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Odonata from the Borneo Highlands Resort on Gunung Penrissen, Kuching Division, Sarawak, Malaysia 2014-2016

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Abstract

Records of Odonata collected in the vicinity of the Borneo Highlands Resort on Gunung Penrissen in south western Sarawak in the period 2014-2016 are presented. Notable records include new species of *Telosticta* Dow & Orr, 2012, *Rhinocypha* Rambur, 1842 and *Leptogomphus* Selys, 1878, as well as the first record of the recently described genus *Borneogomphus* Karube & Sasamoto, 2014 from Sarawak.

Key words: Malaysia, Borneo, Sarawak

Introduction

Records of Odonata from the Borneo Highlands Resort and its surrounds on Gunung Penrissen in the south west of Sarawak, made by the first author in July 2012, were presented in Dow (2012). Records from this extremely interesting area included two new species from the Platystictidae, one of which has since been described as *Drepanosticta burbachii* Dow, 2013 (Dow 2013).

Since 2012 the authors, in various combinations, have visited Borneo Highlands several times:

- March: 2014 Stephen Butler, survey for larvae.
- June: 2014: Rory Dow, survey for adults.
- July 2015: Rory Dow and Graham Reels, survey for adults.
- February-March 2016: Stephen Butler and Rory Dow, survey for adults and larvae, however weather conditions during this visit were so bad that very few adult Odonata were found.

Here we update the data from Dow (2012) with the results of the four surveys made in 2014-2016. All photographs of Odonata in life used in the figures were taken on Gunung Penrissen.

Annotated list of species known from Borneo highlands

Locations

The following codes for groups of sampling sites are used below:

1. Streams and trailside on the main trail running up to the Penrissen peak and back down to the resort, in the area below and approaching the peak (mostly pristine forest). Included under Location 1 in Dow (2012).
2. Streams and trailside on main trail, excluding area below the Penrissen peak. Included under Location 1 in Dow (2012).
3. Streams and trailside on a long and seemingly seldom used side trail, eventually meeting the road to the resort a short distance below the main gate. Location 2 in Dow (2012).
4. Streams and trailside on a trail diverging from the main trail not far from the Kalimantan viewpoint and joining it again near the clubhouse.
5. Small forest streams not near the trail system and running onto the golf course, but sampled inside the forest. Location 3 in Dow (2012).
6. Ponds, streams and drains on golf course and along paths through the golf course not associated with water. Location 4 in Dow (2012).

A selection of sites are shown in Fig. 1 with the group that they belong to indicated; the position of Gunung Penrissen in Sarawak is also indicated.

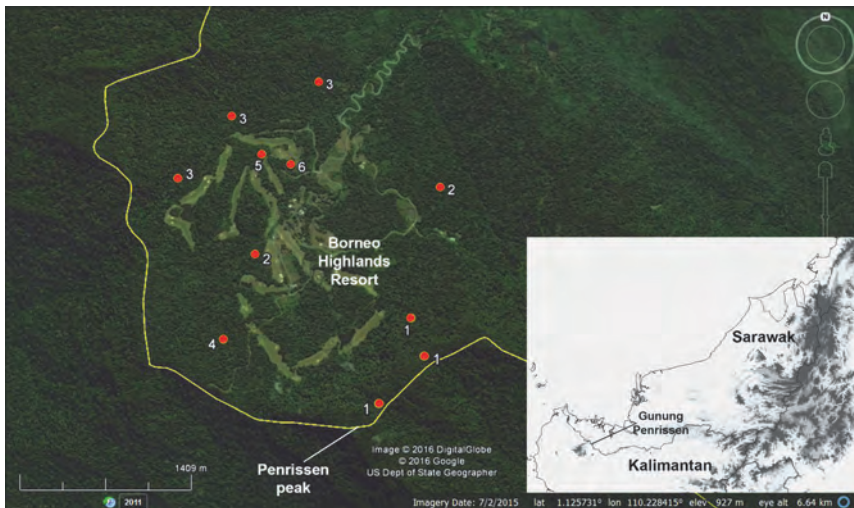


Figure 1: Satellite image of the Borneo Highlands Resort area on Gunung Penrissen with some of the collecting sites indicated; the position of the mountain in Sarawak is shown in the inset image.

