

THE LARVA OF *ANTIPODOPHLEBIA ASTHENES* (TILLYARD): A TERRESTRIAL DRAGONFLY? (ANISOPTERA: AESHNIDAE)

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The last-stage larva of *A. asthenes* (Till.) is described and illustrated, and compared with larvae of the allied genus *Telephlebia* Selys. Although the last-stage larval *Antipodophlebia* is terrestrial, it is not known whether earlier stages are aquatic.

INTRODUCTION

Until recently, *Antipodophlebia asthenes* (Tillyard) has been one of the least known of the Australian Odonata. Originally described, as a species of *Telephlebia* Selys, from two adult females, one from Killarney and the other from "Mount Tambourine" (=Tambourine Mountain) in south-eastern Queensland (TILLYARD, 1916), and transferred to a new, monotypic genus *Antipodophlebia* by FRASER (1960), it was not rediscovered until 1976, when G. Theischinger and L. Müller collected a good series of both sexes from the Bunya Mountains and Mapleton Falls, also in south-eastern Queensland (THEISCHINGER, 1977). However, Theischinger and Müller were unable to find larvae or exuviae of *Antipodophlebia* along creeks in areas where the crepuscular adults were abundant, although *Telephlebia* larvae were common.

The reason for their failure to find larval *Antipodophlebia* has now become apparent, through the accidental discovery of the larva in a terrestrial situation at Joalah National Park, North Tamborine. The *Antipodophlebia* larva was fully grown, a pharate adult female, and had the appearance of a diminutive *Telephlebia*; as only one species of *Antipodophlebia* is known, and the larva came from one of the type localities, we suppose that it is *A.*

asthenes. Its discovery constitutes the first record of a terrestrial anisopteran larva from Australia, and possibly the first such instance known.

DESCRIPTION OF LARVA

Material. (Fig. 1). — 1 last stage female larva, Joalah National Park (27°56'S., 153°12'E.), North Tamborine, Queensland, Australia, 18-21 Oct. 1978, J.F. Lawrence and T.A. Weir. In Australian National Insect Collection, Canberra.

Measurements. — Total length 27.0 mm; length of abdomen 19.0 mm; length of posterior femur 4.70 mm; width of head including eyes 6.67 mm; greatest width of abdomen 4.52 mm.

Colour (Fig. 1). — Blackish brown marked with brownish yellow to pale brown as follows: line along sides of postocular lobes; lobes of pronotum; around mesothoracic spiracle; nodal area and region of pterostigma on wing-pads; central part of femora, and two rings around tibiae; ill-defined lateral stripe from segments 1 to 8 of abdomen.

Body surface. — Slightly shagreened, with numerous tiny dots and very short and fine hairs.

Head. — Labium extending posteriorly to mesocoxae; prementum (Fig. 3) 4.44 mm long, 1.80 mm wide at base, 2.88 mm wide at distal end; distal margin of prementum as a whole slightly angulated with very poorly indicated median cleft and one small tooth very close to it on each side; labial palp (Fig. 5) narrowly subrectangular, its apex rounded on outer side, end hook developed, inner margin finely and somewhat irregularly denticulate, movable hook strong, little shorter than palp. Eyes (Fig. 6) large, strongly protruding; postocular lobe irregularly and finely notched. Vertex markedly raised (Fig. 4). Antennae piliform, 5-seg-



Fig. 1. Female larva of *Antipodophlebia asthenes* (Till.) (total length 27 mm).

mented, segment 3 longest.

Thorax. — Prothorax with small rounded lateral lobes and strong processes (Fig. 7), anterior process longer and horn-like, bent forward, posterior shorter and almost straight. Synthorax armed with three conical tubercles on each side, one above mesocoxa, one above metacoxa and one dorsal to metathoracic spiracle. Wing-sheaths reaching to the middle of abdominal segment 4. Legs short, slender.

Abdomen. — Lateral spines on segments 7-9. Tergite 10 with very flat cone (Fig. 8). Female gonapophyses (Figs 8, 9) reaching beyond middle of segment 10. Anal pyramid (Figs 8, 10) with paraprocts little larger than epiproct; paraprocts slightly curved inward at tips, epiproct evenly curved downwards. Cerci less than half as long as triangular projection on upper epiproct.

