DREPANOSTICTA SIMUNI SPEC. NOV. FROM BORNEO, WITH NOTES ON RELATED SPECIES (ZYGOPTERA: PLATYSTICTIDAE)

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The new sp. is described from Gunung Mulu National Park in Sarawak, Malaysian Borneo and compared with its closest congener, Drepmosticta barbatula Lieftinck and D. drusilla Lieftinck, which are also figured. New distribution records for the latter 2 spp. are documented.

INTRODUCTION

The Platystictidae, once considered to be a small family in the Zygoptera, are now known to be very diverse on the islands of south-east Asia (e.g. VAN TOL, 2000, 2005, 2007a, 2007b; DOW, 2010; VILLANUEVA et al., 2011; VILLANUEVA & SCHORR, 2011), but many species remain very poorly known. In some cases this lack of data is simply the result of a lack of expert sampling in the area in which a species is found, but in other cases it appears to be linked to the secretive habits of the species concerned and, possibly, genuine rarity.

LIEFTINCK (1940) described Drepmosticta barbatula from a single male collected in east Kalimantan, a distinctive species bearing a row of long setae on the superior anal appendages. In 2005 a male Drepmosticta with very similar anal appendages and general appearance was collected at Gunung Mulu National Park, Sarawak and was initially identified (DOW & REELS, 2008) as D. barbatula on the basis of Lieftinck’s description and illustrations. Direct comparison of this specimen with the type of D. barbatula has revealed that it is a distinct species; it is described here as D. simuni sp. nov. Earlier LIEFTINCK (1934) had described D. drusilla from a single male from north-west Kalimantan. Examination of the anal
appendages of *D. drusilla* reveals a close similarity with those of *D. barbatula* and *D. simuni*; however the superior anal appendages of *D. drusilla* lack a distinct row of long setae. All of these species appear to be either very secretive in their behaviour, and/or genuinely scarce. *D. barbatula* was only known from the holotype for 65 years, but a second specimen from Sabah was collected in 2005. Similarly the only definite records of *D. drusilla* were of the type series collected in 1932, but two additional specimens of *D. drusilla*, from west Sarawak, are now available.

**DREPA NOSTICTA BARBATULA** LIEFTINCK, 1940

Figures 2, 5, 8, 10, 13


**Material.** – **Holotype** ♂: (Jan van Tol number 3023), Indonesia, Kalimantan Timur, Sangkulirang, "Batu Besi", leg. M.E. Walsh, VI-1937. – **Other material**: ♂, Malaysia, Sabah, Mount Kinabalu National Park, Poring Hot Springs, stream in Bamboo Garden, leg. unknown, 1-V-2005, in RMNH.

**Remarks.** – The male from Poring Hot Springs agrees well with the holotype of *D. barbatula* except in small details of colouration, and in size; abdomen plus appendages 42mm (48mm in the holotype), hindwing 22.5mm (24.5mm in the holotype). A pair of distinct but irregular basal pits are present on the dorsum of S10 (Fig. 10); these were not mentioned in the original description of *D. barbatula* but are also present on the holotype. Long setae are present on the genital valves of both specimens available.

**DREPA NOSTICTA DRUSILLA** LIEFTINCK, 1934

Figures 3, 6, 11, 14


*Drepanosticta? barbatula*; DOW & REELS, 2010: 15, photographic record.

**Material.** – **Holotype** ♂: (Jan van Tol number 3032), Indonesia, Kalimantan Barat, Sungkawang, Bengkajang, 30-VIII-1932, leg. L.C. de Ruiter. – **Other material**: ♂ (SAR06_PST17), Malaysia, Sarawak, Kuching Division, Lundu district, foot of Gunung Pueh, perched ca 3m above trail pool, leg. R.A. Dow, 28-I-2006; ♂ (SAR09_10_PST413, tentral), Malaysia, Sarawak, Kuching Divi-
Drepanosticta simuni sp. n.

sion, Kubah National Park, Matang Wildlife Centre, in forest at mouth of tributary of Sungai Rayu, leg. R.A. Dow, 4-VI-2010.

REMARKS. — The photographic record made by the first author at Kubah National Park (DOW, 2004; DOW & REELS, 2010; ORR, 2004) and originally thought to be D. barbatula is almost certainly actually D. drusilla; the teneral male from 2010 was captured very close to the spot where the photograph was taken. The two species are very similar in size and appearance. In both of the recent specimens from Sarawak there are a few long setae in the position where D. barbatula and D. simuni have a row of long setae. Distinct basal pits are present on the dorsum of S10 (Fig. 11), as in D. barbatula and D. simuni. Long setae are present on the genital valves. The mature male from Gunung Pueh has an abdomen length plus appendages of ca 45.5mm, Hw 22mm; this is within the range stated for the males from the type series (LIEFTINCK, 1934: 475).