Species list

All species that we have recorded in the Borneo Highlands area of Gunung Penrissen are listed here, but details are only given for material collected after 2012. Species not recorded in Dow (2012) are marked with *. ♂+♀ indicates a pair caught in tandem. Collectors' names are abbreviated as follows: RD – Rory A. Dow, GR – Graham T. Reels, SB – Stephen G. Butler.

Zygoptera

Platystictidae

Drepanosticta new species cf *actaeon* Laidlaw, 1934

As noted in Dow (2012), this is a beautiful species, fairly common at forest streams around the Borneo Highlands Resort. A description is in preparation (Dow in preparation); new material will be listed there. Locations **1, 2, 3, 5**.

Drepanosticta burbachi Dow, 2014

This species is not common. Only a single individual has been found since it was described.

1 – ♂, 2.vii.2014, RD.

Drepanosticta species cf *crenitis* Lieftinck, 1933

A male is shown in Fig. 2.

1 – 2 ♂♂, ♀, 1.vii.2014, RD; 2 ♂♂, 2.vii.2014, RD; ♂, ♂+♀, 14.vii.2015, RD; 2 ♀♀,



Figure 2: *Drepanosticta* cf *crenitis* male. Photo by G.T. Reels.

14.vii.2015, GR. **2** – ♀, 13.vii.2015, RD; ♂, 13.vii.2015, GR. **3** – 2♂♂, 2 ♀♀, 29.vi.2014, RD. **5** – ♀, 28.vii.2015, RD.

Drepanosticta species cf *dentifera* Kimmins, 1936

3 – ♀, 29.vi.2014, RD.

Drepanosticta species cf *forcicula* Kimmins, 1936

Drepanosticta rufostigma (Selys, 1886)

Generally the most common member of the Platystictidae in Sarawak.

2 – ♂, 30.vi.2014, RD; 2 ♂♂, 3.iii.2016, RD. **4** – ♂, 16.vii.2015, RD. **5** – ♂, 28.vi.2014, RD; ♂, 17.vii.2015, RD.

Drepanosticta versicolor (Laidlaw, 1913)

2 – 3 ♂♂, 30.vi.2014, RD; ♂, ♀, 16.vii.2015, RD; ♂, ♀, 16.vii.2015, GR; ♀, 3.iii.2016, RD.

Telosticta bidayuh Dow & Orr, 2012

Some doubts over the identity of specimens from Borneo Highlands were expressed in Dow (2012), however the collection of more material has removed these doubts. A female is shown in Fig. 3.

1 – 4 ♂♂, ♀, 1.vii.2014, RD; 2 ♂♂, 2.vii.2014, RD; ♂, 14.vii.2015, GR; ♂, 15.vii.2015, RD; ♂, 15.vii.2015, GR. **2** – 3 ♂♂, 13.vii.2015, RD; ♀, 13.vii.2015, GR; ♂, 16.vii.2015, RD; ♂, ♀, 16.vii.2015, GR. **3** – 2 ♂♂, ♀, 29.vi.2014, RD; ♀, 17.vii.2015, GR.



Figure 3: *Telosticta bidayuh* female. Photo by G.T. Reels.



Figure 4: *Telosticta new species* male. Photo by G.T. Reels.

*Telosticta new species**

The third new member of the Platystictidae to be found at Borneo Highlands. So far only found at very small and generally very steep trickles and streams on the higher parts of Gunung Penrissen, between ca 1150-1250 m. A description is being prepared (Dow & Stokvis in preparation); material will be listed there. Location **1**. A male is shown in Fig. 4.

Calopterygidae

Vestalis species cf *amicola* Lieftinck, 1965

See Dow (2012) for a discussion of this taxon.

2 – 2 ♂♂, 30.vi.2014, RD. **3** – ♂, 29.vi.2014, RD. **4** – ♂, 16.vii.2015, RD. **5** – ♂, 17.vii.2015, RD; ♂, 1.iii.2016, RD.