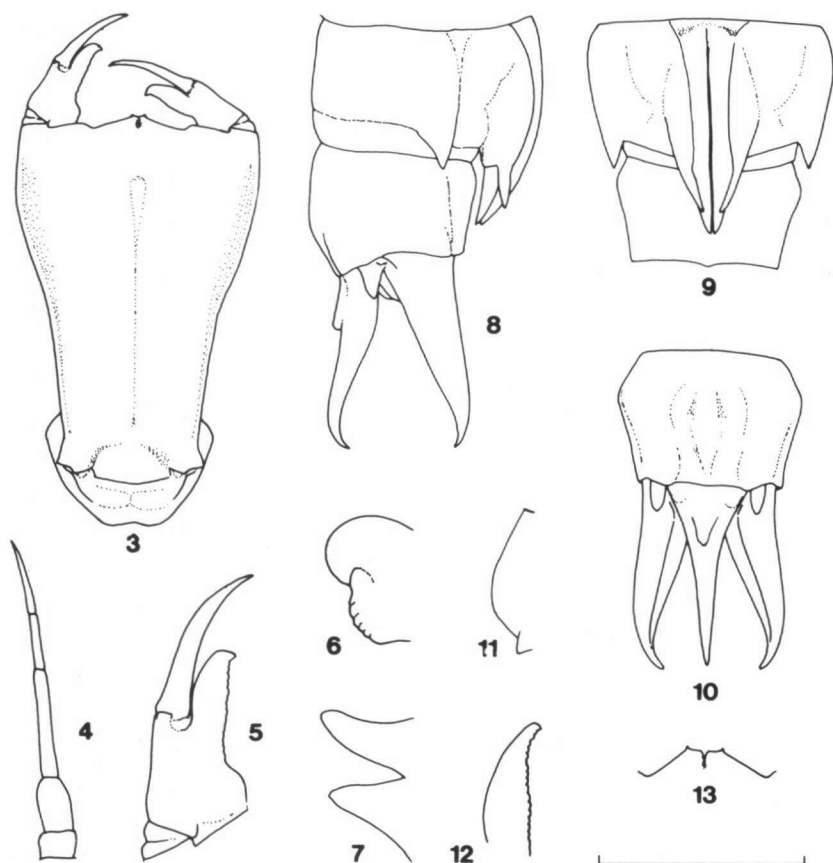


Fig. 2. View across Cedar Creek, North Tamborine, Queensland. The creek bed is in the foreground; a footpath extends across the slope slightly below the centre of the picture; the rock face bounding the valley is in the upper background. For sketch of section of valley see Figure 14.

DIAGNOSIS

The larva of *Antipodophlebia* closely resembles larvae of only one other Australian brachytronine genus, *Telephlebia*; its 5-segmented antennae and progressively tapering abdomen distinguish it from all others. It differs from *Telephlebia* larvae, of which we have material of several species, by its smaller size, its less prominent and more shallowly cleft ligula (cf. Figs 3, 13), the much stouter, less tapered labial palp (cf. Figs 5, 12), the flatter cone on abdominal segment

10 (cf. Figs 8, 11), and the lack of lateral spines on abdominal segment 6. The apical, hirsute ridges on abdominal segments 3-9 (TILLYARD, 1916) are much more weakly developed than in *Telephlebia*.



Figs 3-10. Female larva of *Antipodophlebia asthenes* (Till.): (3) labium, ventral view; — (4) left antenna, dorsal view; — (5) right palp, ventral view; — (6) outline of left eye and post-ocular lobe, dorsal view; — (7) left prothoracic processes, dorsal view; — (8) segments 9 and 10 and anal pyramid, lateral view; — (9) segments 9 and 10, ventral view; — (10) segment 10 and anal pyramid, dorsal view. Figs 11-13. Female larva of *Telephlebia godeffroyi* Selys: (11) outline of tergite 10, lateral view; — (12) apex of right palp, ventral view; — (13) ligula of prementum, ventral view. Scale = 1.25 mm for Figs 4, 5, 7, 12; 2.5 mm for Figs 3, 8, 9, 10, 13; 5 mm for Fig. 6.

