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## Odonata from the Lanjak Entimau Wildlife Sanctuary, Sarawak

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### Abstract

Records of Odonata from the Lanjak Entimau Wildlife Sanctuary (LEWS) in Sarawak, Malaysian Borneo are presented. Previous records of Odonata from LEWS are critically examined. One hundred and ten species have been recorded within the sanctuary, including three that have yet to be found outside (*Drepanosticta adenani*, *Telosticta iban* and "*Elattonneura*" *mauros*); records of four more species are regarded as in need of confirmation, those of another six are incorrect. In addition to the three species only known from LEWS, other notable records include: *Drepanosticta sbong*, *Dysphaea lugens*, *Euphaea* sp. cf. *basalis*, *Pericnemis kiautarum*, *Burmagomphus insularis*, *Gomphidia caesarea*, *Merogomphus* species, *Phaenandrogomphus safei*, *Macromia callisto* and *Idionyx montana*. A fresh illustration of the anal appendages of *Drepanosticta sbong* in lateral view is provided to make up for inaccuracies in the original illustration. The taxonomy of *Phaenandrogomphus safeii* is briefly discussed. *Zygonyx errans* Lieftinck, 1953 is considered a subspecies of *Z. ida* not *Z. iris*. Additional records from areas adjacent to LEWS are given in an appendix.

## Bahasa Melayu Abstract

Rekod Odonata dari Sanktuari Hidupan Liar Lanjak Entimau (LEWS) di Sarawak, Borneo Malaysia dibentangkan di sini. Rekod Odonata terdahulu dari LEWS diperiksa secara teliti. Sebanyak 110 spesies telah direkodkan di dalam sanktuari, ini termasuk tiga spesies yang setakat ini masih belum lagi dijumpai di luar sanktuari ini (*Drepanosticta adenani*, *Telosticta iban* dan "*Elattonneura*" *mauros*); empat rekod yang masih perlu kepastian; dan enam rekod yang tidak tepat. Selain daripada tiga spesies yang unik kepada LEWS tersebut, terdapat juga beberapa spesies yang menarik antaranya, *Drepanosticta sbong*, *Dysphaea lugens*, *Euphaea* sp. cf *basalis*, *Pericnemis kiautarum*, *Burmagomphus insularis*, *Gomphidia caesarea*, *Merogomphus* spesies, *Phaenandrogomphus safei*, *Macromia callisto* dan *Idionyx montana*. Satu ilustrasi baharu padangan sisi apendek anus bagi *Drepanosticta sbong* diberikan untuk membetulkan ketidak-tepatan dalam ilustrasi asal. Taksonomi bagi *Phaenandrogomphus safeii* turut diperbincangkan secara ringkas. *Zygonyx errans* Lieffinck, 1953 dianggap sebagai satu subspecies kepada *Z. ida* bukan *Z. iris*. Rekod tambahan dari kawasan bersebelahan LEWS diberikan dalam lampiran.

**Key words:** Malaysia, Borneo, Sarawak, LEWS, *Drepanosticta sbong*, *Phaenandrogomphus safeii*, checklist, Odonata at light, *Zygonyx ida errans* Lieffinck, 1953 stat. nov.

## Introduction

The Lanjak-Entimau Wildlife Sanctuary (LEWS) is an extensive area of mainly lowland forest in Sarawak, situated between 1.325N and 1.833N and 111.89E and 112.475E and spread across the administrative divisions of Kapit, Sarikei, Sibu and Sri Aman

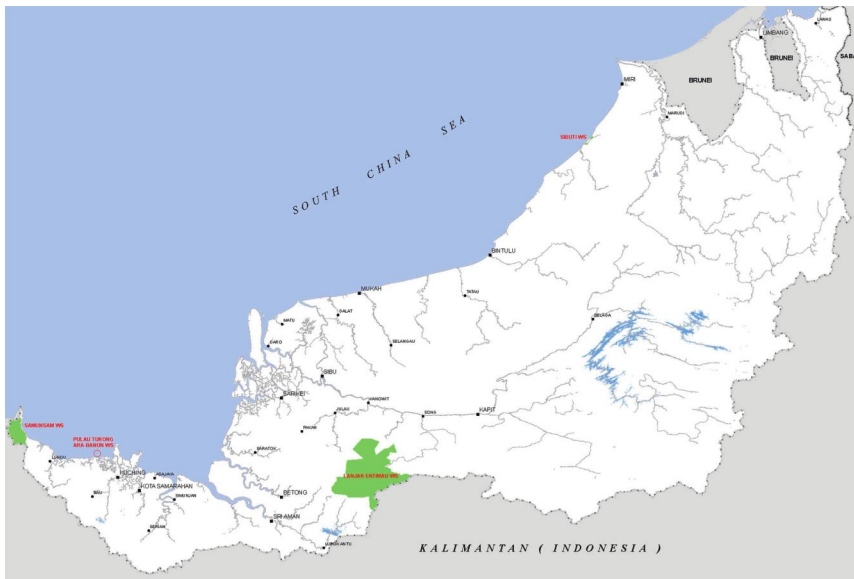


Figure 1. Map showing the location of LEWS in Sarawak.

in Sarawak (Fig. 1). LEWS was constituted and gazetted in 1983 under The Wild Life Protection Ordinance 1958, with the purpose of protecting all wildlife in the area, especially orangutans and hornbills. Subsequently in 2013 the LEWS Extension I was gazetted to allow more areas to be protected and at the same time demonstrate the commitment of the government to wildlife conservation in Sarawak.

Elevations in LEWS range from 60m a.s.l. to 1,285m a.s.l. The highest peak in LEWS is Bukit Lanjak, followed by Bukit Sengayoh (899m a.s.l.) in the north and Bukit Entimau (795m a.s.l.) in the west. Other high points in LEWS include Bukit Sengkajang, Bukit Spali, Bukit Lumut, Bukit Awai and Bukit Peninjau. LEWS has eight distinct forest types: riparian, alluvial, lowland and old secondary forest at lower elevation and hill, summit ridge, sub-montane and montane mossy forest at higher elevations.

In 1997, the ITTO Borneo Biodiversity Expedition 1997 (Kuswanda et al. 1999) to LEWS recorded nearly 3,000 plant (tree, shrub, climber, epiphyte etc.) species, 521 fungi, 42 lichen, 1,050 insect, 117 amphibians, 203 terrestrial and freshwater reptiles, 82 fish, 238 birds including 7 hornbill species, 58 non-primate mammals, and 6 primates. The data collected over the past 20 years need to be updated and, in some cases, needs to be verified.

LEWS shares its southern boundary with Batang Ai National Park (BANP, also in Sarawak) and Betung Kerihun National Park (BKNP, in Indonesia). As part of the regional conservation initiative, LEWS has been selected as one of the three components of the Trans-boundary Conservation Area (TBCA), along with BANP and BKNP. LEWS is also one of the sites under the Heart of Borneo (HoB), a tri-lateral agreement signed in 2005 between Malaysia, Brunei and Indonesia.

Administratively, LEWS is divided into three administrative areas, these are: Nanga Bloh station, the head office for LEWS, located at Ulu Katibas, Song, Kapit, near the



**Figure 2. Satellite image showing the locations of the LEWS stations. Base image from Google Earth.**

mouth of Sungai Bloh (nanga means river mouth in Iban, the dominant Dayak language of the areas around LEWS); Nanga Ju ranger station at Ulu Mujok, Julau, Sarikei; and Nanga Segerak field research station at Ulu Engkari, Lubok Antu, Sri Aman. Each station has its own management present on-site. The locations of the stations are shown in Fig. 2 (see also Fig. 6, 9, 10).

LEWS is accessible from the nearby towns and settlements by river (e.g. see Fig. 3) and some locations can be reached by logging roads. Nearby logging concessions have created relatively easy access to all the field station areas, and other areas. The newly constructed road from Kanowit town to Song and then, eventually, to Kapit town will greatly increase the accessibility to the Ulu Katibas area, thus creating more management challenges for LEWS.

In response to these management challenges, the state of Sarawak launched, in 2015, a new biodiversity research initiative called the Research for Intensified Management of Bio-rich Areas (RIMBA) Sarawak project. Under the RIMBA platform, sites in LEWS and other selected Totally Protected Areas (TPAs) of Sarawak have been opened for research by renowned international institutions through collaboration with the Sarawak Forestry Corporation (SFC) for the purpose of developing intensive, practical conservation management procedures for sustainable conservation of Sarawak's rich biodiversity.

Two areas of LEWS have been selected as sites for the RIMBA Sarawak project. These sites, Nanga Bloh station in Ulu Katibas and Nanga Segerak in Ulu Engkari, were selected due to their unique biodiversity and as the home of iconic wildlife species: orangutan and hornbills. Nanga Ju (Figs. 4, 5) is not included as one of the main RIMBA sites, how-



**Figure 3.** On route to Nanga Segerak station on Sungai Engkari. Photo by G.T. Reels.



Figure 4. Nanga Ju station. Photo by R.W.J. Ngiam.



Figure 5. Relaxing at Nanga Ju station. Photo by R.W.J. Ngiam.

ever it is regarded as an important site to provide connectivity between Nanga Bloh and Nanga Segerak. The other three current RIMBA sites are Ulu Sebuyau National Park, Miri-Sibuti Coral Reef National Park and Nanga Lubang Baya, Batang Ai National Park.

Prior to 2008 no records of Odonata were available from LEWS that we are aware of. In 2008 an expedition jointly organised by the Malaysia Academy of Sciences, Forestry Department Sarawak and Universiti Malaysia Sarawak was made to the area of the Nanga Bloh Field Station in LEWS on 16-29 June. Two groups studying Odonata were present on the 2008 expedition, one from Universiti Malaya (UM) and one from Universiti Kebangsaan Malaysia (UKM); one of the authors of this paper (C.Y. Choong) was part of the latter group. The Odonatological results of both groups present during the 2008 expedition were published in Norma-Rashid et al. (2010). However some of the records in Norma-Rashid et al. (2010) are dubious or, in some cases, clearly incorrect, and few details of the material collected are given.

**Table 1: Dates and stations of trips during which Odonata were collected at LEWS.**

Year	Dates	Station	Authors present
2008	16 <sup>th</sup> –28 <sup>th</sup> June	Nanga Bloh	C.Y. Choong
2013	20 <sup>th</sup> –26 <sup>th</sup> August	Nanga Bloh	R.A. Dow
2015	29 <sup>th</sup> July–7 <sup>th</sup> August	Nanga Ju	R.A. Dow
2016	9 <sup>th</sup> –16 <sup>th</sup> March	Nanga Bloh	R.A. Dow & S.G. Butler
2016	13 <sup>th</sup> July–22 <sup>nd</sup> July	Nanga Segerak	R.A. Dow & G.T. Reels
2016	13 <sup>th</sup> –22 <sup>nd</sup> August	Nanga Ju	R.A. Dow & R.W.J. Ngiam
2017	30 <sup>th</sup> October–12 <sup>th</sup> November	Nanga Bloh	R.A. Dow

Between 2013 and the present the other authors of the report have, in various combinations, visited various parts of LEWS (see Table 1); the results of this collecting are presented here. Specimens collected by C.Y. Choong on the 2008 expedition are also listed in detail, as well as other non-controversial records from Norma-Rashid et al. (2010), so that a complete list of the Odonata currently known from LEWS is presented. Records from Norma-Rashid et al. (2010) that require confirmation, or that are obviously incorrect, are discussed. In total at least 110 species of Odonata are now known to occur in LEWS, with four additional species recorded by Norma-Rashid et al. (2010) regarded as in need of confirmation here.

## List of Odonata known from LEWS

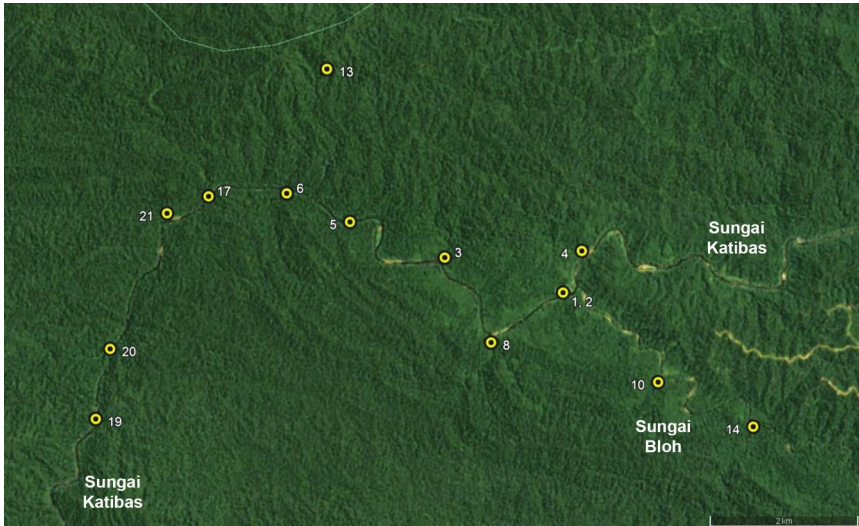
### Locations

The following codes are used for locations where sampling was carried out. Coordinates are given where available.

Nanga Bloh

Altitude on sampled parts of Sungai Katibas ca 120-148m. The locations of some of the sampling sites are shown in Fig. 6.





**Figure 6. Satellite image showing some of the sampling sites in the Nanga Bloh area. Base image from Google Earth.**

1. Open marshy pools at Nanga Bloh Field Station, and around the field station (1.6451N, 112.2773E).
2. A small, high gradient stream at Nanga Bloh Field Station (tributary of Sungai Katibas).
3. Sungai Jik (tributary of Sungai Katibas) and tributaries (1.6493N, 112.2627E).
4. Sungai Datai (tributary of Sungai Katibas) and tributaries (1.6502N, 112.2796E).
5. Sungai Satap (tributary of Sungai Katibas) and tributaries (1.6537N, 112.251E).
6. Sungai Nyungan (tributary of Sungai Katibas) and tributaries (1.6572N, 112.2432E).
7. Sungai Pemanca (tributary of Sungai Katibas) and tributaries (1.6445N, 112.2772E).
8. Sungai Kelimau Besai (tributary of Sungai Katibas) and tributaries (1.6389N, 112.2684E), Fig. 7.
9. Sungai Kelimau Mit (tributary of Sungai Katibas) and tributaries (1.6435N, 112.2669E).
10. Sungai Merating (tributary of Sungai Bloh) and tributaries (1.634N, 112.289E).
11. Sungai Sekawie (tributary of Sungai Katibas) and tributaries (1.6558N, 112.248E).
12. Bearded Pig wallow on Sekawie Trail (1.6663N, 112.2488E).
13. Small, high gradient streams near Sekawie Trail (1.6558N, 112.248E, altitude at head of stream ca 360m a.s.l.); these appear to be the upper parts of Sungai Lait (tributary of Sungai Katibas), a stream not yet sampled further down.
14. Sungai Joh (tributary of Sungai Bloh) and tributaries (1.6286N, 112.3007E).
15. Sungai Woud (tributary of Sungai Bloh) and tributaries (1.6404N, 112.2847E).
16. Sungai Katibas (sampled between Sungai Datai and Sungai Gindi), including back waters and trickles at side, except trickles at Bukit Tuning (see below); (representative coordinates at the mouth of Sungai Nyungan: 1.6572N, 112.2432E); Fig. 8.



**Figure 7. Sungai Kelimau Besai (location 8). Photo by C.Y. Choong.**



**Figure 8. Sungai Katibas (location 16). Photo by C.Y. Choong.**

17. Sungai Begua (tributary of Sungai Katibas) and tributaries (1.6568N, 112.2336E).

18. Sungai Gindi (tributary of Sungai Katibas) and tributaries (1.6292N, 112.221E).

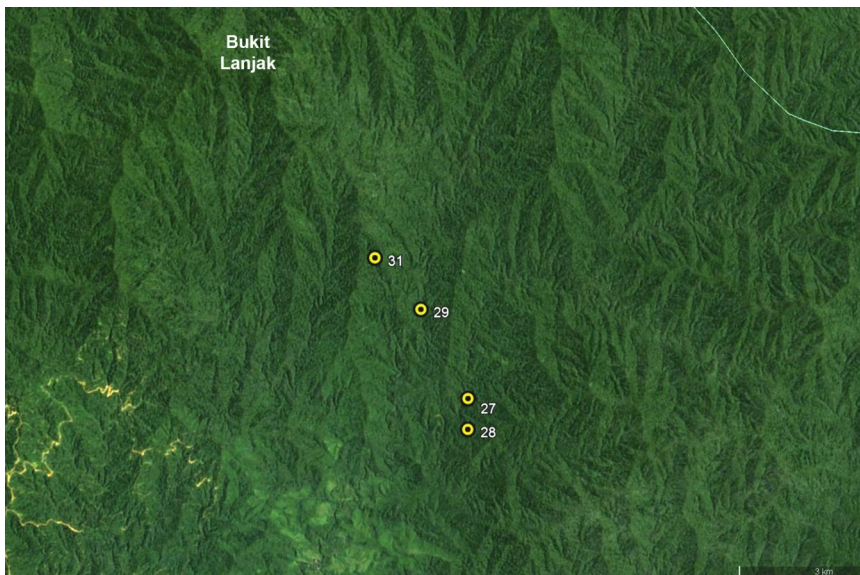
19. Trickles at Bukit Tuning landing place (1.6294N, 112.2199E).

20. Sungai Bedawak (tributary of Sungai Katibas) and tributaries (1.638N, 112.2216E).
21. Sungai Menyarin (tributary of Sungai Katibas) and tributaries (1.6547N, 112.2285E).
22. Sungai Bloh sampled between mouth (1.6456N, 112.2791E) and (1.6259N, 112.3117E); (representative coordinates at the mouth of Sungai Merating: 1.634N, 112.289E).
23. Small streams in Sungai Bedawak area but on opposite bank of Sungai Katibas (1.6376N, 112.2221E).
24. Sungai Melinau (tributary of Sungai Katibas) and tributaries (1.6416N, 112.2232E).
25. Sungai Bugap (tributary of Sungai Bloh) and tributaries (coordinates not taken).

#### Nanga Segerak

Altitude on sampled parts of Sungai Engkari ca 330-350m. The locations of some of the sampling sites are shown in Fig. 9.

26. Sungai Engkari inside boundary (representative coordinates 1.4163N, 112.0092E).
27. Tributaries to Sungai Engkari inside boundary (representative coordinates 1.4168N, 112.0101E).
28. Tributaries to Sungai Segerak inside boundary (representative coordinates 1.4115N, 112.0091E).
29. Sungai Jela (representative coordinates: 1.4303N, 112.0017E).
30. Tributary to Sungai Jela (1.4338N, 111.9997E).
31. Stream below Ubah Ribu (1.4383N, 111.9945E, ca 700m a.s.l. at head).

