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Odonata from two areas in the Upper Baram in Sarawak: Sungai Sii and Ulu Moh

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Abstract

Records of Odonata from two areas in the upper Baram area in Sarawak's Miri Division are presented. Sixty five species are recorded from the Sungai Sii area and sixty three from the Ulu Moh area. Notable records include *Telosticta ulubaram*, *Coeliccia southwelli*, *Leptogomphus* new species, *Macromia corycia* and *Tramea* cf. *virginia*. *Rhyothemis regia* is recorded from Sarawak for the first time.

Key words: dragonfly, Odonata, Sarawak, Sungai Sii, Ulu Moh, Borneo, Malaysia

Introduction

The upper Baram is a huge area in the interior of Sarawak's Miri division (Borneo, Malaysia) that drains into the Baram River. The boundary between the upper and mid Baram is not entirely clear to these authors, however we note that two locations in the upper Baram, Gunung Kalulong and Batu Uro', have erroneously been stated to be in the mid Baram in some publications by the first author. Records of Odonata from the upper Baram area can be found in Dow (2010a, 2010b, 2013, 2014), Dow & Orr (2012), Dow & Reels (2011), Dow, Reels & Ngiam (2015b), Hämäläinen, Dow & Stokvis (2015), Hincks (1930), Kalkman & Villaneuva (2011), Kimmins (1936), Laidlaw (1918, 1920, 1922, 1931, 1932), Lieftinck (1937, 1965) and van Tol & Norma-Rashid (1995). The holotypes of *Dysphaea ulu* Hämäläinen, Dow & Stokvis, 2015, *Coeliccia campioni* Laidlaw, 1918, *Macromia cydippe* Laidlaw, 1922, *Macromia corycia* Laidlaw, 1922 and *Telosticta ulubaram* Dow & Orr, 2012 are from locations in the Upper Baram.

Material & Methods

In this report we present records of Odonata from two areas of the upper Baram, collected during two trips made in 2014 by the authors. The first trip involved both authors and was to a tributary of the Baram called Sungai Sii. The second trip was planned based on information received during the first trip and only involved the first author; this trip was to the Ulu Moh area near the border with Indonesia. Figures 1 and 2 show the position of both locations. The trip to Ulu Moh was funded by the IDF and a generous personal contribution from Martin Schorr.



Figure 1. Map showing positions of the Sungai Sii and Ulu Moh areas in Sarawak.



Figure 2. Map of part of the upper Baram area, showing Sungai Sii and Ulu Moh areas.



Figure 3. Sungai Sii area.

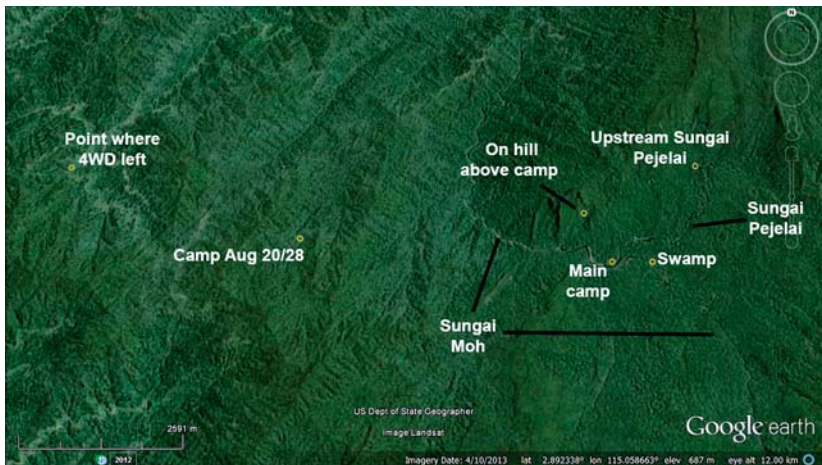


Figure 4. Ulu Moh area.

Sungai Sii is a relatively small tributary of the Baram river, on the northern side and low lying (ca 150-250 m a.s.l. in the part surveyed), and running approximately parallel to a mountain known as Batu Suro' (not to be confused with Batu Uro', a mountain adjacent to Gunung Kalulong on the other side of the Baram), ca 800 m a.s.l. high at its highest point. The forest around Sungai Sii has been logged in the past, but Batu Suro' has not been logged. We made a survey of the Sungai Sii area (Figure 3) from 10-18 July 2014. As well as Sungai Sii and its tributaries, another stream system (Sungai Alah, running directly from the foot of the Batu Suro' ridge) was surveyed, as well as ponds

by old logging roads. Batu Suro' proved to have mostly underground drainage (no streams were found above the foot of the main ridge, in the unlogged forest), and to be so steep in many places that it was too dangerous to work on, however some ponds were found on flat parts of the ridge top. The area proved to be rich in Odonata, with 65 species collected. Unfortunately if the proposed Baram dam goes ahead, Sungai Sii and Sungai Alah will be submerged.

Sungai Moh (Figures 4, 11, 12) is a tributary of the Baram, flowing in on the southern bank some way upstream of Sungai Sii, between the Kenyah settlements of Long Silat and Lio Matoh. Between the mouth and the Ulu (upstream) settlements area there is a series of rapids (e.g. Figure 12) that make it impractical to reach the upper part by boat. Part of the area has been logged, but there is an extensive area adjacent to the



Figure 5. Approaching Sungai Sii: in the boat. Photograph by Robin Ngiam.

border that is so difficult to access that the only logging operations that have taken place have been done using helicopters, Figure 10 shows part of this area. Heli-logging is typically much less damaging than normal logging, both because it is only economically viable to take the largest and most valuable trees and because it does not involve creating the network of logging roads and tractor paths (the so-called Jalan Lipan) that are the source of most of the run-off of sediment, the cause of many landslides, and which disrupt the courses of small streams, in most logging areas. Large parts of the Ulu Moh heli-logging area that the first author saw were essentially pristine. A survey concentrating on the heli-logging area was conducted in 19-30 August 2014, but due to the difficulty of access (a two day journey, mostly on foot, from Long Silat was required just to reach the heli-logging area), distances involved and difficulty of the terrain within the heli-logging area, only a relatively small part of the area was surveyed. As with Sungai Sii, the area proved rich in Odonata, with 63 species collected, a figure including less open habitat Libellulidae than that for Sungai Sii. Fifty seven species were collected in the heli-logging area. A day-by-day summary of the IDF funded Ulu Moh trip is given below.

Personnel

Sungai Sii: the authors. Luke Southwell, Ngau, Neh, Alung, Agustin, Bilong Apoi, Lupa Usa and Ogang Uda. Johannase Lenjau Seling

Ulu Moh: the first author, Luke Southwell, Yusuf Seling, Mutang Tegong, Neilson Agus Sigau, Engan Aran, Eban Lejau and Ogang Uda.

Locations

Batu Suro/Sungai Sii

S1. Sungai Sii and tributaries - streams in disturbed forest, disturbance varying from light to heavy (Coordinates at camp on banks of Sungai Sii: 2.9915°N, 114.9026°E). Figures 5, 6, 7, 8.

S2. Sungai Alah and tributaries - streams in disturbed forest, disturbance varying from light to heavy, upper part emerging from ground in steep terrain (3.0151°N, 114.9097°E).

S3. Natural forest ponds on Batu Suro' - unlogged forest (coordinates not available). Figure 9.

S4. A small partly shaded pond by old logging track near camp at Sungai Sii (exact coordinates not available).

S5. A large pond by the logging road leading from Sungai Sii to Sungai Alah (2.9994°N, 114.9043°E).

S6. In camp and on logging roads and other trails.

Ulu Moh

Outside heli-logging area (averaged coordinates for area: 2.9°N, 115.05°E):

Mo1. Streams in disturbed forest, crossed by logging road, 700-1000 m a.s.l.

Mo2. In other disturbed habitats encountered by logging road, 700-1000 m a.s.l..

Inside heli-logging area:

Mi1. Sungai Moh and Sungai Pejelai near base camp at confluence of the two rivers, ca 680 m a.s.l. (coordinates at base camp: 2.8878°N, 115.0876°E).

Mi2. Streams on hill above base camp, 680-850 m a.s.l.

