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SHORT COMMUNICATIONS

THE LARVA OF *MACROMIA EUTERPE* LAIDLAW, 1915 (ANISOPTERA: MACROMIIDAE)

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An exuviae, associated with the named sp., is described, illustrated and compared with SE Asian congeners, *M. moorei fumata* Krüger and *M. westwoodi* Sel.

INTRODUCTION

A male exuviae of a species of *Macromia* was discovered at Poring Kipungit waterfall and stream, Mt Kinabalu. Sabah, North Borneo, by Matti Hämäläinen. *M. euterpe* is the only representative of the genus to have been observed flying at this particular site.

M. euterpe is a small species, which appears to inhabit the more rapid sections of streams on Mt Kinabalu. It is fairly common in the Poring area and is also commonly found at Mt Kinabalu headquarters area (alt. 1500-1600 m). The species is a Bornean endemic known from the Mt Kinabalu area of Sabah and from the Tinjar Basin in Sarawak (LIEFTINCK, 1957).The exuviae was found at the spot where two descending streams unite ca 150 m below the Kipungit waterfall. The stream is torrential, approximately 4-5 m broad, containing many boulders and drains the south eastern lower slope of Mt Kinabalu, which is covered in lowland dipterocarp forest. Since *M. euterpe* is the only species of its genus so far observed at Mt Kinabalu, it is very likely that the exuviae belongs to this species. The adult female has been observed on several occasions laying eggs on a very torrential section of stream between two waterfalls. The only other odonate at this demanding site was *Stenagrion dubium* adults of which are characterized by having very short and strong legs adapted for hanging in misty vegetation on vertical cliffs (M. Hämäläinen, pers. comm..).

MACROMIA EUTERPE LAIDLAW, 1915

Figures 1, 2a

Material. – 1 ♂ exuviae, NORTH BORNEO: Sabah, Mt Kinabalu, Poring Kipungit waterfall and stream, alt. 500 m, 17/20-IV-1994, M. Hämäläinen leg.

Overall length 26,5mm (Fig. 1a). Body surface light brown, mainly smooth, but with tubercles on antennal bases, post occipital lobes and lateral borders of both prothorax and abdomen.

Head less than twice as broad as long (Fig. 1a), ratio length: breadth approx 8:10. Greatest width of head approximates to the hind margin of eyes. Lateral margins of head strongly convergent, both anteriorly and posteriorly, producing a somewhat pentagonal appearance. A low blunt conical tubercle marks the angle between the rear and lateral margins and is positioned directly behind each eye. The rear margin of the head is slightly sinuous, but not curving anteriorly in the centre as in other related species.

The frons is rectangular, developed anteriorly into an upturned frontal ridge, which has a straight margin and concave warty dorsal surface. Post and ante clypeus both smooth, with dark markings and a setal clump on the lateral margins. The antennae are long, at least twice as long as the distance between their bases. The relative lengths (in mm) are: segm. 1 = 3; segm. 2 = 2,5; segm. 3 = 2,5; segm. 4 = 1,8; segm. 5 = 3; segm. 6 = 1,6; segm. 7 = 1,5.

Labium (Fig. 1b), (extended, but not flattened) ratio width:length = 7:9. The distal margin is finely crenated with 20+ irregularly placed setae on either side of a slightly pronounced obtuse central lobe. These setae become reduced in size towards the articulation of the labial palp. The left side pattern of mental setae is 7 long and closely set outer setae, succeeded by 2 medium sized setae, then by 1 short and 1 minute seta, on left side the pattern is 7+2+2, with no visible minute central seta.

The labial palps bear 5 long setae, though the basal third is unarmed except for a medium sized seta situated close to the palpal hinge. The distal margins of the palpal lobes (Fig. 1d) have 7 indentations, which become successively deeper apically, the crenations between these indentations gradually develop in shape from being round-edged at the internal margin to a narrow finger-shaped projection at the latero-distal margin adjacent to the movable hook. This latter projection is bifurcated, bearing a tiny lobe apically and that on left side is much smaller than the right side equivalent.

Thorax. – The pleural ridge surrounding the notum is strongly formed with a well-developed swelling on the lateral margins, the whole prothoracic area being smooth, with no visible setae. Wing cases set almost parallel (though raised in illustration to show abdominal features), reaching to just over the distal margin of segm. 5.

Legs long, femora of all legs laterally compressed and bearing three pale brown markings. Tibia similarly compressed, bearing two similar markings.