Vestalis atrophala Lieftinck, 1965

2 – ♂, 1.iii.2016, RD; 2 ♂♂, 3.iii.2016, RD. **5** – ♂, 14.vii.2015, RD; ♂, 17.vii.2015, RD.

Vestalis beryllae Laidlaw, 1915

A male is shown in Fig. 5.

1 – ♂, 1.vii.2014, RD; ♂, 13.vii.2015, RD. **2** – ♂, 13.vii.2015, RD; ♀, 13.vii.2015, GR. **3** – ♂, 29.vi.2014, RD.



Figure 5: *Vestalis beryllae* male. Photo by G.T. Reels.

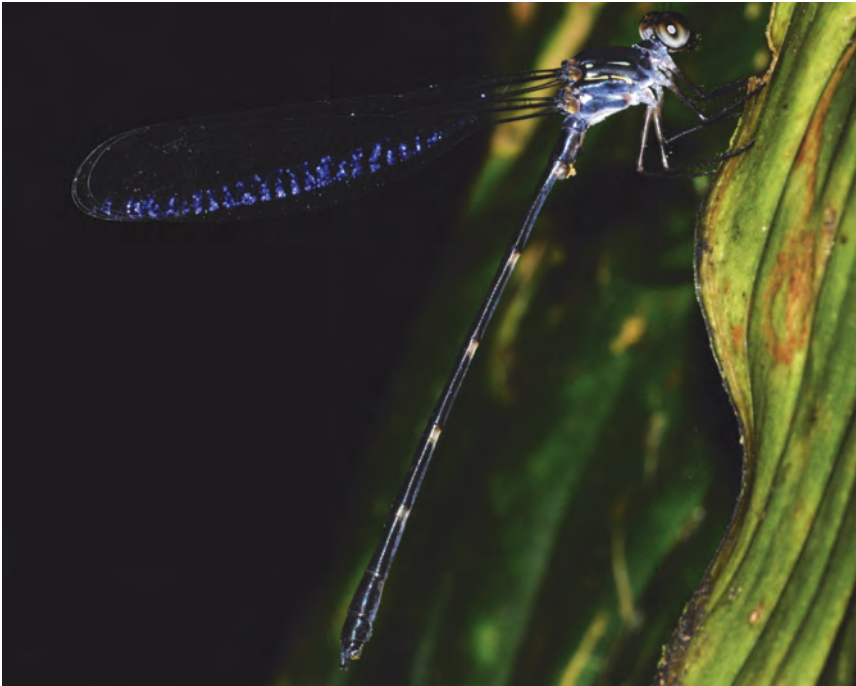


Figure 6: *Devadatta podolestoides* male. Photo by G.T. Reels.

Chlorocyphidae

Heliocypha biseriata (Selys, 1859)*

5 – ♂, 28.vi.2014, RD. 6 – ♀, 15.vii.2015, RD.

Rhinocypha species A

Dow (2012) stated that this was "Probably a new species; several females, differing in their markings from those of all named species known from Borneo, were collected at one small stream". One teneral and one semi teneral male seemingly of the same species have now been collected, confirming its status as a new species. However its description awaits the collection of mature males, which appear to be elusive.

4 – ♀, 16.vii.2015, RD; ♂ (teneral), ♀, 17.vii.2015, RD. 6 – ♂ (semi-teneral), 17.vii.2015, RD.

Rhinocypha species B

See Dow, Reels & Butler (2013) for a discussion of this species.

1 – ♀, 15.vii.2015, RD. 2 – ♀, 30.vi.2014, RD.

Devadattidae

Devadatta podolestoides Laidlaw, 1934

Only the true *D. podolestoides* has been found in the surrounds of Borneo Highlands to-date. A male is shown in Fig. 6.

1 – 2 ♂♂, 1.vii.2014, RD; ♂, ♀, 14.vii.2015, RD; 2 ♂♂, 15.vii.2015, RD. 2 – ♂, 13.vii.2015, RD; 2 ♂♂, 3.iii.2016, RD. 4 – ♀, 17.vii.2015, RD. 5 – 2 ♂♂, 28.vi.2014, RD; ♂, 17.vii.2015, RD.

