

A NEW SPECIES OF *PROCLOEON* BENGTSSON
FROM THE FOREST ZONE OF WEST AFRICA
(EPHEM., BAETIDAE)

BY M.T. GILLIES

In their reappraisal of the North American Baetidae, McCafferty & Waltz (1991) proposed a new and much wider definition of the genus *Procloeon* Bengtsson. The criteria on which this revision is based were not published, but the genus as now conceived includes the forms, a) with or without a hind wing in the adult, and b) with either single or double gill lamellae in the nymphs. Thus defined, it includes many species previously placed in *Centroptilum* Eaton and *Cloeon* Leach. It also conveniently removes the necessity for continuing to use the controversial name *Pseudocentroptilum* Bogesco. *Procloeon* is now regarded as having a wide distribution. The authors noted that the Afrotropical Region was included in this, again without giving details.

Gillies (1962) showed that the African species, assigned by Kimmings (1960) to *Procloeon* on adult characters, had nymphs indistinguishable from *Cloeon*. Since then, no species of *Procloeon* have been recorded from sub-Saharan Africa. McCafferty & Waltz's treatment of the genus changes all that. It means, in particular, that some of the large number of species of described *Cloeon* may need to be transferred back again to *Procloeon*. But which species and on what criteria?

No reliable characters have yet been described for distinguishing adults of the two genera. While there is an overall difference in their ecology, the main morphological difference between the nymphs lies in the degree of development of the gills. The two genera may be differentiated as follows:

Cloeon. Lower gill lamellae rounded; on gills I-IV, upper lamellae (fig. 1) almost as broad (A) as long (B); on V-VI, upper lamellae a half or more as long (B) as lower.

Procloeon. Lower gill lamellae elliptical, anterior margin straight; on gills I-IV, upper lamellae (fig. 2) much narrower than lower; on V-VI, upper lamellae minute or absent.

Gillies (1985) listed 19 species of *Cloeon* s.l. from the Afrotropical Region. Of these, the nymphs of five remain unknown and their generic diagnosis uncertain. On the basis of the gills, only 2 out of the other 14 species of *Cloeon* conform to the definition of *Procloeon* given above. They are *P. africanum* (Barnard) and *P. cylindrocolum* Kimmings.

P. cylindrocolum is a most distinctive species, characterised by a single pterostigmatic crossvein in the wing and, in the female, by irregular white and red lateral lines running along the whole length of the body. Considerable variation was noted in the degree of development of the red markings, and Gillies (1979) regarded them as examples of polymorphism within a single species. It is widely distributed in tropical Africa.

However, recent collections in the forest zone of West Africa have shown that the form of '*cylindrocolum*' occurring there differs consistently

from the material previously studied. This new material is described below as a new species.

Procloeon silvicola sp.n.

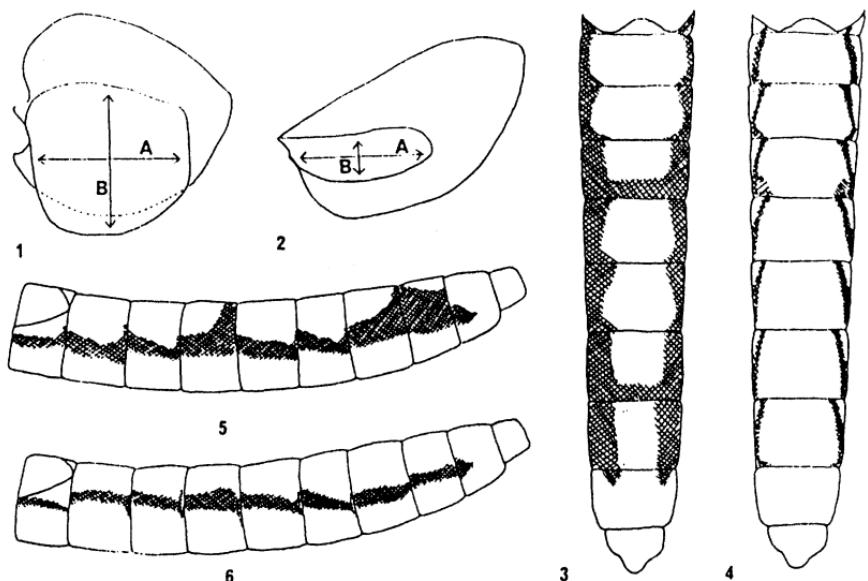
♀ *imago*. Antennae: scape dark red at tip, pedicel white. Vertex opaque white, tinged with pink. Thorax cream; an irregular dark red band running along the entire length of the pleura, continuing onto the abdomen; in some specimens this is bordered above by a broader white 'painted' line; a parallel red line runs forward from the wing root to the anterior pleural margin, in some specimens the space between the two red lines is largely filled in with white pigment; a red streak present on the posterior lobe of the metascutum.

