Bull. Soc. Hist. Nat., Toulouse, 133, 1997, 41-46

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. namarona* LUGO-ORTIZ and MCCAFFERTY, n. sp., from Malagasy. 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 palps, and tarsal claws, 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

Xyrodromeus LUGO-ORTIZ & MCCAFFERTY (Insecta : Ephemeroptera : Baetidae), n. gen., est érigé pour *X. africanus* LUGO-ORTIZ & MCCAFFERTY, n. sp., du Kenya et de l'Ouganda, et pour *X. namarona* LUGO-ORTIZ & MCCAFFERTY, n. sp., de Madagascar. Ces nouveaux taxons sont décrits à partir de larves qui se distinguent des autres Baetidae Afrotropicaux par les mandibules hautement modifiées, avec des incisives en forme de lames. La combinaison de caractères additionnels du labre, des palpes maxillaires et des griffes tarsales distingue aussi *Xyrodromeus*. D'autres caractères des pièces buccales, des fémurs, des écailles sur les tergites abdominaux, et des paraproctes séparent les deux espèces connues.

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 ; *Centroptiloides* 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 ; *Dicentroptilum* WUILLOT and GILLIES ; *Edmulmeatus* LUGO-ORTIZ and MCCAFFERTY ; *Kivua* 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 ; *Ophelmatostoma* WALTZ and MCCAFFERTY ; *Potamocloeon* GILLIES ; *Pseudopannota* WALTZ and MCCAFFERTY ; *Rhithrocloeon* GILLIES ; *Tanzaniella* GILLIES ; and *Thraulobaetodes* ELOUARD and HIDEUX. Several Afrotropical baetids have been reported under *Pseudocloeon* KLAPÁLEK, 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 lingua with broadly rounded distomedial hump. Mandibles (Figs. 3, 4, 14, 15) with fused, basally broad, elongate, distally attenuated, bladelike incisors ; prostheca slender ; short, fine, simple setae present between prostheca and mola. Maxillae (Fig. 5) somewhat narrow and elongate ; crown of galealaciniae 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 galealaciniae. 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 madibles. 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, bladelike 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., *Acanthiops, Afroptilum, Centroptiloides, Dicentroptilum, Edmulmeatus, Nesoptiloides, Thraulobaetodes*, and at least two other undescribed genera (LUGO-ORTIZ and McCAFFERTY, in manuscript)]. Nonetheless, the labrum of *Xyrodromeus* and *Dicentroptilum* are somewhat similar [WUILLOT 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, Labiobaetis,* and *Tanzaniella*) 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.

