

SHORT COMMUNICATIONS

**DESCRIPTION OF THE LAST INSTAR LARVA OF
AGRIOCNEMIS PINHEYI BALINSKY, 1963
(ZYGOPTERA: COENAGRIONIDAE)***

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Larvae of African *Agriocnemis* are virtually unknown. The larval morphology of *A. pinheyi*, a southern African species, is described here for the first time. Some notes on its biology are appended.

INTRODUCTION

The subfamily Agriocnemidinae in the Coenagrionidae is represented by five genera, which are widely distributed in Africa, Asia and Australia. Seventeen species of the genus *Agriocnemis* occur in Africa (DAVIES & TOBIN, 1984), and five in South Africa (PINHEY, 1984). While there are descriptions of some of the larvae of Asiatic species, the larval morphology of the African species is virtually unknown. There is only a weak description of *A. pygmaea* (Rambur, 1842) by PINHEY, (1974) on specimens from the Seychelles, and an illustration of the palpus of *A. sania* Nielsen, 1959 by DUMONT (1991) on specimens from Palestine.

A. pinheyi Balinsky, 1963 is considered by DAVIES & TOBIN (1984) to be synonym of *A. exilis* Sélys, 1872. However, we follow PINHEY (1984), and consider *A. pinheyi* as bona fide species, whose distribution is limited to Kwazulu Natal, Transvaal, Zimbabwe, Mozambique and Zambia (PINHEY, 1984). The larval morphology of *A. pinheyi* is described here for the first time.

* This paper is dedicated to the memory of our colleague, the late Dr J.A.L. (Tony) Watson.

METHODS

The last-instar larvae were collected in the field and reared through to emergence in the laboratory. Species determinations were from the teneral imago. Exuviae were stored in 75% ethyl alcohol, and drawn using a stereomicroscope and camera lucida (50X magnification). All measurements were to the nearest 0.1 mm, using a micrometric eyepiece.

CORBET's (1953) terminology for the labium was adopted.

DESCRIPTION

Material. – 4 ♂ and 4 ♀ final instar larvae from the National Botanical Gardens, and 1 ♀ final-instar larva from the Bird Sanctuary, Pietermaritzburg, Kwazulu Natal, South Africa, February 1992, G. Carchini leg.

Body shape typical for the Coenagrionidae (Figs 1B, 2A) but considerably smaller than in other genera. Body shows a distinctive colour pattern: under surface

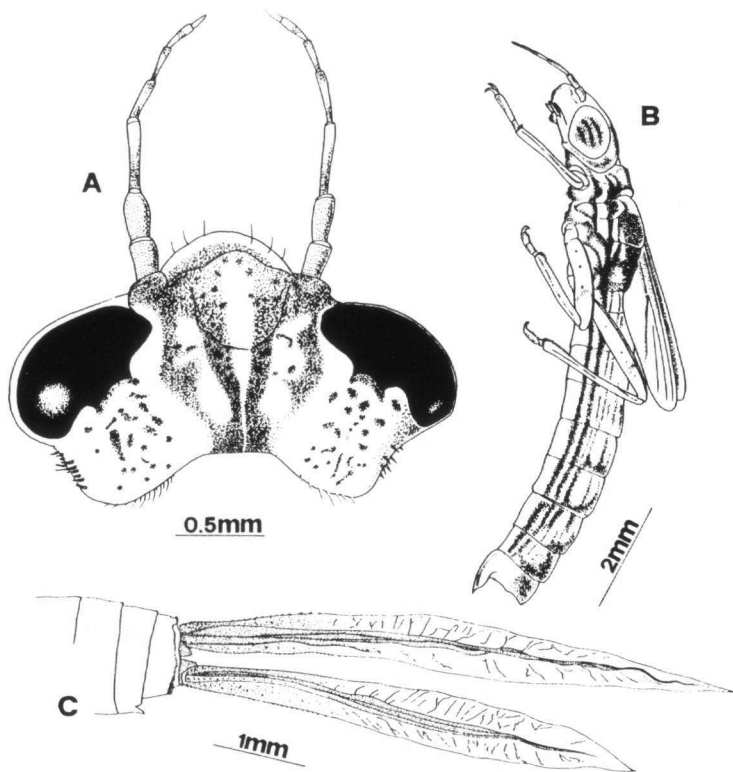


Fig. 1. *Agriocnemis pinheyi*, larva: (A) head, dorsal view; – (B) whole body, lateral view (mask and last part of abdomen removed); – (C) caudal lamellae.

cream-coloured, lateral and dorsal surfaces mostly brown. The brown not uniformly distributed, but forms longitudinal stripes, among which the colour cream is visible. Striped pattern more evident in lateral view (Fig. 1B: two lateral stripes run just below lateral carinae; more dorsally, the brown stripes become larger, and, on the abdomen, the cream ones become very faint, but still remain on the thorax and on the head, where they are partially replaced by rows of dark spots, each being the location for one or more setae.