Euphaeidae

Euphaea subcostalis Selys, 1873

2 – ♂, 30.vi.2014, RD. 5 – ♂, 15.vii.2015, GR; ♂, 17.vii.2015, RD.

Incertae Sedis

Bornargiolestes reelsi Dow, 2014

2 – ♀, 13.vii.2015, RD; ♂, 13.vii.2015, GR. 3 – ♂, ♀, 29.vi.2014, RD. 4 – ♀, 16.vii.2015, GR.

Platycnemididae

Coeliccia species cf *borneensis* (Selys, 1866)*

This is the same taxon reported from areas near the Indonesian border in Kapit Division in Dow & Ngiam (2014) as *Coeliccia* new species *borneensis*-group. Differences in the male appendages from "typical" *C. borneensis* are present, but subtle. *Coeliccia borneensis* increasingly appears to represent a difficult species complex, possibly in the process of speciation; resolution of the status of the taxon found on Gunung Penrissen awaits further work. All specimens were collected trilside away from streams. A male is shown in Fig. 7.

1 – ♂, 2.vii.2014, RD; ♂, 15.vii.2015, GR. 2 – ♂, 13.vii.2015, GR; ♂, 16.vii.2015, RD; ♂, 16.vii.2015, GR.



Figure 7: *Coeliccia* species cf *borneensis* male. Photo by G.T. Reels.



Figure 8: *Coeliccia flavostriata* male. Photo by G.T. Reels.

Coeliccia cyaneothorax Kimmins, 1936*
2 – ♀, 3.iii.2016, RD.

Coeliccia flavostriata Laidlaw, 1918

A male is shown in Fig. 8.

1 – 7 ♂♂, 1.vii.2014, RD; 3 ♂♂, 14.vii.2015, RD; ♂, ♀, 15.vii.2015, RD; ♂, 15.vii.2015, GR. **2** – ♂, ♀, 13.vii.2015, RD; 2 ♂♂, 13.vii.2015, GR; ♀, 16.vii.2015, RD. **3** – 2 ♂♂, 29.vi.2014, RD; ♂, 17.vii.2015, GR. **5** – ♂, 28.vi.2014, RD; ♂, 17.vii.2015, RD. **6** – ♂, 15.vii.2015, RD (drain at forest edge).

Coeliccia species cf *nemoricola* Laidlaw, 1912

1 – 2 ♂♂, ♀, 1.vii.2014, RD; **3** ♂♂, 14.vii.2015, RD; 3 ♂♂, ♀, 14.vii.2015, GR.

Coeliccia nigrohamata Laidlaw, 1918

1 – ♂, 14.vii.2015, RD. **2** – ♂, 16.vii.2015, GR; ♀, 3.iii.2016, RD. **4** – ♂, 1.iii.2016, RD. **5** – ♂, 28.vi.2014, RD. **6** – ♂, 16.vii.2015, RD (forest edge pond with marshy area inside forest).

Prodasineura hosei (Laidlaw, 1913)*

4 – ♂, 16.vii.2015, RD; ♂, 17.vii.2015, RD.

Prodasineura verticalis (Selys, 1860)*

Most specimens were collected at ponds on the golf course, although this is normally a stream species.

6 – ♂, ♂+♀, 14.vii.2015, RD; ♂, 14.vii.2015, GR; ♂, 15.vii.2015, GR.

Coenagrionidae

Aciagrion borneense Ris, 1911

6 – ♂, 16.vii.2015, RD.

Agriocnemis femina (Brauer, 1868)

6 – ♀, 17.vii.2015, RD.

Argiocnemis species

4 – ♂, 17.vii.2015, RD. **6** – ♂, ♀, 16.vii.2015, RD; ♂, 17.vii.2015, RD.

Ischnura senegalensis (Rambur, 1842)

Stenagrion dubium (Laidlaw, 1912)

1 – ♂+♀, 2.vii.2014, RD; ♂, 14.vii.2015, RD; ♂, 15.vii.2015, RD.

Anisoptera

Aeshnidae

Anax panybeus Hagen, 1867*

6 – ♂, 17.vii.2015, RD.

Gynacantha dohrni Krüger, 1899*

1 – ♂, 2.vii.2014, RD.