Mi3. Sungai Adeng, 700-750 m a.s.l. (coordinates not available).

Mi4. Upstream Sungai Pejelai and tributaries, 680-770 m a.s.l. (2.9029°N, 115.1025°E).

Mi5. Swamps between Sungai Pejelai and Sungai Moh, 680-700 m a.s.l. (swamp closest to base camp: 2.8882°N, 115.094°E).

Mi6. Forest pools, ca 680 m a.s.l., mostly near base camp.

Mi7. Around base camp, ca 680 m a.s.l.

Mi8. Precise location unclear, first author not present when collected (coordinates not available).



Figure 6. Approaching Sungai Sii: view of Batu Suro'. Photograph by Robin Ngiam.

Ulu Moh Trip

We first learned about the Ulu Moh area from Enjok (who was with us at Usun Apau, see Dow, Reels & Ngiam 2015b) who we bumped into on the way to Long Silat for the Sungai Sii trip. On our return from Long Silat we discussed the area in detail with Ogang and another old friend, Yusof Tegong, who was also with us at Usun Apau. Both Yusof and Ogang had been to the area, in fact Ogang had travelled through it extensively. The area sounded so interesting that RD made a rough plan with Yusof and then attempted to secure funding. A problem that was apparent from an early stage was the distance from the last point on the logging roads that was still usable to the heli-logging area is rather large. It was agreed that if RD found funding, Yusof would take an advance party and make sufficient repairs to the road further on that it would be possible to use scrambler motorbikes to ferry provisions to a position much nearer the heli-logging area. Once funding was secured personnel were agreed upon: in addition to Luke (LS), Yusof (YT) and Ogang (OU), Yusof's brother Mutang (MT) and Nelson Sigau (NS), another Kenyah from Long Silat, were selected, along with two Kenyah originally from Indonesia but married to Penan from, and now living in, Sarawak: Engan Aran (EA) and Eban Lejau (EL).

August 19. RD, LS and NS departed from Miri driven by MT. Stopped at the 'Kilo 10 camp', the base camp for the Samling timber companies operations in the Baram area, to get permission from the management to work in their area. In previous years when we have made trips into the upper Baram and worked in the logging areas there, it had been sufficient to turn up at 'Kilo 10' on the way and show research permits, but when we did this on the Sungai Sii trip we were told that we should have sort permission from the Samling head office first, and were politely but firmly detained overnight until they got confirmation from the head office that we were not representatives of some NGO bent on stirring up anti-logging or anti-dam protests. This time RD had made the required phone calls and obtained permission and we were able to proceed without much delay. Arrived at Long Silat and settled in at Yusof's home for the evening.

August 20. Early breakfast and departure from Long Silat using 4WD. At this stage all of the team except EA were present. When YT and co made the repair trip they had left the scrambler bikes at the end of the usable-by-car road and EA had stayed on, in a small camp, to guard them. Reached the point where the 4WD had to be left (it seems that it was considered safe to leave the 4WD on its own), met EA and started to ferry our things to the camp for the first night; RD sampled at several locations along the road. The straight line distance between the point where we had to leave the car and the first night camp is small (Figure 4), but the road twists and turns and being able to use the scramble bikes saved a great deal of time and effort. The camp site was beside one of many streams where the bridge had been washed away, at ca 870 m a.s.l.; it was at the furthest point where repairs had been made to the road, after this we were entirely on foot. Just on the otherside of the stream the

road divided, with a main branch carrying on at more or less the same altitude and another branch heading further up the hillside; our route was to be on the main branch, the upper branch had not been investigated. We had too much stuff to carry in one go to the next camp and had to divide the provisions, leaving some stuff that we did not need immediately here with the bikes. The situation of having to leave bikes and supplies unguarded was far from ideal, but unavoidable. Good weather.

August 21. Cloudy weather and light rain for our departure. The first part of our journey was along the logging road, but then we had to use a short cut, descending a steep and difficult slope to cut of a huge loop in the road. It rained heavily during the last part of our descent, stopping shortly after we reached relatively flat ground. After this we were on the logging road until its end; here it became apparent why the road did not continue - the only way forwards was on a very steep slope with alternating ravines filled with large boulders and cliff like sections that had to be negotiated along narrow ledges. Clearly making a road through this part would have involved considerable blasting and had not been deemed practical. Traversing this section on foot was extremely difficult and nerve wracking, and to make matters worse heavy rain started again while we were doing it. However when we finally found our way through we were at the Sungai Moh above the rapids, the sun came out and the forest appeared pristine. After a rest we made our way upstream some distance, crossing the Moh (not particularly easy), to the confluence of the Sungai Pejelai with the Moh, at the base of a peculiarly shaped hill (see Figure 10). Here we established our main camp. At this point the altitude was about 680 m a.s.l. and between the Moh and the Pejelai the terrain is almost flat for a considerable area.



Figure 7. Trekking to the Sungai Sii camp site. Photograph by Robin Ngiam.

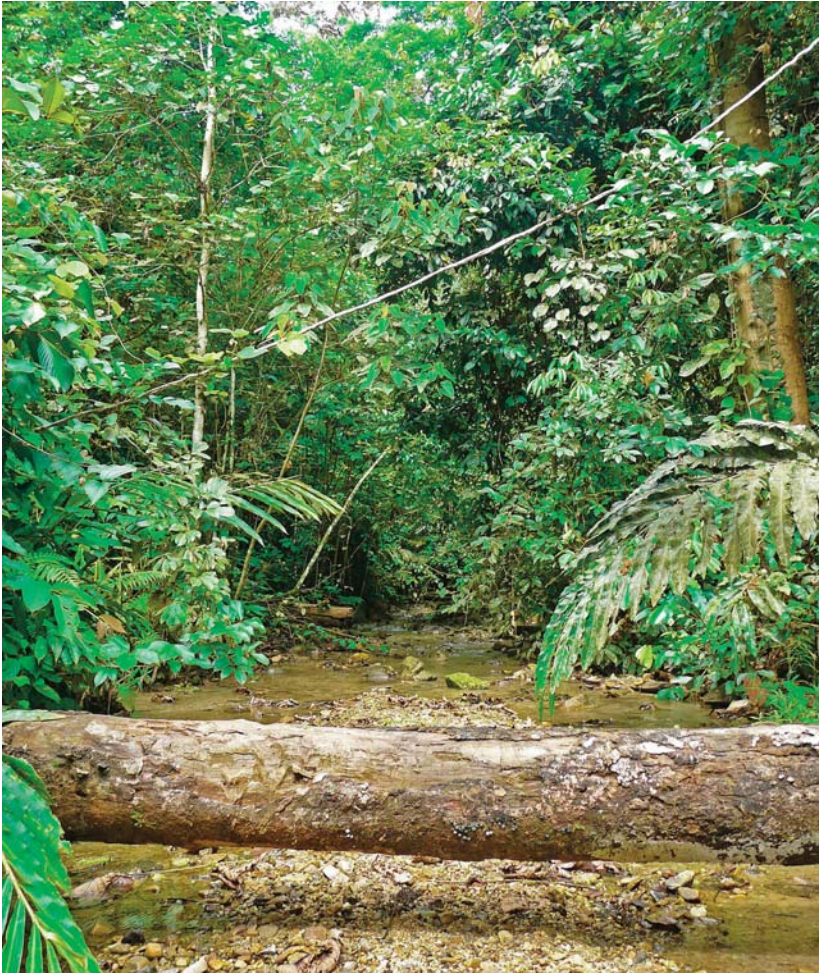


Figure 8. Small tributary of Sungai Sii. Photograph by Robin Ngiam.

August 22. Began sampling. RD worked around the Sungai Pejelai and some small hillside trickles not far upstream from the camp (the slope here was very steep and it was difficult to go far). Other members of the team set off in various directions. The process of finding a way to go further upstream on the Pejelai by walking through the relatively level forest between the Pejelai and the Moh was begun; some small patches of swamp forest were found in the process.

August 23. OU and EA started back to get most of the remaining supplies (a few things were left with the bikes for the night of our return). RD, YT and NS went further upstream on the steep side of the Pejelai while EL and MT went further into the flat area.

After the first difficult part of the slope RD and company came onto a gentler slope where some very nice streams were located. We returned by crossing the Pejelai and walking through the easier terrain between the Moh and the Pejelai.