Femora cream, tibiae and tarsi clear. Wing unpigmented, veins clear except for dark red tinting of the extreme base of costa and the junction of the costa with the costal brace; base of the subcosta and radius as far as the costal brace dark red; stigma normally with a single crossvein, marginal intercalaries restricted to 3–4 alternate interspaces, very short, sometimes reduced in length to vanishing point.

Abdominal markings (figs 3, 5): terga cream, lateral margins of all terga with a broad, irregular, dark red line, on IV this extending over the posterior $\frac{1}{4}$ of the dorsum to form a continuous transverse band, VII–VIII largely red. Tails white, alternate joints of the segments broadly dark red; extreme base white.

♂ *subimago*. Eyes brick-red, cylindrical, about 1.5 times as tall as broad. Thorax chestnut-brown; wings pale grey, legs cream. Abdomen white, tergum IV with a broad red band across posterior $\frac{2}{5}$ of segment; posterior $\frac{1}{2}$ of VII and all of terga VIII–X red; venter and tails white.

Lengths: body, ♂ 4 mm, ♀ 4 mm; wing, ♂ 4 mm, ♀ 4–4.2 mm.



Figs 1–6.—Diagram of gill III, showing ratio of breadth (A) over length (B) of upper lamella; 1, *Cloeon smaeleni*; 2, *Procloeon cylindrocolum*. 3–6: Abdominal tergal pattern: 3, *P. silvicola* sp. n. (dorsal); 4, *P. cylindrocolum* (dorsal). 5, *P. silvicola* sp. n. (lateral); 6, *P. cylindrocolum* (lateral).

Nymph. Much as in *P. cylindroculum*. Gills with double lamellae on I-IV, on V-VII apparently single. On the single skin available, teeth on tarsal claws fewer in number than in *cylindroculum* and occupying a smaller proportion of the total length. Lateral abdominal spines as follows; IV 0, V 2, VI 3-4, VII 3-4, VIII 5-6, IX 6-7.

Holotype ♀ imago: IVORY COAST, Tai Parc Nacional, light trap by forest stream, 10.ii.1988 (*M.T. Gillies*). Deposited in Natural History Museum London.

Paratypes, same provenance, 3♀♀, 10-12.ii.1988; 1♀, tributary of R. Cavally between Grabo and Tibito, 11.ii.1988 (*J.-M. Elouard*); 1♀ imago, 1♂ subimago and associated nymph skin, R. Cavally at Grié, 2.ii.1988. GUINEA, 1♀ imago, Tene Kala in Fouta Jalon, 24.i.1987 (*J.-M. Elouard*).

This species differs from *cylindroculum* (figs 4, 6) in the adult by:

the more extensive markings on the abdominal terga, in particular in possessing a complete band of pigment across the posterior part of tergum IV. While not manifest in all specimens, the vestigial nature of the marginal intercalaries appears to be diagnostic where it occurs. In the nymph, the reduction in teeth on the tarsal claws may be diagnostic, but more material is required to establish this.

