



The genus *Xenaclopus* Arrow (Coleoptera: Scarabaeidae): redescription and removal from the Aclopininae, with systematic notes

FEDERICO C. OCAMPO¹ & FERNANDO Z. VAZ-DE-MELLO²

¹Instituto Argentino de Investigaciones de Zonas Áridas, CCT-CONICET, Mendoza. CC 507. 5500. Mendoza, Argentina. E-mail: federico.ocampo@gmail.com

²Universidade Federal de Mato Grosso, Instituto de Biociências, Departamento de Biologia e Zoologia, Avenida Fernando Corrêa, s/nº, CCBS II, Boa Esperança, Cuiabá, MT 78060-900, Brazil. E-mail: vazdemello@gmail.com

Abstract

The monotypic genus *Xenaclopus* Arrow is redescribed and illustrated, based in its lectotype and paralectotypes. Characters examined indicate that this genus should be removed from the Aclopininae and placed into the subfamily Melolonthinae as *insertae sedis* at the tribal level.

Key words: Melolonthinae; new subfamily placement; Oriental Region

Introduction

Currently the subfamily Aclopininae includes four genera: *Aclopus* Erichson (six species), *Phaenognatha* Hope (eight species), *Neophaenognatha* Allsopp (four species), and *Xenaclopus* Arrow (monotypic). The genus *Xenaclopus* was described by Arrow (1915), who placed it within the Aclopininae based on “the peculiar development of the mandibles and labrum, the reduction of the maxillae and labium, and the number of joints in the antenna”.

However in the following statement Arrow also pointed out how different it is from other members of the Aclopininae: “in other characters common to all the hitherto known species, the clearly greatly reduced abdomen, long metasternum, and consequent far-back position of the hind legs, and the extreme slenderness of the tarsi, it differs entirely”.

D’Hotman and Scholtz (1990), in their contribution on the compared morphology of Scarabaeidae male genitalia, mentioned differences in that structure between *Aclopus* and *Xenaclopus*. D’Hotman and Scholtz (1990) indicated that *Aclopus* and *Xenaclopus* “vary considerably” in their male genitalia, particularly in the relative length of parameres, paramere apex, parameres dorsal sclerotization, and shape of the spiculum gastrale.

While conducting research on the systematic placement and biogeography of the Aclopininae and after detailed studies on the external morphology and male genitalia of the members of this group, we found that the above differences and others described in this contribution justify the transfer of the genus *Xenaclopus* out of Aclopininae. The purpose of this paper is to discuss the systematic placement of *Xenaclopus* and provide a synopsis and redescription of the genus based on the only known species.

Material and methods

Internal and external morphological characters formed the basis of this work. Specimens were examined using a dissecting microscope (6.5 to 40 X) and fiber-optic lights. We used an ocular micrometer for measurements. Internal sclerotized structures were dissected by relaxing the specimen in hot water. Heavily sclerotized parts were soaked in a dilute solution (about 15%) of potassium hydroxide and neutralized in a dilute solution (about 15%) of acetic acid. Genitalia were card-mounted or placed in glycerin-filled vials beneath the specimens.

The following standards were used for characters:

Body Length. Measured from the apex of the clypeus to the apex of the elytra.

Puncture Density. Defined as “dense” if punctures are nearly confluent to less than two puncture diameters apart, “moderately dense” if punctures are between two to six puncture diameters apart, and “sparse” if punctures are separated by more than six puncture diameters.

Length of Setae. Defined as “minute” if less than 0.2 mm, short if between 0.2–0.5 mm, “moderately long” if between 0.5–1.0 mm, and “long” if between 1.0–2.0 mm.

Color. Described based on specimens that are viewed with magnification and illumination.

The results of this study were based on specimens (including the lectotype) belonging to the original type series of *Xenaclopus borneensis* Arrow from The Natural History Museum, London (under the curation of Max Barkley), the Muséum National d'Histoire Naturelle, Paris (under the curation of Olivier Montreuil), and the Canadian National Collection of Insects (under the curation of Patrice Bouchard).

