New Afrotropical Genus of Baetidae (Insecta: Ephemeroptera) with Bladelike Mandibles

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ABSTRACT

_Xyrodromeus_ LUGO-ORTIZ and McCAFFERTY (Insecta: Ephemeroptera: Baetidae), n. gen., is erected for _X. africanus_ LUGO-ORTIZ and McCAFFERTY, n. sp., from Kenya and Uganda, and _X. namarana_ LUGO-ORTIZ and McCAFFERTY, n. sp., from Madagascar. The new taxa are described from larvae that are distinguished from other Afrotropical Baetidae by the highly modified mandibles with bladelike incisors. Additional characteristics of the labrum, maxillary palp, and paraprocts, when taken in combination, also distinguish _Xyrodromeus_. Further characteristics of the mouthparts, femora, abdominal tergal scales, and paraprocts distinguish the two known species.

Keywords: Ephemeroptera, Baetidae, _Xyrodromeus_, new genus, new species, Africa, Madagascar.

RÉSUMÉ


Mots clés: Ephemeroptera, Baetidae, _Xyrodromeus_, genre nouveau, espèces nouvelles, Afrique, Madagascar.

INTRODUCTION

The generic composition of the family Baetidae (Insecta: Ephemeroptera) in the Afrotropics has received considerable attention recently (e.g., WALTZ and McCAFFERTY 1987a, GILLIES 1990a,b, 1991; GILLIES and ELOUARD 1990; ELOUARD and HIDEUX 1991; WUILLOT and GILLIES 1993, 1994; LUGO-ORTIZ and McCAFFERTY 1996a,b,c, 1997a,b, c,d,e; BARBER-JAMES and McCAFFERTY 1997; McCAFFERTY et al. 1997). We can currently account for the following genera as occurring in the region: _Acanthiops_ WALTZ and McCAFFERTY; _Afrobaetodes_ DEMOULIN; _Afroptilum_ GILLIES; _Baetis_ LEACH; _Bugilliesia_ LUGO-ORTIZ and McCAFFERTY; _Centrptiloides_ LESTAGE; _Cheleocloeon_ WUILLOT and GILLIES; _Cloeodes_ TRAVER; _Cloeon_ LEACH; _Crassabwa_ LUGO-ORTIZ and McCAFFERTY; _Dabulamanzia_ LUGO-ORTIZ and McCAFFERTY; _Demoreptus_ LUGO-ORTIZ and McCAFFERTY; _Demoulinia_ GILLIES; _Dicentrotuptum_ WUILLOT and GILLIES; _Edmumleatus_ LUGO-ORTIZ and McCAFFERTY; _Kivina_ McCAFFERTY and LUGO-ORTIZ; _Labiobaetis_ NOVIKOVA and KLUGE; _Maliqua_ LUGO-ORTIZ and McCAFFERTY; _Micksiops_ McCAFFERTY, LUGO-ORTIZ and BARBER-JAMES; _Mutelocloeon_ GILLIES and ELOUARD; _Nesoptiloides_ DEMOULIN; _Opelmatostoma_ WALTZ and McCAFFERTY; _Potamocloeon_ GILLIES; _Pseudopannota_ WALTZ and McCAFFERTY; _Rhithroloceon_ GILLIES; _Tanzaniella_ GILLIES; and _Thraulobaetodes_ ELOUARD and HIDEUX. Several Afrotropical baetids have been reported under _Pseudoclodeon_ KLAFLEK, but they await to be correctly reassigned to other taxa because the concept of that genus remains restricted to its type species (WALTZ and McCAFFERTY 1985).
We herein describe a new genus of Afrotropical Baetidae based on two new species from East Africa and Madagascar. Although the descriptions of the new genus and species are based on the larval stage only, rapid documentation of the baetid and other mayfly fauna in the environmentally threatened areas of the world must be expedited (see Lugo-Ortiz and McCafferty 1996d). The materials upon which this study is based are housed in the Purdue Entomological Research Collection, West Lafayette, Indiana, USA.