A list of Afrotropical Baetidae, formerly placed in *Cloeon*, is given below. Species described from the adult only are listed under *Cloeon* s.l.

| <i>Cloeon</i> Leach | <i>Procloeon</i> Bengtsson | <i>Cloeon</i> s.l. | <i>Potamocloeon</i> Gillies |
|----------------------------|----------------------------------|---------------------------|-----------------------------|
| <i>amaniensis</i> Gillies | <i>africanum</i> (Esb.-Petersen) | <i>aeneum</i> Barnard | <i>dentatum</i> (Kimmings) |
| <i>areolatum</i> Navas | <i>cylindroculum</i> Kimmins | <i>agnewi</i> Hubbard | |
| <i>bellum</i> Navas | <i>silvicola</i> Gillies | <i>chaplini</i> Barnard | |
| <i>crassi</i> Agnew | | <i>rhodesiae</i> Barnard | |
| <i>elevatum</i> Agnew | | <i>viridellum</i> Lestage | |
| <i>gambiae</i> Gillies | | | |
| <i>lacunosum</i> Barnard | | | |
| <i>perkinsi</i> Barnard | | | |
| <i>scitulum</i> Kimmins | | | |
| <i>smaeleni</i> Lestage | | | |
| <i>tanzaniae</i> Gillies | | | |
| <i>virgiliae</i> (Barnard) | | | |

With their reduced gill surface, it is not surprising that the African species of *Procloeon* are found in slowly moving or in large bodies of water. *Cloeon*, on the other hand, is a characteristic inhabitant of ponds and dams where high temperatures and intermittent periods of low oxygenation are to be expected. At the same time, some species may occur in a wide range of habitats, overlapping those of *Procloeon*.

ACKNOWLEDGEMENTS

I am greatly indebted to Dr J.-M. Elouard, Office de la Recherche Scientifique et Technique d'Outre-Mer, for inviting me to take part in his surveys of West African rivers.

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Whitfeld, Hamsey, Lewes, E. Sussex, BN8 5TD.
November 20th, 1995.

REVIEW

'AQUATIC INSECTS OF NORTH EUROPE. A TAXONOMIC HANDBOOK'. Vol. 1, Ephemeroptera – Lepidoptera. Edited by ANDERS NILSSON. Apollo, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark. 274 pp. 129 pls (1371 figs mostly by Gørel Marklund). 29 x 21 cm. Hbk DKK400.00. 1996. [Vol. 2 scheduled end of 1997 same price, but if ordered together DKK700.00 for both vols, which will be invoiced with Vol. 1.]

As often happens with projected multi-author works the intended time-schedule becomes extended and in practice publication day is finally dictated by the slowest author. An editorial ruse to appease the punctual authors and the potential users is to publish some of the manuscripts in hand as volume one and defer the remainder to a second volume. While this may be a little frustrating to those of the punctual authors deferred to the second volume, the actual appearance of vol. 1 is usually the catalyst required for the completion of the final manuscripts. This has been the sequence of events with the work under review, but the editor's confidence in the rapid completion of Volume 2 (end of 1997) is evident in the offer of an advantageous price if the two volumes are ordered together. The reviewer's advice is not to hesitate in ordering this splendid work.

The procedure above also explains the arbitrary division of groups between the two volumes (Vol. 1 has occupied 13 authors to cover 8 orders). However, although only two orders are being deferred to Vol. 2, of these the Diptera is the most diverse of the insect orders with aquatic stages in their life-histories and has occupied 20 authors to cover 25 families. This has no doubt also partly led to the publication delay since some families of Diptera are not so well-known in the immature stages.

Volume 1 includes Ephemeroptera, Plecoptera, Heteroptera, Megaloptera, Neuroptera, Coleoptera, Trichoptera and Lepidoptera, the Odonata and Diptera being deferred to Vol. 2. Geographically the Handbook focuses on the Nordic countries, i.e. Denmark, Norway, Sweden and Finland, but most information will be correct for the rest of Northern Europe, although some more southern taxa may be excluded from the keys and check lists (most British species are included). Introductory text, together with the cited references provide a detailed source of information on morphology, classification, identification, faunistics and natural history. For each group there is also information on habitats, life-cycles, trophic relationships and advice on collecting, rearing techniques and preparation. Richly illustrated keys are provided for both the aquatic larvae and the mostly terrestrial adults, at least to generic level. Check lists record the distribution of all species known from the region on a national basis. The line illustrations are of a very high standard and include whole insects as well as structural details. Aquatic insect larvae are now widely used in environmental monitoring where actual species composition at a given site may provide reliable evidence of acidification and pollution. The availability of this up to date work prepared by some 30 European specialists will greatly facilitate environmental investigations for purely scientific, commercial or governmental purposes. It will be welcomed by all who work with aquatic insects whether as taxonomists or ecologists. — K.G.V. SMITH.