Head almost pentagonal, the postocular lobes well developed behind the occiput, and the postero-lateral corner only a little rounded. Eyes large, pale cream in the fixed material, green-yellowish in the living insect, with three dark stripes running parallel to the frontal plane, the two superior ones being more marked.

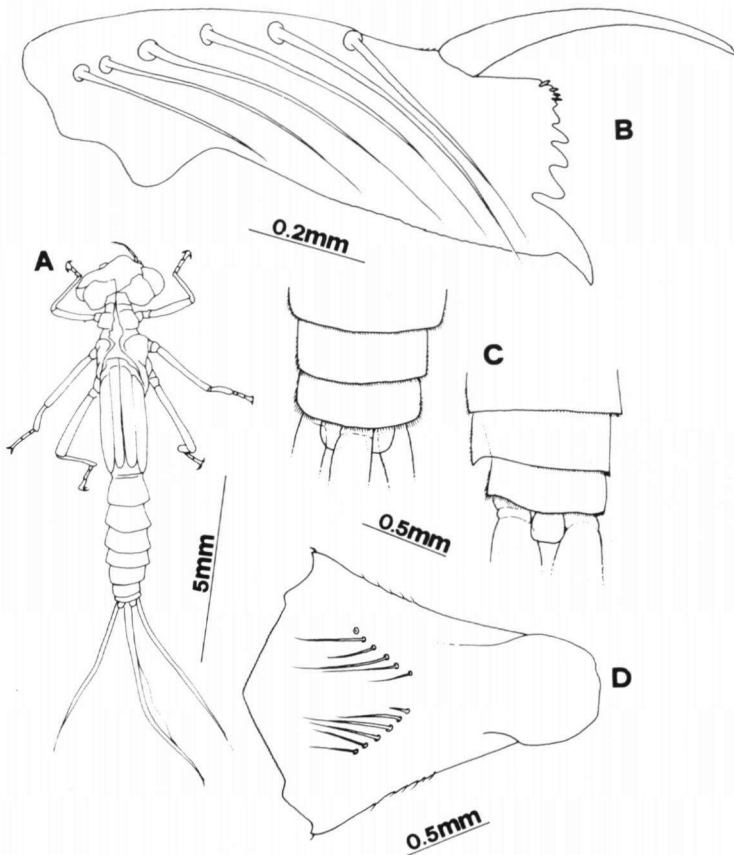


Fig. 2. *Agriocnemis pinheyi*, exuviae: (A) dorsal view; – (B) palpus; – (C) lamellae insertions with cerci in dorsal and lateral view; – (C) prementum, dorsal view.

Dorsal surface of the head with a V-shaped marking, open forward, and two symmetrical stripes running backward from the insertions of the antennae. More laterally, two other symmetrical bands of isolated brown spots (Fig. 1A). In lateral view, a brown stripe links the stripes of the eye with the ones of the thorax. Undersurface of the head with dark spots along the margins of the eyes, each spot bearing a spiniform seta.

The general colour is different in the newly-moulted larva; the brown is very light, and the lateral stripes of the head and thorax barely visible, and not as clear as those on the abdomen. Stripes on the eyes do not change in colour or shape during moulting.

Antennae 7-segmented, the third segment being the longest. The first two segments brown, and the remaining ones alternate brown and cream rings. Seventh segment very short.

Prementum pentagonal in shape. Premental setae usually 5+5, but varying from 5₁+5, to 4+₄. Two rows of spiniform setae on the lateral edges of the prementum (Fig. 2D). Distal margin of prementum feebly crenated. Undersurface of prementum with two very long hair-like setae. Articulation prementum-postmentum reaching the boundary between pro- and mesosternum.

Palpus typical of the family, resembling in shape that of *Ischnura*. Palpal setae usually 5&5, or 6&6, but in some cases 5&4 or 5&6. Moveable hook as long as palpal setae. No marginal setae (Fig. 2B).