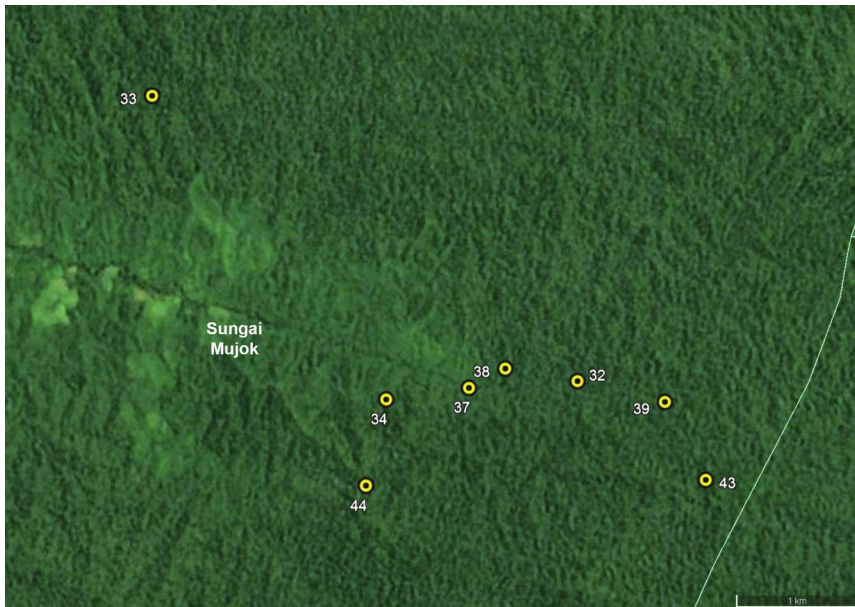


**Figure 9. Satellite image showing some of the sampling sites in the Nanga Segerak area. Base image from Google Earth.**

## Ulu Mujok

Altitude on sampled parts of Sungai Mujok ca 120-150m. The locations of some of the sampling sites are shown in Fig. 10.

32. Sungai Mujok upstream of LEWS boundary (representative coordinates at Nanga Sepulau: 1.683N, 112.1657E); Fig. 11, 12.
33. Sungai Temurok upstream of LEWS boundary (1.7035N, 112.1351E).
34. Sungai Sengadan inside LEWS boundary (1.6817N, 112.1519E).
35. Sungai Sentara inside LEWS boundary (coordinates not taken).
36. Sungai Segak Mit (coordinates at mouth, shared with location 37: 1.6825N, 112.1579E).
37. Sungai Segak Besai (1.6825N, 112.1579E).
38. Sungai Selabi (1.6839N, 112.1605E).
39. Sungai Sepuna (1.6815N, 112.1720E).
40. Small stream on right side Sungai Mujok (going upstream) between Sungai Sepuna and Sungai Sepulau (1.6824N, 112.1647E).
41. Sungai Sepulau Mit (coordinates at mouth, shared with location 42: 1.683N, 112.1657E).
42. Sungai Sepulau Besai (1.683N, 112.1657E).
43. Sungai Tekalit (1.6759N, 112.1749E).
44. Small streams at Bukit Tanggan (1.6757N, 112.1504E).
45. Bearded Pig wallow on way to Bukit Tanggan.



**Figure 10.** Satellite image showing some of the sampling sites in the Nanga Ju area. Base image from Google Earth.



Figure 11. Pushing the prahu through a shallow section of Sungai Mujok on route to our campsite at the LEWS boundary. Photo by R.W.J. Ngiam.

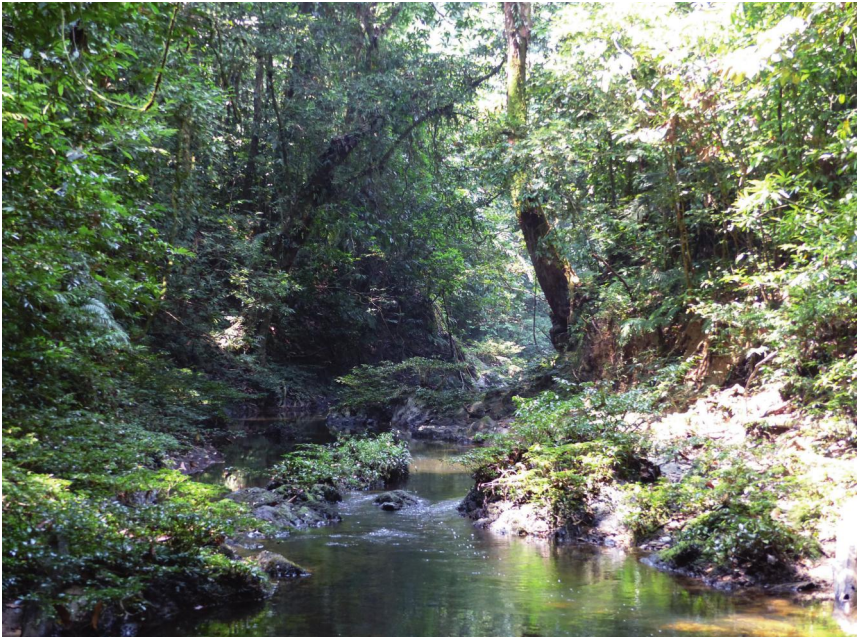


Figure 12. Sungai Mujok inside the LEWS boundary (location 32). Photo by R.W.J. Ngiam.

## List of species

Collectors names are abbreviated as follows (anak abbreviated as ak): names of authors, except Nickson Robi, as SB, CYC, RD, RN, GR; MA – M. ak Adau; JA – J. Awan; EJ – E. ak Jangoh; NMA. – N. ak Masil; SM – S. ak Maurice; BM – B. ak Megong; Nme – N. ak Mengiring, LS – Luke Southwell.

## Zygoptera

### Platystictidae

#### *Drepanosticta actaeon* Laidlaw, 1934

See Dow (2017) for a discussion of this species and details of specimens collected before 2017 (locations 3, 5, 27, 30, 31).

**Loc 3:** ♀, 8.xi.2017, RD; **Loc 11:** ♂, 9.xi.2017, SM. **Loc 13:** 3 ♂♂, 9.xi.2017, RD. **Loc 17:** ♂, 10.xi.2017, RD.

#### *Drepanosticta adenani* Dow & Reels, 2018

A new species found in the Ulu Engkari (2016) and Nanga Bloh (2017) areas of LEWS; see Dow & Reels (2018) for details. Locations 4, 30.

#### *Drepanosticta attala* Lieftinck, 1934

**Loc 4:** ♀, 10.iii.2016, RD.

#### *Drepanosticta* species cf *crenitis* Lieftinck, 1933

**Loc 2:** 2 ♀♀, 12.iii.2016, RD. **Loc 9:** ♀, 24.viii.2013, RD. **Loc 10:** 5 ♂♂, 25.viii.2013, RD; ♀, 6.xi.2017, RD. **Loc 13:** ♀, 26.viii.2013, RD; 2 ♀♀, 9.xi.2017, BM & MA. **Loc 14:** ♂, ♀, 2.xi.2017, RD. **Loc 15:** ♀, 11.xi.2017, SM. **Loc 20:** ♂, ♀, 4.xi.2017, RD. **Loc 25:** ♀, 6.xi.2017, SM. **Loc 27:** ♀, 15.vii.2016, RD. **Loc 30:** ♀, 18.vii.2016, RD. **Loc 33:** ♀, 4.viii.2015, RD. **Loc 34:** 2 ♀♀, 16.viii.2016, RN.

#### *Drepanosticta* species cf *dentifera* Kimmins, 1936

**Loc 3:** ♂, 21.viii.2013, RD.

#### *Drepanosticta dulitensis* Kimmins, 1936

**Loc 3:** 3 ♂♂, 21.viii.2013, RD. **Loc 4:** 2 ♂♂, 22.viii.2013, RD; 2 ♂♂, 31.x.2017, RD. **Loc 7:** ♂, 13.iii.2016, RD. **Loc 9:** ♂, 24.viii.2013, RD. **Loc 13:** ♂, ♀, 26.viii.2013, RD; 3 ♂♂, 9.xi.2017, RD. **Loc 21:** ♂, 15.iii.2016, RD. **Loc 27:** ♂, 14.vii.2016, RD. **Loc 28:** 2 ♂, 17.vii.2016, RD. **Loc 34:** 2 ♂♂, 19.viii.2016, RD.

#### *Drepanosticta* species cf *forcicula* Kimmins, 1936

**Loc 10:** ♂, 25.viii.2013, RD.

#### *Drepanosticta rufostigma* (Selys, 1886)

All material not collected by CYC prior to 2017 is listed in Dow (2017; locations 2, 3, 6, 7, 9, 10, 18, 21, 27, 28, 30, 31, 36, 37, 38, 41, 44), where this species is also discussed. Fig. 13 shows a male.

**Loc 2:** 2 ♂♂, 5.xi.2017, RD. **Loc 3:** ♂, 8.xi.2017, BM & MA; **Loc 5:** 2 ♂♂, 19.vi.2008, CYC. **Loc 8:** ♂, 21.vi.2008, CYC. **Loc 9:** 2 ♂♂, 3.xi.2017, LS. **Loc 10:** ♂, ♂+♀, 6.xi.2017, RD. **Loc 11:** ♂, 9.xi.2017, SM; ♂, 9.xi.2017, LS. **Loc 14:** ♂, 2.xi.2017, RD. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 17:** 3 ♂♂, 2 ♀♀, 10.xi.2017, BM & MA; ♂, 10.xi.2017, SM. **Loc 20:** 2

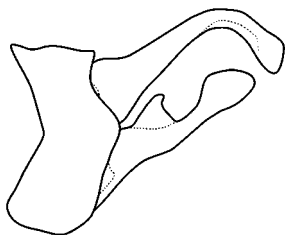
♂♂, 1.xi.2017, LS; ♂, 4.xi.2017, RD. **Loc 23:** 2 ♂♂, 1.xi.2017, RD; 3 ♂♂, 1.xi.2017, BM & MA. **Loc 24:** ♂, 4.xi.2017, SM. **Loc 25:** ♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS.



**Figure 13.** *Drepanosticta rufostigma*. Photo by C.Y. Choong at Nanga Bloh.

*Drepanosticta sbong* Dow, 2010

This peculiar species was described from both sexes from a non-protected site near Kapit Town (Dow 2010); all other records are from LEWS and are presented here for the first time. Until 2017 all records were of single individuals or at most a pair, but in late 2017 five males were collected on a small, steep second order tributary to Sungai Datai at Nanga Bloh and at least as many again were seen, and three individuals were found in another small stream in the same period. Males were observed flying actively and competing for perches. Unfortunately the illustration of the lateral view of the anal appendages of the holotype in Dow (2010: fig. 5) is not entirely accurate, the paraproct is not drawn correctly, this was partly due to its position relative to the cercus in the holotype, but mostly due to the authors inexperience at illustration at the time; a fresh illustration from a specimen from LEWS is provided here (Fig. 14).



**Figure 14.** Lateral view of the anal appendages of male *Drepanosticta sbong* from the Nanga Bloh area, scale bar 0.5mm.

**Loc 2:** ♀, 5.xi.2017, RD. **Loc 4:** ♂, 22.viii.2013, RD; 5 ♂♂, 31.x.2017, RD. **Loc 5:** ♀, 23.viii.2013, RD; ♀, 16.iii.2016, RD. **Loc 14:** 2 ♂♂, ♀, 2.xi.2017, RD. **Loc 27:** ♀, 21.vii.2016, GR.

*Drepanosticta versicolor* (Laidlaw, 1913)

Fig. 15 shows a male.

**Loc 2:** 2 ♂♂, 12.iii.2016, RD; 8 ♂♂, ♀, 5.xi.2017, RD. **Loc 3:** 4 ♂♂, 18.vi.2008, CYC; 9 ♂♂, 21.viii.2013, RD; ♂, 8.xi.2017, LS. **Loc 4:** 3 ♂♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; 3 ♂♂, 31.x.2017, RD. **Loc 5:** 6 ♂♂, ♀, 23.viii.2013, RD; ♂, ♀, 16.iii.2016, RD. **Loc 6:** ♂, 14.iii.2016,



Figure 15. *Drepanosticta versicolor*. Photo by C.Y. Choong at Nanga Bloh.

RD. **Loc 9:** 8 ♂♂, 2 ♀♀, 24.viii.2013, RD. **Loc 10:** 7 ♂♂, ♀, 25.viii.2013, RD; 3 ♂♂, 6.xi.2017, RD. **Loc 11:** ♀, 9.xi.2017, SM. **Loc 13:** 4 ♂♂, 26.viii.2013, RD; 3 ♂♂, 9.xi.2017, RD. **Loc 14:** 5 ♂♂, ♀, 2.xi.2017, RD. **Loc 17:** 2 ♂♂, 10.xi.2017, RD; ♀, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 23:** ♀, 1.xi.2017, RD. **Loc 27:** ♂, ♀, 14.vii.2016, RD; ♂, 15.vii.2016, RD. **Loc 28:** 2 ♂, 17.vii.2016, RD. **Loc 30:** ♂, 19.vii.2016, GR. **Loc 31:** ♂, 19.vii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 36:** ♂, ♀, 30.vii.2015, RD. **Loc 37:** 6 ♂♂, 2 ♀♀, 14.viii.2016, RD. **Loc 38:** ♂, 16.viii.2016, RD. **Loc 39:** ♂, 15.viii.2016, RD.

*Telosticta longigaster* Dow & Orr, 2012

Material collected by CYC in 2008 is listed in Dow & Orr (2012). With *D. rufostigma* this is the most common of the Platystictidae throughout the sampled areas of LEWS. Fig. 16 shows a male.

**Loc 2:** 4 ♂♂, 12.iii.2016, RD; 2 ♂♂, ♀, 5.xi.2017, RD. **Loc 3:** 7 ♂♂, 21.viii.2013, RD; ♂, 8.xi.2017, LS. **Loc 4:** 2 ♂♂, ♀, 22.viii.2013, RD; 2 ♂♂, 10.iii.2016, RD; 6 ♂♂, 31.x.2017, RD; 4 ♂♂, 31.x.2017, LS. **Loc 5:** 2 ♂♂, 16.iii.2016, RD. **Loc 6:** 2 ♂♂, ♀, 14.iii.2016, RD. **Loc 7:** ♂, 13.iii.2016, RD. **Loc 8:** 2 ♂♂, 3.xi.2017, RD. **Loc 9:** 3 ♂♂, 24.viii.2013, RD. **Loc 10:** 4 ♂♂, 25.viii.2013, RD; ♂, ♂+♀, 6.xi.2010, RD. **Loc 13:** ♂, 26.viii.2013, RD; 3 ♂♂, ♀, 9.xi.2017, RD. **Loc 14:** 4 ♂♂, ♀, 2.xi.2017, RD. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 17:** ♂, 10.xi.2017, RD; ♂, 10.xi.2017, LS. **Loc 18:** 4 ♂♂, 9.iii.2016, RD. **Loc 20:** 2 ♂♂, 1.xi.2017, LS; 2 ♂♂, 4.xi.2017, RD. **Loc 21:** ♂, 2 ♀♀, 15.iii.2016, RD. **Loc 23:** ♂, ♀, 1.xi.2017, RD; 6 ♂♂, ♀ (feneral), 1.xi.2010, BM & MA. **Loc 24:** ♂, 4.xi.2017, SM. **Loc 25:** ♂, ♀, 6.xi.2017, LS. **Loc 27:** 3 ♂♂, ♀, ♂+♀, 14.vii.2016, RD; 2 ♂♂, ♀, 15.vii.2016, RD; 7 ♂♂, ♀, 21.vii.2016, GR. **Loc 28:** 5 ♂♂, ♀, 17.vii.2016, RD; 4 ♂♂, 17.vii.2016, GR; ♂, 21.vii.2016, RD. **Loc 30:** 2 ♂♂, ♀, 18.vii.2016, RD; ♂, ♀, 18.vii.2016, GR. **Loc 31:** ♂, 19.vii.2016, RD. **Loc 33:** 2 ♂♂, ♀, 4.viii.2015, RD. **Loc 34:** 4 ♂♂, 16.viii.2016, RN; ♂, 19.viii.2016, RD. **Loc 36:** 2 ♂♂, ♀, 30.vii.2015, RD. **Loc 38:** 3 ♂♂, 1.viii.2015, RD; 3 ♂♂, 16.viii.2016, RD. **Loc 39:** 2 ♂♂,





**Figure 16. *Telosticta longigaster*. Photo by G.T. Reels at Nanga Segerak.**

15.viii.2016, RD. **Loc 40:** ♀, 17.viii.2016, RD. **Loc 44:** 4 ♂♂, 19.viii.2016, RN; 4 ♂♂, ♀, 19.viii.2016, LS.

*Telosticta iban* Dow, 2014

This very distinctive species is only known from the type series from LEWS collected in 2013 in the Nanga Bloh area (see Dow 2014a); attempts to find it again have failed so far. Locations 9, 10.

*Telosticta* species

A female specimen, not the female of *T. iban* or *T. longigaster*, most similar to the female reported from Ulu Baleh in Dow & Ngiam (2014: 27).

**Loc 2:** ♀, 20.viii.2013, RD.

**Argiolestidae**

*Podolestes orientalis* Selys, 1862

**Loc 3:** ♂, 18.vi.2008, CYC. **Loc 4:** ♂, 10.iii.2016, RD. **Loc 5:** ♂, 23.viii.2013, RD. **Loc 6:** ♂, 14.iii.2016, RD; ♂, 14.iii.2016, EJ, BM & MA. **Loc 8:** ♀, 11.xi.2017, BM & MA. **Loc 21:** ♂, 15.iii.2016, RD. **Loc 38:** ♂, 16.viii.2016, RD.

*Podolestes* species

This is the same large size species, closely allied to *P. orientalis*, recorded from Batang Ai National Park in Dow et al. (2015a), Usun Apau National Park in Dow et al. (2015b), and the Ulu Moh area in Dow & Ngiam (2015).

**Loc 12:** ♂, 23.viii.2013, RD.

**Calopterygidae***Neurobasis longipes* Hagen, 1887

Fig. 17 shows a male.

**Loc 3:** ♂, ♀, 18.vi.2008, CYC; 5 ♂♂, 3 ♀♀, 21.viii.2013, JA & MA; ♂, 21.viii.2013, RD; ♀, 16.iii.2016, BM & MA; ♀, 8.xi.2017, BM & MA. **Loc 4:** 8 ♂♂, 5 ♀♀, ♂+♀, 22.viii.2013, JA & MA; ♂, 10.iii.2016, RD; ♂+♀, 31.x.2017, RD; ♀, 31.x.2017, LS. **Loc 5:** 2 ♂♂, ♀, 19.vi.2008, CYC. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** ♀, 24.viii.2013, RD. **Loc 10:** 3 ♂♂, 3 ♀♀, 25.viii.2013 JA & MA. **Loc 14:** 2 ♂♂, 2 ♀♀, 20.vi.2008, CYC; ♂, 2.xi.2017, RD; 2 ♂♂, 2.xi.2017, SM; ♀, 2.xi.2017, LS. **Loc 15:** ♀, 11.xi.2017, SM; ♀, 11.xi.2017, LS. **Loc 16:** ♀, 14.iii.2016, BM; 2 ♂♂, ♀, 1.xi.2017, BM & MA; ♂, 3.xi.2017, BM; ♂, ♀, 4.xi.2017, BM. **Loc 17:** ♀, 10.xi.2017, SM. **Loc 20:** 4 ♂♂, 2 ♀♀, 10.iii.2016, SFC staff; ♂, 1.xi.2017, SM. **Loc 21:** ♂, 11.iii.2016, RD; 3 ♂♂, 4 ♀♀, 11.iii.2016, BM & MA. **Loc 22:** ♀, 2.xi.2017, BM. **Loc 29:** ♀, 19.vii.2016, SFC staff. **Loc 32:** 2 ♂♂, 14.viii.2016, RN; ♂, ♀, 15.viii.2016, LS. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 35:** 2 ♀♀, 20.viii.2016, BM & NMe. **Loc 36:** ♂, 30.vii.2015, RD. **Loc 37:** ♂, 14.viii.2016, RD; 4 ♂♂, ♀, 16.viii.2016, BM. **Loc 38:** ♂, ♀, 1.viii.2015, JA.



