ZOOTAXA

435

Revision of the Neotropical caddisfly genus *Banyallarga* (Trichoptera: Calamoceratidae)

AYSHA L. PRATHER

Magnolia Press
Auckland, New Zealand

AYSHA L. PRATHER

Revision of the Neotropical caddisfly genus *Banyallarga* (Trichoptera: Calamoceratidae)

(*Zootaxa* 435)

76 pp.; 30 cm.

18 Feb. 2004

ISBN 1-877354-28-7 (Paperback)

ISBN 1-877354-29-5 (Online edition)

PUBLISHED BY

Magnolia Press

P.O. Box 41383 St. Lukes

Auckland 1030

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Zootaxa 435: 1–76 (2004)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

435

Revision of the Neotropical caddisfly genus *Banyallarga* (Trichoptera: Calamoceratidae)

AYSHA L. PRATHER

Centre for Biodiversity and Conservation Biology, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6, Canada (ayshap@rom.on.ca)

TABLE OF CONTENTS

Accepted by R.W. Holzenthal: 19 Jan. 2004; published: 18 Feb. 2004

ABSTRACT

Systematics of the genus *Banyallarga* are reviewed. Illustrations, a generic diagnosis, and descriptions are provided for males and females. A new subgenus, *Histricoverpa*, is recognized. Nine previously described species are recognized: *Banyallarga* (*Banyallarga*) *argentinica* Flint, *B.* (*B.*) *columbiana* (Navás), *B.* (*B.*) *loxana* (Navás), *B.* (*B.*) *vicaria* (Walker) *B.* (*B.*) *villosa* (Navás), *B.* (*B.*) *yungensis* Flint, *B.* (*Histricoverpa*) *acutiterga* (Denning and Hogue), *B.* (*H.*) *fortuna* (Resh), and *B.* (*H.*) *mollicula* (McLachlan). Eight species are described as new: *B.* (*B.*) *penai* (Peru), *B.* (*H.*) *echinata* (Peru), *B.* (*H.*) *mexicana* (Mexico), *B.* (*H.*) *nica* (Nicaragua), *B.* (*H.*) *quincemil* (Peru), *B.* (*H.*) *sanchezi* (Colombia), *B.* (*H.*) *sylvana* (Costa Rica, Nicaragua), and *B.* (*H.*) *tapanti* (Costa Rica). *Banyallarga testacea* is designated a synonym of *B.* (*B.*) *vicaria* and a neotype of *B. testacea* is designated to clarify the identity of the genus. The genus *Loxinum*, formerly considered a synonym of *Banyallarga*, is designated a synonym of *Chimarrhodella* (Philopotamidae).

Key words: Trichoptera, Calamoceratidae, *Banyallarga*, caddisfly, Neotropical, taxonomy, systematics

INTRODUCTION

The Calamoceratidae are a cosmopolitan family of 8 extant genera, 1 fossil genus, and over 100 described species. Two endemic genera occur in the Neotropics, *Banyallarga* Navás and *Phylloicus* Müller. *Phylloicus* contains 55 species; *Banyallarga*, with 11 described species, is the second largest calamoceratid genus in the New World. The distribution of these species is more limited than that of *Phylloicus* species, which range from the southwestern United States throughout South America; *Banyallarga* species are restricted to Central America and northwestern South America. A new species from Oaxaca is the northernmost record, and *Banyallarga argentinica* the southernmost.

Only the larva of *Banyallarga argentinica* is described. I have also seen material of *B. acutiterga*; the description will be published elsewhere. Unlike other calamoceratid genera, which exclusively use plant material in their cases, the larvae of *Banyallarga* build tubular cases primarily of mineral fragments with some plant material incorporated. They are found in slowly flowing areas on sandy-stony bottoms or among vegetation (Flint & Angrisano 1985). *Banyallarga* larvae appear to be omnivorous.

Navás established the genus *Banyallarga* in 1916, in the Hydropsychidae, Macronematinae. The holotype of the type species, *B. testacea*, from Colombia, is lost. Subse-

quently, Navás (1934a, b) described 4 additional species from Colombia and Ecuador, these in the genera *Anisocentropus*, *Loxinum*, and *Phylloicus* (all treated by Navás as Calamoceratidae). Flint (1983) transferred Navás' species and two additional species, *Ganonema molliculum* McLachlan 1871 and *Hydropsyche vicaria* Walker 1852, to *Banyallarga*. The female type of *Loxinum aequatorium* is missing; the male type of *Anisocentropus columbianus* and the female type of *A. villosus* are in poor condition; only the female type of *Phylloicus loxanus* is in good condition, and none of the original descriptions are adequate for species discrimination. Neither Walker's nor McLachlan's species are well known, although the female type of the former was redescribed by Betten & Mosely (1940). None of the earlier described species have been studied in detail or reillustrated. Only the 4 species recently described by Flint (1983) and Denning *et al.* (1983) have received adequate attention.

None of these treatments of *Banyallarga* species provided a clear diagnosis of the genus. In reviewing the assignment of species to the Neotropical genera, it appeared that species had been assigned to *Banyallarga* because they were not species of *Phylloicus*, and that whether *Banyallarga* species were a natural group had not been assessed. Prather (2002) examined the phylogenetic relationships of calamoceratid genera. The analysis recovered two reciprocally monophyletic clades of *Banyallarga* (Fig. 37), which are described here as subgenera.

Checklist of *Banyallarga* species

Subgenus *Banyallarga* Navás, 1916
- *Banyallarga argentinica* Flint, 1983
- *Banyallarga columbiana* (Navás, 1934a)
- *Banyallarga loxana* (Navás, 1934a)
- *Banyallarga penai* **new species**
- *Banyallarga vicaria* (Walker, 1852)
- *Banyallarga testacea* Navás, 1916 **new synonym**
- *Banyallarga villosa* (Navás, 1934a)
- *Banyallarga yungensis* Flint, 1983

Histricoverpa **new subgenus**
- *Banyallarga acutiterga* (Denning and Hogue, 1983)
- *Banyallarga echinata* **new species**
- *Banyallarga fortuna* (Resh, 1983)
- *Banyallarga mexicana* **new species**
- *Banyallarga mollicula* (McLachlan, 1871)
- *Banyallarga nica* **new species**
- *Banyallarga quincemil* **new species**
- *Banyallarga sanchezi* **new species**

Banyallarga sylvana **new species**
Banyallarga tapanti **new species**

MATERIALS AND METHODS

Species discrimination

Species were discriminated and described primarily on differences in the male genitalia, especially characteristics of tergum X. In most instances, distinctive characters could be identified to clearly discriminate among species. However, in some instances, character differences among species were subtle. Additionally, limited material, including species known only from the single type specimen, made it difficult to assess within-species variation. Collection and study of additional material may provide evidence that morphotypes described here represent variants of a single species. In the interests of describing the known morphological and geographic diversity, I have described each of the diagnosable morphotypes as a species.

Morphological terminology

For warts and sutures of the head and thorax, I use the terminology of Wiggins (1996). The central setal area of the head may have numerous fine setae, but these are not formed into distinct warts in *Banyallarga*. Calamoceratids do not have a visible cranial suture, but a posteromesal ridge (Fig. 1A; Wiggins 1996, fig. 17.140) is a synapomorphy of the family (Prather 2002).

Wing venation is after Betten (1934) and Mosely & Kimmins (1953). Figure 2 illustrates vein and cell designations. In all calamoceratid forewings, both the nygma and the thyridium are clearly visible.

Terminology for male and female terminalia largely follows that of Schmid (1998). Calamoceratids lack superior and intermediate appendages of tergum X, as well as parameres. In many species, there is a distinct lateral ridge anteriorly on segment IX, just ventral to the base of the preanal appendages, which is continuous with the pleural posterior margin (Fig. 3A). In several species of *Banyallarga*, there are two fields of long setae in the pleural area of male segment IX. The number, length, and stoutness of these setae are species-specific. Using the base of the inferior appendage as a reference point, these are the dorsal pleural setae and the ventral pleural setae (these latter are usually parallel with the inferior appendage base). I use the term phallotremal sclerites (Nielsen 1957) to refer to internal sclerotized structures surrounding the ejaculatory duct, usually consisting of a dorsal, horseshoe-shaped or ovoid structure, and the sclerotized distal portion of the ejaculatory duct. In specimens with the endotheca fully everted, these sclerites are located in the most distal membranous lobes.

Specimen Preparation

To observe diagnostic structures of caddisflies, it is usually necessary to clear soft tissues from the terminalia. The standard method for Trichoptera (Ross 1944) uses 10–12% KOH. The abdomen was clipped from the specimen and then soaked overnight in KOH at room temperature, after which it was flushed with distilled water, using a syringe to flush out the macerated tissues. The abdomen was then placed in a solution of 10% glacial acetic acid/ 72% ethanol, to neutralize the KOH. The abdomen was then examined in a dish of glycerin or ethanol.

The lactic acid method, commonly used by dipterologists (Cumming 1992) for clearing soft tissues, proved to be very useful for everting the phallic endotheca. Abdomens were placed in test tubes with a few milliliters of lactic acid; the test tubes were placed in a beaker bath of glycerin, and then slowly heated in a fume hood to approximately 125° C, for 10–30 minutes, until the soft tissues were macerated. Upon cooling, the specimen was then transferred directly to a dish of glycerin, where any remaining soft tissues were teased out with a probe before examination.

After examination, the cleared abdomen was preserved in a minute genitalia vial containing glycerin and pinned under the specimen, or if stored in ethanol, returned to the original vial.

To reveal details of wing venation, special preparations of a fore- and hind wing from each species were made. After removal from the body, the wings were placed in a dish of ethanol. Using a pair of soft fine artist's brushes, the setae were brushed off the wings. Denuded wings were rinsed in a second dish of ethanol, and then soaked briefly in absolute ethanol to completely dehydrate them. The wings were then arranged on one coverslip, covered with a second, and then placed inside a folded lab wipe. A weight was applied on top of this, to keep the preparation flat while the ethanol evaporated. When dry, tiny dabs of Gelva resin (Solutia Inc.) were applied around the edges of the coverslips to keep them together, and a tab of label paper was glued on with Gelva, to provide a place for pinning the wing preparation back on the original specimen.

Material Examined

All specimens examined were individually labeled with unique alphanumeric identification numbers and specimen data were entered into a Biota database (Colwell 1996). Type depositories and lists of material examined are given with each species discussion. A detailed list of material examined, including individual specimen code numbers, is maintained at the University of Minnesota Insect Collection website (http://www.entomology.umn.edu/museum/databases). Material is deposited, as indicated, in the following institutions:

BMNH The Natural History Museum, London

CNC	Canadian National Collection (Agriculture), Ottawa, Ontario
DEI	Deutsches Entomologisches Institut, Eberswalde, Germany
EMUS	Utah State University, Logan
IBUNAM	Instituto de Biología, Universidad Nacional Autonoma de México, México City
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica
INHS	Illinois Natural History Survey, Champaign, Illinois
IZAM	Instituto de Zoología Agrícola, Maracay, Venezuela
LACM	Los Angeles County Museum of Natural History, Los Angeles
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
MHNJP	Museo de Historia Natural "Javier Prado," Lima, Peru
MNHNP	Muséum National d'Histoire Naturelle, Paris
NMNH	National Museum of Natural History, Washington, D.C.
UCB	Essig Museum of Entomology, University of California, Berkeley
UMSP	University of Minnesota Insect Collection, Saint Paul, Minnesota
ZMHU	Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin

Illustrations

Numbering. To facilitate comparison between species, I have standardized lettering of views. Not all views are included for each species; this accounts for nonconsecutive lettering of figures for some species. Letters used for figures are:

Male: A—lateral view; B—dorsal view; C—segment IX and inferior appendages, ventral view; D—phallus, lateral view; E—phallus, ventral view. **Female**: A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view. **Wings**: A—forewing; B—hind wing.

The phallus of each species is illustrated. However, not all illustrations capture complete detail for a particular species. The membranous endotheca may or may not evert from within the phallobase during specimen preparation. For each species, the phallus illustrated is that of the specimen that most fully revealed details, but in many cases none of the available specimens had the phallus fully everted. Thus, superficial comparison of illustrations of the phallus would erroneously suggest differences between species.

Illustrations of genitalia were generally prepared from the type specimen, if it was in adequate condition for that purpose. Some figures were prepared from additional specimens, especially if the phallus of the type was not fully everted. The specimen from which each figure was prepared is noted in the figure caption. Initially, pencil sketches were made on tracing paper mounted on a grid, corresponding to a 10X10 mm grid in the microscope eyepiece (Olympus model SZH). The pencil sketch was then scanned into Adobe Photoshop (v. 6, Adobe Systems, Inc.). The digital image was "placed" into an Adobe

Illustrator (v. 9, Adobe Systems, Inc.) document, to serve as a template, and then traced to create a vector graphic. A graphics tablet and pen (Intuos™, Wacom Technology Co.) facilitated careful tracing of the original image.

Illustrations are drawn to different scales, so that homologous structures of each species appear approximately the same size. Unless otherwise noted, all component parts of a particular figure are drawn to the same scale. A forewing length is given for each species, to indicate relative size.

Wing venation diagrams were prepared in a similar fashion, except that the template from which the vector graphic was prepared was a digital photograph (taken with an Olympus model C3030 digital camera) of coverslip-mounted wings.

Julie Martinez prepared the color illustration from pencil sketches made using a drawing tube mounted on a dissecting microscope.

SYSTEMATICS

Genus *Loxinum* Navás

Loxinum Navás 1934b:175 [Type species: *Loxinum aequatorium* Navás 1934b, original designation]. —Flint 1983:77 [as synonym of *Banyallarga*]

Navás (1934b) described *Loxinum aequatorium* from Ecuador—based on a single female specimen, which is now lost—as a calamoceratid. The only illustration in his description is of the forewing; characters of the head, wings, and legs are described in the text. The palps are described as long, with the first segment short; the remaining segments long. The forewing illustrated and described possesses only forks I, II, III, and V. The same forks are present in the hind wing. The tibial spurs are 2, 4, 4. "Short" as a descriptor of the first maxillary palp segment is ambiguous (in calamoceratids the first and second segments are of approximately equal length, and several times longer than wide). All known calamoceratids retain fork IV in the forewing of both sexes. Flint (1983) argued that Navás had omitted to draw or mention in the text fork IV, and synonymized *Loxinum* with *Banyallarga*. However, it may be argued that the possession of that character was not necessarily required by Navás's concept of Calamoceratidae—Navás (1931) also described the African genus *Silvatares*—which Prather & Holzenthal (2002) examined and determined to belong to Pisuliidae—in Calamoceratidae, and neither does it have forewing fork IV.

The venation of the wing illustrated appears most similar to that of species in the genus *Chimarrhodella* (Philopotamidae). I compared Navás' illustration with Blahnik & Holzenthal's (1992) illustration of *Chimarrhodella galeata* (Martynov) and specimens of *C. tapanti* Blahnik & Holzenthal 1992 and *C. ulmeri* (Ross 1956). The wings appear very similar in shape, and the crossveins forming the chord are lined up vertically in *Loxinum* and *Chimarrhodella*. There are certain differences: 1) crossvein r is at the bases of forks I

and II in *C. aequatoria*, while it attaches more distally to M_2 in the three *Chimarrhodella* species examined; 2) crossvein m-cu also is placed more distally in *C. aequatoria*. Navás wrote that he used Ulmer's (1907) key. He would have had to make two errors in keying his specimen if he was looking at a *Chimarrhodella*: 1) he would have interpreted the terminal maxillary palp segment as non-annulate (on a pinned specimen this is not always easy to determine); and 2) he would have missed the ocelli (which in *Chimarrhodella* are small and easily obscured by setae on the head). Navás's description and illustration, such as they are, are consistent with Blahnik & Holzenthal's (1992) diagnosis of *Chimarrhodella*, and contradictory to the diagnosis of Calamoceratidae. Therefore, I am transferring this species to *Chimarrhodella*, NEW COMBINATION; as *aequatorium* is the type species of *Loxinum*, the latter becomes a junior synonym of *Chimarrhodella*, **NEW SYNONYM**.

Genus *Banyallarga* Navás

Banyallarga Navás 1916:78 [Type species: *Banyallarga testacea* Navás 1916, original designation]. —Fischer 1963:175 [in Hydropsychidae: Macronematinae]. —Botosaneanu & Flint 1982:24 [larva, as *Phylloicus*]. —Flint 1983:77 [to Calamoceratidae]. —Flint & Angrisano 1985:688 [larva, pupa, distinguished from *Phylloicus*]. —Flint *et al.* 1999a:15 [checklist].

The type specimen of *B. testacea* (the type species of the genus) is lost, and the original description and illustration are too general for species discrimination. Therefore, in order to objectively define the genus, I am designating a neotype for *B. testacea*. A detailed discussion of *B. testacea*ís identity and the neotype designation are to be found under the heading for *B. vicaria*.

Generic description, adult. Forewing length 8.4–20.8 mm; female usually slightly larger than male.

Forewing color (membrane and setae) variable, overall color ranging from golden brown to dark brown, with, in some species, mottled pattern formed by hairs in various shades of gold and brown. Antennae usually twice wing length or longer (in *B. loxana*¸ relative antennal length of females is reduced); scape shorter than head length, round. Maxillary palps 5-segmented in both sexes; all segments 3–4 times longer than wide. Labial palps 3-segmented. Head with anterior, anteromesal, posterior and posterolateral setal warts; central setal area bare or with fine setae only, these not aggregated as distinct warts; anteromesal setal warts prominent and single or paired; posteromesal ridge present at posterodorsal margin of head (Fig. 1A). Mesoscutum without distinct setal warts, with stout setae arranged in two anterior-posterior sublateral lines, each line one to several setae wide; in some species additional setae scattered between these lines (Fig. 1B). Anterior margin of mesoscutellum straight; without warts or prominent setae (Fig. 1B). Metathoracic leg of males often with posterior fringe of long setae. Forewing venation typical for

family: forks I–V present, discoidal and medial cells closed; R_1 recurrent onto R_2 or free to wing margin; Cu_2 and A_1 free to wing margin (Figs. 2A). Hind wing with forks I, II, III, and V present, discoidal and medial cells open (Figs. 2B); base of hind wing with semimembranous sleeve or pouch, enclosing brush of long setae (Fig. 32B; not present in a few species).

Male. Tergum IX much shorter than sternum IX (Fig. 3A); posterior margin of tergum variously modified by short projections or processes. Sternum IX narrower mesally than laterally, internal ridges may be present mesally or sublaterally; patches of pleural setae may be present dorsolaterally or ventrolaterally (Fig. 3A). Preanal appendages of varying length and shape, bearing most setae on apical two-thirds. Tergum X approximately equal in length to inferior appendages, posterior margin of tergum X variously modified with processes and projections. Inferior appendages 2-segmented, not highly modified; coxopodite covered with long setae, particularly on lateral and ventral surfaces; harpago cylindrical or tapered apically, bearing short, pointed, peglike setae on mesal and apicoventral surfaces; some short fine setae may be present basally on harpago; base of inferior appendages occupies 1/2 to 2/3 length of sternum IX. Phallobase a simple curved tube, curvature consistent throughout genus, phallotremal sclerites reduced; dorsal sclerite U- or V-shaped; ventral sclerite narrow and flat or absent; endotheca may consist of multiple membranous lobes with species-specific arrangement.

Female. Sternum VIII more darkly sclerotized than anterior segments, anterior margin marked by darkly sclerotized ridge; posterior margin bearing many short stout setae, mesally cleft to anterior ridge; lateral margins indistinct beyond lateral apodemes extending from anterior margin. Tergum IX with anterior margin entire and concave; mesally without clear junction with tergum X. Sternum IX with anterior and posterior pair of striate lobes lateral to vaginal opening. Tergum X bearing paired posterolateral appendages, varying in shape, length and degree of distinctness from tergite; these appendages bearing many long setae apically; posteromesal portion of tergite membranous or semisclerotized. Sternum X mostly membranous except for bases of dorsal appendages; semisclerotized patches and short fine setae may be present lateral to anal opening. Vaginal apparatus consisting of anterior and posterior sclerites; duct leading to spermatheca arises from within sclerotized pocket on ventral surface of anterior sclerite; duct leading to bursa copulatrix arises from anterior margin; posterior sclerite tapered posteriorly, connected to anterior sclerite by dorsal mound of membranous tissue.

Subgenus *Banyallarga* Navás
Figs. 1–15

Banyallarga Navás 1916:78 [Type species: *Banyallarga testacea* Navás 1916, original designation]. —Fischer 1963:175 [in Hydropsychidae: Macronematinae]. —Botosaneanu & Flint 1982:24 [larva, as *Phylloicus*]. —Flint 1983:77 [to Calamoceratidae]. —Flint & Angrisano 1985:688 [larva, pupa, distinguished from *Phylloicus*].

Species in the subgenus *Banyallarga* are known only from South America. They are distinguished from species in the new subgenus *Histricoverpa* by three characters. 1) The anterior margins of the abdominal terga of both sexes are notched mesally (Fig. 3B); 2) the abdominal sterna lack mesoventral processes; and 3) The preanal appendages are shorter than or subequal to tergum X. The male terminalia of all seven species are very similar; the shape of tergum X is the distinguishing feature of each species.

Male. Tergum IX with darkly sclerotized anterior ridges, posterior margin indistinct, rounded or notched mesally; lateral ridge (Fig. 3A) usually present; dorsal and ventral pleural setae present; sternum IX with anterior ridge. Preanal appendage shorter than tergum X, length 3–4 times width, with long setae on apical half. Tergum X without posterior projections, (sometimes) notched posteromesally (Figs. 3B, 6B). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with tiny peglike setae apically. Phallic endotheca with large round, spiculate ventrolateral lobes and single or paired dorsomesal lobes (Figs. 3D, E).

Female. Sternum VIII anterior marginal ridge darkly sclerotized; with setae on posterior surface or restricted to posterior margin. Tergum IX with distinct anterior marginal ridge; sternum IX with striate lateral lobes. Tergum X semisclerotized posteromesally, appendage extends beyond posterior margin of tergum (Figs. 4B, 7B); sternum X with fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite emarginate or truncate anteriorly. If posterior end of spermatheca sclerotized, not as a sclerotized sphere (Fig. 9A).

***Banyallarga* (*Banyallarga*) *argentinica* Flint**

Figs. 1–4

Banyallarga argentinica Flint 1983:77 [Type locality: Argentina, Pcia. Salta, Cañada la Gotera, Rt. 59, km 23.5; NMNH; male]. —Flint & Angrisano 1985:691 [larva, pupa, biology].

Banyallarga argentinica is distinguished from other species in the subgenus by the height of tergum X at its apex (in lateral view it appears truncate) and the ventrolateral flanges (Fig. 3A). In all other species of the subgenus *Banyallarga*, the apex of tergum X is acute.
Adult. Forewing length 10.2–11.3 mm (n=52).

Head chestnut brown, with dorsomesal crest of golden setae. Maxillary palps golden brown. Antenna twice forewing length, chestnut brown, each flagellomere pale basally and with narrow patch of pale sensilla on anterior surface. Dorsal pterothorax chestnut brown; ventrolateral thorax and legs golden brown, hind tibia of male without posterior fringe. Forewing mottled gold and golden brown, with large patch of gold in distal corner of cell A_3. Hind wings without basal structures.

Male. Tergum IX with heavily sclerotized anterior ridges, posterior margin rounded or notched mesally (Fig. 3B); lateral ridge present; dorsal pleural setae approximately 5; ven-

tral pleural setae approximately 5; sternum IX without posterior extensions of anterior ridge. Preanal appendage shorter than tergum X, tapered apically, with long setae on apical half. Tergum X shallowly notched posteromesally; with posteroventral flange (Fig. 3A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with tiny peglike setae apically. Phallus with phallotremal sclerite V-shaped, ventral sclerite a short tube; endotheca with large round, spiculate ventrolateral lobes and small, paired dorsomesal lobes.

Female. Sternum VIII anterior marginal ridge darkly sclerotized; dense fine setae covering posterior 1/3 (Fig. 4C). Tergum IX with mesal ridge extending length of segment; sternum IX with anterior and posterior lobes darkly sclerotized and finely striate, smooth anteromesally. Tergum X semisclerotized posteromesally, appendage without clear suture line; with short digitate posteromesal process (Fig. 4B); sternum X with semisclerotized plates, bearing fine setae, lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite emarginate anteriorly, posterolateral projections rounded; posterior sclerite triangular (Fig. 4A). Posterior end of spermatheca a tiny sclerotized cone.

The association of the female of this species is tentative. In other species of *Banyallarga*, the males and females appear very similar in color and proportion, the only significant difference being that females are slightly larger. Of the material I examined, only 5 females were collected with males of *B. argentinica*. Three of these, from Argentina, look rather different from the males, being darker, with a different wing shape, and possibly with the shape of the anterior setal wart (of the head) different. They are badly rubbed, so details of wing setation are not available. The other two females, from Bolivia, are different from the Argentina specimens. Unfortunately, all specimens in this series are badly rubbed, and while these females are more similar to the males in color and shape, they are indistinguishable from females of *B. yungensis.* The female illustrated here is one of the specimens from Argentina. It is distinct from females of other *Banyallarga* species, but examination of additional positively associated specimens would increase my confidence that this is indeed the female of *B. argentinica*.

Material examined. **ARGENTINA: Catamarca:** Ao. El Pintado, near La Viña, 18.x.1973, Flint—3 male paratypes (NMNH); El Rodeo, 18–19.x.1973, Flint—1 male paratype (NMNH); **Formosa:** 6.vi—1 male (MCZ); **Jujuy:** 29.ii.1920—1 male paratype (NMNH); Yala, viii.1982, Angrisano—1 female (NMNH); **Salta:** Cañada La Gotera, Rt. 59 km 23.5, 16–17.x.1973, Flint—holotype male (MHNJP); 1 male, 1 female paratypes (UMSP); Payogasta, 13.x.1973, Flint—2 male paratypes (NMNH); Rt. 59. Km. 22.5 Pena Baya, 16–17.x.1973, Flint—5 male paratypes (NMNH); Salta, 17–18.v.1969, P & P Spangler—4 male, 1 female paratypes (NMNH); 1 male paratype (UMSP); 1898–1904, Steinbach—2 males, 2 females (ZMHU); **Tucuman:** Dept. Tafi Viejo, Quebrada Cainzo, 18–19.xii.1950, Golbach—1 male (NMNH); Siambon, 10.x.1973, Flint—1 male paratype (NMNH); Parque Aconquija, 6.iv.1929, Jaynes—1 male paratype (NMNH); **BOLIVIA:**

El Palmar to Cristal Mayo (? label illegible), 1500 m, 10.xii.1984, Peña G.—1 male (NMNH); **Cochabamba:** Siberia, 2900 m, 18.ii.1976, Peña G.—20 males, 2 females (NMNH); 2 males (UMSP); **PERU: Cuzco:** 13°08'00"S 71°33'00"W, 2150 m, 28–29.viii.1989, Adams—6 females (NMNH).

Distribution. Argentina, Bolivia, Peru.

***Banyallarga* (*Banyallarga*) *columbiana* (Navás)**
Fig. 5

Anisocentropus columbianus Navás 1934a:174 [Type locality: Colombia, Santander, Pamplona; MNHNP; original description implies female, but type is male].
Banyallarga columbiana—Flint 1983:77.

This species is known only from the type specimen, which is in rather poor condition, lacking a head, most of its legs, one hind wing, and all the wing hairs. The phallic endotheca is not everted, so that portion is not described. *Banyallarga columbiana* is distinguished from other species in the subgenus *Banyallarga* by the shape of tergum X, which is broad and truncate apically in dorsal view, and has a sharp dorsomesal ridge (Fig. 5A, B). Tergum X is also broad in *B. penai*, but it is shallowly emarginate apically.

Adult. Forewing length 10.9 mm (n=1).

Dorsal pterothorax golden brown; ventrolateral thorax and legs golden brown. Tibial spurs 2:4:3 [according to Navás's description; hind leg of specimen missing]. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae (as in Fig. 32B).

