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New Leptophlebiidae (Ephem.) from the Transvaal

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With 4 figures in the text

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Introduction

Adults of the two new species described below were obtained by breeding out nymphal stages in the laboratory. The nymphs do well in captivity as they do not require flowing water. All descriptions are based on specimens that have been kept for some time in alcohol and that are therefore somewhat lighter in colour than fresh specimens. Paratypes of both new species will in due course be sent to the British Museum (Natural History) in London.

Adenophlebiodes (Hyalophlebia) patriciae n. sp.

Diagnosis

♂ imago: (Fig. 1.) As in ♂ leptophlebiid imagines generally, turbinate eyes divided into large upper portion and small lower portion. Upper portions contiguous, light lilac-grey, not columnar, subcircular in dorsal aspect. Basal portion light grey, not dorsally visible. Lateral ocelli white, much larger than median grey ocellus. Pronotum obscured by turbinate eyes. Mesoscutum light castaneous, with whitish median stripe and two longitudinal light fuscous markings. Metanotum centrally white. Femora white with fuscous suffusions basally, centrally and apically, more prominently so on the anterior surfaces. Tibiae with basal and submedian fuscous suffusions. Abdominal segments I—VII dorsally white with fuscous markings; segment VII in addition with two central dark stripes in anterior half. Segments VIII and IX generally light brownish-black. Abdominal pleurae whitish, each with a dorsoventral dark stripe. Abdomen ventrally white. Cerci and median filament subequal (?equal), with distinct white and lilac-brown segmental annulations. Genitalia whitish. Forceps with three lobes, basal joint elongate, terminal joints short. Penis members broad, dorso-

ventrally flattened, slightly divergent, apically aciculate, with tips in juxtaposition. (The segmentation of the penis lobes which CRASS indicates in his drawing of the genitalia of *Euphlebia bicolor* CRASS 1947 is possibly a misinterpretation as there is no sign of it in this species.) Wings completely hyaline, with no suffusions.