**Figure 17. *Neurobasis longipes*. Photo by C.Y. Choong at Nanga Bloh.**

*Vestalis amaryllis* Lieftinck, 1965

Relatively uncommon at LEWS, compared with *V. amoena* and *V. atropha*.

**Loc 2:** 3 ♂♂, 12.iii.2016, RD; ♂, 5.xi.2017, RD. **Loc 3:** ♂, 18.vi.2008, CYC. **Loc 5:** ♂, 23.viii.2013, RD. **Loc 7:** 4 ♂♂, 24.viii.2013, RD. **Loc 16:** ♂, 21.vi.2008, CYC; 4 ♂♂, 23.vi.2008, CYC; ♂, 25.vi.2008, CYC. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 21:** ♂, 11.iii.2016, BM & MA. **Loc 35:** ♂, 20.viii.2016, LS. **Loc 36:** ♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD; ♂, 17.viii.2016, BM & NMe. **Loc 37:** ♂, 14.viii.2016, RD. **Loc 40:** ♂, 17.viii.2016, RD. **Loc 41:** 3 ♂♂, 18.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD.

*Vestalis amnicola* Lieftinck, 1965

Common in the Ulu Engkari area of LEWS, less so at Nanga Bloh and not yet found at Ulu Mujok.

**Loc 14:** 2 ♂♂, 20.vi.2008, CYC; ♂, 2.xi.2017, RD. **Loc 17:** ♂, 10.xi.2017, RD. **Loc 20:** ♂, 4.xi.2017, BM. **Loc 21:** ♂, 7.xi.2012, SM. **Loc 20:** ♂, 14.vii.2016, RD; 3 ♂♂, 14.vii.2016,

GR. **Loc 27:** 2 ♂♂, 14.vii.2016, RD. **Loc 29:** ♂, 19.vii.2016, GR; 2 ♂♂, 19.vii.2016, SFC staff. **Loc 30:** ♂, 18.vii.2016, RD; ♂, 18.vii.2016, GR; ♂, 19.vii.2016, GR.

*Vestalis amoena* Hagen in Selys, 1853

Very common in the Nanga Bloh and Ulu Mujok areas of LEWS.

**Loc 3:** ♂, 16.iii.2016, BM & MA; 3 ♂♂, 8.xi.2017, BM & MA; ♂, 8.xi.2017, SM. **Loc 4:** ♂, 22.viii.2013, JA & MA; ♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; ♂, 31.x.2017, RD; ♂, 31.x.2017, LS. **Loc 5:** 3 ♂♂, 19.vi.2008, CYC; 2 ♂♂, 23.viii.2013, RD. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** 6 ♂♂, 24.viii.2013, RD; ♂, 3.xi.2017, SM; ♂, 3.xi.2017, LS. **Loc 10:** ♂, ♀♀, 25.viii.2013, JA & MA. ♂, 6.xi.2017, RD. **Loc 14:** ♂, 19.vi.2008, CYC; 6 ♂♂, 20.vi.2008, CYC; 2 ♂♂, 2.xi.2017, RD; ♂, 2.xi.2017, SM; 2 ♂♂, 2.xi.2017, LS. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 16:** 2 ♂♂, 3.xi.2017, RD. **Loc 18:** ♂, 9.iii.2016, RD; ♀, 9.iii.2016, SFC staff. **Loc 20:** 3 ♂♂, 1.xi.2017, SM; ♂, 1.xi.2017, LS. **Loc 21:** 2 ♂♂, 11.iii.2016, RD; 2 ♂♂, 15.iii.2016, RD; 2 ♂♂, 15.iii.2016, EJ, BM & MA; 3 ♂♂, 7.xi.2017, LS. **Loc 22:** ♂, 2.xi.2017, BM; ♀, 6.xi.2017, BM. **Loc 24:** ♀, 4.xi.2017, SM; ♀, 4.xi.2017, LS. **Loc 32:** ♂, 14.viii.2016, RD; ♂, 14.viii.2016, RN; 4 ♂♂, 15.viii.2016, RD; 4 ♂♂, 2 ♀♀, 15.viii.2016, LS; ♂, 21.viii.2016, BM & NMe. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 35:** 2 ♂♂, 20.viii.2016, BM & NMe; 4 ♂♂, ♀, 20.viii.2016, LS. **Loc 36:** 2 ♂♂, ♀, 30.vii.2015, JA; 5 ♂♂, 30.vii.2015, RD; 2 ♂♂, 17.viii.2016, BM & NMe. **Loc 37:** ♂, 14.viii.2016, RD; 4 ♂♂, 16.viii.2016, BM. **Loc 38:** 3 ♂♂, 1.viii.2015, JA; 3 ♂♂, 1.viii.2015, RD; 4 ♂♂, 16.viii.2016, RD. **Loc 39:** ♂, 15.viii.2016, RD; 2 ♂♂, 18.viii.2016, BM & NMe. **Loc 40:** ♂, 17.viii.2016, RD. **Loc 42:** 5 ♂♂, 18.viii.2016, LS. **Loc 43:** ♂, 18.viii.2016, RD.

*Vestalis atrophpha* Lieftinck, 1965

**Loc 2:** ♂, 12.iii.2016, RD. **Loc 3:** 3 ♂♂, 18.vi.2008, CYC; 9 ♂♂, 21.viii.2013, JA & MA; 3 ♂♂, 21.viii.2013, RD; 3 ♂♂, 16.iii.2016, BM & MA; ♂, 8.xi.2017, SM; ♂, 8.xi.2017, LS. **Loc 4:** 2 ♂♂, 22.viii.2013, JA & MA; 3 ♂♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; ♂, 31.x.2017, RD; 2 ♂♂, 31.x.2017, LS. **Loc 5:** ♂, 19.vi.2008, CYC; 3 ♂♂, 23.viii.2013, RD; ♂, 16.iii.2016, RD. **Loc 6:** 12 ♂♂, ♀♀, 23.viii.2013, JA & MA. **Loc 7:** 2 ♂♂, 24.viii.2013, JA & MA. **Loc 8:** ♂, 21.vi.2008, CYC. **Loc 9:** 3 ♂♂, 24.viii.2013, RD; ♂, 3.xi.2017, LS. **Loc 10:** 8 ♂♂, 25.viii.2013, JA & MA; 2 ♂♂, 25.viii.2013, RD. **Loc 11:** 2 ♂♂, 9.xi.2017, SM; ♂, 9.xi.2017, LS. **Loc 14:** 4 ♂♂, 20.vi.2008, CYC; 2 ♂♂, 2.xi.2017, RD; 2 ♂♂, 2.xi.2017, LS. **Loc 15:** 2 ♂♂, 11.xi.2017, LS. **Loc 17:** 2 ♂♂, 10.xi.2017, RD; ♂, 10.xi.2017, BM & MA; 2 ♂♂, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, RD; 3 ♂♂, 9.iii.2016, SFC staff. **Loc 20:** ♂, 1.xi.2017, LS. **Loc 25:** ♂, 6.xi.2017, SM; 7 ♂♂, 6.xi.2017, LS. **Loc 27:** 3 ♂, 14.vii.2016, RD. **Loc 30:** ♂, 18.vii.2016, RD. **Loc 34:** ♂, 16.viii.2016, RN; 2 ♂♂, 17.viii.2016, LS. **Loc 36:** ♂, 30.vii.2015, JA. **Loc 42:** ♂, 18.viii.2016, LS. **Loc 44:** ♂, 19.viii.2016, RD.

*Vestalis beryllae* Laidlaw, 1915

**Loc 2:** ♂, 22.vi.2008, CYC. **Loc 13:** ♂, 26.viii.2013, RD; ♂, 9.xi.2017, RD. **Loc 14:** ♂, on steep tributary, 2.xi.2017, RD. **Loc 20:** ♂, on steep tributary, 4.xi.2017, RD. **Loc 25:** ♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS. **Loc 27:** ♂, 14.vii.2016, RD; ♂, 15.vii.2016, RD. **Loc 31:** ♂, 19.vii.2016, RD.

**Chlorocyphidae**

*Heliocypha biseriata* (Selys, 1859)

**Loc 3:** 4 ♂♂, ♀, 18.vi.2008, CYC; ♂, ♀, 21.viii.2013, RD; ♂, ♀, 16.iii.2016, BM & MA; ♂,

8.xi.2017, SM. **Loc 4:** 3 ♂♂, 22.viii.2013, JA & MA; ♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; 2 ♂♂, 31.x.2017, RD. **Loc 5:** ♂, 19.vi.2008, CYC; 2 ♂♂, 23.viii.2013, RD. **Loc 6:** 4 ♂♂, ♀, 23.viii.2013, JA & MA; 2 ♂♂, 14.iii.2016, EJ, BM & MA. **Loc 7:** 3 ♂♂, 24.viii.2013, JA & MA; ♂, 13.iii.2016, RD. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** ♂, 24.viii.2013, RD; ♂, 2 ♀♀, 3.xi.2017, SM. **Loc 10:** 2 ♂♂, ♀, 6.xi.2017, SM; 2 ♂♂, 6.xi.2017, LS. **Loc 11:** ♀, 9.xi.2017, SM. **Loc 14:** 3 ♂♂, 20.vi.2008, CYC; ♂, 2.xi.2017, RD; ♂, 2.xi.2017, SM; 2 ♀♀, 2.xi.2017, LS. **Loc 15:** ♂, ♀, 11.xi.2017, SM. **Loc 17:** ♀, 10.xi.2017, BM & MA. **Loc 18:** ♂, 9.iii.2016, RD; 3 ♂♂, ♀, 9.iii.2016, BM & MA. **Loc 20:** ♂, 10.iii.2016, SFC staff; 2 ♂♂, ♀, 1.xi.2017, SM. **Loc 21:** ♂, 11.iii.2016, RD; 3 ♂♂, 11.iii.2016, SFC staff. **Loc 22:** 3 ♂♂, ♀, 25.viii.2013, JA & MA; ♂, 25.viii.2013, RD. **Loc 32:** ♂, 15.viii.2016, RD. **Loc 36:** ♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD. **Loc 37:** ♂, 14.viii.2016, RD. **Loc 38:** ♂+♀, 1.viii.2015, JA; ♂, 16.viii.2016, RD. **Loc 39:** 2 ♂♂, 15.viii.2016, RD; ♂, 18.viii.2016, BM & NMA.

*Libellago semiopaca* (Selys, 1873)

**Loc 16:** ♂, 24.vi.2008, CYC; ♂, 23.viii.2013, JA & MA; ♂, 23.viii.2013, RD.

*Libellago stictica* Selys, 1859

Common on Sungai Katibas at Nanga Bloh. Fig. 18 shows a male.

**Loc 4:** ♂, 31.x.2017, RD. **Loc 6:** 2 ♂♂, 23.viii.2013, JA & MA. **Loc 16:** ♂, 23.vi.2008, CYC; ♂, 14.iii.2016, RD; ♂, 16.iii.2016, RD; ♂, 3.xi.2017, BM; ♀, 4.xi.2017, BM; ♂, 7.xi.2017, RD; 2 ♂♂, ♀, 7.xi.2017, BM; 3 ♂♂, ♀, 7.xi.2017, SM. **Loc 20:** 4 ♂♂, 10.iii.2016, SFC staff. **Loc 21:** 2 ♂♂, 11.iii.2016, RD. **Loc 32:** ♂, 14.viii.2016, RD; ♂, 14.viii.2016, RN; ♂, 18.viii.2016, RD.



Figure 18. *Libellago stictica*. Photo by C.Y. Choong at Nanga Bloh.

*Rhinocypha aurofulgens* Laidlaw, 1931

Fig. 19 shows a pair in the wheel position.

**Loc 3:** ♂, 18.vi.2008, CYC; ♂, JA & MA, 21.viii.2013; 4 ♂♂, ♀, 21.viii.2013, RD. **Loc 4:** 4 ♂♂, ♀, 22.viii.2013, JA & MA; 2 ♂♂, 22.viii.2013, RD; 2 ♂♂, 10.iii.2016, RD; 3 ♂♂, 31.x.2017, RD. **Loc 5:** ♂, 16.iii.2016, RD. **Loc 6:** 2 ♂♂, ♂+♀, 23.viii.2013, JA & MA. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 3.xi.2017, RD. **Loc 9:** ♂, 24.viii.2013, RD. **Loc 14:** 2 ♂♂, 20.vi.2008, CYC; 2 ♂♂, 2.xi.2017, RD; ♀, 2.xi.2017, SM. **Loc 16:** 3 ♂♂, ♀, 1.xi.2017, BM & MA; ♀, 7.xi.2017, SM. **Loc 17:** 2 ♂♂, 10.xi.2017, RD. **Loc 18:** ♂, 9.iii.2016, SFC staff. **Loc 20:** ♂, 10.iii.2016, RD; 2 ♂♂, 1.xi.2017, SM; ♂, 4.xi.2017, RD. **Loc 21:** ♂, 15.iii.2016, RD. **Loc 22:** ♀, 14.iii.2016, RD; 2 ♀♀, 6.xi.2017, BM. **Loc 24:** 2 ♂♂, 4.xi.2017, SM. **Loc 26:** 2 ♂♂, ♀, 14.vii.2016, GR. **Loc 29:** ♂, ♀, 19.vii.2016, SFC staff. **Loc 30:** ♂, 19.vii.2016, GR. **Loc 32:** ♂, 14.viii.2016, RN; ♂, 15.viii.2016, RD; ♂, 18.viii.2016, RD; ♀, 21.viii.2016, BM & NMa.



Figure 19. *Rhinocypha aurofulgens* in the wheel. Photo by C.Y. Choong at Nanga Bloh.

*Rhinocypha cucullata* (Selys, 1873)

Fig. 20 shows a male.

**Loc 2:** 2 ♂♂, 22.vi.2008, CYC. **Loc 4:** 2 ♂♂, 22.viii.2013, JA & MA; ♂, 22.viii.2013, RD; 3 ♂♂, 10.iii.2016, RD; 2 ♂♂, 31.x.2017, RD. **Loc 6:** 3 ♂♂, 14.iii.2016, SFC staff. **Loc 20:** ♂, 10.iii.2016, SFC staff; 2 ♂♂, 1.xi.2017, SM; ♂, 4.xi.2017, RD. **Loc 21:** ♂, 11.iii.2016, RD; ♂, 11.iii.2016, BM & MA; 2 ♂♂, 15.iii.2016, RD. **Loc 32:** ♂, 14.viii.2016, RD; 2 ♂♂, 14.viii.2016, RN; 2 ♂♂, 15.viii.2016, RD; ♀, 15.viii.2016, LS. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 35:** ♂, 20.viii.2016, RD. **Loc 37:** ♂, ♀, 14.viii.2016, RD; 4 ♂♂, 2 ♀♀, 16.viii.2016, BM; ♂, 16.viii.2016, LS. **Loc 38:** ♂, 1.viii.2015, RD; ♂, 16.viii.2016, RD. **Loc 39:** 3 ♂♂, 15.viii.2016, RD. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 42:** ♀, 22.viii.2016, LS.



**Figure 20.** *Rhinocypha cucullata*. Photo by R.W.J. Ngiam at Sungai Mujok.

*Rhinocypha stygia* Förster, 1897

Recorded in Norma-Rashid et al. (2010) as *R. cognata* Kimmins, 1936; see Hämäläinen (2009) for a discussion of the status of *R. cognata* as a junior synonym of *R. stygia*. A very local species in Sarawak, but fairly common in the Nanga Bloh area of LEWS.

**Loc 3:** 4 ♂♂, 21.viii.2013, RD; ♂, 16.iii.2016, BM & MA; 5 ♂♂, 31.xi.2017, RD. **Loc 4:** 6 ♂♂, 22.viii.2013, RD; 3 ♂♂, 10.iii.2016, RD. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 3.xi.2017, RD; ♂, 11.xi.2017, BM & MA. **Loc 9:** ♂, 3.xi.2017, SM. **Loc 17:** 3 ♂♂, 10.xi.2017, RD; ♂, 10.xi.2017, BM & MA; 2 ♂♂, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 20:** ♂, 1.xi.2017, SM. **Loc 21:** 2 ♂♂, 15.iii.2016, RD; ♂, 15.iii.2016, EJ, BM & MA. **Loc 33:** 2 ♂♂, 4.viii.2015, RD. **Loc 43:** ♂, 18.viii.2016, RD.

*Rhinocypha* species cf *spinifer* Laidlaw, 1931

**Loc 10:** ♀, at steep tributary, 6.xi.2017, RD. **Loc 27:** ♀, 21.vii.2016. GR.

*Sundacypha petiolata* (Selys, 1859)

Fig. 21 shows a male.

**Loc 8:** ♂, at tributary, 11.xi.2017, RD. **Loc 16:** 3 ♂♂, 23.vi.2008, CYC; ♂, 25.vi.2008, CYC. **Loc 21:** ♂, 11.iii.2016, BM & MA; ♂, 15.iii.2016, RD. **Loc 34:** ♀, 17.viii.2016, LS; ♀, 19.viii.2016, RD. **Loc 35:** ♂, 21.viii.2016, LS. **Loc 36:** 2 ♂♂, 30.vii.2015, JA; ♂, ♀, 30.vii.2015, RD; 5 ♂♂, 17.viii.2016, BM & NMe. **Loc 37:** ♂, 14.viii.2016, RD; ♂, 16.viii.2016, BM; ♂, 16.viii.2016, LS. **Loc 38:** ♂, 31.vii.2015, JA; ♂, 16.viii.2016, RD. **Loc 39:** ♂, 19.viii.2016, BM & NMe. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD.



Figure 21. *Sundacypha petiolata*. Photo by C.Y. Choong at Nanga Bloh.

#### Devadattidae

*Devadatta clavicauda* Dow, Hämäläinen & Stokvis, 2015

See Dow, Hämäläinen & Stokvis (2015) for material not collected by CYC before 2015.

**Loc 5:** ♂, 19.vi.2008, CYC. **Loc 6:** ♂, 11.xi.2017, BM & MA. **Loc 8:** 2 ♂♂, 11.xi.2017, BM & MA. **Loc 11:** 2 ♂♂, 9.xi.2017, SM. **Loc 17:** ♂, 10.xi.2017, RD; ♂, 10.xi.2017, LS. **Loc 18:** 2 ♂♂, 9.iii.2016, RD. **Loc 20:** ♂, 1.xi.2017, LS. **Loc 21:** 2 ♂♂, ♀, 15.iii.2016, RD. **Loc 28:** ♂, 26.vii.2016, RD. **Loc 35:** ♂, 20.viii.2016, BM & NMe. **Loc 37:** 2 ♂♂, 14.viii.2016, RD. **Loc 40:** ♂, 17.viii.2016, RD. **Loc 43:** ♂, 18.viii.2016, RD.

