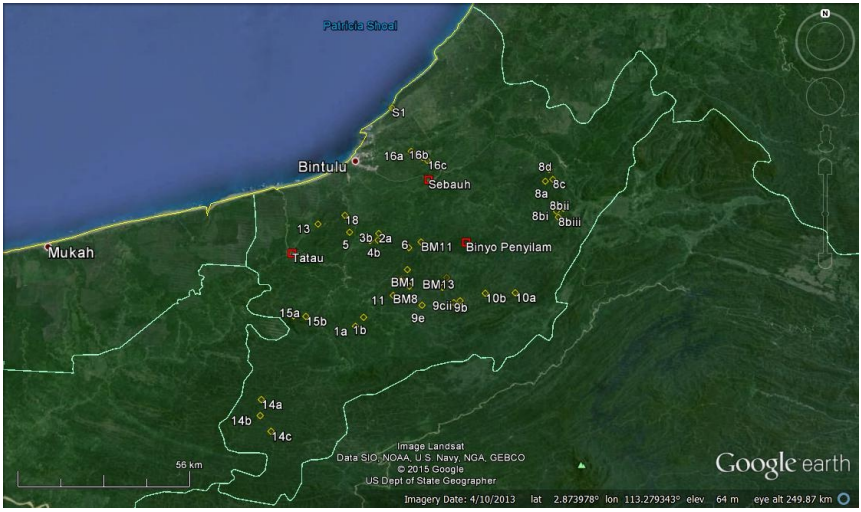


Figure 2. Overview of locations in Bintulu Division sampled for Odonata by us.

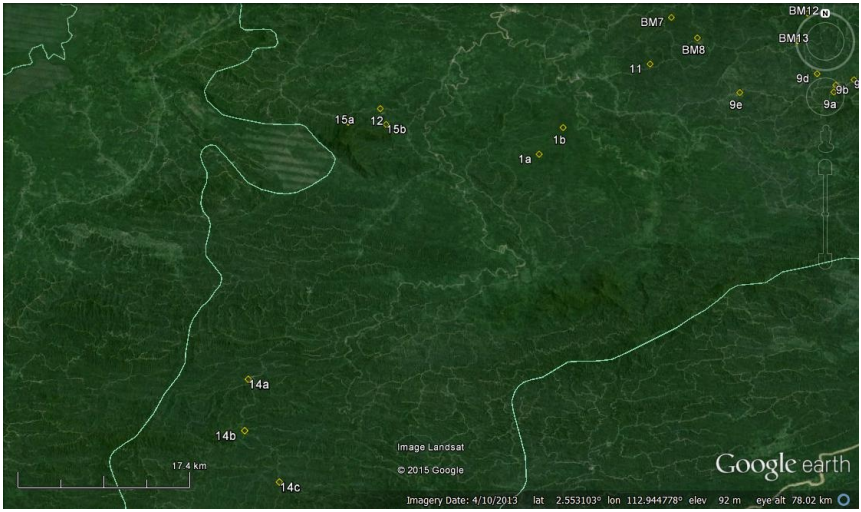


Figure 3. Locations in southwestern Bintulu.

Part 1: Odonata of Bintulu Division

Sampling sites

Sites in Bintulu Division where we have collected Odonata (excluding Binyo Penyilam) prior to 2018 are listed here, grouped into three categories. Fig. 2 gives an overview of the locations covered; Figs. 3–5 show the locations in different parts of Bintulu Division.

Figure 4. **Locations in central Bintulu**.

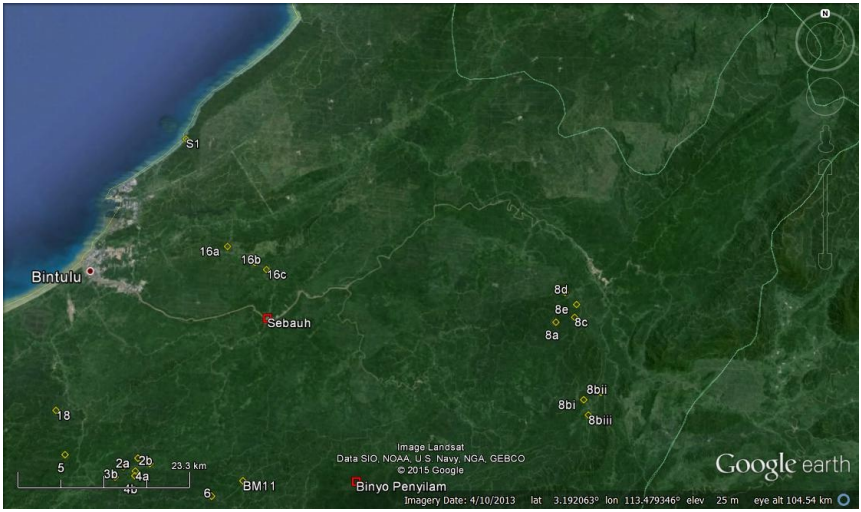


Figure 5. **Locations in eastern Bintulu**.

Bukit Mina Wildlife Corridor locations (Fig. 6 shows a part of the Wildlife Corridor):

BM1. Forest streams in disturbed forest on Bukit Mina, coordinates of Bukit Mina: 2.8262N, 113.2073E.

BM2. An open stream with a large ponded section close to Bukit Mina.

BM3. Other streams in degraded forest not on or at the foot of Bukit Mina but in its vicinity.

Figure 6. Part of the Bukit Mina Wildlife Corridor. Photo by J. Unggang.

Figure 7. Main stream at Bukit Jugam in 2009. Photo by R.A. Dow.

BM4. Outside or at lights at Bukit Mina field station or on the road to the field station.

BM5. Open pools and marshy areas by the road through the wildlife corridor.

BM6. Sungai Mina and a tiny tributary stream, coordinates on the sampled part of Sungai Mina: 2.7969N, 113.1889E.

BM7. Swampy areas adjacent to Sungai Mina and trailside in the area of Sungai Mina.

BM8. A stream at Kakus Nursery (an abandoned *Acacia* nursery), in a buffer of disturbed original forest, coordinates: 2.7747N, 113.2138E.

BM9. Swampy areas by the stream at Kakus Nursery.

BM10. Around old buildings at Kakus Nursery.

BM11. A forest stream system on a steep slope in the wildlife corridor in the vicinity of Block T2C, coordinates: 2.9123N, 113.2491E.

BM12. The "Day 5" stream system; a stream system in disturbed original forest originating on a steep ridge not far from Bukit Jugam (**BM13**). Coordinates: 2.8015N, 113.3275E.

BM13. Bukit Jugam, an area of mixed forest types (mixed dipterocarp forest and kerangas forest) in the eastern part of the wildlife corridor, stream system (Fig. 7) and tributaries sampled. Coordinates on main stream: 2.7716N, 113.3148E.

Other locations:

Locations within the PFP:

1. Bukit Sarang area: **(a)** Bukit Sarang (coordinates at field station: 2.6530N, 113.0511E), sampled habitats include Sungai Sarang (Fig. 8) and tributaries, freshwater swamp forest with pockets of low pH swamp forest, a pond, clearings in swamp forest; **(b)** Sungai Mayeng (coordinates someway downstream from mouth of Sungai Sarang: 2.6803N, 113.0755E), a large stream in disturbed forest.

2. Samarakan: **(a)** conservation area and nursery (coordinates at Sungai Philip within the conservation area: 2.9391N, 113.1185E), sampled habitats include streams, disturbed lowland forest with pockets of freshwater swamp forest, and a large pond; **(b)** T2N near nursery (coordinates at stream site sampled: 2.9327N, 113.1336E), a stream in disturbed forest and small ponds.

3. Block T1C: **(a)** Sungai Gagak (coordinates: 2.9284N, 113.1012E), this stream had *Acacia* to the bank in 2006 and 2008 but by 2011 extensive areas of *Acacia* around the stream had been blown down, damming the stream in multiple places and creating conditions more like an open marsh than a stream. Fig. 9 shows the stream in 2008; **(b)** a stream with good buffer of original forest (coordinates: 2.9167N, 113.0919E); **(c)** a stream with a buffer of extremely degraded forest, very close to 3b; **(d)** by plantation roads etc.

4. Block T1A: **(a)** a stream winding in and out of buffer of original forest near a salt lick (coordinates: 2.9237N, 113.1163E); **(b)** small streams in degraded forest flowing into a large ponded section (coordinates: 2.9182N, 113.1161E); (c) by trails and plantation roads.

5. Block T1F: (coordinates: 2.9432N, 113.0283E), streams in disturbed forest in rather steep terrain.

6. Block T2B: (coordinates: 2.8942N, 113.2115E), a small stream with *Acacia* to the bank.

7. Miscellaneous Samarakan area, details not recorded.

8. Tubau: **(a)** low gradient streams, with and without buffers, substrates stone and sand, near Kemena Camp, and on roads and in camp in same area (coordinates at site

Figure 8. Sungai Sarang in 2008. Photo by R.A. Dow.

Figure 9. Sungai Gagak in 2008. Photo by R.A. Dow.

sampled most: 3.1054N, 113.6377E); **(b)** small streams, two high gradient (i: 3.0092N, 113.6695E and ii: 2.9906N, 113.6913E), one low (**iii**: 2.9906N, 113.6747E), further from Kemena Camp **(c)** a stream system in a steep valley with disturbed original forest (Fig. 10), mostly fairly high gradient, and miscellaneous habitats in the same area (coordinates: 3.1116N, 113.6613E); **(d)** a stream in disturbed forest, gradient increasing from

Figure 10. Valley with original forest in the Tubau area in 2008. Photo by R.A. Dow.

Figure 11. Main stream at Bukit Setiam in 2008. Photo by R.A. Dow.

low to high before a waterfall upstream (3.1434N, 113.6505E); **(e)** another stream system in disturbed forest, separated from **8c** by a ridge, mostly low gradient, plus ponds and marshy areas nearby (3.1278N, 113.6645E).

9. Camp C (a former timber camp converted to an *Acacia* nursery): **(a)** The camp stream system and trailside in its general vicinity (2.7171N, 113.3463E); **(b)** ponds

at the camp (coordinates at camp: 2.7245N, 113.3492E); **(c)** forest and forest edge ponds accessed from main plantation road running towards block K2L (i: forest pond near Sungai Likau 2.7379N, 113.3887E; ii: pond in *Acacia* by road 2.7303N, 113.3681E); **(d)** Binyo Bridge 6 – a broad, sediment-bottomed stream (2.7367N, 113.3318E); **(e)** a stream on the old road from Camp C to Kakus nursery (2.7166N, 113.2526E); **(f)** small low gradient streams close to Camp C. Note that some of the locations here (for instance (a)) are actually outside of the PFP in its present form, but are included here to avoid unnecessary complication.

10. Block K2L: **(a)** a stream sampled 23 June 2010 (2.7545N, 113.5361E) and (b) a stream sampled 25-26 June 2010 (2.7531N, 113.4451E).

11. Kapur Camp (2.7467N, 113.1647E), a stream in a buffer of original forest, a tributary of this stream running from *Acacia*, and marshy areas adjacent to these streams, and also at lights at the nearby buildings and along the road there.

12. Block A1M: coordinates at camp: 2.6996N, 112.8947E, streams in disturbed forest and *Acacia*.

Other, **non-protected**, **locations:**

13. Bukit Setiam, sampling was conducted at a stream and its tributaries in what was good quality original forest at the time of sampling (2008) but that was subsequently heavily logged. Fig. 11 shows the main stream at this location in 2008. Coordinates for sampling site not available, approximate coordinates for peak: 2.9687N, 112.9299E.

14. The Anap Muput Forest Management Unit, logged forest: **(a)** Sungai Sawih and tributaries (2.4356N, 112.7746E); **(b)** Sungai Pati Supan and tributaries (2.3890N, 112.7732E); **(c)** Sungai Sebelalang and tributaries (2.3434N, 112.8067E); (d) roadside drains and ponds, at lights at Sawih Camp.

15. Bukit Kana/Bukit Naong: **(a)** high gradient stream on slopes, falling from cliff (2.6844N, 112.8635E); **(b)** stream on lower slopes of Bukit Kana, with a series of waterfalls (2.6829N, 112.9007E); **(c)** along old logging roads, small ponds etc. At least part of Bukit Kana is now protected as a national park.

16. Locations between Bintulu and Sebauh. Note that the location of Sebauh (as is the case for many small towns in Sarawak) is incorrectly marked on Google Earth; this is corrected in Figs 2 and 5. **(a)** A roadside pond (3.2030N, 113.2173E); **(b)** an open and very disturbed sandy bottomed stream near to the road (3.1822N, 113.2533E); **(c)** Sungai Selezu, a stream in a strip of disturbed, swampy forest (3.1730N, 113.2686E).

17. In Bintulu town.

18. Sungai Segan area (2.9966N, 113.0128E), a large stream and tributaries in disturbed forest.

Similajau National Park locations:

S1 – Around the park headquarters area (3.3473N, 113.1556E); ditches and intermittent ponds.

S2 – Forest streams on Main Trail.

S3 – Forest streams on Circular Trail and Batu Anchau Trail.

Figure 12. Mangrove at Similajau National Park, at low tide. Photo by G.T. Reels.

S4 – Forest streams on Education Trail.

S5 – Within mangrove (Fig. 12).

S6 – Forest streams on Selunsur Trail.

S7 – Sungai Selunsur; this stream was turbid in 2008, as a result of disturbance upstream outside of the National Park boundary.

S8 – Swamp area of Selunsur Trail just before Sg Selunsur.

List of species recorded

A * indicates a first published record for Bintulu Division, ** first published record from Sarawak, *** first published record from Borneo.

Zygoptera

Lestidae

1. *Lestes praemorsus decipiens* Kirby, 1894
   Locations **BM5**, **7**, **9b**, **16a**, **S1**.
2. *Orolestes wallacei* (Kirby, 1889)
   Locations **BM9**, **2a**, **3b**, **8e**.

Platystictidae

3. *Drepanosticta actaeon* Laidlaw, 1934

   More common in the interior of Sarawak than near the coast, and so far only found at one location in Bintulu Division (see Dow 2017). Location **15b**.

4. *Drepanosticta* species cf *crenitis* Lieftinck, 1933*

   Locations **BM1**, **8c**, **14b**, **15a**, **15b**.

5. *Drepanosticta* species cf *dentifera* Kimmins, 1936

   Locations **BM12**, **BM13**, **8c**, **8d**, **8e**, **9a**, **13**, **15b**, **18**, **S3**, **S6**.

6. *Drepanosticta dulitensis* Kimmins, 1936

   Locations **8d**, **15a**, **15b**.

7. *Drepanosticta* species cf *forficula* Kimmins, 1936*

   There are certainly at least two species currently being treated under the name *forficula*; this subject will be treated in more detail elsewhere. Locations **4b**, **8a**, **8c**.

8. *Drepanosticta rufostigma* (Selys, 1886)

   Locations **BM1**, **BM11**, **BM12**, **BM13**, **5**, **8a**, **8c**, **8d**, **8e**, **10b**, **12**, **13**, **14a**, **14b**, **14c**, **15b**, **18**, **S3**.

9. *Drepanosticta versicolor* (Laidlaw, 1913)

   Locations **BM1**, **BM11**, **BM12**, **BM13**, **2a**, **5**, **8b**ii, **8c**, **8d**, **14c**, **18**.

10. *Telosticta dayak* Dow & Orr, 2012

    A recently described species, known from Brunei and Sarawak. At two sites in the BMWC (locations **BM11** and **BM12**) this species occurs together with the next; this has not been observed elsewhere. Locations **BM11**, **BM12**, **BM13**, **9a**, **10a**, **10b**, **11**, **18**, **S2**, **S3**.

11. *Telosticta longigaster* Dow & Orr, 2012

    Another recently described species, widespread in Sarawak and Brunei (Dow & Orr 2012). Locations **BM1**, **BM11**, **BM12**, **5**, **8d**, **8c**, **8e**, **14b**, **14c**, **15a**, **15b**.

12. *Telosticta tubau* (Dow, 2010)

    See Dow (2010a) and Dow & Orr (2012). Location **8c**.

Argiolestidae

13. *Podolestes orientalis* Selys, 1862

    Locations **BM7**, **BM9**, **1a**, **2a**, **6**, **9a**, **12**, **S2**, **S4**.

Calopterygidae

14. *Neurobasis longipes* Hagen, 1887*

    Locations **8a**, **10a**, **12**, **14a**, **14c**.

15. *Vestalis amabilis* Lieftinck, 1965

    A very common species on streams at many of the low lying, swampy locations in Bintulu division. Locations **BM3**, **BM6**, **BM8**, **BM12**, **BM13**, **2a**, **9a**, **9e**, **9f**, **10a**, **10b**, **11**.

16. *Vestalis amaryllis* Lieftinck, 1965

    Locations **BM1**, **BM11**, **BM12**, **2a**, **3a**, **5**, **6**, **8b**i, **8b**ii, **8c**, **8d**, **8e**, **9a**, **10b**, **11**, **14a**, **14c**, **S3**.

17. *Vestalis amoena* Hagen in Selys, 1853*

    Locations **BM3**, **BM6**, **1a**, **1b**, **2a**, **2b**, **3a**, **3b**, **5**, **6**, **7**, **8a**, **8biii**, **8c**, **8e**, **12**, **14a**, **14c**, **16c**.

18. *Vestalis atropha* Lieftinck, 1965*

    Locations **12**, **13**, **14b**.

19. *Vestalis* beryllae Laidlaw, 1915*

    This species is typically found on larger hills and mountains, although it occurs across a broad range of altitudes at such locations. Among the locations sampled in Bintulu division, only the Bukit Kana/Naong hill complex exceeds 500m in altitude, so the fact that it has only been found at that location is not surprising. Location **15b**.

Chlorocyphidae

20. *Heliocypha biseriata* (Selys, 1859)*

    Locations **5**, **8a**, **8biii**, **8c**, **8d**, **8e**, **9a**, **12**, **14a**, **14c**.

21. *Libellago aurantiaca* (Selys, 1859)

    Locations **BM6**, **BM13**, **1a**, **1b**, **3a**, **3b**, **6**, **7**, **9a**, **10a**, **11**, **16c**.

22. *Libellago hyalina* (Selys, 1859)

    Locations **BM3**, **BM6**, **BM8**, **1a**, **1b**, **2a**, **3b**, **6**, **8a**, **8biii**, **8d**, **9a**, **10a**, **11**, **S7**.

Figure 13. *Libellago orri* male at Sungai Gagak in 2006. Photo by R.A. Dow.

23. *Libellago orri* Dow & Hämäläinen, 2008

    Until recently this species was only known from locations within the PFP, but in January 2015 it was also found at locations in Sibu and Mukah divisions. It is very closely related to *Libellago hyalina*, and it would be tempting to believe that it is merely a local colour form of that species, except that at locations where both occur they do not interact any more than species from completely different families do. For instance at Sungai Philip (under location **2a**) the first author has observed

two *L. hyalina* males in an aerial contest at an average of approximately 30 cm from a perched male *L.* orri which totally ignored them; this is typical of the behaviour of the two species when in close proximity to each other. Fig. 13 shows a male. Locations **1a**, **2a**, **2b**, **3a**, **3b**, **3c**.

24. *Libellago semiopaca* (Selys, 1873)

    Locations **1a**, **1b**, **9a**, **10a**, **10b**, **18**, **S7**.

2**5**. *Libellago stictica* (Selys, 1859)

    Seemingly rare in Bintulu Division, this species is normally associated with clear forest streams, but in the Anap Muput area it was found on highly turbid (at time of sampling) streams in logged forest. Locations **14a**, **14c**.

26. *Rhinocypha cucullata* Selys, 1873

    Locations **1a**, **1b**, **14a**, **14c**.

27. *Rhinocypha spinifer* Laidlaw, 1931*

    Location **15b**.

28. *Sundacypha petiolata* (Selys, 1859)

    Locations **BM12**, **BM13**, **2a**, **6**, **8a**, **8c**, **8e**, **9a**, **10b**, **11**, **12**, **14c**, **S3**.

Devadattidae

29. *Devadatta clavicauda* Dow, Hämäläinen & Stokvis, 2015

    A recently described species, common in the lowlands of Sarawak, and which had previously been confused with *D. podolestoides* Laidlaw, 1934. The holotype is from Bukit Mina. Locations **BM1**, **BM12**, **BM13**, **5**, **8c**, **8d**, **8e**, **10b**, **12**, **14a**, **14c**, **18**, **S2**, **S3**.

30. *Devadatta somoh* Dow, Hämäläinen & Stokvis, 2015

    Also a recently described species, most common in the interior of central Sarawak. Locations **5**, **12**, **13**, **14b**, **14c**, **15a**, **15b**.

Euphaeidae

31. *Dysphaea dimidiata* Selys, 1853

    See Hämäläinen, Dow & Stokvis (2015). Locations **BM3**, **BM6**, **BM8**, **1a**, **3a**, **3b**, **7**, **8a**, **8e**, **10a**, **11**, **14a**.

32. *Euphaea impar* Selys, 1859

    Locations **BM1**, **BM6**, **BM8**, **BM11**, **BM12**, **BM13**, **1a**, **2a**, **3a**, **3b**, **3c**, **5**, **6**, **7**, **8a**, **8c**, **8d**, **8e**, **9a**, **10a**, **10b**, **11**, **12**, **13**, **14a**, **14b**, **14c**, **15b**, **18**, **S3**.

33. *Euphaea subcostalis* Selys, 1873*

    Locations **5**, **8a**, **8c**, **8e**, **9a**, **10a**, **12**, **13**, **14a**, **14b**, **14c**, **15a**, **15b**.

34. *Euphaea tricolor* Selys, 1859*

    Locations **12**, **14a**, **14c**.

Philosinidae

35. *Rhinagrion borneense* (Selys, 1886)

Locations **BM3**, **BM6**, **BM8**, **BM11**, **BM12**, **1a**, **2a**, **3a**, **3b**, **4a**, **5**, **6**, **7**, **8a**, **8c**, **8e**, **8d**, **9a**, **10b**, **11**, **12**, **14a**, **14c**, **S2**, **S3**, **S7**.

Platycnemididae

36. *Coeliccia borneensis* (Selys, 1866)

    Locations **2a**, **9a**, **12**, **14c**, **15b**.

37. *Coeliccia campioni* Laidlaw, 1918*

    So far only found at one location in Bintulu Division; this species appears to be more common in the deep interior of Sarawak. Location **15b**.

38. *Coeliccia cyaneothorax* Kimmins, 1936*

    Locations **8c**, **12**, **15b**.

39. *Coeliccia kenyah* Dow, 2010

    Locations **BM1**, **BM12**, **8c**.

40. *Coeliccia* species cf *nemoricola* Laidlaw, 1912

    Locations **BM1**, **BM11**, **BM12**, **BM13**, **8c**, **9a**, **10b**, **13**, **14a**, **S2**, **S3**.

41. *Coeliccia* nigroh*amata*Laidlaw, 1918

    Locations **BM1**, **BM3**, **BM11**, **BM12**, **BM13**, **2a**, **5**, **6**, **8a**, **8bi**, **8d**, **8e**, **9a**, **11**, **12**, **13**, **14a**, **14c**, **18**, **S2**, **S3**, **S4**.

42. *Coeliccia* species

    This is an unnamed species known from sites in Bintulu. Limbang and Miri Divisions, and from Brunei. A description is being prepared by the first author. Locations **S2**, **S3**, **S6**.

43. *Copera vittata* (Selys, 1863)

    See Dow & Unggang (2010) for a discussion of the form of this species found in Bintulu division. Locations **BM7**, **BM9**, **1a**, **2a**, **3a**, **3b**, **3c**, **4b**, **6**, **8a**, **8biii**, **8e**, **9a**, **11**, **12**, **16c**, **18**.

44. "*Elattoneura*" *analis* (Selys, 1860)

    Note that the southeast Asian species currently placed in *Elattoneura* certainly do not belong there, but are left there until the issue of their true genus is re-

Figure 14. "*Elattoneura*" *longispina* male at Bukit Sarang in 2006. Photo by R.A. Dow.

solved, so inverted commas are used around the genus name to emphasise this. Locations **BM3**, **BM6**, **BM8**, **BM11**, **1a**, **2a**, **3b**, **4a**, **6**, **8a**, **8c**, **11**, **14c**.

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

    Location **1a**.

46. "*Elattoneura*" *longispina* Lieftinck, 1937

    Very few locations are known in Sarawak for this species, and all but one of these are in Bintulu Division; see also Dow & Unggang (2010). Fig. 14 shows a male. Location **1a**.

47. *Onychargia atrocyana* Selys, 1865

    Locations **BM1**, **BM9**, **1a**, **2a**, **3a**, **3b**, **6**.

48. *Prodasineura collaris* (Selys, 1860)*

    Locations **BM7**, **1a**, **2a**.

49. *Prodasineura dorsalis* (Selys, 1860)

    Locations **BM1**, **BM11**, **2a**, **3c**, **5**, **6**, **8c**, **8d**, **12**, **14a**, **S2**, **18**, **S3**.

50. *Prodasineura hosei* (Laidlaw, 1913)*

    Locations **8a**, **8c**, **8e**, **9a**, **12**, **14c**.

51. *Prodasineura hyperythra* (Selys, 1886)

    The form of this species found at most locations in Bintulu Division is much darker than typical, however this appears to be merely variation rather than evidence of a new species. Locations **2a**, **3c**, **4a**, **6**, **8a**, **8d**, **8e**, **12**, **14a**.

52. *Prodasineura tenebricosa* Lieftinck, 1937**

    These are the first published records from Sarawak of this predominantly black species, although we have also found it at one site in Gunung Mulu National Park in Miri Division and, more recently, at sites in Kuching (Bau and Kuching Districts) and Serian (Tebedu District) Divisions. It was described from locations in West Kalimantan (Lieftinck 1937), and also occurs in the south and east of Kalimantan. At Sungai Mayeng it was found perching high (ca 4m+ on average) over deep water, with occasional individuals flying lower over the water, where they were extremely wary; the same behaviour has been observed at the other sites in Sarawak (although during very hot dry weather it was found only over shallow water at one site); in contrast, in East Kalimantan the same species perches on vegetation on the stream bank like many other members of the Disparoneurinae. Locations **1a**, **1b**.

53. *Prodasineura verticalis* (Selys, 1860)

    Locations **BM3**, **BM8**, **1a**, **1b**, **2b**, **3a**, **3b**, **5**, **7**, **8a**, **8biii**, **9a**, **10a**, **11**, **12**, **16c**, **18**, **S7**.