Xenaclopus Arrow

(Figs. 1–14)

Xenaclopus Arrow, 1915. Type species: *Xenaclopus borneensis* Arrow, 1915 by monotypy.

Xenaclopus borneensis: Arrow 1915: 318 (original description); Allsopp 1983: 209 (key to Aclopininae genera); Allsopp 1984: 210 (lectotype designation); Lawrence & Newton 1995: 835 (citation); Jameson & Ocampo 2005 (citation).

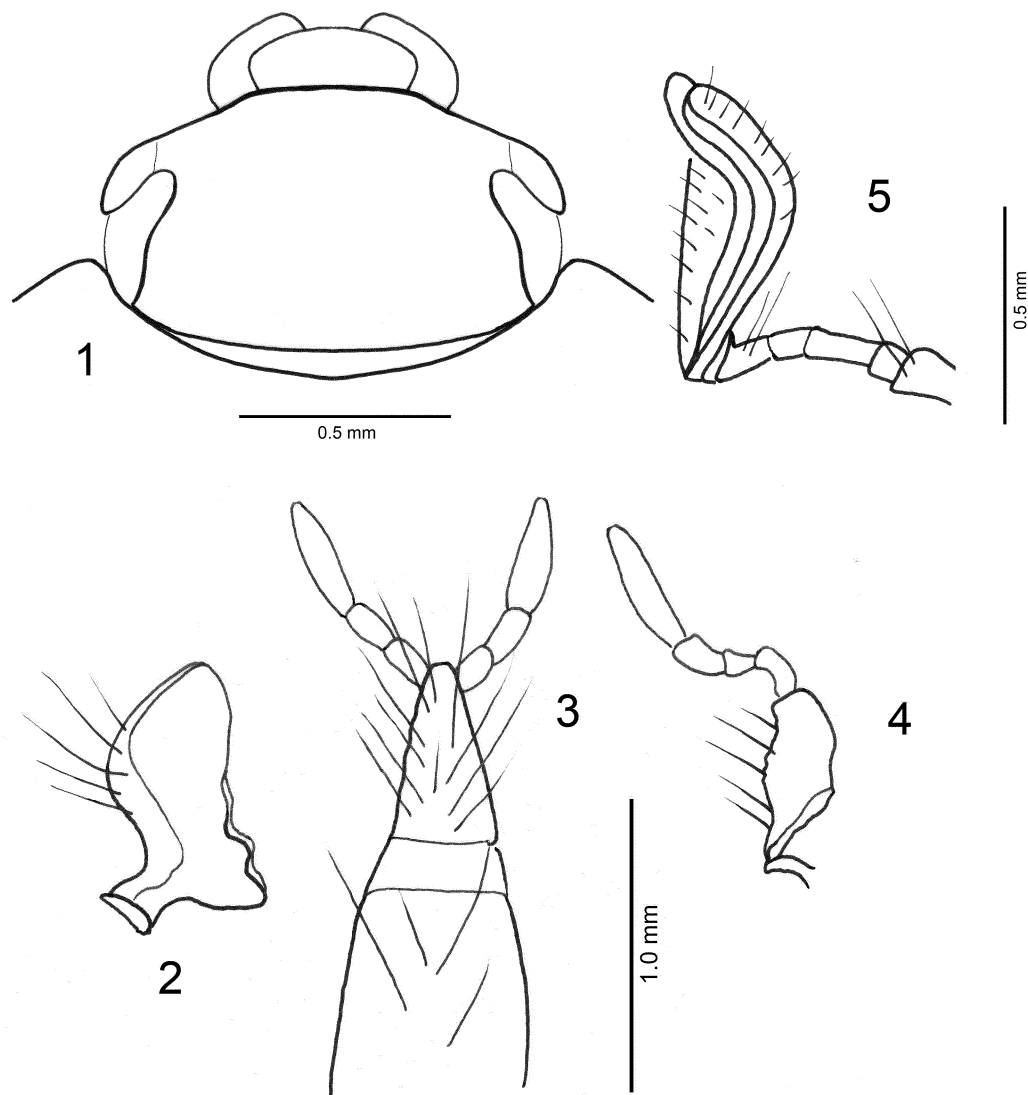
Xenoclopus [sic] sp.: D'Hotman & Scholtz 1990 (morphology of male genitalia).