*Devadatta somoh* Dow, Hämäläinen & Stokvis, 2015

See Dow, Hämäläinen & Stokvis (2015) for material not collected by CYC before 2015. Common in LEWS.

**Loc 2:** 5 ♂♂, 12.iii.2016, RD; 2 ♂♂, 5.xi.2017, RD. **Loc 3:** ♂, 2 ♀♀, 18.vi.2008, CYC; ♂, 16.iii.2016, BM & MA. **Loc 4:** 2 ♂♂, 10.iii.2016, RD; 3 ♂♂, 31.x.2017, RD. **Loc 5:** 3 ♂♂, 19.vi.2008, CYC; ♂, 16.iii.2016, RD. **Loc 6:** 3 ♂♂, ♀, 14.iii.2016, RD. **Loc 8:** 2 ♂♂, 3.xi.2017, RD; ♂, 11.xi.2017, RD. **Loc 9:** ♂, 3.xi.2017, SM; ♀, 3.xi.2017, LS. **Loc 10:** ♂, 9.xi.2017, RD; 5 ♂♂, 9.xi.2017, BM & MA. **Loc 14:** 3 ♂♂, 2.xi.2017, RD; ♂, 2.xi.2017, LS. **Loc 17:** ♂, 10.xi.2017, LS. **Loc 18:** ♂, 9.iii.2016, RD; ♂, 9.iii.2016, SFC staff. **Loc 20:** ♂, 4.xi.2017, RD. **Loc 21:** 2 ♂♂, 15.iii.2016, RD. **Loc 23:** 2 ♂♂, 1.xi.2017, RD; ♂, 1.xi.2017, BM & MA. **Loc 24:** 2 ♂♂, 4.xi.2017, RD. **Loc 25:** 2 ♂♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS. **Loc 27:** 4 ♂♂, 14.vii.2016, RD; 4 ♂♂, 15.vii.2016, RD; ♂, 15.vii.2016, GR; 2 ♂♂, 21.vii.2016, GR. **Loc 28:** 5 ♂♂, 17.vii.2016, RD; ♂, 17.vii.2016, GR. **Loc 30:** 3 ♂♂, ♀, 18.vii.2016, RD; ♂, 18.vii.2016, GR; ♂, 19.vii.2016, GR. **Loc 31:** 3 ♂♂, 19.vii.2016, RD. **Loc 33:** ♂, ♀, 4.viii.2015, RD. **Loc 34:** 2 ♂♂, 16.viii.2016, RN; 2 ♂♂, 17.viii.2016, LS. **Loc 36:** 3 ♂♂, 30.vii.2015, RD. **Loc 38:** ♂, 16.viii.2016, RD. **Loc 44:** ♂, 19.viii.2016, BM & NMe; ♂, 19.viii.2016, RN; 3 ♂♂, 19.viii.2016, LS.

## Euphaeidae

### *Dysphaea dimidiata* (Selys, 1853)

Material collected prior to 2015 (except by CYC) is listed in Hämäläinen, Dow & Stokvis (2015).

**Loc 3:** ♂, 18.vi.2008, CYC. **Loc 4.** **Loc 7.** **Loc 16:** ♂, 9.iii.2016, SFC staff; 2 ♂♂, 14.iii.2016, BM; 5 ♂♂, 3.xi.2017, BM; ♂, 4.xi.2017, BM; ♂+♀, 7.xi.2017, RD. **Loc 20:** ♂, 10.iii.2016, SFC staff. **Loc 21:** ♂, 15.iii.2016, S.W. Louis. **Loc 22:** 4 ♂♂, 2.xi.2017, BM; 3 ♂♂, 6.xi.2017, BM. **Loc 32:** ♂, 15.viii.2016, RN; 2 ♂♂, 15.viii.2016, LS; ♂, 21.viii.2016, BM & NME. **Loc 37:** ♂, 14.viii.2016, RD. **Loc 39:** ♂, 19.viii.2016, RD.

### *Dysphaea lugens* (Selys, 1873)

These records are the only ones in recent decades from Sarawak. In March 2016 the species was found over deep water on the Sungai Katibas and in a shallower section, but isolated by deep water, on the Sungai Bloh. In 2017 two males caught by RD were flying over almost waist deep water immediately upstream of a rapid. Perhaps one of the reasons that there have been few records of this species in recent decades (see Hämäläinen, Dow & Stokvis 2015) is a preference for larger streams with deep water and rapids, and which are therefore difficult to sample.

**Loc 16:** ♂, 22.vi.2008, CYC; ♂, 9.iii.2016, SFC staff; 2 ♂♂, 3.xi.2017, BM; 2 ♂♂, 7.xi.2017, RD. **Loc 22:** ♂, 14.iii.2016, RD.

### *Dysphaea ulu* Hämäläinen, Dow & Stokvis, 2015

Material collected prior to 2015 (except by CYC) is listed in Hämäläinen, Dow & Stokvis (2015).

**Loc 4:** 5 ♂♂, 10.iii.2016, RD; 3 ♂♂, 31.x.2017, RD. **Loc 5:** ♂, 16.iii.2016, RD. **Loc 14:** ♂, 2.xi.2017, RD. **Loc 16:** ♂, 7.xi.2017, RD. **Loc 17:** ♂, 10.xi.2017, BM & MA. **Loc 20:** ♂, 10.iii.2016, SFC staff. **Loc 21:** ♂, 11.iii.2016, BM & MA; ♂, 15.iii.2016, RD. **Loc 22:** ♂, 6.xi.2017, BM. **Loc 26:** ♂, 14.vii.2016, GR. **Loc 29:** ♂, 18.vii.2016, RD; ♂, 18.vii.2016, GR; ♂, 19.vii.2016, SFC staff. **Loc 33:** 2 ♂♂, 4.viii.2015, RD. **Loc 38:** ♂, 1.viii.2015, RD. **Loc 39:** ♂, 15.viii.2016, RD. **Loc 42:** ♂, 18.viii.2016, LS.

### *Euphaea* species cf *basalis* (Laidlaw, 1915)

*Euphaea basalis* is a montane species, originally described from Mount Kinabalu in Sabah, but in recent years found at some locations in Sarawak (e.g. the Hose Mountains, see Dow et al. 2015a). However the present record, from a site at 600-700m on Bukit Lanjak, is from significantly further west than any other, and from lower altitude. Also the behaviour exhibited by the Bukit Lanjak form was extremely fugitive, staying high in the canopy until the sun had been out for a considerable time and then still rarely descending to any spot at catchable height, and extremely wary, so that it was only possible to catch a single specimen. The status of this taxon is a subject of ongoing investigation.

**Loc 31:** ♂, 19.vii.2016, RD.

### *Euphaea impar* Selys, 1859

**Loc 2:** ♂, 18.vi.2008, CYC; ♂, 20.viii.2013, JA, MA & AP; ♂, 5.xi.2017, RD. **Loc 3:** 3 ♂♂, 18.vi.2008, CYC; ♂, 21.viii.2013, RD. **Loc 4:** ♂, 10.iii.2016, RD; 2 ♂♂, 31.x.2017, RD; ♂, 31.x.2017, LS. **Loc 5:** ♂, 19.vi.2008, CYC; ♂, 23.viii.2013, RD. **Loc 6:** 3 ♂♂, 23.viii.2013, JA &



MA; ♂, 14.iii.2016, RD. **Loc 7:** ♂, 24.viii.2013, JA & MA; ♂, 12.iii.2016, RD. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** 2 ♂♂, 3.xi.2017, SM. **Loc 10:** ♂, 25.viii.2013, JA & MA; ♂, 25.viii.2013, RD; ♂, 6.xi.2017, BM. **Loc 11:** ♂, 9.xi.2017, SM; ♂ (feneral), 9.xi.2017, LS. **Loc 15:** ♂, 11.x.2017, SM. **Loc 17:** ♂, 10.xi.2017, RD; ♂, 10.xi.2017, BM & MA; ♂, 10.xi.2017, SM. **Loc 21:** ♂, 11.iii.2016, RD; 2 ♂♂, 11.iii.2016, BM & MA; ♂, 7.xi.2017, SM; ♀, 7.xi.2017, LS. **Loc 23:** ♂, 1.xi.2017, RD. **Loc 24:** ♂, 4.xi.2017, SM; ♀, 4.xi.2017, LS. **Loc 25:** ♂, 6.xi.2017, SM. **Loc 32:** ♂, 13.viii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** ♂, 16.viii.2016, RN. **Loc 35:** 2 ♂♂, 20.viii.2016, BM & NMe; ♂, ♀, 20.viii.2016, LS. **Loc 36:** ♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD; ♂, 17.viii.2016, BM & NMe. **Loc 38:** 2 ♂♂, 1.viii.2015, JA; ♂, 1.viii.2015, RD; ♂, 16.viii.2016, RD. **Loc 39:** ♂, 15.viii.2016, RD; ♂, 19.viii.2016, BM & NMe. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD.

*Euphaea subcostalis* Selys, 1873

Extremely abundant in LEWS.

**Loc 2:** ♂, 20.viii.2013, JA, MA & AP; ♂, 20.viii.2013, RD; ♂, 12.iii.2016, RD. **Loc 3:** 7 ♂♂, 18.vi.2008, CYC; 4 ♂♂, 21.viii.2013, JA & MA; 2 ♂♂, 21.viii.2013, RD; 4 ♂♂, 16.iii.2016, BM & MA; 5 ♂♂, 8.xi.2017, BM & MA; 3 ♂♂, ♀, 8.xi.2017, SM. **Loc 4:** 7 ♂♂, ♀, 22.viii.2013, JA & MA; 2 ♂♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; 2 ♂♂, 31.x.2017, RD. **Loc 5:** ♂, 19.vi.2008, CYC; 13 ♂♂, 23.viii.2013, JA & MA; ♂, 23.viii.2013, RD. **Loc 7:** 7 ♂♂, 24.viii.2013, JA & MA. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 3.xi.2017, RD; ♂, 11.xi.2017, BM & MA. **Loc 9:** ♂, 24.viii.2013, RD; 3 ♂♂, 3.xi.2017, SM. **Loc 10:** 8 ♂♂, 2 ♀♀, 25.viii.2013, JA & MA; ♂+♀, 25.viii.2013, RD. **Loc 11:** 2 ♂♂, 9.xi.2017, SM; ♂ (feneral), 9.xi.2017, LS. **Loc 13:** ♂, 9.xi.2017, RD; ♂, 9.xi.2017, BM & MA. **Loc 14:** 2 ♂♂, 20.vi.2008, CYC. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 16:** 2 ♂♂, 23.vi.2008, CYC. **Loc 17:** ♂, 10.xi.2017, RD; ♂, 10.xi.2017, BM & MA; 4 ♂♂, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, RD; 7 ♂♂, ♀, 9.iii.2016, SFC staff. **Loc 20:** 2 ♂♂, 1.xi.2017, SM; 2 ♂♂, ♀, 4.xi.2017, RD; ♂, 4.xi.2017, BM. **Loc 21:** ♂, 11.iii.2016, RD; ♂, 11.iii.2016, BM & MA; ♀ (feneral with exuvia), 15.iii.2016, EJ, BM & MA. **Loc 23:** 3 ♂♂, 1.xi.2017, BM & MA. **Loc 24:** ♂, 4.xi.2017, SM. **Loc 25:** ♂, 6.xi.2017, SM. **Loc 27:** 2 ♂♂, 14.vii.2016, RD; ♂, 14.vii.2016, GR. **Loc 28:** ♂, 17.vii.2016, GR. **Loc 29:** ♂, 18.vii.2016, RD; ♂, 18.vi.2016, GR; ♂, 19.viii.2016, SFC staff. **Loc 32:** ♂, 14.viii.2016, RD; ♂+♀, 20.viii.2016, RD; ♂ (feneral), 21.viii.2016, RN. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** 2 ♂♂, 16.viii.2016, RN; ♂, 17.viii.2016, LS. **Loc 35:** 2 ♂♂, 20.viii.2016, BM & NMe. **Loc 36:** 2 ♂♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD; 2 ♂♂, 16.viii.2016, BM & NMe. **Loc 38:** ♂, 1.viii.2015, JA; ♂, 1.viii.2015, RD; ♂, 16.viii.2016, RD. **Loc 39:** ♂, 19.viii.2016, RD. **Loc 41:** ♂, 18.viii.2016, RN.

*Euphaea subnodalis* (Laidlaw, 1915)

The records from Ulu Engkari presented here are the most western yet known for this species.

**Loc 26:** ♂, 14.vii.2016, RD; 2 ♂♂, 14.vii.2016, GR. **Loc 29:** ♂, 19.vii.2016, GR.

*Euphaea tricolor* Selys, 1859

**Loc 4:** 2 ♂♂, 22.viii.2013, JA & MA; 2 ♂♂, 22.viii.2013, RD; 2 ♂♂, 10.iii.2016, RD. **Loc 8:** 2 ♂♂, 21.vi.2008, CYC. **Loc 14:** 5 ♂♂, 20.vi.2008, CYC; 2 ♂♂, 2.xi.2017, RD. **Loc 16:** 2 ♂♂, 14.iii.2016, BM; ♂, 1.xi.2017, RD; 2 ♂♂, 1.xi.2017, BM & MA; 6 ♂♂, 4.xi.2017, BM & MA; 5 ♂♂, 7.xi.2017, BM. **Loc 17:** 2 ♂♂, 10.xi.2017, RD; ♂, 10.xi.2017, BM & MA. **Loc 20:** 2 ♂♂, 10.iii.2016, SFC staff; 2 ♂♂, 1.xi.2017, SM. **Loc 22:** ♂, 14.iii.2016, RD; 2 ♂♂, 2.xi.2017, BM; 5 ♂♂, 2.xi.2017, SM; 4 ♂♂, 2 ♀♀, 6.xi.2017, BM; ♂, 11.xi.2017, SM. **Loc 32:** ♂, 14.viii.2016, RN; ♂, 15.viii.2016, RD; ♂, 15.viii.2016, RN; ♂, 18.viii.2016, RD.

**Philosinidae***Rhinagrion borneense* (Selys, 1886)

Fig. 22 shows a male.

**Loc 3:** 4 ♂♂, 18.vi.2008, CYC; 2 ♂♂, 21.viii.2013, JA & MA; 2 ♂♂, ♀, 21.viii.2013, RD; 3 ♂♂, 16.iii.2016, RD; ♂, ♀, 8.xi.2017, BM & MA; 2 ♂♂, 8.xi.2017, SM; ♂, 8.xi.2017, LS. **Loc 4:** 3 ♂♂, 22.viii.2013, JA & MA; 2 ♂♂, 22.viii.2013, RD; ♂, 10.iii.2016, RD; 2 ♂♂, 31.x.2017, RD. **Loc 5:** ♂, 19.vi.2008, CYC; ♂, 23.viii.2013, RD. **Loc 6:** ♂, 14.iii.2016, RD; ♂ (teneral), ♀ (teneral), 14.iii.2016, EJ, BM & MA. **Loc 7:** ♂, 24.viii.2013, JA & MA. **Loc 8:** ♂, 24.viii.2013, RD. **Loc 9:** 4 ♂♂, 3.xi.2017, SM; 5 ♂♂, 3.xi.2017, LS. **Loc 10:** 2 ♂♂, 25.viii.2013, JA & MA; ♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS. **Loc 11:** ♂, 9.xi.2017, SM. **Loc 14:** ♂, 2.xi.2017, SM. **Loc 15:** 2 ♂♂, 11.xi.2017, SM; ♂, 11.xi.2017, LS. **Loc 17:** ♂, 10.xi.2017, RD; 2 ♂♂, 10.xi.2017, BM & MA; ♂, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, SFC staff. **Loc 20:** 2 ♂♂, 1.xi.2017, SM; ♂, 4.xi.2017, RD; ♂, 4.xi.2017, BM. **Loc 21:** ♂, 11.iii.2016, RD; 3 ♂♂, 11.iii.2016, BM & MA; 7 ♂♂, 15.iii.2016, EJ, BM & MA; 2 ♂♂, 7.xi.2017, SM; 2 ♂♂, 7.xi.2017, LS. **Loc 24:** ♂, 4.xi.2017, SM; ♂, 4.xi.2017, LS. **Loc 32:** ♂, 14.viii.2016, RD; ♂, ♀, 14.viii.2016, RN; ♂, 15.viii.2016, RD; ♂, 15.viii.2016, RN; 6 ♂♂, 15.viii.2016, LS; 2 ♂♂, 21.viii.2016, BM & NMe. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** ♂, 17.viii.2016, LS. **Loc 35:** 3 ♂♂, ♀, 20.viii.2016, LS; 2 ♂♂, 20.viii.2016, BM & NMe. **Loc 36:** 2 ♂♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD. **Loc 37:** ♀, 17.viii.2016, RD; ♂, 16.viii.2016, BM; 2 ♂♂, 16.viii.2016, LS. **Loc 38:** 2 ♂♂, 1.viii.2015, JA; ♂, 1.viii.2015, RD; 2 ♂♂, 16.viii.2016, RD. **Loc 39:** ♂, 15.viii.2016, RD; ♂, 18.viii.2016, BM & NMe. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 42:** ♂, 22.viii.2016, LS.



Figure 22. *Rhinagrion borneense*. Photo by C.Y. Choong at Nanga Bloh.

**Platycnemididae***Coeliccia borneensis* (Selys, 1866)

It is possible that more than one species is included in the material below; *C. borneensis* is by far the most problematic member of the species group that bears its name.

**Loc 2:** 3 ♂♂, ♀, 12.iii.2016, RD; 3 ♂♂, 5.xi.2017, RD. **Loc 3:** ♀, 21.viii.2013, JA & MA; ♂, 21.viii.2013, RD; ♂, 8.xi.2017, LS. **Loc 4:** ♂, 22.viii.2013, RD; ♂, 31.x.2017, RD; 2 ♂♂, 31.x.2017, LS. **Loc 5:** 2 ♂♂, 19.vi.2008, CYC; 2 ♂♂, ♀, 23.viii.2013, RD; 2 ♂♂, ♀, 16.iii.2016, RD. **Loc 6:** ♂, 23.viii.2013, JA & MA. **Loc 7:** ♂, ♀, 13.iii.2016, RD. **Loc 9:** ♂, 24.viii.2013, RD. **Loc 10:** 3 ♂♂, ♀, 25.viii.2013, RD; ♂, ♀, 6.xi.2017, RD. **Loc 13:** 5 ♂♂, ♀, 26.viii.2013, RD; 4 ♂♂, 9.xi.2017, RD; ♀, 9.xi.2017, BM & MA. **Loc 15:** 2 ♂♂, 11.xi.2017, SM; ♂, 11.xi.2017, LS. **Loc 17:** ♂, 10.xi.2017, RD; ♀, 10.xi.2017, SM. **Loc 18:** 2 ♂♂, 2 ♀♀, 9.iii.2016, RD. **Loc 20:** ♂, 1.xi.2017, LS; 3 ♂♂, ♀, 4.xi.2017, RD. **Loc 23:** 2 ♂♂, 1.xi.2017, RD. **Loc 25:** ♂, 6.xi.2017, SM; 4 ♂♂ (1 teneral), 6.xi.2017, LS. **Loc 27:** 2 ♂♂, 14.vii.2016, RD; 2 ♂, ♀, 15.vii.2016, RD; ♂, 21.vii.2016, GR. **Loc 28:** 5 ♂♂, ♀, 17.vii.2016, RD. **Loc 30:** ♂, ♀, 18.vii.2016, RD; ♂, 18.vii.2016, GR; 3 ♂♂, 19.vii.2016, GR. **Loc 31:** 5 ♂♂, 19.vii.2016, RD. **Loc 36:** ♂, 30.vii.2015, RD. **Loc 37:** ♂, 14.viii.2016, RD. **Loc 38:** ♂, 1.viii.2015, RD; 2 ♂♂, 16.viii.2016, RD. **Loc 40:** ♂, 17.viii.2016, RD. **Loc 44:** 2 ♂♂, 19.viii.2016, RN; 2 ♂♂, 19.viii.2016, LS.