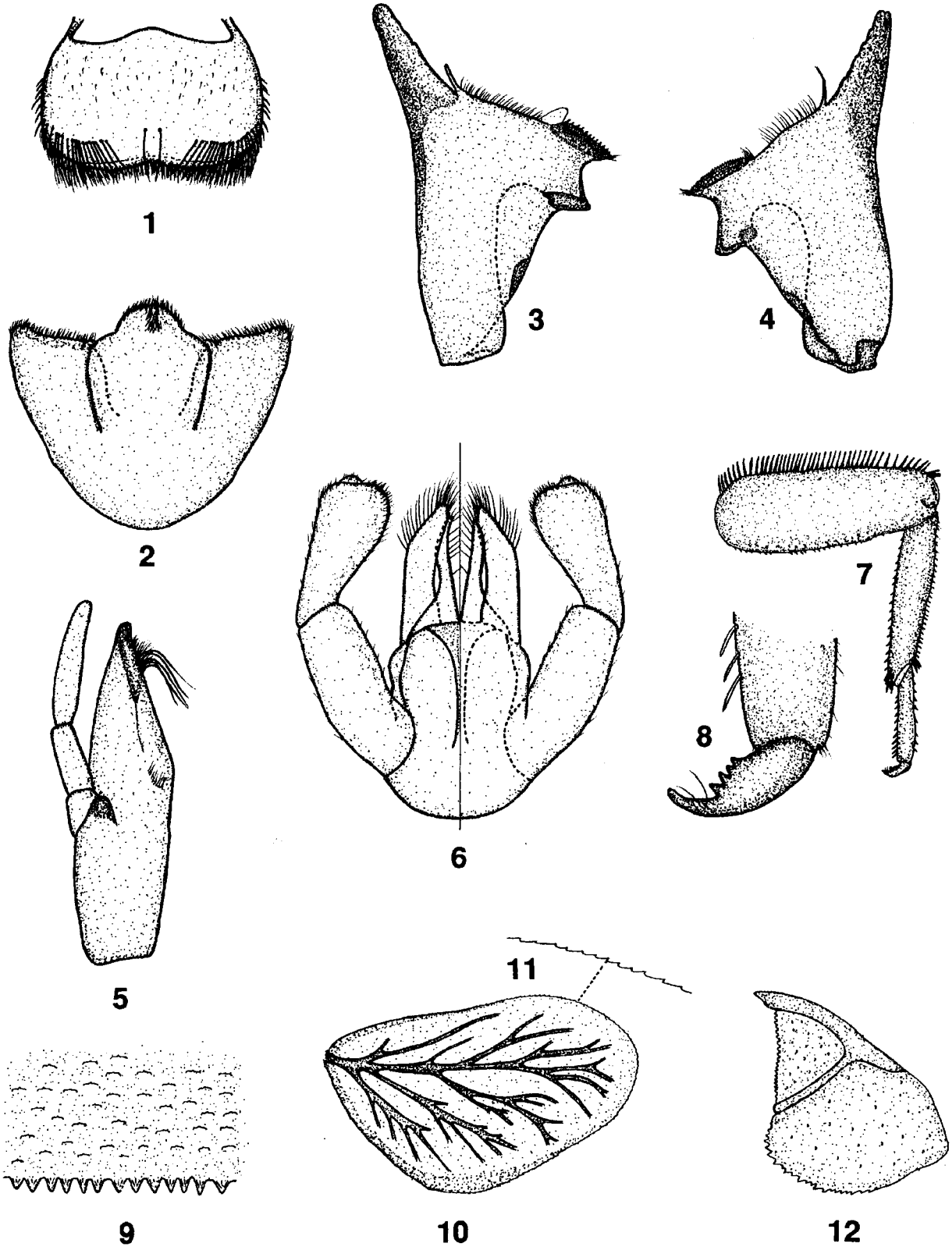
Centroptilum sp. no. 2 DEMOULIN 1964 : 283.

— Description

Larva

Body : Length 9.3-9.5 mm. General coloration yellowbrown.

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 submarginal 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-

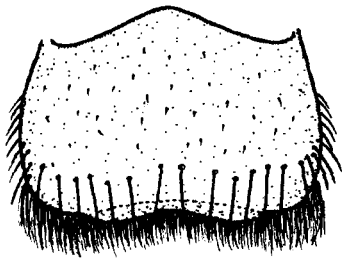


Figs. 1-12. *Xyrodromeus africanus* LUGO-ORTIZ and MCCAFFERTY, n. sp.

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 africanus* 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 branchie. Fig. 11 : Détail du bord branchial. Fig. 12 : Paraprocte.



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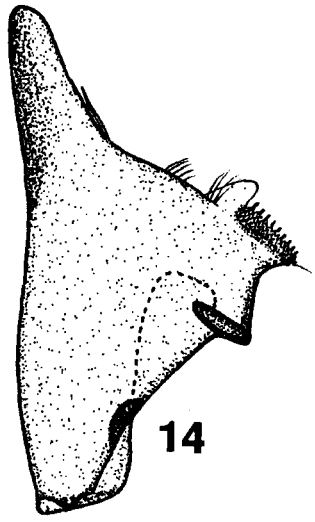

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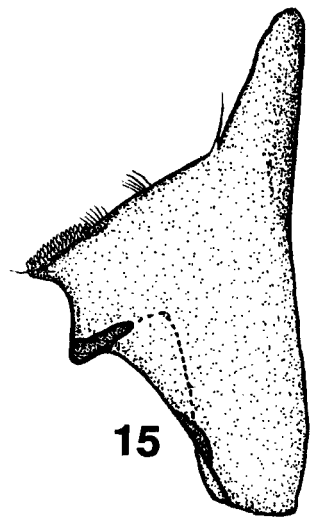