54. *Prodasineura* species cf *peramoena* (Laidlaw, 1913)

    This problematic form, first recorded from Brunei, is listed by Orr (2001) as *Prodasineura* sp. aff *hosei* (Laidlaw) and in Orr (2003) as *Prodasineura* sp. *A*. It is structurally extremely similar or identical to *P. peramoena*, but differs in colour pattern and intensity. It may eventually prove to be merely a variant of *P. peramoena*. Locations **BM3**, **BM11**, **BM12**, **BM13**, **8a**, **8c**, **9a**, **9d**, **9e**, **9f**, **10a**, **10b**, **11**, **S2**, **S3**.

Coenagrionidae

55. *Aciagrion borneense* Ris, 1911

    Locations **BM5**, **1a**, **2b**, **7**, **8e**, **9b**, **16a**.

56. *Agriocnemis femina* (Brauer, 1868)

    Locations **BM10**, **1a**, **2a**, **7**, **9b**, **S1**.

57. *Amphicnemis* species cf *dactylostyla* Lieftinck, 1953

    The group of species including *A. martini* Ris, 1911, *A. dactylostyla*, *A. hoisen* Dow, Choong & Ng, 2010 and *A. platystyla* Lieftinck, 1953, as well as a number of unnamed forms differing in details of the male anal appendages, presents considerable taxonomical difficulties. The form found in Bintulu Division comes closest to *A. dactylostyla*. Location **1a**.

58. *Amphicnemis* species *wallacii*–group

    The *wallacii*-group of *Amphicnemis* species was defined by Dow (2014) but presents considerable taxonomical problems; the form occurring in Bintulu Division cannot be definitely assigned to any named species at this time, but may ultimately prove to be merely a geographical variant of *A. wallacii* Selys, 1863 itself. Locations **BM7**, **BM9**, **1a**, **2a**, **16c**, **S3**, **S4**.

59. *Archibasis incisura* Lieftinck, 1949

    Location **1a**.

60. *Archibasis melanocyana* (Selys, 1877)

    Location **1a**.

61. *Archibasis tenella* Lieftinck, 1949

    Locations **BM3**, **BM6**, **BM13**, **1a**, **2a**, **3a**, **3b**, **6**, **7**, **8a**, **9a**, **11**, **12**, **18**.

62. *Archibasis viola* Lieftinck, 1949

    Locations **BM3**, **BM9**, **1a**, **2a**, **2b**, **3a**, **3b**, **3c**, **4b**, **8a**, **8e**, **9ci**, **S3**.

63. *Argiocnemis* species

    See Dow & Ngiam (2012) for a discussion of this widespread but unnamed species. Locations **BM7**, **BM9**, **2a**, **3a**, **3b**, **3c**, **6**, **8biii**, **8d**, **8e**, **9a**, **9ci**, **11**, **12**, **14c**, **18**.

64. *Ceriagrion bellona* Laidlaw, 1915*

    Locations **BM5**, **BM9**, **9a**, **12**, **15c**.

65. *Ceriagrion cerinorubellum* (Brauer, 1865)

    Locations **BM5**, **BM7**, **BM9**, **1a**, **2a**, **2b**, **3a**, **3b**, **4b**, **6**, **8a**, **9a**, **9ci**, **11**, **12**, **16a**, **18**, **S3**.

66. *Ischnura senegalensis* (Rambur, 1842)*

    Locations **2a**, **2b**, **17**.

67. *Mortonagrion indraneil* Dow, 2011

    Locations **1a**.

68. *Pericnemis dowi* Orr & Hämälainen, 2013*

    This species has most often been found in forest that has not been disturbed by commercial logging, but the record from Bintulu Division is from logged forest. Location **BM12**.

69. *Pericnemis stictica* Hagen in Selys, 1863*

Locations **1a**, **2a**.

70. *Pseudagrion lalakense* Orr & van Tol, 2001*

Originally thought to be a rare species confined to specialist habitats in Brunei (Orr 2001, Orr & van Tol 2001), *P. lalakense* is now known to be a widespread and, at some locations, common species in Borneo (e.g. Dow & Reels 2008, 2009, 2010, Dolný et al. 2011). Locations **BM2, BM8, 4b, 8d, 16b**.

71. *Pseudagrion microcephalum* (Rambur, 1842)

Locations **BM2**, **2a**, **2b**, **4b**, **16b**, **S1**.

72. *Pseudagrion perfuscatum* Lieftinck, 1937

Locations **1a**, **3a**, **3b**, **6**, **7**, **8a**, **18**, **S7**.

73. *Stenagrion dubium* (Laidlaw, 1912)*

Locations **BM1**, **BM12**, **8c**, **8d**, **8e**, **12**, **13**, **14b**, **15a**, **15b**, **18**.

74. *Teinobasis cryptica* Dow, 2010

Locations **1a**, **2a**.

75. *Teinobasis rajah* Laidlaw, 1912

Locations **1a**, **2a**, **3a**, **3b**, **4b**.

76. *Xiphiagrion cyanomelas* Selys, 1876

Locations **BM5**, **1a**, **4b**, **8c**, **8d**, **9b**, **9cii**, **16a**, **S1**.

Anisoptera

Aeshnidae

77. *Anax guttatus* (Burmeister, 1839)*

A male from location **9b** has unusually short legs. Locations **2a**, **9b**.

78. *Anax panybeus* Hagen, 1867

Locations **BM4**, **9b**, **S1**.

79. *Gynacantha dohrni* Krüger, 1899

Locations **BM4**, **1a**, **2a**, **11**, **16c**.

80. *Gynacantha* species

Female specimens not agreeing with G. *dohrni*. Locations **1a**, **2a**.

81. *Heliaeschna bartelsi* Lieftinck, 1940

Location **2a**.

82. *Heliaeschna* idae (Brauer, 1865)*

Loactions **1a**, **2a**.

83. *Heliaeschna simplicia* (Karsch, 1891)

Locations **BM9**, **1a**, **3b**.

84. *Indaeschna grubaueri* (Förster, 1904)

Locations **2a**, **9a**, **14d**, **S2**.

Figure 15. *Linaeschna polli* male at camp C in 2008. Photo by R.A. Dow.

85. *Linaeschna polli* Martin, 1909

Two males of this exceptionally elusive species have been collected at the stream at Camp C, where they were caught in flight. Repeated attempts to find larvae of this species on and around this stream have failed. Fig. 15 shows a male. Location **9a**.

86. *Oligoaeschna amata* (Förster, 1903)**

These are the first records of this species definitely from Sarawak, although there are records from Borneo lacking definite locations in Lieftinck (1940, 1968) and Martin (1909; as *Jagoria poecilopteta*). Two males were caught at lights in a building in the early morning. A female collected at location **9a** might be the undescribed female of this species. Locations **2a**, **9a** (?).

87. *Oligoaeschna buehri* (Förster, 1903)**

The first (and so far the only) record of this poorly known species for Sarawak was made at Bukit Mina, but it was to be expected in the state because of its known occurrence in Brunei (Lieftinck 1968, Orr 2001). Both sexes were found flying around Bukit Mina Field Station at dusk and dawn. Fig. 16 shows a male. Location **BM4**.

Figure 16. *Oligoaeschna buehri* male at Bukit Mina in 2011. Photo by R.A. Dow.

88. *Oligoaeschna* (?) species **

One female specimen collected in swamp forest at Bukit Sarang; instead of the typical paddle shaped superior anal appendages of female *Oligoaeschna*, it has short,

intact, diamond shaped superior anal appendages, but shares the distinctive spindle shaped abdomen of *Oligoaeschna* and clusters with the genus with molecular data (Naturalis Biodiversity Center unpublished data). There is no record of a female *Oligoaeschna* with anal appendages of this form from Borneo (or of this genus or the closely related *Sarasaeschna* Karube & Yeh, 2001 from elsewhere that we are aware of), but it is possible that this is the unknown female of some species previously recorded from the island; however it is certainly not the female of any species recorded from Sarawak before now. Lieftinck (1968: 141–142) suggested that the females of all species now placed in *Oligoaeschna* (the *O. poeciloptera* assemblage in Lieftinck's terminology) have the paddle shaped appendages, but given that the females of many species are not known, this was perhaps hasty. The first author has seen photographs of a female *Oligoaeschna*, distinct from that reported here, from Indonesia (but not Borneo), which also has atypically shaped anal appendages (Hening Triandika Rachman personal communication October 2018). Location **1a**.

89. *Tetracanthagyna plagiata* (Waterhouse, 1877)

    In addition to the locations listed below, this unmistakable species has also been seen several times at Bukit Sarang. Locations **BM8**, **2a**, **3b**, **11**.

90. *Tetracanthagyna* sp.

    Larval record only, not the last species. Location **8a**.

Gomphidae

91. *Acrogomphus jubilaris* Lieftinck, 1964

    Only one species of *Acrogomphus*, *A. jubilaris*, is known from Borneo, but it is possible that others occur and as all records from Bintulu Division are of larvae, not all of which have been successfully reared, it is possible that more than one species is represented here; Dow & Reels (2010) recorded a larva of *Acrogomphus* from Similajau National Park; this is included here. See also Butler, Steinhoff & Dow (2016). Locations **BM1**, **BM11**, **8c**, **18**, **S3**.

92. *Burmagomphus arthuri* Lieftinck, 1953

    Locations **2a**, **11**.

93. *Gomphidia maclachlani* Selys, 1873

    Gomphidia larvae from two locations are provisionally placed under this species, the most common in Sarawak. These records were previously listed in Dow (2008) and Dow & Reels (2010). Locations **BM6**, **1b**, **2a**, **3a**, **S3**.

94. *Heliogomphus* cf *borneensis* Lieftinck, 1964

    Larval records of *Heliogomphus* are listed under *H.* sp. or spp. in the additional records section of Appendix 1, since there is no guarantee that they are of the same species as the single adult record included here. Location **8c**.

95. *Ictinogomphus decoratus melaenops* (Selys, 1858)

    Locations **1a**, **1b**, **2a**, **3b**, **4b**, **12**, **16b**.

96. *Leptogomphus coomansi* Laidlaw, 1936*

    Location **9a**.

97. *Leptogomphus* species cf *coomansi* Laidlaw, 1936

    See Dow, Stokvis & Ngiam (2017) for a discussion of this form. Location **8c**.

98. *Leptogomphus pendelburyi* Laidlaw, 1934

    Location **15b**.

99. *Leptogomphus williamsoni* Laidlaw, 1912

    Locations **8c**, **8d**, **12**, **15a**.

100. *Macrogomphus parallelogramma* (Burmeister, 1839)

    Macrogomphus parallelogramma is a problematic taxon, and we do not find previous treatments of it entirely convincing. A thorough revision including molecular analyses and material from across the range of the complex is needed. Locations **1a**, **9a**.

101. *Macrogomphus quadratus* Selys, 1878

    Location **2a**.

102. *Megalogomphus* species A*

    This species has been treated as *M. icterops* (Martin, 1902) in the past but is not that species. A revision of this group is pending and the issue of the identity of the Bornean species will be dealt with there. Location **11**.

103. *Megalogomphus* species B*

    This species has been confused with *M. sumatranus* (Krüger, 1899). As with the previous species the identity of the Bornean taxon previously treated as *M. sumatranus* will be dealt with in a forthcoming revision of the group. Locations **BM6**, **9a**.

104. *Merogomphus femoralis* Laidlaw, 1931

    Apart from the record below, all definite records of this species from Sarawak are from Binyo Penyilam, in Bintulu Division; see Dow & Unggang (2010). Outside of Sarawak it is only known from the type, labelled as from Kuala Lumpur (Laidlaw 1931), and from Singapore (Cheong et al. 2009). Location **3b**.

105. *Microgomphus chelifer* Selys, 1858

    Larval records of *Microgomphus* are listed under *Microgomphus* sp. or spp. in the additional records section of Appendix 1. Location **BM12**, **BM13**, **1a**, **1b**, **2a**, **3b**, **6**, **8a**.

Chlorogomphidae

106. *Chlorogomphus* sp. or spp.*

    Larval records only, we do not know if they represent one or more species. Locations **BM1**, **BM11**.

Macromiidae

107. *Epophthalmia vittigera* (Rambur, 1842)*

    Location **8biii**.

108. *Macromia cincta* Rambur, 1842

    Locations **BM4**, **BM6**, **1a**, **2a**, **3a**.

109. *Macromia corycia* Laidlaw, 1922*

Larvae from Camp C and Sungai Philip are good matches to *M. corycia* using the COI marker (Naturalis unpublished data), see Fig. 24 in the second part of this paper. Although this marker is not always reliable for identification, given that *M. corycia* certainly occurs in Sarawak and appears well separated from other species in COI, we see no reason to doubt it in this case. Locations **2a**, **9a**.

110. *Macromia cydippe* Laidlaw, 1922*

Locations **BM6**, **1a**, **2a**.

111. *Macromia* species cf *dione* Lieftinck, 1971***

A larval record from Sungai Gagak, this larva is a good match in the COI marker to the poorly known *M. dione* from Sumatra (see Fig. 24 in the second part of this paper), but, given that this is a far more remarkable record than those of *M. corycia* above, we prefer to leave its identity open until adults are collected, in case this is in fact a closely related but distinct species, not separable from *M. dione* using the COI marker. Location **3a**.

Synthemistidae

112. *Idionyx ?yolanda* Selys, 1871*

A female specimen that cannot be identified with complete certainty at present. Location **BM11**.

113. *Macromidia genialis erratica* Lieftinck, 1948*

An apparently uncommon species in Sarawak. Location **BM12**.

114. *Macromidia fulva* Laidlaw, 1915*

Locations **8a**, **12**.

Corduliidae

115. *Hemicordulia tenera* Lieftinck, 1930

Most records of this species from the lowlands of Sarawak have been from low pH habitats, but that is not the case with the records presented here. The specimen from location **4b** was found floating dead in the ponded section of the stream. Locations **3a**, **4b**.

Libellulidae

116. *Acisoma panorpoides* Rambur, 1842*

Locations **2a**.

117. *Aethriamanta gracilis* (Brauer, 1878)*

Locations **1a**, **2a**, **4b**, **6**, **9b**.

118. *Agrionoptera insignis* (Rambur, 1842)

Locations **1a**, **1b**, **2a**, **3b**, **S1**.

119. *Agrionoptera sexlineata* Selys, 1879

Locations **2a**, **S1**, **S4**, **S5**.

120. *Brachydiplax chalybea* Brauer, 1868*
Locations **BM9**, **1a**, **2a**, **2b**, **3a**, **9a**, **S1**.
121. *Brachydiplax* species cf *farinosa* Krüger, 1902
See the comments in Dow, Choong & Ng 2016; the species occurring in Sarawak is *Brachydiplax farinosa* B in that publication. Locations **BM7**, **BM9**, **2a**, **4b**.
122. *Brachygonia oculata* (Brauer, 1878)
Locations **BM7**, **BM9**, **1a**, **1b**, **2a**, **3b**.
123. *Camacinia gigantea* (Brauer, 1867)
Locations **BM3**, **6**, **15c**, **S1**.
124. *Cratilla lineata* (Brauer, 1878)*
Locations **BM7**, **3a**, **8e**, **9a**.
125. *Cratilla metallica* (Brauer, 1878)
Locations **BM7**, **BM9**, **2a**, **3a**, **3d**, **4c**, **5**, **8c**, **8e**, **9a**, **12**, **13**, **15c**.
126. *Diplacodes trivialis* (Rambur, 1842)
Locations **2a**, **S1**.
127. *Hydrobasileus croceus* (Brauer, 1867)*
Locations **5**.
128. *Lyriothemis biappendiculata* (Selys, 1878)
Locations **10b**, **11**, **14a**, **14c**, **S4**.
129. *Lyriothemis cleis* Brauer, 1868
Locations **4c**, **9a**.
130. *Nannophya pygmaea* Rambur, 1842
Locations **BM1**, **BM2**, **BM3**, **BM5**, **BM9**, **BM12**, **1a**, **2a**, **4b**, **6**, **8a**, **8c**, **9a**, **15c**, **18**, **S1**.
131. *Nesoxenia lineata* (Selys, 1879)
Locations **BM9**, **1a**, **1b**, **2a**, **2b**, **3b**, **16c**.
132. *Neurothemis fluctuans* (Fabricius, 1793)
Locations **BM5**, **BM7**, **BM9**, **BM10**, **BM13**, **1a**, **2a**, **2b**, **3a**, **5**, **6**, **7**, **8e**, **9a**, **9b**, **9ci**, **10a**, **11**, **12**, **15c**, **S1**.
133. *Neurothemis ramburii* (Brauer, 1866)
Locations **1a**, **2a**.
134. *Neurothemis terminata* Ris, 1911
Locations **1a**, **2a**, **3a**, **8a**, **8e**, **9a**, **14a**, **S1**.
135. *Onychothemis culminicola* Förster, 1904
Locations **BM6**, **1a**, **3b**, **18**.
136. *Orchithemis pruinans* (Selys, 1878)
Locations **1a**, **2a**, **3a**, **3b**, **4a**.
137. *Orchithemis pulcherrima* Brauer, 1878
Locations **BM1**, **BM2**, **BM7**, **BM9**, **BM11**, **1a**, **2a**, **3a**, **3b**, **3c**, **4c**, **6**, **8a**, **8d**, **9a**, **9ci**, **9f**, **11**, **S8**.

138. *Orthetrum chrysis* (Selys, 1891)
Locations **BM1**, **BM8**, **1a**, **2a**, **2b**, **3a**, **4b**, **8a**, **8e**, **9a**, **10a**, **11**, **18**, **S1**.

139. *Orthetrum glaucum* (Brauer, 1865)*
Locations **BM4**, **BM13**, **3a**, **3d**, **8a**, **8e**, **9a**, **11**, **12**, **14d**, **15c**, **18**.

140. *Orthetrum pruinosum schneideri* Förster, 1903*
Locations **10a**, **15c**.

141. *Orthetrum sabina* (Drury, 1773)
Locations **BM1**, **BM9**, **BM10**, **1a**, **2a**, **3a**, **5**, **8e**, **9a**, **9b**, **13**, **15c**.

142. *Orthetrum testaceum* (Burmeister, 1839)
Locations **BM4**, **1a**, **2a**, **9a**, **12**, **14a**, **14d**, **15c**, **18**, **S1**, **S3**.

143. *Pantala flavescens* (Fabricius, 1798)*
Locations **BM4**, **2a**, **8a**.

144. *Phyllothemis raymondi* Lieftinck, 1950***
These are the first published records of the genus *Phyllothemis* from Borneo; however there are two male and a female specimen (the latter labelled "allotype") from the Bengin River in East Kalimantan, collected by A.M.R. Wegner in September-October 1956, in the collections of the Naturalis Biodiversity Center. Fig. 17 shows a male specimen from Bintulu Division. Locations **6**, **9a**.

Figure 17. ***Phyllothemis raymondi* male**. **Photo by R.A. Dow.**

145. *Pornothemis serrata* Krüger, 1902 A
Two (possiby even three) species are being treated under this name and it cannot be determined which is the true *P. serrata* without viewing the type. The two species which have been found in Bintulu Division differ in the male accessory genitalia and in both the COI and ITS molecular markers (details will be published elsewhere). One species (A) seems to occur mostly in low pH swamp habitats, the other (B) in freshwater swamp; all records listed here are of species B, ex-

cept a male caught on a plantation road near to Sungai Gagak which belongs to species A, and a female from Similajau National Park could be either species (or concievably the possible third species), although species B appears more likely based on the habitats present at the location. Location **3d**.

146. *Pornothemis serrata* Krüger, 1902 B

See above. Locations **1a**, **1b**, **2a**, **3b**, **S4** (?).

147. *Raphismia bispina* (Hagen, 1867)

Location **S5**.

148. *Rhodothemis rufa* (Rambur, 1842)

Location **2a**.

149. *Rhyothemis aterrima* Selys, 1891

Locations **BM9**, **1a**.

150. *Rhyothemis fulgens* Kirby, 1889

As noted in Dow, Ngiam & Ahmad (2015), this species had been treated as a junior synonym of *R. pygmaea* (Brauer, 1867) by most authorities, following Ris (1913), although Lieftinck (1954: 169, footnote 1) noted "there is some reason to believe that Malaysian examples of *pygmaea* (*fulgens* KIRBY) are not conspecific with genuine *pygmaea*." Actually *R. fulgens* is clearly distinct from *R. pygmaea*, differing markedly in its superior anal appendages (see the sketches in Figs. 18–19). Locations **1b**.

151. *Rhyothemis obsolescens* Kirby, 1889*

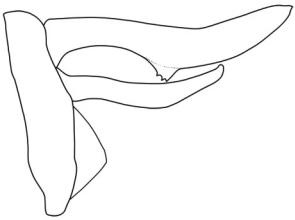
Locations **BM2**, **BM9**, **1a**, **2a**, **2b**, **3a**, **4b**, **6**, **9ci**, **9cii**, **16a**.

152. *Rhyothemis phyllis* (Sulzer, 1776)*

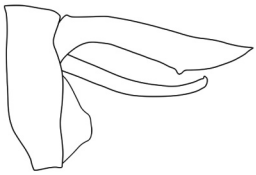
Locations **BM2**, **BM4**, **BM10**, **1a**, **2a**, **4b**, **8e**, **11**.

153. *Rhyothemis triangularis* Kirby, 1889

Locations **BM9**, **1a**, **2a**, **7**, **14c**, **S1**.



18



19

Figures 18–19. Sketches of anal appendages of males of *Rhyothemis* species in lateral view: (17) *R. fulgens*. From a specimen in the Naturalis collection (Kembang Djangut, East Kalimantan, Indonesia, 28.xi.1956, leg. Wegner). (18) *R. pygmaea*. From a specimen in the Naturalis collection (Obi Island, Moluccas, Indonesia, ix.1953, leg. Wegner).

154. *Risiophlebia dohrni* (Krüger, 1902)*

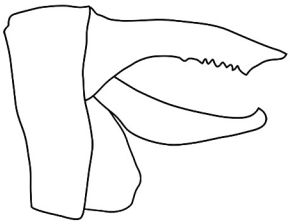
Location **1a**.

155. *Tetrathemis flavescens* Kirby, 1889*

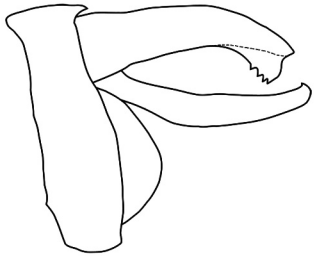
Only a few sites are known for this rarely recorded species. Locations **BM9**, **1a**.

156. *Tetrathemis hyalina* Kirby, 1889*

Ris (1909) treated Kirby's *T. hyalina* as a subspecies of *T. irregularis* Brauer, 1868, a course followed by almost all subsequent authors (although Dow & Ngiam 2014 referred to it as *T. hyalina* without comment). In fact the two are distinct species, a subject that will be dealt with in more detail elsewhere; here we merely give illustrations of the anal appendages of both species in lateral view (Figs. 20–21). It should be noted that there is considerable variation in, for instance, the length of the superior anal appendages relative to the inferior one in *T. hyalina*, but the difference in the shape of the tips of the superior appendages is consistent and this is the character that should be considered as diagnostic. Both species are known to occur together at a location in Palawan (based on specimens in the Naturalis collection). Locations **BM9**, **1a**, **1b**, **2a**, **2b**, **3a**, **3b**, **4b**, **7**, **9a**, **18**.



20



21

Figures 20–21. Sketches of anal appendages of male *Tetrathemis* species in lateral view: (19) *T. hyalina* in lateral view. From a specimen in the Naturalis collection (Maray Paray, Quezon, Palawan, the Philippines, 25.v.-1.vi.1956, leg. Borromeo & Buenafe). (20) *T. irregularis*. From a specimen in the Naturalis collection (Lake Danao, Loreto, Surigao Norte, Palawan, the Philippines, 5.v.1989, leg. Buenafe).

157. *Tholymis tillarga* (Fabricius, 1798)*

Locations **2a**, **9b**, **S1**.

158. *Tramea transmarina euryale* Selys, 1878

Locations **BM2**, **BM5**, **8c**, **S1**.

159. *Trithemis aurora* (Burmeister, 1839)

Locations **BM5**, **2a**, **3a**, **5**, **8d**, **8e**, **9a**, **9b**, **10a**, **15c**.

160. *Trithemis festiva* (Rambur, 1842)*

Locations **BM2**, **5**, **8a**, **8d**, **8e**, **9a**, **10a**, **12**, **14d**.

161. *Tyriobapta laidlawi* Ris, 1919
Locations **BM12**, **2a**, **8a**, **9a**, **S2**, **S3**.
162. *Tyriobapta torrida* Kirby, 1889
Locations **BM1**, **BM7**, **BM9**, **BM11**, **BM13**, **1a**, **1b**, **2a**, **3b**, **3c**, **4b**, **5**, **6**, **8a**, **9a**, **9ci**, **11**, **12**, **S6**.
163. *Urothemis signata insignata* (Selys, 1872)
Locations **BM1**, **BM2**, **2a**, **9b**, **16a**.
164. *Zygonyx ida errans* Lieftinck, 1953
Location **S7**.
165. *Zyxomma obtusum* Albarda, 1881
Location **S1**.
166. *Zyxomma petiolatum* Rambur, 1842
Location **1a**, **2a**, **S1**.

Discussion

We have listed 166 species from Bintulu Division in this paper. With records (published and unpublished) from Binyo Penyilam and older literature records, at least 183 species are known from the division. Within Sarawak, only Kuching and Miri Divisions have more species recorded (based on published and unpublished data), with more than 200 species known from each. Although a relatively large amount of sampling for Odonata has already been conducted in the division, more species will undoubtedly be found, and it is likely that the final total will be in excess of 200 species. It is evident from Fig. 2 that less sampling has been conducted in the southwest and northeast of the division than in the central part, and these areas are a priority for future work. It is noteworthy that the highest altitude at which Odonata have been looked for in the division is below 500m a.s.l. Although Bintulu Division has a much smaller altitudinal range than some other parts of Sarawak, there are peaks that approach (Gunung Mersing in the south west) or slightly exceed (Bukit Kana) 1000m a.s.l. in the division and others that significantly exceed 600m a.s.l. so that water should occur above 500m a.s.l.; more sampling above 400m a.s.l. is another of the priorities for future work there.

Part 2. Results of the molecular analyses

The limited molecular analyses presented here for species of *Archibasis* and *Macromia* are of interest beyond the main scope of this paper and are therefore included separately from the species list.

Table 1. Collection codes and BOLD Process IDs for *Archibasis* specimens used for molecular analysis, and including a *Pseudagrion* outgroup. Location information, collection data are listed for each specimen. Male is indicated by m, female by f. The collection codes can be used to locate the COI sequences on the BOLD website, and also appear as BOLD Sample IDs there.