Type material: Lectotype at BMNH labeled: “LECTO- / TYPE”; “Lundu / Sarawak /G. E. Bryant / 8.1.14.”; “*Xenaclopus borneensis* type Arrow”; “LECTOTYPE / *Xenaclopus* / borneensis / Arrow / det. P. G. Allsopp 1980”.

Two paralectotypes at BMNH labeled: “PARA- / LECTO- / TYPE”; “Lundu / Sarawak /G. E. Bryant / 8.1.14.”; “*Xenaclopus borneensis* type Arrow”; “PARALECTOTYPE” / *Xenaclopus* / borneensis / Arrow / det. P. G. Allsopp 1980”. One paralectotype at BMNH same as above except: “Lundu / Sarawak /G. E. Bryant / 7.1.14.”. One paralectotype at BMNH labeled same as above except: “*Xenaclopus* / borneensis Arr / M.E.Bacchus det 1974 / PARALECTOTYPE”. One paralectotype at CNCI same as above except: “G. Bryant Coll / B. M. 1926-86”; “*Xenaclopus* / borneensis / Arrow / DET. at B.M. / H.F. HOWDEN '62”. Two paralectotypes from MNHN. Malaysia: Sarawak: Lundu, 7-Jan-1914 (1); Mt. Merinjak, 11-May-1914 (1).

Xenaclopus borneensis Arrow

Redescription: Male. Length 3.82–4.11 mm, width 2.26–2.75 mm. Color: Head, pronotum, elytra brown to dark-brown; head progressively darker from clypeus to frons, pronotum with 2 darker areas at middle, elytral margins and suture darker than disc. *Head* (Fig. 1): Eye canthus well developed, marginate with moderately long setae on anterior margin (note: setae not shown in illustration). Eyes well developed, rounded, not entirely divided by eye canthus. Frons slightly convex, surface sparsely punctate, sparsely setose; setae long,



FIGURES 1–5. *Xenaclopus borneensis*. 1. head, dorsal view; 2. left mandible, dorsal view; 3. labium, ventral view; right maxilla, ventral view; 4. left antenna, dorsal view.

slender. Clypeus transverse; lateral margins oblique; anterior margin straight, slightly reflexed; frontoclypeal suture obsolete. Labrum protruding beyond clypeal margin, shape pentagonal with round apex with 5–6 long slender setae (setae not shown in illustration). Mandibles protruding beyond clypeal margin, broadly rounded externally, slightly concave dorsoventrally, lacking incisory teeth, molar area poorly developed (Fig. 2). Labium (Fig. 3) longer than wide, labial palpi with 3 palpomeres; surface setose, setae dense to moderately dense, long, slender. Maxillae poorly developed, maxillary palpus with 4 palpomeres (Fig. 4). Antennae (Fig. 5) with 9 antennomeres, antennal club with 3 antennomeres; sixth antennomere greatly reduced, antennal club longer than antennomeres 1–6 combined. *Pronotum* (Fig. 6): Convex, wider than long. Surface sparsely punctate, setose; setae long, slender. Marginal bead complete; anterior margin concave, with membrane; lateral margins broadly rounded; posterior margin slightly sinuous. Anterior angles nearly right-angled; posterior angles broadly rounded. *Scutellum* (Fig. 6): Large, triangular apex acute, surface sparsely punctate. *Elytra* (Fig. 6.): Convex, globose, lateral margins broadly rounded. Elytral striae absent sparsely punctate, sparsely setose; setae moderately long; pseudoepipleura poorly developed. *Venter* (Fig. 7): Metasternum narrow, 0.51 times as long as wide; 6 ventrites exposed medially; penultimate ventrite as long as previous three ventrites combined (at middle), membranous on apical margin. Pygidium not exposed beyond elytral margin, wider