Male. Tergum IX with darkly sclerotized anterior ridge, posterior margin concave; lateral ridge present; sternum IX with posterior sublateral ridges. Preanal appendage subequal to tergum X, rounded apically, with short setae on apical half (Fig 5B). Tergum X truncate apically, with a sharp dorsolateral ridge (Fig. 5B); in lateral view posterior margin oblique (Fig. 5A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with peglike setae apically. Phallus with phallotremal sclerite U-shaped.

Female. Unknown

Material examined. **COLOMBIA: Santander:** Pamplona, 2300 m, 1920, Rochereau—holotype male (MNHNP).

Distribution. Colombia.

***Banyallarga* (*Banyallarga*) *loxana* (Navás)**
Figs. 6, 7

Phylloicus loxanus Navás 1934a:173 [Type locality: Ecuador, Loja; MNHNP; original description implies male, but type is female].
Banyallarga loxana (Navás)—Flint 1983:77; 1996b:424 [distribution].

This is the largest known species of *Banyallarga*, and size alone is sufficient to distinguish this from other species in the genus. The shape of male tergum X is diagnostic for *B. loxana*, with its narrow, notched apex (Fig. 6A, B).

Adult. Forewing length 15.8–20.8 mm (n=34).

Head chestnut brown. Maxillary palps golden brown, covered with dark setae. Antenna of male twice forewing length, female antenna only slightly longer than wing; flagellum chestnut brown posteromesally, pale anterolaterally. Dorsal pterothorax chestnut brown; ventrolateral thorax and femora golden brown, tibiae covered with dark setae, each tarsomere dark basally and pale distally. Forewing mottled gold and golden brown, with large round patches of pale setae marking nygma and thyridium; large patch of pale setae at posteromesal margin. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae (as in Fig. 32B).

Male. Tergum IX with heavily sclerotized anterior ridge, posterior margin rounded or irregular (Fig. 6B); lateral ridge incomplete dorsally; dorsal pleural setae approximately 15; ventral pleural setae approximately 3; sternum IX with paired sublateral ridges extending from anterior margin, not reaching posterior margin (Fig. 6C). Preanal appendage shorter than tergum X, tapered apically, with long setae on apical half. Tergum X tapered and shallowly notched posteromesally; in lateral view with shallowly humped dorsal ridge (Fig. 6A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae basoventrally, peglike setae apically. Phallus with phallotremal sclerite horseshoe-shaped, ventral sclerite a short tube.

Female. Sternum VIII anterior marginal ridge darkly sclerotized; dense fine setae covering posterior 1/4; posterior margin marked by single row of short stout setae (Fig. 7C). Tergum IX without mesal ridge; sternum IX with anterior and posterior lobes darkly sclerotized and finely striate. Tergum X semisclerotized posteromesally, with sclerotized bands sublaterally, appendage without clear suture line; with short digitate posteromesal process (Fig. 7B); sternum X with patches of fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite emarginate anteriorly, posterolateral projections truncate; posterior sclerite ovoid (Fig. 7A).

Material examined. **ARGENTINA: Tucuman:** Siambon, ii.1933—1 female (NMNH); **BOLIVIA: Cochabamba:** Yungas de Corani, 2800 m, 11.xii.1984, Peña G.—1 female (NMNH); 1 male (UMSP); **La Paz:** Río Zongo, 1900 m, 24–31.x.1984, Peña G.—1 male (NMNH); Tarata, Río Zongo, 3200 m, 24–30.x.1984, Peña G.—6 females

(NMNH); 1 male (UMSP); **ECUADOR: Azuay:** Cajas, 3150 m, 23.xii.1992, Becker—1 male, 3 females (NMNH); Río Llaviuco, 16 km W Quenca, 3010 m, 18.ix.1990, Flint—1 male, 3 females (NMNH); **Loja:** 1909, Poujade—holotype female (MNHNP); **Zamora-Chinchipe:** 30 km E Loja, 2000 m, 23.ix.1990, Flint—1 female (NMNH); **PERU: Cuzco:** 13°08'00"S 71°33'00"W, 2150 m, 28–29.viii.1989, Adams—1 male, 3 females (NMNH); Buenos Aires, 53 km W Pilcopata, 2280 m, 3–5.xii.1979, Heppner—1 female (NMNH); Paucartambo to Pilcopata rd. small streams past Morro Leguia, 2000 m, 21.vi.1993, Blahnik & Pescador—1 female (NMNH); Paucartambo to Pilcopata rd., small stream ca. 0.5 km from Puente Morro Leguia, 2220 m, 20.vi.1993, Blahnik & Pescador—3 females (NMNH); 2 females (UMSP).

Distribution. Argentina, Bolivia, Ecuador, Peru.

Banyallarga (*Banyallarga*) *penai*, new species

Figs. 8, 9

Banyallarga penai is similar to *B. columbiana* in the broad apex of tergum X, which in *B. penai* is shallowly notched. *Banyallarga penai* is distinguished from *B. columbiana* and other species in the subgenus *Banyallarga* by the paired basolateral lobes of tergum X (Fig. 8B).

Adult. Forewing length 11.9–12.9 mm (n=10).

Head chestnut brown. Maxillary palps chestnut brown. Antenna twice forewing length, dark brown laterally, each flagellomere pale basally and with narrow patch of pale sensilla on mesal surface. Dorsal pterothorax chestnut brown; ventrolateral thorax and legs golden brown. Forewing mottled gold and dark brown, with large round patches of golden setae marking nygma and thyridium. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Tergum IX with heavily sclerotized anterior ridge, mesal surface semimembranous and covered with dense fine pilosity; lateral ridge present; dorsal pleural setae approximately 15; ventral pleural setae approximately 5; sternum IX with paired sublateral ridges extending from anterior margin to posterior margin (Fig. 8C). Preanal appendage shorter than tergum X, rounded apically, with long setae on apical half. Tergum X with paired rounded basolateral lobes; tapered and shallowly notched posteromesally (Fig. 8B); in lateral view tapered apically (Fig. 8A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae basoventrally, peglike setae apically. Phallus with phallotremal sclerite horseshoe-shaped, ventral sclerite a short tube; endotheca with large round, spiculate lateral lobes and single large dorsomesal lobe (Fig. 8D, E).

Female. Sternum VIII anterior marginal ridge darkly sclerotized; dense fine setae covering posterior 1/2. Tergum IX without mesal ridge; sternum IX with anterior and posterior lobes darkly sclerotized and finely striate; anterior lobe smooth anteromesally, posterior

lobe with fine punctations posterolaterally. Tergum X semisclerotized posteromesally, appendage roundly tapered posteromesally (Fig. 9B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite emarginate anteriorly, posterolateral projections tapered; posterior sclerite narrowing toward vaginal opening, posterior end of spermatheca a robust sclerotized ring (Fig. 9A).

Holotype male: BOLIVIA: La Paz: Unduavi/Coroico, 2500 m, 19–25.xi.1984, Peña G. (UMSP000010005; NMNH).

Paratypes: BOLIVIA: La Paz: Unduavi/Coroico, 2500 m, 19–25.xi.1984, Peña G.—3 males, 2 females, 2 adults (NMNH); 1 male (UMSP); **ECUADOR: Loja:** Loja, 2750 m, 21.xii.1992, Becker—1 female (NMNH).

Distribution. Bolivia, Ecuador.

Etymology. Named in honor of the late L. E. Peña, who through his collecting efforts added greatly to our knowledge of the Neotropical caddisfly fauna.

***Banyallarga* (*Banyallarga*) *vicaria* (Walker)**

Figs. 10, 11

Hydropsyche vicaria Walker 1852:114 [Type locality: Venezuela; BMNH; female].
Ganonema vicaraium—McLachlan 1871:127 [male]. —Betten & Mosely 1940:218 [redescription of type].
Banyallarga vicaria—Flint 1983:77.
Banyallarga testacea Navás 1916:78 [Original type locality: Colombia, Muzo; collection Appolinaris, now lost?; male]. NEW SYNONYM.

NEOTYPE: VENEZUELA: **Mérida**: Parque Nacional Sierra Nevada, Mucuy Fish Hatchery, 7 km E Tabay, Queb. La Mucuy, 2012 m, 18.i.1994, Holzenthal Cressa & Rinc—n, male (UMSP000000021; UMSP).

Walker (1852) described *Hydropsyche vicaria* (Hydropsychidae) from a female specimen. McLachlan (1871) described a male specimen from Venezuela, identifying the species as that described by Walker and recognizing *H. vicaria* as belonging to the calamoceratid genus *Ganonema*. Navás (1916) described two Colombian species, *testacea* and *crenata*, in a new genus, *Banyallarga*, and designated *testacea* as the type species of the genus. In a review of Neotropical calamoceratids, Flint (1983) recognized Walkerís species as belonging to the same generic unit as *B. testacea*, while from the wing venation illustrated, he placed *B. crenata* as a species of *Phylloicus*. The types of both Navás species were in the collection Appolinaris, and now are presumed lost (Flint *et al*. 1999a). No other material identified as *B. testacea* is known. Therefore, *B. testacea* is known only from Navás's illustrations of the wings and a lateral view of the male terminalia. The latter illustration is highly generalized, and could pertain to a number of species, of which two, *B. columbiana* and *B. vicaria*, are found in the mountain range containing the original type

locality of *B. testacea*,. Because of this potential confusion, I am designating a neotype (ICZN 1999, Article 75) for *B. testacea*, to define the species objectively. *Banyallarga vicaria* is the better known of the two species and therefore more appropriate for fixing the identity of *B. testacea* (*B. columbiana* being known only from the holotype, which is in poor condition), According to Article 67.1.2, (ICZN 1999), *B. testacea*, as a junior synonym, remains the type species of *Banyallarga*.

Banyallarga vicaria can be separated from *B. columbiana* by the lack of a sharp mesal ridge on the dorsal surface of male tergum X, the shallow notch of the apical margin, and the more pronounced apical tapering. From the similar *B. villosa*, it can be separated by the shallow, as opposed to deep, mesal notch on the apex of tergum X.

Adult. Forewing length 9.9–11.9 (n=97).

Head chestnut brown, with dorsomesal crest of dark and golden setae. Maxillary palps chestnut brown. Antenna twice forewing length, dark brown, each flagellomere pale basally and with narrow patch of pale sensilla on anterior surface. Dorsal pterothorax chestnut brown, golden brown mesally; ventrolateral thorax and legs golden brown, hind tibia of male without posterior fringe. Forewing mottled dark brown and gold, nygma, thyridium, and anal cell marked in gold. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae, female with thick basoposterior brush of golden setae.

Male. Tergum IX posterior margin rounded (Fig. 10B); lateral ridge present; dorsal pleural setae approximately 15; sternum IX with heavy anterior ridge. Preanal appendage shorter than tergum X, tapered apically, with long setae on apical half. Tergum X tapered in dorsal and lateral views, shallowly notched posteromesally (Fig. 10B). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae dorsally and tiny peglike setae apically. Phallus with phallotremal sclerite horseshoe-shaped, ventral sclerite a short tube; endotheca with large round, spiculate lateral lobes and long digitate dorsomesal lobes (Fig. 10D, E).

Female. Sternum VIII anterior marginal ridge darkly sclerotized; posterior margin marked by single row of stout setae. Tergum IX with anterior marginal ridge extending mesally length of segment; sternum IX with single pair of lobes darkly sclerotized and striate; anterolateral surface concave, surface rugose. Tergum X semisclerotized posteromesally, appendage without clear suture line; roundly tapered posteromesally (Fig. 11B); sternum X with fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite truncate anteriorly, posterolateral projections rounded; posterior sclerite ovoid (Fig. 11A).

BOLIVIA: La Paz: Unduavi/Coroico, 2500 m, 19–25.xi.1984, Peña G.—1 male, 1 female (NMNH); **VENEZUELA:** *B. vicaria* holotype female (BMNH); **Barinas:** La Chimenea, 5 km Sur La Soledad, 1500 m, 28–29.v.1975, Dietz—1 female (NMNH); San Isidro, 24.ix.1975, Dietz—4 males (NMNH); 25.ix.1925, Dietz—1 male (NMNH); San

Isidro, 14 km Sur La Soledad, 1500 m, 30–31.v.1975, Dietz—1 male (NMNH); Parque Nacional Sierra Nevada, Queb. San Juan in Sta. Rosa, 08°27'52"N 70°50'55"W, 1000 m, 21.iii.1997, Holzenthal—3 males (UMSP); **Lara:** Yacambú, 1200 m, 13.v.1981, Townes—11 males, 14 females (NMNH); Parque Nacional Dinira, Quebrada Las Pinetas, 09°46'19"N 70°01'45"W, 1889 m, 22.vi.2001, Holzenthal, Blahnik, Paprocki, & Cressa—2 males, 1 female (IZAM); 3 males, 7 females (UMSP); Parque Nacional Yacambú, 6–8.iv.1981, Menke & Hollenberg—2 males (NMNH); 13 km SE Sanare, 1560 m, 1–5.viii.1981, Heppner—5 males, 6 females (NMNH); 28–31.viii.1981, Heppner—6 males (NMNH); 10 males, 10 females (UMSP); 6–11.viii.1981, Heppner—12 males, 15 females (NMNH); El Blanquito, 1350 m, 1–3.viii.1976, Rosales & Joly—2 males, 4 females (NMNH); **Mérida:** Río Albarregas, ca. 1 km NW Univ. de los Andes, 08°38'02"N 71°09'29"W, 1980 m, 17.i.1994, Holzenthal, Cressa, & Rincón—1 male, 1 female (IZAM); 1 female (UMSP); 24.iv.1995, Holzenthal, Gutic, & Segnini—1 female (UMSP); Río La Gonzalez, road between Merida & Jaji, 08°35'05"N 71°17'58"W, 1870 m, 25.iv.1995, Holzenthal, Cressa, & Gutic—8 females (UMSP); Río Montalban, Rt. 4 19 km W Merida, 20.ii.1976, C & O Flint—3 females (NMNH); Tabay, 2200 m, 1.v.1981, Townes—1 male (NMNH); 30.iv.1981, Townes—1 female (NMNH); Parque Nacional Sierra Nevada, Mucuy Fish Hatchery, 7 km E Tabay, Queb. La Mucuy, 2012 m, 18.i.1994, Holzenthal, Cressa, & Rincón—2 males (NMNH); 4 males, 9 females, *B. testacea* neotype male (UMSP); 26.iv.1995, Holzenthal, Gutic, & Segnini—4 males, 3 females (UMSP); **Trujillo:** Quebrada Potrerito, 7.5 km NE Bocono, 09°16'26"N 70°13'06"W, 1530 m, 29–30.iv.1995, Holzenthal, Cressa, & Gutic—9 females (UMSP).

Distribution. Bolivia, Colombia, Venezuela.

***Banyallarga* (*Banyallarga*) *villosa* (Navás)**

Figs. 12, 13

Anisocentropus villosa Navás 1934a:174 [Type locality: Ecuador, Loja; MNHNP; original description implies male, but type is female].
Banyallarga villosa—Flint 1983:77.

This species is known from just a handful of specimens, all badly rubbed, so the wing pattern is unknown. The association of the males is circumstantial, and based on a single series of males and females collected together. The male of *Banyallarga villosa* can be separated from *B. vicaria* and other species in the subgenus *Banyallarga* by the deep mesal notch of male tergum X (Fig. 12B).

Adult. Forewing length 9.4–11.7 mm (n=8).

Head chestnut brown, with dorsomesal crest of golden setae. Maxillary palps golden brown. Antenna chestnut brown. Dorsal pterothorax chestnut brown; ventrolateral thorax and legs golden brown, hind tibia of male without posterior fringe. Forewing chestnut and golden brown. Hind wings without basal structures.

Male. Tergum IX with faint anterior ridge, extending mesally to posterior margin (Fig. 12B); lateral ridge incomplete dorsally; dorsal pleural setae approximately 15, long; sternum IX with heavy anterior ridge and paired sublateral posterior ridges. Preanal appendage subequal to tergum X, sharply tapered apically, with long setae on apical half. Tergum X in dorsal view with deep posteromesal notch, apically tapered in lateral view (Fig. 12A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae basally and peglike setae apically. Phallus with phallotremal sclerite horseshoe-shaped, ventral sclerite a short tube (Fig. 12D, E).

Female. Sternum VIII anterior marginal ridge darkly sclerotized; with fine setae on posterior margin. Tergum IX with anterior marginal ridge extending mesally 1/2 length of segment; sternum IX with anterior and posterior lobes striate; smoothly sclerotized anteromesally and posterolaterally. Tergum X semimembranous, with sclerotized bands sublaterally, appendage with short digitate posteromesal process (Fig. 13B); sternum X with fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite truncate anteriorly, posterolateral projections rounded; posterior sclerite triangular (Fig. 13A).

ECUADOR: Loja: 1909, Poujade—holotype female (MNHNP); Loja, Staudinger—2 males, 1 female (ZMHU); 2750 m, 23–25.iii.1965, Peña G.—3 males (NMNH); Loja, San Lucas, 2500 m, 24.x.1977, Peña G.—1 male (NMNH).

Distribution. Ecuador.

***Banyallarga* (*Banyallarga*) *yungensis* Flint**

Figs. 14, 15

Banyallarga yungensis Flint 1983:79 [Type locality: Argentina, Pcia. Tucumán, Horco Molle, near Tucumán; NMNH; male].

Ganonema vicarium—Martynov 1912:7 [description of male misidentified as *Ganonema vicarium*].

A number of species in the subgenus *Banyallarga* have the apex of tergum X acute. The male of *B. yungensis* can be separated from those species by the high dorsal ridge of tergum X (Fig. 14A).

Adult. Forewing length 9.7–12.4 mm (n=64).

Head chestnut brown, with dorsomesal crest of golden setae. Maxillary palps dark brown. Antenna twice forewing length, dark brown, each flagellomere pale basally and with narrow patch of pale sensilla on anterior surface. Dorsal pterothorax chestnut brown; ventrolateral thorax and femora golden brown, tibiae covered with dark setae, each tarsomere dark basally and pale distally. Forewing mottled dark brown and gold, nygma marked by golden spot, proximal half of wing posterior mostly bright gold; thyridial cell

filled with dark brown setae. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Tergum IX with faint anterior ridge, posterior margin indistinct (Fig. 14B); lateral ridge absent; dorsal pleural setae numerous, short; sternum IX with heavy anterior ridge. Preanal appendage subequal to tergum X, roundly tapered apically, with long setae on apical half. Tergum X in dorsal view tapered, with shallow rounded posteromesal notch, in lateral view with high dorsal ridge and tapered apically (Fig. 14A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae basally and peglike setae apically. Phallus with phallotremal sclerite horseshoe-shaped, ventral sclerite a short tube, with large spiculate ventrolateral lobes and small rounded paired dorsomesal lobes (Fig. 14D, E).

Female. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering surface of sternite. Tergum IX with anterior marginal ridge extending mesally length of segment; sternum IX with anterior and posterior lobes striate; smoothly sclerotized anteromesally and posterolaterally. Tergum X semimembranous, appendage roundly tapered posteromesally (Fig. 15B); sternum X with fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite emarginate anteriorly, posterolateral projections short; posterior sclerite ovoid (Fig. 15A).

ARGENTINA: Salta: 72: Rosario del al Frontera, Los Banos, 11.iv.1979—1 male, 1 female (NMNH); 73: W. of Grl. Güemes, Parq. Nat. El Ray, 10.iv.1979—2 males, 2 females (NMNH); **Tucuman:** Dept. Tafi Viejo, Quebrada Cainzo, 18–19.xii.1950, Golbach—3 males (NMNH); Horco Molle, near Tucumán, 15–19.i.1966, Stange—2 females (NMNH); 19.i.1966, Stange—holotype male, 1 male paratype (NMNH); 3–10.iv.1966, Stange—6 male, 7 female paratypes (NMNH); 7–13.iii.1966, Stange—15 male, 8 female paratypes (NMNH); **BOLIVIA: Chuquisaca:** Incahuasi, E Muyupampa, 1600 m, 23.xii.1984, Peña G.—2 males (NMNH); **Cochabamba:** Siberia, 2900 m, 18.ii.1976, Peña G.—1 female (NMNH); **La Paz:** Quebradas del Río Zongo, 1400 m, 24–30.x.1984, Peña G.—1 male, 1 female (NMNH); 1 male, 1 female (UMSP); Río Zongo, 1900 m, 24–31.x.1984, Peña G.—1 male (NMNH); Sorata, 2800 m, 11–15.xi.1984, Peña G.—1 male (NMNH); Unduavi/Coroico, 2500 m, 19–25.xi.1984, Peña G.—1 male (NMNH); 1 male (UMSP); Zongo, Staudinger—1 male (ZMHU); **PERU: Cuzco:** 13°08'00"S 71°33'00"W, 2150 m, 28–29.viii.1989, Adams—8 males (NMNH); Callanga, Staudinger & Bang-Haas—1 male, 2 females (DEI); Machu Picchu, 2450 m, 16–18.x.1981, Davis—1 male paratype (NMNH); Paucartambo to Pilcopata rd., Puente Morro Leguia, 13°07'26"S 71°43'22"W, 2200 m, 20–21.vi.1993, Blahnik & Pescador—1 female (NMNH); Paucartambo to Pilcopata rd., Quebrada Quitacalz—n at Puente Quitacalzón, 13°01'34"S 71°29'58"W, 1050 m, 25–27.vi.1993, Blahnik & Pescador—2 males (NMNH); 2 males (UMSP); Paucartambo to Pilcopata rd., Río San Pedro @ Puente San Pedro, 13°03'18"S 71°32'47"W, 1445 m, 24.vi.1993, Blahnik & Pescador—1 female (NMNH); 1 female

(UMSP); Paucartambo to Pilcopata rd., river at Puente Unión, 13°04'13"S 71°34'00"W, 1670 m, 21–23.vi.1993, Blahnik & Pescador—4 males (NMNH); Quincemil, xi.1962, Peña G.—1 male (CNC); Santa Isabel, Cosnipata Valley, 22.xii.1951, Woytkowski—1 male (NMNH); 26.xii.1951, Woytkowski—1 male (NMNH); 30.xi.1951, Woytkowski—2 males (NMNH); 6.xii.1951, Woytkowski—1 male (NMNH); Paucartambo, Callanga, Callanga River Valley, 1300 m, 21.ii.1953, Woytkowski—1 male (NMNH); 25.ii.1953, Woytkowski—1 male (NMNH); Paucartambo to Pilcopata rd., streamlet 50 m E Quinta Calzon, 1050 m, 26.vi.1993, Blahnik & Pescador—1 male (NMNH); Pte. San Pedro, ca. 50 km NW Pilcopata km 152, 13°09'00"S 71°26'00"W, 1430 m, 2–3.ix.1988, Flint & Adams—2 males (NMNH); 30–31.viii.1989, Adams—2 males (NMNH); stream 3 km E Puente San Pedro, 13°09'00"S 71°26'00"W, 1430 m, 31.viii.1989, Adams—5 males (NMNH); Quinta Calzon ca. 30 km NW Pilcopata, km 164, 13°09'00"S 71°22'00"W, 1030 m, 1–2.ix.1989, Adams—1 male (NMNH); streamlet, 50 km E Quinta Calzon, 13°09'00"S 71°22'00"W, 1030 m, 2.ix.1989, Adams—1 male (NMNH); **VENEZUELA: Lara:** Yacambú, 1200 m, 10.v.1981, Townes—3 males, 3 females (NMNH).

Distribution. Argentina, Bolivia, Peru, Venezuela.

***Histricoverpa*, new subgenus**

Figs. 16–36

Type species: *Ganonema molliculum* McLachlan 1871.

This subgenus includes two species originally described in *Murielia* Hogue and Denning 1983 (in Denning *et al.* 1983). The genus was largely established to accommodate these two species, (described in the same paper), but the authors chose to select *Phylloicus farri* Flint (1968) as the type species for their new genus, based on what they believed to be synapomorphies. However, Flint *et al.* (1999b) recognized that the type species of *Murielia* is a true species of *Phylloicus* and therefore synonymized *Murielia* with *Phylloicus*. He transferred the two new species of *Murielia* described in Denning et al (1983) to *Banyallarga*. However, the new species described in *Murielia*, *Banyallarga acutiterga* and *B. fortuna*, along with a Venezuelan species, *B. mollicula*, and several new species from Central America and northwestern South America do form a distinct clade within *Banyallarga* (Fig. 37), whose distinctiveness was first recognized by Hogue and Denning. This clade is here described as a new subgenus of *Banyallarga*.

Histricoverpa is distinguished from its sister subgenus by several characters. A pointed mesal process is present on the anterior margin of sternum VII (Fig. 16), in some species also on sternum VI. The abdominal terga lack anteromesal notches. In males of several species (*B. acutiterga*, *echinata*, *fortuna*, *nica*, *quincemil*, and *sylvana*; the single male specimens of *mexicana* and *sanchezi* have lost segment IV) the lateral margin of sternum IV is deeply excavated (Fig. 16); possibly this is related to the function of an abdom-

inal glandular structure. In *B. acutiterga¸ echinata, fortuna, nica, quincemil, sylvana,* and *tapanti*, the posterolateral margin of segment IX is broadly produced as a rounded lobe (Fig. 17A). Generally, the preanal appendages are much longer than tergum X, except in *B. mollicula*, and are somewhat flexible distally. The name refers to the thornlike setae on the phallic endothecal membrane (Figs. 17D, 21D), which are unique to the species in this subgenus. The endotheca was fully everted in only a few specimens, so I am unable to assess whether the arrangement of the thornlike setae is species-specific. In the female, the posterior end of the spermatheca is sclerotized as a sphere, with a posterior invagination where the spermathecal duct enters (Fig. 20A).

Male. In some species, sternum IV lateral margin deeply excavated (Fig. 16). Tergum IX very short mesally; anterolateral margin of segment IX with broad rounded anterior process (Fig. 17A). Preanal appendages usually much longer than tergum X, narrow, several times longer than wide. Phallic endotheca bearing numerous thornlike setae or spines (Figs. 17D, 21D).

Female. Tergum IX with anterior marginal ridge entire, mesal ridge sometimes present. Sternum IX with anterior and posterior pair of striate lobes lateral to vaginal opening. Tergum X bearing paired posterolateral appendages, varying in shape, not extending 1/2 length beyond posterior margin of tergum; posteromesal portion of tergite membranous or semisclerotized. Sternum X mostly membranous except for bases of dorsal appendages; semisclerotized patches and short fine setae may be present lateral to anal opening. Vaginal apparatus complex (Figs. 18A, 20A); posterior end of spermatheca sclerotized as a sphere, with posterior invagination where spermathecal duct enters (Figs. 20A, 22A).

Etymology. From *histricis*, Latin, meaning "porcupine", and *verpa*, Latin, meaning "penis," for the phallus of these species, the endotheca of which is covered with thornlike setae that resemble the quills of a porcupine.

***Banyallarga* (*Histricoverpa*) *acutiterga* (Denning and Hogue)**

Figs. 16–18

Murieila acutiterga Denning and Hogue, in Denning *et al.* 1983:188 [Type locality: Costa Rica, San José Province, Motel Prado, San Isidro del General; LACM; male;].
Banyallarga acutiterga—Flint *et al.* 1999b:73.

Banyallarga acutiterga, as its name implies, is distinguished by the long, acute apicoventral projection of tergum X. In overall genitalic morphology, it is similar to *B. quincemil* and *sylvana*, but these species lack the long acute projection.

Adult. Forewing length 9.8–10.5 mm (n=22).