Species	RMNH number	Sex/ stage	Country/ Province/District	Location and/or date	BOLD process ID
Archibasis incisura	RMNH.INS.506747	m	Indonesia, Kalimantan Tengah	28.vi.2012	ODOBP4143-16
	RMNH.INS.509362	m	Brunei, Belait	14.iii.2013	ODOBP6822-16
	RMNH.INS.557645	m	Malaysia, Sarawak, Bintulu	Bukit Sarang, 10.viii.2013	ODOBP4674-16
	RMNH.INS.557771	m	Sumatra, Riau	15.ii.2014	ODOBP4798-16
Archibasis oscillans	RMNH.INS.557743	m	Sumatra, Riau	15.ii.2012	ODOBP4771-16
Archibasis viola	RMNH.INS.503604	m	Malaysia, Sarawak, Bintulu	Tubau, 16.vi.2010	ODOBP2253-16
	RMNH.INS.505822	m	Malaysia, Johor	25.iv.2009	ODOBP3386-16
	RMNH.INS.506860	m	Malaysia, Sarawak, Betong	Maludam NP, 7.vii.2012	ODOBP5202-16
	RMNH.INS.506936	m	Malaysia, Sarawak	Kuching	ODOBP5273-16
	RMNH.INS.509241	m	Cambodia, Koh Krong	2.xi.2010	ODOBP6703-16
	RMNH.INS.509242	f	Cambodia, Koh Krong	29.xi.2010	ODOBP6704-16
	RMNH.INS.557773	f	Sumatra, Riau	15.ii.2014	ODOBP4800-16
	RMNH.INS.557774	m	Sumatra, Riau	15.ii.2014	ODOBP4801-16
	RMNH.INS.557887	m	Brunei, Belait	Sungai Ingei, 4.iii.2014	ODOBP4908-16
Pseudagrion williamsoni	RMNH.INS.501365	m	Malaysia, Pahang	19.ix.2009	ODOBP8495-16

Materials and methods

Specimens

The dataset used for *Archibasis* includes 14 specimens, plus outgroup, from Borneo, Cambodia, Peninsular Malaysia and Sumatra (see Table 1). The dataset for *Macromia* includes 28 specimens (adult and larval), plus outgroup, from Borneo, China, Peninsular Malaysia and Sumatra (see Table 2). The mitochondrial marker COI

Table 2: Collection codes and Process IDs for *Macromia* specimens used for molecular analysis, and including an *Epophthalmia* outgroup. Location information, collection data are listed for each specimen. Male is indicated by m, female by f and larva by l. The collection codes can be used to locate the COI sequences on the BOLD website, and also appear as BOLD Sample IDs there.

Species	RMNH number	Sex/ stage	Country/ Province	Location & date	BOLD process ID
Macromia beriandi	RMNH.INS.506484	m	Hong Kong		ODOBP3894-16
Macromia calliope	RMNH.INS.509129	f	China, Guangdong		ODOBP6605-16
Macromia callisto	RMNH.INS.229059	l	Malaysia, Sarawak, Miri	Gunung Mulu NP, 14.I.2008	ODOBP7548-16
	RMNH.5010322	m	Indonesia, East Kalimantan	24.xi.2005	ODOBP980-16
Macromia cincta	RMNH.INS.501364	m	Malaysia, Pahang		ODOBP8494-16
	RMNH.INS.509633	f	Brunei, Belait		ODOBP7090-16
	RMNH.INS.557651	m	Malaysia, Sarawak, Bintulu	Bukit Sarang	ODOBP4680-16
Macromia corycia	RMNH.INS.229083	l	Malaysia, Sarawak, Bintulu	Sungai Philip	ODOBP7564-16
	RMNH.5008333	l	Malaysia, Sarawak, Bintulu	Camp C	ODOBP407-16
	RMNH.5008345	l	Malaysia, Sarawak, Bintulu	Sungai Philip	ODOBP419-16
	RMNH.5008348	l	Malaysia, Sarawak, Bintulu	Sungai Philip	ODOBP422-16
	RMNH.5008427	m	Malaysia, Sarawak, Miri	Ulu Moh	ODOBP479-16
Macromia cydippe	RMNH.INS.228979	m	Malaysia, Sarawak, Miri	Gunung Mulu NP	ODOBP7472-16
	RMNH.INS.229035	l	Malaysia, Sarawak, Miri	Gunung Mulu NP, Long Lansat, 9.I.2008	ODOBP7525-16
	RMNH.INS.500078	l	Malaysia, Sarawak, Bintulu	Sungai Philip, 24.x.2008	ODOBP7727-16
	RMNH.INS.506381	f	Malaysia, Sarawak, Miri	Gunung Mulu NP, Sg Paku, 23.v.2012	ODOBP3796-16
	RMNH.INS.557671	l	Malaysia, Sarawak, Kapit	LEWS, 21.viii.2013	ODOBP4700-16
Macromia dione	RMNH.INS.557808	m	Sumatra, Riau		ODOBP4834-16
Macromia sp.	RMNH.INS.229050	l	Malaysia, Sarawak, Miri	Gunung Mulu NP, Camp 1, 12.I.2008	ODOBP7540-16
Macromia sp. cf *dione*	RMNH.INS.229089	l	Malaysia, Sarawak, Bintulu	Sungai Gagak	ODOBP7569-16
Macromia westwoodii	RMNH.INS.500015	l	Malaysia, Sarawak, Miri	Mount Dulit	ODOBP7698-16
	RMNH.INS.503529	m	Malaysia, Sarawak, Kapit	Hose Mountains, 23.v.2010	ODOBP2191-16
	RMNH.INS.503530	m	Malaysia, Sarawak, Kuching	Kubah NP, 3.vi.2010	ODOBP2192-16
	RMNH.INS.503531	f	Malaysia, Sarawak, Kuching	Kubah NP	ODOBP2193-16
	RMNH.INS.507823	m	Malaysia, Sarawak, Kuching	Gunung Pueh	ODOBP5693-16
	RMNH.INS.509697	l	Malaysia, Sarawak, Kuching	Kubah NP, 1.vii.2013	ODOBP4205-16
	RMNH.INS.506334	m	Malaysia, Sarawak, Miri	Usun Apau NP, 28.iv.2012	ODOBP3751-16
	RMNH.INS.506340	m	Malaysia, Sarawak, Miri	Usun Apau NP, 28.iv.2012	ODOBP3756-16
Epophthalmia vittigera	RMNH.INS.557889	m	Brunei, Belait		ODOBP4910-16

was amplified from all of these specimens and the nuclear marker ITS from the *Archibasis* specimens plus outgroup.

The gene trees resulting from Maximum Likelihood (ML) and Bayesian Inference (BI) of these sequences, are shown in Figs. 22, 23 (*Archibasis*) and Fig. 24 (*Macromia*). All sequences have been uploaded to the BOLD website and can be found there using the collection codes or BOLD Process IDs listed in Tables 2 and 3.

Methods

DNA extraction and amplification. This was carried out as detailed in Dow & Stokvis (2018) and (for ITS) Dow, Stokvis & Ngiam (2017) and the reader is referred to the relevant sections in those publications for details.

Analysis. This was performed as described in Dow & Stokvis (2018) and Dow, Stokvis & Ngiam (2017) and the reader is referred to the relevant sections in those publications for details.

Archibasis

DNA barcoding is a useful tool in taxonomy, but its limitations need to be clearly understood: Unless one defines species to mean COI gene species, not all distinct species are distinguishable using COI (or any other single marker) and conversely entities that appear well separated from one-another in this marker on the basis of a limited number of samples are not always distinct species in a broader sense. The cause of the first of these problems is typically taken to be introgression (although simple but perhaps unpopular paraphyletic speciation is another possibility in some cases), and to quote from a recent paper on speciation (Shapiro et al. 2016: 7) "gene flow by sexual hybridization across eukaryotic species boundaries (introgression) can be strong enough to obscure species branching events in large regions of the genome.". The *Archibasis* data presented here seem to illustrate the introgression point well. *Archibasis incisura* and *A. viola* are undoubtedly distinct biological species, well differentiated morphologically, and can be found together at some locations. *Archibasis oscillans* (Selys, 1877) is clearly closely related to *A. incisura* but to our knowledge there is no reason to believe that they are synonyms. This is especially so since their ranges overlap in Sumatra and Peninsular Malaysia but there is no record of any intermediate specimen. However these three species are indistinguishable using COI (or more precisely the standard 658 bit pair section of COI used for DNA barcoding) as can be seen in the COI gene tree in Fig. 22, which shows the results of Maximum Likelihood and Bayesian analyses of COI data. Neighbour joining analyses give similar results. The COI results are almost certainly due to introgression. Using the same analyses methods, *A. incisura* plus *A. oscillans* are clearly separated from *A. viola* in the ITS marker (Fig. 23), and *A. incisura* and *A. oscillans* appear to also be separated, albeit weakly, in the same marker. Although more samples of *A. oscillans* are certainly needed to increase confidence in this result, the *A. incisura* samples included (from Sumatra and widely separated parts of Borneo) show little variation in ITS, as do the *A. viola* samples (from Borneo, Sumatra, Peninsular Malaysia and Cambodia), suggesting that relatively small differences in this marker may be taxonomically significant for *Archibasis* species. If any one or two of these species was not a

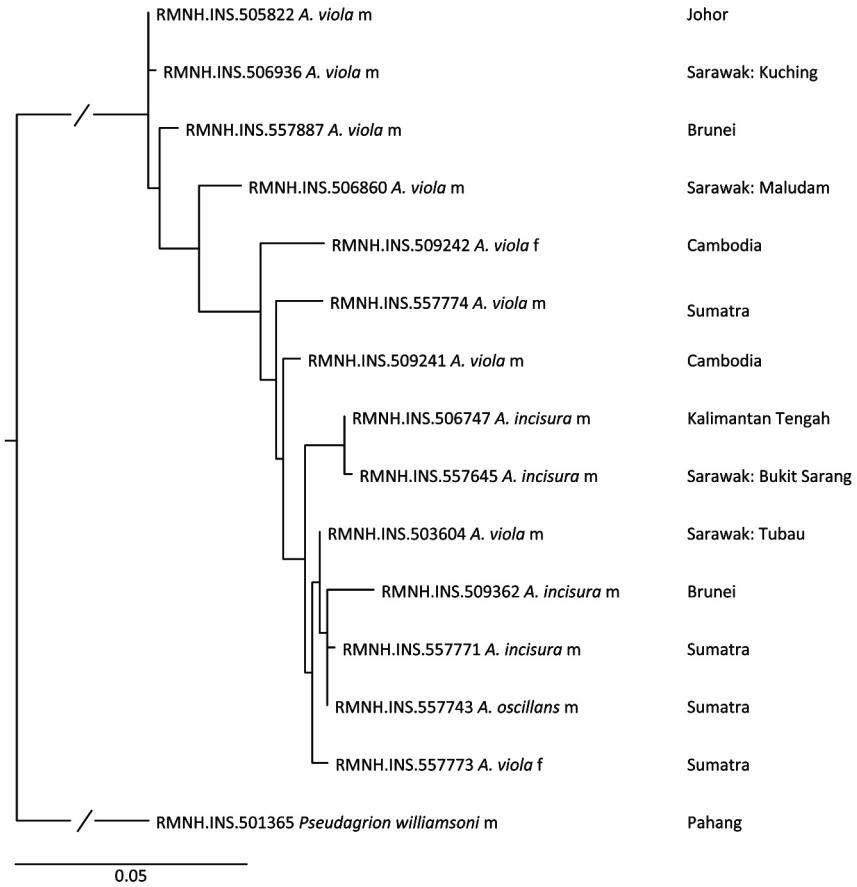


Figure 22. COI gene tree for *Archibasis* species from Maximum Likelihood (ML) and Bayesian Inference (BI). The best ML tree is shown. Bootstrap values and posterior probabilities (generally low) are omitted for clarity. RMNH collection codes are shown for each specimen, as well as the sex (male is indicated by m and female by f) of the specimen and an indication of where it was collected; the reader is also referred to Table 1.

known species they would not be discovered using this dataset and COI based DNA barcoding alone or techniques based on it such as bar code gap analysis. Examples such as this illustrate the limitations of single marker methods in species discovery. Although males of these species are readily distinguished, identification of females is presently more difficult and the larvae of the species are likely to be very similar to each other. A simple, single marker molecular method for identifying females and, especially, the larvae of these species is obviously desirable and although COI fails in this regard, ITS appears likely to fit the bill.

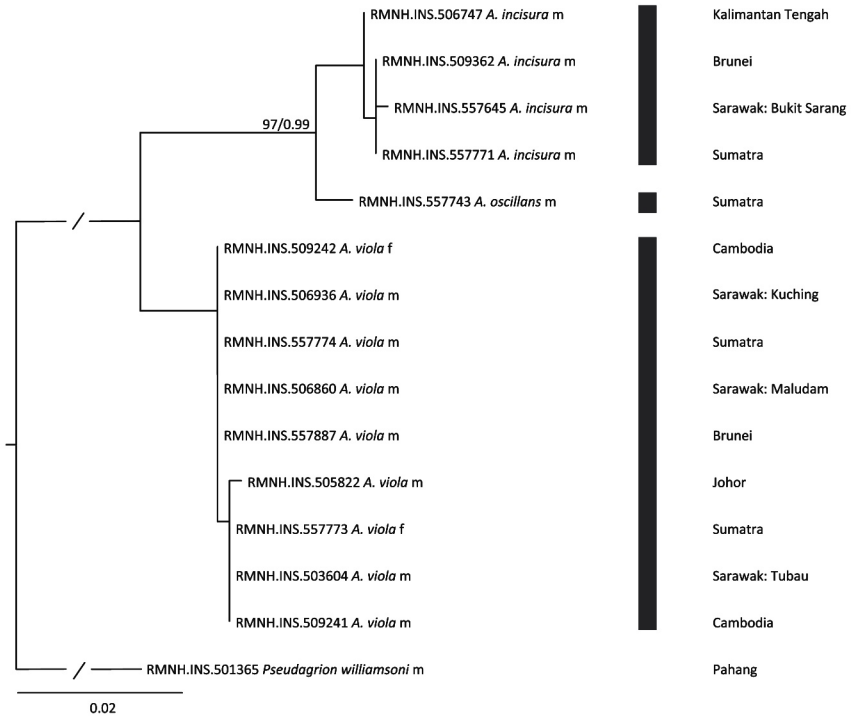


Figure 23. ITS gene tree for *Archibasis* species from Maximum Likelihood (ML) and Bayesian Inference (BI). The best ML tree is shown, with posterior probabilities from the BI analysis also depicted on the branches. Bootstrap values and posterior probabilities are shown if less than 100 or 1.0 respectively. RMNH collection codes are shown for each specimen, as well as the sex (male is indicated by m and female by f) of the specimen and an indication of where it was collected; the reader is also referred to Table 1.

Macromia

Many species of *Macromia* appear to be only weakly or not at all differentiated in their anal appendages and accessory genitalia and to have been largely judged as distinct from each other on the basis of size, colour pattern and apparent geographical separation. It is likely that there are many synonyms in this genus in Asia, and, for example, Kosterin (2015) questioned the separate status of *M. berlandi* Lieftinck, 1941 and *M. cupricincta* Fraser, 1924 (supposing that *M. berlandi* is merely a northern subspecies of *M. cupricincta*) and Dow & Ngiam (2015) that of *M. corycia* Laidlaw, 1922 and *M. gerstaeckeri* Krüger, 1899. There is a need to revise the genus in Asia, but this is a huge and difficult task that in practice will have to be undertaken in a number of small steps. Here we present and discuss COI data (Fig. 24 shows the gene tree) for a part of the genus in Asia, and some morphological data for one pair of species occurring in Borneo, as a part of one of these small steps.

In contrast to the *Archibasis* species considered above, the *Macromia* species included in our analyses are mostly well differentiated in the COI marker. The possible exceptions to this are the *M. dione* and *M.* cf *dione* pair, and the *M. callisto* and *M. calliope* pair (refer to Fig. 24). *Macromia dione* is very similar to *M. callisto* and it is interesting that the two appear well differentiated in COI, although more samples are need to confirm this. We are being conservative with regards to the identity of *M.* cf *dione* in the absence of adult material, but given the kind of habitat (a stream in oil palm plantation, see Dow et al. 2018) that confirmed *M. dione* has now been recorded in in Sumatra, it would not be surprising for the species to be both much more widely distributed than is currently known and to occur in the kind of habitat in which the larva from Bintulu was found (a stream in *Acacia* plantation).

Regarding *M. callisto* and *M. calliope*, the similarity in Fig. 24 may merely be another case of COI failing to separate distinct species. However although the two species were placed in the same species group by Lieftinck (1929), they seem never to have been rigorously compared to each other and in fact are very similar in the male anal appendages and accessory genitalia, but differ quite markedly in size and colour pattern. This lack of comparison may have occurred because of supposed large geographic separation: *M. callisto* had only been recorded from Malaysia in the period over which all of Lieftinck's discussions of the genus were written, and *M. calliope* only from Vietnam. However the ranges of the two species may overlap, *M. callisto* was recorded from Thailand, first by Asahina (1981), and Yokoi & Souphanthong (2014) list both from Laos (with *M. calliope* also now known from China). We are certainly not suggesting that the two should be synonymised on the basis of COI without further investigation, merely that such investigation should take place, if only to confirm their separate status.

Macromia westwoodii and *Macromia euterpe* are another pair of very similar species. The molecular analysis includes a number of adult and larval examples of *M. westwoodii* from various locations in Sarawak, including one from the Hose Mountains previously identified as *M. euterpe* (see below), all of which cluster together in a single clade with little variation in COI. The larva from Gunung Mulu National Park, which had been identified as *M. westwoodii* on morphological grounds, that appears as a sister to *M. westwoodii* in Fig. 24 is curious and might be another, hitherto undetected species. However this could be a case where a nuclear mitochondrial DNA segment (NUMT: a non-coding copy of part of an organism's mitochondrial DNA in its nuclear genome) has been amplified rather than the true mitochondrial COI, or there might merely be more variation in COI in *M. westwoodii* than the other samples analysed to date show.

Macromia westwoodii was described from a female from Penang Island and aside from a presumably erroneous record from Vietnam (Martin 1904) and a record from Palawan (Hämäläinen & Müller 1997) has only ever been recorded from Sundaland to our knowledge. The first records for Borneo are in Lieftinck (1935). Curiously, the series from one of the locations mentioned was collected in "swampy forest", not typical habitat for this species in our experience. *Macromia euterpe* was described from a series of three males and two females from Mount Kinabalu in Sabah (Laidlaw 1915b) and later also recorded from Mount Merinjak (Laidlaw 1920: one male and one female) and Mount Dulit (Kimmins 1936: one male), both in Sarawak. Laidlaw (1915b) did not give

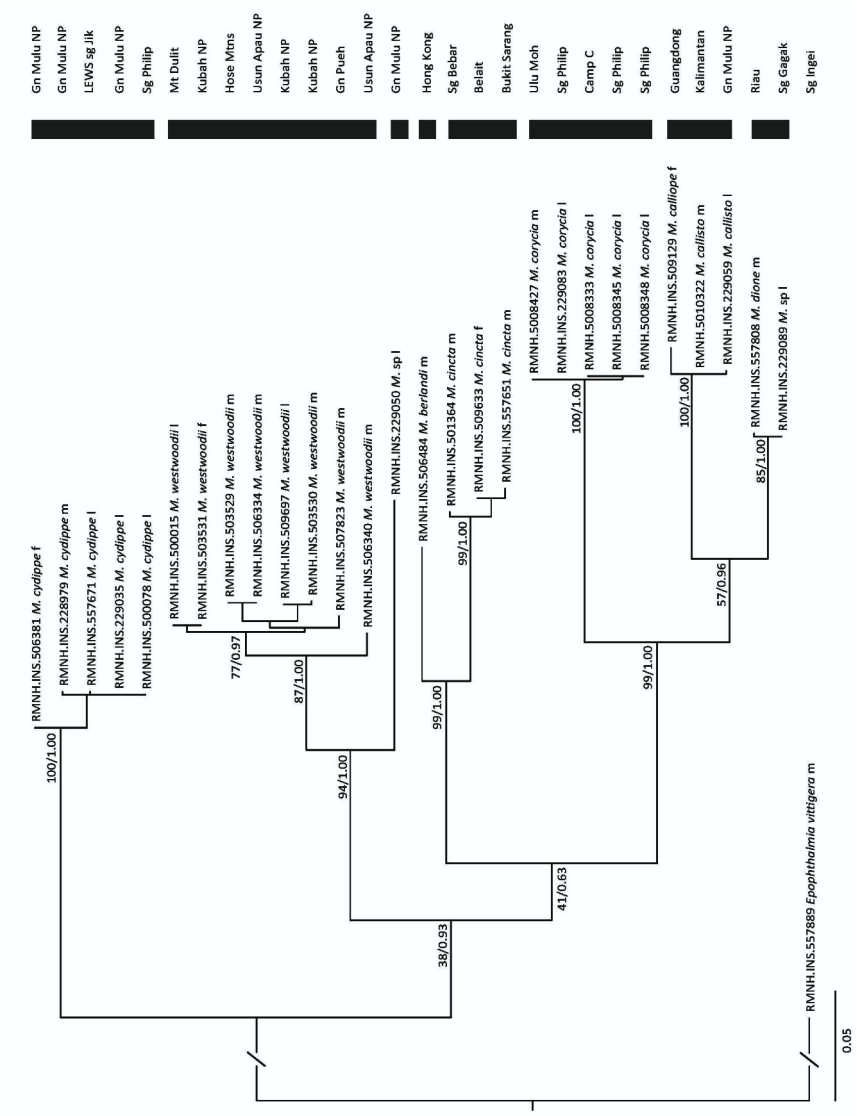


Figure 24. COI gene tree for *Macromia* species from Maximum Likelihood (ML) and Bayesian Inference (BI). The best ML tree is shown, with posterior probabilities from the BI analysis also depicted on the branches. Bootstrap values and posterior probabilities are shown if less than 100 or 1.0 respectively. RMNH collection codes are shown for each specimen, as well as the sex (male is indicated by m, female by f and larva by l) of the specimen and an indication of where it was collected; the reader is also referred to Table 2.

Table 3. Measurements of males of *Macromia westwoodii* and of *M. euterpe* (from Laidlaw 1915), ordered by increasing Hw length and then increasing abdomen plus anal appendages length. * - specimen listed in Dow et al. 2015a as *M. euterpe*.

Species	Hw (mm)	Abd. + apps. (mm)	Location	Approximate altitude (m a.s.l.)
M. westwoodii	40.5	43.5	Gunung Melatai, Kapit, Sarawak	1100
*M. westwoodii**	41	43	Hose Mountains, Kapit, Sarawak	1300-1400
M. westwoodii	42.5	43	Usun Apau, Miri, Sarawak	1000
M. westwoodii	42.5	45	Sungai Sii, Miri, Sarawak	250-300
M. euterpe	43	43	Mount Kinabalu, Sabah	1000?
M. westwoodii	43	44	Usun Apau, Miri, Sarawak	1000
M. westwoodii	43	45	Kedah, Peninsular Malaysia	350-450
M. westwoodii	43	47	Gunung Serapi, Kuching, Sarawak	400-600
M. westwoodii	43.5	44.5	Gunung Kalulong, Miri, Sarawak	750-920
M. westwoodii	44	43	Gunung Melatai, Kapit, Sarawak	1100
M. westwoodii	44	44	Tama Abu Range, Miri, Sarawak	1400-1550
M. westwoodii	44	44	Gunung Melatai, Kapit, Sarawak	1100
M. westwoodii	44	45	Kedah, Peninsular Malaysia	350-450
M. westwoodii	44	46	Gunung Serapi, Kuching, Sarawak	400-600
M. westwoodii	44	47	Gunung Kalulong, Miri, Sarawak	300
M. westwoodii	44	47.5	Mount Dulit, Miri side, Sarawak	100-400
M. westwoodii	44	50	Hose Mountains, Kapit, Sarawak	800-900
M. westwoodii	44.5	45	Usun Apau, Miri, Sarawak	1000
M. westwoodii	45	46	Mount Dulit, Kapit side, Sarawak	1000-1100
M. westwoodii	45	48	Bukit Baya, Sri Aman, Sarawak	450-500
M. westwoodii	45	48	Ulu Balui, Kapit, Sarawak	940-1010
M. westwoodii	45	48	Gunung Kalulong, Miri, Sarawak	750-920
M. westwoodii	45	50	Hose Hose Mountains, Kapit, Sarawak	920-1020
M. westwoodii	45	50.5	Gunung Ungaran, Central Java	795
M. westwoodii	46	47	Bukit Baya, Sri Aman, Sarawak	450-500
M. westwoodii	46	49	Bukit Baya, Sri Aman, Sarawak	450-500
M. westwoodii	47	48	Merawa Camp, Miri, Sarawak	1100
M. westwoodii	48.5	52	Tama Abu Range, Miri, Sarawak	1100-1200

the altitude at which the specimens were collected, but later (Laidlaw 1934) gave 3,300 feet as the altitude, but it is not clear from where he got this figure; Kimmins (1968) does not mention it as included on the labels of the lectotype nor did the first author find any such annotaion on the labels. Lieftinck (1954) did not include the record from Mount Merinjak in his summary of *M. euterpe* (or under any other species), presumably this was merely an oversight. The next original records of this species from

Sarawak were in Dow (2006) from the Tama Abu Range and in Dow et al. (2015) from the Hose Mountains. Since the first of these records was published the first author has developed considerable doubts over it and over the status of *M. euterpe* as a separate species, as mentioned in Dow et al (2015: 28). Laidlaw (1915b) onlly compared males of his species with a male supposed to be that of *M. westwoodii* from Bangka Island (but this specimen is now known to belong to *M. cydippe*) and noted that his females differ from the female of *M. westwoodii* (based only on a description) in size and wing venation. Laidlaw stated that a male and a female "cotype" were or would be deposited in the Sarawak Museum but these specimens have not been found there and are either lost or were never sent or returned to the museum.

Lieftinck (1929) examined one of the paratypes of *M. euterpe* given to him by Laidlaw and provided a key in which *M. euterpe* is separated from *M. westwoodii* on the basis of markings on the thorax present in Javan examples of *M. westwoodii* but not present in Bornean examples. Lieftinck (in the key) gives the length of the pterostigma as 1.75mm in *M. euterpe*, significantly shorter than in *M. westwoodii*, but Laidlaw (1915b: 26) correctly gives the length of the pterostigma as "2.5 mm. or a trifle less" which is within the range for *M. westwoodii*, Lieftinck also provided illustrations of the anal appendages and accessory genitalia of both species, which do not show any convincing difference between the two species. The first author has re-examined male material of *M. westwoodii*, including examples from Java and Peninsular Malaysia, and specimens previously identified as *M. euterpe* in his collection, and can find no convincing difference between them in the anal appendages or accessory genitalia. A spectrum of sizes is present (see Table 3, which includes Laidlaw's measurements of abdomen and Hw for *M. euterpe*) and it is apparent that although *M. euterpe* is at the lower end of the size range it falls within the variation in *M. westwoodii*. Here we consider the records of *M. euterpe* from Sarawak in Dow (2006) and Dow et al. (2015) to actually refer to *M. westwoodii*.