August 24. RD surveyed one of the areas of swamp forest between the Pejelai and the Moh. YT went to a stream called Sungai Adeng on the far side of the Moh from the camp. The others completed making a route to the upper part of the Pejelai. OU and EA returned in the evening with the rest of the supplies, specimens collected on the way and the news that they had found a better route back through the logged area – a logging road that avoided the need to make the shortcut down the steep slope.

August 25. Most of the party headed for the upstream Pejelai area. Here the Pejelai divides. RD went with EL to the lefthand (looking upstream) branch while the rest worked in the right branch. Because the water was too deep to ford at the confluence of the two branches, EL and RD had to cut across the land inbetween, this was surprisingly difficult because the forest near the confluence was extremely dense and tangled. On the other side the left branch was rather different, a long sluggish section with a sandy bottom and many fallen trees. Upstream from the tangled section the forest was different on the two banks, on the right side there was mixed dipterocarp forest but on the left side was a formation that seemed more typical for higher altitudes. It was on the left side that RD saw the only extensive damage from logging that he encountered in the heli logging area; there was an extensive area back from the Pejelai that must have had many large and valuable trees, since it had almost been clear cut. But even here, a small stream running beside the logged section was running clear (because of the absence of Jalan Lipan) and still held interesting odonates. Further upstream the gradient went up and progress was blocked by cliffs and a waterfall. The right branch carries on with a low gradient for a considerable distance.



Figure 9. Muddy pond on top of the Batu Suro' ridge.



Figure 10. View of the Ulu Moh heli-logging area. Our main camp was at the foot of the strangely shaped mountain in the left of the photograph. Photograph by Egan Aran.



Figure 11. Sungai Moh near the main camp. Photograph by Egan Aran.

August 26. Back to the upstream Pejelai. As time was running short, EA and OU agreed to make a small camp at the right branch and make an early start the next day in an attempt to reach higher ground further up on the right branch. Unfortunately, after the rest of the party had gone back to the base camp, EA and OU were caught by surprise by a flash flood, which washed away various items they had left by the stream, including nets, and OU's shoes. This prevented them from accomplishing much on the next day.

August 27. NS, RD and LS surveyed small, steep streams higher on the hill above the camp. On returning to camp found the shoeless OU and heard about the small disaster with the flash flood. RD gave OU his spare shoes, which were much too big for OU and had to be tied onto his feet.

August 28. Broke camp but delayed from starting because the Moh had risen in the night and was no longer fordable. After a few hours the water had dropped sufficiently that it was possible to cross, but only with considerable difficulty. After traversing the difficult hill side section and getting onto the logging road, OU and RD went ahead, using the new route on the higher logging road. Reached the camp of August 20 shortly before dusk; the others arrived after dark.



Figure 12. Sungai Moh someway downstream from camp. Photograph by Egan Aran.

August 29. Broke camp, most of the party began ferrying stuff back to the 4WD. RD and EL used an old logging road to try to reach the higher part of the stream by the camp. The road was heavily overgrown and while cutting a path the palm of RD's hand was penetrated by a sharp stick; the resulting wound was small but bled spectacularly, however once the bleeding was stopped it was possible to progress and eventually a small and interesting tributary was found. Unfortunately heavy rain began shortly after the stream was reached, so a retreat was made and EL and RD began the walk back to the car. By late afternoon the whole party was assembled at the 4WD and returned to Long Silat.

A note on Ulu Moh

Ulu Moh is one of a few almost pristine, non-protected areas, remaining along the Malaysia/Indonesia border in Sarawak; all are difficult to access. The 2014 expedition was only able to penetrate a small distance into the area, and cover a small part of the altitudinal range present due to the difficulties of the terrain and the lack of roads. In the south western part of the area (off the bottom of Figure 4) there is a peak above 1800 m a.s.l. on the border, within the area where only heli-logging has taken place. There are undoubtedly many more species of Odonata to find in the area, and it must have much other interesting wildlife. Figure 13 shows a species accumulation plot for the 57 species collected within the heli-logging area, over the eight days on which any collecting was conducted in that area; there is no sign of the plot levelling out for the area surveyed.

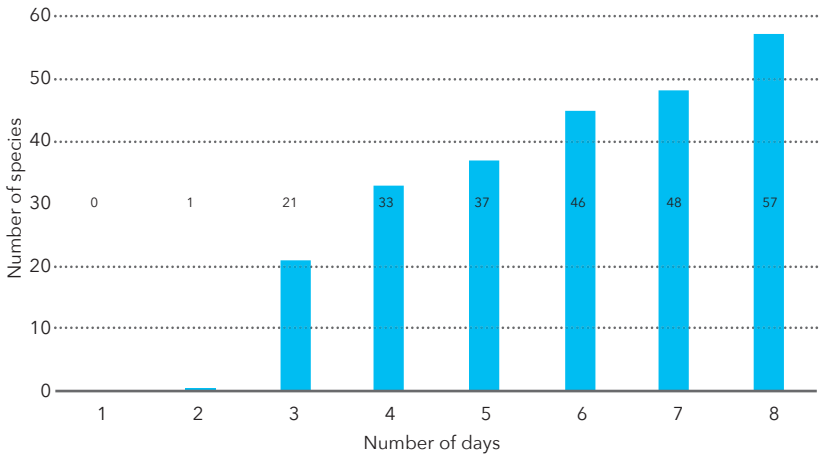


Figure 13. Species accumulation plot for species collected in the Ulu Moh heli-logging area.

There is at least a chance to get the area protected before further logging activities take place there, but more data is needed to help make the case for protection, whether as part of Sarawak's protected area system, or as a large area of High Conservation Value Forest (HCVF) within Samling's concessions. We attempted to raise funds for a second, longer, trip to Ulu Moh in 2015, with the goal of reaching higher ground by following the course of the Moh towards the high peak mentioned above. Unfortunately it was not possible to raise the required amount. We still hope to go back to the area, possibly in 2016, if the money can be found. We estimate that a 25 day trip (the minimum required) would cost around 8,000 Euro (unless there is a drastic improvement in exchange rates): the costs of working in the interior of Sarawak are always high; for Ulu Moh, although 4WD costs are relatively low because a vehicle cannot be used within the area of interest, fees for porters and guides are high (and to be clear - the team used in 2014 are worth every penny of it) and for a longer expedition there will be a need to set up a store along the way and employ two people to guard it (the alternative would be to take a small army of porters to carry everything the whole distance, which would be considerably more expensive).

Species collected

Collectors: Engan Aran - EA; Rory Dow - RD; Robin W. J. Ngiam - RN; Neh Pawi - NP; Nelson Sigau - NS; Luke Southwell - LS; Ogang Uda - OU; Lupa Usa - LU; Mutang Tegong - MT; Yusof Tegong - YT. ♂+♀ indicates a pair collected in tandem.

Zygoptera

Lestidae

Orolestes wallacei (Kirby, 1889)

There appear to be small but consistent differences in the male anal appendages of Bornean individuals treated as this species from swamp forest habitats on the one hand and forest pools in hilly and mountainous areas on the other. However the two forms are not separable using the so-called DNA barcoding marker COI (unpublished Naturalis data). Further investigation is required to determine if the two forms are distinct species.

S4 - 1♂, 15 vii 2014, RD. **Mo2** - 2♂♂, 24 viii 2014, EA & OU.

Mi6 - 1♂, 24 viii 2014, RD.

Platystictidae

Both areas reported on here contain much suitable habitat for members of the Platystictidae, and twelve species from the family were recorded. However more than two individuals were collected for only three of these species, and each of the remaining nine species were found at single sites only. This situation contrasts sharply with that

observed further west in the Ulu Balui and Ulu Baleh areas of Kapit division (Dow & Ngiam 2014) in a broadly overlapping (but higher on average) altitude range and a comparable sampling period, where ten species from the family were recorded but more than three individuals were collected for seven of them (more than ten for six of them).

Drepanosticta actaeon Laidlaw, 1934

S1 - 3 ♂♂, 10 vii 2014, RD; 2 ♂♂, 13 vii 2014, LS. **S2** - 1 ♂, 12 vii 2014, RD.