*Coeliccia campioni* Laidlaw, 1918

Much scarcer, at least at the altitudes that we have sampled at, than the previous species in LEWS; LEWS appears to be at the western edge of the range of this species.

**Loc 7:** ♂, 13.iii.2016, RD. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 10:** ♂, 6.xi.2017, RD. **Loc 17:** ♂, 10.xi.2017, RD. **Loc 27:** ♂, 21.vii.2016, GR; **Loc 28:** 2 ♂, 17.vii.2016, RD. **Loc 36:** ♂, 30.vii.2015, RD. **Loc 40:** ♂, 17.viii.2016, RD.

*Coeliccia cyaneothorax* Kimmins, 1936

**Loc 2:** ♂, 20.viii.2013, JA, MA & AP. **Loc 3:** ♀, 18.vi.2008, CYC; ♂, 21.viii.2013, JA & MA; ♂+♀, 21.viii.2013, RD. **Loc 4:** 2 ♂♂, ♀, ♂+♀, 10.iii.2016, RD; ♂, 31.x.2017, RD. **Loc 5:** ♂+♀, 16.iii.2016, RD. **Loc 11:** 2 ♂♂, 9.xi.2017, SM. **Loc 17:** 2 ♂♂, 10.xi.2017, RD; ♂, 10.xi.2017, SM. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 26:** ♀, 14.vii.2016, RD. **Loc 25:** ♂, 6.xi.2017, SM. **Loc 27:** ♂, 14.vii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** ♂+♀, 17.viii.2016, LS. **Loc 35:** ♂, 20.viii.2016, BM & NMe; ♂, 3(♂+♀), 20.viii.2016, LS. **Loc 39:** ♂, 19.viii.2016, RD. **Loc 43:** ♂, 18.viii.2016, RD.

*Coeliccia* species cf *nemoricola* Laidlaw, 1912

Although not among specimens collected by the second author during the 2008 expedition, Norma-Rashid et al. (2010) recorded *Coeliccia nemoricola*. It is assumed here that this in fact refers to a relatively common species found throughout Sarawak (see, for instance, Dow & Ngiam 2012, 2015, Dow & Reels 2013), including in the lowlands, rather than the true *C. nemoricola* which only occurs at higher altitudes from the Tama Abu range in Miri and Limbang divisions and north and eastwards into the Crocker Range in Sabah. Subsequently we have collected this species in LEWS.

**Loc 18:** ♂, 9.iii.2016, RD. **Loc 28:** 4 ♂♂, 17.vii.2016, RD.

*Coelliccia nigrohamata* Laidlaw, 1918

**Loc 2:** ♂, 12.iii.2016, RD; ♂, 5.xi.2017, RD. **Loc 3:** 8 ♂♂, 18.vi.2008, CYC; 5 ♂♂, 21.viii.2013, RD; ♂, 16.iii.2016, BM & MA; ♂, 8.xi.2017, SM; ♂, 8.xi.2017, LS. **Loc 4:** ♂, ♂+♀, 22.viii.2013, RD; ♂, ♂+♀, 10.iii.2016, RD; ♂, 31.x.2017, RD. **Loc 5:** 6 ♂♂, 19.vi.2008, CYC; 2 ♂♂, 2(♂+♀), 23.viii.2013, RD; ♂, 16.iii.2016, RD. **Loc 6:** 3 ♂♂, 23.viii.2013, JA & MA; ♂, 14.iii.2016, RD. **Loc 7:** 7 ♂♂, 24.viii.2013, JA & MA; ♂, 13.iii.2016, RD. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 3.xi.2017, RD; 4 ♂♂, 11.xi.2017, BM & MA. **Loc 9:** ♂, 24.viii.2013, RD; 2 ♂♂, 3.xi.2017, LS. **Loc 10:** ♂, 25.viii.2013, JA & MA; 2 ♂♂, 25.viii.2013, RD; ♂, 6.xi.2017, RD. **Loc 11:** ♂, 9.xi.2017, SM; 2 ♂♂, 9.xi.2017, LS. **Loc 13:** ♂, ♀, 26.viii.2013, RD. **Loc 14:** 3 ♂♂, ♀, 20.vi.2008, CYC; ♂, 2.xi.2017, RD; ♂, 2.xi.2017, LS. **Loc 16:** 4 ♂♂, ♀, 23.vi.2008, CYC. **Loc 17:** ♂, ♂+♀, 10.xi.2017, RD; 2 ♂♂, 10.xi.2017, BM & MA; 2 ♂♂, 10.xi.2017, SM; ♂, ♀, 10.xi.2017, LS. **Loc 18:** 2 ♂♂, ♂+♀, 9.iii.2016, RD; ♂, 9.iii.2016, SFC staff. **Loc 20:** 3 ♂♂, 1.xi.2017, LS; 2 ♂♂, 4.xi.2017, RD. **Loc 21:** ♂, 11.iii.2016, RD. **Loc 23:** 2 ♂♂, ♂+♀, 1.xi.2017, RD. **Loc 24:** 3 ♂♂, 4.xi.2017, SM; 3 ♂♂, 4.xi.2017, LS. **Loc 25:** 3 ♂♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS. **Loc 27:** 3 ♂♂, 14.vii.2016, RD; ♂, 15.vii.2016, RD; ♂, 15.vii.2016, GR; 3 ♂♂, 21.vii.2016, RD. **Loc 28:** 2 ♂♂, 17.vii.2016, RD; ♂, 17.vii.2016, GR; ♂, 21.vii.2016, RD. **Loc 30:** ♂, 18.vii.2016, RD; ♂, 18.vii.2016, GR; ♂, 19.vii.2016, GR. **Loc 31:** ♂, ♀, 19.vii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** ♂, 17.viii.2016, LS. **Loc 35:** 2 ♂♂, ♀ (feneral), ♂+♀, 21.viii.2016, LS. **Loc 36:** ♂, ♀, ♂+♀, 30.vii.2015, RD; ♂, 17.viii.2016, BM & NMe. **Loc 37:** ♂, 14.viii.2016, RD; 4 ♂♂, 17.viii.2016, LS. **Loc 38:** ♂, ♂+♀, 1.viii.2015, RD; 2 ♂♂, 16.viii.2016, RD. **Loc 39:** ♂, 15.viii.2016, RD; ♂, 18.viii.2016, BM & NMe. **Loc 40:** 3 ♂♂, ♂+♀, 17.viii.2016, RD. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 42:** ♂, 18.viii.2016, RD. **Loc 43:** ♂, 19.viii.2016, BM & NMe; ♂, 19.viii.2016, RN.

*Copera vittata* (Selys, 1863)

**Loc 5:** 2 ♂♂, 23.viii.2013, RD. **Loc 21:** ♂, 14.iii.2016, RD.

*"Elattoneura" analis* (Selys, 1860)

**Loc 4:** ♂, 10.iii.20016, RD; ♂, 31.x.2017, RD. **Loc 5:** ♂, 19.vi.2008, CYC; ♂, 23.viii.2013, RD; ♂, 16.iii.2016, RD. **Loc 6:** ♂, 14.iii.2016, BM. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** 2 ♂♂, 3.xi.2017, LS. **Loc 10:** ♂, 25.viii.2013, RD. **Loc 14:** ♂, ♀, 2.xi.2017, SM; ♂, 2.xi.2017, LS. **Loc 17:** ♂, 10.xi.2017, RD. **Loc 20:** ♂, 4.xi.017, BM. **Loc 21:** ♂, 15.iii.2016, RD; ♂, 15.iii.2016, EJ, BM & MA; ♂, 7.xi.2017, LS. **Loc 32:** ♂, 14.viii.2016, RD; 2 ♂♂, 14.viii.2016, RN; ♂, 15.viii.2016, RN; 8 ♂♂, 15.viii.2016, LS; ♂+♀, 20.viii.2016, RD. **Loc 35:** 3 ♂♂, 20.viii.2016, LS. **Loc 36:** 3 ♂♂, 30.vii.2015, RD. **Loc 37:** ♂, 16.viii.2016, BM; 2 ♂♂, 16.viii.2016, LS. **Loc 38:** ♂, 1.viii.2015, JA; 2 ♂♂, 1.viii.2015, RD; ♂, 16.viii.2016, RD. **Loc 39:** 2 ♂♂, ♀, 15.viii.2016, RD.

*"Elattoneura" mauros* Dow, Choong & Ng, 2010

Initially misidentified as *Elattoneura coomansi* Lieftinck, 1937 (Norma-Rashid et al. 2010), this species remains known only from LEWS. Unfortunately the location where the holotype and four of the paratypes were collected was mistakenly given as Sungai Begua (**Loc 17** here) when it was actually Sungai Jik (**Loc 3** here) in Dow et al. (2010). The species is found hanging on steep banks and on overhanging vegetation at the side of the Kafibas and Bloh, and sometimes just inside the mouths of tributary streams, often over water that is waist deep or more; most records are from near to stream mouths but in 2017 individuals were collected at some points remote from any stream mouth. Only material not in the type series is listed here. Fig. 23 shows a male.



**Figure 23. “*Elatoneura mauros*”. Photo by C.Y. Choong at Nanga Bloh.**

**Loc 16:** ♂, at mouth of Sungai Sekawie, 26.viii.2013, RD; 2 ♂♂, at mouth of Sungai Jik, 15.iii.2016, RD; 2 ♂♂, at mouth of Sungai Kelimau Besai, 3.xi.2017, RD; 6 ♂♂, 7.xi.2017, RD, 2 ♂♂, 7.xi.2017, BM; 3 ♂♂, at mouth of Sungai Jik, 8.xi.2017, BM; ♂, at mouth of Sungai Jik, 8.xi.2017, SM; ♂+♀, at mouth of Sungai Sekawie, 9.xi.2017, SM. **Loc 22:** ♂, at mouth of Sungai Merating, 25.viii.2013, JA & MA; 3 ♂♂, at mouth of Sungai Merating, 25.viii.2013, RD; 3 ♂♂, at mouth of Sungai Merating, 6.xi.2017, RD; 3 ♂♂, 6.xi.2017, BM.

*Prodasineura dorsalis* (Selys, 1860)

**Loc 4:** ♂+♀, 22.viii.2013, RD. **Loc 5:** 2 ♂♂, 23.viii.2013, RD. **Loc 8:** ♂, ♀, 3.xi.2017, RD; ♂, ♀, 11.xi.2017, BM & MA. **Loc 9:** 2 ♂♂, 3.xi.2017, LS. **Loc 10:** ♂, 6.xi.2017, RD. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 16:** 2 ♂♂, ♀, 23.vi.2008, CYC. **Loc 17:** ♂, 10.xi.2017, RD. **Loc 18:** ♂+♀, 9.iii.2016, RD. **Loc 35:** ♂, ♂+♀, 21.viii.2016, LS. **Loc 37:** ♂, 14.viii.2016, RD.

*Prodasineura hosei* (Laidlaw, 1913)

**Loc 3:** ♂, 8.xi.2017, RD. **Loc 4:** ♂+♀, 10.iii.2016, RD. **Loc 5:** ♂+♀, 23.viii.2013, RD; ♂, 16.iii.2016, RD. **Loc 8:** ♂, 11.xi.2017, RD. **Loc 9:** 3 ♂♂, 24.viii.2013, RD. **Loc 10:** 2 ♂♂, 6.xi.2017, BM & MA; 2 ♂♂, 6.xi.2017, SM; ♂, 6.xi.2017, LS. **Loc 15:** ♂, 11.xi.2017, SM. **Loc 21:** 3 ♂♂, 15.iii.2016, RD; ♂, 7.xi.2017, SM. **Loc 32:** ♂, 14.viii.2016, RD; ♂, 14.viii.2016, RN; ♂, 15.viii.2016, RD; 2 ♂♂, 15.viii.2016, LS. **Loc 33:** ♂, 1.viii.2015, RD. **Loc 34:** ♂, 19.viii.2016, RD. **Loc 35:** 2 ♂♂, ♀, 20.viii.2016, BM & NMe. **Loc 36:** ♂, 30.vii.2015, JA; 2 ♂♂, ♂+♀, 30.vii.2015, RD; ♂, 16.viii.2016, RD. **Loc 37:** 5 ♂♂, ♂+♀, 14.viii.2016, RD; ♂, 16.viii.2016, BM; 2 ♂♂, ♀, 16.viii.2016, LS. **Loc 38:** ♂+♀, 1.viii.2015, RD. **Loc 39:** 2 ♂♂, 18.viii.2016, BM & NMe; ♂, 19.viii.2016, RD. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD.

*Prodasineura hyperythra* (Selys, 1886)

**Loc 3:** ♂, 18.vi.2008, CYC; **Loc 4:** ♂, 22.viii.2013, RD; ♂, 31.x.2017, RD. **Loc 5:** ♂, 23.viii.2013, RD. **Loc 7:** ♂, 13.iii.2016, RD. **Loc 8:** ♂, ♀, 11.xi.2017, RD; 2 ♂♂, 11.xi.2017, BM & MA. **Loc 16:** 2 ♂♂, 23.vi.2008, CYC. **Loc 26:** ♂, 14.vii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 37:** ♂, 14.viii.2016, RD. **Loc 38:** 2 ♂♂, 16.viii.2016, RD. **Loc 41:** ♂+♀, 21.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD.

*Prodasineura verticalis* (Selys, 1860)

**Loc 3:** ♂, 16.iii.2016, BM & MA. **Loc 4:** ♂+♀, 10.iii.2016, RD. **Loc 9:** ♂, 24.viii.2013, RD. **Loc 10:**

2 ♂♂, ♀, 6.xi.2017, SM. **Loc 14:** ♂, 20.vi.2008, CYC; ♂, 2.xi.2017, SM. **Loc 16:** 2 ♂♂, 3.xi.2017, BM. **Loc 20:** ♂, 10.iii.2016, SFC staff. **Loc 21:** ♂, 15.iii.2016, RD; 2 ♂♂, ♂+♀, 7.xi.2017, SM. **Loc 22:** 2 ♂♂, ♂+♀, 25.viii.2013, JA & MA; ♂, 2.xi.2017, BM; 2 ♂♂, 6.xi.2017, BM.

## Coenagrionidae

*Argiocnemis femina* (Brauer, 1868)

**Loc 1:** ♂, 18.vi.2008, CYC; 4 ♂♂, 2 ♀♀, 20.vi.2008, CYC.

*Argiocnemis* species

**Loc 5:** 2 ♂♂, 23.viii.2013, RD. **Loc 6:** ♂, 14.iii.2016, RD.

*Ceriagrion bellona* Laidlaw, 1915

**Loc 1:** ♀, 20.viii.2013, JA, MA & AP.

*Pericnemis dowi* Orr & Hämäläinen, 2013

**Loc 5:** ♂, 16.iii.2016, RD. **Loc 13:** ♀, on steep slope above stream, 9.xi.2017, BM.

**Loc 31:** ♂, 19.vii.2016, RD. **Loc 36:** ♂, 30.vii.2015, RD. **Loc 37:** ♀, 16.viii.2016, LS.

*Pericnemis kiautarum* Orr & Hämäläinen, 2013

**Loc 1:** ♂, at lights in the field station in the early evening, 12.iii.2016, RD.

*Pseudagrion microcephalum* (Rambur, 1842)

**Loc 16:** ♂, 14.iii.2016, BM. **Loc 18:** ♂, 9.iii.2016, RD.

*Stenagrion dubium* (Laidlaw, 1912)

**Loc 2:** 2 ♂♂, 12.iii.2016, RD; ♂, 5.xi.2017, RD. **Loc 3:** ♂, 18.vi.2008, CYC; 2 ♂♂, 21.viii.2013, RD; ♂, 8.xi.2017, SM; ♂, 8.xi.2017, LS. **Loc 4:** ♂, 22.viii.2013, RD; ♀, 10.iii.2016, RD; ♂+♀, 31.x.2017, RD. **Loc 5:** ♂, ♀, 19.vi.2008, CYC; ♂, 23.viii.2013, RD; ♂, 16.iii.2016, RD. **Loc 6:** ♂, 14.iii.2016, RD. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 3.xi.2017, RD; ♂, 11.xi.2017, RD. **Loc 9:** ♂, 2(♂+♀), 24.viii.2013, RD. **Loc 10:** ♂+♀, 25.viii.2013, RD; ♂, 6.xi.2017, RD. **Loc 13:** 2 ♂♂, 26.viii.2013, RD; ♂, 9.xi.2017, RD; 2 ♂♂, 9.xi.2017, BM & MA. **Loc 14:** ♂, ♀, 20.vi.2008, CYC; 2 ♂♂, 2.xi.2017, RD; ♂, 2.xi.2017, LS. **Loc 16:** 5 ♂♂, 23.vi.2008, CYC. **Loc 17:** ♂, 10.xi.2017, RD. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 20:** ♂, 4.xi.2017, RD. **Loc 21:** ♂, 15.iii.2016, RD; 2 ♂♂, 7.xi.2017, LS. **Loc 24:** ♂, 4.xi.2017, SM. **Loc 25:** ♂, 6.xi.2017, LS. **Loc 27:** 2 ♂♂, 14.vii.2016, RD; 2 ♂♂, 14.vii.2016, GR; ♂, 15.vii.2016, RD; 3 ♂♂, 15.vii.2016, GR; ♀, 21.vii.2016, GR. **Loc 28:** 2 ♂♂, 17.vii.2016, RD; ♂, 17.vii.2016, GR. **Loc 30:** 2 ♂♂, ♀, 18.vii.2016, RD; ♂, 19.vii.2016, GR. **Loc 33:** ♂, 4.viii.2015, RD. **Loc 34:** ♂, 16.viii.2016, RN. **Loc 35:** ♂, 20.viii.2016, LS. **Loc 36:** ♂, 30.vii.2015, RD. **Loc 38:** ♂, 16.viii.2016, RD. **Loc 40:** ♀, 17.viii.2016, RD. **Loc 44:** ♂, 19.viii.2016, RN.