In late February 2019 the first author was able to examine the type of *M. euterpe* in the Natural History Museum, London and could not find any indication that it is outside of the variation seen in *M. westwoodii*. The male specimen labelled as *M. euterpe* from Mount Dulit was also located, and again falls within the variation seen in *M. westwoodii*. No specimens from Mount Merinjak were found. It appears certain that *M. euterpe* is a junior synonym of *M. westwoodii* but formal combination of the two is perhaps best done in a peer reviewed publication and will therefore be done elsewhere. In the meantime *M. euterpe* is dropped from the list of species occurring in Sarawak since we can be confident that the specimens from Mount Merinjak, which would have been identified with reference to the published descriptions and/or direct comparision with the type, will also fall within the variation seen in *M. westwoodii*.

Acknowledgements

We would like to thank the Sarawak Forestry Corporation and Sarawak Forest Department for granting permission to collect Odonata in Sarawak. All of us owe a debt to various staff members (past and present) of the Conservation Department of Grand Perfect Pusaka Sendirian Berhad and the authors in various combinations are also

thankful to the staff of Similajau National Park and the Anap Muput Forest Management Unit. Oleg Kosterin and Haomiao Zhang provided specimens included in the molecular analyses to the Naturalis Biodiversity Center. Hening Triandika Rachman kindly allowed the first author to mention his *Oligoaeschna* record.

References

Asahina, S., 1981. Records of little or unknown Odonata from Thailand. Tombo 23(1/4): 3–16.

Butler, S.G., 2011. Description of the last instar larvae of *Ictinogomphus acutus* (Laidlaw) from Sarawak, with a key to the larvae of the congeneric species (Anisoptera: Gomphidae). Odonatologica 40(2): 123–129.

Butler, S.G., 2013. Description of the last instar larva of *Orchithemis pulcherrima* Brauer from Sarawak, Malaysia (Anisoptera: Libellulidae). Odonatologica 42(3): 247–251.

Butler, S.G. & A.G. Orr, 2013. The larva of *Heliaeschna simplicia* Karsch, 1891 (Anisoptera: Aeshnidae). Odonatoologica 42(2): 151–156.

Butler, S.G., P.O.M. Steinhoff & R.A. Dow, 2016. Description of the final instar larva of *Acrogomphus jubilaris* Lieftinck, 1964 (Odonata, Gomphidae), with information on the distribution of *Acrogomphus* in Borneo. Zootaxa 4184(2): 367–375.

Cheong, L.F., Tang, H. B. & Ngiam, W.J., 2009. New records for Singapore dragonflies. Agrion 13(1): 8–13.

Dolný, A., D. Bárta, S. Lhota, Rusdianto & P. Drozd, 2011. Dragonflies (Odonata) in the Bornean rain forest as indicators of changes in biodiversity resulting from forest modifications and destruction. Tropical Zoology 24: 63–86.

Dow, R.A., 2005. Odonata, burglary and ballistic cicadas in South–east Asia. Agrion 9(1): 10–12.

Dow, R.A., 2008. Odonata of the "Glen Forest" at Samarakan, Bintulu Division, Sarawak, Malaysian Borneo. Agrion 12(2): 46–48.

Dow, R.A., 2010a. Two new Platystictidae (Odonata: Zygoptera) from Sarawak, Malaysian Borneo. Zootaxa 2412: 63–68.

Dow, R.A., 2010b. A review of the *Teinobasis* of Sundaland, with the description of *Teinobasis cryptica* sp. nov. from Malaysia (Odonata: Coenagrionidae). International Journal of Odonatology 13(2): 205–230, plate II.

Dow, R.A., 2010c. Revision of the genus *Coeliccia* (Zygoptera: Platycnemididae) in Borneo. Part I: The *borneensis*–group of species. Zoologische Mededelingen 84(7): 117–157.

Dow, R.A., 2011a. Stephen Stone anak Singki and new records of *Linaeschna polli* Martin *from Sarawak. Agrion 15(2): 48–49.*

Dow, R.A., 2011b. *Mortonagrion indraneil* spec. nov. from Borneo, and a redescription of *M. arthuri* Fraser (Odonata: Zygoptera: Coenagrionidae). Zootaxa 3093: 35–46.

Dow, R.A., 2013. *Drepanosticta burbachi* spec. nov. from Sarawak, Borneo, a new species allied to *D. dulitensis* Kimmins, with notes on related species (Zygoptera: Platystictidae). Odonatologica 42(3): 203–2010.

Dow, R.A., 2014. *Amphicnemis triplex* sp. nov. from Central Kalimantan, Indonesia (Odonata: Coenagrionidae). Odonatologica 43(1/2): 67–77.

Dow, R.A., 2017. A new Bornean species of *Drepanosticta* allied to *D. actaeon* Laidlaw, with notes on related species (Odonata: Zygoptera: Platystictidae). International Dragonfly Fund – Report 104: 1–32.

Dow, R.A., A.D. Advento, E.C. Turner, J.-P. Caliman, W.A. Foster, M, Naim, J.L. Snaddon & S. Ps, 2018. Odonata from the BEFTA Project area, Riau Province, Sumatra, Indonesia. Faunistic Studies in South-East Asian and Pacific Island Odonata 24: 1–22.

Dow, R.A., C.Y. Choong & Y.F. Ng, 2016. Records of Odonata from Perlis, Malaysia in August 2015, with a checklist of species recorded from the state. Faunistic Studies in South–East Asian and Pacific Island Odonata 16: 1–22.

Dow, R.A., C.Y. Choong & A.G. Orr, 2007. Two new species of *Chalybeothemis* from Malaysia, with a redefinition of the genus (Odonata: Libellulidae). International Journal of Odonatology 10 (2): 171–184.

Dow, R.A. & M. Hämäläinen, 2008. *Libellago orri* sp. nov. from northern Borneo (Odonata: Chlorocyphidae). International Journal of Odonatology 11(1): 27–34, Pl. II.

Dow, R.A., M. Hämäläinen & F.R. Stokvis, 2015. Revision of the genus *Devadatta* Kirby, 1890 in Borneo based on molecular and morphological methods, with descriptions of four new species (Odonata: Zygoptera: Devadattidae). Zootaxa 4033(3): 301–349.

Dow, R.A. & R.W.J. Ngiam, 2012. Odonata collected in the Hose Mountains, Kapit Division, Sarawak, Malaysia in April 2011. International Dragonfly Fund Report 44: 1–18.

Dow, R.A. & R.W.J. Ngiam, 2014. Odonata from logged and unlogged forest in the Ulu Balui and Ulu Baleh, Kapit Division, Sarawak, in June and September 2013. International Dragonfly Fund Report 73: 1–48.

Dow, R.A. & R.W.J. Ngiam, 2015. Odonata from two areas in the Upper Baram in Sarawak: Sungai Sii and Ulu Moh. International Dragonfly Fund Report 84: 1–31.

Dow, R.A., R.W.J. Ngiam & R. Ahmad, 2015. Odonata of Maludam National Park, Sarawak, Malaysia. Journal of Threatened Taxa 7(1): 6764–6773.

Dow, R.A. & A.G. Orr, 2012. *Telosticta*, a new damselfly genus from Borneo and Palawan (Odonata: Zygoptera: Platystictidae). The Raffles Bulletin of Zoology 60(2): 361–397.

Dow, R.A. & G.T. Reels, 2008. List of species recorded at Gunung Mulu National Park, Sarawak, Malaysian Borneo in 2005–2006. Echo 5: 2–3.

Dow, R.A. & G.T. Reels, 2009. Expedition to Mount Dulit, Sarawak, August–September 2008 – Odonata. International Dragonfly Fund Report 19: 1–16.

Dow, R.A. & G.T. Reels, 2010. The Odonata of three National Parks in Sarawak. Agrion 14(1): 14-19.

Dow, R.A. & G.T. Reels, 2011. *Coeliccia southwelli* sp. nov. (Odonata: Zygoptera: Platycnemididae) from Mount Dulit, Sarawak. Zootaxa 2832: 63–68.

Dow, R.A., G.T. Reels & R.W.J. Ngiam, 2015. Previously unpublished Odonata records from Sarawak, Borneo, Part III. Sri Aman, Sibu and Kapit Divisions. Faunistic Studies in South–East Asian and Pacific Island Odonata 9: 1–34.

Dow, R.A., F. Stokvis & R.W.J. Ngiam, 2017. Revision of the Genus *Leptogomphus* Selys in Borneo, including gene trees and a two marker molecular phylogeny (Odonata: Anisoptera: Gomphidae). Zootaxa 4358(2): 201–257.

Dow, R.A. & J. Unggang, 2010. The Odonata of Binyo Penyilam, a unique tropical wetland area in Bintulu Division, Sarawak, Malaysia. Journal of Threatened Taxa 2(13): 1349–1358.

Hämäläinen, M., Dow, R.A. & Stokvis, F.R., 2015. Revision of the Sundaland species of the genus *Dysphaea* Selys, 1853 using molecular and morphological methods, with notes on allied species (Odonata: Euphaeidae). Zootaxa 3949(4): 451–490.

Hämäläinen, M. & R.A. Müller, 1989. Description of *Teinobasis annamaijae* spec. nov. from the Philippines (Odonata: Coenagrionidae). Opuscula Zoologica Fluminensia 44: 1–4.

Hincks, W.D., 1930. Some notes on a collection of Sarawak Odonata. Sarawak Museum Joural 4: 49–56.

Kimmins, D.E., 1936. The Odonata of the Oxford University Sarawak expedition. Journal of the Federated Malay States Museum 18: 65–108.

Kimmins, D.E., 1968. A list of the type–specimens of Libellulidae and Corduliidae (Odonata) in the British Museum (Natural History). Bulletin of the British Museum (Natural History), Entomology 22(6): 279–305.

Kosterin, O.E. 2015. Taxonomic and faunal notes on *Macromia* Rambur, 1842 from Cambodia (Odonata: Macromiidae). Odonatologica 44(1/2): 117–151.

Laidlaw, F.F., 1915a. Some additions to the dragonfly fauna of Borneo. Sarawak Museum Journal 2(6): 273–275.

Laidlaw, F.F., 1915b. Contributions to a study of the dragonfly fauna of Borneo. Part III. A collection made on Mount Kina Balu by Mr J.C. Moulton in September and October 1913. Proceedings of the Zoological Society of London 1915: 25–39.

Laidlaw, F.F., 1920. Contributions to the study of the dragonfly fauna of Borneo. Part IV. A list of species known to occur in the island. Proceedings of the Zoological Society of London 1920: 311–342.

Laidlaw, F.F., 1931. A list of the dragonflies (Odonata) of the Malay Peninsula with descriptions of new species. Journal of the Federated Malay Museums 16(3/4): 175–233.

Laidlaw, F.F., 1934. A note of the dragonfly fauna (Odonata) of Mount Kinabalu and of some other mountain areas of Malaysia: with a description of some new or little known species. Journal of the Federated Malay States Museums 17(3): 549–561.

Lieftinck, M.A., 1929. A revision of the known Malaysian dragonflies of the genus *Macromia* Rambur, with comparative notes on species from neighbouring countries and descriptions of new species. Tijdschrift voor Entomologie 72: 59–108.

Lieftinck, M.A., 1935. New and little known Odonata of the Oriental and Australian Regions. Treubia 15(2): 175–207.

Lieftinck, M.A., 1937. Descriptions and records of South–east Asiatic Odonata. Treubia 16: 55–119.

Lieftinck, M.A., 1940. Descriptions and records of South–east Asiatic Odonata (II). Treubia 17: 337–390.

Lieftinck, M.A., 1954. Handlist of Malaysian Odonata. A catalogue of the dragonflies of the Malay Peninsula, Sumatra, Java and Borneo, including the adjacent small islands. Treubia (Suppl.) 22: i–xiii + 1–202.

Lieftinck, M.A., 1968. A review of the genus *Oligoaeschna* Selys in Southeast Asia. Tijdschrift voor Entomologie 111(5): 137–186, plates 12–13.

Martin, R., 1904. Liste des Névroptères de L'Indo–Chine. In "Mission Pavie Indo–Chine 1879–1895. Études diverses. III. Recherches sur l'histoire naturelle de L'Indo–Chine orientale, Ernest Leroux, Paris, PP. 204–221.

Martin, R., 1909. Aeschnines II. Collections Zoologiques du Baron Edm. De Selys Longchamps. Catalogue Systématique et Descriptif 19: 85–156, plates III–IV.

Orr, A.G., 2001. An annotated checklist of the Odonata of Brunei with ecological notes and descriptions of hitherto unknown ♂♂ and larvae. International Journal of Odonatology 4: 167-220.

Orr, A.G., 2003. Dragonflies of Borneo. Natural History Publications (Borneo), Kota Kinabalu. x + 195 pp.

Orr, A.G. & J. van Tol, 2001. *Pseudagrion lalakense* spec. nov. from Borneo with notes on its ecology (Odonata: Coenagrionidae). International Journal of Odonatology 4(1): 51–56.

Ris, F., 1909. Libellulinen 1. Collections Zoologiques du Baron Edm. De Selys Longchamps. Catalogue Systématique et Descriptif 9: 1–120, plate I.

Ris, F., 1913. Libellulinen 7. Collections Zoologiques du Baron Edm. De Selys Longchamps. Catalogue Systématique et Descriptif 15: 837–964, plate VII.

Seehausen, M. & R.A. Dow, 2016. Morphological studies and taxonomic considerations on the 'reddish-brown-winged' group of *Neurothemis* Brauer, 1867 with the description of *N. taiwanensis* sp. nov. (Odonata: Libellulidae). International Dragonfly Fund Report 93: 1–101.

de Selys Longchamps, E. & H.A. Hagen, 1854. Monographie des Calopterygines. Mémoires de la Société Royale des Sciences de Liége 9, i–xi + 1–291, pls. 1–14, excl.

Shapiro B.J., J.-B. Leducq & J. Mallet, 2016. What is speciation? PLoS Genet 12(3): e1005860. doi:10.1371/journal.pgen.1005860

Yokoi, N., & V. Souphanthong, 2014. A List of Lao Dragonflies. 110 pp., privately published.

Appendix: Detailed Specimen Records

Details of material collected are given here, except where previously published elsewhere (in which case the paper giving the details is cited). Authorities are stated for most species listed below (there is one exception one exception in the additional records section) in the main list above and are not repeated here.

Collectors: the author's names are abbreviated as SB, RD, GR, PS and JU. Other collectors are abbreviated as: Lim Chan Koon – LCK; Chin Sing Yun – CSY; workers at Bukit Sarang – W; Dayang Noorafizah binti Haji Abang Hamrin and Nor Emel Farnida binti Jaddil – D & E, Ollince Tateh – OT, Rose Ragai – RR; Belden Giman – BG; Nyegang Megom – NM; Azizan Juhin – AJ; Steven Stone – SS; Empenit Empawi – EE; Li Josesph – LJ; Moses Tarang – MT.

Zygoptera

Lestidae

Lestes praemorsus decipiens

BM5 – 2 ♂♂, 9–10.ii.2010, OT. **7** – 2 ♂♂, 25.x.2008, RD. **9b** – ♂, 24.viii.2009, RD; ♂, 25.iii.2014, RD. **16a** – 4 ♂♂, ♀, 6.v.2005, GR. **S1** – ♂, 1.ii.2008, GR; 2 ♂♂, 2.ii.2008, GR.

Orolestes wallacei

BM9 – ♂, 30.vi.2010, RD. **2a** – ♂, 7.iii.2005, RD; ♂, 27.ii.2008, RD; ♀, 22.x.2008, RD; ♀, 19.viii.2009, RD. **3b** – ♂, 14.ix.2011, RD. **8e** – ♀, 16.vi.2010, RD.

Platystictidae

Drepanosticta actaeon

See Dow (2017).

Drepanosticta species cf *crenitis*

BM1 – ♀, 1.v.2011, OT. **8c** – ♀, 15.viii.2009, OT; ♂, 31.viii.2009, RD; ♂, ♀, 15.vi.2010, RD. **14b** – ♂, 2 ♀♀, 18.xi.2010, RD. **15a** – 2 ♀♀, 22.iii.2012, RD. **15b** – ♀, 27.iii.2012, OT.

Drepanosticta species cf *dentifera*

BM1 – ♀, 23.x.2008, RD. **BM12** – ♂, 26.iii.2014, RD. **BM13** – ♂, ♀, 24.viii.2009, RD. **8c** – ♂, 19.x.2008, RD. **8d** – ♂, 17.viii.2009, RD. **8e** – ♂, 16.vi.2010, OT. **9a** – 3 ♂♂, 25.vi.2010, RD. 13 – 2 ♂♂, ♀, 31.i.2008, RD. **15b** – ♀, 27.iii.2012, RD. **18** – ♂, 21.iii.2014, BG. **S3** – 2 ♂♂, 2 ♀♀, 2.ii.2008, GR; ♂, 4.ii.2008, GR; ♂, 4.ii.2012, S.B. **S6** – ♂, ♀, 3.ii.2008, RD.

Drepanosticta dulitensis

Material listed in Dow (2013).

Drepanosticta species cf *forficula*

4b – 2 ♀♀, 17.ix.2011, OT. **8a** – 3 ♂♂, ♀, 18.x.2008, RD. **8c** – ♂, ♀, 19.x.2008, RD; 2 ♂♂, 16.viii.2009, RD.

Drepanosticta rufostigma

Material listed in Dow (2017), except that collected by PS.

BM1 – 2 ♂♂, 20.iii.2014, PS.

Drepanosticta versicolor

BM1 – 2 ♂♂, 23.x.2008, RD. **BM11** – ♂, 22.iii.2014, RD. **BM12** – 2 ♂♂, 26.iii.2014, RD; 2 ♂♂, 28.iii.2014, RD; 2 ♂♂, 28.iii.2014, BG; ♂, 4.ix.2014, RD. **BM13** – ♂, 4.ix.2014, BG. **2a** – 3 ♂♂, 22.i.2008, RD; ♂, ♂+♀, 6.v.2011, LJ; 2 ♂♂, 6.v.2011, OT. **5** – ♂, ♂+♀, 21.viii.2009, RD; ♂, ♀, 5.v.2011, OT. **8bii** – ♂, 20.i.2008, RD. **8c** – 5 ♂♂, 19.x.2008, RD; 2 ♂♂, ♀, 31.viii.2009, RD; ♂, 12.vi.2010, OT; ♀, 15.vi.2010, RD. **8d** – ♂, 17.viii.2009, RD. **14b** – 4 ♂♂, 18.xi.2010, RD. **14c** – 3 ♂♂, 19.xi.2010, RD; 2 ♂♂, 20.xi.2010, RD. **18** – ♂, 21.iii.2014, OT.

Telosticta dayak

See Dow & Orr (2012) for records prior to 2012.

BM11 – ♂, 22.iii.2014, RD. **BM12** – 5 ♂♂, 26.iii.2014, RD; ♀, 26.iii.2014, OT; ♂, 3.ix.2014, RD; ♂, 4.ix.2014, RD. **BM13** – 4 ♂♂, 4.ix.2014, BG. **9a** – 2 ♂♂, ♀, 25.iii.2014, RD. **18** – ♂, 21.iii.2014, OT.

Telosticta longigaster

See Dow & Orr (2012) for records prior to 2012.

BM1 – 2 ♂♂, ♀, 20.iii.2014, RD; ♂, 20.iii.2014, PS; ♂, 20.iii.2014, OT. **BM11** – ♂, 22.iii.2014, RD. **BM12** – 2 ♂♂, ♀, 26.iii.2014, RD; 2 ♂♂, ♀, 26.iii.2014, BG; 2 ♂♂, 28.iii.2014, RD; 4 ♂♂, 28.iii.2014, BG; 4 ♂♂, 3.ix.2014, RD; ♂, 3.ix.2014, BG; ♀, 4.ix.2014, RD. **15a** – 2 ♂♂, 22.iii.2012, RD. **15b** – ♀, 26.iii.20**12**, RD; 3 ♂♂, 27.iii.2012, RD; 2 ♂♂, 27.iii.2012, BG & NM; 3 ♂♂, 27.iii.2012, OT.

Telosticta tubau

See Dow (2010a) and Dow & Orr (2012).

Argiolestidae

Podolestes orientalis

BM7 – 2 ♂♂, 27.iv.2011, RD. **BM9** – ♂, 12.xi.2010, SS; ♂, 28.iv.2011. RD. **1a** – ♀, 28.ii.2006, RD; ♂, 1.iii.2006, RD; ♀, 2.iii.2006, W; ♀, 3.iii.2006, LCK. **2a** – 2 ♂♂, 5.iii.2006, RD; ♂, 7.iii.2006, RD; ♂, 2.iii.2008, RD; ♂, 19.viii.2009, RD; 2 ♂♂, ♀, 6.v.2011, RD; ♂, 6.v.2011, LJ; ♂, 8.v.2011, RD; ♂, 17.iii.2014, PS; ♂, 18.iii.2014, RD. **6** – ♂+♀, 19.ix.2011, RD. **9a** – 2 ♂♂, 25.iii.2014, RD. **12** – ♂, 21.iii.2012, RD. **S2** – 2 ♂♂, 1.ii.2008, GR. **S4** – ♀, 5.ii.2008, RD.

Calopterygidae

Neurobasis longipes

8a – ♀, 19.i.2008, RD; ♂, **18**.x.2008, RD; ♂, 11.vi.2010, RD. **10a** – ♂, 23.vi.2010, RD. **12** – ♀, 21.iii.2012, RD; ♂, 23.iii.2012, RD; 2 ♂♂, 24.iii.2012, RD; ♂, ♀, 24.iii.2012, NM. **14a** – ♂, ♀, ♂+♀, 17.xi.2010, RD. **14c** – ♂, ♀, 19.xi.2010, RD; ♂, 20.xi.2010, RD.

Vestalis amabilis

BM3 – 6 ♂♂ 24.i.2008, RD. **BM6** – 2 ♂♂, 27.iv.2011, RD; 5 ♂♂, ♀, 27.iv.2011, LJ; 2 ♂♂, 27.iv.2011, SS; ♂, 27.iv.2011, OT. **BM8** – 2 ♂♂, 30.vi.2010, RD; ♀, 30.vi.210, SS; ♀, 30.vi.210, OT; ♂, 12.xi.2010, SS; ♂, 2 ♀♀, 12.xi.2010, OT; ♂, 28.iv.2011, RD; 2 ♂♂, 28.iv.2011, LJ. **BM12** – ♂, 25.iii.2014, RD. **BM13** – 2 ♂♂, ♀, 24.viii.2009, RD; 2 ♂♂, ♀, 24.viii.2009, EE; 2 ♂♂, ♀, 24.viii.2009, OT & SS; ♀, 22.vi.2010, RD; 2 ♂♂, 22.vi.2010, SS; ♂, 22.vi.2010, JT. **2a** – 5 ♂♂, ?♀, 5.iii.2006, RD; 7 ♂♂, 29.ii.2008, RD; 3 ♂♂, 24.x.2008,

RD; 2 ♂♂, 24.x.2008, BG & NM; ♂, ?♀, 19.viii.2009, OT & SS; 3 ♂♂, ?♀, 8.v.2011, RD; 2 ♂♂, 18.iii.2014, RD; ♂, 18.iii.2014, OT; ♂, 19.iii.2014, OT. **9a** – ♂, 27.viii.2009, RD; ♂, 27.viii.2009, EE; 3 ♂♂, ♂+♀, 20.vi.2010, RD; 7 ♂♂, ♀, 20.vi.2010, SS; ♂, 20.vi.2010, JT; 2 ♂♂, 5.v.2011, SS; ♂, 6.v.2011, SS; ♂, 25.iii.2014, RD; 2 ♂♂, ♀, 25.iii.2014, BG & NM; ♂, 25.iii.2014, MT & OT. 9e – ♂, 27.iii.2014, BG. **9f** – 3 ♂♂, 28.iii.2014, OT. **10a** – 5 ♂♂, 23.vi.2010, RD; ♂, 23.vi.2010, SS; ♂, 23.vi.2010, JT. **10b** – ♂+♀, 26.vi.2010, RD; ♂, 26.vi.2010, SS. **11** – ♂, 1.vii.2010, RD; ♂, 11.xi.2010, RD; ♂, 11.xi.2010, OT.

Vestalis amaryllis

BM1 – ♂, 23.i.2008, RD; ♂, 23.x.2008, RD; 4 ♂♂, 9–10.ii.2010, OT; 3 ♂♂, 1.v.2011, SS; 3 ♂♂, 1.v.2011, OT; 2 ♂♂, 20.iii.2014, RD. **BM11** – ♂, 22.iii.2014, RD; ♂, 22.iii.2014, PS. **BM12** – 2 ♂♂, ♂+♀, 28.iii.2014, RD; ♂, 28.iii.2014, BG; ♂, 3.ix.2014, NM. **2a** – ♂, 7.iii.2006, RD; ♂, 22.x.2008, RD. **3a** – ♂, 6.iii.2006, RD. **5** – 3 ♂♂, 5.v.2011, RD; ♂, 5.v.2011, LJ; 2 ♂♂, ?♀, 5.v.2011, NM; 2 ♂♂, 5.v.2011, OT. **6** – 3 ♂♂, 19.ix.2011, RD; ♂, 19.ix.2011, SS; ♂, 19.ix.2011, OT. **8bi** – ♂, 20.i.2008, RD. **8bii** – ♂, 20.i.2008, RD. **8c** – 5 ♂♂, 20.x.2008, RD; ♂, ♂+♀, 16.viii.2009, RD; ♂, ?♀, 16.viii.2009, OT & SS; ?♀, 30.viii.2009, RD; 2 ♂♂, 31.viii.2009, RD; ♂, 31.viii.2009, OT; 2 ♂♂, 2.ix.2009, RD; ♂, 10.vi.2010, RD; ♂, 15.vi.2010, RD. **8d** – 4 ♂♂, 17.viii.2009, RD; ♂, 17.viii.2010, OT & SS. **8e** – 2 ♂♂, 14.vi.2010, RD; 2 ♂♂, 16.vi.2010, RD; ♂, 16.vi.2010, SS; ♂, 16.vi.2010, OT. **9a** – ♂, 25.vi.2010, RD. **10b** – ♀, 26.vi.2010, RD; ♂, 26.vi.2010, SS. **11** – 2 ♂♂, 10.xi.2010; RD; ♂, 10.xi.2010, OT; 3 ♂♂, 29.iv.2011, LJ; 4 ♂♂, 30.iv.2011, LJ; 3 ♂♂, 30.iv.2011, SS; ♂, 30.iv.2012, OT. **14a** – 3 ♂♂, 17.xi.2010, RD. **14c** – 2 ♂♂, 20.xi.2010, RD. **S3** – 4 ♂♂, 2.ii.2008, RD; 2 ♂♂, 3 ?♀♀, 2.ii.2008, GR; ♂, 4.ii.2012, SB; ?♀, 10.iii.2014, SB.