Mo1 - 2 ♂♂, 29 viii 2014, RD.

Drepanosticta attala Lieftinck, 1934

S2 - 1 ♀, 12 vii 2014, LS.

Drepanosticta species cf *crenitis* Lieftinck, 1933

Mi2 - 1 ♂, 27 viii 2014, RD.

Drepanosticta species cf *dentifera* Kimmins, 1936

S1 - 1 ♀, 11 vii 2014, RD; 1 ♀, 15 vii 2014, RD.

Drepanosticta dulitensis Kimmins, 1936

Mi2 - 1 ♂, 27 viii 2014, RD.

Drepanosticta species cf *forficula* Kimmins, 1936

Mi2 - 1 ♀, 22 viii 2014, RD.

Drepanosticta rufostigma (Selys, 1886)

S1 - 2 ♂♂, 10 vii 2014, RD; 2 ♂♂, 1 ♀, 11 vii 2014, RD; 3 ♂♂, 13 vii 2014, RD; 1 ♂, 13 vii 2014, RN; 1 ♂, 13 vii 2014, NP; 1 ♂, 13 vii 2014, LS; 3 ♂♂, 14 vii 2014, LS; 1 ♂, 15 vii 2014, RD; 2 ♂♂, 17 vii 2014, RN. **S2** - 1 ♂, 12 vii 2014, RD; 1 ♂, 12 vii 2014, LS; 1 ♂, 12 vii 2014, OU. **Mo1** - 2 ♂♂, 20 viii 2014, RD; 1 ♂, 29 viii 2014, RD.

Mi2 - 4 ♂♂, 23 viii 2014, RD; 2 ♂♂, 27 viii 2014, RD; 1 ♀, 27 viii 2014, LS.

Mi4 - 1 ♂, 25 viii 2014, RD; 1 ♂, 26 viii 2014, OU. **Mi7** - 1 ♂, 25 viii 2014, LS.

Drepanosticta versicolor (Laidlaw, 1913)

S1 - 7 ♂♂, 1 ♀, 13 vii 2014, RD. **Mo1** - 1 ♂, 29 viii 2014, RD.

Mi2 - 2 ♂♂, 22 viii 2014, RD; 1 ♂, 25 viii 2014, LS. **Mi4** - 2 ♂♂, 25 viii 2014, RD.

Telosticta ?berawan Dow & Orr, 2012

The female collected agrees broadly with females thought to be of this species from Gunung Mulu.

Mi2 - 1 ♀, 27 viii 2014, RD.

Telosticta species cf *belalongensis* Dow & Orr, 2012

A teneral male, the anal appendages are deformed and in bad condition, but it appears closest to *T. belalongensis*.

S1 - 1 ♂, 14 vii 2014, LS.

Telosticta longigaster Dow & Orr, 2012

S2 - 1 ♂, 15 vii 2014, RN.

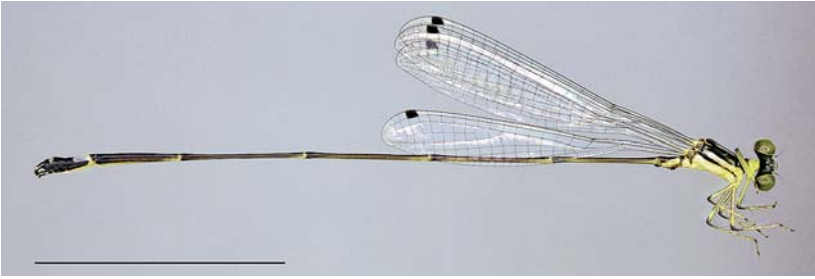


Figure 14. *Telosticta ulubaram* male from Ulu Moh. Scale bar 20mm. Photograph by Rory Dow.

Telosticta ulubaram Dow & Orr, 2012

Ulu Moh is the most western location, and the lowest altitude, so far known for this upland species (Figure 14).

Mi4 – 2 ♂♂, 25 viii 2014, RD.

Argiolestidae

Podolestes orientalis Selys, 1862

Mi5 – 1 ♂, 24 viii 2014, RD.

Podolestes species

See Dow, Reels & Ngiam (2015a, 2015b) for comments on this species.

Mi6 – 1 ♂, 25 viii 2014, EA; 1 ♀, 27 viii 2014, EA & OU.

Calopterygidae

Neurobasis longipes Hagen, 1887

S1 – 1 ♀, 16 vii 2014, OU & LU. **Mi2** – 1 ♂, 23 viii 2014, RD. **Mi4** – 3 ♂♂, 24 viii 2014, RD; 1 ♂, 24 viii 2014, MT; 3 ♂, 1 ♀, 25 viii 2014, EA; 1 ♂, 1 ♀, 26 viii 2014, EA, NS & MT; 1 ♀, 26 viii 2014, YT; 1 ♂, 27 viii 2014, EA & OU.

Vestalis amaryllis Lieftinck, 1965

S1 – 1 ♂, 11 vii 2014, RD; 1 ♂, 11 vii 2014, OU; 1 ♂, 13 vii 2014, RN; 3 ♂♂, 15 vii 2014, OU. **Mi2** – 3 ♂♂, 23 viii 2014, RD. **Mi8** – 1 ♂, 22 viii 2014, OU.

Vestalis amnicola Lieftinck, 1965

S1 – 3 ♂♂, 10 vii 2014, RD; 2 ♂♂, 10 vii 2014, RN; 1 ♂, 11 vii 2014, RD; 5 ♂♂, 11 vii 2014, OU; 2 ♂♂, 12 vii 2014, RN; 7 ♂♂, 12 vii 2014, NP; 1 ♂, 13 vii 2014, NP; 6 ♂♂, 14 vii 2014, OU; 1 ♂, 15 vii 2014, RD; 5 ♂♂, 15 vii 2014, OU; 9 ♂♂, 16 vii 2014, OU & LU. **S2** – 5 ♂♂, 12 vii 2014, LS; 14 ♂♂, 1 ♀, 12 vii 2014, OU; 1 ♂, 15 vii 2014, RN. **Mo1** – 1 ♂, 20 viii 2014, RD; 1 ♂, 21 viii 2014, RD; 2 ♂♂, 24 viii 2014, EA & OU. **Mi2** – 4 ♂♂, 23 viii 2014, RD; 1 ♂, 23 viii 2014, YT; 1 ♂, 27 viii 2014, RD. **Mi3** – 4 ♂♂, 24 viii 2014, YT. **Mi4** – 1 ♂, 24 viii 2014, NS; 1 ♂, 24 viii 2014, MT; 1 ♂, 25 viii 2014, EA.

Vestalis atropa Lieftinck, 1965

S1 - 1♂, 11 vii 2014, OU; 1♂, 12 vii 2014, NP; 1♂, 16 vii 2014, OU & LU.

S2 - 1♂, 12 vii 2014, RD; 1♂, 12 vii 2014, OU. **Mi2** - 2♂♂, 23 viii 2014, YT.

Mi3 - 1♂, 24 viii 2014, YT. **Mi4** - 1♂, 26 viii 2014, YT.

Chlorocyphidae

Heliocypha biseriata (Selys, 1859)

Figure 15 shows a pair forming the wheel position.

S1 - 1♂, 10 vii 2014, RN; 1♂, 11 vii 2014, RD; 2♂♂, 12 vii 2014, NP; 2♂♂, 13 vii 2014, NP; 2♂♂, 15 vii 2014, OU; 2♂♂, 1♀, 16 vii 2014, OU & LU; 1♀, 17 viii 2014, OU.

S2 - 4♂♂, 12 vii 2014, OU. **Mi1** - 1♂, 22 viii 2014, RD; 10♂♂, 3♀♀, 24 viii 2014, NS; 10♂♂, 1♀, 24 viii 2014, MT. **Mi2** - 1♂, 23 viii 2014, RD; 4♂♂, 2♀♀, 23 viii 2014, NS; 3♂♂, 23 viii 2014, YT. **Mi4** - 1♂, 1♀, 25 viii 2014, EA; 1♂, 3♀♀, 25 viii 2014, OU; 1♂, 2♀♀, 26 viii 2014, EA, NS & MT; 2♂♂, 3♀♀, 26 viii 2014, YT; 1♂, 6♀♀, 27 viii 2014, EA & OU. **Mi8** - 1♀, 23 viii 2014, MT.