DREPA NOSTICTA SIMUNI SP. NOV.

Figures 1, 4, 7, 9, 12, 15


Material. — Holotype ♂: (SAR05_PST1), Malaysia, Sarawak, Miri division, Gunung Mulu National Park, foot of Gunung Mulu, perched trails side near junction of Summit Trail with old trail to the Sarawak Chamber, leg. J. Simun, 24-IV-2005.
Etymology. — Simuni, a noun in the genitive case. Named for Jeffry Simun, who collected the holotype, a member of the staff at Gunung Mulu National Park and friend of the first author.

DIAGNOSIS. — A long bodied platystictid, readily distinguished from all other members of the family except *D. barbatula* by the combination of size, lack of pale antehumeral markings and presence of a row of long setae arising directly from the underside of the apical half of the superior anal appendage. Distinguished from *D. barbatula* by the deep cleft in the tip of the superior anal appendage, and the more slender internal spine on the inferior anal appendage.


Thorax. — Prothorax, largely pale yellowish white except propleuron, which has extensive dorso-posterior black marking, and the central third of the posteri-
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or pronotal lobe which is black. Posterior pronotal lobe of simple crescent shape. Synthorax: Meseptisternum and meseptimeron bronzyl black. Antealar triangles black near apex, pale towards wing bases. Metepisternum largely occupied by a yellowish band running its entire length, bronzyl black below this. Metepimer-

don mostly yellowish, with a black area below the meta-
pleural suture. Venter of synthorax pale. Legs: each with
coxa and trochanter cream, femur cream with a dark
stripe along extensor surface, black above joint. Tibia black
immediately below femur, then mostly brown, darker on
flexor surface, tarsus brown.

Wings: 13 Px in Fw, 12 Px in
Hw. Anal crossing branched
in all wings. R₄ arising distal
to subnodus in IR₁, joined to
it by a short stalk. Pterostigma
an elongate trapezium
with costal side shorter than
anal side, and proximal side
slightly shorter than distal
side, dark brown with narrow
white border, covering slight-
ly more than one underlying
cell.

A b d o m e n. — Largely
brown. S1 yellowish cream
latterly, brownish dorsally,
this darker near basally but
with a small central basal yellow
mark, cream to sides.
S3–7 brown with a pale basal
annulus, becoming broader
and more diffuse on success-
seive segments. S8 very dark
brown and black above, pale
brown at sides. S9 black with
a pair of dorsal basal yellow
spots (Fig. 4). S10 black, with

Figs 10–12. Male anal appendages, dorsal view: (10) Drepa-
nosticta barbatula, Poring Hot springs; — (11) D. drusilla,
Gunung Pueh; — (12) D. simuni sp. n., holotype.
a pair of deep widely separated dorsal basal pits (Figs 4, 12). Long setae are present on the genital valves. Anal appendages (Figs 7, 9, 12, 15) brown, inferiors paler than superiors, especially basally. Superior appendage ca twice the length of S10, directed upwards from base, then abruptly downwards at ca half length, the two sections at slightly more than a right angle to each other, the apical section slimmer than the basal one in lateral view (Fig. 7). A long spine originates from the inner margin of the upper surface of the superior anal appendage at the down-turn. Row of long beard-like setae arising from the underside of the superior appendage (Fig. 7). Tip of superior appendage deeply cleft interiorly, most visible in internal-oblique dorsal view (Fig. 9), between the spine and the base of the cleft lies an pale, weakly sclerotised, hollowed area. Inferior anal appendages as shown in Figures 7 and 15, articulated at base then narrowing to a stalk bearing a long, thin, internally directed spine arising from the inner dorsal surface at ca midpoint of appendage, expanded terminally into a dorsally hallowed foliate structure. Penis (Fig. 1): of typical form for the family (see illustrations in VAN
TOL, 2009), with a row of setae centrally on either side of the shaft and a very slight convexity between the arms of the terminal segment.