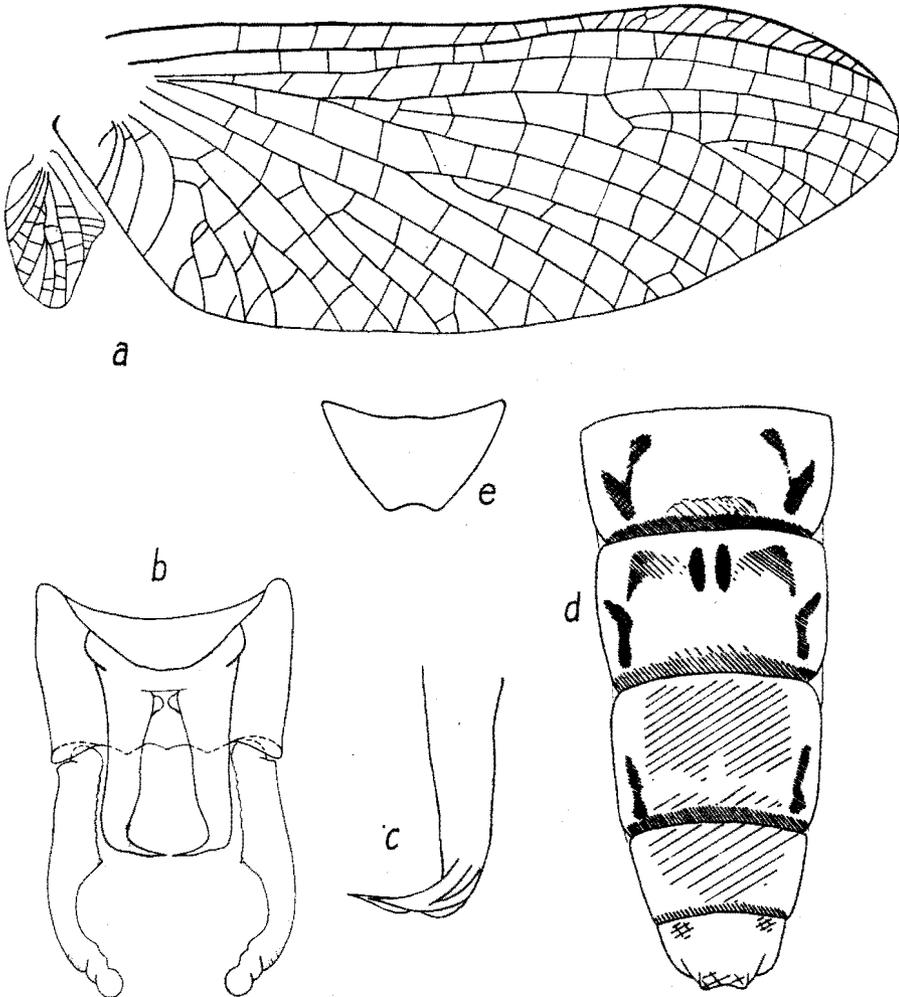


Fig. 1. *Adenophlebiodes (Hyalophlebia) patriciae* n. sp. (a—d, ♂ imago; e, ♀ imago) a. fore- and hindwing; b. genitalia; c. tip of penis lobe enlarged; d. dorsal view of last abdominal segments (semidiagrammatic); e. ♀ subanal plate.

Material: Holotype ♂ (with wings and genitalia mounted), 5 paratypes.

Length 8.5 mm, cerci c. 15 mm, forewing 9 mm X 3 mm, hindwing 2 mm X 1 mm.

♀ imago: (Fig. 1.) Similar to ♂, but thorax and abdomen more robust. Eyes dove grey, set at posterolateral sides of head. Lateral ocelli more widely spaced than in ♂. Pronotum with distinct fuscous pattern. Thorax generally similar to that of ♂; abdomen with overall light rufous ground colour. Abdominal segments dorsally with hint of clear median stripe: this passes between two darker marks on segment VII as described in ♂. Abdominal pleurae similar to those in ♂, but background colour dirty, with marks as described in ♂. Venter dirty whitish. Legs similar to those of ♂. Cerci and median filament as in ♂. Subanal plate triangular, with shallow concavity. Wings as in ♂.

Material: 7 ♀♀ (allotype series).

Length 8.3 mm, forewing 10 mm X 4 mm, hindwing 2 mm X 1 mm.