*Teinobasis laidlawi* Kimmins, 1936

**Loc 5:** 2 ♂♂, 19.vi.2008, CYC. **Loc 12:** ♂, 26.viii.2013, JA & MA; 2 ♂♂, 26.viii.2013, RD; ♂, 9.xi.2017, MA; 2 ♂♂, 9.xi.2017, RD.

## Incertae sedis

*Bornargiolestes fuscus* Dow, 2014

See Dow (2014b) for material collected before 2016. It should be noted that only females have been found in LEWS so far, and the specimen available at the time

Dow (2014b; from Location 5 as defined here) was published was left out of the type series of *B. fuscus* because of this and differences in colouration from typical examples found with males in Lambir Hills and on Gunung Mulu; some doubt remains over whether the form found in LEWS is really *B. fuscus*, this issue will only be resolved when males are found there.

**Loc 6:** ♀, 14.iii.2016, RD. **Loc 20:** ♀, 4.xi.2017, RD.

## Anisoptera

### Aeshnidae

*Heliaeschna* species

**Loc 2:** ♀, 21.vi.2008, CYC.

*Indaeschna grubaueri* (Förster, 1904)

**Loc 2:** ♂, 24.vi.2008, CYC. **Loc 12:** ♂, 26.viii.2013, RD.

*Tetracanthagyna degorsi* Martin, 1896

**Loc 4:** ♀, 22.viii.2013, RD. **Loc 9:** ♀, 3.xi.2017, LS. **Loc 19:** 1 larvae, 9.iii.2016, SB. **Loc 21:** larva, 15.iii.2016, SB. **Loc 30:** ♀, 18.vii.2016, GR.

### Gomphidae

*Acrogomphus jubilaris* Lieftinck, 1964

*Acrogomphus* larvae (see Butler et al. 2016 for a discussion of this genus in Borneo) from LEWS are assumed here to belong to *A. jubilaris*, although the presence of additional *Acrogomphus* species in Borneo cannot be ruled out.

**Loc 6:** 2 larvae, 14.iii.2016, SB. **Loc 19:** 2 larvae, 9.iii.2016, SB. **Loc 20:** larva, 10.iii.2016, SB. **Loc 21:** 3 larvae, 15.iii.2016, SB.



Figure 24. *Burmagomphus insularis*. Photo by C.Y. Choong at Nanga Bloh.

*Burmagomphus insularis* Laidlaw, 1914

Another poorly known species. Fig. 24 shows a male.

**Loc 16:** ♂, 25.vi.2008, CYC; ♂, 7.xi.2017, RD. **Loc 22:** ♀, 11.xi.2017, SM.

*Gomphidia caesarea* Lieftinck, 1929

This species was described from West Kalimantan (Lieftinck 1929) and had remained unrecorded again until CYC collected a male in LEWS in 2008.

**Loc 16:** ♂, 24.vi.2008, CYC.

*Gomphidia maclachlani* (Selys, 1873)

**Loc 3:** ♀, 21.viii.2013, RD. **Loc 21:** ♂, 11.iii.2016, RD. **Loc 32:** ♂, 21.viii.2016, BM & NMe. **Loc 39:** ♂, 18.viii.2016, BM & NMe. **Loc 42:** ♂, 18.viii.2016, LS.

*Heliogomphus cf blandulus* Lieftinck, 1929

At present the Bornean *Heliogomphus* present considerable taxonomic difficulties.

**Loc 32:** ♂ (teneral), 21.viii.2016, RD.

*Heliogomphus ?borneensis* Lieftinck, 1963

**Loc 33:** ♀ (teneral), 1.viii.2015, RD.

*Leptogomphus coomansi* Laidlaw, 1936

See Dow, Stokvis & Ngiam (2017) for adult records. Locations 32, 34, 36, 37, 38, 43.

*Leptogomphus* species cf *coomansi* Laidlaw, 1936

See Dow, Stokvis & Ngiam (2017) for adult records up to 2016 and a discussion of the status of this form.

**Loc 8:** ♂ (teneral), 3.xi.2017, RD. **Loc 17:** ♂ (teneral), 10.xi.2017, BM & MA. **Loc 33.** **Loc 38.**

*Leptogomphus pendleburyi* Laidlaw, 1934

See Dow, Stokvis & Ngiam (2017) for records to 2016.

**Loc 3:** ♂ (teneral), 8.xi.2017, RD. **Loc 6.** **Loc 13:** ♀, 9.xi.2017, BM & MA. **Loc 17:** ♀ (teneral), 10.xi.2017, RD. **Loc 44.**

*Leptogomphus sii* Dow, Stokvis & Ngiam, 2017

See Dow, Stokvis & Ngiam (2017), Loc 20.

*Leptogomphus williamsoni* Laidlaw, 1912

See Dow, Stokvis & Ngiam (2017) for adults collected.

**Loc 2.** **Loc 6:** 1 larva, 14.iii.2016, SB. **Loc 13:** larva, 26.viii.2013, AP. **Loc 20:** ♀, 4.xi.2017, RD. **Loc 21.** **Loc 27.** **Loc 28.**

*Macrogomphus quadratus* Selys, 1878

**Loc 20:** 4 larvae, 10.iii.2016, SB. **Loc 21:** 3 larvae, 15.iii.2016, SB.

*Megalogomphus icterops* (Martin, 1902)

Fig. 25 shows a male.

**Loc 32:** ♂, 17.viii.2016, RD; ♂, 20.viii.2016, RD.

*Megalogomphus cf sumatranus* (Krüger, 1899)

**Loc 3:** ♀, 8.xi.2017, MA; ♂, ♀, 8.xi.2017, RD. **Loc 4:** ♂, 22.viii.2013, JA & MA; ♂, 10.iii.2016, RD. **Loc 20:** ♂, 2 ♀♀, 10.iii.2016, SFC staff.





**Figure 25. *Megalogomphus icteropis*. Photo by R.W.J. Ngiam at Sungai Mujok.**

*Merogomphus* species

Unfortunately the anal appendages, already distorted, of two teneral males collected in LEWS shrivelled after preservation, however the appendages were at least close to those of *M. femoralis* Laidlaw, 1931 (the only *Merogomphus* species known from Sarawak until now, see Dow & Unggang 2010) and the markings are in fairly good agreement, however the size is significantly smaller; possibly this is a new species or a new record for Borneo but mature specimens are required to determine this. Both males were caught at the mouths of tributaries of the Katibas, perched in vegetation above waist deep water over sediment substrates.

**Loc 10:** ♂ (teneral), just inside mouth, 6.xi.2017, RD. **Loc 16:** ♂ (teneral), at mouth of Sungai Kelimau Besai, 3.xi.2017, RD.

*Microgomphus chelifer* (Selys, 1858)

**Loc 34:** ♀ (teneral), 14.viii.2016, RD. **Loc 35:** ♂, 20.viii.2016, BM & NMe. **Loc 38:** ♀, 1.viii.2015, RD.

*Microgomphus* species cf *chelifer* (Selys, 1858)

**Loc 8:** ♀ (teneral), 11.xi.2017, RD. **Loc 21:** ♀ (teneral), 11.iii.2016, BM & MA. **Loc 32:** ♀, 18.viii.2016, RD. **Loc 38:** ♀, 1.viii.2015, RD.

*Phaenandrogomphus safei* Dow & Luke, 2015

These are only the second records of this species, first described from Sabah (see Dow & Luke 2014). The first author of Dow & Luke (2014) and this paper may have been premature in placing this species and *Onychogomphus treadwayi* Müller & Hämäläinen, 1993 in *Phaenandrogomphus*: in doing so he overlooked, for instance, *Nychogomphus* Carle, 1986, which has a very similar penile organ. In fact the closest relative to *P. safei* now appears to be *Onychogomphus duaricus* Fraser, 1924, which is often placed in *Nychogomphus*. With hindsight it would have been better to take

a conservative approach and describe this species in *Onychogomphus* pending a thorough genus level revision of the Asian Onychogomphinae.

On November 7, 2017, when water levels were relatively low on the Katibas, the river was running very clear, and the sun was out brightly from early, two or more males were seen flying immediately upstream of every rapid passed on the river and three males were collected; the species had not been spotted at these locations previously, and on subsequent days, when conditions were less good, a few individuals only were seen at these locations. The undescribed female (supposition, but the specimen is very similar to the males in its markings and size) was found perched on vegetation overhanging the Sungai Bloh a few days later. Fig. 26 shows the male collected at ulu Mujok.

**Loc 16:** ♂, 7.xi.2017, RD; ♂, 7.xi.2017, BM; ♂, 7.xi.2017, SM. **Loc 22:** ♀, 11.xi.2017, MA. **Loc 32:** ♂, 21.viii.2016, BM & NMe.



Figure 26. *Phaenandrogomphus safeii*. Photo by R.W.J. Ngiam at Sungai Mujok.



Figure 27. *Sieboldius japonicus*. Photo by R.W.J. Ngiam at Sungai Mujok.

*Sieboldius japponicus* (Selys, 1854)

Fig. 27 shows a male.

**Loc 16:** ♂, 23.vi.2008, CYC; ♂, 7.xi.2017, RD. **Loc 32:** ♂, 18.viii.2016, RD. Also seen at locations 14 and 17.

**Chlorogomphidae**

*Chlorogomphus* species

It is entirely possible that more than one species is included here. Fig. 28 shows the female collected at Nanga Segerak.

**Loc 3:** larva, 21.viii.2013, AP. **Loc 19:** 2 larvae, 9.iii.2016, SB; **Loc 27:** 1 ♀, 15.vii.2016, GR. **Loc 34:** ♀ larva (reared), 16.viii.2016, RN.



**Figure 28.** *Chlorogomphus* species female. Photo by G.T. Reels at Nanga Segerak.

**Macromiidae**

*Macromia callisto* Laidlaw, 1922

There has been no clear record of this species from Borneo until now; Liefstinck (1971: caption to Fig. 11, page 25) illustrates the anal appendages of a male stated to be from Borneo, and gives some notes on the same male (stated to be in fragments) on page 24, but the specimen is not listed with the material studied on page 23. Presumably the specimen was simply omitted from the list of material, but it is unfortunate that no more information on the location is available. The record in Liefstinck (1971) has, unsurprisingly, been largely overlooked until now, and *M. callisto* was not listed from Borneo in Orr (2003).

**Loc 4:** 2 ♀♀, 10.iii.2016, RD. **Loc 5:** ♂, 23.viii.2013, RD; ♀, 24.viii.2013, RD. **Loc 6:** ♀, 14.iii.2016, EJ. **Loc 17:** ♀, 10.xi.2017, SM. **Loc 20:** ♀, 10.iii.2016, SFC staff.

*Macromia corycia* Laidlaw, 1922

**Loc 2:** ♂, 21.vi.2008, CYC. **Loc 16:** ♂, 25.vi.2008, CYC. **Loc 21:** ♀, 15.iii.2016, EJ, BM & MA. **Loc 30:** ♀, 19.vii.2016, GR. **Loc 32:** ♀, 15.viii.2016, RN.

*Macromia cydippe* Laidlaw, 1922

**Loc 3:** 2 larvae, 21.viii.2013, AP; ♂, 16.iii.2016, BM & MA. **Loc 21:** ♂, 11.iii.2016, RD; 2 larvae, 15.iii.2016, SB. **Loc 32:** ♀, 17.viii.2016, RD.

*Macromia westwoodii* Selys, 1874

**Loc 2:** ♀, 17.vi.2008, CYC. **Loc 6:** 2 larvae, 14.iii.2016, SB. **Loc 31:** ♀, 19.vii.2016, RD.

**Synthemistidae***Idionyx montana* Karsch, 1891

The number of records of this species from Sarawak, where it was first recorded in Batang Ai National Park in 2007 (Dow et al. 2015a) is increasing slowly but surely (also see the appendix to this paper).

**Loc 30:** ♂, 18.vii.2016, GR.

*Macromidia fulva* Laidlaw, 1915

**Loc 1:** ♀, came to lights at field station kitchen at dusk, 31.x.2017, RD. **Loc 8:** ♂, 11.xi.2017, BM & MA. **Loc 10:** larva, 25.viii.2013, AP. **Loc 21:** ♀, 7.xi.2017, SM.

*Macromidia genialis erratica* Lieftinck, 1948

Larval records; molecular data (Naturalis unpublished) clearly indicates that these are not *M. fulva*, and places them with *M. genialis erratica*.

**Loc 3:** larva, 21.viii.2013, AP. **Loc 4:** larva, 22.viii.2013, AP.

**Libellulidae***Cratilla lineata* (Brauer, 1878)

Recorded by Norma-Rashid et al. (2010).

*Cratilla metallica* (Brauer, 1878)

**Loc 6:** 3 ♂♂, ♀, 23.viii.2013, JA & MA. **Loc 8:** ♂, 21.vi.2008, CYC; ♂, 11.xi.2017, MA; ♂, 11.xi.2017, RD. **Loc 12:** 2 ♂♂, 26.viii.2013, JA & MA; ♂, 26.viii.2013, RD. **Loc 30:** ♂, 18.vii.2016, RD. **Loc 37:** ♀, 15.viii.2016, BM. **Loc 38:** ♂, 1.viii.2015, RD. **Loc 39:** ♂, 15.viii.2016, RD. **Loc 45:** ♂, 19.viii.2016, BM & NMe.

*Hylaeothemis clementia* Ris, 1909

**Loc 4:** ♂, 10.iii.2016, RD; ♂, 31.x.2017, RD. **Loc 6:** ♂, 23.viii.2013, JA & MA.

*Lyrithemis biappendiculata* (Selys, 1878)

**Loc 3:** ♂, 21.viii.2013, RD. **Loc 4:** ♂, 22.viii.2013, RD. **Loc 5:** 4 ♂♂, ♀, 19.vi.2008, CYC; ♂, 16.iii.2016, RD. **Loc 6:** 6 ♂♂, ♀, 23.viii.2013, JA & MA. **Loc 7:** 2 ♂♂, 24.viii.2013, JA & MA. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 9:** ♂, 24.viii.2013, RD; ♂, 3.xi.2017, LS. **Loc 10:** ♂, 25.viii.2013, JA & MA; ♂, 6.xi.2017, LS. **Loc 11:** ♂, 9.xi.2017, LS. **Loc 15:** 2 ♂♂, 21.vi.2008, CYC. **Loc 17:** ♂, 10.xi.2017, RD; ♀, 10.xi.2017, BM & MA. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 20:** ♂, 4.xi.2017, RD. **Loc 21:** ♂, 11.iii.2016, BM & MA; ♂, 15.iii.2016, RD. **Loc 25:** ♂, 6.xi.2017, LS. **Loc 35:** ♂, ♀, 20.viii.2016, BM & NMe; ♂, 20.viii.2016, LS; 2 ♂♂, 21.viii.2016, LS. **Loc 36:** ♂, 30.vii.2015, RD; ♂, 17.viii.2016, RD. **Loc 37:** ♂, 14.viii.2016, RD; 4 ♂♂, 16.viii.2016, LS. **Loc 38:** ♂, 1.viii.2015, RD; ♂, 16.viii.2016, RD. **Loc 41:** ♂, 18.viii.2016, RN. **Loc 43:** ♂, 18.viii.2016, RD. **Loc 44:** ♀, 19.viii.2016, BM & NMe.

*Lyriothemis cleis* Brauer, 1868

**Loc 3:** 2 ♀♀, 21.viii.2013, JA & MA. **Loc 4:** ♂, 31.x.2017, RD. **Loc 6:** 2 ♂♂, 23.viii.2013, JA & MA. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 18:** ♂, 9.iii.2016, RD. **Loc 34:** ♀, 16.viii.2016, RN.

*Neurothemis fluctuans* (Fabricius, 1793)

**Loc 1:** 2 ♂♂, ♀, 20.viii.2013, JA, MA & AP. **Loc 8:** ♂, 11.xi.2017, BM & MA. **Loc 14:** ♂, 20.vi.2008, CYC. **Loc 16:** ♂, 3.xi.2017, BM; ♂, 7.xi.2017, MA.

*Onychothemis coccinea* Liefinck, 1953

**Loc 4:** 2 ♂♂, 22.viii.2013, JA & MA; ♂, 22.viii.2013, RD; ♂, 31.x.2017, RD. **Loc 6:** ♂, 23.viii.2013, JA & MA. **Loc 8:** ♂, 3.xi.2017, RD. **Loc 14:** ♂, 20.vi.2008, CYC; ♂, 2.xi.2017, RD; 2 ♂♂, 2.xi.2017, SM. **Loc 16:** ♂, 14.iii.2016, RD; ♂, 14.iii.2016, BM; 4 ♂♂, 3.xi.2017, BM. **Loc 20:** ♂, 1.xi.2017, SM; ♂, 1.xi.2017, LS. **Loc 21:** 2 ♂♂, 15.iii.2016, EJ, BM & MA. **Loc 22:** ♂, 2.xi.2017, BM; 6 ♂♂, 6.xi.2017, BM; ♂, 11.xi.2017, LS. **Loc 24:** ♂, 4.xi.2017, SM. **Loc 32:** 2 ♂♂, 14.viii.2016, RN; ♂, 17.viii.2016, RD; ♂, ♀, 21.viii.2016, BM & NMe. **Loc 35:** ♂, 20.viii.2016, BM & NMe.

*Onychothemis culminicola* Förster, 1904

This species appears to be rather common on the lower reaches of the Katibas River, but on the upper reaches *O. coccinea* dominates and far fewer *O. culminicola* are seen.

**Loc 16:** 2 ♂♂, 14.iii.2016, BM; ♂, 3.xi.2017, BM. **Loc 20:** 2 ♂♂, 10.iii.2016, SFC staff. **Loc 21:** ♀, 11.iii.2016, RD.

*Orthetrum chrysis* (Selys, 1891)

**Loc 1:** ♂, 18.vi.2008, CYC; ♂, 20.vi.2008, CYC; 2 ♂♂, 20.viii.2013, JA, MA & AP; ♂+♀, 20.viii.2013, RD; ♂, 11.iii.2016, RD. **Loc 4:** ♂, 31.x.2017, RD. **Loc 26:** ♂, 14.vii.2016, GR. **Loc 36:** ♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD.

*Orthetrum glaucum* (Brauer, 1865)

**Loc 1:** ♂, 22.vi.2008, CYC; ♂, 11.iii.2016, RD. **Loc 26:** ♂, 14.vii.2016, RD. **Loc 29:** ♂, ♀, 19.vii.2016, SFC staff.

*Orthetrum prunosum schneideri* Förster, 1903

**Loc 1:** ♂, ♀, 20.viii.2013, JA, MA & AP. **Loc 4:** ♂, 10.iii.2016, SFC staff; ♂, 31.x.2017, RD. **Loc 5:** ♂, 23.viii.2013, RD. **Loc 6:** ♂, 14.iii.2016, EJ, BM & MA. **Loc 11:** ♂, 9.xi.2017, RD. **Loc 14:** ♂, 18.vi.2008, CYC; ♂, ♀, 20.vi.2008, CYC. **Loc 21:** ♂, 15.iii.2016, EJ, BM & MA. **Loc 26:** ♂, 14.vii.2016, GR. **Loc 29:** 2 ♂♂, 19.vii.2016, SFC staff. **Loc 32:** ♂, 15.viii.2016, RN. **Loc 36:** ♂, 30.vii.2015, JA & NMA; ♂, 30.vii.2015, RD. **Loc 39:** ♂, 19.viii.2016, BM & NMe.

