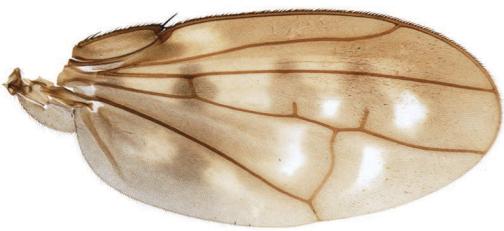




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A Revision of the New World Species of *Paralimna* Loew (Diptera: Ephydriidae)

Rosaly Ale-Rocha and Wayne N. Mathis

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ABSTRACT

Ale-Rocha, Rosaly, and Wayne N. Mathis. A Revision of the New World Species of *Paralimna* Loew (Diptera: Ephydriidae). *Smithsonian Contributions to Zoology*, number 643, x + 148 pages, 215 figures, 31 maps, 1 table, 2015.—The New World species of the genus *Paralimna* Loew are revised. Fifteen new species are described and four new synonyms are proposed (*Paralimna cilifera* Hendel = *Paralimna sana* Cresson, *Paralimna sticta* Hendel = *Paralimna taurus* Cresson, *Paralimna bistrata* Hendel = *Paralimna molossus* Schiner, and *Paralimna multipunctata* Williston = *Paralimna thomae* (Wiedemann)). A key to the 34 known, New World species of the subgenus *Paralimna* is provided, as is a key to the three New World species of the subgenus *Phaiosterna* Cresson. Diagnoses, detailed distributional data for the species of the genus, notes on the biology, and illustrations (photographs and drawings) are provided to assist species identification. A cladistic analysis was performed to examine the monophyly of the known species groups of *Paralimna*. The ingroup includes a total of 64 exemplar species. Outgroup sampling includes the following exemplar genera: *Afrolimna* Cogan, *Oedenops* Becker, and *Papuama* Mathis and Zatwarnicki. The analyses of the 36 included characters recovered a monophyletic subgenus *Phaiosterna* Cresson and a paraphyletic subgenus *Paralimna* if the *limbata* species group is included. Except for the *limbata* species group, the remaining known species groups of *Paralimna* were not sustained.

Cover images, from left to right: Head, body, and wing of *Paralimna stellata*, sp. nov., from Figures 194, 1, and 207 herein, respectively. (Center photo by S. A. Marshall, used with permission.)

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FRONTISPIECE (FIGURE 1). *Paralimna* (*Paralimna*) *stellata*, sp. nov. (Ecuador. Orellana: Tiputini, ♂). Photograph by Stephen A. Marshall, used with permission.

A Revision of the New World Species of *Paralimna* Loew (Diptera: Ephydriidae)

INTRODUCTION

The shore-fly genus *Paralimna* Loew is one of the most species rich in the subfamily Hydrelliinae Robineau-Desvoidy, having 98 described species worldwide (Mathis and Zatwarnicki 1995, 2002, and updates, including those described in this paper). Although the New World fauna of *Paralimna* is diverse, its species richness has never been adequately explored or documented, which are the primary objectives of this paper.

Few summaries of the New World fauna of *Paralimna* are available, and these are now woefully out of date. Almost one hundred years ago Cresson (1916) revised the genus and then, more than thirty years later (1947), he provided a synopsis of the Neotropical fauna. Although Cresson's synopsis was then the best available, it was incomplete, including only 16 of nearly 25 described species and lacking keys, illustrations, and adequate descriptions. In his synopsis, and perhaps partially accounting for the incomplete synoptic treatment, Cresson (1947:47) also observed that the subgenus *Paralimna* is "a group of very difficult species." Since Cresson, the New World fauna of *Paralimna* has been largely neglected, undoubtedly in part because of the difficulty in recognizing species, as Cresson observed.

In a preliminary study of New World fauna of *Paralimna* we discovered that numerous species await description. The purpose of this paper is to revise comprehensively the New World fauna of *Paralimna*, including 15 undescribed species (e.g., Figure 1) in addition to the 25 New World species that had been previously described, primarily as isolated descriptions. Much of this increase has resulted from a greatly improved sampling of the New World fauna, especially from the Neotropics. Also contributing to this expansion is our use of characters from structures of the male terminalia, which have revealed species complexes for what had been treated in some cases as a single, widespread species.