Abdomen. – Comparatively small and only moderately arched in cross section

(mainly so in the last three segments). In dorsal view the greatest width is reached at segm. 6. Lateral spines are present on segs 8 & 9, that on 8 being about half the length of that on segm. 9. The latter spine is stouter, slightly incurved and reaches 2/3 way to the distal margin of segm. 10. Dorsal hooks are present on segs 2-10 (Fig 1f), those on segs 2-4 being slender and erect, that on 4 being slightly recurved and those on 5 stouter and strongly recurved, with a pronounced keel. The hook on segm. 10 is short, but pronounced, projecting over the distal margin of its segment. The anal pyramid

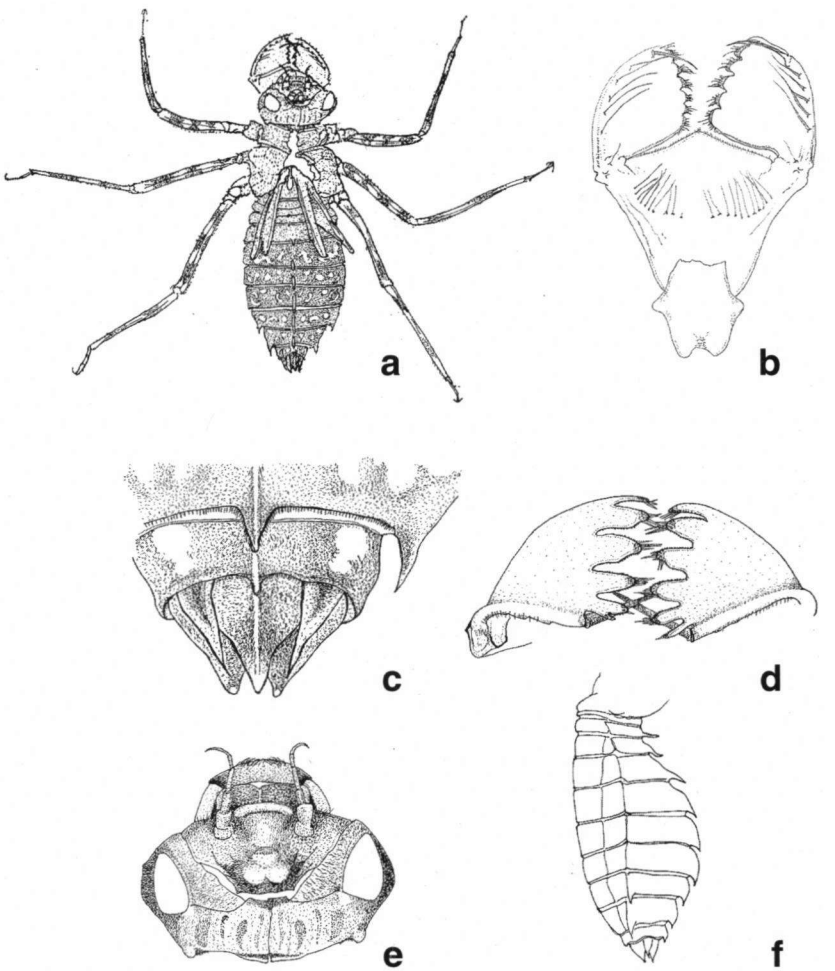

Fig. 1. *Macromia euterpe* Laidlaw, final instar exuviae: (a) general aspect; – (b) labium dorsal view; – (c) anal appendages, dorsal view; – (d) labium, frontal view; – (e) head, dorsal view; – (f) abdomen, lateral view.

(Fig. 1c) is approximately the same length as seg. 9, the epiproct is strongly keeled and just longer than the cerci, the paraprocts being slightly longer than both. All are dark basally with pale tips.

Colour pattern. – Thorax, legs and head are mid brown with pale blotches. Segs 10, 9 & 8 are similarly coloured, the rest of the abdomen becomes paler on the basal segments, being darkest overall at the lateral margins. The dorsal surface of the abdomen has a pale patch where the wing cases normally cover the central area of each segment. A sinuous pattern runs parallel and close to the lateral margin and pale blotches surround the dorsal hooks. In between these areas small pale spots are irregularly distributed, except on segm. 10, which has only a pale patch marking the base of the cerci. Similar wart-like tubercles surround the smooth areas on either side of the median line. There are smooth patches on segs 4-10, surrounded by mottled warts.