Vestalis amoena

BM3 – ♂, 24.i.2008, RD. **BM6** – ♂, 27.iv.2011, SS. **1a** – 4 ♂♂, 28.ii.2006, RD; 5 ♂♂, ♀, 2.iii.2006, RD; 2 ♂♂, ♀, 3.iii.2006, RD; ♂, ♀, 3.iii.2006, LCK; 5 ♂♂, 12.x.2008, RD; 2 ♂♂, 13.x.2008, RD; 2 ♂♂, 14.x.2008, RD; ♂, 7.viii.2013, RD; ♂, 8.viii.2013, RD; ♂, 11.viii.2013, RD; 2 ♂♂, 2 ♀♀, 12.viii.2013, NM. 1b – 6 ♂♂, 9.viii.2013, RD; 2 ♂♂, 9.viii.2013, BG. **2a** – ♂, 7.v.2011, RD. **2b** – 4 ♂♂, 19.iii.2014, RD. **3a** – ♂, 6.iii.2006, RD; ♀, 6.iii.2006, CSY; 4 ♂♂, 3.iii.2008, RD. **3b** – ♂, 9.v.2011, SB; 2 ♂♂, 9.v.2011, RD; ♀, 9.v.2011, SS; ♀, 14.ix.2011, SS. **5** – 4 ♂♂, 5.v.2011, RD; ♂, 5.v.2011, LJ; 3 ♂♂, 5.v.2011, NM. **6** – 2 ♂♂, 19.ix.2011, SS; 2 ♂♂, ♀, 19.ix.2011, OT. **7** – 3 ♂♂, 28.ii.2008, RD. **8a** – 2 ♂♂, 19.i.2008, RD; 3 ♂♂, 18.x.2008, RD. **8biii** – ♂, 20.i.2008, RD. **8c** – ♂, 12.vi.2010, RD. **8e** – ♂, 14.vi.2010, RD; ♂, 14.vi.2010, OT; ♂, 16.vi.2010, SS. **12** – ♂, 23.iii.2012, RD; 4 ♂♂, 24.iii.2012, RD; 2 ♂♂, ?♀, 24.iii.2012, NM. **14a** – 7 ♂♂, 17.xi.2010, RD. **14c** – 8 ♂♂, ♀, 19.xi.2010, RD; 4 ♂♂, 20.xi.2010, RD. **16c** – 3 ♂♂, 6.v.2005, RD; 2 ♀♀, 6.v.2005, GR.

Vestalis atropha

12 – 4 ♂♂, 25.iii.2012, RD; ♂, 25.iii.2012, NM. **13** – 2 ♂♂, 31.i.2008, RD. **14b** – 3 ♂♂, 18.xi.2010, RD.

Vestalis beryllae

15b – ♀, 26.iii.2012, RD; ♂, 27.iii.2012, RD.

Chlorocyphidae

Heliocypha biseriata

5 – ♂, 21.viii.2009, RD; ♂, 5.v.2011, RD; 3 ♂♂, 5.v.2011, LJ; ♂, ♀, 5.v.2011, OT. **8a** – 3

♂♂, ♀, 19.i.2008, D&E; ♂, 18.x.2008, RD; ♂, 18.x.2008, OT. **8biii** – 2 ♂♂, 20.i.2008, D&E. **8c** – ♂, 16.viii.2009, OT & SS; ♂, ♂+♀, 12.vi.2010, RD. **8d** – ♂, 17.viii.2009, RD; ♂, 17.viii.2009, OT & SS. **8e** – ♂, 14.vi.2010, RD; ♂, 14.vi.2010, OT. **9a** – ♂, 20.vi.2010, RD; 2 ♂♂, 20.vi.2010, JT; ♂, 21.vi.2010, JT & SS. **12** – ♂, 21.iii.2012, RD; ♀, 23.iii.2012, RD; ♂, 24.iii.2012, RD; 3 ♂♂, 24.iii.2012, NM; ♂, 25.iii.2012, RD; ♂, 25.iii.2012, NM; ♂, 25.iii.2012, OT. **14a** – 2 ♂♂, 17.xi.2010, RD. **14c** – ♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD.

Libellago aurantiaca

BM3 – 2 ♂♂, 24.i.2008, RD; ♂, 9–10.ii.2010, OT. **BM6** – ♂, 27.iv.2011, RD; ♂, 27.iv.2011, OT. **BM13** – 2 ♂♂, 24.viii.2009, RD; ♂, 24.viii.2009, EE; ♂, 22.vi.2010, RD. **1a** – 3 ♂♂, 28.ii.2006, RD; ♂, 2.iii.2006, RD; ♂, 3.iii.2006, LCK; ♂, 12.x.2008, RD; ♂, 7.viii.2013, RD; ♂, 8.viii.2013, BG & NM. 1b – ♂, 9.viii.20113 RD; ♂, ♀, 9.viii.2013, BG. **3a** – ♂, 3.iii.2008, RD. **3b** – ♂, 9.v.2011, RD; ♂, 14.ix.2011, RD. **6** – ♂, 19.ix.2011, OT. **7** – 2 ♂♂, ♀, 28.ii.2008, RR. **9a** – ♂, 25.iii.2014, RD. **10a** – ♂, 23.vi.2010, RD; 2 ♂♂, 23.vi.2010, SS; ♂, 23.vi.2010, JT. **11** – ♂, 29.vi.2010, RD; ♂, 1.vii.2010, RD; ♂, 1.vii.2010, OT; ♂, 11.xi.2010, OT; ♂, 29.iv.2011, SS. **16c** – 4 ♂♂, 3 ♀♀, 6.v.2005, RD.

Libellago hyalina

BM3 – 2 ♂♂, 9–10.ii.2010, OT. **BM6** – ♂, 27.iv.2011, LJ; 2 ♂♂, 27.iv.2011, SS; ♂, 27.iv.2011, OT. **BM8** – ♂, 30.vi.2010, RD; 3 ♂♂, 30.vi.2010, SS; ♂, 30.vi.2010, OT; 4 ♂♂, ♀, 12.xi.2010, SS; 2 ♂♂, ♀, 12.xi.2010, OT; ♂, 28.iv.2011, RD; ♂, 28.iv.2011, LJ; ♂, 28.iv.2011, SS. **1a** – 4 ♂♂, 28.ii.2006, RD; 4 ♂♂, ♂+♀, 1.iii.2006, RD; 2 ♂♂, 1.iii.2006, W; 3 ♂♂, 3.iii.2006, LCK; ♂, 12.x.2008, RD; ♂, 13.x.2008, RD; ♂, 15.x.2008, RD; ♂, 15.x.2008, OT; ♂+♀, 8.viii.2013, RD; 3 ♂♂, 8.viii.2013, BG & NM; ♂+♀, 10.viii.2013, RD; ♂, 11.viii.2013, RD. 1b – 2 ♂♂, ♂+♀, 9.viii.2013, RD. **2a** – ♂, 5.iii.2006, RD; ♂, 27.ii.2008, RD; ♂, 27.ii.2008, RR; ♂, 2.iii.2008, RD; ♂, 24.x.2008, BG & NM; ♂, 19.viii.2009, RD; 5 ♂♂, 8.v.2011, RD; 2 ♂♂, 8.v.2011, SS; ♂, 17.iii.2014, PS. **3b** – 3 ♂♂, 9.v.2011, SB; ♂, 9.v.2011, RD; 2 ♂♂, 9.v.2011, SS; ♂, 14.ix.2011, RD; ♂, 14.ix.2011, SS. **6** – ♂, 19.ix.2011, OT. **8a** – 3 ♂♂, 19.i.2008, RD; 2 ♂♂, 18.x.2008, RD; ♂, 11.vi.2010, RD; 2 ♂♂, 11.vi.2010, OT. **8biii** – 2 ♂♂, 20.i.2008, RD. **8d** – 3 ♂♂, 17.viii.2009, RD; 3 ♂♂, 17.viii.2009, OT & SS. **9a** – ♂, 25.viii.2009, RD; ♂, 20.vi.2010, JT; ♂, 5.v.2011, SS; 3 ♂♂, 6.v.2011, SS. **10a** – 3 ♂♂, ♀, 23.vi.2010, SS; ♂, 23.vi.2010, JT. **11** – ♂, 1.vii.2010, OT; ♂, 11.xi.2010, OT. **S7** – 2 ♂♂, 3.ii.2008, GR.

Libellago orri

See Dow & Hämäläinen (2008) for material collected before 2008.

1a – ♂, 12.x.2008, RD; ♂, 14.x.2008, RD; ♂, 15.x.2008, RD; 2 ♂♂, 7.viii.2013, RD; ♂, 11.viii.2013, RD. **2a** – ♂, 27.ii.2008, RD; ♂, 29.ii.2008, RD; ♂, 24.x.2008, RD; ♂, 19.viii.2009, RD; 3 ♂♂, ? ♀, 8.v.2011, RD; ♂, ? ♀, 8.v.2011, SS; ♂, 17.iii.2014, PS; ♂, 18.iii.2014, RD. **2b** – ♂, 19.iii.2014, RD. **3a** – 2 ♂♂, 3.iii.2008, RD. **3b** – 2 ♂♂, 9.v.2011, RD. **3c** – ♂, 18.ix.2011, OT.

Libellago semiopaca

1a – ♂, 28.iii.2006, RD; ♂, 12.x.2008, RD. **1b** – 2 ♂♂, 9.viii.2013, RD. **9a** – ♂, 20.vi.2010, RD; ♂, 20.vi.2010, SS. **10a** – ♂, 23.vi.2010, SS. **10b** – ♂, 25.vi.2010, RD. **18** – ♂, ♀, 21.iii.2014, RD; ♀, 21.iii.2014, PS. **S7** – 3 ♂♂, 3.ii.2008, RD; ♂, 3.ii.2008, GR.

Libellago stictica

14a – 3 ♂♂, ♀, 17.xi.2010, RD. **14c** – 2 ♂♂, 19.xi.2010, RD.

Rhinocypha cucullata

1a – ♂, 10.viii.2013, RD; ♂, 11.viii.2013, BG. **1b** – 4 ♂♂, 9.viii.2013, RD; ♀, 9.viii.2013, BG. **14a** – 2 ♂♂, 17.xi.2010, RD. **14c** – 5 ♂♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD.

Rhinocypha cf *spinifer*

15b – ♀, 27.iii.2012, RD.

Sundacypha petiolata

BM12 – ♂, 28.iii.2014, RD. **BM13** – ♂, 4.ix.2014, BG. **2a** – ♂, 5.iii.2006, RD; ♂, 2.iii.2008, RD; ♂, 24.x.2008, RD; ♂, 24.x.2008, BG & NM; ♀, 19.viii.2009, OT & SS; 4 ♂♂, 8.v.2011, RD; ♂, 8.v.2011, SS; 2 ♂♂, 17.iii.2014, RD; ♂, 19.iii.2014, PS. **6** – ♂, 19.ix.2011, RD; ♂, 19.ix.2011, SS; ♂, ♀, 19.ix.2011, OT. **8a** – ♂, 18.x.2008, RD; 2 ♂♂, ♀, 11.vi.2010, RD; ♂, 11.vi.2010, OT. **8c** – ♂, 16.viii.2009, RD; ♂, 31.viii.2009, RD. **8e** – ♂, 14.vi.2010, RD; ♂, 16.vi.2010, RD. **9a** – ♂, 25.iii.2014, RD; 2 ♂♂, 25.iii.2014, BG & NM; ♂, 25.iii.2014, MT & OT. **10b** – ♂, 26.vi.2010, RD. **11** – 2 ♂♂, ♀, 1.vii.2010, RD; ♂, 11.xi.2010, RD; 2 ♂♂, 11.xi.2010, OT; 2 ♂♂, ♀, 29.iv.2011, LJ; ♀, 29.iv.2011, SS; 3 ♂♂, 29.iv.2011, OT; ♂, 30.iv.2011, LJ; 6 ♂♂, 30.iv.2011, SS; 2 ♂♂, 30.iv.2011, OT. **12** – ♂, 23.iii.2012, RD. **14c** – 2 ♂♂, 20.xi.2010, RD. **S3** – ♂, 2.ii.2008, RD; ♂, 14.iii.2014, SB.

Devadattidae

Devadatta clavicauda

Material listed in Dow, Hämäläinen & Stokvis (2015).

Devadatta somoh

Material listed in Dow, Hämäläinen & Stokvis (2015).

Euphaeidae

Dysphaea dimidiata

See Hämäläinen, Dow & Stokvis (2015).

Euphaea impar

BM1 – ♂, 23.i.2008, RD; 3 ♂♂, 9–10.ii.2010, OT; ♂, 1.v.2011, LJ; ♂, 1.v.2011, OT. **BM6** – 7 ♂♂, ♀, 27.iv.2011, LJ; ♂, ♀, 27.iv.2011, OT. **BM8** – ♂, ♀, 30.vi.2010, SS; ♂, 12.xi.2010, SS; 2 ♂♂, 12.xi.2010, OT; ♀, 28.iv.2011, SS. **BM1**1 – ♀, 22.iii.2014, PS. **BM12** – ♂, 26.iii.2014, MT; ♂, 28.iii.2014, BG; ♂, 3.ix.2014, RD; ♀, 3.ix.2014, BG. **BM13** – ♂, 24.viii.2009, OT; ♂, 22.vi.2010, RD; ♂, 22.vi.2010, JT. **1a** – 2 ♂♂, 3.iii.2006, LCK; ♂+♀, 12.x.2008, RD; ♂, 8.viii.2013, BG & NM; 2 ♂♂, 12.viii.2013, NM. **2a** – 2 ♂♂, 5.iii.2006, RD; 2 ♂♂, 8.v.2011, RD; ♂, 18.iii.2014, OT. **3a** – ♂, 6.iii.2006, CSY. **3b** – 2 ♂♂, 9.v.2011, RD; ♂, 9.v.2011, SS. **3c** – ♂, 18.ix.2011, RD; ♂, 18.ix.2011, SS. **5** – ♂, 21.viii.2009, RD; 2 ♂♂, ♀, 21.viii.2009, OT & SS; ♂, 5.v.2011, RD; 2 ♀♀, 5.v.2011, LJ; ♂, 5.v.2011, OT. **6** – 2 ♂♂, 19.ix.2011, SS; ♂, 19.ix.2011, OT. **7** – ♂, 28.ii.2008, RD. **8a** – 3 ♂♂, 19.i.2008, RD; ♂, 18.x.2008, OT; ♂, 11.vi.2010, RD. **8c** – ♂, 19.x.2008, RD; ♂, 16.viii.2009, RD; 2 ♂♂, 16.viii.2009, OT & SS; ♂, 31.viii.2009, RD; ♂, 31.viii.2009, OT; ♂, 2.ix.2009, RD; ♀, 10.vi.2010, RD; 2 ♂♂, 10.vi.2010, OT & SS; 4 ♂♂, 15.vi.2010, SS; ♂, 15.vi.2010, OT. **8d** – ♂, 17.viii.2009, OT & SS. **8e** – ♂, 14.vi.2010, RD; 3 ♂♂, 16.vi.2010, SS. **9a** – ♂, 25.viii.2009, OT; ♂, 25.vi.2010, RD; 2 ♂♂, 25.vi.2010, JT; ♂, 25.iii.2014, RD; 2 ♂♂, 2 ♀♀, 25.iii.2014, BG & NM; 2 ♂♂, 25.iii.2014, MT & OT. **10a** – ♂,

23.vi.2010, RD. **10b** – ♂, 26.vi.2010, RD; ♂, 26.vi.2010, SS. **11** – ♂, 1.vii.2010, RD; ♂, 1.vii.2010, OT; ♂, 10.xi.2010, OT; 2 ♂♂, 11.xi.2010, OT; 3 ♂♂, 29.iv.2011, LJ; ♂, 29.iv.2011, SS; 3 ♂♂, 29.iv.2011, OT; 4 ♂♂, 30.iv.2011, SS; 2 ♂♂, 30.iv.2011, OT. **12** – ♂, 21.iii.2012, RD; ♂, 24.iii.2012, RD; ♀, 25.iii.2012, OT. 13 – 2 ♂♂, 31.i.2008, RD. **14a** – 2 ♂♂, 17.xi.2010, RD. **14b** – ♂, 18.xi.2010, RD. **14c** – 3 ♂♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD. **15b** – ♂, 27.iii.2012, RD. **18** – 2 ♂♂, 21.iii.2014, BG; ♂, 21.iii.2014, OT. **S3** – ♂+♀, 2.ii.2008, RD.

Euphaea subcostalis

5 – ♂, 21.viii.2009, RD; 5 ♂♂, 5.v.2011, LJ; ♂, 5.v.2011, NM. **8a** – ♂, 19.i.2008, RD; ♂, 18.x.2008, RD. **8c** – 2 ♂♂, 20.x.2008, OT; ♂, 16.viii.2009, RD; 2 ♂♂, ♀, 16.viii.2009, OT; 2 ♂♂, 31.viii.2009, RD; ♂, 2.ix.2009, RD; ♂, 12.vi.2010, OT; 7 ♂♂, 15.vi.2010, SS; ♂, ♀, 15.vi.2010, OT. **8e** – ♂, 16.vi.2010, RD. **9a** – ♂, 21.vi.2010, RD. **10a** – ♂, 23.vi.2010, RD. **12** – ♂, 23.iii.2012, RD; 3 ♂♂, 24.iii.2012, RD; 2 ♂♂, 25.iii.2012, RD; 2 ♂♂, ♀, 25.iii.2012, OT; 2 ♂♂, 25.iii.2012, NM. 13 – 3 ♂♂, 31.i.2008, RD. **14a** – ♂, 17.xi.2010, RD. **14b** – ♂, ♂+♀, 18.xi.2010, RD. **14c** – 4 ♂♂, 19.xi.2010, RD. **15a** – ♂, 22.iii.2012, RD. **15b** – ♂, 26.iii.2012, RD; ♂, 26.iii.2012, OT; ♂, 27.iii.2012, RD.

Euphaea tricolor

12 – ♂, 25.iii.2012, NM. **14a** – 3 ♂♂, 17.xi.2010, RD. **14c** – ♂, 19.xi.2010, RD.

Philosinidae

Rhinagrion borneense

BM3 – 2 ♂♂, 24.i.2008, RD. **BM6** – ♂, 27.iv.2011, RD; 2 ♂♂, 27.iv.2011, LJ; 2 ♂♂, 27.iv.2011, SS. **BM8** – ♂, 30.vi.2010, RD; ♂, 30.vi.2010, SS; ♂, 12.xi.2010, SS; ♂, 28.iv.2011, SS. **BM1**1 – ♂, 22.iii.2014, PS. **BM12** – ♂, 28.iii.2014, RD. **1a** – ♂, 10.viii.2013, RD. **2a** – 2 ♂♂, 5.iii.2006, RD; ♂, 29.ii.2008, RD; ♂, 24.x.2008, RD; ♂, 24.x.2008, BG & NM; ♂, 19.viii.2009, RD; 2 ♂♂, 8.v.2011, SB; 4 ♂♂, ♀, 8.v.2011, RD; 3 ♂♂, 8.v.2011, SS; ♂, 20.ix.2011, SS; ♂, 18.iii.2014, RD. **3a** – ♂, 6.iii.2006, RD. **3b** – ♂, 9.v.2011, RD; ♂, 9.v.2011, SS. **4a** – ♂, 15.ix.2011, RD; ♂, 15.ix.2011, OT. **5** – 2 ♂♂, 21.viii.2009, RD; ♂, 5.v.2011, RD; ♂, 5.v.2011, LJ. **6** – 2 ♂♂, 19.ix.2011, SS; 2 ♂♂, 19.ix.2011, OT. **7** – ♂, 28.ii.2008, RD. **8a** – ♂, 19.i.2008, RD; ♂, 18.x.2008, RD; ♂, 18.x.2008, AJ; 2 ♂♂, 11.vi.2010, RD; ♂, 11.vi.2010, OT. **8c** – ♂, 20.x.2008, RD; ♂, 16.viii.2009, RD; ♂, 16.viii.2009, OT & SS; ♂, 31.viii.2009, RD; ♂, 31.viii.2009, OT; ♂, 2.ix.2009, RD. **8e** – ♂, 17.viii.2009, RD. **8d** – ♂, 14.vi.2010, RD; ♂, 14.vi.2010, OT; ♂, 16.vi.2010, SS; ♂, 16.vi.2010, OT. **9a** – ♂, 27.viii.2009, RD; ♂, 27.viii.2009, OT; ♂, 25.vi.2010, RD; ♂, 25.iii.2014, RD; ♂, 25.iii.2014, BG & NM. **10b** – ♂, 26.vi.2010, RD. **11** – ♂, 29.vi.2010, RD; ♀, 1.vii.2010, RD; ♂, 1.vii.2010, OT; ♂, 10.xi.2010, RD; ♂, 10.xi.2010, OT; ♂, 11.xi.2010, RD; 2 ♂♂, 11.xi.2010, JT; 5 ♂♂, 29.iv.2011, LJ; 3 ♂♂, 29.iv.2011, SS; ♂, 29.iv.2011, OT; 5 ♂♂, 2 ♀♀, 30.iv.2011, LJ; 3 ♂♂, 30.iv.2011, SS; 4 ♂♂, ♀, 30.iv.2011, OT. **12** – ♂, 23.iii.2012, RD; ♂, 24.iii.2012, RD; ♂, 25.iii.2012, RD. **14a** – ♂, 17.xi.2010, RD. **14c** – 2 ♂♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD. **S2** – 2 ♂♂, 1.ii.2008, GR. **S3** – ♂, 2.ii.2008, GR; ♂, 14.iii.2014, S B. **S7** – ♂, 3.ii.2008, RD.

Platycnemididae

Coeliccia borneensis

See Dow & Reels (2011) for records prior to 2011.

2a – ♀, 6.v.2011, LJ; 2 ♀♀, 7.v.2011, RD. **9a** – ♂, 25.iii.2014, RD. **12** – ♀, 24.iii.2012, RD. **15b** – ♂, ♀, 26.iii.2012, RD; ♂, ♀, 26.iii.2012, NM; ♀, 26.iii.2012, OT; 4 ♂♂, 27.iii.2012, RD.

Coeliccia campioni

15b – ♂, 26.iii.2012, RD.

Coelicia cyaneothorax

8c – ♂, 12.vi.2010, RD; ♂, 15.vi.2010, RD. **12** – 2 ♂♂, 25.iii.2012, RD. **15b** – ♂, 26.iii.2012, RD; ♂, 27.iii.2012, RD.

Coeliccia kenyah

See Dow (2010c) for records before 2010.

BM1 – 3 ♂♂, ♀, 20.iii.2014, RD. **BM12** – ♂, 26.iii.2014, RD.

Coeliccia species cf *nemoricola*

BM1 – ♂, 23.i.2008, RD; 3 ♂♂, 1.v.2011, OT. **BM11** – 2 ♂♂, 22.iii.2014, RD. **BM12** – 3 ♂♂, 2 ♀♀, 26.iii.2014, RD; 2 ♂♂, 26.iii.2014, BG; ♀, 26.iii.2014, OT; ♂, 28.iii.2014, BG; 2 ♂♂, 3.ix.2014, RD; ♀, 3.ix.2014, BG. **BM13** – ♀, 24.viii.2009, RD. **8c** – 6 ♂♂, 19.x.2008, RD; ♂, 19.x.2008, AJ. **9a** – ♀, 27.viii.2009, SS; ♂, 25.vi.2010, RD. **10b** – ♂, 26.vi.2010, RD. 13 – 3 ♂♂, 31.i.2008, RD. **14a** – 3 ♂♂, 17.xi.2010, RD. **S2** – ♂, 3.ii.2008, RD. **S3** – ♀, 2.ii.2008, RD.

Coeliccia nigroh*amata*

BM1 – 2 ♂♂, ♀, 23.i.2008, RD; ♂, 9–10.ii.2010, OT; ♂, ♀, 1.v.2011, OT; ♂, 20.iii.2014, RD. **BM3** – ♂, 24.i.2008, RD. **BM11** – ♂, 22.iii.2014, RD. **BM12** – ♂, 26.iii.2014, RD; ♂, 26.iii.2014, OT; ♂, 28.iii.2014, BG; ♂, 3.ix.2014, BG; ♂, 3.ix.2014, NM; ♂+♀, 4.ix.2014, RD. **BM13** – ♂, 4.ix.2014, BG. **2a** – 5 ♂♂, ♂+♀, 22.i.2008, RD; ♀, 19.viii.2009, OT & SS; 3 ♂♂, ♂+♀, 6.v.2011, RD; 8 ♂♂, ♂+♀, 6.v.2011, LJ; 4 ♂♂, 6.v.2011, NM; ♂, ♀, 6.v.2011, OT; ♂, ♀, 7.v.2005, RD; ♂, 17.iii.2014, RD. **5** – 2 ♂♂, 5.v.2011, RD; ♂, 5.v.2011, LJ; ♂, 5.v.2011, NM; ♂, 5.v.2011, OT. **6** – 3 ♂♂, 19.ix.2011, RD; 2 ♂♂, 19.ix.2011, OT. **8a** – ♂, ♂+♀, 18.x.2008, RD. **8bi** – ♂, 20.i.2008, RD. **8d** – 4 ♂♂, 17.viii.2009, RD. **8e** – ♂, 16.vi.2010, RD. **9a** – 2 ♂♂, 25.iii.2014, RD; ♂, 25.iii.2014, MT & OT. **11** – 2 ♂♂, 29.vi.2010, RD; ♂, ♀, 1.vii.2010, RD; ♂, 1.vii.2010, OT; 3 ♂♂, ♂+♀, 10.xi.2010, RD; ♂, ♀, 10.xi.2010, OT; ♂, 29.iv.2011, LJ; 2 ♂♂, 29.iv.2011, OT; ♂, 30.iv.2011, OT. **12** – ♂, ♂+♀, 21.iii.2012, RD; ♂, 23.iii.2012, RD; ♂, 24.iii.2012, RD; 2 ♂♂, 25.iii.2012, RD. 13 – 4 ♂♂, ♀, 31.i.2008, RD. **14a** – 5 ♂♂, 17.xi.2010, RD. **14c** – 5 ♂♂, 2(♂+♀), 19.xi.2010, RD; 4 ♂♂, ♂+♀, 20.xi.2010, RD. **18** – ♂, 21.iii.2014, RD. **S2** – ♂, 1.ii.2008, RD. **S3** – 2 ♂♂, 2.ii.2008, RD; 3 ♂♂, 2.ii.2008, GR. **S4** – ♂, 5.ii.2008, RD.