*Orthetrum testaceum* (Burmeister, 1839)

Recorded by Norma-Rashid et al. (2010).

*Rhodothemis rufa* (Rambur, 1842)

Recorded by Norma-Rashid et al. (2010).

*Trithemis aurora* (Burmeister, 1839)

**Loc 26:** ♂, 14.vii.2016, RD.

*Trithemis festiva* (Rambur, 1842)

**Loc 26:** ♂, 14.vii.2016, GR.

*Tyriobapta kuekenthali* (Karsch, 1900)

**Loc 33:** ♂, 4.viii.2015, RD.

*Tyriobapta torrida* Kirby, 1889

**Loc 3:** 2 ♂♂, 18.vi.2008, CYC. **Loc 4:** ♂, 10.iii.2016, RD. **Loc 5:** ♂, 23.viii.2013, RD. **Loc 6:** ♂, 14.iii.2016, RD; 2 ♂♂, ♀, 14.iii.2016, EJ, BM & MA. **Loc 8:** 2 ♂♂, 11.xi.2017, BM & MA. **Loc 11:** 3 ♂♂, 9.xi.2017, SM. **Loc 14:** ♂, 2.xi.2017, LS. **Loc 20:** 2 ♂♂, 4.xi.2017, BM. **Loc 24:** ♂, 4.xi.2017, LS; 3 ♂♂, 4.xi.2017, SM. **Loc 35:** ♂, 20.viii.2016, BM & NMe. **Loc 36:** 2 ♂♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD. **Loc 37:** ♂, 16.viii.2016, LS. **Loc 38:** ♂, 16.viii.2016, RD. **Loc 39:** ♂, 18.viii.2016, BM & NMe. **Loc 41:** 2 ♂♂, ♀, 17.viii.2016, BM & NMe.

*Zygonyx ida errans* Lieftinck, 1953 stat. nov.

This taxon was described as a subspecies of *Z. iris* Selys, 1869 (Lieftinck 1953), but morphological evidence places it with *Z. ida* Hagen, 1867 not *Z. iris* and molecular data clearly differentiates it from *Z. iris*. This matter will be dealt with in more detail elsewhere (Dow in preparation), but as changes of status of subspecies are not regulated by the Zoological Code and we are tired of writing a name that we know to be incorrect, we introduce the change here.

**Loc 4:** ♂, 22.viii.2013, RD. **Loc 14:** 2 ♂♂, 2.xi.2017, SM. **Loc 16:** ♂, ♀, 23.vi.2008, CYC; ♂, 24.vi.2008, CYC; ♂, 14.iii.2016, RD; 3 ♂♂, ♀, 14.iii.2016, BM; ♂, 1.xi.2017, BM & MA; ♂, 3.xi.2017, BM; ♂, 4.xi.2017, BM; 2 ♂♂, ♀, 7.xi.2017, BM; ♂+♀, 8.xi.2017, RD. **Loc 17:** ♀, 10.xi.2017, SM. **Loc 20:** ♂, 4.xi.2017, RD. **Loc 22:** 2 ♂♂, 2.xi.2017, R. Dow; 2 ♂♂, 2.xi.2017, BM; 3 ♂♂, 6.xi.2017, BM. **Loc 32:** ♂, 17.viii.2016, RD. **Loc 33:** ♂, 4.viii.2015, RD.

*Zyxomma petiolatum* Rambur, 1842

Recorded by Norma-Rashid et al. (2010).

**Additional records of larvae, and teneral and female Anisoptera**

Various larvae from both suborders, and also some teneral specimens and mature females from three Anisopteran families cannot be assigned with confidence to any of the taxa in the list above at present, although at least some of them will belong under those taxa. These are listed here rather than above, in order to avoid both artificially inflating the number of species recorded from LEWS and unwarranted lumping.

**Zygoptera****Calopterygidae***Vestalis* species

**Loc 10:** 2 larvae, 9.iii.2016, SB.

**Chlorocyphidae**

## Undetermined genus

**Loc 10:** larva, 9.iii.2016, SB.

**Platycnemididae***Coelliccia* species

**Loc 10:** larva, 9.iii.2016, SB.

## Anisoptera

### Gomphidae

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

**Loc 6:** 4 larvae, 14.iii.2016, SB. **Loc 20:** 10 larvae, 10.iii.2016, SB. **Loc 21:** 5 larvae, 15.iii.2016, SB.

*Gomphidia* sp. or spp.

**Loc 6:** larva, 23.viii.2013, AP. **Loc 20:** 2 larvae, 10.iii.2016, SB.

*Heliogomphus* spp.

At least two species appear to be represented in this material.

**Loc 3:** 2 larvae, 21.viii.2013, AP; 2 larvae, 16.iii.2016, BM; ♀ (feneral), 16.iii.2016, BM & MA. **Loc 4:** ♀ (feneral), 10.iii.2016, RD. **Loc 6:** ♀, 23.viii.2013, JA & MA; 2 larvae, 23.viii.2013, AP. **Loc 10:** ♀ (feneral), 25.viii.2013, RD. **Loc 13:** ♀, 26.viii.2013, RD; larva, 26.viii.2013, AP. **Loc 21:** 2 larvae, 15.iii.2016, SB; ♀, 15.iii.2016, EJ, BM & MA.

*Leptogomphus* sp. or spp.

It is highly likely that more than one species is included here.

**Loc 3:** 6 larvae, 21.viii.2013, AP. **Loc 4:** larva, 22.viii.2013, AP. **Loc 6:** larva, 23.viii.2013, AP; larva, 14.iii.2016, SB. **Loc 10:** larva, 25.viii.2013, AP. **Loc 19:** 2 larvae, 9.iii.2016, SB. **Loc 21:** 5 larvae, 15.iii.2016, SB.

*Macrogomphus* sp.

**Loc 3:** larva, 21.viii.2013, AP. **Loc 16:** exuvia, 19.vi.2008, CYC.

*Megalogomphus* sp. or spp.

**Loc 6:** 3 larvae, 14.iii.2016, SB. **Loc 20:** 3 larvae, 10.iii.2016, SB. **Loc 21:** 3 larvae, 15.iii.2016, SB.

*Microgomphus* sp. or spp.

**Loc 3:** larva, 21.viii.2013, AP. **Loc 4:** 3 larvae, 22.viii.2013, AP. **Loc 6:** 3 larvae, 14.iii.2016, SB. **Loc 16:** ♀, 23.vi.2008, CYC. **Loc 20:** larva, 10.iii.2016, SB. **Loc 21:** 5 larvae, 15.iii.2016, SB. **Loc 32:** ♂ larva (reared), 14.viii.2016, RN.

Onychogomphine species

Although this is possibly the larva of *Phaenandrogomphus safeii*, it is just as likely that it is that of some other member of the Onychogomphinae the adult of which has yet to be detected at LEWS.

**Loc 20:** larva, 10.iii.2016, SB.

### Macromiidae

*Macromia* spp.

Probably a number of species are represented in this material, which is nearly all larvae. One female specimen collected differs in some respects from the females of all identified species so far recorded at LEWS and is likely to represent an additional species.

**Loc 3:** larva, 16.iii.2016, BM. **Loc 6:** 5 larvae, 14.iii.2016, SB. **Loc 19:** 10 larvae, 9.iii.2016, SB. **Loc 20:** 10 larvae, 10.iii.2016, SB; ♀, 10.iii.2016, SFC staff. **Loc 21:** 10 larvae, 15.iii.2016, SB.

## Synthemistidae

*Idionyx* sp. or spp.

**Loc 1:** ♀, flying at back of field station in late afternoon, 6.xi.2017, SM. **Loc 17:** ♀, 10.xi.2017, BM & MA. **Loc 18:** ♀, 9.iii.2016, RD. **Loc 19:** larva, 9.iii.2016, SB. **Loc 20:** ♀, 1.xi.2017, SM. **Loc 21:** 2 larvae, 15.iii.2016, SB. **Loc 24:** ♀, 4.xi.2017, LS. **Loc 44:** ♀, 19.viii.2016, BM & NMe.

*Macromidia* species

**Loc 22:** larva, 14.iii.2016, SB.

## Records in need of confirmation

*Vestalis amabilis* Lieftinck, 1965

Recorded by Norma-Rashid et al. (2010) as "moderate" in relative abundance but not recorded by CYC during the expedition or by us later. Moreover, *V. amabilis* is normally found only in habitats where other *Vestalis* species are absent, in contrast to other species of the *amoena*-group (except *V. beryllae*) which are often found together. This record might represent a misidentification of one of the other *amoena*-group species (probably *V. amoena* itself, which exhibits some variation in its superior anal appendages as seen in lateral view) and needs confirmation.

*Prodasineura interrupta* (Selys, 1860)

Recorded in Norma-Rashid et al. (2010) but not collected by the second author of this publication. In fact the Bornean taxon that has been referred to as *P. interrupta* is actually a distinct species (Dow & Ngiam in preparation). The record of a "singleton" from Lanjak Entimau might refer to this as-yet-unnamed species or one of its allies; however the habitats (mostly mixed dipterocarp forest) seen in the area of the Nanga Bloh Field Station by authors of this report are far from typical of the habitat of species of the *interrupta*-group in Borneo (usually low pH streams in peat swamp, kerapa and kerangas forest). We note that the blue form of *Coelliccia borneensis*, common in LEWS, bears a superficial resemblance to *P. interrupta*.

*Hemicordulia tenera* Lieftinck, 1930

Recorded by Norma-Rashid et al. (2010). Again, the habitats at Nanga Bloh are far from typical of those where this species is normally recorded in Borneo, and we regard this record as requiring confirmation.

*Risioptionia dohrni* (Krüger, 1902)

Recorded by Norma-Rashid et al. (2010). This is typically a species of swamp forest; but it is occasionally found in small swampy areas within other forest formations, so that its presence in the Nanga Bloh area of LEWS cannot be ruled out. However this record is regarded as needing further confirmation.

## Incorrect Records

*Devadatta podolestoides* Laidlaw, 1934

Listed by Norma-Rashid et al. (2010) but actually refers to a mixture of *D. clavicauda* and *D. somoh*; in Sarawak the true *D. podolestoides* has not been recorded east of the Lupar River.



#### *Vestalis anacolosa* Lieftinck, 1965

Listed by Norma-Rashid et al. (2010). *Vestalis anacolosa* was described from Poring Hot Springs in Sabah (Lieftinck 1965) and was distinguished from *V. atropa* (type locality Mount Dulit) on the basis of its completely reduced inferior anal appendages, compared to thin and atrophied in *V. atropa*, there also appeared to be differences in the terminal part of the superior anal appendages. In central Sarawak many populations of *V. atropa* include a full spectrum between the condition of the inferior appendages as seen in typical *V. atropa* and in typical *V. anacolosa*, whilst apparent differences in the superior appendages are accounted for by the degree of rotation of the tip. It is very likely that the two species are synonymous, but in any event the population in Lanjak Entimau belongs to just one species, which is the same as *V. atropa*.

#### *Libellago phaethon* (Laidlaw, 1931)

Norma-Rashid et al. (2010) list this species from a "singleton" of unspecified sex. This species is otherwise known only from south-eastern Sabah and the immediately adjacent part of North Kalimantan; facts not remarked upon in Norma-Rashid et al (2010). The record from Lanjak Entimau would represent a remarkable range extension and cannot be accepted without further evidence.

#### *Rhinoneura villosipes* Laidlaw, 1915

As with the previous species Norma-Rashid et al. (2010) list this species from a "singleton" of unspecified sex, but in this case the record would be even more extraordinary as *R. villosipes* is a montane species only known from above 1000m on Mount Kinabalu in Sabah. The occurrence of this species in the lowlands of western Kapit Division would be truly remarkable and it is informative that no remark was made on this in Norma-Rashid et al. (2010). Without strong evidence to the contrary this record must be regarded as a misidentification of some other member of the Chlorocyphidae.

#### *Elatoneura coomansi* Lieftinck, 1937

This was a misidentification of *E. mauros* in Norma-Rashid et al. (2010) before it was recognised as a distinct species.

#### *Pericnemis triangularis* Laidlaw, 1931

Norma-Rashid et al. (2010) listed *P. triangularis*, however Orr & Hämäläinen (2013) noted that this species is actually only known from the type female from the east of Sabah and erected two new species for specimens previously treated as *P. triangularis*. It is not known which, if either, of the two *Pericnemis* species recorded in LEWS is referred to by the record of *P. triangularis* in Norma-Rashid et al. (2010), but it is extremely unlikely to be *P. triangularis* as it is currently understood.

## Discussion

With at least 110 species already recorded, LEWS has an impressive Odonata fauna, especially since this figure includes relatively few open and disturbed habitat species; inventories for many protected areas receive a significant boost in species numbers from species not typical of their habitats but found at ponds in clearings

around buildings, but such habitats have added to the LEWS inventory only in a very limited way, with only 12 species genuinely falling into this category. There are undoubtedly more species to be found within LEWS, although ultimately its odonate diversity will be limited by at least two factors: (a) limited altitudinal range compared with, for instance, Gunung Mulu National Park; (b) limited range of habitat types compared with some other protected areas, e.g. there does not appear to be any real swamp forest within LEWS, although swampy areas exist, especially along sections of the larger rivers.

Three of the species recorded from LEWS have so far only been found within the borders of the wildlife sanctuary: *Drepanosticta adenani*, *Telosticta iban* and "*Elatoneura*" *mauros*. Of these, the two Platystictidae are difficult to find species which, hopefully, have a wider distribution than we know at present. "*Elatoneura*" *mauros* is inconspicuous because of its dark colouration and habits, and therefore would easily be overlooked. It is very likely to occur further down the Katibas River and possibly on some of its larger tributaries outside of LEWS; it remains to be seen if it occurs outside of the Katibas system. Regardless of whether any or all of these three species occur outside of LEWS, the wildlife sanctuary is clearly of great value for their conservation.

The diversity of some stream systems at LEWS is also very notable (although probably typical of such systems in unlogged lowland forest in Sarawak), with more than 40 species found on several individual systems, only sampled over a relatively short part of their courses and over a few days, in the Nanga Bloh area. The only stream systems of comparable size with comparable recorded odonate diversity that we are aware of in Sarawak are within Gunung Mulu National Park.

The field stations are all outside or only just inside the boundary of LEWS, so that even at Nanga Bloh we have not been able to penetrate very far into the interior of the sanctuary. The most pristine habitats will be located in the deep interior where it would have been challenging for people to establish homes for themselves even in headhunting days when the incentives, from a safety point of view, for living in inaccessible locations were very high. It is difficult to work effectively far inside the sanctuary, camps must be set up, necessitating the transport of materials and provisions, but travel by long boat much past the points we have reached is either completely impractical for much of the year, or (for instance on the Katibas) requires a large number of highly skilled boatmen who can bring the boats through the numerous rapids safely. Similarly proceeding into the interior on foot will require many porters; both methods will be relatively costly, but are sure to be rewarding in odonatological terms. However, even nibbling around the edges, as we have been doing to date, will still bring worthwhile results, especially since we have not visited many parts of the boundary. Additionally, Bukit Lanjak, the highest peak in LEWS, can be reached from Nanga Segerak, but we have so far only gone a little over half of the way up and accessed only one stream system at this altitude; other peaks, in particular Bukit Spali, are located at the boundary and are potentially fruitful locations.

In addition to the three species only known from LEWS, a number of the other species recorded there appear to be rather rare or at least rarely recorded, for instance: *Drepanosticta sbong* (only one other, non-protected, location is known), *Dysphaea lugens* (no other location currently known in Sarawak), *Burmagomphus insularis* (only

one other, non-protected, location currently known in Sarawak), *Gomphidia caesarea* (no other location currently known), and *Phaenandrogomphus safeii* (no other location known in Sarawak, just one location known in Sabah).

Diversity is notably high in some families and genera in LEWS. The Platystictidae are very well represented with 13 species; this is the highest number for any protected area in Sarawak, surpassing even Gunung Mulu National Park. The Chlorocyphidae are also very diverse at LEWS with eight species recorded, as are the Euphaeidae where the only species known from Borneo definitely not recorded at LEWS is *Euphaea ameeke* van Tol & Norma-Rashid, 1995. The Platycnemididae are well represented and it is noteworthy that although with six species recorded the Disparoneurinae cannot be considered especially well represented, they are well represented compared to some other hilly and mountainous areas in the interior of Sarawak. The Gomphidae are very well represented with at least 19 species, this is the highest total of any protected area in Borneo as far as we are aware. However some families are poorly represented: the Argiolestidae, Coenagrionidae, Aeshnidae and Libellulidae; this is due to the lack of swamp forest and/or open habitats favoured by most species from these families. As yet there is no record of the Lestidae from LEWS, but *Orolestes wallacei* (Kirby, 1889) is to be expected.

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## Appendix: Unpublished records from areas adjacent to LEWS

### Locations

Sri Aman Division: Ulu Engkari

UE1: Sungai Engkari from Rumah Bada to Nanga Segerak (representative coordinates 1.4057N, 111.9964E).

UE2: Sungai Segerak (1.4119N, 112.0052E).

UE3: Around Nanga Segerak Field station (1.4138N, 112.0045E), helipad and trail to Rumah Bada.

UE4: In NCR land around Rumah Bada.

UE5: Ponds at Rumah Bada (Rumah Bada: 1.3903N, 111.9851E).

Sarikei Division: Sungai Kanowit

SK1: Sungai Kanowit at bridge on road leading to Ulu Mujok area (1.729N, 111.9937E).

SK2: Pond by road near bridge at SK1.

Sarikei Division: Ulu Mujok

UM1: Sungai Mujok between SFC field station and boundary of the wildlife sanctuary (representative coordinates 1.7023N, 112.1018E, at Rumah Menging, the last longhouse on the Sungai Mujok). Broad stream passing through mosaic of primary and second growth forest and agricultural land.

- UM2: Pools beside Sungai Mujok, near Rumah Menging: pools at rear of pebbly beach beside large stream.
- UM3: Sungai Sepenti (1.7064N, 112.0893E). A stream passing through agricultural land and disturbed forest.
- UM4: Sungai Telau (1.7014N, 112.104E). Stream passing through agricultural land and disturbed forest.
- UM5: Sungai Selumau (1.6960N, 112.0936E). Stream passing through agricultural land and disturbed forest.
- UM6: Sungai Ju (1.7072N, 112.0693E). Stream passing through agricultural land and disturbed forest.
- UM7: Small, old, oxbow lakes and other ponds by Sungai Ju (1.7103N, 112.0754E).
- UM8: Sungai Lingga (1.6952N, 112.1209E). Stream in disturbed and almost pristine forest.
- UM9: Sungai Amut (1.6998N, 112.1075E). Stream with vegetation second growth over whole length surveyed.
- UM10: Sungai Temurok downstream of LEWS boundary (1.6917N, 112.1299E). Stream in forest of increasingly good quality going upstream.
- UM11: Sungai Sengkadan downstream of LEWS boundary.