T h o r a x almost glabrous, especially on the inferior surface. Wing sheaths massive, almost reaching the end of S4 in the last-instar larva.

Legs flattened, with a few spiniform setae. A brown ring on each tibia and each femur. A strong keel on femora and tibiae makes the legs lineate in appearance. Femora with a row of small, dark spots, each spot bearing a short spiniform seta.

A b d o m e n conical, with lateral carina on segments S1-S9. Each carina with a row of few, small spiniform setae on the edge. In the females, ovipositor reaching about the end of S10.

Cerci short and almost globe-shaped, both in males and females (Fig. 2C).

Caudal lamellae remarkably long and pointed, not flexible in the proximal half. No breaking line on lamellae insertions on S10. Principal tracheae almost straight, and secondary tracheae emerging from the latter at an angle a little less than 90°. Secondary tracheae thin, twisted and ramified, discontinuously pigmented.

Table I
Measurements (mm) from nine
specimens of *A. pinheyi*

| Character | Mean | S.D. |
|-------------------------------------|------|------|
| Head width | 2.4 | 0.06 |
| Distance between antenna insertions | 0.9 | 0.05 |
| Antenna length | 1.7 | 0.08 |
| Wing-sheath length | 2.8 | 0.14 |
| Hind femur length | 2.2 | 0.08 |
| Hind tibia length | 2.0 | 0.11 |
| Hind tarsus length | 0.8 | 0.05 |
| Mask length | 1.8 | 0.05 |
| Mask width | 1.3 | 0.05 |
| Body length | 9.4 | 0.10 |
| Medial lamella length | 5.5 | 0.40 |
| Lateral lamella length | 5.6 | 0.47 |

The proximal third of the lamella darker than the distal part, especially along the principal tracheae (Fig. 1C).

For measurements see Table I.

BIOLOGICAL NOTES

The larvae were collected in still water, among dense stands of *Typha* sp. Since the lamellae lack a line of breakage and are not flexible in the proximal half, they are probably not important for swimming. In the laboratory, when the lamellae are held in forceps, the living larvae are unable to cast them off. Thus, it seems that in this species, the caudal lamellae do not offer protection against predation, as is usual in the Coenagrionidae. It is likely that *A. pinheyi* rarely moves, remaining among the vegetation, where its striped body provides excellent camouflage.

DISCUSSION

The larva of this *Agriocnemis* species is clearly distinguishable from those of the other South African genera of Coenagrionidae. The total body length is much shorter. Also, the lamellae are comparatively longer, and lack a line of breakage, which is usually present in Coenagrionidae. Further, the striped pattern along the body, which is almost continuous from the head to the abdomen, is apparently peculiar to the species. Among the other African *Agriocnemis* spp., the only available complete description refers to *A. pygmaea* (PINHEY, 1974). Unfortunately, the description is very brief, and the illustrations poor. The shape of the head, body, lamellae, mask and the number of premental and palpal setae appear similar to those in our specimens. However, PINHEY (1974) does not mention the stripes on the abdomen, which are so evident in our specimens.

Larvae of some Asiatic species have also been described (KUMAR & PRASAD, 1978) (KERDPIBULE et al., 1979), (CHOWDHURY & MIAH, 1990). There are some differences in dimensions and features between *A. pinheyi* and these species: the larvae are generally small, ranging between 8.4 mm (*A. lacteola* Sélys, 1877) and 11.3 (*A. femina* Brauer, 1868) (CHOWDHURY & MIAH, 1990). However, the shape of prementum and palpus appears to be similar in all the species. *A. corbeti* has a very peculiar feature on the legs: tarsi and distal part of tibiae bear scattered pectinate setae, mixed with tridentate and simple setae (KUMAR & PRASAD, 1978). We have also observed these structures in *A. pinheyi*, yet there is no mention of this character in any of the other descriptions of African or Asiatic *Agriocnemis* spp.

Regarding the caudal lamellae, *A. corbeti*, *A. lacteola* and an unidentified *Agriocnemis* sp. from Thailand (KERDPIBULE et al., 1979), have distinct dark transverse pigmented bands. There is no evidence of these bands in *A. pinheyi*

(Fig. 1C) and in *A. femina*.

Finally, *A. sania* has a movable hook much shorter than the internal tooth of palpus. This very distinctive character distinguishes *A. sania* from *A. pinheyi*, and also from other described *Agriocnemis* larvae.

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