Coeliccia species

S2 – 2 ♂♂, ♂+♀, 3.ii.2008, RD. **S3** – ♀, 2.ii.2008, RD; ♂, 4.ii.2008, RD; ♂, 4.ii.2008, *GR*. **S6** – ♂, 3.ii.2008, GR.

Copera vittata

BM7 – 2 ♂♂, ♀, 27.iv.2011, RD; ♂, ♀, 27.iv.2011, OT. **BM9** – 2 ♂♂, ♂+♀, 30.vi.2010, RD; ♀, 30.vi.2010, SS; ♂, ♀, 30.vi.2010, OT; ♀, 12.xi.2010, OT; ♂, 28.iv.2011, SS. **1a** – 5 ♂♂, ♀, 1.iii.2006, RD; 7 ♂♂, 1.iii.2006, W; ♂, 2.iii.2006, RD; 9 ♂♂, 2 ♀♀, ♂+♀, 2.iii.2006, W; ♀, 12.x.2008, OT; ♂, 15.x.2008, RD; ♂, ♀, 15.x.2008, OT; ♂, ♀, 8.viii.2013, BG & NM; ♀, 10.viii.2013, BG; ♂, 11.viii.2013, RD; 2 ♂♂, ♀, 13.viii.2013, BG; 2 ♂♂, 13.viii.2013, NM. **2a** – 3 ♂♂, 5.iii.2006, RD; ♂+♀, 5.iii.2006, CSY; ♂, 22.i.2008, RD; ♂, 27.ii.2008, RD; 3 ♂♂,

♀, 27.ii.2008, RR; ♂, 29.ii.2008, RR; ♀, 24.x.2008, BG; ♂, 19.viii.2009, RD; ♂, 19.viii.2009, OT & SS; 2 ♂♂, 6.v.2011, RD; 2 ♂♂, 6.v.2011, LJ; 2 ♂♂, 6.v.2011, OT; ♂, 8.v.2011, SB; 2 ♂♂, ♂+♀, 8.v.2011, RD; 5 ♂♂, 8.v.2011, SS; 2 ♂♂, 18.iii.2014, RD; ♂, 19.iii.2014, OT. **3a** – ♂, 3.iii.2008, RD. **3b** – ♂, 14.ix.2011, RD. **3c** – ♂, 18.ix.2011, RD. **4b** – ♀, 17.ix.2011, OT. **6** – ♂, 19.ix.2011, RD. **8a** – ♂, 19.i.2008, RD; ♂, 11.vi.2010, RD. **8biii** – ♂, 20.i.2008, RD. **8e** – ♂, 14.vi.2010, RD. **9a** – ♂, 20.vi.2010, RD; ♀, 5.v.2011, SS. **11** – ♂. 1.vii.2010, RD; 2 ♂♂, 10.xi.2010, RD; ♂, 10.xi.2010, OT; ♀, 29.iv.2011, LJ; 2 ♂♂, 29.iv.2011, OT; ♂, 30.iv.2011, OT. **12** – ♂, 23.iii.2012, RD. **16c** – ♀, 6.v.2005, RD. **18** – ♂, ♀, 21.iii.2014, BG.

"*Elattoneura*" *analis*

BM3 – ♂, 24.i.2008, RD; 3 ♂♂, 9–10.ii.2010, OT. **BM6** – 7 ♂♂, ♂+♀, 27.iv.2011, RD; 2 ♂♂, 27.iv.2011, SS; 3 ♂♂, 27.iv.2011, OT. **BM8** – 2 ♂♂, 30.vi.2010, RD; ♂, ♀, 28.iv.2011, RD. **BM11** – ♂, 22.iii.2014, RD. **1a** – ♂, 2.iii.2006, RD; ♂, 3.iii.2006, LCK; ♂, 14.x.2008, RD; 5 ♂♂, 7.viii.2013, RD; ♂+♀, 8.viii.2013, RD; ♂, ♀, 8.viii.2013, BG & NM; ♂, 11.viii.2013, BG; ♂, 12.viii.2013, NM. **2a** – 6 ♂♂, 5.iii.2006, RD; 2 ♂♂, ♂+♀, 7.iii.2006, RD; 3 ♂♂, 27.ii.2008, RD; 2 ♂♂, 27.ii.2008, RR; ♂, 29.ii.2008, RD; ♀, 29.ii.2008, RR; 2 ♂♂, ♂+♀, 2.iii.2008, RD; ♂, 24.x.2008, RD; 5 ♂♂, 24.x.2008, BG & NM; 2 ♂♂, 19.viii.2009, RD; ♂, 19.viii.2009, OT & SS; ♂, 20.ix.2011, SS; 2 ♂♂, ♂+♀, 18.iii.2014, RD; 4 ♂♂, 18.iii.2014, OT. **3b** – ♂, 14.ix.2011, RD. **4a** – ♂, 15.ix.2011, RD; ♂, 15.ix.2011, OT. **6** – ♂, 19.ix.2011, RD; 3 ♂♂, 19.ix.2011, SS; 6 ♂♂, 19.ix.2011, OT. **8a** – 2 ♂♂, 11.vi.2010, RD; 4 ♂♂, 11.vi.2010, OT. **8c** – ♂, 16.vi.2010, OT. **11** – ♂, 29.vi.2010, RD; 2 ♂♂, 1.vii.2010, RD; 2 ♂♂, 1.vii.2010, OT; 3 ♂♂, ♀, 10.xi.2010, RD; ♂, 10.xi.2010, OT; ♂, 11.xi.2010, RD; 2 ♂♂, 11.xi.2010, OT; 3 ♂♂, 29.iv.2011, LJ; 7 ♂♂, ♀, 29.iv.2011, OT; 2 ♂♂, 30.iv.2011, LJ; 3 ♂♂, 30.iv.2011, OT. **14c** – 5 ♂♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD.

"*Elattoneura*" *aurantiaca*

1a – ♂, 28.iii.2006, RD; 3 ♂♂, 10.viii.2013, RD; ♂, **11**.viii.2013, RD.

"*Elattoneura*" *longispina*

1a – 7 ♂♂, 28.ii.2006, RD; 2 ♂♂, 3.iii.2006, RD.

Onychargia atrocyana

BM1 – ♂, 1.v.2011, LJ. **BM9** – 2 ♂♂, 28.iv.2011, RD. **1a** – ♂+♀, 2.iii.2006, RD; ♂, 8.viii.2013, RD; ♀, 11.viii.2013, RD. **2a** – ♂+♀, 27.ii.2008, RD; ♂, 19.viii.2009, RD; ♀, 7.v.20, RD; ♂, 20.ix.2011, RD. **3a** – ♂, 3.iii.2008, RD. **3b** – ♂+♀, 9.v.2011, RD. **6** – ♂+♀, 19.ix.2011, RD.

Prodasineura collaris

BM7 – ♀, 27.iv.2011, RD. **1a** – 2 ♂♂, 2.iii.2006, RD; ♂, ♀, 2.iii.2006, W; ♂, 3.iii.2006, LCK; 2 ♀♀, 8.viii.2013, BG & NM; ♂, 12.viii.2013, RD. **2a** – 2 ♂♂, ♂+♀, 6.v.2011, RD; 2 ♂♂, 2 ♀♀, ♂+♀, 6.v.2011, LJ; 2 ♂♂, ♀, 6.v.2011, OT.

Prodasineura dorsalis

BM1 – ♂, 23.i.2008, RD. **BM11** – ♂, 22.iii.2014, RD. **3c** – 2 ♀♀, 18.ix.2011, RD. **5** – ♂, 21.viii.2009, RD; ♂, 5.v.2011, OT. **6** – 2 ♂♂, 19.ix.2011, RD. **8c** – ♂, 20.x.2008, RD; ♂, 31.viii.2009, OT. **8d** – ♂, 17.viii.2009, RD; ♂, 17.viii.2009, OT & SS. **12** – 2 ♂♂, ♀, 23.iii.2012, RD. **14a** – ♂, 17.xi.2010, RD. **18** – ♂, 21.iii.2014, PS. **S2** – 2 ♂♂, ♀, ♂+♀, 1.ii.2008, RD; ♂, 1.ii.2008, GR. **S3** – ♂, 2.ii.2008, RD; 2 ♂♂, 2.ii.2008, GR; ♂, 4.ii.2008, GR; ♂, 14.iii.2014, SB.

Prodasineura hosei

8a – 3 ♂♂, 11.vi.2010, RD; ♂, **11**.vi.2010, OT. **8c** – 2 ♂♂, 19.x.2008, RD; ♂, 16.viii.2009,

RD; ♂, 16.viii.2009, OT & SS. **8e** – ♂, 14.vi.2010, RD. **9a** – ♂, 20.vi.2010, RD. **12** – 2 ♂♂, 24.iii.20**12**, RD. **14c** – ♂, 20.xi.2010, RD.

Prodasineura hyperythra

2a – 3 ♂♂, ♀, 5.iii.2006, RD; 3 ♂♂, ♂+♀, 7.iii.2006, RD; ♂, 27.ii.2008, RD; ♂+♀, 29.ii.2008, RD; 3 ♂♂, ♂+♀, 2.iii.2008, RD; ♂, 19.viii.2009, RD; ♂, 6.v.2011, RD; ♂, 6.v.2011, LJ; 3 ♂♂, 8.v.2011, RD; ♂, 8.v.2011, SS; ♂, 19.iii.2014, OT. **3c** – ♂, 18.ix.2011, RD. **4a** – ♂, 15.ix.2011, RD; ♂, 15.ix.2011, OT. **6** – 2 ♂♂, 19.ix.2011, RD. **8a** – ♂, 19.i.2008, RD; ♂, 18.x.2008, RD; ♂, 11.vi.2010, RD. **8d** – ♂, 17.viii.2009, RD. **8e** – ♂, 16.vi.2010, OT. **12** – ♂, 23.iii.2012, RD; ♂, 24.iii.2012, RD. **14a** – 2 ♂♂, 17.xi.2010, RD.

Prodasineura tenebricosa

1a – ♂, 10.viii.2013, RD; ♂, 11.viii.2013, BG. **1b** – 4 ♂♂, 2 ♀♀, ♂+♀, 9.viii.2013, RD.

Prodasineura verticalis

BM3 – ♂, 24.i.2008, RD. **BM8** – ♂, 30.vi.2010, RD; 2 ♂♂, 30.vi.2010, SS; ♂, 30.vi.2010, OT; ♂, 12.xi.2010, SS; 2 ♂♂, 12.xi.2010, OT; ♂, ♀, 28.iv.2011, RD. **1a** – ♂, 2 ♀♀, 28.ii.2006, RD; ♂, 28.ii.2006, W; ♂, 2.iii.2006, RD; 5 ♂♂, 5 ♀♀, 2.iii.2006, W; 2 ♂♂, 3.iii.2006, RD; ♂, 12.x.2008, RD; 2 ♂♂, 7.viii.2013, RD; ♂, ♀, 7.viii.2013, BG; ♂, 8.viii.2013, BG & NM; ♂, 11.viii.2013, RD; ♂, 11.viii.2013, BG; 2 ♂♂, 12.viii.2013, NM. 1b – ♂, 9.viii.2013, RD; ♀, 9.viii.2013, BG. **2b** – ♂, 19.iii.2014, RD. **3a** – 3 ♂♂, 6.iii.2006, RD; ♂, 2 ♀♀, 6.iii.2006, CSY; ♂+♀, 3.iii.2008, RD; ♀, 3.iii.2008, RR. **3b** – ♂, ♀, 9.v.2011, SB; 3 ♂♂, 9.v.2011, RD; ♂, 14.ix.2011, RD; 2 ♂♂, 14.ix.2011, SS. **5** – ♂, 5.v.2011, RD. **7** – 2 ♂♂, 28.ii.2008, RR. **8a** – 3 ♂♂, 19.i.2008, D&E; ♂, 18.x.2008, RD. **8biii** – ♂, 20.i.2008, RD. **9a** – ♂, 25.viii.2009, RD; ♂, 20.vi.2010, JT. **10a** – 2 ♂♂, 23.vi.2010, RD; ♂, 23.vi.2010, SS; 2 ♂♂, 23.vi.2010, JT. **11** – ♂, 29.vi.2010, RD; 2 ♂♂, 1.vii.2010, RD; ♂+♀, 1.vii.2010, OT; ♂, 11.xi.2010, OT. **12** – ♂, 23.iii.2012, RD; 3 ♂♂, ♂+♀, 24.iii.2012, RD; 2 ♂♂, ♀, 24.iii.2012, NM. **16c** – 3 ♂♂, 6.v.2005, RD. **18** – ♂, ♀, 21.iii.2014, RD; 2 ♂♂, 21.iii.2014, BG; ♂, 21.iii.2014, PS; 2 ♂♂, 21.iii.2014, OT. **S7** – 2 ♂♂, ♀, 3.ii.2008, RD; ♂, 3.ii.2008, GR.

Prodasineura species cf *peramoena*

BM3 – ♂, ♀, 24.i.2008, RD; 2 ♂♂, ♀, 9–10.ii.2010, OT. **BM11** – ♂, 22.iii.2014, OT. **BM12** – ♂, 28.iii.2014, RD; ♂, 3.ix.2014, RD. **BM13** – 4 ♂♂, ♂+♀, 24.viii.2009, RD; ♂+♀, 22.vi.2010, RD; 3 ♂♂, 2 ♀♀, 22.vi.2010, SS; ♂, 22.vi.2010, JT; ♂, 4.ix.2014, BG; 2 ♂♂, 4.ix.2014, NM. **8a** – ♂, ♂+♀, 11.vi.2010, RD; ♂, 11.vi.2010, OT. **8c** – ♂, 31.viii.2009, RD; ♂, 16.vi.2010, OT. **9a** – 2 ♂♂, 2 ♀♀, 25.viii.2009, RD; ♂, ♀, 25.viii.2009, OT & SS; ♂, 27.viii.2009, RD; ♂+♀, 27.viii.2009, EE; 2 ♂♂, ♀, 2(♂+♀), 20.vi.2010, RD; ♀, 20.vi.2010, SS; 2 ♂♂, 2 ♀♀, 20.vi.2010, JT; ♂, 21.vi.2010, RD; ♀, 21.vi.2010, SS & JT; ♂, 25.vi.2010, RD; 6 ♂♂, 5.v.2011, SS; 2 ♂♂, ♀, 25.iii.2014, RD; 2 ♂♂, 25.iii.2014, MT & OT. **9d** – ♂, 22.vi.2010, RD. 9e – ♂, 27.iii.2014, OT. **9f** – ♂, 28.iii.2014, RD. **10a** – 3 ♂♂, 23.vi.2010, RD; ♂, 23.vi.2010, SS. **10b** – ♂, 25.vi.2010, RD; ♂, 26.vi.2010, RD; ♂, 26.vi.2010, SS. **11** – 2 ♂♂, 29.vi.2010, RD; 2 ♂♂, ♀, 1.vii.2010, RD; ♂, 10.xi.2010, RD. **S2** – ♂+♀, 1.ii.2008, RD; ♂, 2(♂+♀), 1.ii.2008, GR; ♂, 3.ii.2008, RD. **S3** – 3 ♂♂, 2.ii.2008, RD; ♂+♀, 2.ii.2008, GR.

Coenagrionidae

Aciagrion borneense

BM5 – ♂, 23.i.2008, RD; ♂, 9–10.ii.2010, OT. **1a** – ♂, 12.x.2008, RD. **2b** – ♂, 19.iii.2014,

RD. **7** – ♂, 28.ii.2008, RD; ♂, 25.x.2008, RD. **8e** – 2 ♂♂, 2 ♀♀, 14.vi.2010, OT. **9b** – ♂, 19.vi.2010, RD. **16a** – 2 ♂♂, ♀, 6.v.200**5**, RD.

Agriocnemis femina

BM10 – ♀, 28.iv.2011, RD. **1a** – ♀, 12.x.2008, RD. **2a** – ♂, 5.iii.2006, RD; ♀, 22.x.2008, BG & NM (at lights). **7** – ♀, 28.ii.2008, RR; ♂, ♀, 25.x.2008, BG & NM. **9b** – ♂, ♀, 19.vi.2010, RD. **S1** – ♂, 1.ii.2008, RD.

Amphicnemis species cf *dactylostyla*

1a – ♂, 1.iii.2006, RD; ♂, 2.iii.2006, RD; ♂, ♀, 2.iii.2006, W; ♀, 8.viii.2013, RD; 2 ♂♂, 11.viii.2013, RD.

Amphicnemis species *wallacii*–group

BM7 – ♀, 27.iv.2011, RD; ♂, ♀, 27.iv.2011, OT. **BM9** – ♀, 30.vi.2010, RD; 2 ♀♀, 12.xi.2010, OT; 3 ♂♂, 28.iv.2011, RD; ♀, 28.iv.2011, OT. **1a** – 2 ♂♂, 4 ♀♀, 28.ii.2006, RD; 22 ♂♂, 4 ♀♀, 1.iii.2006, RD; 3 ♂♂, 6 ♀♀, 1.iii.2006, W; 19 ♂♂, 3 ♀♀, 2.iii.2006, RD; 14 ♂♂, 5 ♀♀, 2.iii.2006, W; ♀, 3.iii.2006, RD; 5 ♂♂, 2 ♀♀, 12.x.2008, RD; 3 ♂♂, ♀, 14.x.2008, OT; 2 ♂♂, 15.x.2008, RD; ♂, ♀, 15.x.2008, OT; 6 ♂♂, ♀, 7.viii.2013, RD; 2 ♂♂, 3 ♀♀, 7.viii.2013, BG; ♂, ♀, 8.viii.2013, RD; 3 ♂♂, 4 ♀♀, 8.viii.2013, BG & NM; ♂, 10.viii.2013, BG; 6 ♂♂, ♀, 11.viii.2013, RD; 3 ♂♂, 11.viii.2013, BG; ♂, 3 ♀♀, 13.viii.2013, BG; ♀, 13.viii.2013, NM. **2a** – ♀, 5.iii.2006, RD; ♂, ♀, 7.iii.2006, RD; 2 ♀♀, 27.ii.2008, RD; 3 ♂♂, 4 ♀♀, 27.ii.2008, RR; ♂, 29.ii.2008, RD; ♀, 29.ii.2008, RR; ♀, 22.x.2008, BG; ♂, 24.x.2008, RD; 2 ♂♂, 24.x.2008, BG & NM; ♂, ♀, 6.v.2011, RD; ♀, 6.v.2011, LJ; ♂, 7.v.2011, RD; ♂, ♀, 8.v.2011, RD; ♀, 8.v.2011, SS; ♂, 20.ix.2011, RD; ♂, ♀, 19.iii.2014, OT. **16c** – ♀, 6.v.2005, RD. **S3** – ♂, 2.ii.2008, GR. **S4** – ♀, 5.ii.2008, GR.

Archibasis incisura

1a – ♂, 28.ii.2006, RD; 5 ♂♂, 3.iii.2006, RD; 3 ♂♂, 13.x.2008, RD; ♂, 13.x.2008, OT; 5 ♂♂, 10.viii.2013, RD; 3 ♂♂, ♀, 10.viii.2013, BG; 8 ♂♂, 11.viii.2013, BG.

Archibasis melanocyana

1a – ♂, 28.ii.2006, RD.

Archibasis tenella

BM3 – ♂, 24.i.2008, RD; ♂, 9–10.ii.2010, OT. **BM6** – ♂, 27.iv.2011, RD. **BM13** – ♂, 22.vi.2010, RD. **1a** – ♂, 10.viii.2013, BG. **2a** – 2 ♂♂, ♀, 7.iii.2006, RD; ♂, 29.ii.2008, RD; ♂, ♀, 24.x.2008, RD; 3 ♂♂, 8.v.2011, RD; ♂, 8.v.2011, SS; 2 ♂♂, 18.iii.2014, RD; **3a** – 2 ♂♂, 6.iii.2006, RD; ♂, 6.iii.2006, CSY. **3b** – 2 ♂♂, 9.v.2011, SB; 4 ♂♂, 9.v.2011, RD; ♂, 9.v.2011, SS; ♂, 14.ix.2011, RD; ♀, 14.ix.2011, SS. **6** – 4 ♂♂, 19.ix.2011, RD; ♂, 19.ix.2011, SS; 3 ♂♂, 19.ix.2011, OT. **7** – 2 ♂♂, 28.ii.2008, RD. **8a** – 4 ♂♂, 19.i.2008, RD; 2 ♂♂, ♂+♀, 11.vi.2010, RD. **9a** – ♂, 25.viii.2009, RD; ♂, 25.viii.2009, OT & SS; ♂, 27.viii.2009, RD; 2 ♂♂, 20.vi.2010, RD; 3 ♂♂, 20.vi.2010, SS; ♂, 20.vi.2010, JT; ♂, ♀, 5.v.2011, SS; 4 ♂♂, 6.v.2011, SS; ♂, 25.iii.2014, RD; ♂, 25.iii.2014, BG & NM; ♂, 25.iii.2014, MT & OT. **11** – 2 ♂♂, ♀, 1.vii.2010, RD; 2 ♂♂, 1.vii.2010, OT; 2 ♂♂, 10.xi.2010; RD; ♂, 11.xi.2010, OT; 2 ♂♂, 29.iv.2011, LJ; 2 ♂♂, 29.iv.2011, OT; 2 ♂♂, 30.iv.2011, OT. **12** – 3 ♂♂, 24.iii.2012, RD. **18** – ♂, 20.iii.2014, RD.

Archibasis viola

BM3 – ♂, 9–10.ii.2010, OT. **BM9** – ♂, ♂+♀, 30.vi.2010, RD; ♂, 30.vi.2010, OT; ♀, 12.xi.2010, SS; 2 ♂♂, 28.iv.2011, RD. **1a** – 4 ♂♂, 28.ii.2006, RD; 4 ♂♂, ♂+♀, 1.iii.2006, RD; ♂, 1.iii.2006, W; 2 ♂♂, 2.iii.2006, RD; ♂, 3.iii.2006, RD; ♂, 12.x.2008, RD; ♂, 14.x.2008, RD; ♂, 15.x.2008, RD; ♂, 8.viii.2013, RD; ♂, 11.viii.2013, RD; ♂, 13.viii.2013, BG. **2a** – 2 ♂♂, ♀, 5.iii.2006, RD;

♀, 7.iii.2006, RD; ♂+♀, 27.ii.2008, RD; ♂, 29.ii.2008, RD; ♂, 19.viii.2009, RD; ♂, 8.v.2011, SB; 2 ♂♂, 8.v.2011, RD; ♂, 17.iii.2014, PS; ♂, ♂+♀, 18.iii.2014, RD; ♂+♀, 19.iii.2014, PS. **2b** – ♂, 19.iii.2014, RD. **3a** – 3 ♂♂, ♂+♀, 6.iii.2006, RD; 2 ♂♂, 6.iii.2006, CSY. **3b** – ♂, 7.v.2011, LJ; ♂, 9.v.2011, S B. **3c** – ♂, 18.ix.2011, OT. **4b** – ♂, 17.ix.2011, RD. **8a** – ♂, 19.i.2008, RD. **8e** – ♂, 16.vi.2010, RD. **9ci** – ♂, 21.vi.2010, RD; ♂, 21.vi.2010, SS & JT. **S3** – ♂, 4.ii.2008, RD.

Argiocnemis species

BM7 – 2 ♂♂, 2 ♀♀, 27.iv.2011, RD; ♂, 27.iv.2011, SS; ♂, ♀, 27.iv.2011, OT. **BM9** – 2 ♂♂, 30.vi.2010, RD; ♂, 30.vi.2010, OT; 2 ♂♂, 12.xi.2010, OT; 2 ♂♂, ♀, 12.xi.2010, SS. **2a** – ♂, ♀, 5.iii.2006, RD; 4 ♂♂, 2 ♀♀, 7.iii.2006, RD; 4 ♂♂, 27.ii.2008, RD; ♂, ♀, 27.ii.2008, RR; ♀, 2.iii.2008, RD; ♂, 24.x.2008, RD; ♂, ♀, 8.v.2011, RD; ♀, 8.v.2011, SS; ♂, 18.iii.2014, PS. **3a** – ♂, 6.iii.2006, RD; ♂, 7.v.2011, LJ. **3b** – ♀, 9.v.2011, SS; 2 ♀♀, 14.ix.2011, RD; ♀, 14.ix.2011, SS. **3c** – ♀, 18.ix.2011, OT. **6** – ♀, 19.ix.2011, SS. **8b**iii – 2 ♂♂, 20.i.2008, RD. **8d** – ♀, 17.viii.2009, RD. **8e** – 2 ♀♀, 14.vi.2010, RD; 2 ♀♀, 14.vi.2010, OT. **9a** – ♂, ♀, 20.vi.2010, RD; ♂, 20.vi.2010, SS. **9ci** – ♂, 21.vi.2010, RD. **11** – ♂, 1.vii.2010, RD; ♀, 1.vii.2010, OT; ♂, ♀, 10.xi.2010, OT; 3 ♀♀, 11.xi.2010, OT; ♂, 2 ♀♀, 29.iv.2011, LJ; ♂, 29.iv.2011, OT. **12** – ♂, 23.iii.2012, RD; ♂, 25.iii.2012, RD; ♂, 25.iii.2012, OT. **14c** – ♀, 20.xi.2010, RD. **18** – ♂, 21.iii.2014, RD.

Ceriagrion bellona

BM5 – ♂, ♀, 23.i.2008, RD. **BM9** – ♂, 28.iv.2011, RD. **9a** – ♀, 21.vi.2010, RD **12** – ♂, 25.iii.2012, NM; ♂, 25.iii.2012, OT. **15c** – ♂, 27.iii.2012, BG & NM.