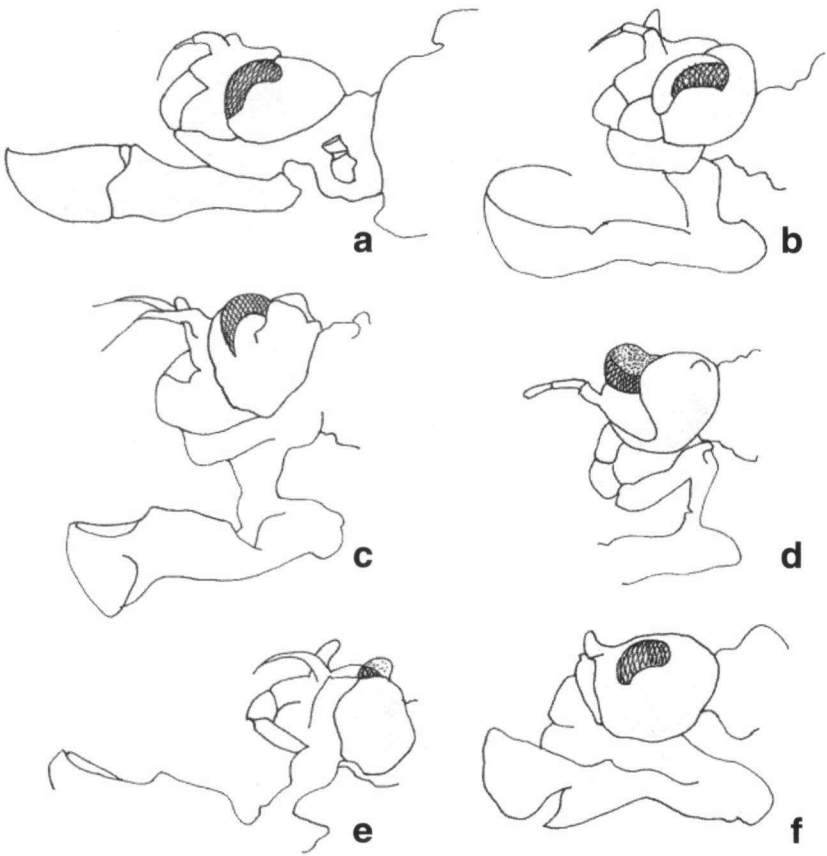

Fig. 2. Larval head and prothorax, in left lateral view: (a) *Macromia euterpe* Laidlaw (Borneo); – (b) *M. m. moore* Sel. (Nepal); – (c) *M. amphigena* Sel. (Japan); – (d) *M. flavocolorata* Fraser (Nepal); – (e) *M. westwoodi* Sel. (Malaysia); – (f) *Phyllomacromia trifasciata* (Ramb.) (Madagascar).

DISCUSSION

LIEFTINCK (1950) separates the larvae of *Macromia* into current resisting and current evading types and lists the form and structures by which he classifies them. According to this list *M. euterpe* would appear to be a current evader which buries itself in the substrate. Its abdomen is not strongly carinated in cross section, being slightly flattened though the ventral surface is not as flat as in those species which use it in order to adhere to leaf surfaces. Its legs are longish, radially arranged and flattened in cross section and they are attached quite near to where the sides meet the ventral surface of the thorax. The tarsae are long, being useful for anchoring purposes, although the tarsal claws are more curved than in some sand dwelling *Macromia* species. The highest point of the body is at the attachment of the wing cases which subsequently slope apically downwards to the abdomen, providing a simple "... stream line principle ...".

Normally the substrate dwellers have horn-like protruding eyes, (see Figs 2a-f) for a range of eye and frontal horn shapes), though in *M. euterpe* these are not so pronounced (Fig. 2a) and the strange ridge-shaped frontal horn (Figs 1e, 2a) is not found in any other species that I have studied. The light patterning on the abdomen (Fig. 1a) would suggest a sand dweller, though of course exposure to light can cause bleaching. In the areas where the species has been observed there may well be small areas of sand among the large boulders, but the greater part of the substrate is of a rather coarser material (M. Hämäläinen, pers. comm.).

M. euterpe differs also from the species described by LIEFTINCK (1950), in having a strongly defined hook on segm. 10 (Fig. 1f), only *M. westwoodi* having an "... apical projection ... ". The wart-like tubercles surrounding the median line appear to be rather less defined in shape than those described in *M. westwoodi* by LIEFTINCK (1950). It is also slightly larger 26mm as opposed to the included species of which the largest recorded *M. moorei fumata* attains 24mm.

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