Figure 15. *Heliocypha biseriata* forming the wheel. Photograph by Robin Ngiam.

Rhinocypha aurofulgens Laidlaw, 1931

S1 - 1♂, 10 vii 2014, RD; 1♂, 10 vii 2014, RN; 1♂, 14 vii 2014, OU; 5♂♂, 17 viii 2014, OU.
S2 - 1♂, 12 vii 2014, RD. **Mo1** - 1♂, 20 viii 2014, RD. **Mi1** - 1♂, 1♀, 22 viii 2014, RD.
Mi2 - 1♂, 23 viii 2014, RD. **Mi3** - 1♂, 24 viii 2014, YT. **Mi4** - 1♂, 25 viii 2014, EA;
 2♂♂, 25 viii 2014, OU; 3♂♂, 26 viii 2014, YT. **Mi8** - 1♂, 22 viii 2014, YT.

Rhinocypha spinifer Laidlaw, 1931

Mo1 - 2♂♂, 20 viii 2014, RD. **Mi2** - 3♂♂, 23 viii 2014, RD; 3♂♂, 23 viii 2014, NS;
 2♂♂, 1♀, 23 viii 2014, YT. **Mi3** - 5♂♂, 24 viii 2014, YT. **Mi4** - 2♂♂, 26 viii 2014, RD.
Mi8 - 1♂, 25 viii 2014, NS.

Rhinocypha stygia Förster, 1897

Relatively few locations are known for this species (Figure 16).

S1 - 2♂♂, 13 vii 2014, RD; 1♂, 16.vii.2014, RD; ?♀, 17 vii 2014, RN; 1♂, 17 vii 2014, LS;
 2♂♂, 17 vii 2014, OU. **S2** - 1♂, 12 vii 2014, OU.

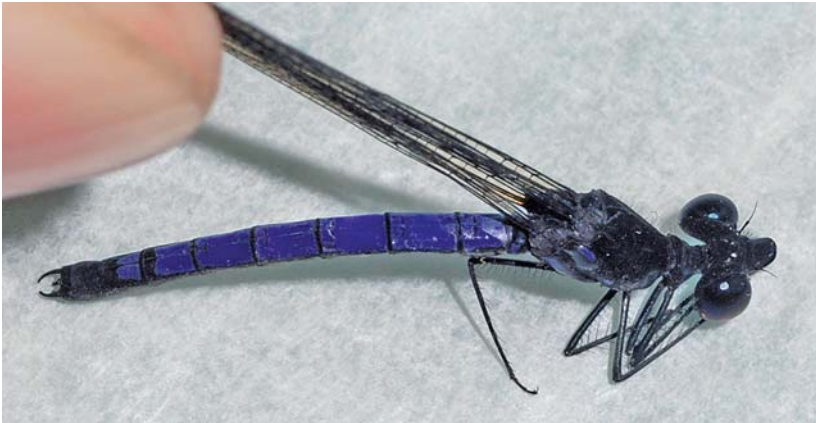


Figure 16. *Rhinocypha stygia* male in hand. Photograph by Robin Ngiam.

Devadattidae

Material will be listed in Dow, Hämäläinen & Stokvis (to appear in *Zootaxa*). The codes for species used below are consistent with that used in Dow & Ngiam 2014 and Dow, Reels & Ngiam 2015a, 2015b.

Devadatta species A

S1, Mo1, Mi1, Mi2, Mi3.

Devadatta species C

Mo1, Mi2.

Euphaeidae

Dysphaea ulu Hämäläinen, Dow & Stokvis, 2015

Described and material listed in Hämäläinen, Dow & Stokvis (2015);
the holotype is from Ulu Moh.

S1, Mi1, Mi2, Mi4.

Dysphaea dimiditata (Selys, 1853)

Material listed in Hämäläinen, Dow & Stokvis (2015). Seemingly this species is less common in the upper Baram than *D. ulu*.

Mi4.

Euphaea impar Selys, 1859

S1 - 1♂, 11 vii 2014, RD; 1♂, 13 vii 2014, RN; 1♂, 13 vii 2014, NP; 2♂♂, 15 vii 2014, OU.

Mi2 - 1♂, 23 viii 2014, RD; 1♂, 23 viii 2014, NS; 1♂, 23 viii 2014, YT; 1♂, 27 viii 2014, RD.

Mi4 - 1♂, 24 viii 2014, NS; 1♂, 1♀, 24 viii 2014, MT; 1♂, 26 viii 2014, EA, NS & MT;
1♂, 26 viii 2014, OU.

Euphaea subcostalis Selys, 1873

S1 - 1♂, 10 vii 2014, RD; 1♂, 11 vii 2014, RD; 2♂♂, 12 vii 2014, RN; 3♂♂, 12 vii 2014, NP;
1♂, 13 vii 2014, RD; 1♂, 13 vii 2014, RN; 2♂♂, 13 vii 2014, NP; 1♂, 13 vii 2014, LS;
1♂, 14 vii 2014, OU. **S2** - 1♂, 12 vii 2014, RD; 2♀♀, 12 vii 2014, OU; 1♀, 12 vii 2014, LS.

Mi2 - 2♂♂, 23 viii 2014, RD; 4♂♂, 23 viii 2014, NS; 2♂♂, 23 viii 2014, YT.

Mi3 - 1♂, 24 viii 2014, YT. **Mi4** - 1♂, 24 viii 2014, NS.

Euphaea subnodalis (Laidlaw, 1915)

Mo1 - 2♂♂, 20 viii 2014, RD. **Mi2** - 1♂, 23 viii 2014, RD. **Mi3** - 1♂, 24 viii 2014, YT.

Mi4 - 2♂♂, 24 viii 2014, NS.

Euphaea tricolor Selys, 1859

Mi1 - 2♂♂, 22 viii 2014, RD; 2♂♂, 24 viii 2014, RD. **Mi2** - 1♂, 23 viii 2014, RD.

Mi4 - 3♂♂, 24 viii 2014, NS; 2♂♂, 24 viii 2014, MT; 2♂♂, 25 viii 2014, EA;
1♂, 25 viii 2014, RD; 2♂♂, 26 viii 2014, EA, NS & MT; 1♂, 26 viii 2014, YT;
2♂♂, 27 viii 2014, EA & OU.

Philosiniidae

Rhinagrion borneense (Selys, 1886)

S1 - 1♂, 10 vii 2014, RD; 1♂, 11 vii 2014, RD; 1♂, 12 vii 2014, RN; 1♂, 13 vii 2014, LS;
2♂♂, 13 vii 2014, NP; 1♂, 15 vii 2014, OU; 2♂♂, 1♀, 16 vii 2014, NP; 1♂, 17 vii 2014, LS;
2♂♂, 17 vii 2014, OU. **S2** - 1♂, 12 vii 2014, RD; 1♂, 12 vii 2014, LS.

Mi2 - 1♂, 23 viii 2014, RD; 6♂♂, 23 viii 2014, NS; 9♂♂, 23 viii 2014, YT.

Mi3 - 2♂♂, 24 viii 2014, YT. **Mi4** - 5♂♂, 24 viii 2014, NS; 1♂, 1♀, 24 viii 2014, MT;
1♂, 25 viii 2014, EA; 1♂, 25 viii 2014, OU; 3♂♂, 26 viii 2014, EA, NS & MT;
3♂♂, 26 viii 2014, OU. **Mi8** - 1♀, 22 viii 2014, OU; 2♂♂, 23 viii 2014, MT.

Platycnemididae

The *Coeliccia borneensis*-group is well represented in the collections from Sungai Sii and Ulu Moh, with four species, although the numbers of individuals and sites for these species was very low. Similarly to the case with the Platystictidae, slightly fewer (three) species were recorded in the Ulu Balui and Ulu Baleh areas further west in Kapit division (Dow & Ngiam 2014) but abundances were greater. More strikingly, only a single member of the Disparoneurinae was recorded in the Ulu Balui/Ulu Baleh but four were recorded at Sungai Sii/Ulu Moh.

Coeliccia borneensis (Selys, 1866)

S1 - 1♂, 16 vii 2014, RN. **Mi2** - 1♀, 27 vii 2014, LS.