**Measurements** (mm). — Abdomen without caudal appendages ca 45.5, superior appendage just over 1, Hw 23.

**Remarks.** — *D. simuni* is very similar to *D. barbatula*, but differs significantly in the structure of the terminal part of the superior anal appendages and in the inferior anal appendages. In the inferior anal appendages of *D. simuni* not only is the terminal part a different shape from that of *D. barbatula*, but the inner margin of the appendage runs smoothly from the articulation to the spine (Fig. 15), whereas in *D. barbatula* (and *D. drusilla*) the inner margin runs inwards then contracts sharply shortly after the articulation, making a sharp corner (Figs 13, 14)

**Discussion**

The row of long setae on the superior anal appendages of *D. barbatula* and *D. simuni* is superficially similar to the dense tuft of setae occurring on the superior appendages of *D. hamadryas* Laidlaw, 1931 and its allies from Peninsular Malaysia. LIEFTINCK (1940) noted this similarity, but, correctly in our view, did not propose a particularly close relationship between *D. barbatula* and the mainland species. In *D. barbatula* and *D. simuni* the setae arise as a relatively long row on the lower surface of the superior appendages, whereas in *D. hamadryas* and its allies they arise as a concentrated bunch from a small stalk-like protuberance. There are also significant differences in the structure of the inferior appendages between *D. barbatula* and *D. simuni* on the one hand and *D. hamadryas* and allies on the other. As already noted, *D. drusilla* is extremely similar in structure and coloration to *D. barbatula*, with the most significant difference being the lack of the row of long setae on the superior appendages; however as noted above, in the specimens from Sarawak a few long setae are present in the same position. The two species can be further differentiated by the shorter distance between the sharp corner on the inner margin of the inferior anal appendage and the base of the spine in *D. barbatula* (Figs 13, 14), the more strongly inward turned and less smoothly shaped terminal part of the inferior anal appendage and the colour of the middle pronotal lobe: entirely pale in *D. drusilla* but with a dark central mark in *D. barbatula*. All of these species share well defined, deep basal dorsal pits on S10 of the abdomen: depressions are present in this position in all species of the Platystictidae that have been checked for this character by the first author, but vary considerably in depth and size; in many cases they are very shallow and poorly defined and easily overlooked. They also all share long setae on the genital valves, a character not typically present in the Old World Platystictidae. Clearly *D. drusilla* falls within the same group as *D. barbatula* and *D. simuni*.

There are also number of similarities between *D. barbatula*, *D. drusilla* and *D. simuni* and two other species from south-east Asia: *D. attala* Lieftinck, 1934 from
Borneo (LIEFTINCK, 1934) and *D. lestooides* (Brauer, 1868), originally described from Mindanao in the Philippines but now known to have a wider distribution within the Philippines (VAN TOL, 2005). The anal appendages of *D. attala* differ in that the dorsal spine of the superior anal appendages is more inwardly directed, so that it is only just visible in typical lateral view (LIEFTINCK, 1934: fig. 2). The anal appendages of *D. attala* are extremely similar in structure to *D. lestooides*, with the inferior anal appendages of both of the same general form as those of *D. barbatula* etc. *D. attala* and *D. lestooides* also share the same form of penis as *D. barbatula* etc. The pits on the dorsum of S10 do not appear to be as well defined in *D. lestooides* as in *D. barbatula* etc.; they are very poorly defined in *D. attala*. However both *D. attala* and *D. lestooides* bear long setae on the genital valves. All five species are here considered likely to form a monophyletic group. The habitat in which the holotype of *D. barbatula* was collected was not recorded. However the specimen from Poring Hot Springs was apparently collected at a small stream. The holotype of *D. simuni* was collected trailside in mixed dipterocarp forest. There was a variety of streams, from tiny trickles to a large torrential stream, in the vicinity. LIEFTINCK (1934: 474) records “forest-brook” as the habitat of the two males from the type series of *D. drusilla*. This information is not on the labels of the type series and must presumably have come from the collector. It is not possible to know if the specimens were actually collected at the brook or merely somewhere in its vicinity. The mature male *D. drusilla* from Gunung Pueh was collected away from running water, but the teneral male from the Matang Wildlife Centre was collected at the confluence of a small closed canopy forest stream with its much larger parent stream. On several occasions the first author has observed platystictids likely to be *D. drusilla* in forest away from any stream at the Matang Wildlife Centre. It is difficult to draw firm conclusions on the habitat requirements of these species, but they probably breed in small forest streams and are either very scarce or, more likely, are secretive in their habits and only spend short periods at accessible heights at the breeding habitat. It is worth noting that *D. attala* appears to spend much of its time perched sufficiently high in the forest to be effectively undetectable. It has been observed ovipositing into leaf ribs high above swift running sections of larger forest streams than are typical of the habitats of most Platystictidae (R.A. Dow unpublished).

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