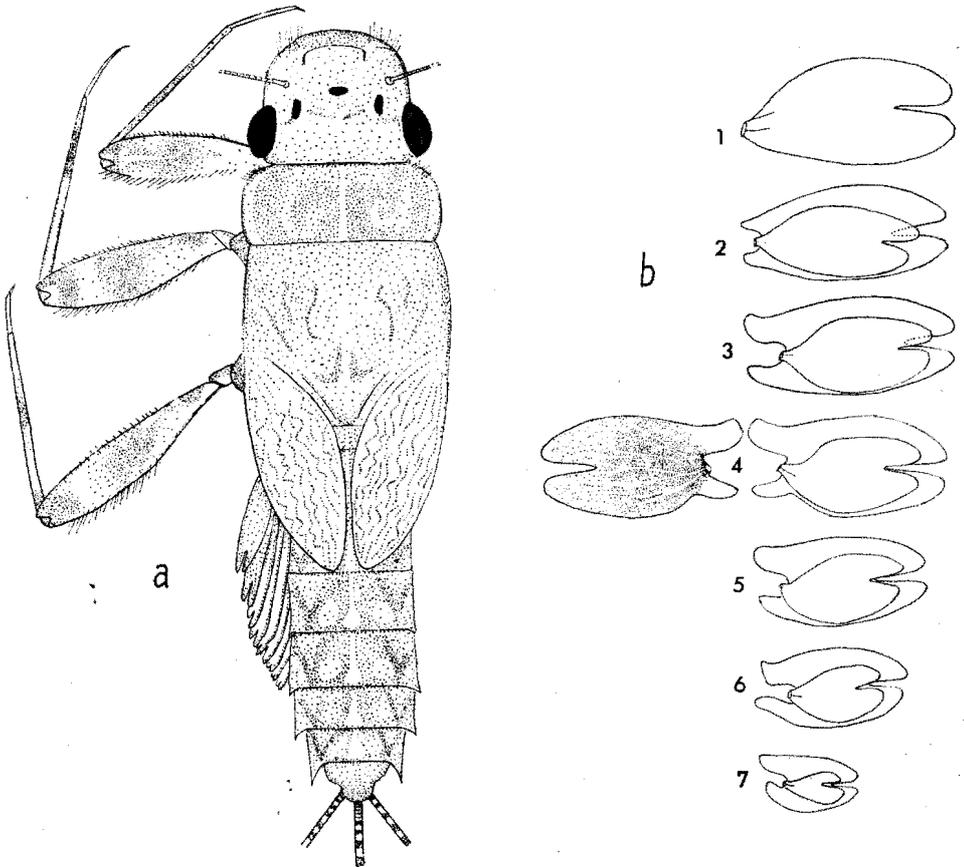


Fig. 2. *Adenophlebiodes (Hyalophlebia) patriciae* n. sp. (Mature nymph). a. dorsal aspect of nymph; b. gill-lamellae, with one lamella of fourth gill in detail.

Mature nymph: (Fig. 2 and 3.) General fascies (except for gills) similar to that of *Euthraululus*, but abdomen relatively shorter and femora

more dorsoventrally flattened, with dark patches. Very similar to *Euphlebica bicolor* CRASS = *Adenophlebiodes bicolor* (CRASS) (vide EDMUNDS 1953). Living nymphs have a black appearance. Gills light smoky colour, flat, lamellate, closely applied to the abdominal pleurae, with no filaments. Tracheation inconspicuous, not dark. Gill-attachment not at posterolateral tip of segment, but more dorsally, almost on anterior border of segment. First gill single and largest, thereafter the gills become progressively smaller. Gills on other segments bilamellate, the smaller anterior (upper) lamella being very similar but c. $\frac{3}{4}$ the size of the other. Each lamella with a deep apical excision. Gills very similar to those of *A. bicolor* but first gill not operculiform, not fringed with setae, and apically excised. Gills seven in number, not six as in *A. bicolor*. As in *A. bicolor*, the larger lamella of each pair has in the second gill slight, and in the remaining gills (3—7), prominent basal transparent extensions. Head rufous, with whitish and fuscous markings. Eyes black, antennae colourless, pronotal border antero-laterally setose. Thorax castaneous, with lighter ochraceous central and lateral markings. Segments VII to IX laterally uniacuminate. Cerci and median filament with distinct light brown-yellow and darker segmental annulations. Mouth parts as illustrated.

Material: 7 nymphs (various instars).

Length 9.5 mm.

Discussion

According to ULMER's (1933) key to the leptophlebiid genera, the species described above falls into *Adenophlebiodes* ULMER. This is therefore the second species of this genus to be recorded in Southern Africa, the other being *Adenophlebiodes (Adenophlebiodes) bicolor* (CRASS). It is the first South African record of a *Hyalophlebia*. The Central African species described in the literature all have distinctive genitalia or belong to *Adenophlebiodes* s. s. Of the six or so species described, only *A. bicolor* has been correlated with the nymphal stage, although DEMOULIN (1956) has figured an unspecified nymph of this genus with the query sub-gen. *Hyalophlebia*? DEMOULIN's nymph, though badly preserved, seems to agree with that of *A. bicolor* in gill number and in the nature of the first gill (operculiform), but the claws are less elongate, with fewer and coarser denticulations. The claw of *A. patriciae* n. sp. is very similar to that of DEMOULIN's nymph, but has 13 denticulations as opposed to the 9 figured by DEMOULIN (first claw in both cases). The gills of *A. patriciae*, however, show clear-cut differences when compared to those of both DEMOULIN's nymph and the nymph of *A. bicolor*. It seems therefore, that as far as nymphal morphology is concerned, only the claw structure is of subgeneric difference in *Adenophlebiodes*, i. e. if DEMOULIN's nymph is not really *Adenophlebiodes* s. s.

Further study of correlated nymphal material will be necessary to confirm this point.

Locality

Sterk River (a tributary of the Magalakwena) 39 km. NW of Potgietersrus (Jan., Feb. 1960) (= locus typicus). Mogol (Mokolo) River 4,5 km. NW of Vaalwater and Palala River 46 km. NE of Vaalwater (both Nov. 1960). Extensive sampling of most other Transvaal rivers has not revealed this species. It is therefore probably restricted to this area. Altitudes 1000 m. — 1250 m.