Head chestnut brown. Maxillary palps chestnut brown. Antenna twice forewing length, chestnut brown, each flagellomere pale basally and with narrow patch of pale sen-

silla on anterior surface. Dorsal pterothorax chestnut brown; ventrolateral thorax and femora chestnut brown, metathoracic tibia of male with long posterior setal fringe. Forewing mottled chestnut and golden brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Lateral margin of sternum IV deeply excavated (Fig. 16). Sternum VII with pointed anteromesal process (Fig. 16). Tergum IX with darkly sclerotized anterior ridge, posterior margin indistinct from tergum X (Fig. 17B); lateral ridge present; dorsal pleural setae numerous, long. Preanal appendage much longer than tergum X, narrow, slightly expanded and flexible apically, with long setae on apical 2/3. Tergum X with long acute apicoventral projections (Figs. 17A, B); cleft posteromesally (Fig. 17B). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago rounded apically, of uniform circumference, with short fine setae basally and peglike setae apically. Phallus with phallotremal sclerite U-shaped (17E), thornlike setae on endothecal membrane.

Female. Sternum VII with pointed anteromesal process. Sternum VIII narrow anterior marginal ridge darkly sclerotized; fine setae covering posterior 1/4 of sternite. Tergum IX with mesal ridge extending posteriorly 1/2 length of segment; sternum IX with anterior and posterior lobes striate. Tergum X semimembranous, appendage short, smoothly rounded posteriorly (Fig. 18B); sternum X with fine setae lateral to anal opening. Vaginal apparatus anterior and posterior sclerites equal in length; anterior sclerite rounded anteriorly, posterolateral projections truncate; posterior sclerite ovoid (Fig. 18A).

COSTA RICA: Puntarenas: 13 mi. E of Esparta, 853 m 25.vii.1967—2 males (NMNH); 2.8 mi E of Golfito, 3–4.vii.1967, Flint & Ortiz—9 males (NMNH); Río Bellavista, ca. 1.5 km NW Las Alturas, 08°57'04"N 82°50'46"W, 1400 m, 10–11.viii.1990, Holzenthal, Blahnik, & Muñoz—2 males (UMSP); 16–17.iii.1991, Holzenthal, Muñoz, & Huisman—1 male (UMSP); 8–9.iv.1987, Holzenthal, Hamilton, & Heyn—1 female (INBIO); 1 male (UMSP); Río Cotón, in Las Alturas, 08°56'17"N 82°49'34"W, 1360 m, 13–14.viii.1990, Holzenthal, Blahnik, & Muñoz—1 male (INBIO); Río Jaba, rock quarry, 1.4 km (air) W Las Cruces, 08°47'24"N 82°58'12"W, 1150 m, 9.viii.1990, Holzenthal, Blahnik, & Muñoz—3 males, 3 females (UMSP); Jardín Botanico R & C Wilson, unnamed trib., Sendro del Agua, 08°48'00"N 82°57'36"W, 1180 m, 8.viii.1990, Holzenthal, Blahnik, & Muñoz—2 males, 2 females (UMSP); **San José:** Motel Prado, San Isidro del General, 10.vi.1967, Hogue—holotype male, 1 male paratype (LACM).

Distribution. Costa Rica.

***Banyallarga* (*Histricoverpa*) *echinata*, new species**
Figs. 19–20

Banyallarga "n. sp. 1" Flint 1996b:424

As its name implies, *B. echinata* is distinguished easily from other known species by the presence of paired rows of prominent spinelike setae on the dorsal and lateral surfaces of tergum X (Fig. 18B). *Banyallarga nica* is the only other species in *Histricoverpa* with spinelike setae on tergum X, but these are shorter, not arranged in rows, and located on the apices of long lateral lobes.

Adult. Forewing length 9.3–11.0 mm (n=11).

Head golden brown, with dorsomesal crest of dark brown setae. Maxillary palps golden brown. Antenna twice forewing length, golden brown. Dorsal pterothorax golden brown; ventrolateral thorax and femora golden brown, metathoracic tibia of male with long posterior setal fringe. Forewing mottled chestnut and gold. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Lateral margin of sternum IV deeply excavated (as in Fig. 16). Sterna VI and VII with pointed anteromesal processes. Tergum IX with short truncate posterior projection; dorsal pleural setae numerous; sternum IX with paired mesal ridges extending from anterior to posterior margin. Preanal appendages long, slightly flexible apically; apical 2/3 covered with long fine setae (Fig. 19B). Segment X deeply emarginate posteriorly, forming two acute lateral projections; mesal and lateral margins bearing spinelike setae (Fig. 19B). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 19C). Phallus with U-shaped phallotremal sclerite, thornlike setae on endothecal membrane (Fig. 19D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 20C). Tergum IX with mesal ridge extending only slightly from anterior margin, posterior margin marked by rounded lobes bearing fine pilosity (Fig. 20B); sternum IX with anterior and posterior lobes darkly sclerotized and striate (Fig. 20A). Tergum X semimembranous, appendage roundly tapered (Fig. 20B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening. Vaginal apparatus anterior sclerite truncate anteriorly, posterolateral projections acute, posterior portion folded beneath ventral surface; posterior sclerite enclosed within a semisclerotized sheath more than half width of posterior abdomen; dorsal connective membrane with regular, dense pleating (Fig. 20A).

Holotype male: PERU: Madre de Dios: Manu Biosphere Res., Pakitza Bio. Sta., 01-13-19-99, 11°56'00"S 71°18'00"W, 350 m, 1.x.1987, Pogue (BIOLAT/TRIC000000105; NMNH).

Paratypes: PERU: Cuzco: Cosnipata Valley, 12.iii.1952, Woytkowski—2 males (INHS); 24.ii.1952, Woytkowski—1 male (INHS); **Madre de Dios:** Manu Biosphere Res., Pakitza Bio. Sta., 01-13-01-99, 11°56'00"S 71°18'00"W, 350 m, 27.ix.1987, Pogue—1 male (NMNH); 01-13-19-99, 11°56'00"S 71°18'00"W, 350 m, 1.x.1987, Pogue—1 male, 1 female (NMNH); kitchen stream, 11°56'00"S 71°18'00"W, 250 m, 12–18.ix.1989, Adams—1 male (NMNH); trail 2, marker 18, 11°56'00"S 71°18'00"W, 250 m, 12–

23.ix.1989, Adams *et al.*—1 male (NMNH); Quebrada Paujil-Picoflor, trail 1, marker 13, 11°56'39"S 71°16'59"W, 350 m, 4–6.vii.1993, Blahnik & Pescador—1 female (MHNJP); Quebrada Trompetero, trail 2, marker 15, 11°56'39"S 71°16'59"W, 350 m, 3.vii.1993, Blahnik & Pescador—1 male (UMSP).

Distribution. Peru

Etymology. *Echinata*, from the Latin *echinatus*, meaning "prickly," referring to the prominent spinelike setae of male tergum X.

***Banyallarga* (*Histricoverpa*) *fortuna* (Resh)**

Figs. 21–22

Undescribed genus, undescribed species "A" McElravy *et al.* 1981:153—Denning *et al.* 1983:190.
Murielia fortuna Resh, in Denning *et al.* 1983:190 [Type locality: Panama, Rio Chiriqui at Fortuna; UCB; male;].
Banyallarga fortuna—Flint *et al.* 1999b:73.

Banyallarga fortuna and *B. tapanti* are the only species of *Histricoverpa* that have the apex of tergum X rounded in lateral view (Figs. 21A, 35A). *Banyallarga fortuna* is distinguished from *B. tapanti* by the absence (Fig 21A, B) of the dorsomesal ridge present on the tergum X of *B. tapanti* (Fig. 35A, B) .

Adult. Forewing length 8.4–9.9 mm (n=6).

Head golden brown. Maxillary palps golden brown. Antenna twice forewing length, chestnut brown, each flagellomere pale basally and with narrow patch of pale sensilla on anterior surface. Dorsal pterothorax golden brown; ventrolateral thorax and legs golden brown, metathoracic tibia of male with long posterior setal fringe. Forewing mottled chestnut and golden brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Lateral margin of sternum IV deeply excavated (as in Fig. 16). Sterna VI and VII with pointed anteromesal processes. Tergum IX with distinct anterior marginal ridge; dorsal pleural setae numerous. Preanal appendages much longer than tergum X, slightly flexible apically; apical 2/3 covered with long fine setae (Fig. 21A). Segment X shallowly emarginate posteriorly (Fig. 21B), forming two short rounded lateral projections; in lateral view posterior margin rounded. Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 21C). Phallus with U-shaped dorsal phallotremal sclerite, ventral sclerite a short, indistinct sclerotized tube, thornlike setae cover ventral and anterolateral surface of endothecal membrane (Fig. 21D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; short stout setae in two rows on posterior margin (Fig. 22C). Tergum IX without mesal ridge, posterior margin rounded (Fig. 22B); sternum IX with

anterior and posterior lobes darkly sclerotized and striate. Tergum X semimembranous, appendage roundly tapered (Fig. 22B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening (Fig. 22A). Vaginal apparatus anterior sclerite shallowly emarginate anteriorly, posterolateral projections short; posterior sclerite ovoid (Fig. 22A).

COSTA RICA: Cartago: near Tuis, 914 m, 16–22.vii.1993, Hanson—1 male (EMUS); **Heredia:** Parque Nacional Braulio Carrillo, Río Peje, Puesto El Ceiba, 10°19'37"N 84°04'41"W, 480 m, 29–31.v.1990, Holzenthal, Blahnik, & Muñoz—1 female (UMSP); **Límon:** Limon, 16 km W Guapiles, 400 m, ii–iii.1989, Hanson—2 males (UMSP); **PANAMA: Chiriqui:** Fortuna Dam Site nr. Hornitos, 08°55'00"N 82°16'00"W, 1050 m, 17–23.viii.1977, Wolda—holotype male (UCB); 25.iv–1.v.1979, Wolda—1 female (NMNH).

Distribution. Costa Rica, Panama.

***Banyallarga* (*Histricoverpa*) *mexicana*, new species**
Figs. 23–24

This species is known only from two specimens. It is unique within *Histricoverpa* due to the easily recognizable long, paired, apically bifurcate posterior projections of tergum X (Fig. 23A, B).

Adult. Forewing length 13.0–13.3 mm (n=2).

Head golden brown. Maxillary palps golden brown. Antenna golden brown, base of each flagellomere pale. Dorsal pterothorax golden brown; ventrolateral thorax and femora golden brown, metathoracic tibia of male with long posterior setal fringe. Forewing uniform golden brown.

Male. Sternum VII with pointed anteromesal process. Tergum IX with anterior marginal ridge extending mesally to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 23B); lateral ridge incomplete posteriorly; anterior marginal ridge of sternum extending slightly posteriorly. Preanal appendages long, broadening from base and constricting subapically, slightly flexible apically; apical 2/3 covered with long fine setae (Fig. 23B). Segment X deeply cleft posteromesally, forming two long, apically bifurcate lateral projections; in lateral view, ventral margin concave and posterior projection long and narrow (Fig. 23A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 23A). Phallus with U-shaped phallotremal sclerite, thornlike setae on endothecal membrane (23D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (24C). Tergum IX with anterior marginal ridge extending only slightly mesally, posteromesally indistinct from tergum X (Fig. 24B); sternum IX with anterior and posterior lobes darkly sclerotized and striate; with tiny setae posteriorly (Fig. 24A). Tergum X semimembranous,

appendage truncate apically (Fig. 24B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening. Vaginal apparatus anterior sclerite rounded anteriorly, posterolateral projections short and rounded; posterior sclerite longer than anterior, constricted at anterior margin of sternum IX; dorsal connective membrane distinct (Fig. 24A).

Holotype male: MEXICO: Oaxaca: La Esperanza, 18.iv.1983, Garcia & Ibarra (UMSP000065234; IBUNAM).

Paratype: MEXICO: Oaxaca: La Esperanza, 18.iv.1983, Garcia & Ibarra—1 female (IBUNAM).

Distribution. Mexico.

Etymology. Named for the country of Mexico, where this northernmost representative of the genus *Banyallarga* was collected.

Banyallarga (*Histricoverpa*) *mollicula* (McLachlan)

Figs. 25–26

Ganonema molliculum McLachlan 1871:127 [Type locality: Venezuela; BMNH; male].
Banyallarga mollicula—Flint 1983:77.

Among species of *Histricoverpa*, only *B. mollicula* has preanal appendages shorter than tergum X (Fig. 25A). The handful of specimens available were badly rubbed or preserved in ethanol, so color and wing pattern are badly faded.

Adult. Forewing length 10.6–12.1 mm (n=12).

Head golden brown. Antenna twice forewing length. Dorsal pterothorax golden brown; ventrolateral thorax and legs golden brown.

Male. Sternum VII with pointed anteromesal process. Tergum IX with mesal ridge extending to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 25B); lateral ridge present; anterior marginal ridge of sternum entire, without posterior extensions. Preanal appendages shorter than tergum X, lanceolate, apical 1/3 covered with long fine setae (Fig. 25B). Segment X with rounded dorsal process; posterior margin rounded mesally, with short rounded lateral processes; in lateral view posterior margin obtuse (Fig. 25A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with peglike setae apically. Phallus with U-shaped phallotremal sclerite, thornlike setae on endothecal membrane (Fig. 25D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 26C). Tergum IX with mesal ridge running length of segment, posterior indistinct from tergum X (Fig. 26B); sternum IX with single pair of striate ventral lobes (Fig. 26A). Tergum X semimembranous, appendage posterior margin oblique (Fig. 26B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening (Fig. 26A). Vaginal apparatus

anterior sclerite truncate anteriorly, posterolateral projections short; posterior sclerite ovoid (Fig. 26A).

VENEZUELA: Göring—holotype male (BMNH); **Aragua:** Km. 27, Choroni, 1500 m, 27.v.1955—5 males, 6 females (UMSP).

Distribution. Venezuela.

Banyallarga (*Histricoverpa*) *nica*, new species

Figs. 27–28

Banyallarga nica is similar to *B. echinata* in having prominent spinelike setae on tergum X; however, in *B. nica* these spines are shorter and restricted to the apices of the posterior processes (Fig. 27A, B). All specimens I examined were preserved in ethanol; consequently, color and wing pattern were not preserved.

Adult. Forewing length 10.0–10.8 mm (n=14).

Antenna twice forewing length. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Lateral margin of sternum IV deeply excavated (as in Fig. 16). Sternum VII with pointed anteromesal process. Tergum IX with mesal ridge extending to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 27B); lateral ridge present; dorsal pleural setae fine and numerous (Fig. 27A). Preanal appendages long, slightly expanded and flexible apically; apical 2/3 covered with long fine setae (Fig. 27A, B). Segment X deeply emarginate posteriorly, forming two digitate lateral projections, apices of projections bearing short spinelike setae (Fig. 27B). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 27C). Phallus with horseshoe-shaped phallotremal sclerite, thornlike setae proximally and ventrally on endothecal membrane (Fig. 27D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 28C). Tergum IX without mesal ridge, posterior margin indistinct from tergum X (Fig. 28B); sternum IX with anterior and posterior lobes darkly sclerotized and striate, smoothly sclerotized anteromesally, punctate posterolaterally (Fig. 28A). Tergum X semimembranous, appendage roundly tapered (Fig. 28B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening (Fig. 28A). Vaginal apparatus anterior sclerite truncate anteriorly, posterolateral projections acute; posterior sclerite enclosed within a semisclerotized sheath half width of posterior abdomen; dorsal connective membrane with regular pleating (Fig. 28A).

Holotype male: NICARAGUA: Jinotega: Peñas Blancas, 13°17'00"N 85°33'00"W, 1300 m, 25.vii.1997, Maes & Hernández (UMSP000063355; UMSP).

Paratypes: NICARAGUA: Jinotega: Cerro Kilambé, 13°34'00"N 85°43'00"W, 1520

m, 1.viii.1997, Maes & Hernández—4 males (UMSP); 1.vii.1997, Maes & Hernández—4 males, 1 female (UMSP).

Distribution. Nicaragua

Etymology. "Nica" is a nickname for Nicaraguans or Nicaragua, the country in which the types were collected.

***Banyallarga* (*Histricoverpa*) *quincemil*, new species**
Figs. 29–30

Banyallarga quincemil is distinguished from *B. acutiterga* and *sylvana* by the acute apex of tergum X, which in *B. quincemil* is without apicoventral projections or dorsolateral lobes (Fig. 29B). This new species is known only from Peru, while the other two species are Central American. The type specimens are rather badly rubbed, so details of coloration are unavailable.

Adult. Forewing length 10.5–11.1 mm (n=10).

Head golden brown. Maxillary palps golden brown. Antenna twice forewing length, golden brown. Forewing chestnut brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae; hind wing of female with short basal brush of pale setae.

Male. Lateral margin of sternum IV deeply excavated (as in Fig. 16). Sternum VII with pointed anteromesal process. Tergum IX with anterior marginal ridge extending mesally to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 29B); lateral ridge present; dorsal pleural setae fine and numerous; ventral pleural setae approximately 10. Preanal appendage longer than tergum X, slightly wider at middle, apical 1/4 rugose, slightly flexible, covered with long fine setae (Fig. 29A). Segment X shallowly emarginate posteriorly; with short rounded paired dorsolateral projections (Fig. 29B); in lateral view apex of tergum roundly tapered. Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 29C). Phallus with U-shaped phallotremal sclerite, thornlike setae on endothecal membrane (Fig. 29D).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 30C). Tergum IX with anterior marginal ridge not extending posteromesally, posterior margin indistinct from tergum X (Fig. 30B); sternum IX with anterior and posterior lobes darkly sclerotized and striate, smoothly sclerotized anteromesally, with tiny punctations posterolaterally. Tergum X semimembranous, appendage roundly tapered (Fig. 30B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening. Vaginal apparatus anterior sclerite truncate anteriorly, posterolateral projections short, rounded; posterior sclerite twice length of anterior sclerite, enclosed within a semisclerotized sheath; dorsal connective membrane with regular pleating (Fig. 30A).

Holotype male: PERU: Cuzco: Quincemil, viii.1962, Peña G. (UMSP000065236; CNC).

Paratypes: PERU: Cuzco: Quincemil, viii.1962, Peña G.—7 females (CNC); 1 male, 1 female (UMSP).

Distribution. Peru.

Etymology. Named for the type locality in Peru.

***Banyallarga* (*Histricoverpa*) *sanchezi*, new species**
Figs. 31–32

Banyallarga sanchezi is easily distinguished from all other species in the genus by the highly modified tergum X and the mesoventral process of the inferior appendage (Fig. 31A). Tergum X has two pairs of long digitate ventrolateral processes. In addition, this is the only species in the genus that bears a long digitate mesal process on the coxopodite. The species is known only from a single male specimen.

Adult. Forewing length 11.3 mm (n=1).

Head golden brown. Maxillary palps golden brown. Antenna chestnut brown, each flagellomere pale basally. Dorsal pterothorax golden brown; ventrolateral thorax and legs golden brown, metathoracic tibia of male with long posterior setal fringe. Forewing mottled gold and golden brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Sternum VII with pointed anteromesal process. Tergum IX with anterior margin deeply emarginate; sternum IX strongly angularly projected posteriorly; pleural setae numerous (Fig. 31B). Preanal appendage shorter than tergum X, narrow, apex slightly flexible, covered with long fine setae. Segment X with short spinelike setae along posterior midline; with two pairs of long digitate ventrolateral processes (Fig. 31B) Inferior appendage with long setae ventrally and laterally on coxopodite, base of coxopodite with long digitate mesal process; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 31B). Phallus with U-shaped phallotremal sclerite, thornlike setae on endothecal membrane (Fig. 31D).

Female. Unknown.

Holotype male: COLOMBIA: Huila: Quebrado Juancho, 10 km W Iquira, 13.iii.1993, Sanchez (UMSP000002649; NMNH).

Distribution. Colombia.

Etymology. Named for the collector, Mario Sanchez.

***Banyallarga* (*Histricoverpa*) *sylvana*, new species**
Figs. 33–34

This species is known from Costa Rica and Nicaragua. Across this range, there is subtle variation in the shape of tergum X (Fig. 33A, B); however, I observed intermediate morphologies between the two extreme variants illustrated here and am confident that all are conspecific. The prominent dorsolateral lobe of tergum X (Fig. 33A, B) is the diagnostic character of this species, separating it from *B. quincemil* and *acutiterga*.

Adult. Forewing length 8.8–10.5 mm (n=15).

Head golden brown. Maxillary palps golden brown. Antenna twice forewing length, golden brown; each flagellomere pale basally and with pale strip of sensilla anteriorly. Dorsal pterothorax golden brown; ventrolateral thorax and legs golden brown, metathoracic tibia of male with long posterior setal fringe. Forewing uniform chestnut brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae; hind wing of female with short thick basal tuft of setae.

Male. Lateral margin of sternum IV deeply excavated (as in Fig. 16). Sternum VII with pointed anteromesal process. Tergum IX with anterior marginal ridge extending mesally to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 33B); lateral ridge incomplete anteriorly; dorsal pleural setae fine and numerous (Fig. 33A). Preanal appendage longer than tergum X, slightly expanded apically and flexible, apical half covered with fine setae (Fig. 33B). Tergum X cleft posteromesally, separating roundly (Fig $33B_2$) or acutely tapered (Fig. $33B_1$) apicoventral projections; with paired rounded dorsolateral lobes (Fig. 33A, B); in lateral view with posteroventral projection (Fig. 33A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae basally and peglike setae apically (Fig. 33C). Phallus with horseshoe-shaped phallotremal sclerite, thornlike setae on endothecal membrane (Fig. 33D, E).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 34A). Tergum IX with anterior marginal ridge not extending mesally, posterior margin not distinct from tergum X (Fig. 34B); sternum IX with anterior and posterior lobes darkly sclerotized and striate, with fine punctation posteriorly; anterolateral surface invaginated and rugose (Fig. 34A). Tergum X semimembranous, appendage rounded posteriorly (Fig. 34B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening (Fig 34A). Vaginal apparatus anterior sclerite truncate anteriorly, posterolateral projections short; posterior sclerite ovoid anteriorly; dorsal connective membrane with regular pleating (Fig. 34A).

Holotype male: COSTA RICA: Alajuela: Reserva Forestal San Ramón, Río San Lorencito & tribs., 10°12'58"N 84°36'25"W, 980 m, 1–4.v.1990, Holzenthal & Blahnik (UMSP000000068; UMSP).

Paratypes: COSTA RICA: Alajuela: unnamed river, Cerro Campana ca. 6 km (air) NW Dos Rios, 10°54'00"N 85°24'00"W, 640 m, 22–23.vii.1987, Holzenthal, Morse, & Clausen—1 male (NMNH); Parque Nacional Rincón de la Vieja, Quebrada Provisión, 10°46'08"N 85°16'52"W, 810 m, 4.iii.1986, Holzenthal & Fasth—1 male (UMSP); Reserva Forestal San Ramón, Río San Lorencito & tribs., 10°12'58"N 84°36'25"W, 980 m, 1–4.v.1990, Holzenthal & Blahnik—2 males, 1 female (UMSP); 2–4.vii.1986, Holzenthal, Heyn, & Armitage—1 male, 1 female (UMSP); 24–27.ii.1987, Chacón—1 male (UMSP); 30.iii–1.iv.1987, Holzenthal, Hamilton, & Heyn—1 male, 1 female (INBIO); **Guanacaste:** Río Los Ahogados, Río Los Ahogados, 11.3 km ENE Quebrada Grande, 10°51'54"N 85°25'23"W, 470 m, 26.vi.1986, Holzenthal, Heyn, & Armitage—1 female (UMSP); **San José:** Parque Nacional Braulio Carrillo, La Ventana, 1330 m, 5.viii.1990, 1 male (INBIO); **NICARAGUA: Jinotega:** Peñas Blancas, 13°17'00"N 85°33'00"W, 1300 m, 25.vii.1997, Maes & Hernández—1 male (UMSP); **Zelaya:** Cerro Saslaya, 13°44'00"N 85°01'00"W, 700 m, 1.iv.1996, Maes & Hernández—1 male, 1 female (NMNH).

Distribution. Costa Rica, Nicaragua.

Etymology. *Sylvana*, from the Latin *Silvanus*, meaning "god of woods," referring to the forests where this species was collected.

Banyallarga (*Histricoverpa*) *tapanti*, new species
Figs. 35–36

Banyallarga tapanti shares with *B. fortuna* the broadly rounded apex of tergum X in lateral view (Fig. 35B). It is distinguished from *B. fortuna* by the prominent dorsomesal ridge of tergum X (Fig. 35A). This species is known only from three specimens, so variation is difficult to assess. The single female specimen is indistinguishable from the female of *B. sylvana* (Fig. 34); the association of the *B. tapanti* female is tentative.

Adult. Forewing length 8.8–9.4 mm (n=3).

Head golden. Maxillary palps golden brown. Antenna twice forewing length, golden; each flagellomere pale basally and with pale strip of sensilla anteromesally. Dorsal pterothorax golden; ventrolateral thorax and legs golden, metathoracic tibia of male with long posterior setal fringe. Forewing uniform golden brown. Hind wing of male with basal semimembranous sleeve or pouch, enclosing brush of long setae.

Male. Sternum VII with pointed anteromesal process. Tergum IX with anterior marginal ridge extending mesally to posterior margin, covered dorsally by semisclerotized membrane bearing dense fine pilosity (Fig. 35B); lateral ridge present; dorsal pleural setae approximately 15. Preanal appendage slightly longer than tergum X, slightly expanded apically and flexible, apical half covered with long setae. Tergum X cleft posteromesally, separating roundly tapered lateral projections; with high dorsomesal ridge (Fig. 35B); in lateral view apex rounded (Fig. 35A). Inferior appendage simple, with long setae ventrally and laterally on coxopodite; harpago of uniform diameter along length, with fine setae

basally and peglike setae apically. Phallus with W-shaped phallotremal sclerite, thornlike setae ventrolaterally on endothecal membrane (Fig. 35D, E).

Female. Sternum VII with pointed anteromesal process. Sternum VIII anterior marginal ridge darkly sclerotized; fine setae covering posterior surface of sternite (Fig. 36C). Tergum IX with anterior marginal ridge not extending mesally, posterior margin not distinct from tergum X (as in Fig. 34B); sternum IX with anterior and posterior lobes darkly sclerotized and striate, with fine punctation posteriorly; anterolateral surface invaginated and rugose (Fig. 36A). Tergum X semimembranous, appendage rounded posteriorly (as in Fig. 34B); sternum X with semisclerotized plates bearing fine setae lateral to anal opening. Anterior sclerite of vaginal apparatus truncate anteriorly, posterolateral projections short; posterior sclerite ovoid anteriorly; dorsal connective membrane with regular pleating (Fig. 36A).

Holotype male: COSTA RICA: Cartago: Reserva Tapantí, Quebrada Segunda @ administration building, 09°45'40"N 83°47'13"W, 1250 m, 23.viii.1990, Holzenthal & Huisman (UMSP000000071; UMSP).

Paratypes: COSTA RICA: Cartago: Reserva Tapantí, Quebrada Segunda @ administration building, 09°45'40"N 83°47'13"W, 1250 m, 9–10.v.1990, Holzenthal & Blahnik—1 female (UMSP); 23.viii.1990, Holzenthal & Huisman—1 male (UMSP).

Distribution. Costa Rica.

Etymology. This species is named for the Tapantí Wildlife Reserve in the western Talamanca Mountains of Costa Rica.

Key to Neotropical genera of Calamoceratidae (adults)

The adults of *Banyallarga* species are quite uniform in general appearance, particularly within each subgenus, and the brown and gold coloring of all known species is similar to that illustrated in Fig. 38 (species of *Histricoverpa* are probably more uniformly colored). However, the character by which they are most easily distinguished from the other Neotropical genus, *Phylloicus*, is not a synapomorphy, but the retention of a structure which is lost in *Phylloicus*. Most species of *Phylloicus* have relatively dramatic wing patterns of stripes or bands, but it is a large and diverse genus, and some drabber species could be confused with *Banyallarga*.