Ceriagrion cerinorubellum

BM3 – ♂, 24.i.2008, RD. **BM5** – ♂, 23.i.2008, RD; 3 ♂♂, 9–10.ii.2010, OT. **BM7** – ♂, 27.iv.2011, RD; ♂, 27.iv.2011, SS; ♂, 27.iv.2011, OT. **BM9** – ♂, 30.vi.2010, RD; ♂, 30.vi.2010, SS; ♂, 30.vi.2010, OT; 2 ♂♂, 12.xi.2010, SS; ♂, 12.xi.2010, OT; ♀, 28.iv.2011, RD; ♂, 28.iv.2011, OT. **1a** – ♂, 28.ii.2006, RD; ♂, 1.iii.2006, RD; ♂, ♂+♀, 2.iii.2006, RD; 4 ♂♂, ♀, 2.iii.2006, W; ♀, 3.iii.2006, LCK; 3 ♂♂, 12.x.2008, OT; ♂, 15.x.2008, RD; ♂, 11.viii.2013, RD; 3 ♂♂, 13.viii.2013, BG; ♂, 13.viii.2013, NM. **2a** – ♂, 5.iii.2006, RD; ♂, 22.i.2008, RD; ♂, 27.ii.2008, RR; ♂, 19.viii.2009, OT & SS; ♂, 6.v.2011, RD; ♀, 6.v.2011, LJ; ♂, 8.v.2011, SB; ♂, 8.v.2011, RD; ♂, 8.v.2011, SS; ♂, 20.ix.2011, SS; ♂, 18.iii.2014, RD; 2 ♂♂, ♀, 19.iii.2014, PS; ♂, 19.iii.2014, OT. **2b** – ♂, 19.iii.2014, RD. **3a** – 2 ♂♂, 6.iii.2006, RD; ♂, 6.iii.2006, CSY; ♂, 7.v.2011, LJ. **3b** – ♀, 9.v.2011, RD. **4b** – ♂, 17.ix.2011, RD; 3 ♂♂, 17.ix.2011, SS. **6** – 2 ♂♂, 19.ix.2011, RD; ♂, 19.ix.2011, 2011, SS; ♂, 19.ix.2011, OT. **8a** – ♂, 19.i.2008, RD. **9a** – ♂, 27.viii.2009, OT. **9ci** – ♂ 21.vi.2010, RD; 4 ♂♂, 21.vi.2010, SS & JT. **11** – ♂, 29.iv.2011, LJ. **12** – ♀, 23.iii.2012, RD. **16a** – ♂, 6.v.2005, GR. **18** – ♂, 21.iii.2014, RD; ♀, 21.iii.2014, BG. **S3** – ♂, 2.ii.2008, RD.

Ischnura senegalensis

2a – ♂, ♂+♀, 22.i.2008, RD; ♀, 29.ii.2008, RD. **2b** – ♀, 19.iii.2014, RD. **17** – ♀, 22.viii.2009, AJ.

Mortonagrion indraneil

See Dow (2011b).

Pericnemis dowi

BM12 – ♂, 26.iii.2014, RD.

Pericnemis stictica

1a – ♂, 7.viii.2013, RD. **2a** – ♀, 6.v.2011, RD; ♂, 7.v.2011, RD.

Pseudagrion lalakense

BM2 – ♂, 23.i.2008, RD; ♂, 23.x.2008, RD. **BM8** – ♂, 30.vi.2010, RD. **4b** – 3 ♂♂, ♂+♀, 17.ix.2011, RD. **8d** – ♀, 17.viii.2009, OT & SS. **16b** – ♂, 6.v.2005, RD.

Pseudagrion microcephalum

BM2 – ♂, 23.i.2008, RD. **2a** – 3 ♂♂, ♂+♀, 22.i.2008, RD; 2 ♂♂, 14.x.2008, RD. **2b** – ♂, 19.iii.2014, RD. **4b** – ♂, 17.ix.2011, RD; ♂, 17.ix.2011, SS. **16b** – 2 ♂♂, ♀, 6.v.2005, GR. **S1** – ♂, 1.ii.2008, RD; ♂, 5.ii.2012, SB.

Pseudagrion perfuscatum

1a – 2 ♂♂, 28.ii.2006, RD; 2 ♂♂, 1.iii.2006, RD; ♂, 8.viii.2013, RD. **3a** – 4 ♂♂, ♀, 6.iii.2006, RD; ♂, 3.iii.2008, RD; 3 ♂♂, ♀, 7.v.2011, SS. **3b** – ♂+♀, 9.v.2011, RD. **6** – ♂, 19.ix.2011, OT. **7** – ♂, ♂+♀, 28.ii.2008, RD. **8a** – ♂, 18.x.2008, RD. **18** – ♂, 21.iii.2014, RD. **S7** – 2 ♂♂, 3.ii.2008, GR.

Stenagrion dubium

BM1 – 2 ♂♂, 23.i.2008, RD; ♂, 23.x.2008, RD; ♂, 1.v.2011, OT; ♂, 20.iii.2014, PS. **BM12** – ♂, 26.iii.2014, RD; ♂, 26.iii.2014, MT. **8c** – ♂, ♂+♀, 19.x.2008, RD; ♂, 20.x.2008, RD; ♂, 30.viii.2009, RD; 2 ♂♂, 31.viii.2009, RD; ♂, 10.vi.2010, RD. **8d** – ♂, 17.viii.2009, RD. **8e** – ♂, 14.vi.2010, RD. **12** – 2 ♂♂, 24.iii.2012, RD; ♂, 24.iii.2012, NM; ♂, 25.iii.2012, NM. 13 – 6 ♂♂, 31.i.2008, RD. **14b** – 3 ♂♂, 18.xi.2010, RD. **15a** – ♂, 22.iii.2012, RD; ♂, 22.iii.2012, NM; ♂, 22.iii.2012, OT. **15b** – 3 ♂♂, 26.iii.2012, RD; ♂, 26.iii.2012, NM; 2 ♂♂, 26.iii.2012, OT; 3 ♂♂, ♀, 27.iii.2012, RD; 4 ♂♂, 27.iii.2012, BG & NM. **18** – ♀, 21.iii.2014, BG; ♂, 21.iii.2014, OT.

Teinobasis cryptica

2a – ♀, 6.v.2011, RD.

Teinobasis rajah

2a – ♂, 6.v.2011, RD; ♂, 20.ix.2011, RD. **3b** – 6 ♂♂, 9.v.2011, RD; ♂, 14.ix.2011, RD. **4b** – ♂, 17.ix.2011, OT.

Xiphiagrion cyanomelas

BM5 – ♂, ♂+♀, 23.i.2008, RD; ♂, 9–10.ii.2010, OT. **1a** – ♂, 14.x.2008, RD. **4b** – ♂, 17.ix.2011, RD. **8c** – ♂, 19.x.2008, RD. **8d** – ♂, 17.viii.2009, RD. **9b** – ♂, 21.viii.2009, RD; ♂, 24.viii.2009, OT; ♂, 19.vi.2010, RD; ♂, 5.v.2011, SS. **9cii** – ♂+♀, 21.vi.2010, JT. **16a** – ♂, 6.v.2005, GR. **S1** – ♂+♀, 1.ii.2008, GR.

Anisoptera

Aeshnidae

Anax guttatus

2a – ♂, 24.x.2008, RD. **9b** – ♂, 24.viii.2009, RD.

Anax panybeus

BM4 – ♂, 4.ix.2014, RD. **9b** – ♂, 5.v.2011, SS; ♂, 6.v.2011, SS. **S1** – ♀, 1.ii.2008, RD

Gynacantha dohrni

BM4 – ♂, 27.iv.2011, RD; ♂, 4.ix.2014; RD. **1a** – ♂, 13.viii.2013, RD. **2a** – ♂, 24.i.2008, RD. **11** – ♀, 12.xi.2010, RD. **16c** – ♀, 6.v.2005, GR.

Gynacantha species

1a – ♀, 2.iii.2006, RD. **2a** – ♀, 7.v.2011, RD.

Heliaeschna bartelsi

2a – ♀, 20.viii.2009, SS.

Heliaechna idae

1a – ♂, 15.x.2008, RD; ♂, 6.viii.2013, RD; ♂, 9.viii.2013, RD. **2a** – ♂, 22.iii.2014, BG.

Heliaeschna simplicia

BM9 – ♀, 30.vi.2010, RD; ♀ larva, 28.iv.2011 (emerged 15.vii.2011), S B. **1a** – ♂, 10.viii.2013, RD. **3b** – ♂, 9.v.2011, SB.

Indaeschna grubaueri

2a – ♂, 7.v.2011, RD. **9a** – ♂, 5.v.2011, SS. **14d** – ♀, 20.xi.2010, RD. **S2** – ♀, 1.ii.2008, RD.

Linaeschna polli

9a – ♂, 25.viii.2009, SS; ♂, 20.vi.2010, SS.

Oligoaeschna amata

2a – 2 ♂♂, 24.x.2008, BG. **9a** – ? ♀, 21.vi.2010, RD.

Oligoaeschna buehri

BM4 – ♂, 2 ♀♀, 27.iv.2011, RD.

Oligoaeschna (?)species 1

1a – ♀, 7.viii.2013, RD.

Tetracanthagyna plagiata

BM8 – larvae, 28.iv.2011, S B. **2a** – 2 larvae, 2.iii.2008, RR. **3b** – ♀, 9.v.2011, RD; ♀, 9.v.2011, SS. **11** – ♀, 1.vii.2010, RD; ♀, 11.xi.2010, OT; ♀, 30.iv.2011, LJ.

Tetracanthagyna species

8a – larva, 18.x.2008, AJ & OT.

Gomphidae

Acrogomphus jubilaris

BM1 – 1 larva, 23.i.2008, D & E; 1 larva, 20.iii.2014, PS. **BM11** – 5 larvae, 22.iii.2014, PS. **8c** – 2 larvae, 19.x.2008, AJ & OT. **18** – 1 larva, 21.iii.2014, PS. **S3** – 1 larva, 4.ii.2008, RD.

Burmagomphus arthuri

2a – ♀, 2.iii.2008, RD. **11** – ♀, 30.iv.2011, SS.

Gomphidia maclachlani

BM6 – ♂, ?larvae, 27.iv.2011, S B. 1b – ♂, 9.viii.2013, RD; ♂, 10.viii.2013, RD. **S3** – 2 ?larvae, 4.ii.2008, RD.

Heliogomphus borneensis

8c – ♂, 30.viii.2009, RD.

Ictinogomphus decoratus melaenops

1a – 2 ♂♂, 3.iii.2006, RD; ♂, 13.x.2008, RD; ♂, 10.viii.2013, RD; 5 ♂♂, 11.viii.2013, BG. **1b** – 2 ♂♂, 9.viii.2013, RD. **2a** – ♂, 22.i.2008, RD. **3b** – ♂, 9.v.2011, RD. **4b** – ♂, 17.ix.2011, SS. **12** – ♀, 23.iii.2012, RD. **16b** – ♂, 6.v.2005, GR.

Leptogomphus coomansi

Adult material is listed in Dow et al. (2017), except:

9a – ♂, 25.viii.2009, RD (in the collection of the Sarawak Biodiversity Centre).

Leptogomphus pendelburyi

Adult material is listed in Dow et al. (2017).

Leptogomphus species cf *Leptogomphus coomansi*

Adult material is listed in Dow et al. (2017).

Leptogomphus williamsoni

Adult material is listed in Dow et al. (2017).

Macrogomphus parallelogramma

1a – ♂, 11.x.2008, RD; ♂, 13.x.2008, RD; ♂, 7.viii.2013, RD. **9a** – ♀, 27.viii.2009, RD; ♂, 5.v.2011, SS; ♀, 6.v.2011, SS.

Macrogomphus quadratus

2a – ♀, 18.iii.2014, RD.

Megalogomphus species A

11 – ♂, 10.xi.2010, JU; ♂, 30.iv.2011, SS.

Megalogomphus species B

9a – ♂, 25.viii.2009, RD.

Merogomphus femoralis

3b – ♂, 9.v.2011, RD.

Microgomphus chelifer

BM12 – ♀, 4.ix.2014, RD. **BM13** – ♀, 24.viii.2009, RD. **1a** – 2 ♀♀, 13.x.2008, RD; ♀, 8.viii.2013, RD; 3 ♂♂ (teneral), 10.viii.2013, RD; ♂, ♀, 11.viii.2013, RD. 1b – ♂ (teneral), 9.vii.2013, BG. **2a** – ♀, 2.iii.2008, RR. **3a** – 2 larvae (COI matches), 3.iii.2008, RR. **3b** – ♂ (teneral), 9.v.2011, RD. **6** – ♀, 19.ix.2011, SS. **8a** – ♂, 11.vi.2010, OT.

Chlorogomphidae

Chlorogomphus sp. or spp.

BM1 – ♀ (reared from larva), 20.iii.2014, SB; 2 larvae, 20.iii.2014, PS. **BM11** – 3 larvae: 22.iii.2014, PS.

Macromiidae

Epophthalmia vittigera

8biii – larva, 20.i.2008, RD.

Macromia cincta

BM4 – ♂, 28.iv.2011, RD; ♀, 4.ix.2014, RD. **1a** – ♂, 11.viii.2013, RD; ♂, 11.viii.2013, BG. **2a** – ♀, 5.iii.2006, RD; 3 larvae, 2.iii.2008, RR; ♀, larva, 8.v.2011, S B. **3a** – ♀, 7.v.2011, LJ.

Macromia corycia

2a – larva (COI match), 2.iii.2008, RR; 2 larvae (COI matches), 18.iii.2014, S *B.* **9a** – larva (COI match), 25.iii.2014, SB.

Macromia cydippe

BM6 – larvae, 27.iv.2011, S B. **1a** – ♀, 28.ii.2006, RD. **2a** – larva, 2.iii.2008, RR; larva (COI match), 24.x.2008, BG & NM; larva, 08.v.2011, SB, 2 larvae, 19.iii.2014, PS.

Macromia species cf *dione*

3a – larva, 3.iii.2008, RR.

Synthemistidae

Idionyx ?yolanda

BM11 – ♀, 22.iii.2014, RD.

Macromidia genialis erratica

BM12 – ♀, 26.iii.2014, RD.

Macromidia fulva

8a – ♀, 19.i.2008, RD. **12** – 2 ♀♀, 23.iii.2012, RD; ♀, 25.iii.2012, RD; ♀, 27.v.2012, RD; ♂, 27.iii.2012, JU.

Corduliidae

Hemicordulia tenera

3a – ♂, 7.v.2011, LJ. **4b** – ♂, 17.ix.2011, RD.

Libellulidae

Acisoma panorpoides

2a – 2 ♂♂, 7.v.2011, RD; ♂, 18.iii.2014, RD.

Aethriamanta gracilis

1a – ♂, 14.x.2008, RD. **2a** – ♂, 24.x.2008, RD. **4b** – ♂, 17.ix.2011, RD. **6** – ♀, 19.ix.2011, OT. **9b** – ♂, 27.iii.2014, RD.

Agrionoptera insignis

1a – 2 ♂♂, 1.iii.2006. RD; ♂, 3.iii.2006, RD; 2 ♀♀, 13.x.2008, RD; ♂, 8.viii.2013, RD; ♂, 11.viii.2013, RD; ♂, ♀, 11.viii.2013, BG. 1b – ♀, 9.viii.2013, RD. **2a** – ♂, 7.iii.2006, RD; ♂, 27.ii.2008, RD; ♂, 19.viii.2009, RD. **3b** – ♀, 9.v.2011, RD. **S1** – ♂, 1.ii.2008, RD; ♂, 1.ii.2008, GR.

Agrionoptera sexlineata

2a – ♀, 6.iii.2006, RD. **S1** – ♂, 1.ii.2008, GR. **S4** – ♂, 5.ii.2008, GR. **S5** – ♀, 4.ii.2008, GR.

Brachydiplax chalybea

BM9 – ♂, 28.iv.2011, SS; 1 larva, 28.iv.2011, S B. **1a** – ♂, 1.iii.2006, RD; 2 ♂♂, 1.iii.2006, W; ♂, 2.iii.2006, RD; ♂, 12.x.2008, RD. **2a** – 2 ♂♂, 5.iii.2006, RD; ♂, 22.i.2008, RD; ♀, 27.ii.2008, RD (at lights); 2 ♀♀, 23.x.2008, RD (at lights); ♂, 24.x.2008, BG (at lights); ♂, 7.v.2011, RD; ♂, 14.ix.2011, RD (at lights during heavy rain). **2b** – ♂, 19.iii.2014, RD. **3a** – ♂, 7.v.2011, SS. **9a** – ♂, 6.v.2011, SS. **S1** – ♂, 4.ii.2012, SB; 2 ♂♂, 13.iii.2014, SB.

Brachydiplax farinosa

BM7 – ♂, 27.iv.2011, RD; ♂, 27.iv.2011, OT. **BM9** – ♂, 30.vi.2010, RD; 2 ♂♂, 12.xi.2010, SS; ♂, 28.iv.2011, RD. **2a** – 2 ♂♂, 27.ii.2008, RD; ♂, 19.viii.2009, RD; ♂, 8.v.2011, SB; 3 ♂♂, 8.v.2011, RD; ♂, 20.ix.2011, RD; ♂, 20.ix.2011, SS; ♂, 17.iii.2014, RD. **4b** – ♂, 17.ix.2011, RD.

Brachygonia oculata

BM7 – ♂, 27.iv.2011, RD. **BM9** – ♂, 30.vi.2010, RD; ♂, 12.xi.2010, SS; ♂, 12.xi.2010, OT; ♂, 28.iv.2011, RD; ♂, 28.iv.2011, OT. **1a** – ♂, 2 ♀♀, 28.ii.2006, RD; ♂, 1.iii.2006, RD; ♂, ♀, 2.iii.2006, RD; ♂, 13.x.2008, RD; ♂, 15.x.2008, RD; 2 ♂♂, 10.viii.2013, BG; ♂, 11.viii.2013, RD. 1b – ♀, 9.viii.2013, RD. **2a** – ♂, 18.iii.2014, RD. **3b** – ♂, 9.v.2011, RD; ♀, 9.v.2011, SS; ♂, 14.ix.2011, RD.

Camacinia gigantea

BM3 – ♀, 24.i.2008, RD; ♂, 9–10.ii.2010, OT. **6** – ♂, 19.ix.2011, RD. **15c** – ♂, 27.iii.2012, RD. **S1** – 2 ♂♂, 1.ii.2008, RD; 2 ♂♂, 1.ii.2008, GR.

Cratilla lineata

BM7 – ♂, 27.iv.2011, OT. **3a** – ♂, 6.iii.2006, RD. **8e** – ♂, 14.vi.2010, RD. **9a** – 2 ♂♂, 20.vi.2010, RD.

Cratilla metallica

BM7 – ♂, 27.iv.2011, OT. **BM9** – ♂, 28.iv.2011, RD. **2a** – ♂, 2.iii.2008, RD. **3a** – ♂, 6.iii.2006, RD; ♂, 6.iii.2006, CSY. **3d** – ♂, 18.ix.2011, SS. **4c** – ♂, 15.ix.2011, RD. **5** – ♂, 21.viii.2009, RD; ♀, 5.v.2011, OT. **8c** – ♂, 20.x.2008, RD. **8e** – ♂, 14.vi.2010, RD; ♀, 16.vi.2010, RD. **9a** – ♂, 27.viii.2009, RD; ♂, 27.viii.2009, EE; ♂, 27.viii.2009, OT; ♂, 25.vi.2010, RD; ♂, 25.vi.2010, SS. **12** – ♀, 23.iii.2012, OT. 13 – ♂, 31.i.2008, RD. **15c** – ♂, 26.iii.2012, RD; ♂, 26.iii.2012, NM.

Diplacodes trivialis

2a – ♂, 7.iii.2006, RD. **S1** – ♀, 1.ii.2008, RD.

Hydrobasileus croceus

5 – ♂, 5.v.2011, RD.

Lyriothemis biappendiculata

10b – ♂, 26.vi.2010, RD. **11** – ♂, 1.vii.2010, RD. **14a** – 2 ♂♂, 17.xi.2010, RD. **14c** – ♂, 19.xi.2010, RD; ♂, 20.xi.2010, RD. **S4** – ♂, 5.ii.2008, RD.

Lyriothemis cleis

4c – ♂, 15.ix.2011, RD. **9a** – ♂, 27.viii.2009, RD; ♂, 25.vi.2010, RD.

Nannophya pygmaea

BM1 – 2 ♂♂, 1.v.2011, OT. **BM2** – 3 ♂♂, 23.i.2008, RD; ♀, 23.x.2008, RD. **BM3** – 3 ♂♂, 9–10.ii.2010, OT. **BM5** – ♂, 1.v.2011, OT. **BM9** – ♂, 12.xi.2010, SS; ♂, 28.iv.2011, SS; ♂, 28.iv.2011, OT. **BM12** – ♂, 4.ix.2014, RD. **1a** – ♂, 1.iii.2006, RD; ♂, 2.iii.2006, W; ♂, 14.x.2008, RD. **2a** – ♂, 5.iii.2006, RD; ♂, 7.iii.2006, RD. **4b** – 2 ♂♂, 17.ix.2011, RD; ♂, 17.ix.2011, SS; ♂, 17.ix.2011, OT. **6** – ♂, 19.ix.2011, SS; ♂, 19.ix.2011, OT. **8a** – ♂, 19.i.2008, RD. **8c** – ♂, 19.x.2008, RD. **9a** – ♂, 25.viii.2009, RD; 2 ♂♂, 27.viii.2009, EE; ♂, 27.viii.2009, OT; ♂, 20.vi.2010, RD; ♀, 5.v.2011, SS. **15c** – ♂, 26.iii.2012, RD. **18** – ♂ (seen, not collected), 21.iii.2014, PS. **S1** – ♂, 1.ii.2008, RD.

Nesoxenia lineata

BM9 – ♂, 30.vi.2010, RD. **1a** – ♂, 28.ii.2006, RD; ♂, 3.iii.2006, RD; ♂, ♂+♀, 12.x.2008, RD; ♂, 15.x.2008, RD; ♀, 11.viii.2013, BG. 1b – ♀, 9.viii.2013, RD. **2a** – ♂, 7.iii.2006, RD; ♂, ♀, 18.iii.2014, RD. **2b** – ♂, 19.iii.2014, RD. **3b** – ♀, 9.v.2011, SB; ♂, ♀, 9.v.2011, RD. **16c** – ♂, ♀, 6.v.2005, GR.

Neurothemis fluctuans

Material listed in Seehausen & Dow (2016).

Neurothemis ramburii

Material listed in Seehausen & Dow (2016).

Neurothemis terminata

Material listed in Seehausen & Dow (2016).

Onychothemis culminicola

BM6 – ♂, 27.iv.2011, RD. **1a** – ♂, 7.viii.2013, RD; 2 ♂♂, 10.viii.2013, RD; ♂, 11.viii.2013, BG. **3b** – ♂, 14.ix.2011, RD. **18** – 2 ♂♂, 21.iii.2014, RD.

Orchithemis pruinans

1a – ♂, 13.x.2008, RD; 3 ♂♂, 10.viii.2013, RD; 2 ♂♂, 11.viii.2013, RD. **2a** – ♂, 27.ii.2008, RD; ♂, 24.x.2008, RD; 2 ♂♂, 24.x.2008, BG; ♂, 19.viii.2009, RD; ♂, 19.viii.2009, SS & OT; 2 ♂♂, 8.v.2011, SB; 2 ♂♂, 8.v.2011, RD; ♂, 8.v.2011, SS; ♂, 17.iii.2014, PS; ♂, 19.iii.2014, OT. **3a** – 2 ♂♂, 6.iii.2006, RD; 2 ♂♂, 3.iii.2008, RD. **3b** – ♂, 14.ix.2011, RD. **4a** – ♂, 15.ix.2011, RD.

Orchithemis pulcherrima

BM1 – ♂, 9–10.ii.2010, OT; 2 ♂♂, 3 ♀♀, 1.v.2011, LJ; ♂, ♀, 1.v.2011, OT. **BM2** – ♂, 23.i.2008, RD. **BM7** – ♀, 27.iv.2011, RD; ♀, 27.iv.2011, SS. **BM9** – ♂, 30.vi.2010, RD; 2 ♂♂, 28.iv.2011, LJ; 1 larva, 28.iv.2011, S B. **BM11** – ♂, 22.iii.2014, RD. **1a** – 3 ♂♂, 1.iii.2006, RD; ♀, 2.iii.2006, RD; ♀, 2.iii.2006, W; ♂, ♀, 12.x.2008, RD; ♂, 15.x.2008, RD; ♂, 15.x.2008, OT; 4 ♂♂, 8.viii.2013, BG & NM; ♂, 11.viii.2013, RD; ♀, 12.viii.2013, NM. **2a** – ♂, ♀, 5.iii.2006, RD; ♂, 29.ii.2008, RD; ♂, 6.v.2011, RD; ♀, 6.v.2011, OT; ♂, 18.iii.2014, RD. **3a** – ♂, 3 ♀♀, 6.iii.2006, RD; ♀, 6.iii.2006, CSY; 2 ♂♂, 7.v.2011, SS. **3b** – ♂, 9.v.2011, S B. **3c** – ♂, 18.ix.2011, SS. **4c** – ♀, 15.ix.2011, RD. **6** – 3 ♂♂, 19.ix.2011, RD; ♂, 19.ix.2011, SS. **8a** – ♂, 19.i.2008, RD. **8d** – ♂, 17.viii.2009, RD. **9a** – ♂, 27.viii.2009, RD; ♂, 27.viii.2009, EE; ♂, 27.viii.2009, OT; ♂, 20.vi.2010, RD; ♂, 25.vi.2010, RD; ♂, 5.v.2011, SS; ♂, 6.v.2011, SS. **9ci** – ♀, 21.vi.2010, RD. **9f** – 2 ♂♂, 28.iii.2014, OT. **11** – ♂, 29.vi.2010, RD; ♂, 1.vii.2010, RD; ♂, 10.xi.2010, RD; ♂, 11.xi.2010, OT; ♂, 30.iv.2011, LJ. **S8** – ♂, 3.ii.2008, RD; ♂, 3.ii.2008, GR.

Orthetrum chrysis

BM1 – ♂, 9–10.ii.2010, OT; ♂, 1.v.2011, LJ. **BM8** – ♂, 12.xi.2010, SS. **1a** – ♂, 28.ii.2006, RD; ♂, 12.x.2008, RD; ♂, 10.viii.2013, RD; ♂, 11.viii.2013, BG. **2a** – ♂, 24.x.2008, RD (at lights); ♂, 8.v.2011, RD. **2b** – ♂, 19.iii.2014, RD. **3a** – ♂, 6.iii.2006, RD. **4b** – ♂, 17.ix.2011, RD. **8a** – ♂, 19.i.2008, RD. **8e** – ♂, 16.vi.2010, RD. **9a** – ♂, 25.viii.2009, SS & OT; 2 ♂♂, 27.viii.2009, EE; ♂+♀, 20.vi.2010, RD; ♂, 6.v.2011, SB; ♂, 25.iii.2014, RD; ♂, 25.iii.2014, BG & NM. **10a** – ♂, 23.vi.2010, RD; ♂, 23.vi.2010, SS. **11** – ♂, 29.vi.2010, RD; ♂, 10.xi.2010, RD. **18** – ♂, 21.iii.2014, RD. **S1** – ♂, 1.ii.2008, RD; ♂, 1.ii.2008, GR.