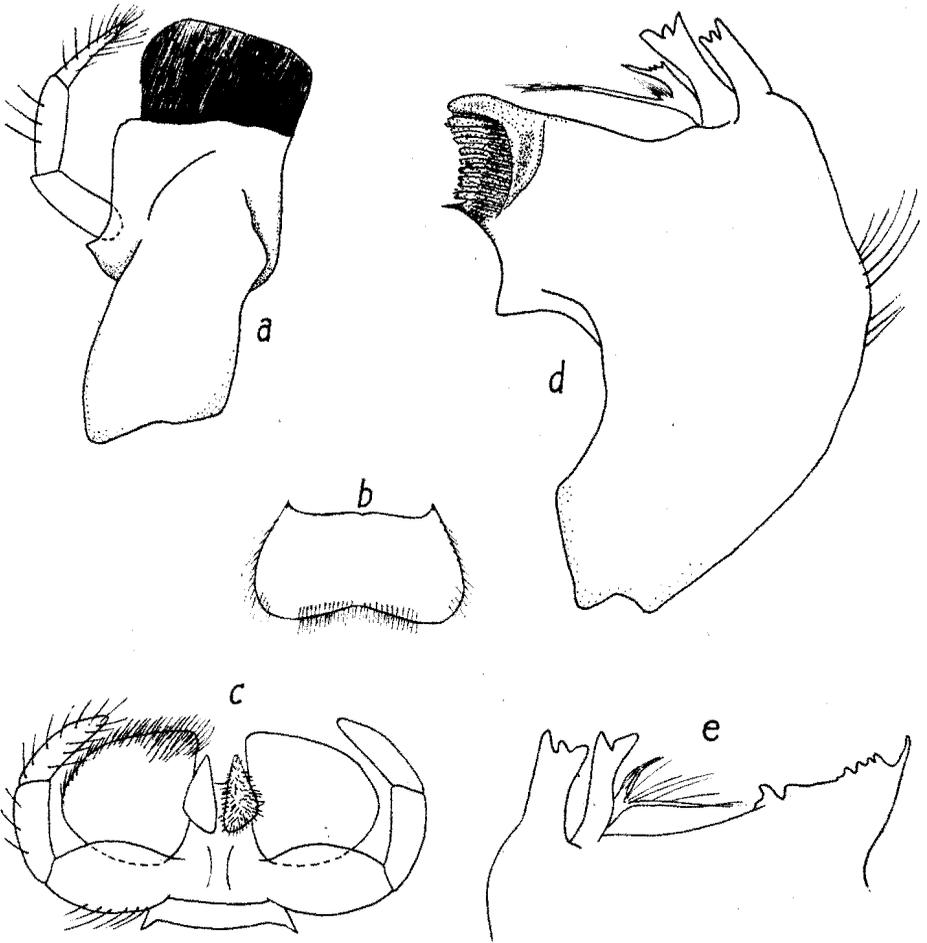


Fig. 3. *Adenophlebiodes patriciae* n. sp. Nymphal mouthparts.
 a. maxilla; b. clypeus; c. labium; d. left mandible, ventral;
 e. apex of right mandible, ventral.

General Notes

The nymphs, in their natural habitat, cling to stones in the quieter sections where they feed on algae and organic detritus. None was taken in stony runs where the current was moderately fast. Also found in the same habitat were nymphs of *Euthraulius* and *Metacnemis valida* SÉLYS. There were no obvious signs of pollution, either mineral or organic, in any of the rivers mentioned above. pH range at these localities is 7 to 8, according to daytime field readings. CHOLNOKY (1954), on the basis of algal samples from the Mogol, thinks that the pH of these localities is somewhat lower, say between 6 and 6.5, due to the weakly buffered nature of waters flowing off Waterberg System rocks, which consist mainly of conglomerates and sandstones. He ascribes the pH discrepancy to algal photosynthesis.

Choroerpes ndebele n. sp.