The genus *Paralimna* Loew, type species *Paralimna appendiculata* Loew, 1862a, was first described from specimens collected in the Nearctic Region ("Middle States" and "Georgia"; Loew 1862a), but the genus is now known to occur essentially pantropically with some species extending into north and south temperate areas (Egypt, Japan, northern Australia, and North America) (Mathis and Zatwarnicki 2002). Before the current study, the genus had included about 85 species, and of these 25 species had been recorded previously from the New World (Mathis and Zatwarnicki 1995, 2002). *Paralimna* is classified in the tribe Dryxini and includes most of the species diversity within this tribe. The diversity of species within *Paralimna* is accompanied by considerable structural diversity,

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making characterization of even the genus difficult. The monophyly of the genus, for example, is supported by a single morphological character: the lateral aedeagal process (Mathis and Zatwarnicki 2002). Body length, which is just one indication of the variation, varies by a factor of four, between 1.85 and 7.80 mm.

Paralimna is currently divided into two subgenera, the nominal *Paralimna* Loew and *Phaiosterna* Cresson. These subgenera are distinguished by the shape of the eye and height of the gena (eye distinctly higher than wide and short gena in *Phaiosterna*; eye nearly round, about as wide as high, and gena high in *Paralimna*). Cresson (1916) described *Phaiosterna* as a subgenus within *Paralimna*, and this subgenus has been accepted by subsequent authors. Mathis and Zatwarnicki (2002) revised *Phaiosterna* on a world basis and included six species of which three occur in the New World. The subgenus *Paralimna* is substantially more species rich than *Phaiosterna* and currently includes nearly 80 described species (Mathis and Zatwarnicki 1995). Moreover, and based on morphospecies existent in collections, we knew that species diversity for the genus is considerably greater than described, especially in the New World. The forefemur of males, with series of distinct, often curved, setae on the anteroventral surface, is considered the synapomorphy of *Paralimna* (*Paralimna*). In the Afrotropical Region the subgenera are divided into seven species groups (Cogan 1968), and except for the Afrotropical *limbata* group, which is indeed monophyletic as characterized by the gena being secondarily short, the remaining sublineages within this subgenus were not characterized (Mathis and Zatwarnicki 2002).

Cresson (1915, 1916, 1929, 1933) contributed significantly to our knowledge of *Paralimna* by describing more than half of the New World species. Except for five species (*P. decipiens* Loew, 1878; *P. molossus* Schiner, 1868; *P. punctipennis* (Wiedemann, 1830); *P. secunda* Schiner, 1868; and *P. thomae* (Wiedemann, 1830)), all other species of *Paralimna* from the New World were described mostly in the first third of the twentieth century (Cresson 1915, 1916, 1929, 1933; Hendel 1930; Mathis and Zatwarnicki 2002), and only a few species have been revised. Descriptions of the first recognized species are comparatively simple and, in view of the currently known fauna, are largely inadequate for species' recognition. This situation became even more egregious with the addition of more species descriptions. For the vast majority of New World congeners, description and illustrations of structures of the male terminalia are completely lacking. Following the precedent of Cogan (1968), we discovered that these structures provide additional and important characters for recognition of species. Thus, a major purpose for the research reported herein was to describe, illustrate, and analyze these structures, especially as the resulting information pertains to recognition of included taxa and phylogenetic placement.

METHODS AND MATERIALS

The terminology adopted in the descriptions, with the exceptions noted in Mathis (1986), Mathis and Zatwarnicki (1990a), and below, follows McAlpine (1981). Our usage of the term mesopleuron in the keys and descriptions is according to McAlpine (1981:26, "the entire pleuron of the mesothorax") and is not synonymous or to be confused with the anepisternum. We have followed the terminology for most structures of the male terminalia that other workers in Ephydriidae have used (see references in Mathis 1986; Mathis and Zatwarnicki 1990a, 1990b), such as surstyli, which in Dryxini is divided into a presurstylus (surstylus) and postsurstylus (clasper). We use the term basal flagellomere for the large antennomere beyond the pedicel. The terminology for structures of the male terminalia is provided directly as labels on Figures 2–5 and is not repeated for comparable illustrations of other species. Alternative spellings for some localities are cited in parenthesis, especially for locality names that were transliterated into English. The species descriptions are composite and not based solely on the holotype. Veins and crossveins are defined in McAlpine (1981). One head and two venational ratios that are used in the descriptions are defined below (all ratios are averages of three specimens: the largest, smallest, and one other).