Tetracanthagyna ?degorsi Martin, 1896*

Larva only, certainly not that of *T. plagiata* (Waterhouse, 1877).

6 (a stream running out onto the golf course from the forest) – Larva, 1.iii.2014, SB.

Gomphidae

Acrogomphus jubilaris Lieftinck, 1964

Since the publication of Dow (2012) only one more adult female has been collected at Borneo highlands, while apparently ovipositing on a rocky stretch of a small stream after 3 pm. However larvae have been found to be abundant on several streams here. The holotype of *A. jubilaris* is from Tebang in Sarawak (Lieftinck 1964; not to be confused with Tebang in Kalimantan Timur), which is said to be on the north-east slope of Gunung Penrissen (Lieftinck 1965: 347, in the type series of *Vestalis amaryllis* Lieftinck, 1965), although the first author has not been able to unambiguously match it to any modern location in this area. The larva of *A. jubilaris* is described in Butler, Steinhoff & Dow (2016).

2 – Larvae, 1.iii.2016, SB; larvae, 3.iii.2016, SB. 4 – Larvae, 1.iii.2016, SB. 5 – ♀, 28.vi.2014, RD; larvae, 29.ii.2016, SB. 6 (streams running out onto the golf course from the forest) – Larvae, iii.2014, SB.

Borneogomphus species*

The genus *Borneogomphus* Karube & Sasamoto, 2014 was described only recently for *B. teramotoi* Karube & Sasamoto, 2014, from the Mount Kinabalu area in Sabah (Karube & Sasamoto 2014). Larvae collected on Gunung Penrissen agree with the description of the larva of *B. teramotoi*. One male collected in 2014 partially emerged; although the anal appendages cannot be examined usefully, the genital ligula is of the same distinctive form as the species from Sabah. The determination of whether this represents a new species or *B. teramotoi* awaits the collection of mature males.

1 – Larva, 2.iii.2016, SB. 2 – Larvae, 3.iii.2016, SB. 6 (a stream running out onto the golf course from the forest) – Larvae, iii.2014, SB.

Heliogomphus species

2 – Larva, 3.iii.2016, SB. 6 (stream running out onto the golf course from the forest) – Exuvia, iii.2014, SB.

Leptogomphus new species *

A male and two females collected high on Gunung Penrissen in 2015 are a new species, allied to *L. williamsoni* Laidlaw, 1912. However these are not the same species as females identified as *L. williamsoni* in Dow (2012). This new species will be described in a revision of *Leptogomphus* in Borneo (Dow, Ngiam & Stokvis in preparation); adult material will be listed in that publication.

Leptogomphus species

More than one species may be being treated here, as various larval records that cannot be definitely assigned to a particular species are included under this heading for convenience. Females from Gunung Penrissen that strongly resemble *L. williamsoni* and that were treated as that species in Dow (2012), differ consistently in the structures on their heads from *L. williamsoni* from other parts of Borneo; it is not clear whether this is just variation. Larvae collected at some locations resemble that of *L. williamsoni* as described in Ngiam & Dow (2013), but differ in some details, however none were found at the location where *Leptogomphus* new species was found, and it seems at least as likely that they are the larvae of the ?*L. williamsoni* taxa as that of the new species. One larva collected in 2014 at location 4 does not resemble that of *L. williamsoni*, but it is not possible to say whether it is that of *L.* new species or of yet another species; unfortunately it died before emergence.

2 – Larvae, 3.iii.2016, SB. **4** – Larva, 1.iii.2014, SB. **6** (streams running out onto the golf course from the forest) – Larvae, 1.iii.2014, SB.

Macrogomphus quadratus (Selys, 1878)*

6 (streams running out onto the golf course from the forest) – Larva, 1.iii.2014, SB.

Chlorogomphidae

Chlorogomphus species cf *dayak* (Laidlaw, 1911)*

Only larvae have been collected, but one male has been successfully reared, it is close to *C. dayak* but differs in details of the anal appendages at least and may represent a new species. However resolution of this issue requires further study.