1. Xyrodromeus Lugo-Ortiz and McCafferty, n. gen.
— Description

Larva

Head: Frontal keel absent. Labrum (Figs. 1, 13) basally broad, anteriorly with shallow anteromedial emargination. Hypopharynx (Fig. 2) with superlinguae somewhat distolaterally narrow and linguae with broadly rounded distomedial hump. Mandibles (Figs. 3, 4, 14, 15) with fused, basally broad, elongate, distally attenuated, blade-like incisors; prostheca slender; short, fine, simple setae present between prostheca and mola. Maxillae (Fig. 5) somewhat narrow and elongate; crown of galealacinae with four blunt denticles; palps three segmented; palp segment 1 nearly 0.33x length of segment 2; segment 2 nearly 0.50x length of segment 3; segment 3 somewhat apically narrow, reaching tip of galealacinae. Labium (Figs. 6, 16) with somewhat elongate and narrow glossae and paraglossae; palp segment 2 basally narrow, distomedially expanded; palp segment 3 short, excentric, somewhat nipplelike.

Thorax: Legs (Fig. 7) without villopore; dorsal and ventral margins of femora subparallel; tarsal claws (Fig. 8) with one row of denticles and one subapical pair of long, fine, simple setae.

Abdomen: Terga (Figs. 9, 17) with scale bases over surface, and triangular spination on posterior margin. Gills (Figs. 10, 11) on abdominal segments 1-7, platelike, held dorsally, well tracheated, marginally serrate. Paraprocts (Figs. 12, 18) with variable marginal spination. Terminal filament nearly 0.50x length of cerci.

Adult

Unknown.

— Etymology

The generic name is a combination of the Greek words xyron (blade) and dromeus (runner). It is an allusion to the unique mandibles. The gender is masculine.

— Type species

Xyrodromeus africanus Lugo-Ortiz and McCafferty, n. sp.

— Included species and distribution

Xyrodromeus africanus Lugo-Ortiz and McCafferty, n. sp. (Kenya, Uganda); X. namarona Lugo-Ortiz and McCafferty, n. sp. (Malagasy).

— Diagnosis and discussion

Larvae of Xyrodromeus are distinguished by the shallow anteromedial emargination of the labrum (Figs. 1, 13); basally broad, apically attenuated, blade-like mandibular incisors (Figs. 3, 4, 14, 15); three-segmented maxillary palps (Fig. 5); distomedially expanded segment 2 of the labial palps (Figs. 6, 16); and tarsal claws with one row of denticles and one subapical pair of long, fine, simple setae (Fig. 8).

Because the larvae of Xyrodromeus are so specialized, and because its adults are unknown, it is not possible at present to determine its relationships with other Afrotropical genera. Xyrodromeus does not belong to a complex of genera that have larvae with two rows of denticles on the tarsal claws and adults with single marginal intercalaries in the forewings [viz., Acanthiopes, Afrotiplum, Centroptiloides, Dicentrotipilum, Edumineutus, Nesoptiloides, Thraulobaetides, and at least two other undescribed genera (Lugo-Ortiz and McCafferty, in manuscript)]. Nonetheless, the labrum of Xyrodromeus and Dicentrotipilum are somewhat similar [Wullot and Gillies (1994): Fig. 10]. Xyrodromeus does not belong to the Baetis complex of genera among those with adults having double marginal intercalaries in the forewings (represented in the Afrotropics by Baetis, Demoreptus, Labioabaeis, and Tanzianniella) because it lacks the villopore [Waltz and McCafferty (1987b): Figs. 1, 4, 5, 17]. Nonetheless, the incisors of at least one known species of Demoreptus somewhat approach the extreme of the Xyrodromeus condition [Lugo-Ortiz and McCafferty (1994a): Figs. 11, 12]. A possible relationship with the Bugilliesia complex of genera (Lugo-Ortiz and McCafferty 1996c) can not be ascertained until the male genitalia of Xyrodromeus are known. The possibility remains that Xyrodromeus will be found to be related to Oriental or Australian taxa, once the baetid fauna of those regions is better known.

2. Xyrodromeus africanus Lugo-Ortiz and McCafferty, n. sp.

Centrotipilum sp. no. 2 Demoulin 1964: 283.

— Description

Larva

Body: Length 9.3-9.5 mm. General coloration yellow-brown.