Coeliccia campioni Laidlaw, 1918

S1 - 1♂, 13 vii 2014, RD. **Mo1** - 2♂♂, 20 viii 2014, RD.

Coeliccia cyaneothorax Kimmins, 1936

S1 - 1♂, 10 vii 2014, RD; 1♂, 13 vii 2014, RN.

Coeliccia kenyah Dow, 2010

S1 - 1♂, 13 vii 2014, RD.

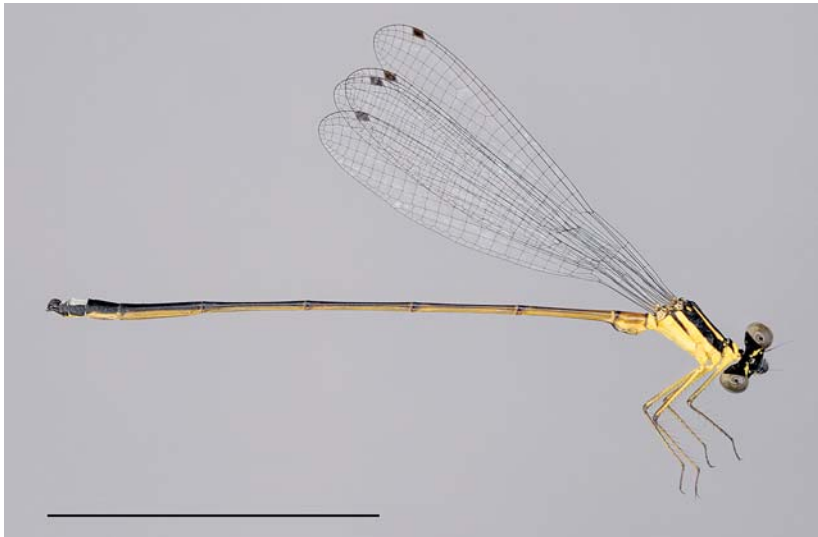


Figure 17. *Coeliccia southwelli* male. Scale bar 20mm. Photograph by Rory Dow.

Coeliccia species cf *nemoricola* Laidlaw, 1912

Mo1 - 4 ♂♂, 20 viii 2014, RD. **Mi2** - 4 ♂♂, 22 viii 2014, RD; 2 ♂♂, 1 ♀, 23 viii 2014, RD; ♂+♀, 23 viii 2014, MT; 1 ♂, 27 viii 2014, RD; 1 ♂, 27 viii 2014, LS.

Mi4 - 4 ♂♂, 25 viii 2014, EA; 1 ♂, 25 viii 2014, RD; 2 ♂♂, 25 viii 2014, OU; 3 ♂♂, 26 viii 2014, YT. **Mi5** - 1 ♂, 24 viii 2014, RD. **Mi7** - 2 ♂♂, 25 viii 2014, LS.

Mi8 - 5 ♂♂, 22 viii 2014, OU.

Coeliccia nigrohamata Laidlaw, 1918

S1 - 1 ♂, 11 vii 2014, RD; 4 ♂♂, 13 vii 2014, RD; 1 ♂, 13 vii 2014, RN; 1 ♂, 15 vii 2014, OU; 7 ♂♂, 1 ♀, 17 vii 2014, OU. **S2** - 1 ♂, 12 vii 2014, RD; 2 ♂♂, 1 ♀, 12 vii 2014, LS; 1 ♂, 15 vii 2014, RN. **S3** - 13 ♂♂, 2 ♀♀, 16 vii 2014, OU & LU. **Mo1** - 2 ♂♂, 20 viii 2014, RD; 1 ♂, 1 ♀, 24 viii 2014, EA & OU. **Mi2** - 1 ♂, 1 ♀, 23 viii 2014, RD.

Mi4 - 1 ♂, 24 viii 2014, NS; 1 ♂, 25 viii 2014, EA; 2 ♂♂, 25 viii 2014, OU; 1 ♀, 26 viii 2014, OU; 4 ♂♂, 2 ♀♀, 27 viii 2014, EA & OU. **Mi5** - 1 ♂, 24 viii 2014, RD.

Mi8 - 5 ♂♂, 22 viii 2014, OU; 2 ♂♂, 23 viii 2014, MT.

Coeliccia southwelli Dow & Reels, 2011

This is the first record of *C. southwelli* since it was described from Mount Dulit (Dow & Reels 2011). Additionally a re-examination of the specimen listed as *Coeliccia* sp. A in Dow (2010) has convinced us that it is most likely a teneral specimen of *C. southwelli*, increasing its known range into the northern central part of Borneo (Figure 17).

Mi2 - 2 ♂♂, 24 viii 2014, RD.

Copera vittata (Selys, 1863)

S1 - 2 ♂♂, 12 vii 2014, RN; 1 ♀, 15 vii 2014, OU. **S2** - 2 ♂♂, 12 vii 2014, LS.

S3 - 1 ♀, 16 vii 2014, OU & LU. **Mo2** - 1 ♀, 24 viii 2014, EA & OU.

Mi1 - 1 ♀, 21 viii 2014, LS; 1 ♀, 22 viii 2014, RD. **Mi4** - 1 ♂, 27 viii 2014, EA & OU.

Prodasineura dorsalis (Selys, 1860)

S1 - 1 ♂, 17 vii 2014, OU; 1 ♂, 17 vii 2014, LS. **Mi4** - 1 ♂, 1 ♀, ♂+♀, 25 viii 2014, RD; 1 ♂, 1 ♀, 26 viii 2014, OU.

Prodasineura hosei (Laidlaw, 1913)

S1 - 1 ♂, 10 vii 2014, RN. **S2** - 1 ♂, 17 vii 2014, RD. **Mi4** - 3 ♂♂, 25 viii 2014, RD; 3 ♂♂, 26 viii 2014, EA, NS & MT; 5 ♂♂, 26 viii 2014, RD; 1 ♂, 26 viii 2014, YT; 2 ♂♂, 26 viii 2014, OU.

Prodasineura hyperythra (Selys, 1886)

S1 - 1 ♂, 12 vii 2014, RN; 1 ♂, 13 vii 2014, RN; 1 ♂, 13 vii 2014, NP; 2 ♂♂, 16 vii 2014, OU & LU; 1 ♂, 17 vii 2014, RN. **S2** - 2 ♂♂, 12 vii 2014, RD; 3 ♂♂, 1 ♀, 12 vii 2014, LS.

Mi2 - 1 ♂, 23 viii 2014, RD. **Mi4** - 1 ♂, 25 viii 2014, OU; 1 ♂, 2 ♀♀, 26 viii 2014, EA, NS & MT. **Mi8** - 1 ♂, 22 viii 2014, OU.

Prodasineura verticalis (Selys, 1860)

S1 - 2 ♂♂, 18 vii 2014, RD.

Coenagrionidae

Amphicnemis species cf *dactylostyla* Liefstinck, 1953

It was extremely interesting to find this species in small patches of low pH swamp forest between Sungai Moh and Sungai Pejelai, it represents the first record of a species allied to *A. martini* Ris, 1911 from an upland area; the species of this group are normally found in lowland forest, most often in low pH swamp forest formations.

Mi5 - 1♂, 1♀, 22 viii 2014, EA & MT; 2♀♀, 24 viii 2014, RD; 1♀, 24 viii 2014. MT; 1♀, 27 viii 2014, YT.

Archibasis tenella Liefstinck, 1949

Mi4 - 2♂♂, 26 viii 2014, EA, NS & MT.

Argiocnemis species

S1 - 1♂, 17 vii 2014, LS. **S3** - 3♂♂, 16 vii 2014, OU & LU.

Mi4 - 2♀♀, 27 viii 2014, EA & OU.

Ceriagrion bellona Laidlaw, 1915

S3 - ♂+♀, 15 vii 2014, LS. **Mo2** - ♂+♀, 20 viii 2014, RD; 11♂♂, 6♀♀, 24 viii 2014, EA & OU. **Mi4** - 1♂, 2♀♀, 25 viii 2014, EA; 1♂, 25 viii 2014, OU.