2 – Larvae, 1.iii.2016, SB; larvae, 3.iii.2016, SB. **5** – Larvae, iii.2014, SB.

Macromiidae

Macromia westwoodii Selys, 1874

1 – ♀, 14.vii.2015, RD; **2** ♀♀, 14.vii.2015, GR; ♀, 15.vii.2015, RD. **3** – ♀, 30.vi.2014, RD. **4** – ♀, 16.vii.2015, GR. **5** – Larvae, 29.ii.2016, SB. **6** (a stream running out onto the golf course from the forest) – Larva, 4.iii.2014, SB.

Synthemistidae

Idionyx species*

At present it is not possible to say which species the single adult female, or the larvae, collected at Borneo Highlands represents.

2 – Larvae, 1.iii.2014, SB. **5** – Larva, 2.iii.2014, SB; ♀, 17.vii.2015, RD; larvae, 29.ii.2016, SB.

Macromidia fulva Laidlaw, 1915

2 – Larvae, 1.iii.2014, SB.

Libellulidae

Aethriamanta gracilis (Brauer, 1878)*

6 – ♂, ♂+♀, 17.vii.2015, RD.

Nannophya pygmaea Rambur, 1842*

6 – ♂, 16.vii.2015, RD.

Neurothemis fluctuans (Fabricius, 1793)

Neurothemis terminata Ris, 1911*

6 – ♂, 17.vii.2015, RD.

Orthetrum chrysis (Selys, 1891)

Orthetrum glaucum (Brauer, 1865)

6 – 2 ♂♂, 2.vii.2014, RD.

Orthetrum pruinatum schneideri Förster, 1903

1 – ♀, 15.vii.2015, RD.

Rhyothemis triangularis Kirby, 1889*

6 – ♂, 17.vii.2015, RD.

Tramea transmarina euryale Selys, 1878*

6 – ♂, 15.vii.2015, RD.

Trithemis aurora (Burmeister, 1839)

Trithemis festiva (Rambur, 1842)

Tyriobapta torrida Kirby, 1889

4 – ♂, 16.vii.2015, GR.

Zygomma petiolatum Rambur, 1842*

6 – ♂, 17.vii.2015, RD.

Zygonyx iris errans Lieftinck, 1953*

6 (a stream running out onto the golf course from the forest) – exuvia, 1.iii.2016, SB.

Discussion

Currently 57 or more species of Odonata are known from the Borneo Highlands area of Gunung Penrissen. Whilst this is not a particularly large figure, the proportion of poorly known and previously unknown taxa is remarkably high. At least five species have so far been found only at this location (*Drepanosticta burbachii*, *Drepanosticta*

new species, *Telosticta* new species, *Rhincocypha* species A and *Leptogomphus* new species). The genus *Borneogomphus* is otherwise only known from the Mount Kinabalu area of Sabah (Karube & Sasamoto 2014) but it is not known yet if the species occurring on Gunung Penrissen is the same as that from the Mount Kinabalu area. Gunung Penrissen is the only location in Sarawak west of the Lupar River where any member of the *Coeliccia borneensis*-group apart from *Coeliccia flavostriata* has been found. Additionally, *Rhincocypha* species B and *Bornargiolestes reelsi* are only known from a few locations.

The distinctiveness of the fauna found at Borneo Highlands is due, at least in part, to altitude. It is the only location that we know of in south-western Sarawak where it is easy to work above 900m; the first author has collected in the 900-1050m altitude range on Gunung Pueh further to the west and also on the border with Indonesia, but there one has to start from not much above sea-level, and above the foot of the mountain conditions are very difficult and most streams are running under the ground. However some of the species currently known only from Gunung Penrissen may well be found in the nearby Bungo Range in Sarawak, and/or over the border on Gunung Niut in north-west Kalimantan; this mountain is significantly higher and larger than Gunung Penrissen, and is potentially of very high interest for Odonata.

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Tillyard, R., 1924. The dragonflies (Order Odonata) of Fiji, with special reference to a collection made by Mr. H.W. Simmonds, F.E.S., on the Island of Viti Levu. Transactions of the Entomological Society London 1923 III-IV: 305-346.

Citations of internet sources should include the date of access.

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

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