Head: Coloration medium brown. Antennae nearly 3.0 length of head capsule. Labrum (Fig. 1) with distal margin broadly rounded and shallow anteromedial emargination; submedial pair of long, fine, simple setae and sub marginal row of 16-18 long, fine, simple setae present. Hypopharynx as in Fig. 2. Left mandible (Fig. 3) with medial margin of modified incisor weakly serrate; margin between prostheca and mola with abundant short, fine, simple setae. Right mandible (Fig. 4) with medial margin of modified incisor weakly serrate; margin between prostheca and mola with abundant short, fine, simple setae. Maxillae as in Fig. 5. Labium (Fig. 6) with glossae subequal in length to paraglossae; glossae long and narrow, with short, fine, simple setae me-
Figs. 1-12. Xyrodromeus africanaus Lugo-Ortiz and McCafferty, n. sp.
Fig. 1: Labrum (dorsal). Fig. 2: Hypopharynx. Fig. 3: Left mandible. Fig. 4: Right mandible. Fig. 5: Right maxilla. Fig. 6: Labium (left-central; right-dorsal).
Fig. 7: Left foreleg. Fig. 8: Tarsal claw. Fig. 9: Detail of tergal surface. Fig. 10: Gill 4. Fig. 11: Detail of gill margin. Fig. 12: Paraproct.

Figs. 1 à 12. Xyrodromeus africanaus Lugo-Ortiz and McCafferty, n. sp.
Fig. 1: Labre (vue dorsale). Fig. 2: Hypopharynx. Fig. 3: Mandibule gauche. Fig. 4: Mandibule droite. Fig. 5: Maxille droite. Fig. 6: Labium (vue ventrale à gauche; vue dorsale à droite). Fig. 7: Patte antérieure gauche. Fig. 8: Griffe tarsale. Fig. 9: Détail de la surface tergale. Fig. 10: 4e branche. Fig. 11: Détail du bord branchial. Fig. 12: Paraprocte.
Figs. 13-18. *Xyrodromeus namarona* Lugo-Ortiz and McCafferty, n. sp.

Fig. 13: Labrum (dorsal). Fig. 14: Left mandible. Fig. 15: Right mandible. Fig. 16: Labium (left-central; right dorsal). Fig. 17: Detail of tergal surface. Fig. 18: Paraproct.

Figs. 13 à 18. *Xyrodromeus namarona* Lugo-Ortiz et McCafferty, n. sp.

Fig. 13. Labre (vue dorsale). Fig. 14. Mandibule gauche. Fig. 15. Mandibule droite. Fig. 16. Labium (vue ventrale à gauche; vue dorsale à droite). Fig. 17: Détail de la surface tergale. Fig. 18: Paraprocte.

dially and apically; paraglossae long and narrow, with long, somewhat robust, simple setae apically; palp segment 1 nearly 1.30x length of segments 2 and 3 combined; palp segment 2 broadly expanded distomedially; palp segment 3 broadly rounded apically.

Thorax: Coloration medium yellow-brown, with pale markings. Hindwingpads present. Legs (Fig. 7) coloration dark to medium yellow-brown; femora dorsally with row of long, apically pointed, relatively robust, simple setae, and ventrally with short, distally acute, simple setae scattered over surface; tibiae dorsally with short, fine, simple setae, and ventrally with short, relatively robust, distally acute, simple setae; tarsi dorsally with short, fine, simple setae, and ventrally with short, relatively robust, distally acute, simple setae, increasing in length distally; tarsal claws (Fig. 8) with four broadly based denticles.

Abdomen: General coloration dark yellow-brown. Tergum 1 dark yellow-brown, anteriorly and posteriorly medium brown; terga 2-3 dark yellow-brown, medium brown anteriorly, posteriorly, and medially, with broad oblique medium brown posterolateral dashes; terga 4-7 dark yellow-brown, anteriorly and posteriorly medium brown, with broad
oblique medium brown posteralateral dashes ; terga 8-9 dark yellow-brown, anteriorly and posteriorly medium brown, without oblique posteralateral dashes ; tergum 10 dark yellow-brown. Terga (Fig. 9) with relatively large scale bases and broadly based marginal spines. Gills (Figs. 10, 11) well tracheated, with conspicuous marginal serration. Paraprocts (Fig. 12) with 18-20 irregular marginal spines ; small scale bases scattered over surface. Caudal filaments coloration dark yellow-brown.

**Adult**

Unknown.

**Material examined**

_Holotype_ : Larva, Kenya, Turasha R, 9100 ft, 0°40'S/36°40'E, 9-1-1997, R. W. Griffiths and S. Cooper. _Paratype_ : Larva, same data [mouthparts, forelegs, tergum 4, gills 4, and paraproct on slide (medium : Euparal)]. _Other material_ : larva, same data.