— Hind wing with fork I present (Fig. 2B)..... *Banyallarga*
— Hind wing with fork I absent (Prather 2003, fig. 5)..... *Phylloicus*

Key to the males of *Banyallarga*

I provide this key for the convenience of readers who do not have ready access to the Inter-

net. However, for ease of use and accuracy of identification, I recommend an interactive key, which will include any taxonomic changes subsequent to publication of this paper, maintained at <http://www.entomology.umn.edu/museum/projects>. Upon request, I can provide updated conventional or interactive keys on paper or CD-ROM.

1 Endotheca of phallus with thornlike setae (Fig. 21D) . (**subgenus *Histricoverpa***) 2
— Endotheca of phallus without thornlike setae, but may have fine setae or spicules (Fig. 3D) ..... (**subgenus *Banyallarga***) 11
2(1) Preanal appendage long, usually longer than tergum X, slender, digitate (Fig. 17A, B) 3
— Preanal appendage broad, shorter than tergum X (Fig. 25A, B) .... ***B.* (*H.*) *mollicula*** (McLachlan)
3(2) Coxopodite a simple cylindrical tube without basal process (Fig. 17A, C) 4
— Coxopodite with long, digitate, mesal process (Fig. 31C) .. ***B.* (*H.*) *sanchezi*** n. sp.
4(3) Tergum X with both normal setae and spinelike setae (Fig. 19A, 27A)..... 5
— Tergum X setose, but without prominent spinelike setae (Fig. 17A, B)..... 6
5(4) Tergum X shallowly emarginate, suboval in lateral view, with paired linear rows of long spinelike setae (Fig. 19A, B)..... ***B.* (*H.*) *echinata*** n. sp.
— Tergum X deeply emarginate, with paired digitate lateral projections, apices of projections bearing short spinelike setae (Fig. 27A, B)..... ***B.* (*H.*) *nica*** n. sp.
6(4) Tergum X rounded apically in lateral view (Figs. 21A, 35A)..... 7
— Tergum X acute or bifurcate apically in lateral view (Figs. 23A, 29A, 33A) 8
7(6) Tergum X without dorsomesal ridge (Fig. 21A, B)..... ***B.* (*H.*) *fortuna*** (Resh)
— Tergum X with high dorsomesal ridge (Fig. 35A, B)..... ***B.* (*H.*) *tapanti*** n. sp.
8(6) Tergum X shallowly to moderately cleft, without long lateral bifurcate projections (Figs. 17B, 29B, 33B), but with acutely tapered or rounded apicoventral lateral projections, or apex of X acute, but without projections (Figs. 17A, 29A, 33B)... 9
— Tergum X deeply cleft, with long, paired, apically bifurcate lateral projections (Fig. 23A, B)..... ***B.* (*H.*) *mexicana*** n. sp.
9(8) Tergum X with short or no apicoventral projection (Figs. 29A, 33B)..... 10
— Tergum X with long, acute apicoventral projection (Fig. 17A)..... ..... ***B.* (*H.*) *acutiterga*** (Denning and Hogue)
10(9) Tergum X without apicoventral projection; dorsolateral lobes not prominent (Fig. 29 (Fig. 29A, B)... ***B.* (*H.*) *quincemil*** n. sp.
— Tergum X with short, acute apicoventral projection and prominent paired rounded dorsolateral lobes (Fig. 33A, B) ..... ***B.* (*H.*) *sylvana*** n. sp.
11(1) Tergum X acute apically in lateral view, without ventrolateral flanges (Fig. 5A) 12
— Tergum X truncate apically in lateral view, with ventrolateral flanges (Fig. 3A) .... ***B.*(*B.*) *argentinica*** Flint
12(11) Tergum X with high, setose dorsal ridge (Fig. 14A, B)..... ***B.* (*B.*) *yungensis*** Flint

— Tergum X without high dorsal ridge, but with linear row of mesal setae (Fig. 5B) 13

13(12) Apex of tergum X, in dorsal view, broad, truncate or shallowly emarginate (Figs. 5B, 8B) 14

— Apex of tergum X, in dorsal view, narrow, with deep or shallow posteromesal notch (Figs. 6B, 10B, 12B) 15

14(13) Apex of tergum X, in dorsal view, truncate; without basolateral lobes (Fig. 5B) ..... ***B.* (*B.*) *columbiana*** (Navás)

— Apex of tergum X, in dorsal view, shallowly emarginate; with paired rounded basolateral lobes (Fig. 8B) ..... ***B.* (*B.*) *penai*** n. sp.

15(13) Large species, forewing length 16–21 mm ..... ***B.* (*B.*) *loxana*** (Navás)

— Small species, forewing length 9–12 mm 16

16(15) Tergum X, in dorsal view, with shallow posteromesal notch (Fig. 10B) ..... ***B.* (*B.*) *vicaria*** (Walker)

— Tergum X, in dorsal view, with deep posteromesal notch (Fig. 12B) ..... ***B.* (*B.*) *villosa*** **(Navás)**

ACKNOWLEDGEMENTS

I wish to thank the many people without whose assistance this work would not have been possible. First, the museum curators and staff who helped to locate types and provided material for this study: Peter Barnard, BMNH; Edward Becker, CNC; Reinhard Gaedike, DEI; Joaquin Bueno-Soria, IBUNAM; Brian Brown, LACM; Philip Perkins, MCZ; Jean Legrand, MNHNP; Cheryl Barr, UCB; Wolfram Mey, ZMHU; and especially Oliver Flint and Nancy Adams, NMNH, whose collecting efforts provided the bulk of material and whose encouragement was invaluable. Julie Martinez prepared the color illustration with her usual patience and care, and I thank her for doing such a beautiful job. I am grateful for the thoughtful criticism and suggestions of my dissertation committee, William Miller, Andrew Simons, and Susan Weller. I thank Roger Blahnik for helpful discussion and suggestions throughout this study, and for allowing me to use his sketches of Costa Rican species in preparing illustrations. Last, but certainly not least, I thank my doctoral advisor Ralph Holzenthal for the opportunity to work on this group, for his continual encouragement and advice, and for the financial support to complete this project.

This work was supported by the National Science Foundation (DEB-9972724 to Holzenthal and Prather; DEB-9971885, DEB-0117772 to Holzenthal and Blahnik), the University of Minnesota Graduate School (Doctoral Dissertation Special Grant and Doctoral Dissertation Fellowship), and the Dayton-Wilkie Fund of the Bell Museum of Natural History.

REFERENCES

Betten, C. B. (1934) *The caddis flies or Trichoptera of New York state*, New York State Museum Bulletin, Vol. 292, 576 pp.

Betten, C. B. & Mosely, M. E. (1940) *The Francis Walker types of Trichoptera in the British Museum*, Natural History, British Museum, London, 248 pp.

Blahnik, R. J. & Holzenthal, R. W. (1992) Revision of the Neotropical genus *Chimarrhodella* Lestage (Trichoptera: Philopotamidae). *Systematic Entomology*, 17, 109–132.

Botosaneanu, L. & Flint, O. S., Jr. (1982) On some Trichoptera from northern Venezuela and Ecuador (Insecta). *Beaufortia*, 32, 13–26.

Colwell, R. K. (1996) *Biota: The Biodiversity Database Manager*, Sinauer Associates, Inc., Sunderland, Massachusetts.

Cumming, J. M. (1992) Lactic acid as an agent for macerating Diptera specimens. *Fly Times*, 8, 7.

Denning, D. G., Resh, V. H. & Hogue, C. L. (1983) New species of *Phylloicus* and a new Neotropical genus of Calamoceratidae (Trichoptera). *Aquatic Insects*, 5, 181–191.

Fischer, F. C. J. (1963) *Hydropsychidae, Arctopsychidae*, Trichopterorum Catalogus, Vol. 4, Nederlandsche Entomologische Vereeniging, Amsterdam, vi + 225 pp.

Flint, O. S., Jr. (1968) New species of Trichoptera from the Antilles. *The Florida Entomologist*, 51, 151–153.

Flint, O. S., Jr. (1983) *Studies of Neotropical caddisflies, XXXIII: New species from austral South America (Trichoptera)*, Smithsonian Contributions to Zoology, Vol. 377, Smithsonian Institution Press, Washington, 100 pp.

Flint, O. S., Jr. (1996a) Studies of Neotropical caddis flies, LV: Trichoptera of Trinidad and Tobago. *Transactions of the American Entomological Society*, 122, 67–113.

Flint, O. S., Jr. (1996b) Trichoptera collected on the expeditions to Parque Manu, Madre de Dios, Peru. *In*: Wilson, D. E. & Sandoval, A. (Eds) *Manu: The biodiversity of southeastern Peru*, Smithsonian Institution Press., Washington, DC, pp. 369–430.

Flint, O. S., Jr. & Angrisano, E. B. (1985) Studies of Neotropical caddisflies, XXXV: The immature stages of *Banyallarga argentinica* Flint (Trichoptera: Calamoceratidae). *Proceedings of the Biological Society of Washington*, 98, 687–697.

Flint, O. S., Jr., Holzenthal, R. W. & Harris, S. C. (1999a) *Catalog of the Neotropical caddisflies (Insecta: Trichoptera)*, Ohio Biological Survey, Special Publication, Columbus, Ohio, iv+239 pp.

Flint, O. S., Jr., Holzenthal, R. W. & Harris, S. C. (1999b) Nomenclatural and systematic changes in the Neotropical caddisflies (Insecta: Trichoptera). *Insecta Mundi*, 13, 73–84.

International Commission on Zoological Nomenclature. (1999) *International Code of Zoological Nomenclature (ICZN)*, Fourth edition, The International Trust for Zoological Nomenclature, London, xxix + 306 pp.

Martynov, A. B. (1912) On two collections of Trichoptera from Peru. *Annuaire de Musée Zoologique de l'Académie Impérial des Sciences de St. Pétersbourg*, 17, 1–40.

McElravy, E. P., Resh, V. H., Wolda, H. & Flint, O. S., Jr. (1981) Diversity of adult Trichoptera in a "non-seasonal" tropical environment. *In*: Moretti, G. P. (Ed) *Proceedings of the 3rd International Symposium on Trichoptera*, Dr. W. Junk Publishers, The Hague, pp. 149–156.

McLachlan, R. (1871) On new forms, etc., of extra-European trichopterous insects. *Journal of the Linnean Society of London, Zoology*, 11, 98–141, plates 142–144.

Mosely, M. E. & Kimmins, D. E. (1953) *The Trichoptera (Caddis-Flies) of Australia and New Zealand*, Natural History, British Museum, London, 550 pp.

Navás, R. P. L. (1916) Neuroptera nova Americana. *Memorie della Pontificia Accademia Romana dei Nuovi Lincei, Serie II*, 2, 59–80.

Navás, R. P. L. (1931) Insectos del Museo de Paris. *Brotéria. Série Zoológica*, 27, 101–136.

Navás, R. P. L. (1934a) Insectos Suramericanos, Novena serie. *Revista de la Academia de Ciencias de Madrid*, 31, 155–184.

Navás, R. P. L. (1934b) Tricópteros nuevos o interesantes. *Brotéria, Série Ciências Naturais*, 3, 81–95, 13 fig.

Nielsen, A. (1957) *A comparative study of the genital segments and their appendages in male Trichoptera*, Biologiske Skrifter Det Kongelige Danske Videnskabernes Selskab, Vol. 8, I kommission hos Ejnar Munksgaard, Copenhagen, 159 pp.

Prather, A. L. (2002) *Phylogenetic analyses of Leptoceroidea and Calamoceratidae, and revisions of the Neotropical genera Banyallarga and Phylloicus (Insecta: Trichoptera)*. PhD thesis, University of Minnesota, Saint Paul, xix + 485 pp.

Prather, A. L. (2003) A revision of the Neotropical caddisfly genus *Phylloicus* (Trichoptera: Calamoceratidae). Zootaxa, 275, 1–214.

Prather, A. L. & Holzenthal, R. W. (2002) The identity of *Silvatares excelsus* Navás 1931. *In*: Mey, W. (Ed) *Proceedings of the 10th International Symposium on Trichoptera*, Nova Supplementa Entomologica, Vol. 15, Goecke & Evers, Keltern, pp. 231–234.

Ross, H. H. (1944) *The Caddis Flies, or Trichoptera, of Illinois*, Bulletin of the Illinois Natural History Survey, Vol. 23, Urbana, 326 pp.

Ross, H. H. (1956) *Evolution and classification of the mountain caddisflies*, University of Illinois Press, Urbana, 213 pp.

Schmid, F. (1998) *Genera of the Trichoptera of Canada and adjoining or adjacent United States*, The Insects and Arachnids of Canada, Part 7, NRC Research Press, Ottawa, 319 pp.

Ulmer, G. (1907) *Trichoptera*. Wytsman, P. (Ed), Genera Insectorum, Vol. 60, L. Desmet Verteneuil [etc.], Bruxelles, 259 pp.

Walker, F. (1852) *Catalogue of the specimens of Neuropterous insects in the collection of the British Museum, Part I: Phryganides–Perlides*, British Museum, London, 136 pp.

Wiggins, G. B. (1996) Trichoptera families. *In*: Merritt, R. W. & Cummins, K. W. (Eds) *An Introduction to the Aquatic Insects of North America*, 3rd edition, Kendall-Hunt, Dubuque, Iowa, pp. 309–349.

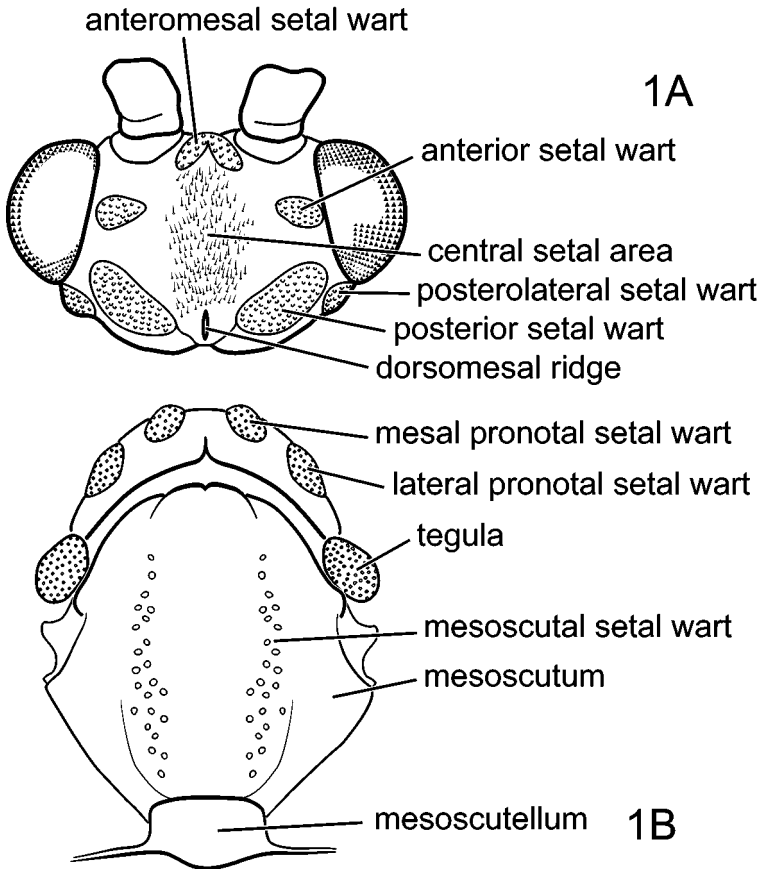

FIGURE 1. *Banyallarga* (*Banyallarga*) *argentinica*. Adult (UMSP000022090): A—head, dorsal; B—thorax, dorsal.

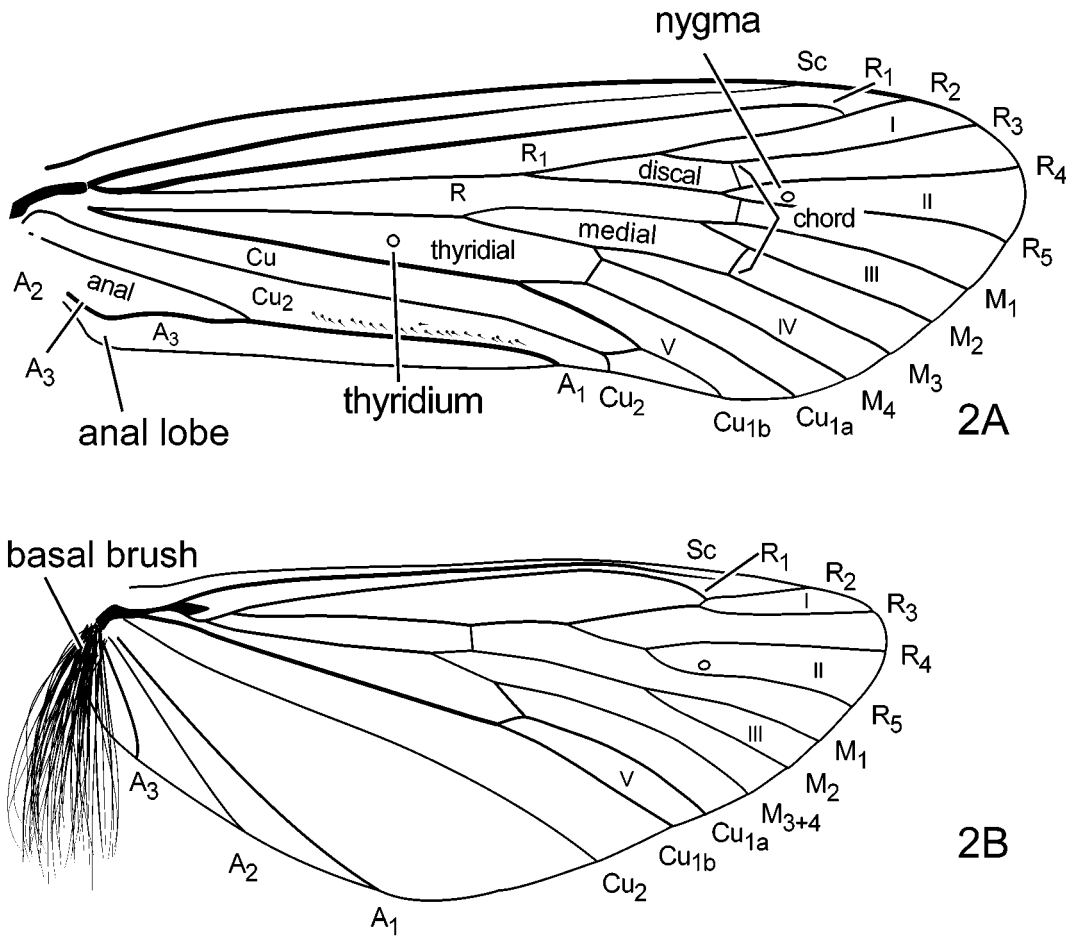

FIGURE 2. *Banyallarga* (*Banyallarga*) *argentinica*. Wings (UMSP000022091): A—forewing; B—hindwing.

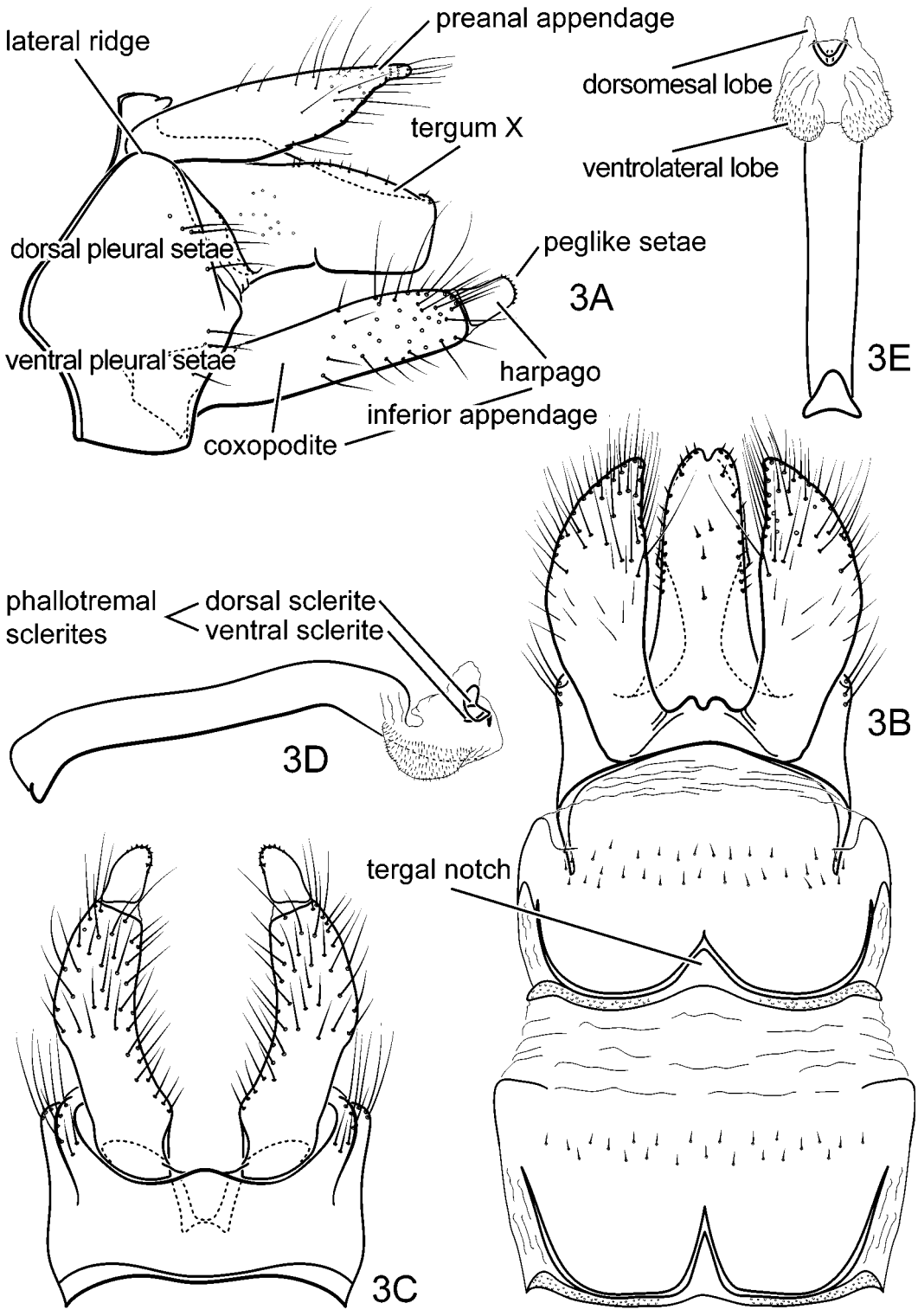

FIGURE 3. *Banyallarga* (*Banyallarga*) *argentinica*. Male (holotype): A—lateral view; B—terga VII–X, dorsal view; C—ventral view; D—phallus, lateral view; E—phallus, ventral view.

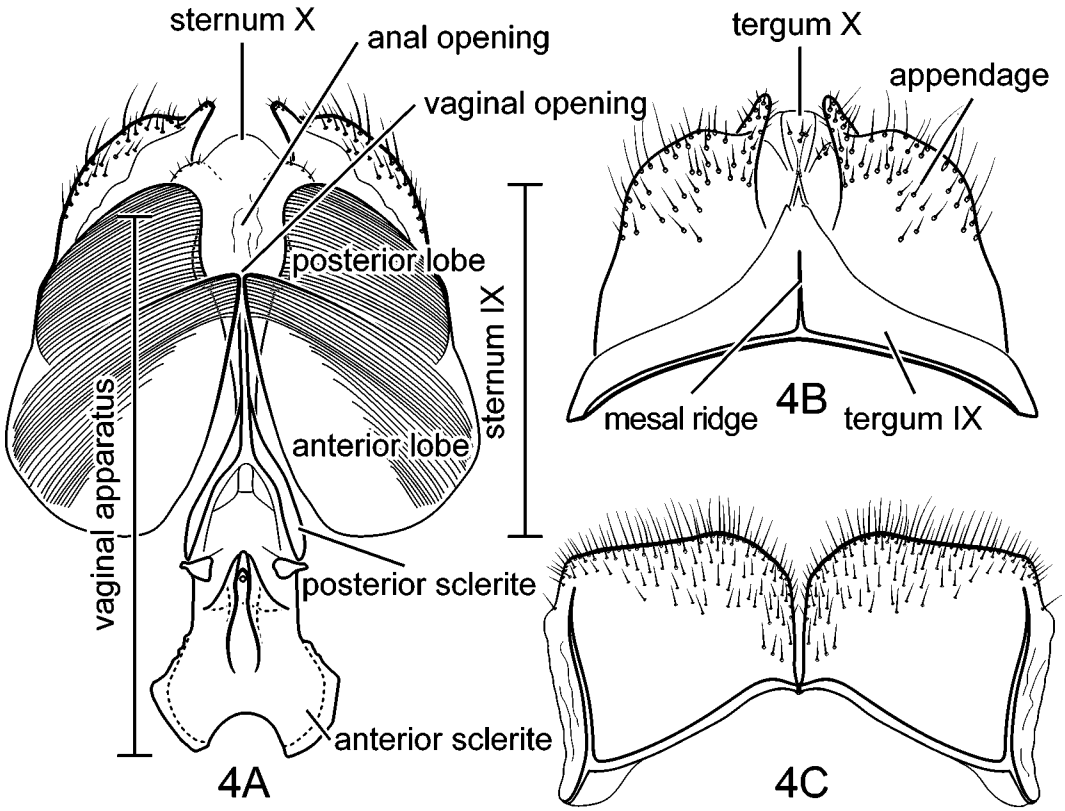

FIGURE 4. *Banyallarga* (*Banyallarga*) *argentinica*. Female (UMSP000022090): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

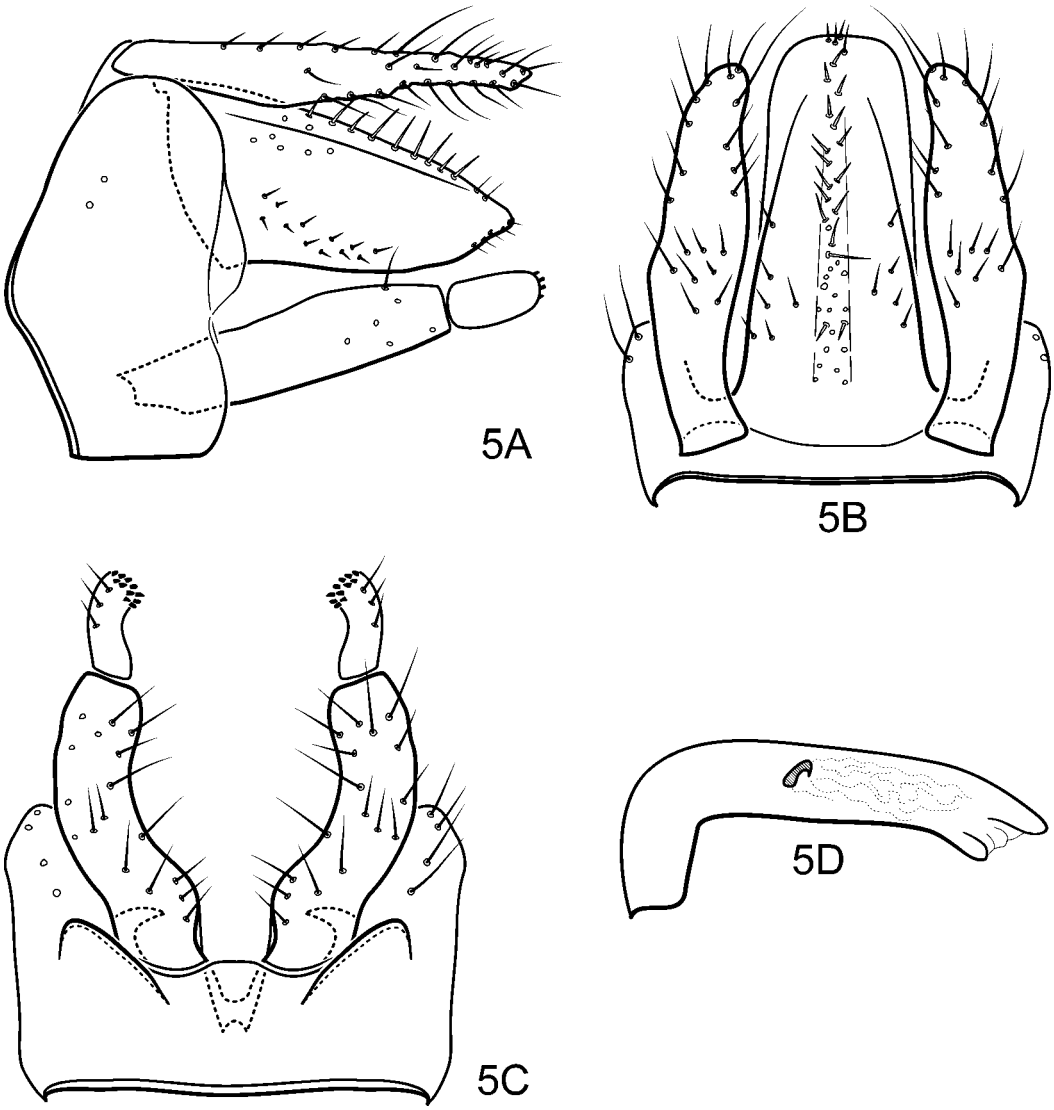

FIGURE 5. *Banyallarga* (*Banyallarga*) *columbiana*. Male (holotype): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view.