1. Gena-to-eye ratio is the genal height divided by the eye height. Measurements are taken from the head in lateral view.
2. Costal-vein ratio is the straight line distance between the apices of radial (R) veins R_{2+3} and R_{4+5} divided by the distance between the apices of R_1 and R_{2+3} .
3. Medial-vein (M-vein) ratio is the straight line distance along vein M between crossveins r-m and dm-cu divided by the distance apicad of crossvein dm-cu.

The cladistic analysis was performed using the program NONA (Goloboff 1999). A branch-swapping search was conducted with the characters unordered and unweighted option in effect. The data matrix (see Table 1) consisted of 36 morphological characters compiled for 64 species of *Paralimna*. Outgroups were selected from the genera *Afrolimna* Cogan, *Oedenops* Becker, and *Papuama* Mathis and Zatwarnicki.

Distribution maps were made using Esri ArcView[©] GIS 3.2. Longitude and latitude coordinates were obtained for the locality where each specimen was collected and entered into a Microsoft Excel[©] spreadsheet. If unavailable directly from specimen labels, longitude and latitude were estimated using gazetteers and maps to determine the geographical coordinates. Localities of specimens were plotted on a world land projection, presented within Esri ArcView layouts, and exported as encapsulated postscript [EPS] files.

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ABSF	Archbold Biological Station, Venus, Florida (M. Deyrup)
AMNH	American Museum of Natural History, New York, New York (David A. Grimaldi)
ANSP	Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania (Jon K. Gelhaus and Jason D. Weintraub)
BMNH	The Natural History Museum (formerly the British Museum [Natural History]), London, England (Brian Pitkin and John E. Chainey)
BYU	Brigham Young University, Provo, Utah (Shawn M. Clark)
CMP	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (Chen Young)
CNC	Canadian National Collection, Ottawa, Canada (Jeffrey M. Cumming and James O'Hara)
CU	Cornell University, Ithaca, New York (J. Liebherr)
DZUP	Universidade Federal do Paraná, Curitiba, Paraná, Brazil (Luciane Marinoni)
FSCA	Florida State Collection of Arthropods, Gainesville, Florida (Gary J. Steck)
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil (José Albertino Rafael)
KU	University of Kansas, Lawrence, Kansas (M. Engel)
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Philip D. Perkins)
MSU	Montana State University, Bozeman, Montana (Michael A. Ivie)
MZUSP	Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (Carlos José Einicker Lamas)
NMW	Naturhistorisches Museum, Wien, Austria (Peter Sehnal)
OSUC	Ohio State University, Museum of Biological Diversity, Columbus, Ohio (Luciana Musetti)
SMN	Staatliches Museum für Naturkunde in Stuttgart, Stuttgart, Germany (Hans-Peter Tschorasnig)
ZIL	Zoological Institute, Lund University, Lund, Sweden (Roy Danielsson)
ZMUC	Zoological Museum, Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark (Thomas Pape)

Erin Kolski of Smithsonian's Department of Entomology prepared the distribution maps. The plates of heads and thoraces

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SYSTEMATICS

TRIBE DRYXINI ZATWARNICKI

Dryxini Zatwarnicki 1992:85 [type genus: *Dryxo* Robineau-Desvoidy 1830].—Mathis and Zatwarnicki 1995:115–127 [world catalog]; 2002:1–101 [revision at generic level].