than long, surface sparsely setose; setae long, slender. Abdominal spiracles dorsal to sternotergal suture. *Legs*: Protibiae with 3 teeth (Fig. 8), protibial spur slightly curved. Mesotibiae and metatibiae (Fig. 9) with short, medial, transverse carinae. Mesotibial and metatibial (Fig. 10) apex with fringe of thick setae; mesotibial and metatibial spurs contiguous, metatibial spurs (Figs. 9–10) both set below tarsal articulation; inner spur longer than outer spur. Metatibial tarsal insertion simple, without notch; metatibial apical margin entire. Tarsus approximately as long as tibiae. Tarsomeres 1 and 5 each longer than 2, 3, 4 individually; all tarsi with long, apical setae (Fig. 9). Protarsal claws curved, outer claw bifid (split) (Fig. 11). Mesotarsal and metatarsal claws simple (not bifid), symmetrical (Figs. 9). *Male Genitalia*: phallobase dilated basally, elongate apically, entirely open ventrally; parameres simple, symmetrical, elongate; paramere apex acute, angled in relation to phallobase (Figs. 12–13), genital segment (spiculum gastrale) poorly sclerotized, Y-shaped with very wide basal arm (Fig. 14).

Remarks. Females are unknown to us.



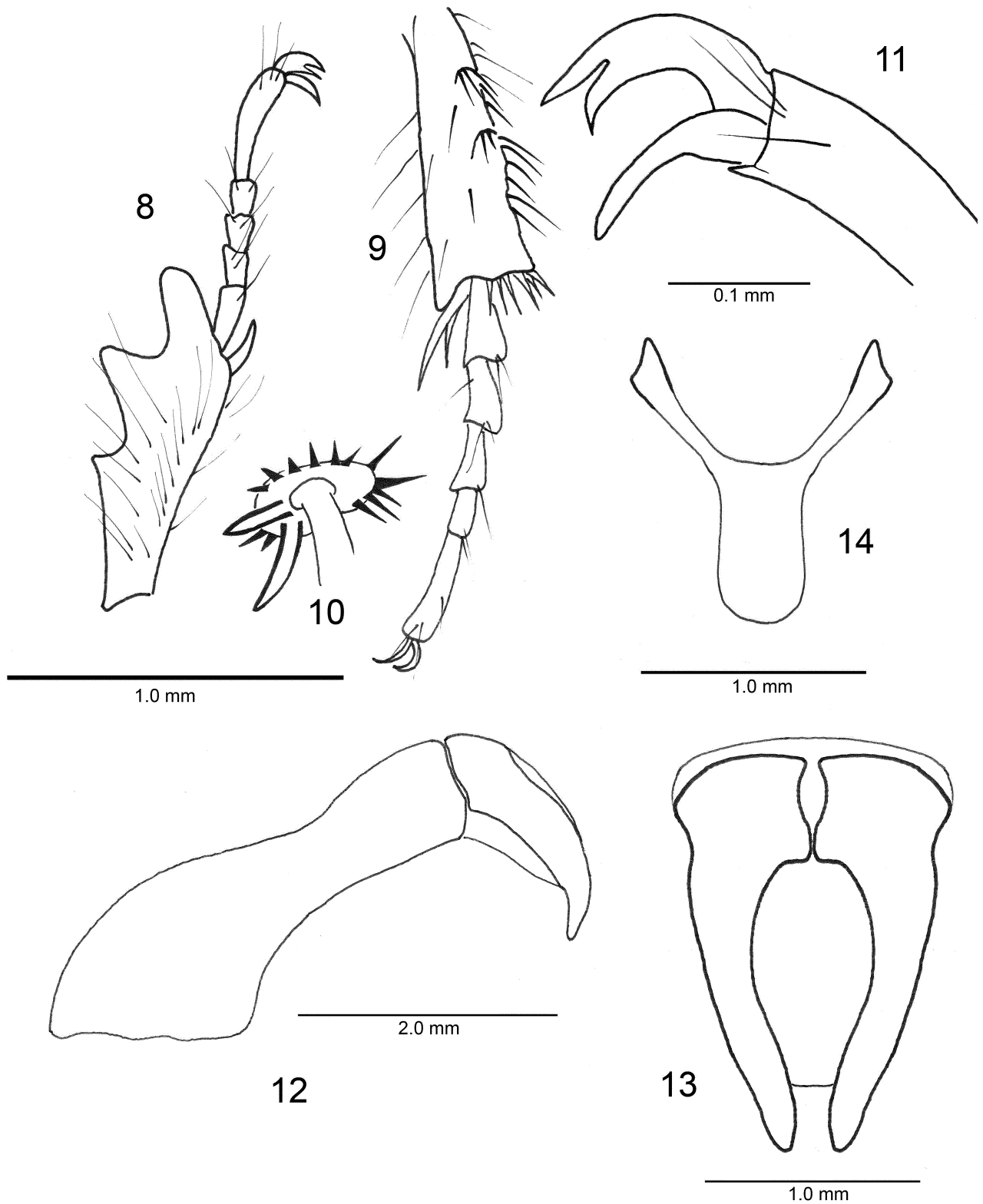
FIGURES 6–7. *Xenaclopus borneensis* habitus. 6. dorsal view; 7. ventral view.