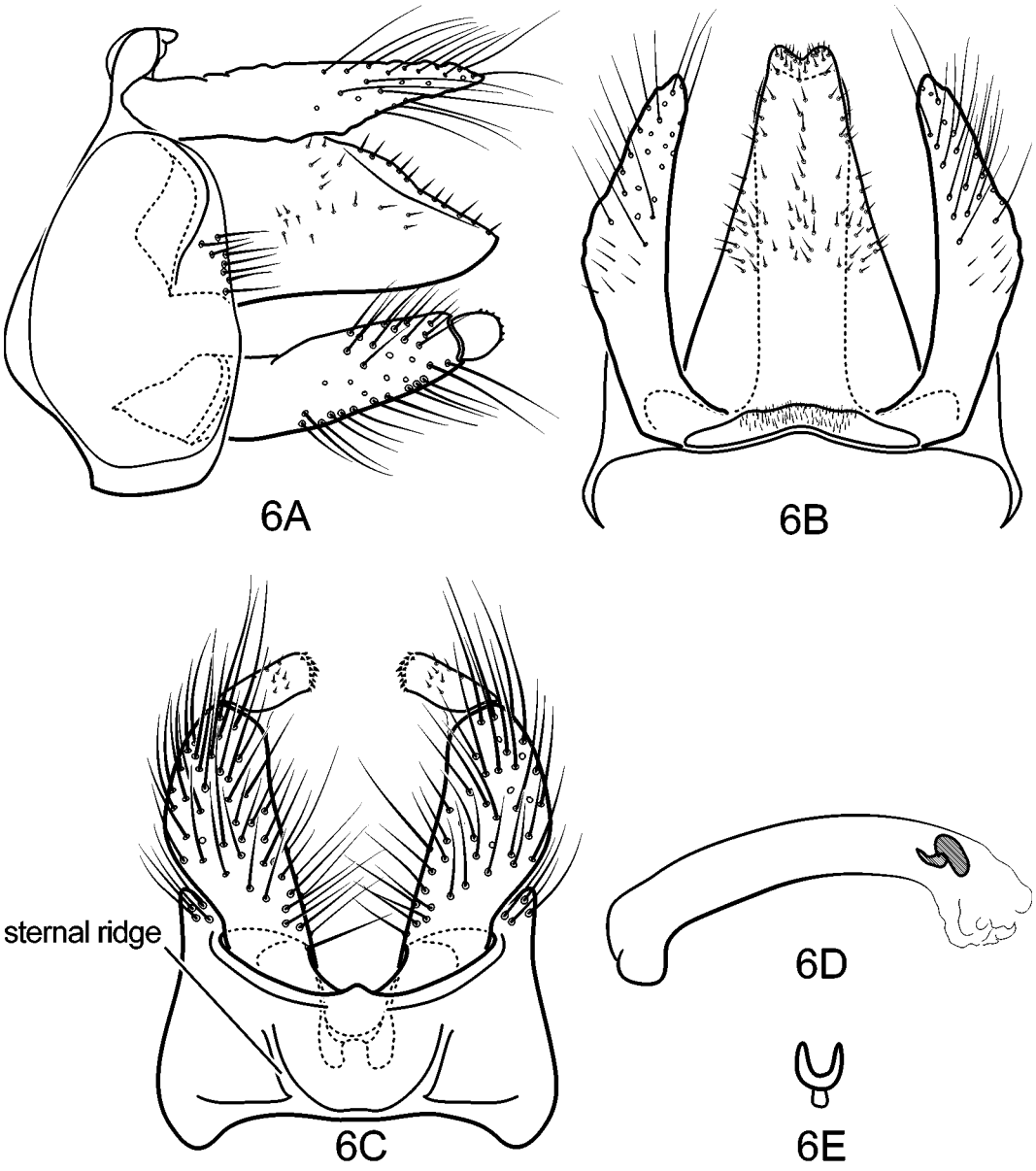

FIGURE 6. *Banyallarga* (*Banyallarga*) *loxana*. Male (UMSP0000009860): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallotremal sclerites, dorsal view.

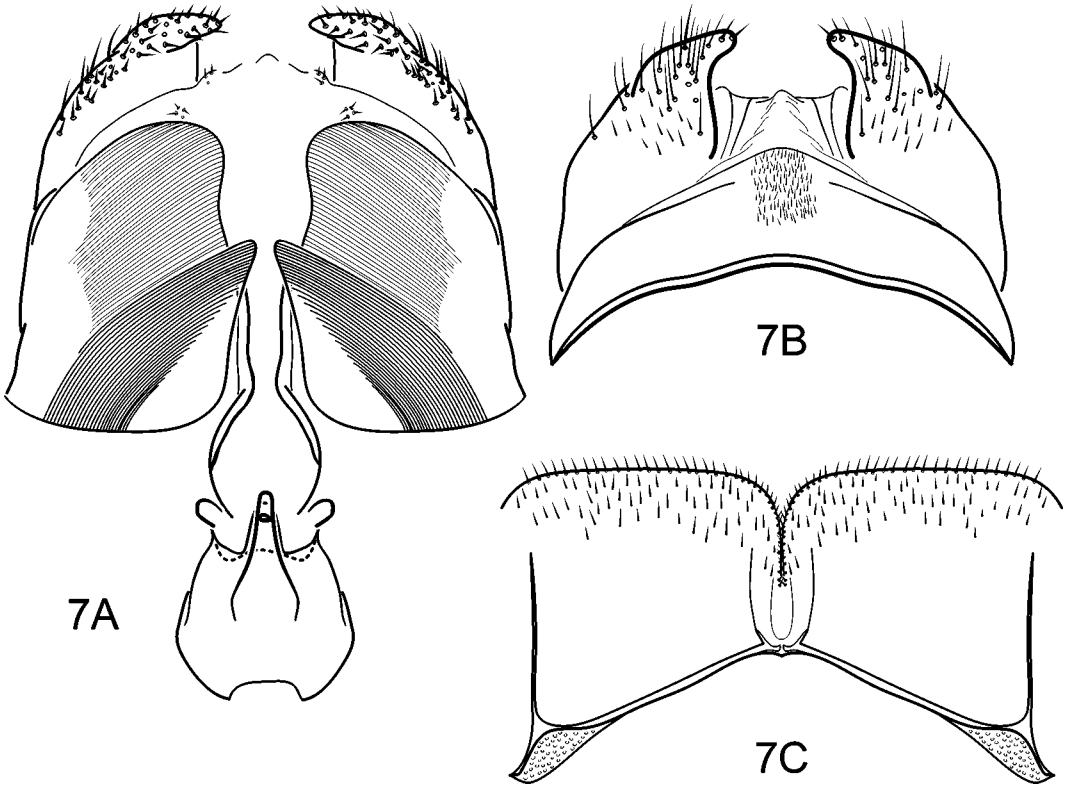

FIGURE 7. *Banyallarga* (*Banyallarga*) *loxana*. Female (holotype): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

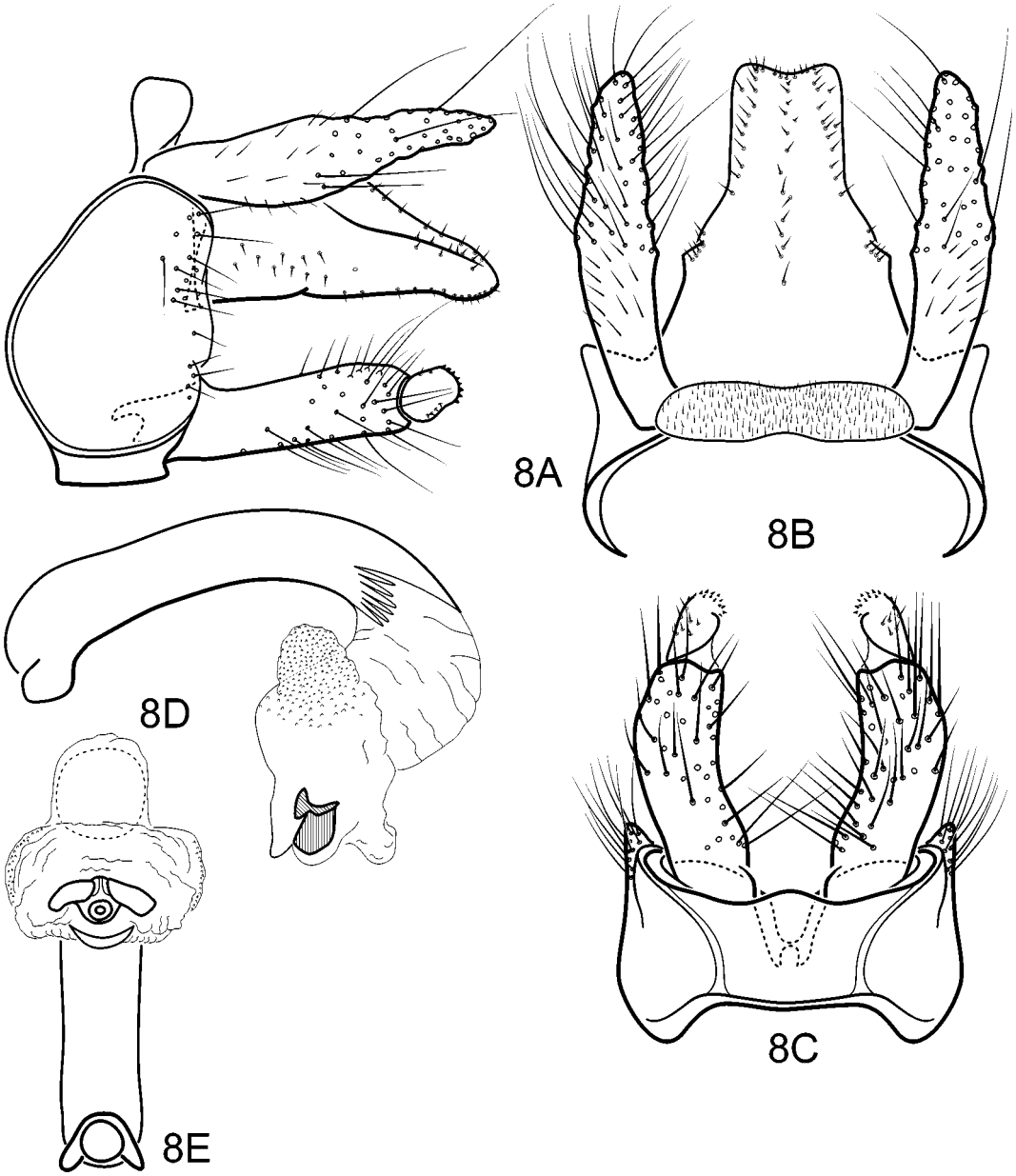

FIGURE 8. *Banyallarga* (*Banyallarga*) *penai*. Male (holotype): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallus, caudoventral view.

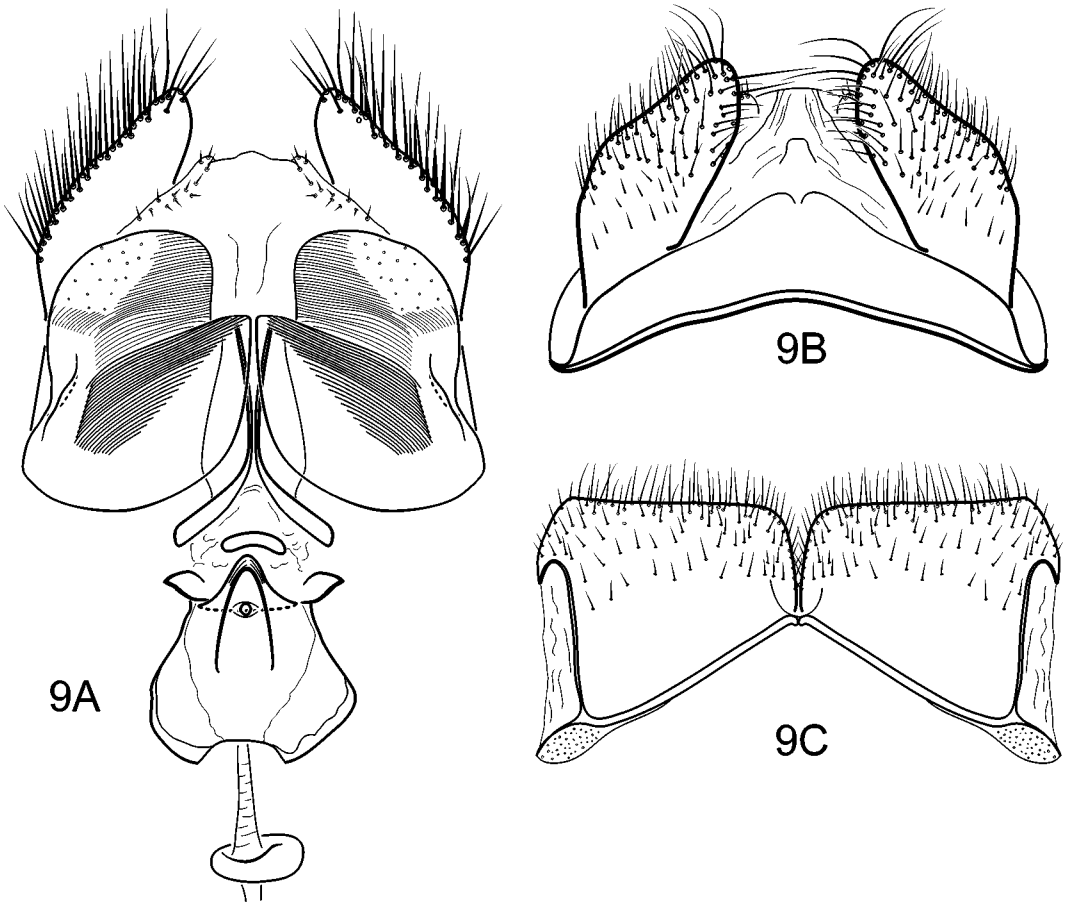

FIGURE 9. *Banyallarga* (*Banyallarga*) *penai*. Female (UMSP000010006): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

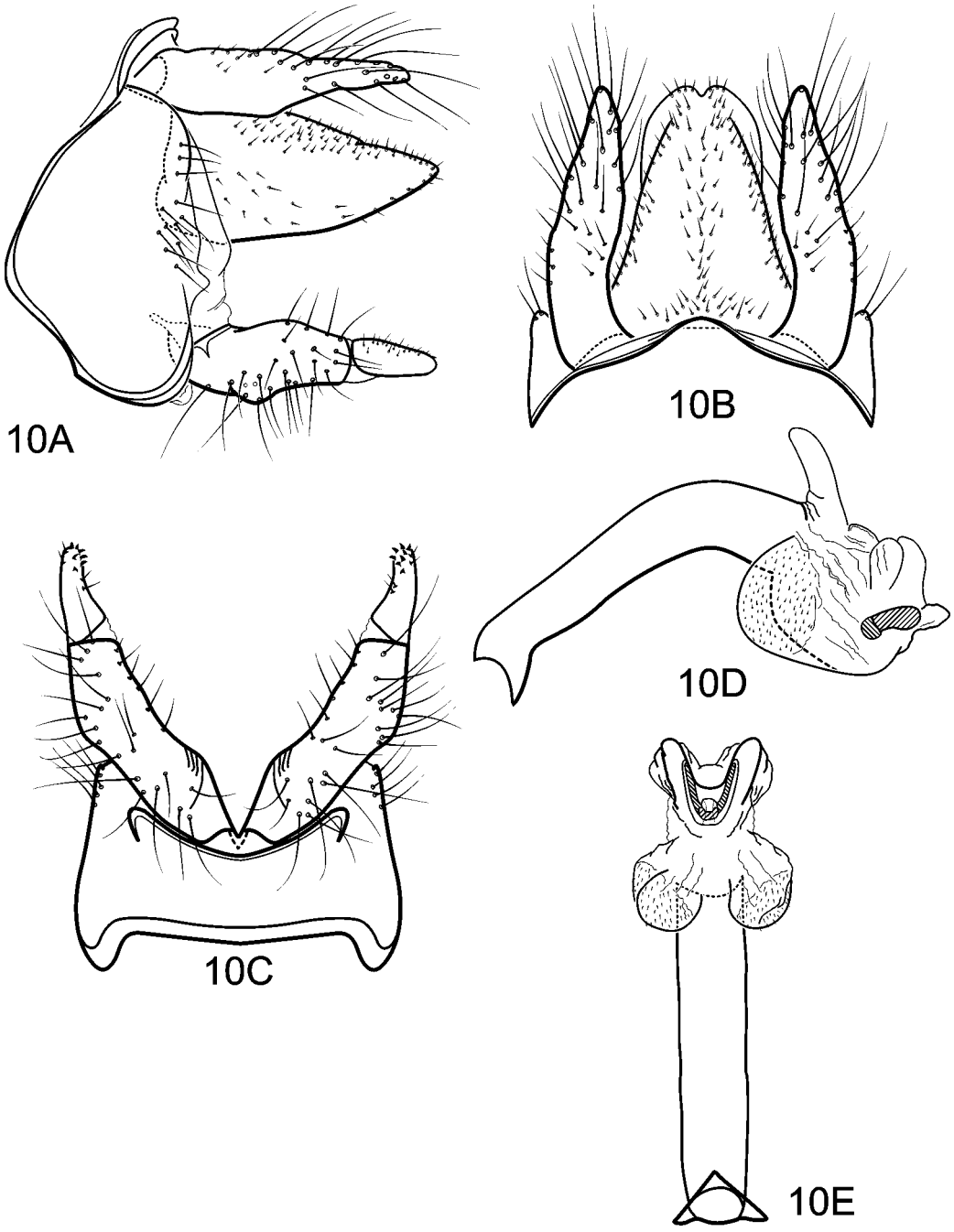

FIGURE 10. *Banyallarga* (*Banyallarga*) *vicaria*. Male (UMSP000009897): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallus, caudoventral view.

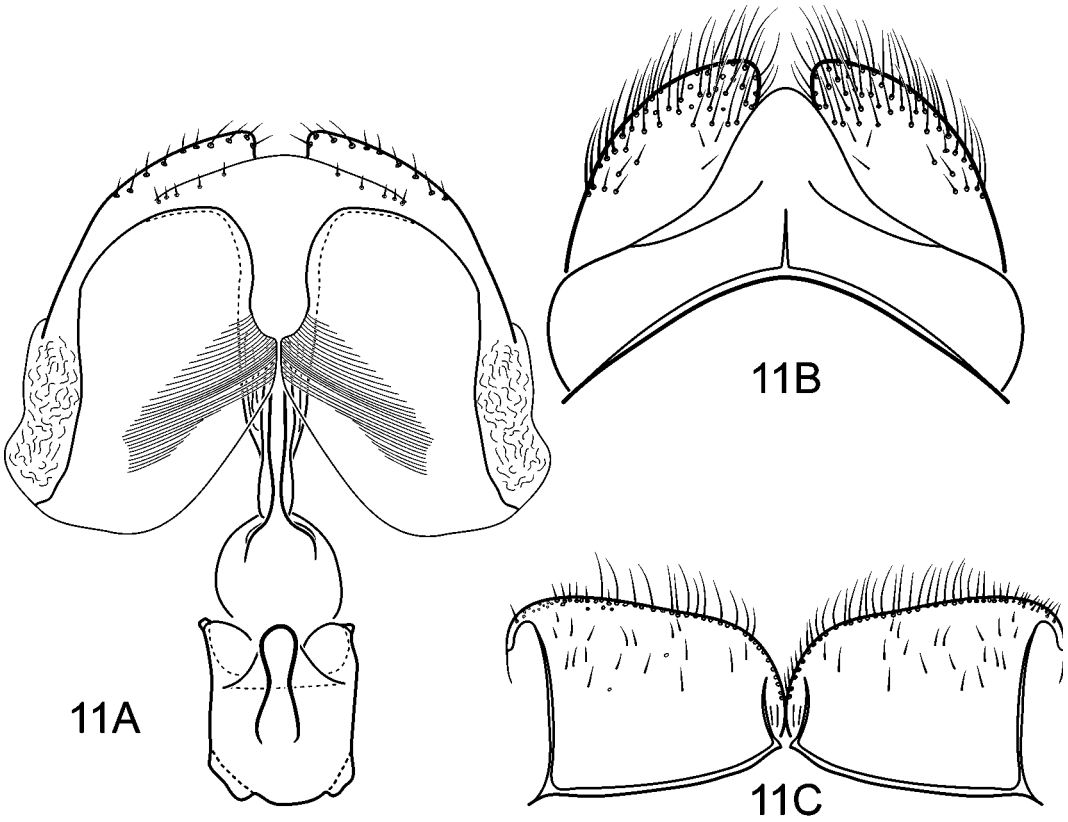

FIGURE 11. *Banyallarga* (*Banyallarga*) *vicaria*. Female (holotype): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

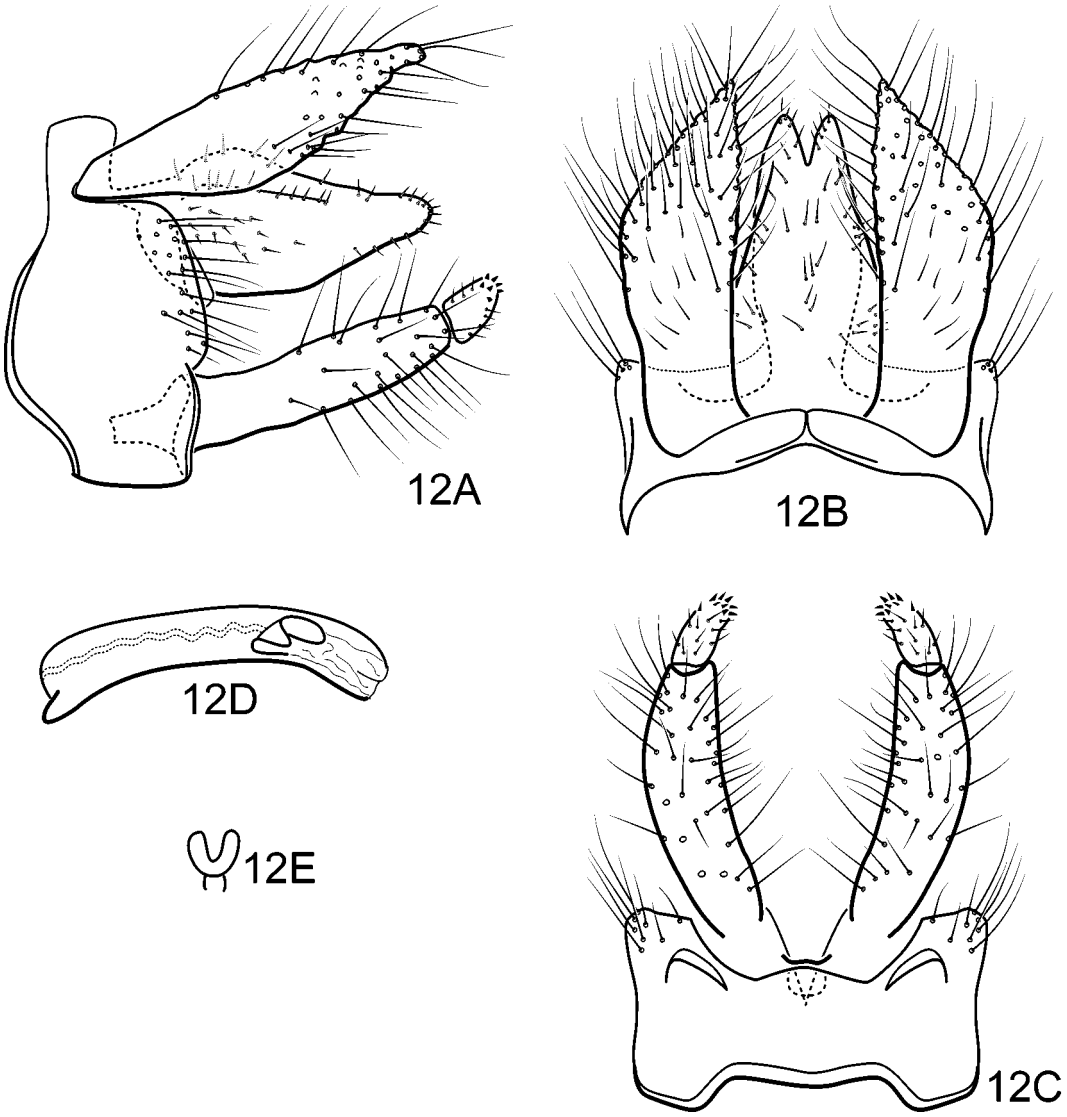

FIGURE 12. *Banyallarga* (*Banyallarga*) *villosa*. Male (UMSP000009924): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallotremal sclerites, dorsal view.