DIAGNOSIS. Dryxini are the sister group of Notiphilini Bigot, and the tribe is distinguished from Notiphilini and other shore-fly tribes by the following combination of characters (Mathis and Zatwarnicki, 2002): ocellar seta stronger than the weak pseudopostocellar seta; reclinate fronto-orbital seta well developed, proclinate setae reduced or lacking; eye appearing bare; face wide, transversely arched, and generally projected anteriorly; facial setae in a serial row or two that runs more or less parallel to parafacial; gena high (secondarily short in some species of *Paralimna*); subcranial cavity moderately large and cavernous; dorsocentral setae 4 (1+3), secondarily reduced in some genera of Dryxini (*Corythophora*, *Dryxo*, and *Omyxa*); prescutellar acrostichal setae present, well developed; postsutural supra-alar setae strong, longer than posterior notopleural seta; posterior notopleural seta at same level as anterior seta; ventral anepisternal seta elongate, twice length of dorsal seta; costa elongate, extended to vein M; midtibia with prominent, erect, extensor setae on dorsal surface; abdominal tergites fasciate; male terminalia with surstyli divided into a presurstylus (clasper) and postsurstylus (surstylus); presurstylus with apex angulate and bifurcate; subepandrial plate reduced; pregonite and postgonite reduced or lacking (the structure remaining may represent a fused and/or reduced pre- and postgonite); hypandrium connected basally with postsurstylus, not with epandrium.

GENUS PARALIMNA LOEW

Paralimna Loew 1862a:138 [type species: *Paralimna appendiculata* Loew 1862a (=*Notiphila punctipennis* Wiedemann 1830), monotypy].—Osten Sacken 1878:201 [Nearctic catalog].—Becker 1896:114–115 [review, discussion of relationships].—Williston 1908:308 [key to Nearctic genera].—Cresson 1916:101–124 [revision]; 1946:229 [key to Nearctic species]; 1947:37, 46 [key, review of Neotropical species].—Curran 1934:347 [key to Nearctic genera].—Malloch 1933:11 [review].—Wirth and Stone 1956:465, 470 [generic key, review, Californian species].—Wirth 1965:748 [Nearctic catalog]; 1968:14–16 [Neotropical catalog].—Cole 1969:392, 396 [generic key, review of species from western United States].—Mathis and Zatwarnicki 1995:118–127 [world catalog]; 2002:59–60 [diagnosis].

DIAGNOSIS. This genus is distinguished from others of Dryxini by the following combination of characters: anterior proclinate fronto-orbital seta larger than posterior seta; arista bearing 5 or more dorsal hairs; facial seta usually 1, if more, not well separated; notopleuron bearing 2 large setae; anepisternal and anterior dorsocentral (1+3) setae well developed; presutural supra-alar seta present; katepisternal seta present; forefemur lacking row of short, somewhat blunt spines along anteroventral surface; mid- and hindfemora normally developed, much shorter than length of abdomen.

DESCRIPTION. Small to large shore flies, body length 1.85–7.80 mm.

Head: Frons wider than high, shallowly arched anteroventrally, not projected forward, sparsely setulose; ocelli in equilateral or isosceles triangle, ocellar triangle setulose; pseudopostocellar setulae well developed, usually half length of ocellar seta, divergent; paravertical seta well developed, subequal in length to anterior proclinate fronto-orbital seta, convergent; ocellar seta, inner and outer vertical setae, and reclinate interfrontal seta well developed; proclinate fronto-orbital setae 2, both shorter than interfrontal seta, moderately well developed, anterior seta about twice length of posterior seta. Basal flagellomere rounded apically; arista bearing 5 or more long rays along dorsal surface. Face with 1–3 long (subequal to length of anterior fronto-orbital seta), inclinate (but not cruciate) facial setae on ventral half of face and 3–4 smaller setulae interspersed along same vertical series as larger setae. Parafacial at anterior margin of eye narrow, width much less than length of basal flagellomere. Gena variable, from short ($\frac{1}{4}$ eye height) to high (subequal to combined length of basal flagellomere and pedicel); genal seta well developed.