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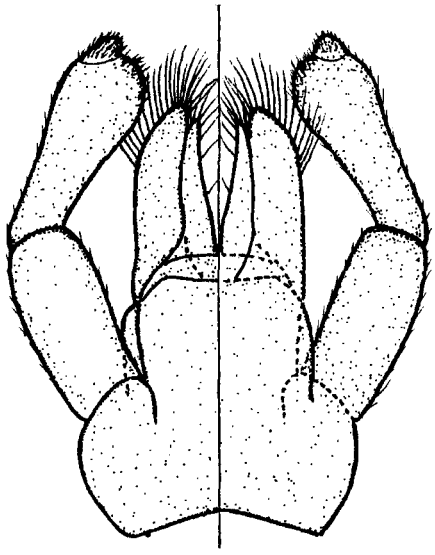

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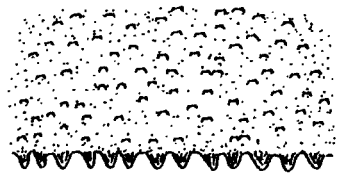

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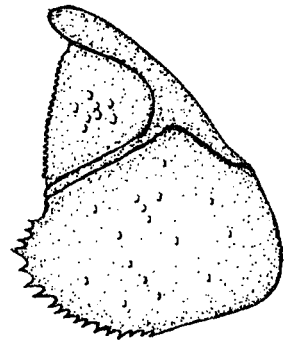

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Figs. 13-18. *Xyrodromeus namarona* LUGO-ORTIZ and MCCAFFERTY, n. sp.
Fig. 13 : Labrum (dorsal). Fig. 14 : Left mandible. Fig. 15 : Right mandible. Fig. 16 : Labium (left-central ; right dorsal). Fig. 17 : Detail of tergal surface. Fig. 18 : Paraproct.

Figs. 13 à 18. *Xyrodromeus namarona* LUGO-ORTIZ and 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 posterolateral dashes ; terga 8-9 dark yellow-brown, anteriorly and posteriorly medium brown, without oblique posterolateral 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-I-1997, R. W. Grffiths and S. Cooper. *Paratype* : Larva, same data [mouthparts, forelegs, tergum 4, gill 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).

DEMOULIN (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, DEMOULIN'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 vermiform 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 emargination ; 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 ventraly 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 sharpt 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

Holotype : Larva, Malagasy, Antananarivo (=Tananarive) Prov., Ankeniheny R, 4 km S of Manjakotompo Forest Station, 28°C, 1-XI-1971, G. F. and C. H. Edmunds and F. Emmanuel. *Paratypes* : Four larvae, same data as holotype ; two larvae, Malagasy, Fianarantsoa Prov., Namarona R, at Ranomafana, 22°C, 5-XI-1971, G. F. and C. H. Edmunds and F. Emmanuel [mouthparts, forelegs, tergum 4, gills 4, and paraproct of one larva mounted on slide (medium : Euparal)]. *Other material* : All Malagasy : Eighty-five larvae, same data as holotype ; 41 larvae, Antananarivo (=Tananarive) Prov., Ankeniheny R, Manjakatompo Forest Station, 2-XI-1971, G. F. and C. H. Edmunds and F. Emmanuel ; 21 larvae, Antananarivo (=Tananarive) Prov., Amboromotsy R, nr Sambaina, 3-XI-1971, G. F. and C. H. Edmunds and F. Emmanuel ; 11 larvae, Fianarantsoa Prov., Namarona R, at Ranomafana, 22°C, 5-XI-1971, G. F. and C. H. Edmunds and F. Emmanuel ; 22 larvae, toamasina (=Tamatave) Prov., stream at Gri-Gri, RN 2, 17-X-1971, G. F. and C. H. Edmunds and F. Emmanuel.

— 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 medially smooth and the margin between the prosthecae and molae 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).

ACKNOWLEDGEMENTS

We thank G. F. Edmunds, Jr. (Salt Lake City, Utah) and R. Griffiths (London, Ontario) for the donation of the specimens used in this study. We also thank A. Thomas (Université Paul Sabatier, Toulouse, France) for assistance in the preparation of the manuscript. This paper has been assigned Purdue Agricultural Research Program Journal No. 15391.

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