THE HABITAT OF LARVAL *ANTIPODOPHLEBIA*

Perhaps the most interesting feature of the larval *Antipodophlebia* was its habitat. The larva was collected from the underside of a log on the dry slopes of the valley of Cedar Creek, about which Joalah National Park centres. The slope supports rain forest, and TILLYARD (1916, Figs 1, 2) illustrated the lower parts of it. A further illustration is given in Figure 2 of this paper, and a rough sketch of its profile appears in Figure 14. Although the superficial litter was dry, the soil under stones and logs was damp. Lawrence and Weir collected their larva not far uphill of the path shown in Figures 2 and 14, and in August, 1979, Watson found a fragment of a further odonate larva, apparently *Antipodophlebia*, in spider web under a log perhaps half way from the path to the lower margin of the valley wall. The underside of this second log was damp, but without free water.

Potential prey was abundant throughout the litter — various small insect larvae and adults, Acarina, Arachnida, Opiliones, Amphipoda, Iso-poda, and Myriapoda.

We know of no earlier records of truly terrestrial anisopteran larvae, and it need not be assumed that the larva of *Antipodophlebia* is terrestrial throughout its life. S. EDA has shown that the last instar larva of *Epiophlebia superstes* Selys, the relict anisozygopteran, is terrestrial during the last few months of its life (P.S. Corbet, pers. comm.). If the larva of *Antipodophlebia* behaves in this way, it would have to be very mobile, for the logs were a horizontal distance of up to perhaps 50 m, and a vertical distance of perhaps 5–10 m, from the creek, and possibly a shorter distance from some minor seepages below the margin of the valley.

It is also worth bearing in mind that although few odonate larvae have managed to regain the terrestrial habits of their ancestors, many have developed, or perhaps retained, the ability to withstand the absence of free water for at least part of their larval lives, even if only for short periods. Species that appear to have done so include several Australasian forms — the megapodagrionids of the *Argiolestes pusillus* complex and *Podopteryx selysi*

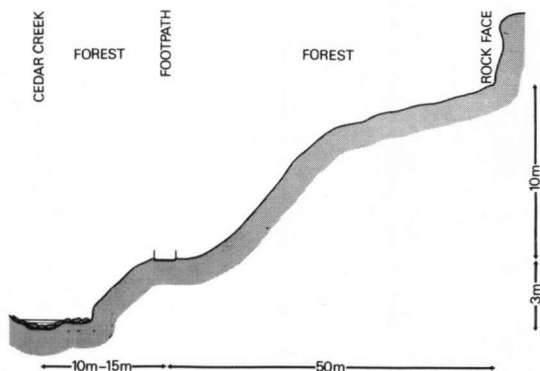


Fig. 14. Sketch of section of Cedar Creek Valley, North Tamborine, Queensland, near the alignment of Figure 2. Measurements very approximate.

(Förster), species of *Petalura* Leach and *Uropetala* Selys (Petaluridae), *Telephlebia* and perhaps *Austropetalia* Tillyard (Aeshnidae), the synthemistids *Synthemis eustalacta* (Burmeister) and *S. leachi* Selys, and *Austro-cordulia refracta* Tillyard (Corduliidae) (TILLYARD, 1910, 1916; WATSON, 1965, 1967, 1977, 1980; WATSON & DYCE, 1978; WOLFE, 1953).

The closest parallel with *Antipodophlebia* is the larva of its close ally, *Telephlebia*. We know from TILLYARD (1916) and our own observations that larval *Telephlebia* are semi-aquatic, and can not only move away from free water, but can also catch terrestrial or aerial insects. We have taken larval *Telephlebia*, of several species and instars, from damp litter within a few metres of streams, and from almost dry sand in a creek bed. Perhaps the larva of *Antipodophlebia* shows a similar, but more extreme, specialisation.

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