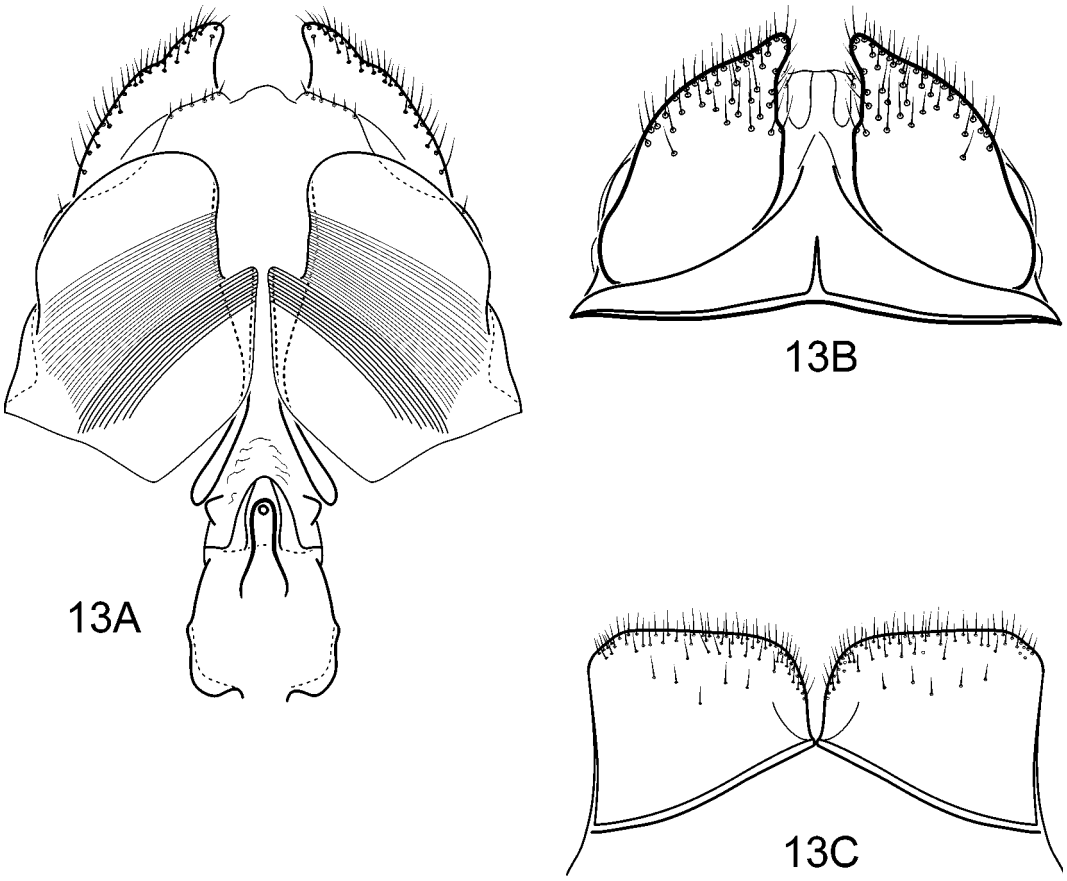

FIGURE 13. *Banyallarga* (*Banyallarga*) *villosa*. Female (holotype): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

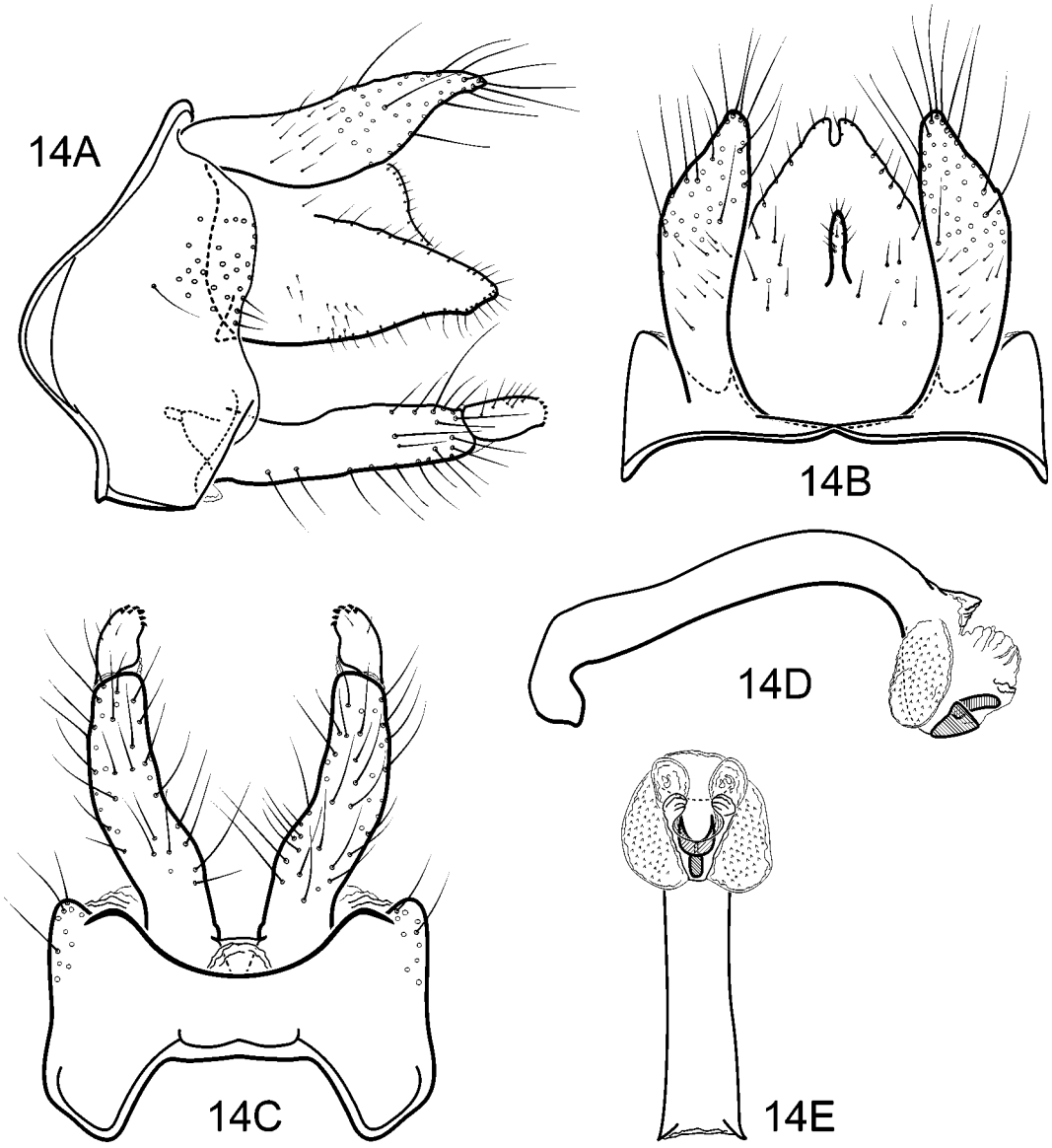

FIGURE 14. *Banyallarga* (*Banyallarga*) *yungensis*. Male (A–C, holotype: D–E, UMSP000218878): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallotremal sclerites, dorsal view.

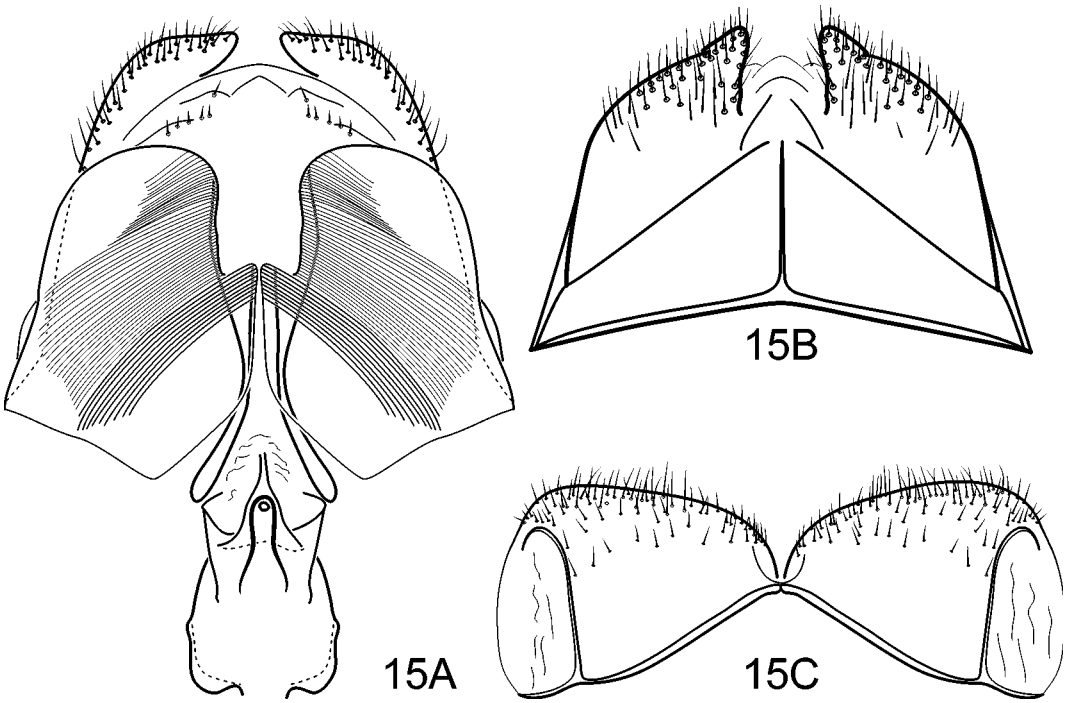

FIGURE 15. *Banyallarga* (*Banyallarga*) *yungensis*. Female (UMSP000218877): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

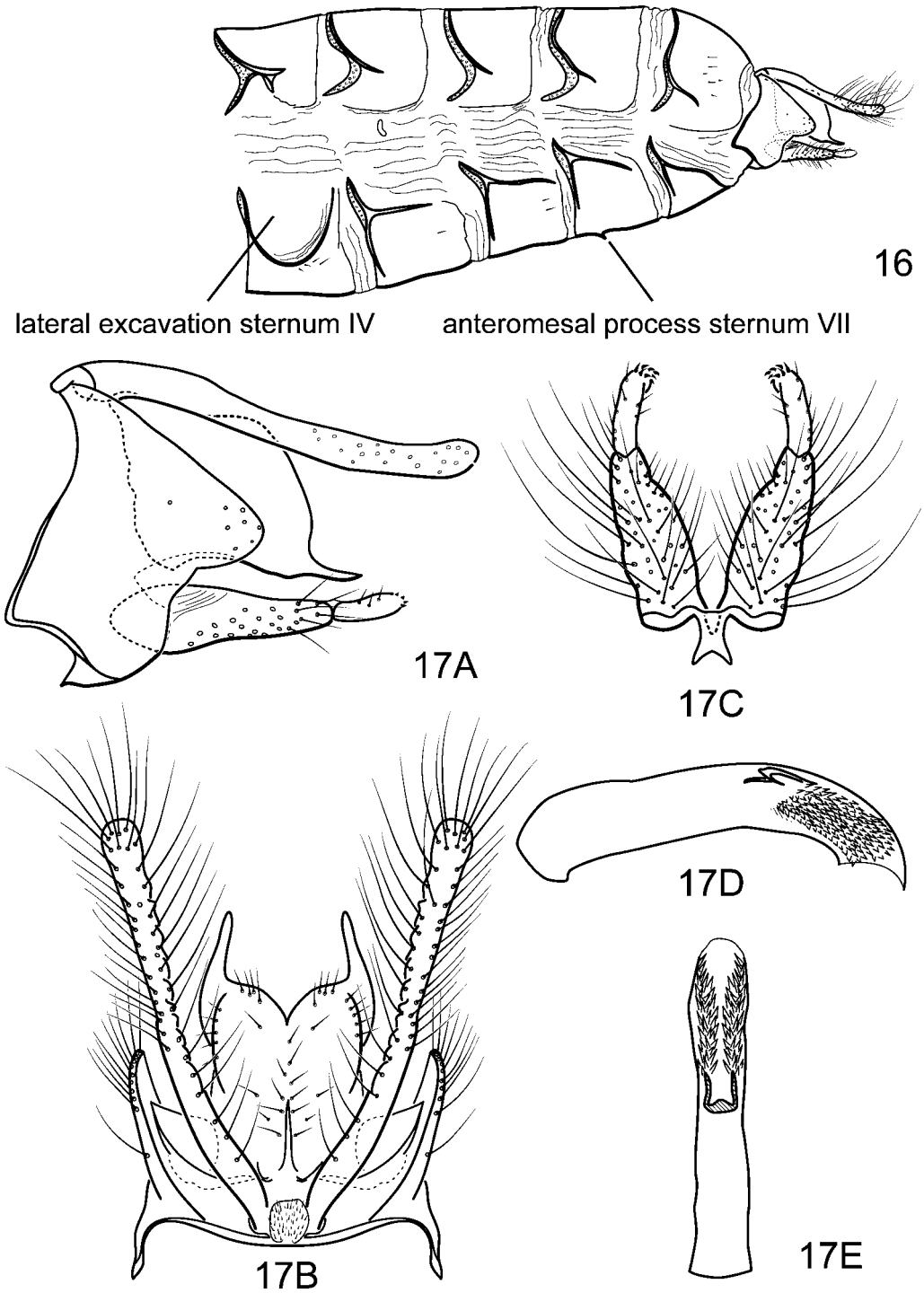

FIGURE 16. *Banyallarga* (*Histricoverpa*) *acutiterga*. Male (UMSP00000051): abdominal segments IV–X, lateral view. **FIGURE 17.** *Banyallarga* (*Histricoverpa*) *acutiterga*. Male (A, D, E, holotype; B, C, UMSP000000056): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view; E—phallotremal sclerites, dorsal view.

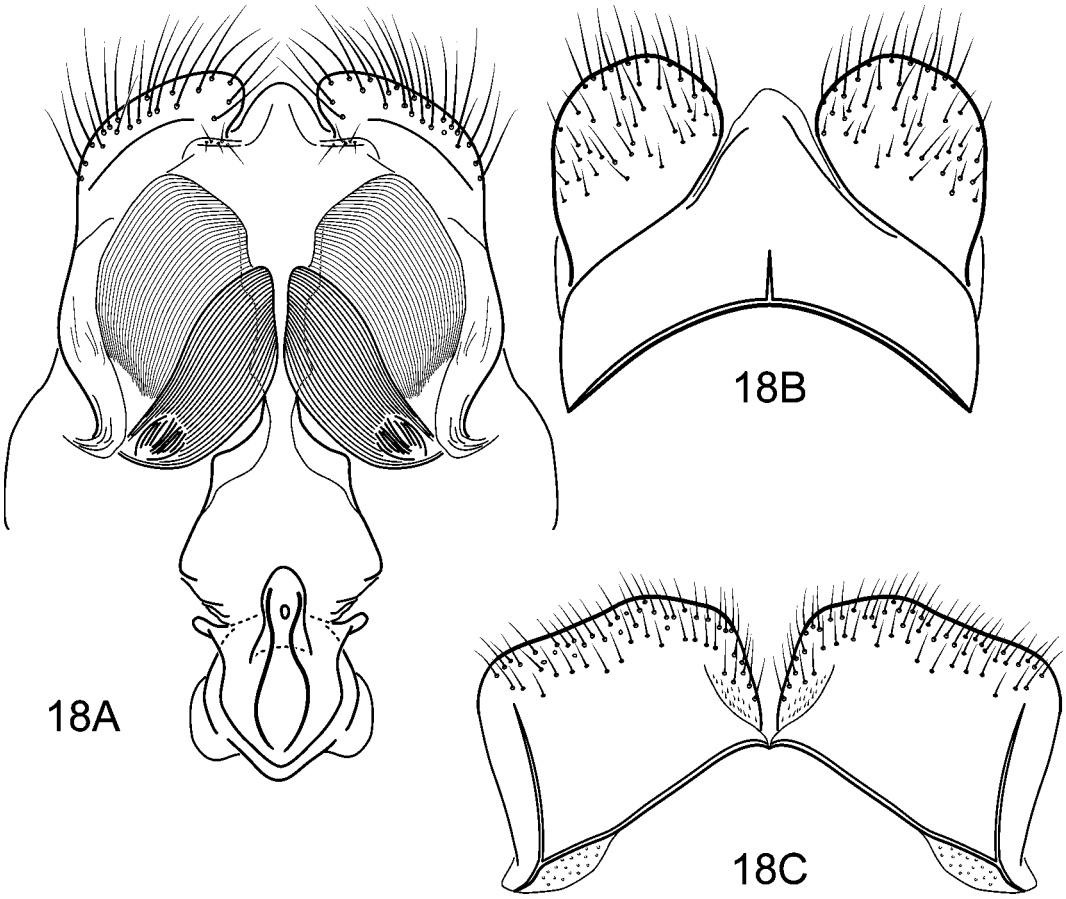

FIGURE 18. *Banyallarga* (*Histricoverpa*) *acutiterga*. Female (UMSP000000051): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

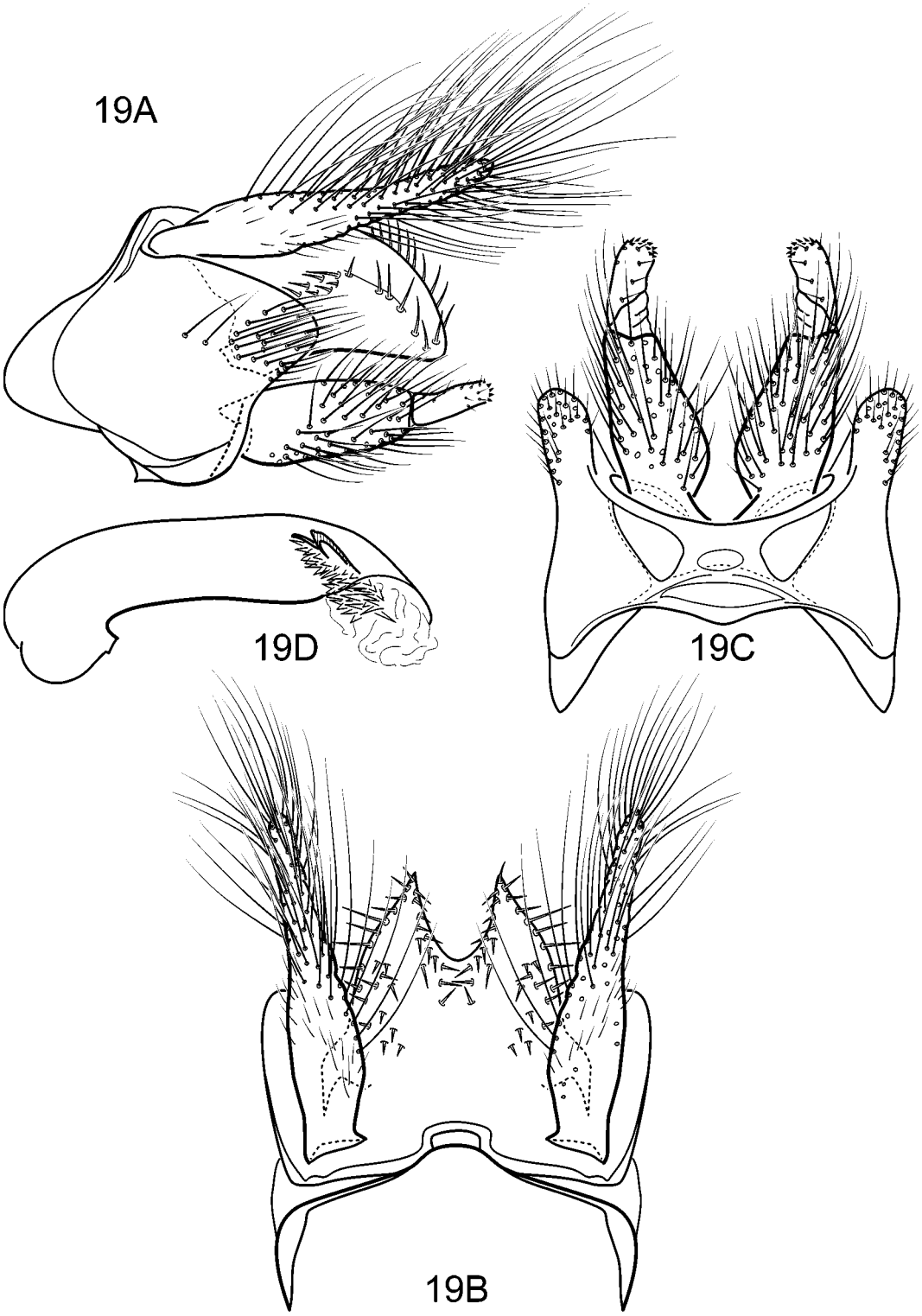

FIGURE 19. *Banyallarga* (*Histricoverpa*) *echinata*. Male (UMSP000218882): A—lateral view; B—dorsal view; C—ventral view; D—phallus, lateral view.

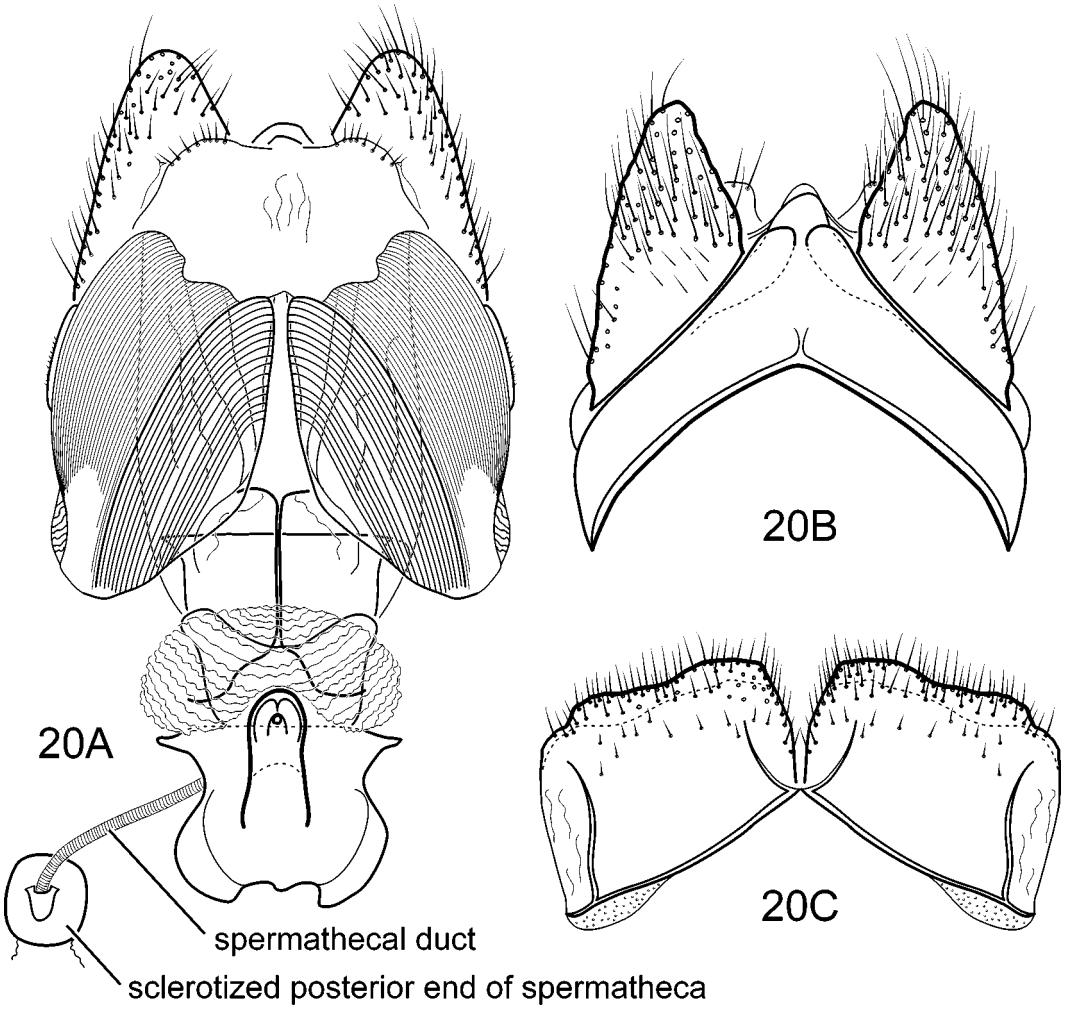

FIGURE 20. *Banyallarga* (*Histricoverpa*) *echinata*. Female (BIOLAT/TRIC000000113): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

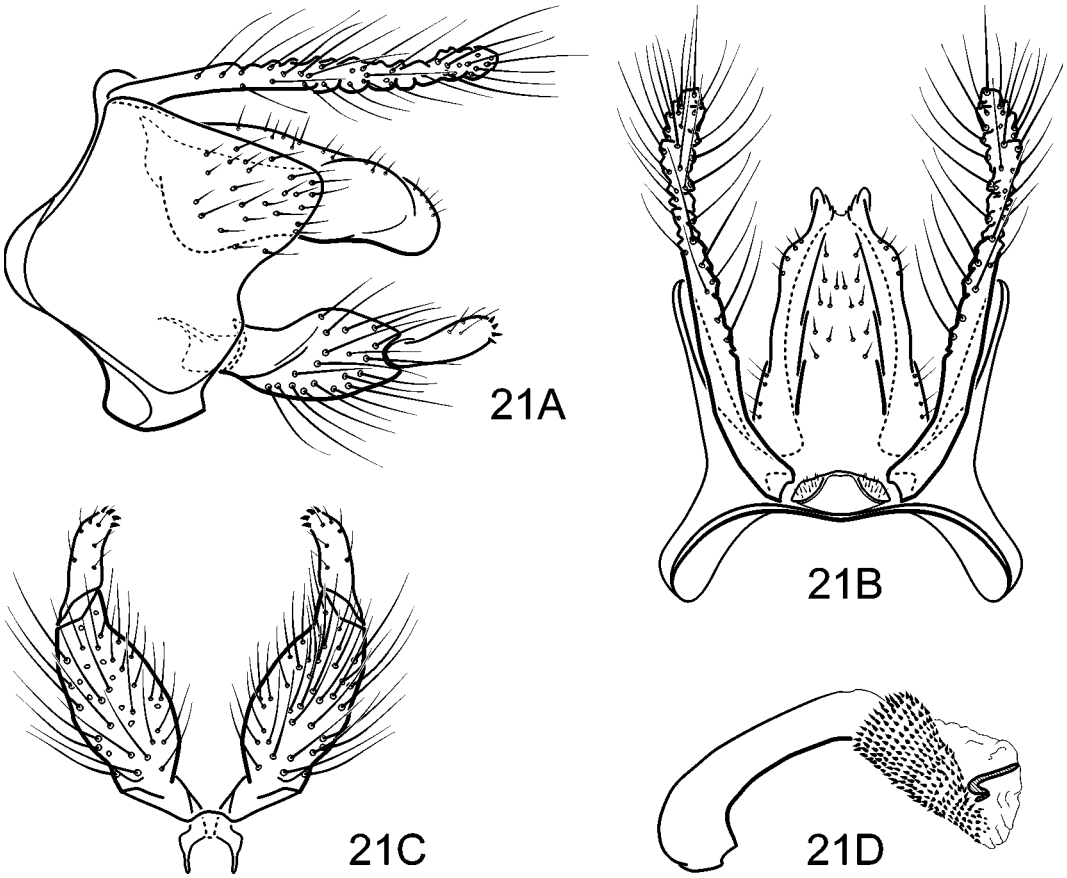

FIGURE 21. *Banyallarga* (*Histricoverpa*) *fortuna*. Male (A–C, UMSP000032411; D, UMSP000065232): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view.