Orthetrum glaucum

BM4 – ♂, 23.i.2008, RD; ♂, 1.v.2011, LJ. **BM13** – ♀, 22.vi.2010, JT. **3a** – ♂, 6.iii.2006, RD. **3d** – ♂, 18.ix.2011, SS. **8a** – ♂, 19.i.2008, RD; ♂, 19.i.2008, D&E. **8e** – ♂, 16.vi.2010, RD. **9a** – ♂, 27.viii.2009, EE; ♂, 20.vi.2010, JT; ♂, ♀, 5.v.2011, SS; ♀, 25.iii.2014, BG & NM. **11** – ♂, 10.xi.2010, RD. **12** – ♂, 24.iii.2012, RD; ♀, 25.iii.2012, RD; ♂, 25.iii.2012, NM; ♂, 25.iii.2012, OT. **14d** – ♂, 20.xi.2010, RD. **15c** – ♀, 22.iii.2012, RD; ♂, 26.iii.2012, NM; ♀, ♂+♀, 26.iii.2012, OT; ♂, 2 ♀♀, 27.iii.2012, BG & NM; ♂, 27.iii.2012, OT. **18** – 2 ♂♂, 21.iii.2014, RD.

Orthetrum pruinosum schneideri

10a – ♂, 23.vi.2010, RD. **15c** – ♂, 26.iii.2012, RD; ♂, 26.iii.2012, NM.

Orthetrum sabina

BM1 – ♂, 9–10.ii.2010, OT; ♀, 1.v.2011, SS. **BM9** – ♂, 28.iv.2011, RD. **BM10** – ♀♀, 12.xi.2010, SS.

1a – ♂, 1.iii.2006, RD; 3 ♂♂, 1.iii.2006, W; ♂, 14.x.2008, RD. **2a** – ♂, 5.iii.2006, RD; ♂, 22.i.2008, RD; ♀, 18.iii.2014, OT. **3a** – ♀, 6.iii.2006, CSY. **5** – 2 ♂♂, 21.viii.2009, SS & OT. **8e** – ♂, 14.vi.2010, OT. **9a** – 2 ♂♂, 27.viii.2009, EE. **9b** – ♂, 24.viii.2009, RD; ♂, 24.viii.2009, OT; 2 ♂♂, 19.vi.2010, JT; ♂, 5.v.2011, SS. **13** – ♂, 31.i.2008, RD. **15c** – ♂, 26.iii.2012, RD; ♂, 27.iii.2012, BG & NM.

Orthetrum testaceum

BM4 – ♀, 1.v.2011, LJ. **1a** – ♂, 1.iii.2006, RD; ♂, 12.x.2008, RD. **2a** – ♂, 5.iii.2006, RD. **9a** – ♂+♀, 27.viii.2009, RD; ♂, 27.viii.2009, EE; ♀, 5.v.2011, SS. **12** – ♂, 26.iii.2012, RD. **14a** – ♂, ♀, 17.xi.2010, RD. **14d** – ♂, 20.xi.2010, RD. **15c** – ♂, 26.iii.2012, OT. **18** – ♂, 21.iii.2014, RD; ♂, 21.iii.2014, PS. **S1** – ♂, 1.ii.2008, RD; ♂, 1.ii.2008, GR. **S3** – ♂, 4.ii.2012, SB.

Pantala flavescens

BM4 – ♂, 24.x.2008, RD, **2a** – ♀, 6.v.2011, LJ. **8a** – ♂, 18.x.2008, RD.

Phyllothemis raymondi

6 – 2 ♂♂, 19.ix.2011, RD. **9a** – ♂, 25.iii.2014, RD.

Pornothemis serrata A

3d – ♂, 18.ix.2011, RD.

Pornothemis serrata B

BM9 – ♂, 28.iv.2011, RD. **1a** – ♂, ♀, 12.x.2008, RD; 3 ♂♂, 15.x.2008, RD; 2 ♂♂, 7.viii.2013, RD; 2 ♂♂, 8.viii.2013, RD; 4 ♂♂, 10.viii.2013, RD; 2 ♂♂, 2 ♀♀, 11.viii.2013, BG. **1b** – ♂, 2 ♀♀, 9.viii.2013, RD; ♀, 9.viii.2013, BG. **2a** – 3 ♂♂, 20.ix.2011, RD. **3b** – ♂, ♀, 9.v.2011, RD; 2 ♂♂, 14.ix.2011, RD. **S4** – ♀?, 5.ii.2008, RD.

Raphismia bispina

S5 – ♂, 2.ii.2008, RD; 2 ♂♂, 2.ii.2008, GR; 2 ♂♂, 4.ii.2008, GR; ♀, 5.ii.2008, RD; ♂, 4.ii.2012, SB.

Rhodothemis rufa

2a – ♂, 7.v.2011, RD.

Rhyothemis aterrima

BM9 – ♂, 28.iv.2011, RD. **1a** – ♂, 1.iii.2006, RD; ♂, 3.iii.2006, RD; 2 ♂♂, 13.x.2008, RD; ♀, 10.viii.2013, RD.

Rhyothemis fulgens

1b – ♀, 3.iii.2006, RD; ♀, 12.x.2008, RD; 2 ♂♂, 13.x.2008, RD.

Rhyothemis obsolescens

BM2 – ♂+♀, 23.x.2008, RD; 2 ♂♂, 9–10.ii.2010, OT. **BM9** – ♂, 12.xi.2010, SS; ♂, 28.iv.2011, RD; ♂, 28.iv.2011, SS; 2 ♂♂, 28.iv.2011, OT. **1a** – ♂, 13.x.2008, RD; ♂, 11.viii.2013, RD. **2a** – ♂, 7.iii.2006, RD; ♂, 18.iii.2014, PS. **2b** – ♂, 19.viii.2009, RD. **3a** – ♂, 7.v.2011, RD. **4b** – ♂, 17.ix.2011, RD; ♂, 17.ix.2011, SS. **6** – ♂, 19.ix.2011, RD; ♂, 19.ix.2011, SS. **9ci** – ♂, 21.vi.2010, RD. **9c**ii – ♂, 21.vi.2010, RD. **16a** – ♂, 6.v.2005, GR.

Rhyothemis phyllis

BM2 – ♂, 23.x.2008, RD. **BM4** – 2 ♂♂, 1.v.2011, LJ. **BM10** – ♀, 30.vi.2010, SS. **1a** – ♀, 1.iii.2006, RD; ♂, 14.x.2008, RD. **2a** – ♀, 5.iii.2006, RD; ♂, 22.i.2008, RD. **4b** – ♀, 17.ix.2011, OT. **8e** – ♀, 14.vi.2010, RD. **11** – ♀, 13.xi.2010, RD.

Rhyothemis triangularis

BM9 – ♂, 28.iv.2011, RD. **1a** – ♂, 1.iii.2006, RD; ♂, 1.iii.2006, W; ♂, 14.x.2008, RD; ♂,

19.iii.2013, RD. **2a** – ♂, 22.i.2008, RD; ♂, 20.ix.2011, RD. **7** – ♂, 28.ii.2008, RR. **14c** – ♀, 19.xi.2010, RD. **S1** – ♂, 1.ii.2008, RD.

Risiophlebia dohrni

1a – ♂, 28.ii.2006, RD.

Tetrathemis flavescens

BM9 – ♂, 12.xi.2010, OT. **1a** – ♀, 2.iii.2006, RD.

Tetrathemis hyalina

BM9 – ♂, 30.vi.2010, RD; ♂, 12.xi.2010, OT; ♂, 28.iv.2011, RD; ♂, 28.iv.2011, LJ. **1a** – ♂, 28.ii.2006, RD; ♂, 1.iii.2006, RD; ♂, 1.iii.2006, W; ♀, 2.iii.2006, RD; ♂, 3.iii.2006, RD; 2 ♂♂, 15.x.2008, RD; ♂, 8.viii.2013, RD; ♂, 10.viii.2013, RD; ♂, 13.viii.2013, BG. 1b – ♀, 9.viii.2013, RD. **2a** – ♂, 7.iii.2006, RD; ♂, 29.ii.2008, RD; ♂+♀, 3.iii.2008, RD; ♂, 19.viii.2009, RD; ♂, 8.v.2011, SB; 2 ♂♂, 8.v.2011, RD. **2b** – ♂, 19.iii.2014, RD. **3a** – ♂, 6.iii.2006, RD; ♂, 7.v.2011, LJ. **3b** – 2 ♂♂, 9.v.2011, RD; 2 ♂♂, 9.v.2011, SS; ♂, ♀, 14.ix.2011, RD. **4b** – ♂, 17.ix.2011, OT. **7** – ♀, 25.x.2008, RD. **9a** – ♀, 20.vi.2010, RD. **18** – ♂, 21.iii.2014, RD.

Tholymis tillarga

2a – ♀, 7.iii.2006, RD; ♂, 22.i.2008, RD; ♀, 27.ii.2008, RD. **9b** – ♀, 19.vi.2010, RD. **S1** – ♂, 5.ii.2012, SB.

Tramea transmarina euryale

BM2 – ♂, 9–10.ii.2010, OT. **BM5** – ♀, 12.xi.2010, SS. **8c** – ♂+♀, 20.x.2008, RD. **S1** – ♂, 1.ii.2008, RD; ♀, 5.ii.2008, RD.

Trithemis aurora

BM5 – ♂, 23.i.2008, RD. **2a** – ♂, 29.ii.2008, RD. **3a** – ♂, 6.iii.2006, RD. **5** – ♂, 5.v.2011, RD. **8d** – 2 ♂♂, 17.viii.2009, SS & OT. **8e** – 2 ♂♂, 14.vi.2010, OT; ♀, 16.vi.2010, SS. **9a** – ♀, 27.viii.2009, EE. **9b** – ♂, 5.v.2011, SS. **10a** – ♂, 23.vi.2010, RD; ♀, 23.vi.2010, JT. **15c** – ♀, 26.iii.2012, OT; ♀, 27.iii.2012, BG & NM.

Trithemis festiva

BM2 – ♂, 23.i.2008, RD. **5** – ♂, 21.viii.2009, RD. **8a** – ♂, 19.x.2008, RD; ♂, 11.vi.2010, RD; ♂, 11.vi.2010, OT. **8d** – ♂, 17.viii.2009, RD; ♂, 17.viii.2009, SS & OT. **8e** – ♂, 14.vi.2010, RD; ♂, 14.vi.2010, OT. **9a** – ♂, 27.viii.2009, RD. **10a** – ♂, 23.vi.2010, RD; ♂, 23.vi.2010, SS; 2 ♂♂, 23.vi.2010, JT. **12** – ♂, 23.iii.2012, RD; ♂, 25.iii.2012, NM; ♂, 25.iii.2012, OT. **14d** – ♂, 19.xi.2010, RD.

Tyriobapta kuekenthali

BM12 – ♂, 28.iii.2014, RD; ♂, 4.ix.2014, RD. **2a** – ♂, 5.iii.2006, RD; 2 ♂♂, 2.iii.2008, RD. **8a** – ♂, 19.i.2008, RD; ♂, 18.x.2008, RD; ♂, **11**.vi.2010, RD. **9a** – ♂, 25.iii.2014, RD. **S2** – 2 ♂♂, 1.ii.2008, RD; ♂, 1.ii.2008, GR. **S3** – ♂, 4.ii.2008, GR; ♂, 14.iii.2014, SB.

Tyriobapta torrida

BM1 – 3 ♂♂, 9–10.ii.2010, OT. **BM7** – ♂, 27.iv.2011, RD. **BM9** – ♂, 30.vi.2010, RD; ♂, 12.xi.2010, SS; ♂, 12.xi.2010, OT; ♂, 28.iv.2011, LJ; ♂, 28.iv.2011, SS; ♂, 1 larva, 28.iv.2011, S B. **BM11** – ♂, 22.iii.2014, RD. **BM13** – ♂, 22.vi.2010, RD. **1a** – ♂, 28.ii.2006, RD; 3 ♂♂, 1.iii.2006, W; ♀, 3.iii.2006, LCK; ♂, 12.x.2008, RD; ♂, 15.x.2008, RD; ♂, 11.viii.2013, RD. **1b** – ♂, 9.viii.2013, RD; ♂, 9.viii.2013, BG. **2a** – ♂, 5.iii.2006, RD; 2 ♂♂, 8.v.2011, RD; ♂, 20.ix.2011, SS. **3b** – ♀, 9.v.2011, S B. **3c** – 2 ♂♂, 18.ix.2011, SS. **4b** – ♂, 17.ix.2011, RD; 2 ♂♂, 17.ix.2011, SS. **5** – ♂, 5.v.2011, RD. **6** – ♂, 19.ix.2011, RD. **8a** – ♂, 19.i.2008, RD; ♂, 18.x.2008, RD; ♂, 11.vi.2010, RD; ♂, 11.vi.2010,

OT. **9a** – ♂, 25.viii.2009, RD; 3 ♂♂, ♀, 27.viii.2009, EE; ♂, 5.v.2011, SS; ♂, 25.iii.2014, RD. **9ci** – ♂, 21.vi.2010, RD; ♂, 21.vi.2010, SS & JT. **11** – ♂, 1.vii.2010, RD; ♂, 10.xi.2010, RD. **12** – ♂, 23.iii.2012, RD; ♂, 24.iii.2012, RD; ♂, 25.iii.2012, RD. **S6** – ♂, 3.ii.2008, RD.

Urothemis signata insignata

BM1 – ♂, 1.v.2011, LJ. **BM2** – ♂, 23.x.2008, RD. **2a** – ♀, 5.iii.2006, RD; ♂, 22.i.2008, RD. **9b** – ♂, 27.iii.2014, RD. **16a** – 2 ♂♂, 6.v.2005, GR.

Zygonyx ida errans

S7 – 2 ♂♂, 3.ii.2008, RD.

Zyxomma obtusum

S1 – ♂, 3.ii.2008, GR; ♂, 5.ii.2012, SB.

Zyxomma petiolatum

1a – ♂, 28.ii.2006, RD; ♀, 13.viii.2013, RD (at lights). **2a** – ♀, 24.i.2008, RD (at lights); ♀, 22.x.2008, RD (at lights); ♂, 14.ix.2011, RD (at lights during heavy rain); ♂, 17.iii.2014, PS. **S1** – ♂, 4.ii.2012, SB.

Additional Records

Zygoptera

Platystictidae

Undetermined sp.

BM1 – larva, 20.iii.2014, PS.

Euphaeidae

Euphaea sp.

BM1 – larva, 20.iii.2014, PS.

Platycnemididae

Disparoneurine sp.

18 – ♀, 21.iii.2014, PS.

Anisoptera

Aeshnidae

Anax sp.

BM1 – larvae, 1.v.2011, SB.

Oligoaeschna sp.

Female specimens collected at Kapur Camp, likely to not be the female of any species listed above, but not certainly so.

11 – ♀, 11.xi.2010, RD; ♀, 30.iv.2011, SB.

Gomphidae

Burmagomphus and/or *Merogomphus* sp. or spp.

Larvae and teneral individuals, not agreeing with *B. arthuri* but not definitely assigned to any other species; it is possible that some of the larval records will eventualy prove to belong to *Merogomphus* or an allied genus, and could be those of *M. femoralis*.

BM6 – larvae, 27.iv.2011, S B. **2a** – ♂, ♀ (both extremely teneral), 7.iii.2006, larva, 2.iii.2008, RR; RD; 4 larvae, 18.iii.2014, PS; 1 larva, 19.iii.2014, PS. **3b** – larva (died during emergence), 9.v.2011, SB.

Gomphidia sp. or spp.

2a – ?larva, 2.iii.2008, RR; ?larva, 24.x.2008, RD. **3a** – ?larva, 3.iii.2008, RD.

Heliogomphus sp. or spp.

BM1 – larva, 23.i.2008, D & E. **BM11** – larva, 22.iii.2014, PS. **2a** – larva, 2.iii.2008, RR. **8a** – 2 larvae, 18.x.2008, AJ & OT. **8biii** – larva, 20.i.2008, D & E. **8c** – larva, 19.x.2008, AJ & OT; 2 larvae, 20.x.2008, AJ & OT. **S3** – 3 larvae, 4.ii.2008, RD.

Leptogomphus sp. or spp.

BM1 – larva, 20.iii.2014, PS. **BM11** – larva, 22.iii.2014, PS. **2a** – 2 larvae, 19.iii.2014, PS. **8a** – larva, 18.x.2018, AJ & OT. **S3** – 3 larvae, 4.ii.2008, RD.

Macrogomphus sp. or spp.

2a – 3 larvae, 2.iii.2008, RR; larva, 24.x.2008, RD; 5 larvae, 18.iii.2014, PS.

Megalogomphus sp.

BM6 – larvae, 27.iv.2011, SB.

Microgomphus sp. or spp.

BM6 – larvae, 27.iv.2011, S B. **2a** – 4 larvae, 2.iii.2008, RR; 3 larvae, 18.iii.2014, PS; larva, 19.iii.2014, PS. **3a** – 3 larvae, 3.iii.2008, RR. **8a** – larva, 18.x.2008, AJ & OT. **S3** – 7 larvae, 4.ii.2008, RD.

Macromiidae

Macromia sp. cf *callisto* Laidlaw, 1902

2a – 4 larvae, 19.iii.2014, PS.

Macromia sp. or spp.

BM6 – larvae, 27.iv.2011, S B. **2a** – 10 larvae, 18.iii.2014, PS.

Synthemistidae

Idionyx sp. or spp.

2a – 4 larvae, 18.iii.2014, PS.

Libellulidae

Tyriobapta ?torrida

2a – 10 larvae, 19.iii.2014, PS.

Appendix 2: Checklists of species recorded in Similajau National Park and the Bukit Mina Wildlife Corridor

Similajau National Park

Zygoptera

Lestidae

1. *Lestes praemorsus decipiens* Kirby, 1894

Platystictidae

2. *Drepanosticta* species cf *dentifera* Kimmins, 1936
3. *Drepanosticta rufostigma* (Selys, 1886)
4. *Telosticta dayak* Dow & Orr, 2012 (listed as *Protosticta* sp. cf *feronia* B Lieftinck, 1933 in Dow & Reels (2010))

Argiolestidae

5. *Podolestes orientalis* Selys, 1862

Calopterygidae

6. *Vestalis amaryllis* Lieftinck, 1965

Chlorocyphidae

7. *Libellago hyalina* (Selys, 1859)
8. *Libellago semiopaca* (Selys, 1873)
9. *Sundacypha petiolata* (Selys, 1859)

Devadattidae

10. *Devadatta clavicauda* Dow, Hämäläinen & Stokvis, 2015 (listed as *D. podolestoides* Laidlaw, 1934 in Dow & Reels (2010))

Euphaeidae

11. *Euphaea impar* Selys, 1859

Philosinidae

12. *Rhinagrion borneense* (Selys, 1886)

Platycnemididae

13. *Coeliccia* species cf *nemoricola* Laidlaw, 1912
14. *Coeliccia* nigroh*amata* Laidlaw, 1918
15. *Coeliccia* species
16. *Prodasineura dorsalis* (Selys, 1860)
17. *Prodasineura verticalis* (Selys, 1860)
18. *Prodasineura* species cf *peramoena* (Laidlaw, 1913)

Coenagrionidae

19. *Agriocnemis femina*(Brauer, 1868)
20. *Amphicnemis* species *wallacii*–group
21. *Archibasis viola* Lieftinck, 1949
22. *Ceriagrion cerinorubellum* (Brauer, 1865)

23. *Pseudagrion microcephalum* (Rambur, 1842)
24. *Pseudagrion perfuscatum* Lieftinck, 1937
25. *Xiphiagrion cyanomelas* Selys, 1876

Anisoptera

Aeshnidae

26. *Anax panybeus* Hagen, 1867
27. *Indaeschna grubaueri* (Förster, 1904)

Gomphidae

28. *Acrogomphus jubilaris* Lieftinck, 1964
29. *Gomphidia maclachlani* (Selys, 1873)
30. *Heliogomphus* sp.
31. *Leptogomphus* sp.
32. *Microgomphus* sp.

Libellulidae

33. *Agrionoptera insignis* (Rambur, 1842)
34. *Agrionoptera sexlineata* Selys, 1879
35. *Brachydiplax chalybea* Brauer, 1868
36. *Camacinia gigantea* (Brauer, 1867)
37. *Diplacodes trivialis* (Rambur, 1842)
38. *Lyriothemis biappendiculata* (Selys, 1878)
39. *Nannophya pygmaea* Ris, 1911
40. *Neurothemis fluctuans* (Fabricius, 1793)
41. *Neurothemis terminata* Ris, 1911
42. *Orchithemis pulcherrima* Brauer, 1878
43. *Orthetrum chrysis* (Selys, 1891)
44. *Orthetrum testaceum* (Burmeister, 1839)
45. *Pornothemis serrata* Krüger, 1902 B?
46. *Raphismia bispina* (Hagen, 1867)
47. *Rhyothemis triangularis* Kirby, 1889
48. *Tholymis tillarga* (Fabricius, 1798)
49. *Tramea transmarina euryale* Selys, 1878
50. *Tyriobapta laidlawi* Ris, 1919 (listed as *Tyriobapta kuekenthali* (Karsch, 1900) in Dow & Reels (2010))
51. *Tyriobapta torrida* Kirby, 1889
52. *Zygonyx ida errans* Lieftinck, 1953 (listed as *Zygonyx ida* Selys, 1869 in Dow & Reels (2010))
53. *Zyxomma obtusum* Albarda, 1881
54. *Zyxomma petiolatum* Rambur, 1842

The Bukit Mina Wildlife Corridor

Zygoptera

Lestidae

1. *Lestes praemorsus decipiens* Kirby, 1894
2. *Orolestes wallacei* (Kirby, 1889)

Platystictidae

3. *Drepanosticta* species cf *crenitis* Lieftinck, 1933
4. *Drepanosticta* species cf *dentifera* Kimmins, 1936
5. *Drepanosticta rufostigma* (Selys, 1886)
6. *Drepanosticta versicolor* (Laidlaw, 1913)
7. *Telosticta dayak* Dow & Orr, 2012
8. *Telosticta longigaster* Dow & Orr, 2012

Argiolestidae

9. *Podolestes orientalis* Selys, 1862
10. *Vestalis amabilis* Lieftinck, 1965
11. *Vestalis amaryllis* Lieftinck, 1965
12. *Vestalis amoena* Hagen in Selys, 1853

Chlorocyphidae

13. *Libellago aurantiaca* (Selys, 1859)
14. *Libellago hyalina* (Selys, 1859)
15. *Sundacypha petiolata* (Selys, 1859)

Devadattidae

16. *Devadatta clavicauda* Dow, Hämäläinen & Stokvis, 2015

Euphaeidae

17. *Dysphaea* dimiditata Selys, 1853
18. *Euphaea impar* Selys, 1859

Philosinidae

19. *Rhinagrion borneense* (Selys, 1886)

Platycnemididae

20. *Coeliccia kenyah* Dow, 2010
21. *Coeliccia* species cf *nemoricola* Laidlaw, 1912
22. *Coeliccia nigrohamata* Laidlaw, 1918
23. *Copera vittata* (Selys, 1863)
24. "*Elattoneura*" *analis* (Selys, 1860)
25. *Onychargia atrocyana* Selys, 1865
26. *Prodasineura collaris* (Selys, 1860)
27. *Prodasineura dorsalis* (Selys, 1860)
28. *Prodasineura verticalis* (Selys, 1860)

29. *Prodasineura* species cf *peramoena* (Laidlaw, 1913)

Coenagrionidae

30. *Aciagrion borneense* Ris, 1911
31. *Agriocnemis femina* (Brauer, 1868)
32. *Amphicnemis* species *wallacii*–group
33. *Archibasis tenella* Lieftinck, 1949
34. *Archibasis viola* Lieftinck, 1949
35. Argiocnemis species
36. *Ceriagrion bellona* Laidlaw, 1915
37. *Ceriagrion cerinorubellum* (Brauer, 1865)
38. *Pericnemis dowi* Orr & Hämälainen, 2013
39. *Pseudagrion lalakense* Orr & van Tol, 2001
40. *Pseudagrion microcephalum* (Rambur, 1842)
41. *Stenagrion dubium* (Laidlaw, 1912)
42. *Xiphiagrion cyanomelas* Selys, 1876

Anisoptera

Aeshnidae

43. *Anax panybeus* Hagen, 1867
44. *Gynacantha dohrni* Krüger, 1899
45. *Heliaeschna simplicia* (Karsch, 1891)
46. *Oligoaeschna buehri* (Förster, 1903)
47. *Tetracanthagyna plagiata* (Waterhouse, 1877)

Gomphidae

48. *Acrogomphus jubilaris* Lieftinck, 1964
49. *Gomphidia maclachlani* (Selys, 1873)
50. *Megalogomphus* species B
51. *Microgomphus chelifer* Selys, 1858

Chlorogomphidae

52. *Microgomphus chelifer* Selys, 1858

Macromiidae

53. *Macromia cincta* Rambur, 1842
54. *Macromia cydippe* Laidlaw, 1922

Synthemistidae

55. *Idionyx ?yolanda* Selys, 1871
56. *Macromidia genialis erratica* Lieftinck, 1948

Libellulidae

57. *Brachydiplax chalybea* Brauer, 1868
58. *Brachydiplax* species cf *farinosa* Krüger, 1902

59. *Brachygonia oculata* (Brauer, 1878)
60. *Camacinia gigantea* (Brauer, 1867)
61. *Cratilla lineata* (Brauer, 1878)
62. *Cratilla metallica* (Brauer, 1878)
63. *Nannophya pygmaea* Ris, 1911
64. *Nesoxenia lineata* (Selys, 1879)
65. *Neurothemis fluctuans* (Fabricius, 1793)
66. *Onychothemis culminicola* Förster, 1904
67. *Orchithemis pulcherrima* Brauer, 1878
68. *Orthetrum chrysis* (Selys, 1891)
69. *Orthetrum glaucum* (Brauer, 1865)
70. *Orthetrum sabina* (Drury, 1773)
71. *Orthetrum testaceum* (Burmeister, 1839)
72. *Pantala flavescens* (Fabricius, 1798)
73. *Rhyothemis aterrima* Selys, 1891
74. *Rhyothemis obsolescens* Kirby, 1889
75. *Rhyothemis phyllis* (Sulzer, 1776)
76. *Rhyothemis triangularis* Kirby, 1889
77. *Tetrathemis flavescens* Kirby, 1889
78. *Tetrathemis hyalina* Kirby, 1889
79. *Tramea transmarina euryale* Selys, 1878
80. *Trithemis aurora* (Burmeister, 1839)
81. *Trithemis festiva* (Rambur, 1842)
82. *Tyriobapta laidlawi* Ris, 1919
83. *Tyriobapta torrida* Kirby, 1889
84. *Urothemis signata insignata* (Selys, 1872)

INSTRUCTION TO AUTHORS

Faunistic studies of South-East Asian and Pacific islands Odonata 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:
Swezey, O. & F. Williams, 1942. Dragonflies of Guam. Bernice P. Bishop Museum Bulletin 172: 3-6.
Tillyard, R., 1924. The dragonflies (Order Odonata) of Fiji, with special reference to a collection made by Mr. H.W. Simmonds, F.E.S., on the Island of Viti Levu. Transactions of the Entomological Society London 1923 III-IV: 305-346.

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.