Diagnosis

♂ imago: (Fig. 4). In dorsal aspect, turbinate eyes distinctly separate; upper division orange, oval in outline; lower division grey, projecting forward from under anterolateral border of upper portion. Ocelli basally castaneous, apically opaque white. Lateral ocellus against anterior edge of upper division, much larger than median ocellus. Pronotum mottled fuscous and black. Thorax dorsally black. Femora and tibiae dark, tarsi lighter. Abdominal segments much lighter than thorax, each segment with a similar brown and light ochraceous pattern. Cerci and median filament minutely spinose, not annulate, light in colour. Genitalia light brownish. Forceps with two distinct small terminal lobes, which are not rounded but have an almost cubic appearance, especially the terminal lobe. Basal lobe (annulus) not satisfactorily distinguishable. Penis members slightly divergent, not tapering but almost spatulate, relatively larger than in *Choroerpes nigrescens* BARNARD 1932. Wings completely clear, with light brown neuration. Cross-venation, except in pterostigmal area, very light and in many places almost indistinguishable. Forewing with 10—15 simple cross-veins, of which one very faint vein is proximal to the bulla. Subcostal cross-veins 8—10, of which one or sometimes two are proximal to the bulla. Hindwing with a few cross-veins, in addition 3 subcostal and 1 subradial cross-vein. Venation seems somewhat variable.

Material: Holotype ♂, 1 paratype.

Length 8.75 mm., forewing 7 mm. × 2.3 mm.

♀ imago: Similar to ♂, but thoracic dorsum not black but a fuscous brown. Eyes dark grey. Cross-venation seemingly much more distinct than in ♂; Forewing without "gamboge patch on the pterostigmal portion of the costal and subcostal areas in the ♀ only" which BARNARD describes for

Ch. nigrescens. Cross-veins in forewing 19 in number, 2 being proximal to the bulla. Subanal plate triangular with truncated apex.

Material: 3 ♀♀ (allotype series).

Length 9 mm., forewing 8 mm. \times 2.5 mm.

Mature nymph: (Fig. 4). Very similar to that of *Ch. nigrescens*. The only structural differences between nymphs of the two species seem to be in the gill lamellae, if BARNARD's drawings of those of his species are accurate. Both species have gills attached to the first seven abdominal segments, with the first gill single and narrow-lanceolate (almost filiform) and the remaining gills double, foliaceous; with a much smaller apical leaf arising from an indentation in the lamella. The outline of this indentation seems quite distinctive in *Ch. ndebele* n. sp. Illustrations are given of gills from the type material of *Ch. nigrescens* (see discussion below), and of the gills of *Ch. ndebele* n. sp. It is not possible to determine whether there are