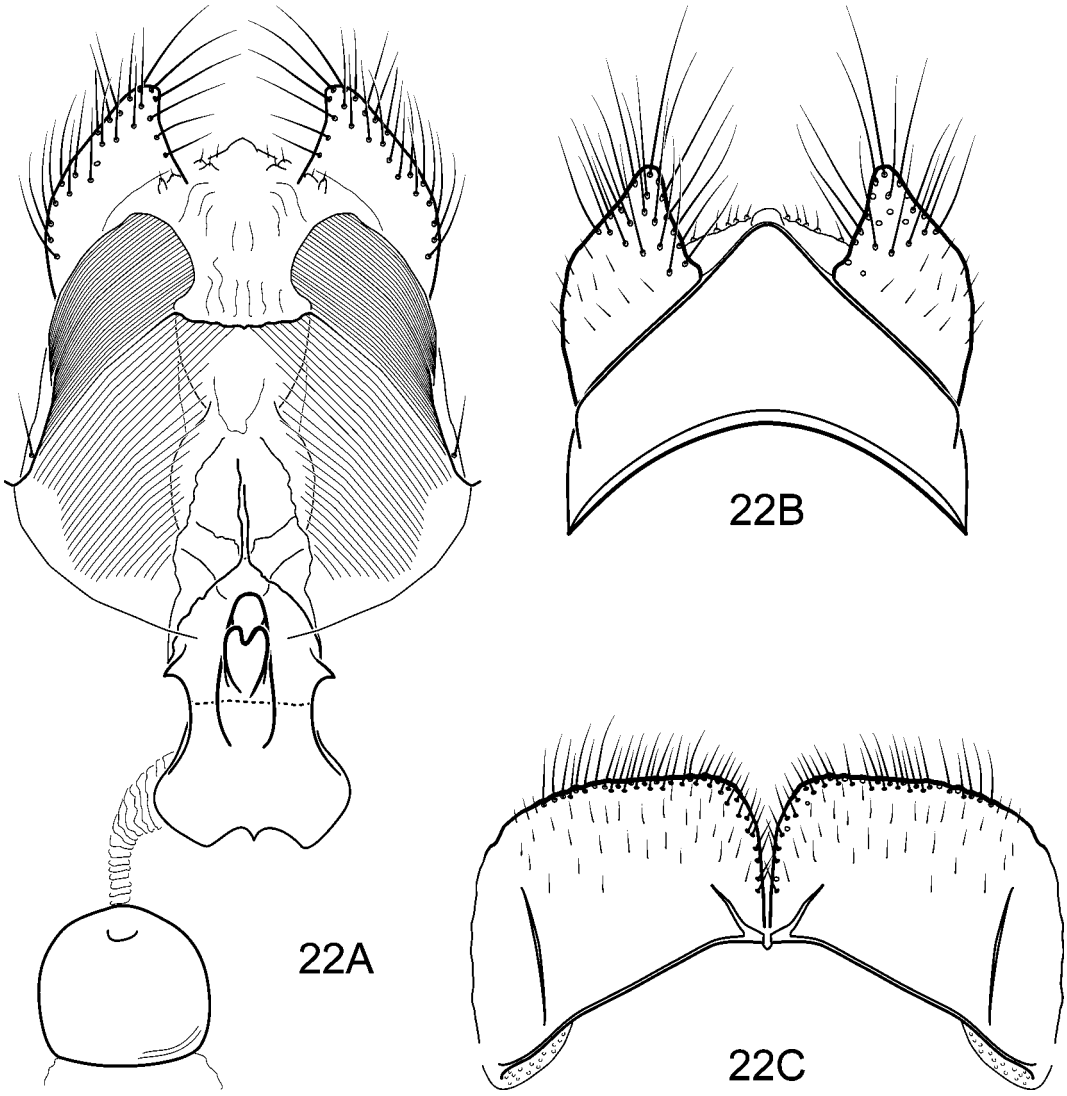

FIGURE 22. *Banyallarga* (*Histricoverpa*) *fortuna*. Female (UMSP000218872): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

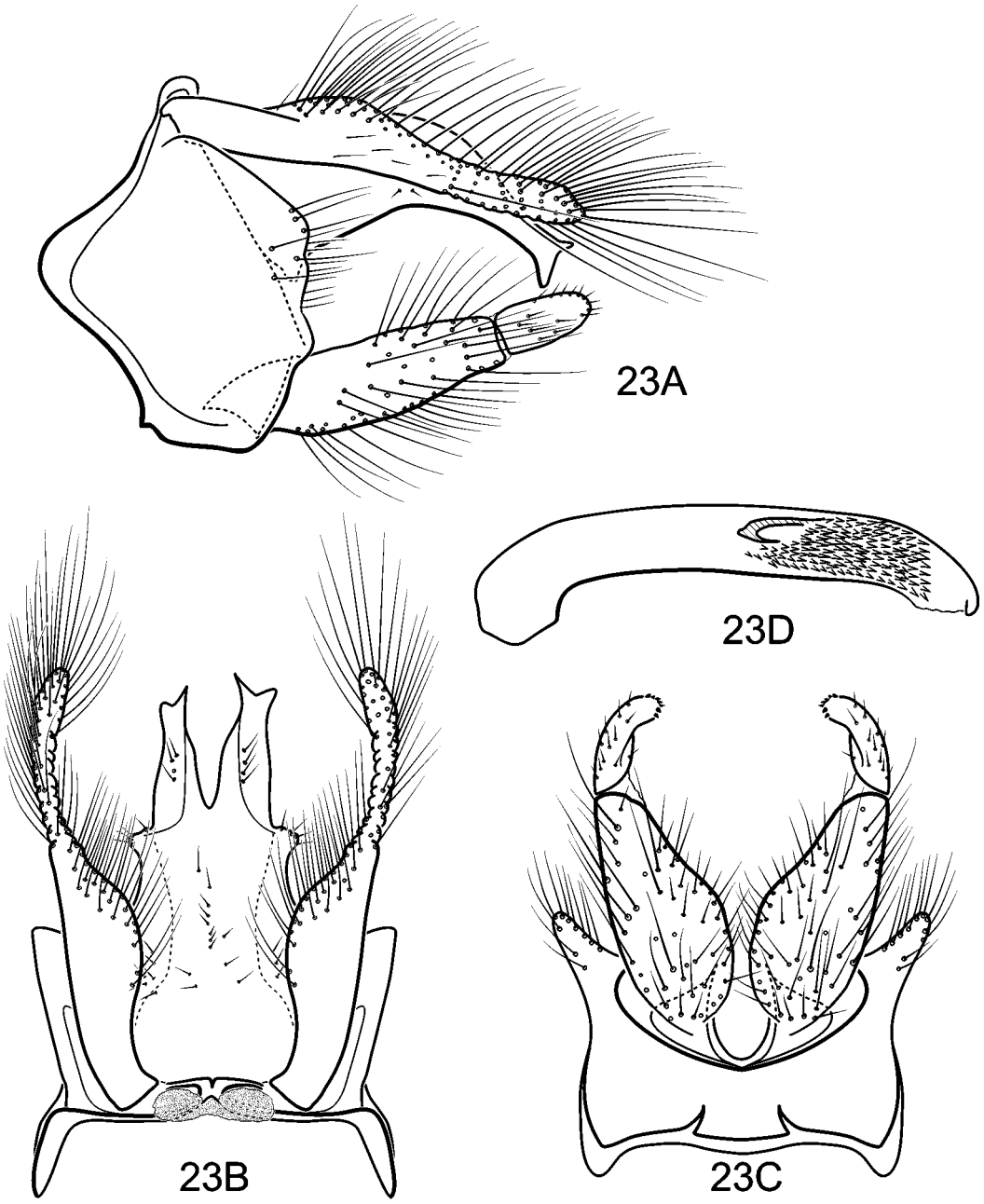

FIGURE 23. *Banyallarga* (*Histricoverpa*) *mexicana*. Male (holotype): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view.

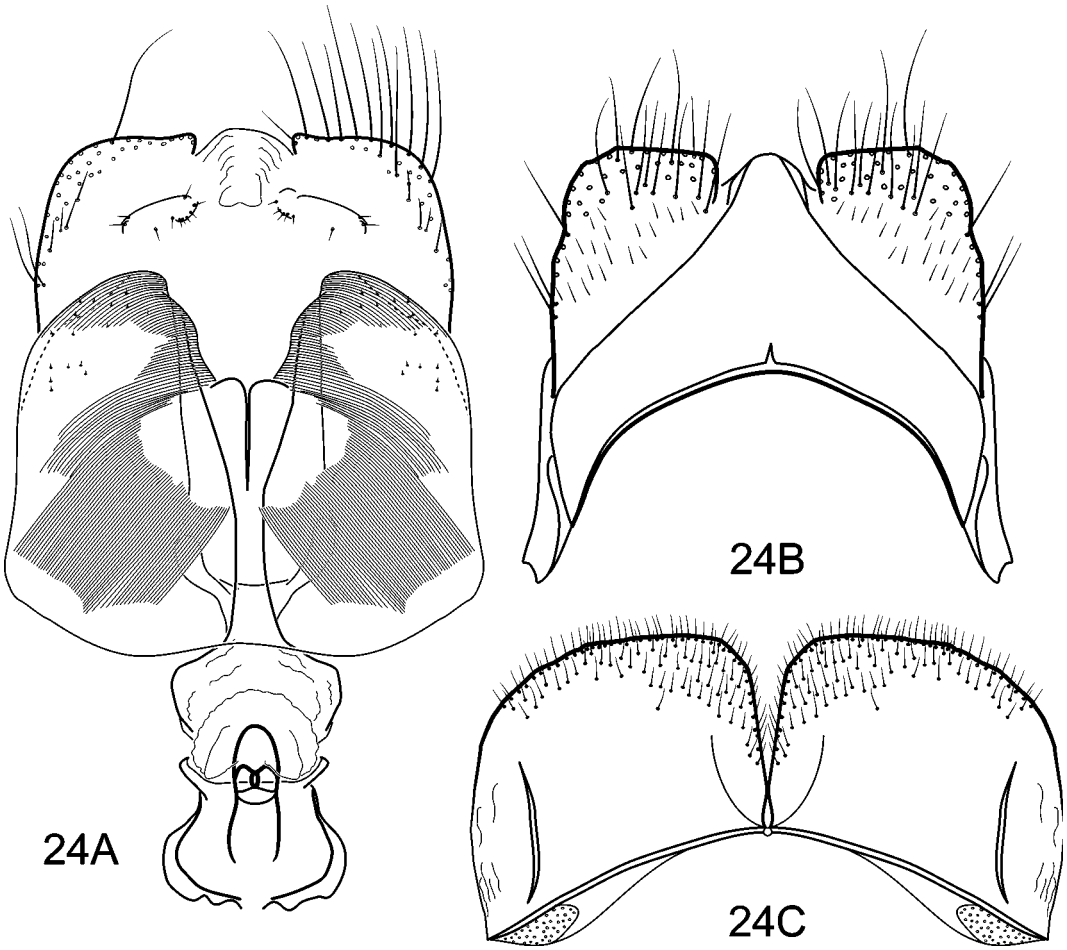

FIGURE 24. *Banyallarga* (*Histricoverpa*) *mexicana*. Female (UMSP000065235): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

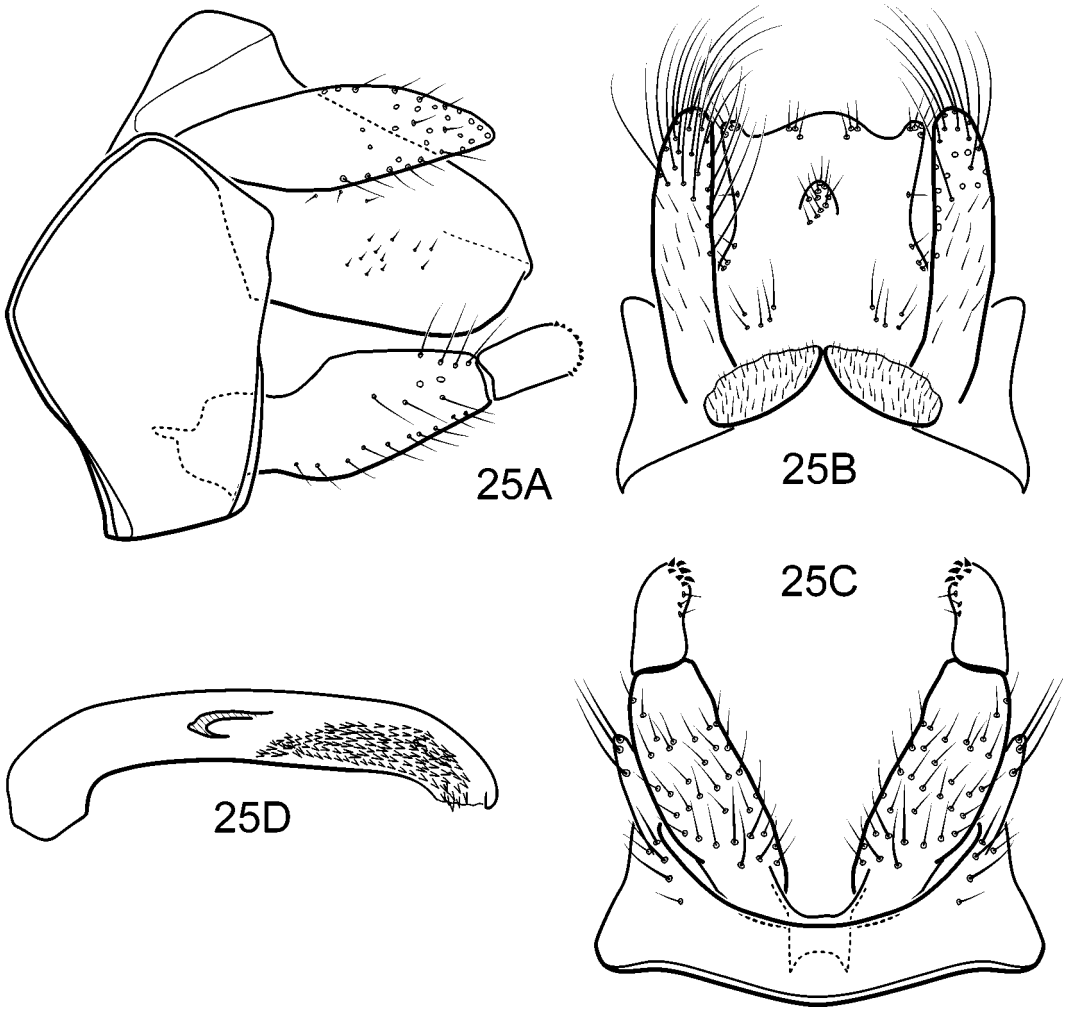

FIGURE 25. *Banyallarga* (*Histricoverpa*) *molliculum*. Male (A, D, holotype; B, C, UMSP000218879): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view.

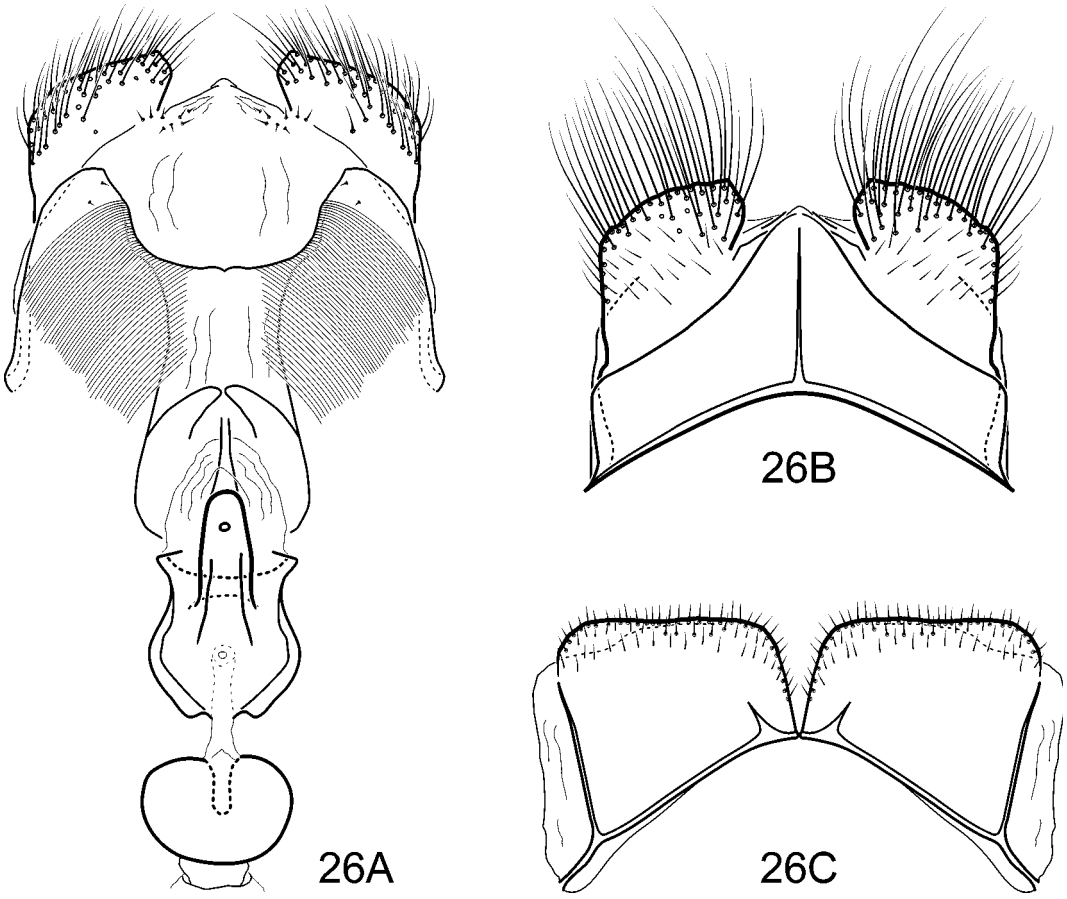

FIGURE 26. *Banyallarga* (*Histricoverpa*) *molliculum*. Female (UMSP000218879): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

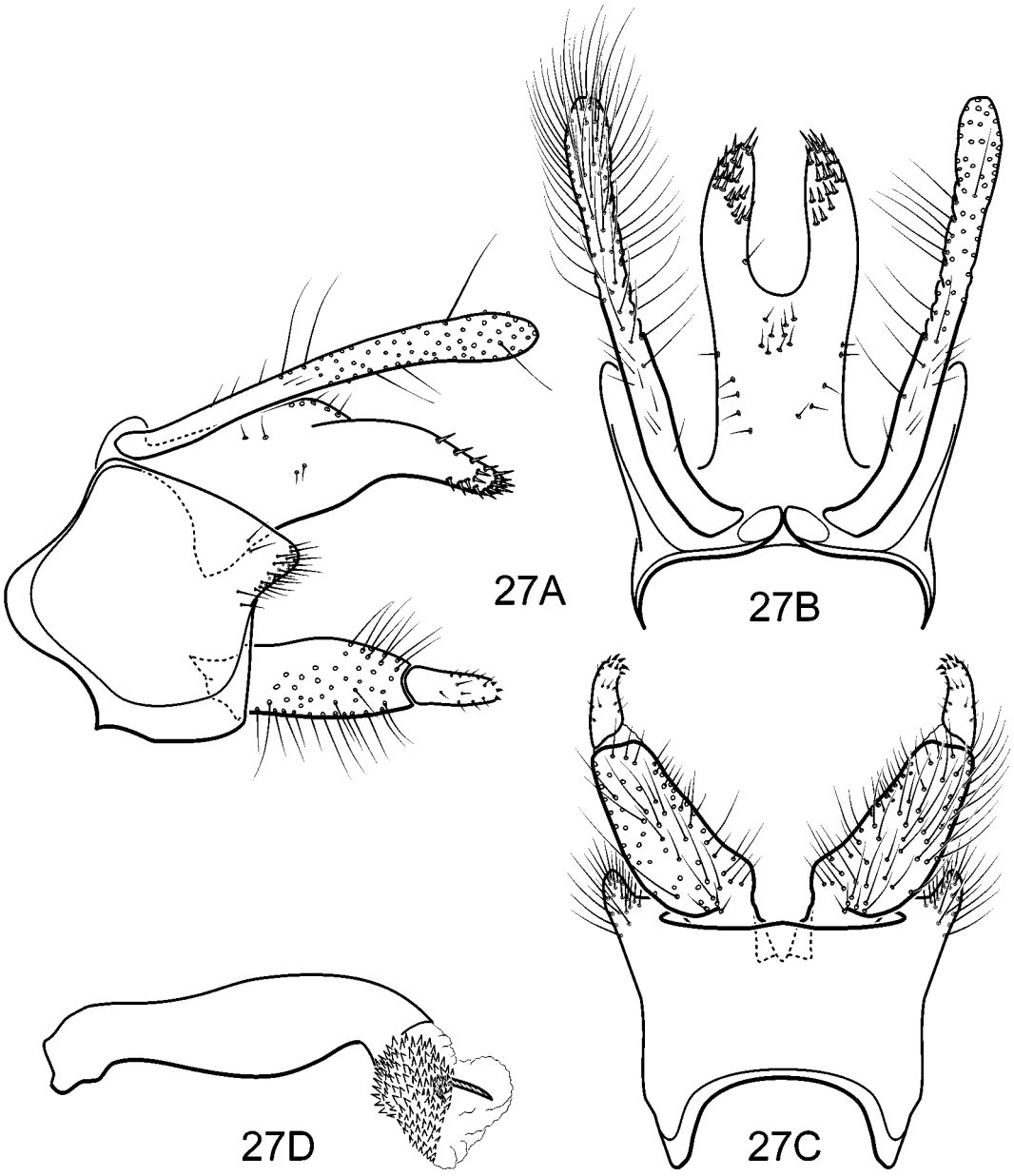

FIGURE 27. *Banyallarga* (*Histricoverpa*) *nica*. Male (UMSP000063353): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view; E—phallus, caudoventral view.

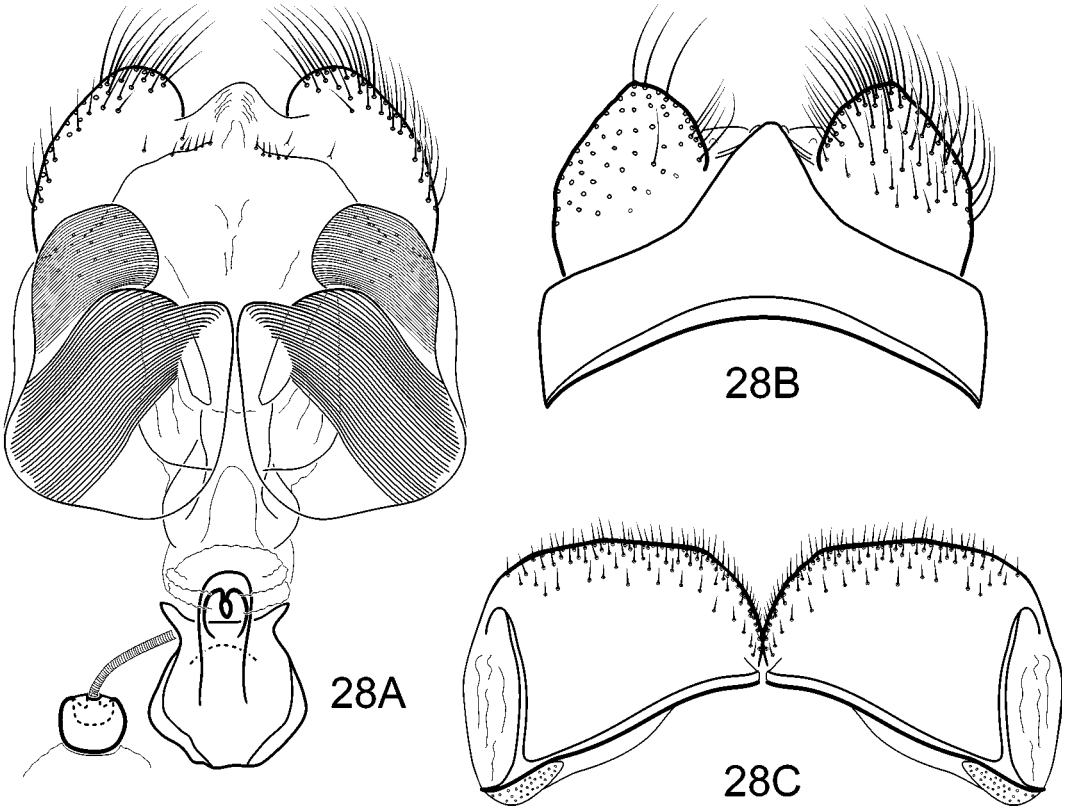

FIGURE 28. *Banyallarga* (*Histricoverpa*) *nica*. Female (UMSP000063353): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

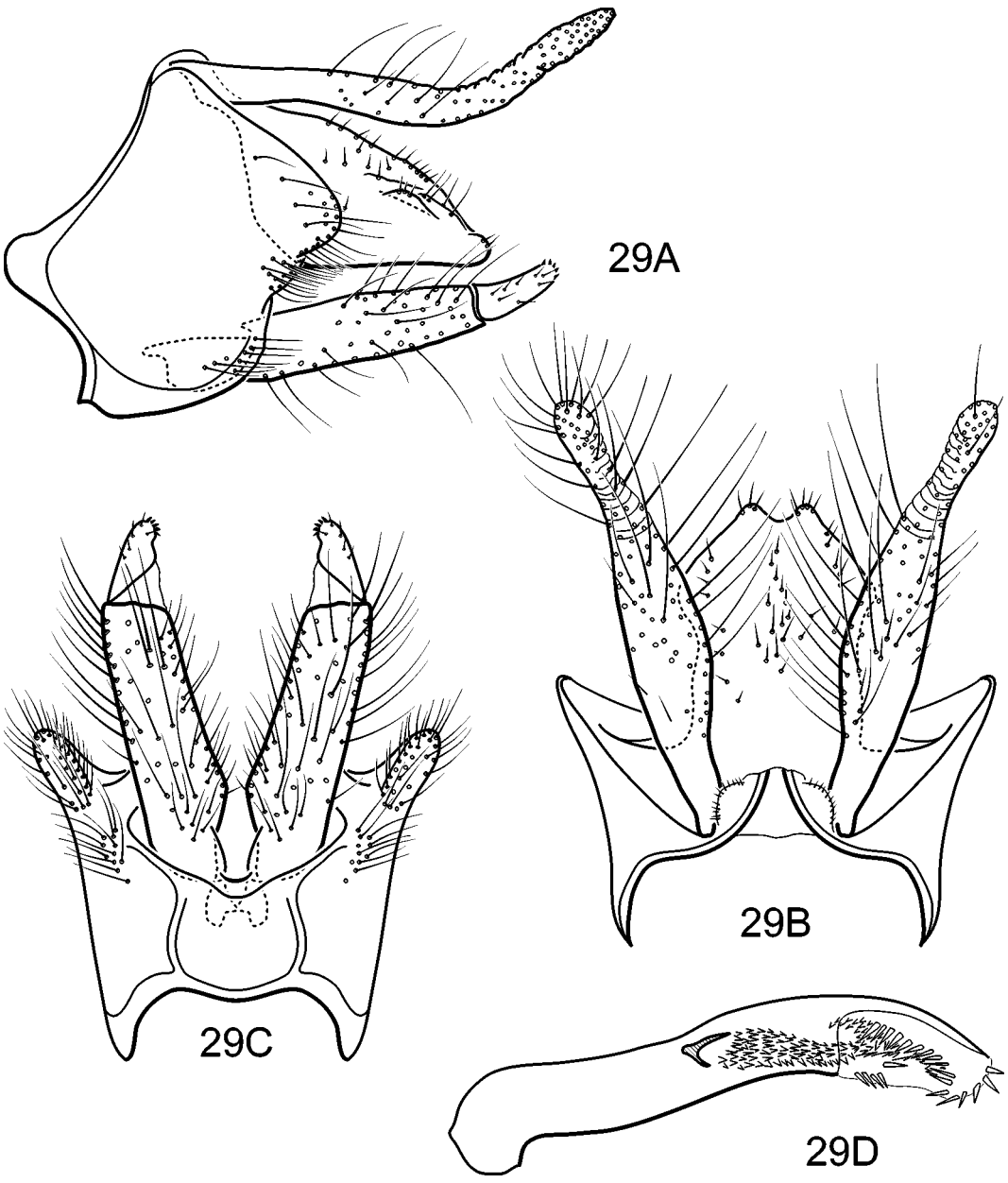

FIGURE 29. *Banyallarga* (*Histricoverpa*) *quincemil*. Male (UMSP000065237): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view.