Stenagrion dubium (Laidlaw, 1912)

S1 - 1♂, 10 vii 2014, RD; ♂+♀, 13 vii 2014, RD; 2♂♂, 13 vii 2014, RN;

1♂, 14 vii 2014, RD. **S2** - 1♂, 17 vii 2014, RD. **Mo1** - 1♂, 20 viii 2014, RD;

2♂♂, 21 viii 2014, RD. **Mi2** - 2♂♂, 27 viii 2014, RD. **Mi4** - 1♂, 25 viii 2014, EA.

Teinobasis laidlawi Kimmins, 1936

One male collected at Ulu Moh is immature, with brown colouration; it was collected at the head of a tiny high gradient stream, hanging underneath a leaf (behaviour typical for *T. cryptica* Dow, 2010). The site is not typical for the species and we suppose that this immature individual had moved away from the swampy areas between the Moh and Pejelai, the most likely habitat seen for the species in the area, whilst maturing.

S3 - 7♂♂, 7 vii 2014, LS & LU. **S4** - 2♂♂, 10 vii 2014, RD. **Mi2** - 1♂, 22 viii 2014, RD.

Xiphiagrion cyanomelas (Selys, 1876)

Mo2 - 1♂, 21 viii 2014, RD; 12♂♂, 4♀♀, 24 viii 2014, EA & OU.

Anisoptera

Aeshnidae

Anax panybeus Hagen, 1867

S5 - 1♂, 17 vii 2014, RD.

Indaeschna grubaueri (Förster, 1904)

S4 - 1♂, 15 vii 2014, RD. **S5** - 3♂♂, 15 vii 2014, LS & LU.

Tetracanthagyna degorsi Martin, 1896

Mo1 - 1♀, 20 viii 2014, RD.

Gomphidae

In addition to species collected from the Gomphidae, the first author observed a species of *Megalogomphus* on a tributary of the Sungai Pejelai, and a small species of *Macrogomphus* that he is sure he has never seen before, on the same stream.

Gomphidia maclachlani (Selys, 1873) (Figure 18).

S1 - 1♂, 13 vii 2014, RN; 1♀, 15 vii 2014, OU; 1♂, 16 vii 2014, OU & LU.

Mi2 - 1♀, 23 viii 2014, RD.

Heliogomphus species

A general female that cannot be identified to species.

S1 - 1♀, 17 vii 2014, OU.



Figure 18. *Gomphidia maclachlani* male in hand. Photograph by Robin Ngiam.

Leptogomphus coomansi Laidlaw, 1934

S1 - 1♀, 16 vii 2014, RD.

Leptogomphus new species

This new species will be named in a revision of the genus in Borneo.

S1 - 1♂, 13 vii 2014, RD; 1♀, 15 vii 2014, RD; 1♂, 17 vii 2014, RN.

Leptogomphus cf *pasia* van Tol, 1990

This species is not *L. pasia*, the name used here is for consistency with earlier publications, e.g. van Tol (1990); it will be named in a revision of the genus in Borneo.

S1 - 1♂, 17 vii 2014, RN.

Leptogomphus williamsoni Laidlaw, 1912

S1 - 1♀, 17 vii 2014, RN. **S2** - 1♂, 17 vii 2014, RD.

Chlorogomphidae

Chlorogomphus species

A single female was collected while apparently ovipositing in a seepage at Sungai Sii; at present it cannot be matched to a male of any described species (Figure 19).

S1 - 1♀, 11 vii 2014, RD.



Figure 19. *Chlorogomphus* species female. Scale bar 20mm. Photograph by Rory Dow.

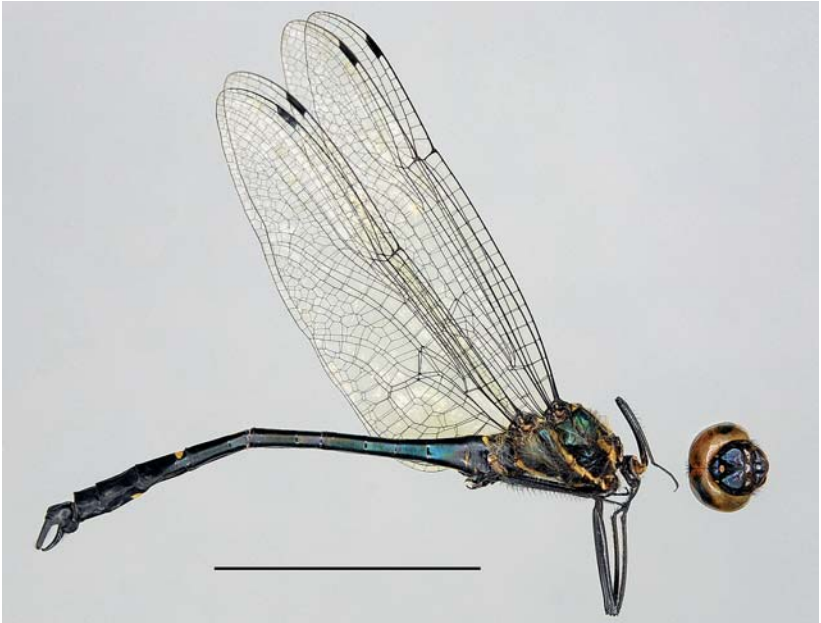


Figure 20. *Macromia corycia* male. Scale bar 20mm. Photograph by Rory Dow.

Macromiidae

Macromia cydippe Laidlaw, 1922

S1 - 1♂, 17 vii 2014, RN.

Macromia corycia Laidlaw, 1922

There are very few records definitely of this species, originally described from the upper Baram by Laidlaw (1922), it was recorded from the Koyan River in the Dulit range by Kimmins (1936), from south eastern Kalimantan by van Tol (2006) and from the Lanjak Entimau Wildlife Sanctuary in western Kapit division by Norma-Rashid et al. (2010). Other records (e.g. in Orr 2001) are of females and, given the well-known difficulties involved in identification of female *Macromia*, might possibly refer to some other species. *Macromia gerstaeckeri* Krüger, 1899, a species with a wide distribution in Sundaland, was recorded from Sabah by Liefertinck (1971) based on a female specimen; the two species are very similar, at least structurally, and might be synonymous. Even if they are not the same species it remains questionable if the record from Sabah is really *M. gerstaeckeri* or is actually *M. corycia*. The males collected by the first author at Sungai Sii and at Ulu Moh were all flying between 8 and 10 h am (Figure 20).

S1 - 1♂, 10 vii 2014, RD; 1♀, 13 vii 2014, RD. **Mi4** - 1♂, 25 viii 2014, OU; 2♂♂, 26 viii 2014, RD.

Macromia westwoodi Selys, 1874

S1 - 1♀, 12 vii 2014, RN; 1♂, 16 vii 2014, RN. **S2** - 1♀, 15 vii 2014, RN.

Corduliidae

Procordulia fusiformis Lieftinck, 1977

Males were collected at a pond by a high (ca 1000 m a.s.l.) section of logging road in the Ulu Moh area. Most records of this species come from similar habitats; clearly it is tolerant of disturbance, or even favours the type of forest edge ponds that are frequently found beside (usually created by) logging roads.

Mo2 - 3 ♂♂, 24 viii 2014, EA & OU.

Libellulidae

Agrionoptera sexlineata Selys, 1879

Mi5 - 2 ♂♂, 22 viii 2014, EA & MT.

Cratilla lineata (Brauer, 1878)

S6 - 1 ♂, 14 vii 2014, LS.

Cratilla metallica (Brauer, 1878)

S1 - 1 ♂, 10 vii 2014, RD; 1 ♂, 10 vii 2014, RN; 1 ♂, 16 vii 2014, RN.

S6 - 1 ♂, 16 vii 2014, LS. **Mo2** - 2 ♂♂, 24 viii 2014, EA & OU.

Mi7 - 2 ♂♂, 24 viii 2014, LS.

Hylaeothemis clementia Ris, 1909

S1 - 1 ♂, 17 vii 2014, OU. **Mo1** - 1 ♂, 24 viii 2014, EA & OU.

Lyriothemis biappendiculata (Selys, 1878)

S1 - 1 ♂, 15 vii 2014, OU; 1 ♂, 16 vii 2014, OU & LU. **S2** - 3 ♂♂, 12 vii 2014, LS.