**Discussion**

_Xyrodromeus africanus_ is distinguished by the labrum (Fig. 1) being broadly rounded anteriorly and having a dense submarginal row of 18-20 long, fine, simple setae on either side ; the mandibles (Figs. 3, 4) having slight serration along the medial margin of the modified incisors and a long row of short, fine, simple setae between the prosthecae and molae ; the labium having a broadly expanded palp segment 2 and a short, broadly rounded palp segment 3 (Fig. 6) ; the apically pointed setae of the dorsal margin of the femora (Fig. 7) ; the large scale bases of the terga (Fig. 9) ; and the irregular spination of the paraprocts (Fig. 12).

DEMOLIN (1964) briefly described _Centroptilum_ sp. no. 2 from larvae collected in Kenya and Uganda. Although his figures of the larvae are somewhat sketchy, they agree with our concept of _X. africanus_, and thus we consider his _Centroptilum_ sp. no. 2 to be equivalent to _X. africanus_. However, DEMOLIN's (1964) figure 5b, which is intended to show some of the wearing of the mandibular incisors, corresponds to another species that probably belongs to _Dicentroptilum_ [see WUILLOT and GILLIES (1994) : Figs. 6, 7].

3. _Xyrodromeus namarona_ LUGO-ORTIZ and McCAFFERTY, n. sp.

**Description**

_Larva_

Body : Length 5.1-6.1 mm. General coloration medium brown.

Head : Coloration medium brown, with faint vermiciform markings on frons and vertex. Antennae nearly 3.0x length of head capsule. Labrum (Fig. 13) with distal margin slightly protruding in medial two-thirds and shallow anteromedial margination ; submedial pair of long, fine, simple setae and submarginal row of five to six long, fine, simple setae present. Hypopharynx similar to Fig. 2. Left mandible (Fig. 14) with medial margin of modified incisor smooth ; margin between prostheca and mola with two small tufts of short, fine, simple setae. Right mandible (Fig. 15) with medial margin of modified incisor smooth ; margin between prostheca and mola with two small tufts of short, fine, simple setae. Maxillae similar to Fig. 5. Labium (Fig. 16) with glossae subequal in length to paraglossae ; glossae long and somewhat broad, with short, fine, simple setae medially and apically ; paraglossae long and somewhat broad, with long, somewhat robust, simple setae apically ; palp segment 1 nearly 0.84x length of segments 2 and 3 combined ; palp segment 2 moderately expanded distomedially ; palp segment 3 narrowly rounded apically.

Thorax : Coloration medium yellow-brown, with pale markings. Hindwingpads present. Legs (similar to Fig. 7) coloration dark to medium yellow-brown ; femora dorsally with row of long, apically blunt, relatively robust, simple setae, and ventrally with short, distally acute, simple setae scattered over surface ; tibiae dorsally with short, fine, simple setae, and ventrally with short, relatively robust, distally acute, simple setae ; tarsi dorsally with short, fine, simple setae, and ventrally with short, relatively robust, distally acute, simple setae, increasing in length distally ; tarsal claws (similar to Fig. 8) with four broadly based denticles.

Abdomen : General coloration medium brown, with no distinct color pattern. Terga (Fig. 17) with abundant small scale bases and broadly based marginal spines. Gills (similar to Figs. 10, 11) well tracheated, with conspicuous marginal serration. Paraprocts (Fig. 18) with 18-20 sharp marginal spines, somewhat increasing in length distally ; small scale bases scattered over surface. Caudal filaments coloration dark to pale yellow-brown ; length : 4.1-5.1 mm.

**Adult**

Unknown.

**Material examined**

— Etymology

The specific epithet is after the name of one of the Malagasy rivers where the species was collected, and thus is a noun in apposition.

— Discussion

Larvae of *X. namarona* are distinguished by the labrum (Fig. 13) having the distal margin slightly protruding in its medial two-thirds and a sparse submarginal row of five to six long, fine, simple setae; the mandibles (Figs. 14, 15) having their modified incisors mediadly smooth and the margin between the prosthecae and molea with few, long, fine, simple setae; the labium (Fig. 16) having a moderately expanded palp segment 2 and a narrowly rounded palp segment 3; the apically blunt setae of the dorsal margin of the femora; the abundant small scale bases of the terga (Fig. 17); and the more organized spination of the paraprocts (Fig. 18).

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