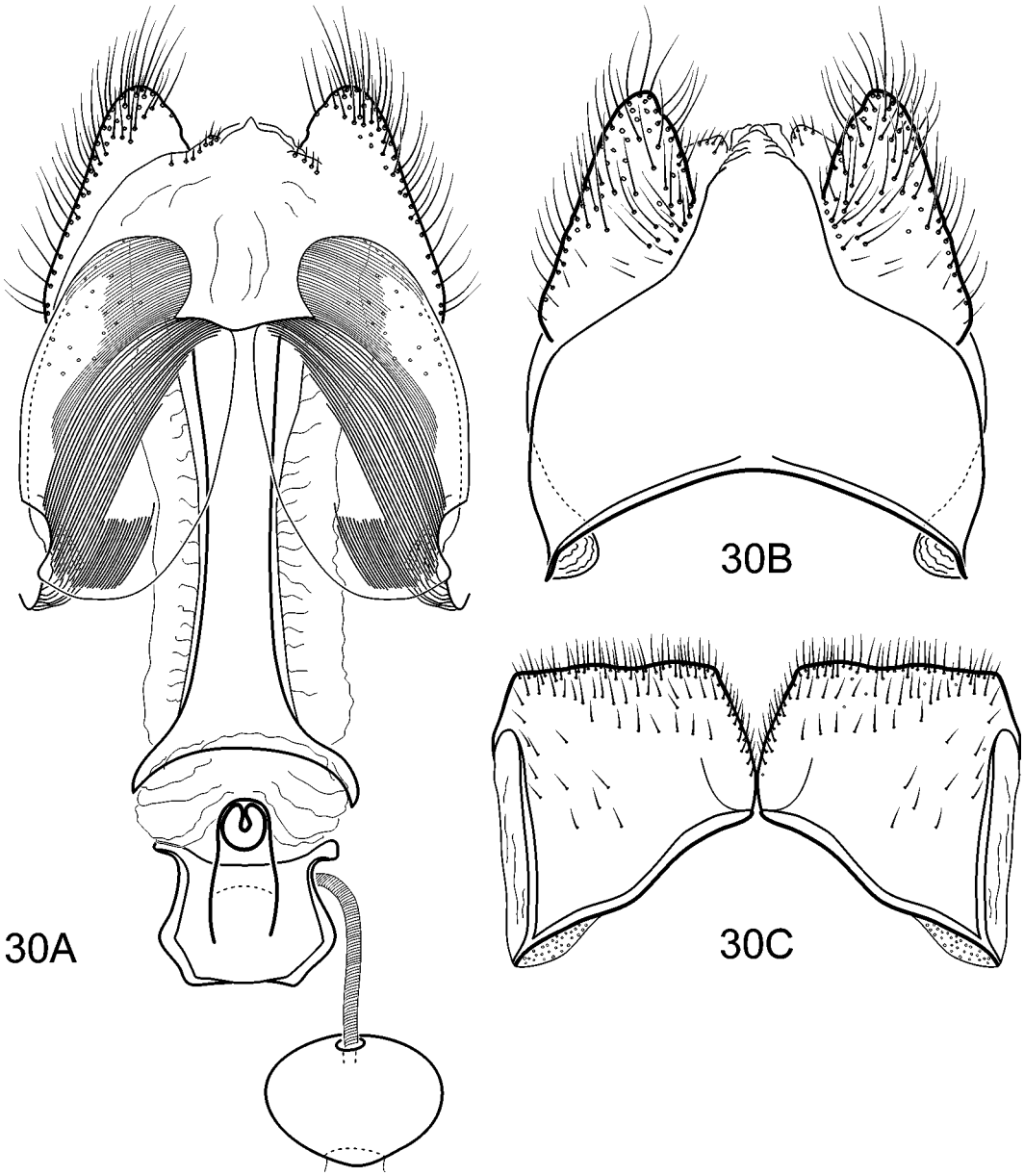

FIGURE 30. *Banyallarga* (*Histricoverpa*) *quincemil*. Female (UMSP000065238): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

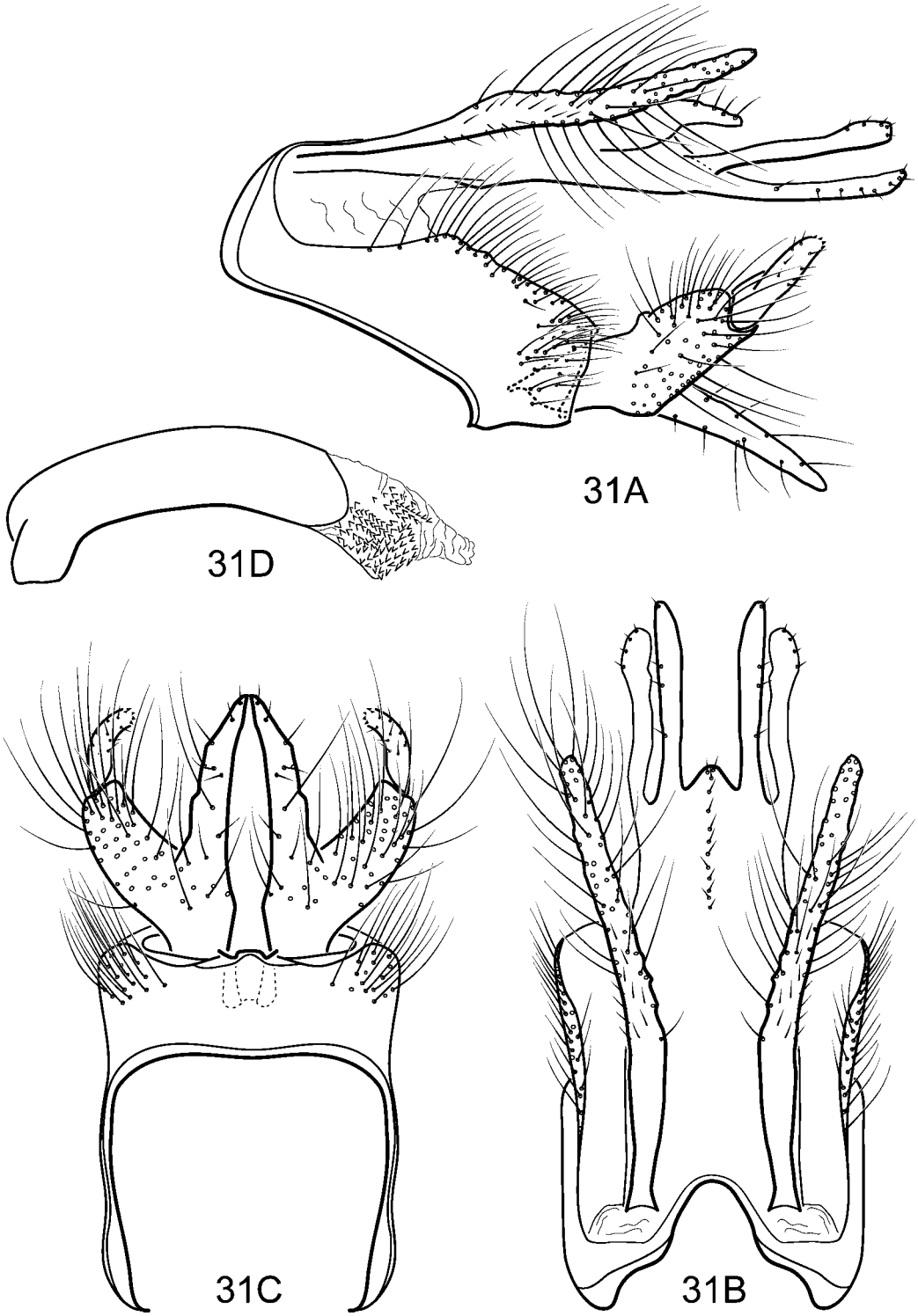

FIGURE 31. *Banyallarga* (*Histricoverpa*) *sanchezi*. Male (holotype): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view.

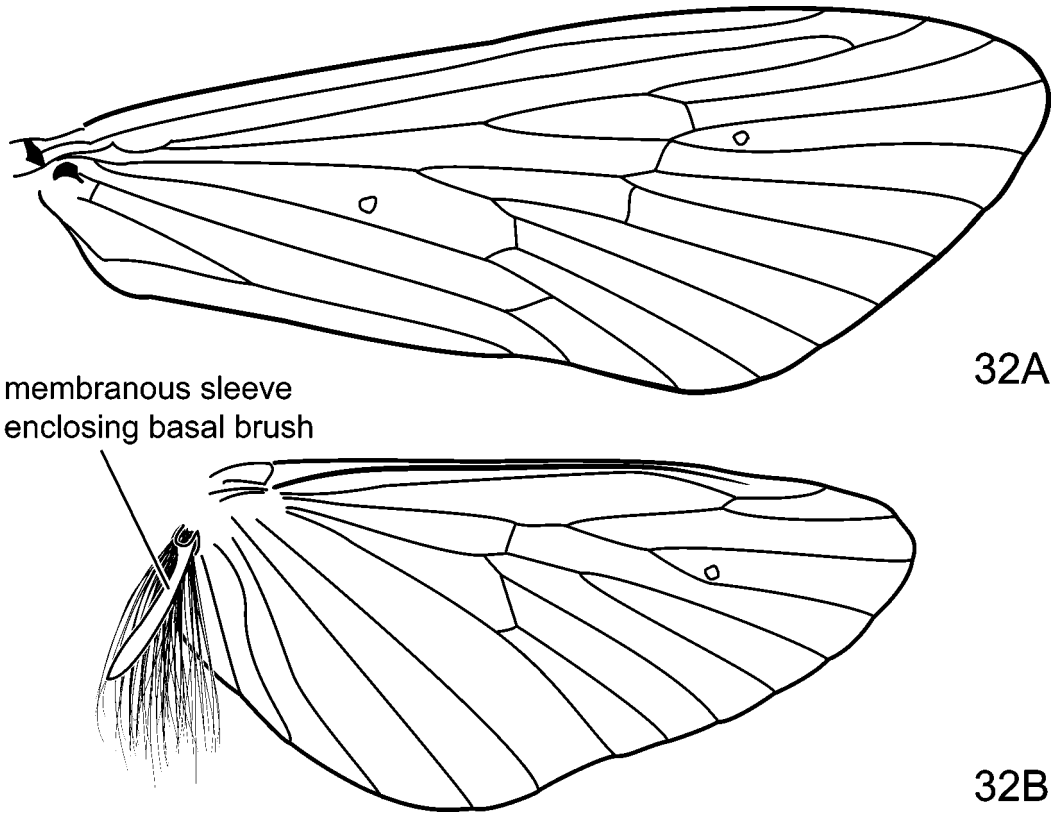

FIGURE 32. *Banyallarga* (*Histricoverpa*) *sanchezi*. Wings (holotype): A—forewing; B—hindwing.

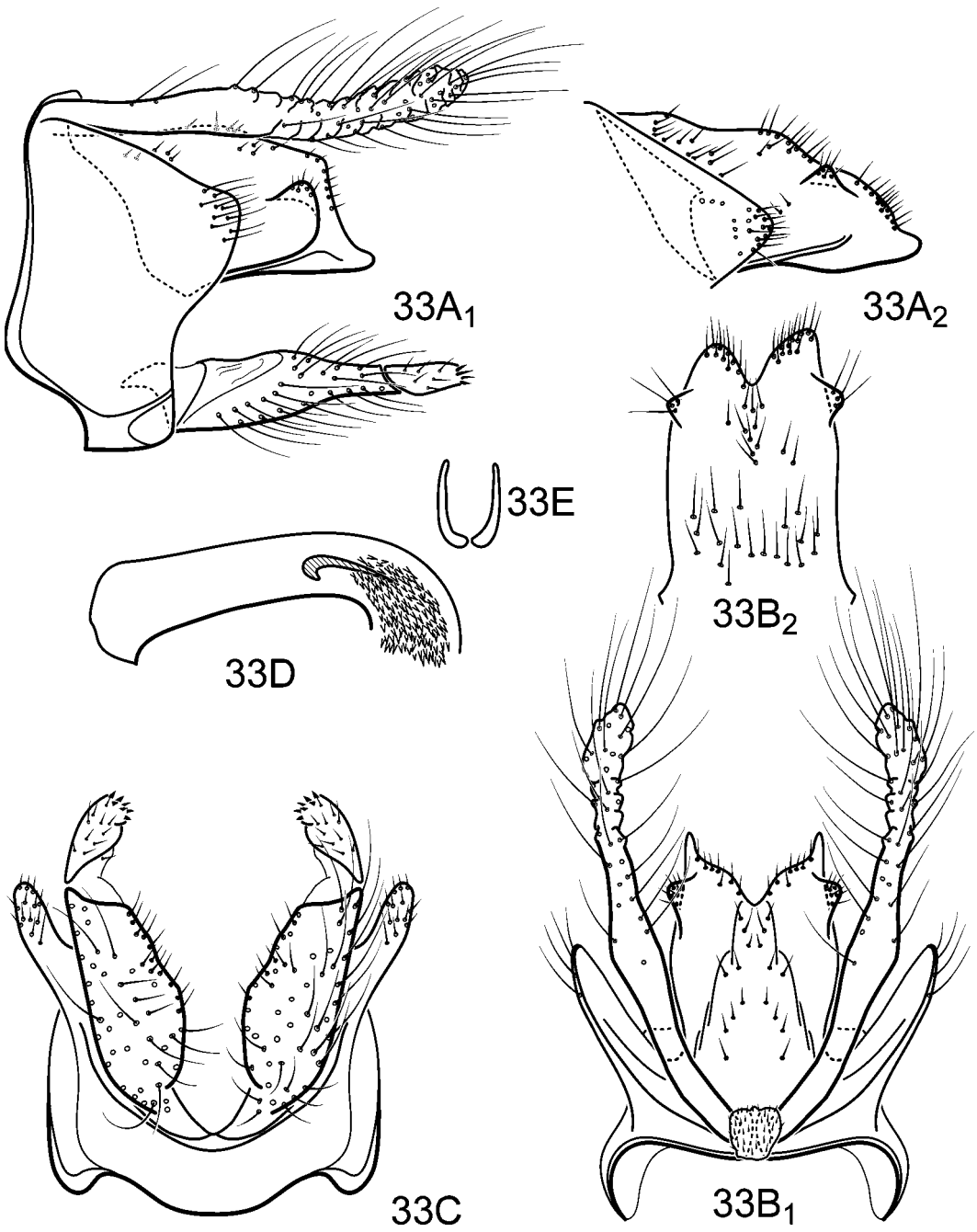

FIGURE 33. *Banyallarga* (*Histricoverpa*) *sylvana*. Male (A_1, B_1, C, D: holotype; A_2, B_2, UMSP000063346): A_1—lateral view; A_2—lateral view of tergum X, variant; B_1—dorsal view; B_2—dorsal view of tergum X, variant; C—inferior appendage, ventral view; D—phallus, lateral view.

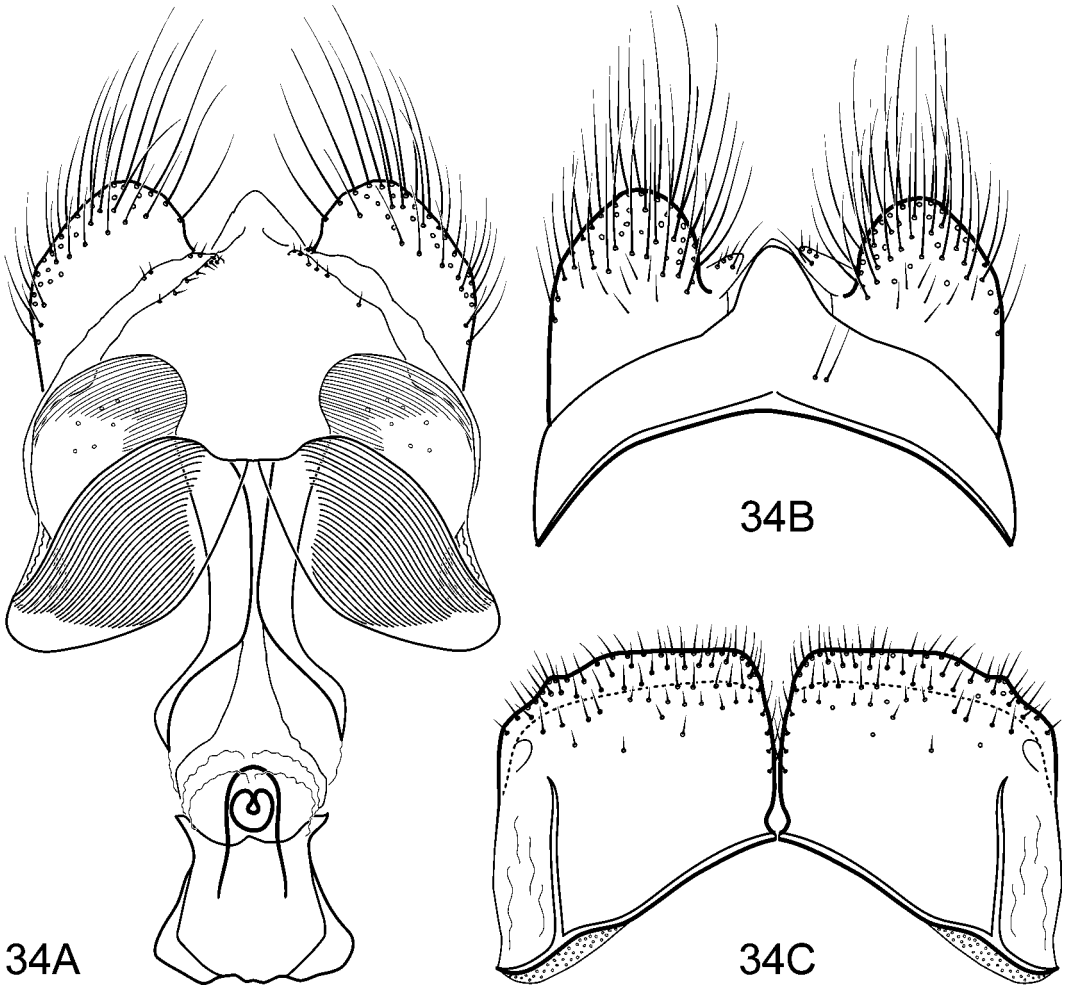

FIGURE 34. *Banyallarga* (*Histricoverpa*) *sylvana*. Female (UMSP000063348): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

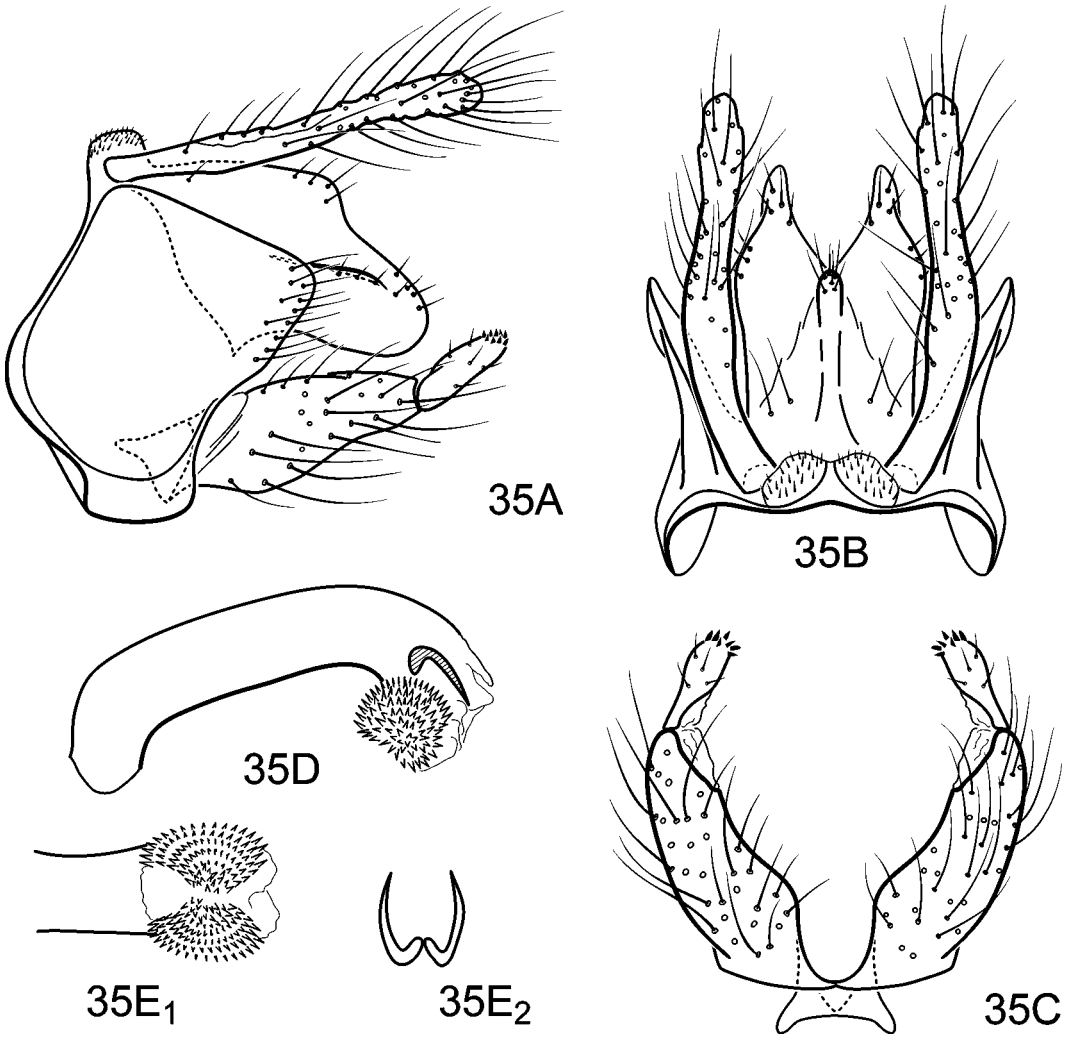

FIGURE 35. *Banyallarga* (*Histricoverpa*) *tapanti*. Male (holotype): A—lateral view; B—dorsal view; C—inferior appendage, ventral view; D—phallus, lateral view; E_1, apex of phallus, ventral; E_2, phallotremal sclerite, dorsal.

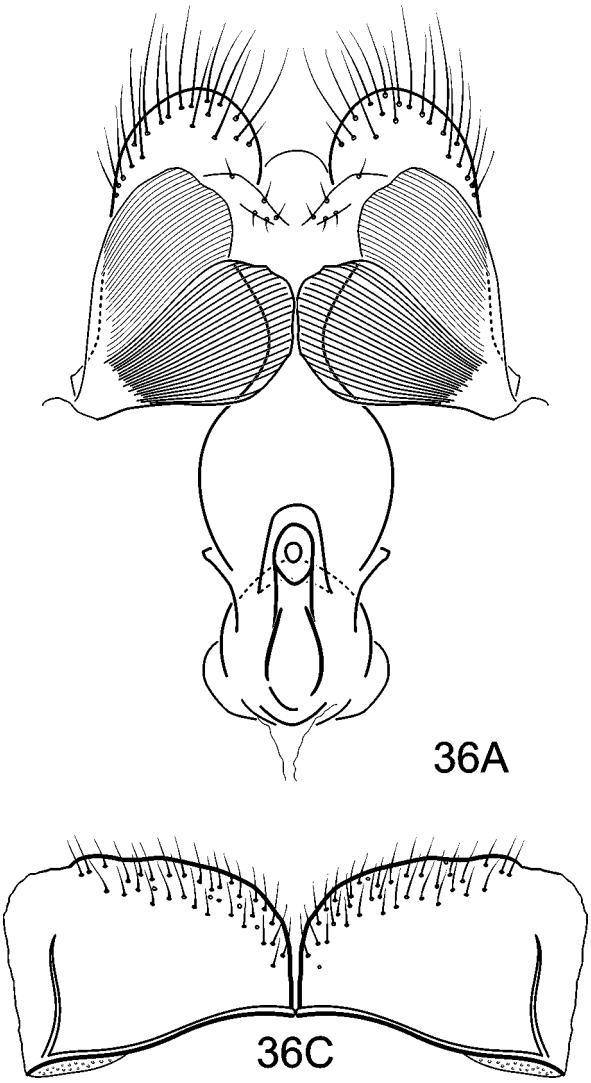

FIGURE 36. *Banyallarga* (*Histricoverpa*) *tapanti*. Female (UMSP000000073): A—sterna IX, X and vaginal apparatus, ventral view; B—terga IX and X, dorsal view; C—sternum VIII, ventral view.

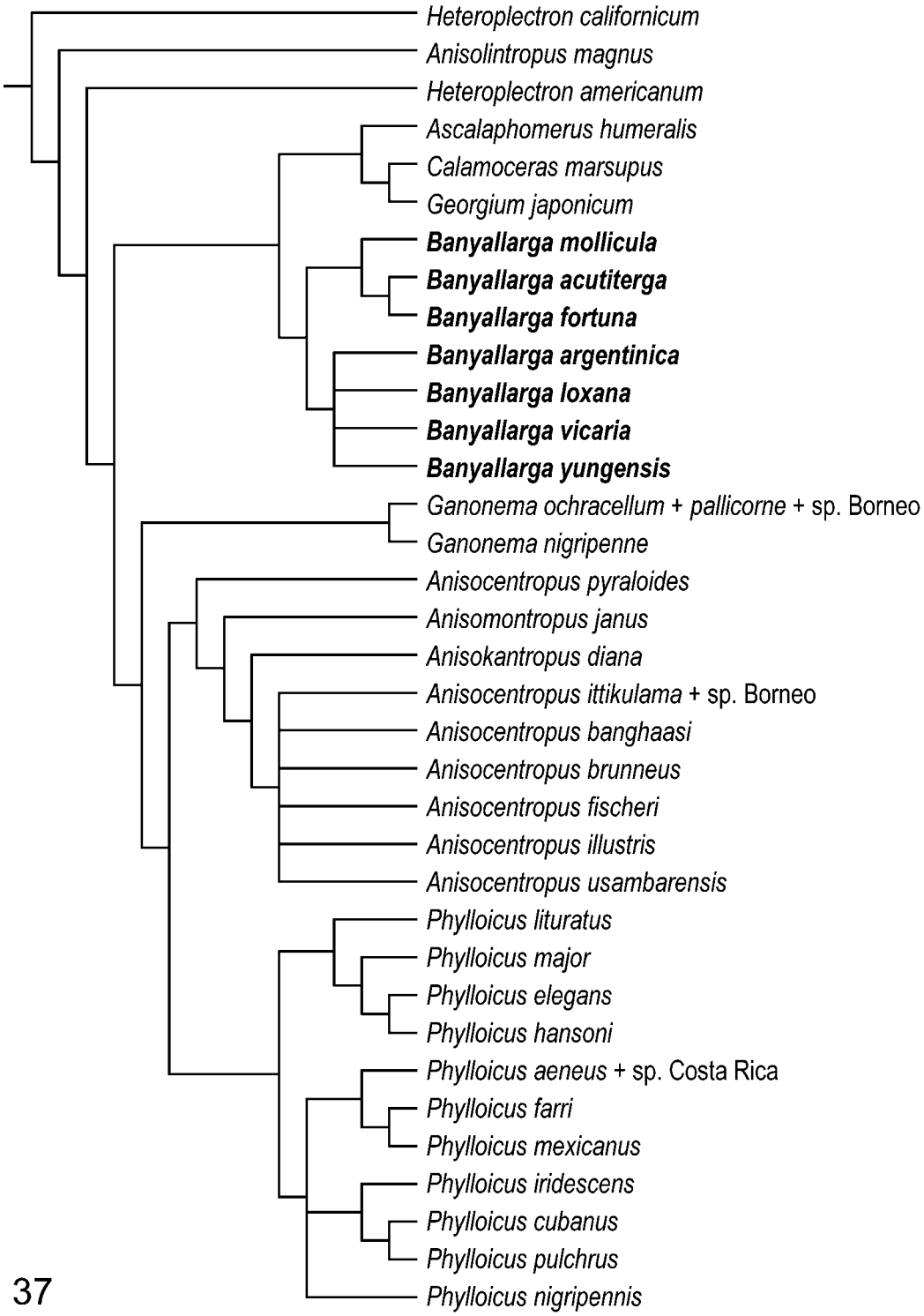

FIGURE 37. Relationships of calamoceratid genera (from Prather 2002).

38

FIGURE 38. *Banyallarga* (*Banyallarga*) *vicaria*. Habitus, lateral (composite of UMSP000000013 and UMSP000000021.

About the author

Aysha Prather, Ph.D. is a Postdoctoral Fellow at the Royal Ontario Museum in Toronto, Ontario, Canada. She completed her doctoral degree at the University of Minnesota in 2002, under the supervision of Dr. Ralph Holzenthal. Her research is in systematics and morphology of caddisflies, with an emphasis on Neotropical groups. Dr. Prather and her colleagues in Neotropical caddisfly studies maintain a website about their research at:

http://www.entomology.umn.edu/museum/projects/