Mi2 - 1 ♂, 23 viii 2014, RD. **Mi4** - 1 ♂, 25 viii 2014, EA; 1 ♀, 25 viii 2014, RD;

1 ♂, 27 viii 2014, EA & OU. **Mi8** - 1 ♂, 22 viii 2014, OU; 1 ♂, 23 viii 2014, MT.

Lyriothemis cleis Brauer, 1868

S1 - 1 ♂, 11 vii 2014, RD; 1 ♀, 17 vii 2014, NP.

Nesoxenia lineata (Selys, 1879)

Mi5 - 1 ♂, 24 viii 2014, RD; 1 ♂, 27 viii 2014, YT.

Neurothemis fluctuans (Fabricius, 1793)

S1 - 1 ♂, 10 vii 2014, RN; 1 ♀, 13 vii 2014, NP. **S6** - 1 ♂, 15 vii 2014, NP.

Mi1 - 1 ♂, 22 viii 2014, RD. **Mi4** - 1 ♂, 26 viii 2014, EA, NS & MT.

Onychothemis coccinea Lieftinck, 1953

Mi4 - 1 ♂, 25 viii 2014, RD; 1 ♂, 26 viii 2014, EA, NS & MT; 1 ♂, 27 viii 2014, EA & OU.

Orchithemis pulcherrima Brauer, 1878

Mi5 - 1 ♂, 22 viii 2014, EA & MT. **Mi8** - 2 ♂♂, 22 viii 2014, YT.

Orthetrum glaucum (Brauer, 1865)

S1 - 1 ♂, 10 vii 2014, RN. **S2** - 1 ♂, 12 vii 2014, OU. **S6** - 3 ♂♂, 16 vii 2014, NP;

1 ♀, 16 vii 2014, OU & LU. **Mo2** - 1 ♂, 20 viii 2014, RD. **Mi7** - 1 ♂, 27 viii 2014, NS.

Orthetrum pruinolum schneideri Förster, 1903

S1 - 1♂, 10 vii 2014, RN; 1♂, 13 vii 2014, NP. **S3** - 2♂♂, 1♀, ♂+♀, 15 vii 2014, LU & LS.
Mo1 - ♂+♀, 20 viii 2014, RD. **Mi1** - 1♂, 22 viii 2014, RD. **Mi3** - 2♂♂, 24 viii 2014, YT.
Mi7 - ♂+♀, 24 viii 2014, LS; 1♂, 27 viii 2014, NS. **Mi8** - 1♂, 22 viii 2014, EA & MT.

Orthetrum testaceum (Burmeister, 1839)

S1 - 1♂, 10 vii 2014, RN. **S6** - 1♂, 15 vii 2014, RN. **Mi1** - ♂+♀, 22 viii 2014, RD.
Mi4 - 2♂♂, 26 viii 2014, EA, NS & MT; 1♂, 26 viii 2014, YT.

Pornothemis serrata Krüger, 1902

The occurrence of this swamp forest species in the upland Ulu Moh area might have been surprising if had not already been found at higher altitude on the Usun Apau plateau (Dow, Reels & Ngiam 2015b).

Mi1 - 1♀, 22 viii 2014, RD. **Mi5** - 4♂♂, 1♀, 22 viii 2014, OU; 4♂♂, 22 viii 2014, YT;
 2♂♂, 24 viii 2014, RD; 1♂, 27 viii 2014, YT.

Rhyothemis regia (Brauer, 1867)

This is the first record of this species from Sarawak; in Borneo there are published records from two sites in Sabah (Chung *et al.* 2013) and the first author has observed it in the Maliau Basin area, also in Sabah. Figure 21a shows the male from Sungai Sii, Figure 21b shows a male from Mindanao.

S5 - 1♂, 17 vii 2014, RD.

Rhyothemis triangularis Kirby, 1889

S5 - 2♂♂, 17 vii 2014, RD.

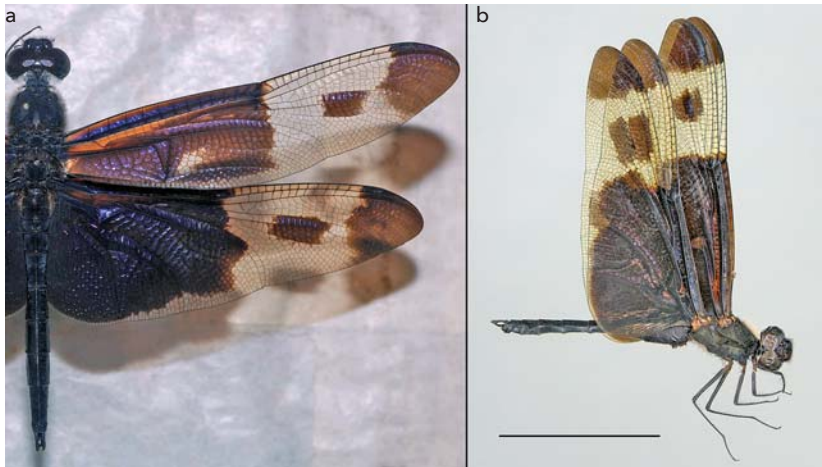


Figure 21. *Rhyothemis regia* males. (a) Male from Sungai Sii in hand. Photograph by Robin Ngiam. (b) A male from Mindanao, the Philippines. Scale bar 20mm. Photograph by Rory Dow.

Tetrathemis irregularis hyalina Kirby, 1889

S1 - 1♂, 15 vii 2014, OU. **S2** - 1♂, 12 vii 2014, LS. **S3** - 1♀, 16 vii 2014, OU & LU.

Tramea species cf *virginia* (Rambur, 1842)

There is one old record of *T. virginia* from Borneo (Hincks 1930: ♂ and ♀ from Bintulu in Sarawak, collected in 1925; these specimens may be in the Sarawak Museum). A male collected at Sungai Sii differs in some details from specimens from China. *Tramea* remains in a state of great confusion in Asia; the true identity of the Sungai Sii specimen (and those collected in 1925) can probably only be determined once a thorough revisional study of the genus in Asia has been made. The pair from Bintulu might have been supposed to represent individuals from further north accidentally displaced to Borneo by strong winds. However the discovery of a specimen far inland at Sungai Sii suggests that the species may be resident in Borneo (Figure 22).

S5 - 1♂, 17 vii 2014, RD.



Figure 22. *Tramea* cf *virginia* male. Scale bar 20mm. Photograph by Rory Dow.

Trithemis aurora (Burmeister, 1839)

S1 - 1♂, 10 vii 2014, RD.

Trithemis festiva (Rambur, 1842)

S2 - 1♂, 12 vii 2014, RD. **S6** - 1♂, 15 vii 2014, NP. Mo1 - 2♂♂, 1♀, 24 viii 2014, EA & OU. **Mi7** - 1♂, 27 viii 2014, NS.

Tyriobapta torrida Kirby, 1889

S1 - 1♂, 11 vii 2014, RD; 1♂, 12 vii 2014, RN; 1♂, 13 vii 2014, LS; 3♂♂, 15 vii 2014, OU.
S2 - 1♂, 12 vii 2014, LS. **S3** - 1♂, 16 vii 2014, OU & LU. **S4** - 2♂♂, 17 vii 2014, LS.
Mi1 - 1♂, 22 viii 2014, RD. **Mi8** - 1♂, 22 viii 2014, EA & MT; 1♂, 22 viii 2014, OU;
2♂♂, 27 viii 2014, YT.

Zygonyx iris errans Lieftinck, 1953

S1 - 2♂♂, 12 vii 2014, RN; 1♂, 2♀♀, 13 vii 2014, RN; 1♂, 16 vii 2014, OU & LU.

Zyxomma obtustum (Albarda, 1881)

S5 - 2♂♂, 12 vii 2014, RD; 1♂, 15 vii 2014, RN; 2♂♂, 15 vii 2014, NP.

Incertae sedis

Idionyx species

Mo2 - 1♀, 29 viii 2014, RD. **Mi7** - 1♀, 27 viii 2014, EA.

Macromidia fulva Laidlaw, 1915

S1 - 1♂, 15 vii 2014, RN. **Mo1** - 2♀♀, 20 viii 2014, RD. **Mi4** - 1♂, 25 viii 2014, RD.

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