Discussion

Although the labral and mandibular characters are shared with the other aclopine genera, there is no evidence to support these characters as synapomorphic. The toothed front inner claw, exposed basal ventrite, membranous posterior part of penultimate ventrite, elongated phallobase, and shortened parameres are enough characters to exclude this genus from Aclopininae and include it in the subfamily Melolonthinae.

The Australian and South American aclopininae all have simple claws, basal abdominal ventrite hardened and concealed below metacoxae, penultimate ventrite lacking membranous posterior part, shortened phallobase, elongated parameres and spiculum gastrale not developed.

The membranous posterior part of the penultimate abdominal sternite is usually considered a character for the tribe Pachydemini in its current sense, however, *Xenaclopus* has unique proclaws, different buccal pieces, and dissimilar genital characters to the other genera now included in this tribe (that do not appear to form a monophyletic clade). Within the Melolonthinae, we cannot reliably place *Xenaclopus* in any of the described tribes. The current tribal classification of the subfamily is in dire need of review since many of the tribes are polyphyletic or paraphyletic (see Smith et al. 2006).



FIGURES 8–14. *Xenaclopus borneensis*. 8. left protibia, dorsal view; 9. right metatibia, dorsal view; 10. right metatibial apex, apical view; 11. left proclaws, ventral view; 12. aedeagus, lateral view; 13. parameres, apical view; 14. genital sclerite (spiculum gastrale), ventral view.

Acknowledgments

We thank the curators for the loan or possibility to examine the specimens, and to Andrew Smith and two anonymous referees for very useful comments. Denis Keith contributed with relevant bibliography to FZVM. FCO thanks the Consejo Nacional de Investigaciones Científicas (CONICET) and the CCT-CONICET, Mendoza for their support. FZVM received a CNPq post-doctoral grant (PDJ 151603/2007-3). This project was supported by an NSF/PEET grant (DEB-0118669) to Mary Liz Jameson and Brett Ratcliffe, by an NSF Biodiversity Surveys and Inventories grant (DEB 0342189) to Andrew Smith and Federico Ocampo, and by an NSF-DBI grant (0500767) to Mary Liz Jameson and Federico Ocampo.

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