Thorax: Mesonotum more or less uniformly setulose; acrostichal setulae in 6–8 irregular rows; 1 pair of large, prescutellar, acrostichal setae; dorsocentral setae 4 (1+3), well developed, posterior pair displaced laterally; presutural supra-alar seta well developed, subequal in length to anterior, dorsocentral seta; supra-alar setae 2 (1+1), presutural seta inserted more medial than postsutural seta; postpronotal seta well developed; notopleural setae 2, posterior seta shorter; anepisternum bearing 2 large setae along posterior margin, ventral seta greatly elongate; katepisternal seta well developed. Scutellum nearly flat, posterior margin truncate. Veins lacking setulae; costa long, extended to vein M; crossvein dm–cu regularly developed, nearly straight, longer than apical section of vein CuA₁. Mid- and hindfemora normally developed, shorter than length of abdomen; foretibia of male lacking several long, slender setae at apex on ventral surface; forebasitarsus lacking row of long, slender, pale setulae inserted along anterior surface; midtibia with 3 dorsal extensor setae (subapically, sub-basally, and near basal $\frac{1}{3}$); mid- and hindfemora normally developed, much shorter than length of abdomen.

Abdomen: Male abdominal sternites 3 and 4 rectangular, longer than wide; sternite 5 narrow basally, becoming wider posteriorly, posterior margin shallowly concave. Male terminalia: epandrium is U-shaped in posterior view, simple, band-like,

unadorned; cercus semielliptical or ovoid; presurstylus generally L-shaped with ventral arm reduced, sometimes ventral arms absent; postsurstylus with apex largely bifurcate, internal lobe bearing 2 long and robust setae and 2 short setae inside; lateral aedeagal process articulated at the base of aedeagus laterally; aedeagus usually with membranous apex; hypandrium forming a conically shaped pouch; phallapodeme hardly sclerotized, usually triangular in lateral view. Female abdominal sternites 2–5 longer than wide, 6 rather quadrangular, 1, 7, and 8 wider than longer, sternite 8 with posterior margin shallowly concave; cercus small, ovoid; spermatheca pedunculate.

DISTRIBUTION. The genus *Paralimna* occurs pantropically with a few species extending into temperate areas (Egypt, Japan, northern Australia, and North America).

REMARKS. *Paralimna*, with 98 species (Mathis and Zatwarnicki 1995, 2002), includes most of the species diversity of Dryxini, and we know that there are numerous undescribed species in collections that await description, especially from Asia. Undoubtedly many species also await collection. Certainly the results of this paper document the need for ongoing field work with many of the new species being based on recently collected specimens.

KEY TO NEW WORLD SUBGENERA OF PARALIMNA

(Adapted from Mathis and Zatwarnicki, 2002)

1. Body generally dark colored, dark brown to grayish brown; tergites without distinct dark band basally; eye distinctly higher than wide; gena short, usually slightly less than length of basal flagellomere ($\frac{1}{4}$ eye height), wholly covered by setae; basal flagellomere with short, inconspicuous setae dorsally *Phaiosterna* Cresson
Body coloration contrastingly bicolored, silvery white to gray and dark brown; tergites distinctly banded, brown band basally; eye round, about as wide as high; gena high, height usually greater than length of basal flagellomere (subequal to combined length of basal flagellomere and pedicel), with few setae on middle and ventral margin; basal flagellomere with conspicuous elongate setae dorsally *Paralimna* Loew

SUBGENUS *PARALIMNA* LOEW

Paralimna Loew 1862a:138 [type species: *Paralimna appendiculata* Loew 1862a (=*Notiphila punctipennis* Wiedemann 1830), monotypy].—Cresson 1947:47–54 [diagnosis, review of Neotropical species].—Wirth 1965:748 [Nearctic catalog]; 1968:14–15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:118–126 [world catalog]; 2002:61–63 [diagnosis].

Poecilothorax Becker 1922:73 (as a genus). Type species: *Poecilothorax angustus* Becker 1922 (=*Paralimna puncticollis* Becker 1922), monotypy.—Cresson 1947:108 [synonymy].

DIAGNOSIS. This subgenus is distinguished from other congeneric subgenera by the following combination of characters: small to large shore flies, body length 1.85–6.30 mm; thorax usually darkened dorsally and lighter laterally, frosted, without shining aspect.