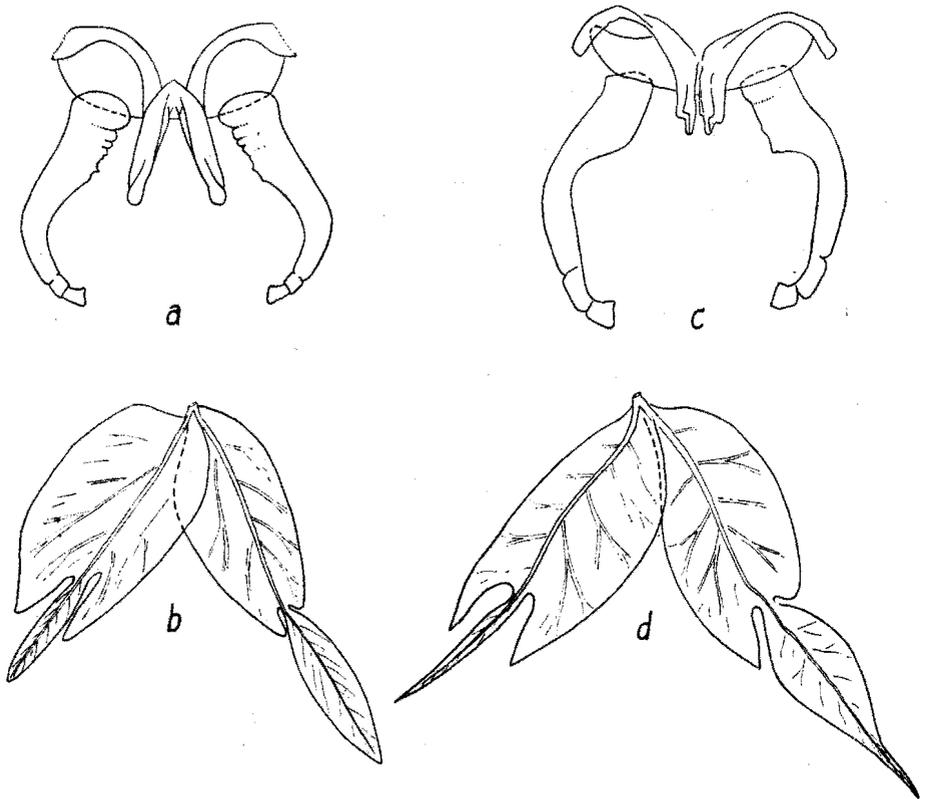


Fig. 4. *Choroterpes* spp.

a. *Ch. ndebele* n. sp. Genitalia; b. *Ch. ndebele* n. sp. Nymph. 2nd gill (right side), inner aspect with lamellae slightly moved apart; c. *Ch. nigrescens* BARNARD. Genitalia; d. *Ch. nigrescens* BARNARD. Nymph. 2nd gill (right side), inner aspect, with lamellae slightly moved apart.

any nymphal colour pattern differences as the material of *Ch. nigrescens* has lost all colour in the alcohol; even the gills have disintegrated somewhat. However, from BARNARD's description it would appear that the patterns are very similar.

Material: 2 nymphs (various instars).

Length 10 mm

Discussion

The species described above is the second of this genus to be recorded in the Sub-Saharan Region, the other being *Ch. nigrescens*. The two are obviously very closely allied, but it is probable that *Ch. nigrescens* is restricted to the southern and south-western Cape. Unfortunately, BARNARD in his description of *Ch. nigrescens* did not designate any types, and his published illustration of the genitalia is not quite satisfactory. Dr. K. M. F. SCOTT of Cape Town kindly made a search in the South African Museum and found a small collection of mayfly material, one tube of which was labelled "*Choroterpes nigrescens* BARNARD, Gr. Drakenstein." with no further information or date. It contains one ♂ imago with the genitalia removed and placed in a separate tube, a ♂ and ♀ subimago, and a few nymphal stages. It was obviously his type material and comes from one of his type localities, Groot Drakenstein. This material is now formally designated as the type material of *Choroterpes nigrescens* BARNARD 1932, and will be returned (labelled as such) to the South African Museum, Cape Town.

The type genitalia mentioned here have been redrawn for comparison with those of *Ch. ndebele* n. sp.

Locality

Pienaar's River at Baviaanspoort, c. 18 km. NE of Pretoria (Jan. 1961) (= locus typicus).

General Notes

The nymphs prefer quiet backwaters or slowly flowing water where they cling to the undersides of stones. They are found in association with nymphs of *Euthraulius bugandensis* KIMMINS 1956 (imagines bred out from these nymphs kindly identified by Dr. D. E. KIMMINS, British Museum).

Acknowledgements

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Summary

1. Two new leptophlebiids, *Adenophlebiodes (Hyalophlebia) patriciae* n. sp. and *Choroterpes ndebele* n. sp., are described. The nymphal forms are also described.

2. Short field notes on the nymphal habitats of the two new species are given.
3. The type material of *Choroterpes nigrescens* BARNARD 1932 is designated, and a new drawing of the genitalia of this species is given.

Zusammenfassung

1. Zwei neue Leptophlebiiden, *Adenophlebiodes (Hyalophlebia) patriciae* n. sp. und *Choroterpes ndebele* n. sp. werden mit ihren Nymphen zusammen beschrieben.
2. Über das Vorkommen und die Ökologie der Nymphen werden kurze Bemerkungen gegeben.
3. Die Ergebnisse der erneuten Untersuchung der Typus-Exemplare von *Choroterpes nigrescens* BARNARD 1932 und Zeichnungen ihrer Geschlechtsorgane werden mitgeteilt.

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