### List of species

Abbreviations for collector's names are as used in the main body of the paper.

### Zygoptera

#### Platystictidae

*Drepanosticta attala* Lieftinck, 1934

**Loc UM1:** ♂, 30.vii.2015, RD; ♂, 6.viii.2015, RD.

*Drepanosticta* species cf *crenitis* Lieftinck, 1933

**Loc UM3:** ♂, 29.vii.2015, RD.

*Drepanosticta dulitensis* Kimmins, 1936

**Loc UM5:** 2 ♂♂, 2.viii.2015, RD.

*Drepanosticta* species cf *forcicula* Kimmins, 1936

**Loc UM5:** ♂, 2.viii.2015, RD.

*Drepanosticta rufostigma* (Selys, 1886)

Material listed in Dow (2017). Locations UM6, UM8.

*Drepanosticta versicolor* (Laidlaw, 1913)

**Loc UM3:** 3 ♂♂, 29.vii.2015, RD. **Loc UM5:** 4 ♂♂, 2.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD.

*Telosticta longigaster* Dow & Orr, 2012

**Loc UM5:** 2 ♂♂, 2 ♀♀, 2.viii.2015, RD. **Loc UM6:** 3 ♂♂, 3.viii.2015, RD.

## Argiolestidae

*Podolestes orientalis* Selys, 1862

**Loc UM5:** 2 ♂♂, ♀, 2.viii.2015, RD.

## Calopterygidae

*Neurobasis longipes* Hagen, 1887

**Loc UE1:** ♂, 13.vii.2016, RD. **Loc UM1:** ♂, 2 ♀♀, 30.vii.2015, JA; 2 ♀♀, 15.viii.2016, BM & NMe. **Loc UM4:** ♀, 31.vii.2015, JA; ♂, 31.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD.

**Loc UM10:** ♀, 4.viii.2015, NMa

*Vestalis amaryllis* Lieftinck, 1965

**Loc UE1:** ♂, 13.vii.2016, RD. **Loc UE2:** ♂, 16.vii.2016, RD; 2 ♂♂, 16.vii.2016, GR. **Loc UM3:** ♂, 29.vii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD. **Loc UM10:** ♂, 4.viii.2015, NMa

*Vestalis amnicola* Lieftinck, 1965

**Loc UE1:** ♂, 13.vii.2016, RD; 2 ♂♂, 13.vii.2016, GR.

*Vestalis amoena* Hagen in Selys, 1853

**Loc UE4:** ♀, 22.vii.2016, RD. **Loc UM1:** ♂, 29.vii.2015, RD; ♂, ♀, 30.vii.2015, JA; ♂, ♂+♀, 30.vii.2015, RD; ♂+♀, 6.viii.2015, RD; 3 ♂♂, 15.viii.2016, BM & NMe; ♀, 21.viii.2016, LS. **Loc UM3:** ♂, 29.vii.2015, RD. **Loc UM4:** 2 ♂♂, 31.vii.2015, JA; ♂, 31.vii.2015, RD. **Loc UM5:** 3 ♂♂, 2.viii.2015, RD; 7 ♂♂, 2.viii.2015, NMa. **Loc UM6:** ♂, 3.viii.2015, RD; 2 ♂♂, 3.viii.2015, NMa. **Loc UM8:** 3 ♂♂, 5.viii.2015, RD; 2 ♂♂, 5.viii.2015, NMa. **Loc UM10:** 3 ♂♂, 4.viii.2015, NMa

*Vestalis atrophala* Lieftinck, 1965

**Loc UM5:** ♂, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, NMa

## Chlorocyphidae

*Heliocypha biseriata* (Selys, 1859)

**Loc UM1:** 3 ♂♂, ♀, 15.viii.2016, BM & NMe. **Loc UM3:** 2 ♂♂, 29.vii.2015, JA & NMa; ♂, 29.vii.2015, RD. **Loc UM4:** ♂, 31.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, NMa. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD.

*Libellago semiopaca* (Selys, 1873)

**Loc SK1:** ♂, 12.viii.2016, RD; ♂, 12.viii.2016, RN.

*Libellago stictica* (Selys, 1859)

**Loc UM1:** ♂, 6.viii.2015, RD; ♂, 7.viii.2015, NMa; ♂, 15.viii.2016, BM & NMe. **Loc UM6:** ♂, 3.viii.2015, RD.

*Rhinocypha aurofulgens* Laidlaw, 1931

**Loc UE1:** ♂, 13.vii.2016, RD; ♂, 13.vii.2016, GR. **Loc UE2:** ♂, ♂+♀, 16.vii.2016, RD. **Loc UM1:** ♂, 30.vii.2015, RD; 2 ♂♂, 7.viii.2015, RD; 2 ♂♂, 15.viii.2016, BM & NMe. **Loc UM8:** ♂, 5.viii.2015, NMa

*Rhinocypha cuculata* (Selys, 1873)

**Loc UM1:** ♂, 29.vii.2015, RD; ♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD. **Loc UM4:** ♂, 31.vii.2015, JA. **Loc UM8:** 3 ♂♂, 5.viii.2015, RD. **Loc UM10:** 2 ♂♂, 4.viii.2015, NMa

*Rhinocypha stygia* Förster, 1897

**Loc UM8:** ♂, 5.viii.2015, RD.

*Sundacypha petiolata* (Selys, 1859)

**Loc UM5:** 2 ♂♂, 2.viii.2015, RD. **Loc UM8:** 2 ♂♂, 5.viii.2015, RD. **Loc UM11:** ♂, 16.viii.2016, RN.

### Devadattidae

*Devadatta clavicauda* Dow, Hämmäläinen & Stokvis, 2015

**Loc UE4:** ♂, 22.vii.2016, RD. **Loc UM3:** ♂, ♀, 29.vii.2015, RD. **Loc UM4:** ♂, 31.vii.2015, RD. **Loc UM5:** 3 ♂♂, 2.viii.2015, RD. **Loc UM8:** 2 ♂♂, ♀, 5.viii.2015, RD. **Loc UM9:** ♂, 7.viii.2015, RD. **Loc UM10:** ♀, 4.viii.2015, RD.

*Devadatta somoh* Dow, Hämmäläinen & Stokvis, 2015

**Loc UM5:** 4 ♂♂, 2.viii.2015, RD. **Loc UM6:** 2 ♂♂, 3.viii.2015, RD.

### Euphaeidae

*Dysphaea dimidiata* (Selys, 1853)

**Loc UM1:** 4 ♂♂, 30.vii.2015, RD; 2 ♂♂, ♀, 7.viii.2015, RD; ♀, 7.viii.2015, NMa. **Loc UM8:** 2 ♂♂, 5.viii.2015, RD.

*Dysphaea ulu* Hämmäläinen, Dow & Stokvis, 2015

**Loc Loc UE1:** 4 ♂♂, 13.vii.2016, RD. **Loc UM8:** ♂ (feneral), 5.viii.2015, RD.

*Euphaea impar* Selys, 1859

**Loc UE4:** ♂, 22.vii.2016, RD. **Loc UM3:** 4 ♂♂, ♀, 29.vii.2015, JA & NMa; 2 ♂♂, 29.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD; ♂, 2.viii.2015, NMa. **Loc UM6:** 2 ♂♂, 3.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD. **Loc UM10:** ♂, 4.viii.2015, NMa. **Loc UM11:** ♂, 16.viii.2016, RN.

*Euphaea subcostalis* Selys, 1873

**Loc UM3:** ♂, 29.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD; 2 ♂♂, 2.viii.2015, NMa. **Loc UM8:** ♂, 5.viii.2015, RD. **Loc UM11:** ♂, 16.viii.2016, RN.

*Euphaea subnodalis* (Laidlaw, 1915)

**Loc UE1:** 3 ♂♂, 13.vii.2016, RD; 2 ♂♂, 13.vii.2016, GR.

*Euphaea tricolor* Selys, 1859

**Loc UE1:** ♂, 13.vii.2016, RD. **Loc UM1:** 3 ♂♂, 29.vii.2015, RD; 4 ♂♂, 30.vii.2015, JA; ♂, 13.viii.2016, RD. **Loc UM4:** ♂, 31.vii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD.

### Philosinidae

*Rhinagrion borneense* (Selys, 1886)

**Loc UM1:** ♂, 30.vii.2015, RD. **Loc UM4:** ♂, 31.vii.2015, JA; ♂, 31.vii.2015, RD. **Loc UM5:** 2 ♂♂, 2.viii.2015, RD; 3 ♂♂, 2.viii.2015, NMa. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD; 12 ♂♂, 5.viii.2015, NMa. **Loc UM10:** 6 ♂♂, 4.viii.2015, NMa.



## Platycnemididae

*Coeliccia borneensis* (Selys, 1866)

**Loc UM5:** ♂, 2.viii.2015, RD.

*Coeliccia cyaneothorax* Kimmins, 1936

**Loc UE2:** ♂+♀, 16.vii.2016, GR. **Loc UM8:** ♂, 5.viii.2015, RD.

*Coeliccia nigrohamata* Laidlaw, 1918

**Loc UE2:** ♂, 16.vii.2016, RD; ♂, 16.vii.2016, GR. **Loc UE4:** ♂, 22.vii.2016, RD. **Loc UM3:** ♂, 29.vii.2015, RD. **Loc UM4:** ♂, ♂+♀, 31.vii.2015, RD. **Loc UM5:** ♂, ♂+♀, 2.viii.2015, RD. **Loc UM6:** 2 ♂♂, 3.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD. **Loc UM10:** ♀, 4.viii.2015, NMa. **Loc UM11:** ♂, 16.viii.2016, RN.

*Copera vittata* (Selys, 1863)

**Loc UM7:** 4 ♂♂, 3.viii.2015, RD; ♂, 3.viii.2015, NMa. **Loc UM9:** ♂, 7.viii.2015, RD.

"*Elatoneura*" *analis* (Selys, 1860)

**Loc UM1:** 2 ♂♂, 30.vii.2015, JA; ♂, 30.vii.2015, RD; ♂, 6.viii.2015, RD; ♂, ♀, 15.viii.2016, BM & NMe. **Loc UM4:** ♂, 31.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM8:** ♂, ♀, 5.viii.2015, RD; ♂, 5.viii.2015, NMa

*Prodasineura hosei* (Laidlaw, 1913)

**Loc UM4:** 2 ♂♂, 31.vii.2015, RD. **Loc UM5:** 2 ♂♂, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM8:** 2 ♂♂, ♂+♀, 5.viii.2015, RD. **Loc UM9:** ♂, 7.viii.2015, RD.

*Prodasineura hyperythra* (Selys, 1886)

**Loc UM3:** ♂, 31.vii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM9:** 2 ♂♂, 7.viii.2015, RD.

*Prodasineura verticalis* (Selys, 1860)

**Loc UE1:** ♂, ♀, 13.vii.2016, RD. **Loc UM1:** 3 ♂♂, 7.viii.2015, NMa. **Loc UM4:** ♂, 31.vii.2015, JA; 2 ♂♂, ♀, 31.vii.2015, RD. **Loc UM10:** ♂, ♀, 4.viii.2015, RD.

## Coenagrionidae

*Agriocnemis femina* (Brauer, 1868)

**Loc UE5:** ♀, 22.vii.2016, RD.

*Agriocnemis* species

**Loc UE5:** 2 ♂♂, 22.vii.2016, RD; 3 ♂♂, 22.vii.2016, GR. **Loc UM4:** ♂, 31.vii.2015, JA.

**Loc UM5:** ♂, 2.viii.2015, RD. **Loc UM7:** 2 ♂♂, 3.viii.2015, RD; ♂, 3.viii.2015, NMa

*Ceriagrion cerinorubellum* (Brauer, 1865)

**Loc SK2:** ♀, 12.viii.2016, RD.

*Pseudagrion lalakense* Orr & van Tol, 2001

**Loc SK2:** ♂, 12.viii.2016, RD.

*Pseudagrion perfuscatum* Lieftinck, 1937

**Loc UE5:** ♂, 22.vii.2016, RD. **Loc UM6:** ♂, 3.viii.2015, RD.

*Stenagrion dubium* (Laidlaw, 1912)

**Loc UE2:** ♂, 16.vii.2016, GR. **Loc UM1:** ♂, 30.vii.2015, RD. **Loc UM5:** ♂+♀, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD.

*Teinobasis laidlawi* Kimmins, 1936

**Loc UM7:** ♂, 3.viii.2015, RD.

## Anisoptera

### Aeshnidae

*Heliaeschna* species

**Loc UM5:** ♀, 2.viii.2015, RD.

### Gomphidae

*Heliogomphus ?borneensis* Lieftinck, 1963

**Loc UM5:** ♂ (teneral), 2.viii.2015, RD.

*Ictinogomphus decoratus melaenops* (Selys, 1858)

**Loc UM1:** ♂, 30.vii.2015, RD.

*Leptogomphus coomansi* Laidlaw, 1936

See Dow, Stokvis & Ngiam (2017). Locations UM1, UM8, UM10.

*Macrogomphus parallelogramma albarda* (Selys, 1878)

**Loc UM1:** ♀, 6.viii.2015, RD.

*Megalogomphus icterops* (Martin, 1902)

**Loc UM1:** ♂, 1.viii.2015, RD.

*Sieboldius japonicus* (Selys, 1854)

**Loc UM1:** ♂, 6.viii.2015, RD; ♂, 6.viii.2015, EJ; ♂, 13.viii.2016, RN.

### Macromiidae

*Macromia corycia* Laidlaw, 1922

**Loc UE1:** ♀, 13.vii.2016, RD.

*Macromia westwoodii* Selys, 1874

**Loc UE1:** ♀, 13.vii.2016, EJ.

### Synthemistidae

*Idionyx montana* Karsch, 1891

**Loc UM1:** ♂, 6.viii.2015, NMa

*Idionyx yolanda* Selys, 1871

**Loc UM8:** ♂, hawking over small trail near stream, 5.viii.2015, RD.

*Idionyx* sp. or spp.

**Loc UM1:** ♀, 13.viii.2016, RN; 2 ♀♀, 21.viii.2016, LS. **Loc UM5:** ♀, 2.viii.2015, NMa.

**Loc UM6:** ♀, 3.viii.2015, NMa.

*Macromidia fulva* Laidlaw, 1915

**Loc UM1:** ♀, 5.viii.2015, RD.

## Libellulidae

*Brachydiplax chalybea* Brauer, 1868

**Loc UE5:** ♂, 22.vii.2016, GR.

*Cratilla lineata* (Brauer, 1878)

**Loc SK2:** ♂, 22.viii.2016, RD. **Loc UM4:** ♂, 31.vii.2015, JA.

*Cratilla metallica* (Brauer, 1878)

**Loc UE1:** ♂, 13.vii.2016, RD. **Loc UM1:** 2 ♂♂, 15.viii.2016, BM & NMe. **Loc UM8:** ♂, 5.viii.2015, RD; ♂, 5.viii.2015, NMa. **Loc UM10:** ♂, 4.viii.2015, RD.

*Hylaeothemis clementia* Ris, 1909

**Loc UM9:** 2 ♂♂, 7.viii.2015, RD.

*Lyriothemis biappendiculata* (Selys, 1878)

**Loc UM4:** ♂, ♀, 31.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD. **Loc UM8:** ♂, 5.viii.2015, RD.

*Lyriothemis cleis* Brauer, 1868

**Loc UM1** (at camp site) – ♂, 19.viii.2016, RD.

*Neurothemis fluctuans* (Fabricius, 1793)

**Loc UE5:** ♂, 22.vii.2016, RD. **Loc UM2:** ♂, 6.viii.2015, NMa. **Loc UM4:** ♂, 31.vii.2015, RD.

*Neurothemis ramburii* (Brauer, 1866)

**Loc UM2:** ♂, 6.viii.2015, NMa

*Neurothemis terminata* Ris, 1911

**Loc UM1:** ♀, 21.viii.2016, LS.

*Onychothemis coccinea* Liefstinck, 1953

**Loc UE1:** ♂, 13.vii.2016, RD; ♂, 13.vii.2016, GR. **Loc UM1:** ♂, 30.vii.2015, RD; ♂, 6.viii.2015, RD; ♂, 15.viii.2016, BM & NMe. **Loc UM8:** ♂, 5.viii.2015, RD.

*Onychothemis culminicola* Förster, 1904

**Loc SK1:** ♂, 12.viii.2016, RN.

*Orthetrum chrysis* (Selys, 1891)

**Loc UE1:** ♂, 13.vii.2016, RD. **Loc UM4:** ♂, 31.vii.2015, JA.

*Orthetrum glaucum* (Brauer, 1865)

**Loc UE1:** ♂, 13.vii.2016, GR. **Loc UM1:** ♂, ♀, 6.viii.2015, NMa. **Loc UM3:** ♀, 29.vii.2015, JA & NMa

*Orthetrum pruinosum schneideri* Förster, 1903

**Loc UE1:** ♂, 13.vii.2016, GR. **Loc UM4:** ♀, 31.vii.2015, JA. **Loc UM6:** ♂, 3.viii.2015, NMa. **Loc UM10:** ♂, 4.viii.2015, NMa

*Orthetrum sabina* (Drury, 1770)

**Loc UE3:** ♀, 21.vii.2016, RD.

*Orthetrum testaceum* (Burmeister, 1839)

**Loc UE5:** ♂, 22.vii.2016, RD. **Loc UM4:** ♂, 31.vii.2015, RD.

*Rhyothemis triangularis* Kirby, 1889

**Loc UE5:** ♂, 22.vii.2016, RD.

*Tetrathemis hyalina* Kirby, 1889

**Loc UE5:** 2 ♂♂, 22.vii.2016, RD. **Loc UM2:** ♂, 6.viii.2015, RD. **Loc UM7:** 2 ♂♂, 3.viii.2015, RD.

*Trithemis aurora* (Burmeister, 1839)

**Loc SK2:** ♂, 12.viii.2016, RD. **Loc Loc UE1:** ♂, 13.vii.2016, RD. **Loc UM1:** ♂, 30.vii.2015, JA.

*Tyriobapta torrida* Kirby, 1889

**Loc UE5:** ♂, 22.vii.2016, GR. **Loc UM1:** 3 ♂♂, 6.viii.2015, NMa. **Loc UM4:** ♂, 31.vii.2015, JA; ♂, 31.vii.2015, RD. **Loc UM5:** ♂, 2.viii.2015, RD. **Loc UM6:** ♂, 3.viii.2015, RD; 5 ♂♂, 2 ♀♀, 3.viii.2015, NMa. **Loc UM8:** ♂, 5.viii.2015, RD; ♂, ♀, 5.viii.2015, NMa. **Loc UM10:** 3 ♂♂, 4.viii.2015, NMa

*Zygonyx ida errans* Lieftinck, 1953

**Loc UE1:** ♂, 13.vii.2016, GR. **Loc UM1:** 3 ♂♂, 7.viii.2015, NMa. **Loc UM4:** ♂, 31.vii.2015, RD. **Loc UM10:** ♂, 4.viii.2015, NMa

*Zyxomma petiolatum* Rambur, 1842

**Loc UM1:** ♂, 6.viii.2015, NMa; ♀, 7.viii.2015, NMa.

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