Head: Frons usually with characteristic pattern of spots, brown with yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, between inner vertical and interfrontal seta, on fronto-orbits between proclinate fronto-orbital setae, and just above antennal bases. Ocelli arranged in equilateral or isosceles triangle; ocellar seta well developed, usually longer than anterior fronto-orbital seta and subequal to outer

vertical seta, setae well separated, usually inserted anterolateral to anterior ocellus. Basal flagellomere usually gradually narrowed toward apex, with fringe of elongate dorsal setae; length about twice width; arista bearing 7–16 long hairs along dorsal surface. Face conspicuously convex, with carina and antennal groove marked, comparatively well arched; usually bearing 1, occasionally 2–3 long facial setae, if more than 1, setae approximate. Eye rounded, as wide as high or slightly higher than wide. Gena high, height slightly more than $\frac{1}{3}$ eye height, (height usually greater than length of basal flagellomere; subequal to combined length of basal flagellomere and pedicel); usually with few setae on ventral half.

Thorax: Mesonotum brown medially and through dorsocentral track, between yellowish to brownish gray, conspicuously vittate; pleural area predominantly gray, with or without spots, sometimes predominantly brown; dorsal surface of scutellum flat. Wing with coloration variable, from hyaline to distinctly patterned. Forefemur of male frequently with row of modified setae (curved, slightly or distinctly flattened setae) on anteroventral surface.

Abdomen: Frequently tergites with fasciate pattern with darker fascia basally. Sternite 1 shiny. Male terminalia: epandrium simple, band-like, unadorned; cerci subelliptical; presurstylus not connected to each other dorsally; postsurstylus usually widest

medially with a protuberant setulose lobe anteriorly and a variable process posteriorly in the middle; aedeagus mostly tubular, elongate, gently flattened laterally; lateral aedeagal process narrowed in middle, curved ventrally in lateral view.

DISCUSSION. Structures of the male terminalia have been used to facilitate identification of species of *Paralimna* since Cogan (1968). Despite obvious differences in structures of the terminalia between species, there are cases in which some structures, mostly the presurstylus, are so similar that it is difficult

to recognize different species. For example, structures of the male terminalia, especially the presurstylus of *P. brunneiceps*, *P. fellerae*, *P. meridionalis*, *P. nigropicta*, and *P. punctipennis*, are very similar. The phallapodeme should be carefully evaluated because it varies intraspecifically. The postsurstylus and remaining structures of the male terminalia have provided useful characters for species distinction; however, the position from which these structures are viewed and illustrated can mislead and result in misidentifications.

KEY TO NEW WORLD SPECIES OF THE SUBGENUS PARALIMNA

1. Wing distinctly patterned, mostly brown with white or hyaline spots; crossvein dm–cu concave, curved to base; with short stump veins on longitudinal veins R₄₊₅ and M [Figures 200–202, 207]; face high, about twice length of frons in anterior view [Figures 172–174, 194]; frons almost flat 2
- Wing without distinct pattern, hyaline or uniformly brown tinged; diffused infuscation mainly on transverse veins can be present; crossvein dm–cu not as above; short stump veins on longitudinal veins R₄₊₅ and M rarely present; face moderately high, about 1.5× the length of frons; frons usually convex 4
2. Frons with a large black velvety spot on ventral portion of fronto-orbit, lateral to antenna [Figures 172, 194] 3
- Frons without a large black velvety spot [Figures 173–174] *Paralimna (Paralimna) guttata*, sp. nov.
3. Frons with a large, shiny black ovate medial area extended from anterior ocellus to anterior margin [Figure 172]; aedeagal process short, shorter than half of aedeagus length, setae of presurstylus slender [Figures 54, 56] *Paralimna (Paralimna) fulgifrons*, sp. nov.
- Frons without a shiny black ovate medial area on anterior margin [Figure 194]; aedeagal process approximately half of aedeagal length, setae of presurstylus robust [Figures 126, 128] *Paralimna (Paralimna) stellata*, sp. nov.
4. A quadrate to short rectangular dark brown to black velvety spot between bases of antennae; face uniformly silvery gray to yellowish gray, rarely an inconspicuous pale golden-brown stripe on the carina and sometimes a pair of small, pale golden spots between largest facial setae; wing hyaline lacking infuscate halos; head wider than high in anterior view [Figure 182]; male forefemur concave ventrally near apex, with anteroventral series of short, flattened, curved setae and posteroventral setae arranged in more than 1 row and concentrated on basal half *P. nigropicta* Cresson
- Without a quadrate spot between bases of antennae, if spot present, then elongate, extended over carina; coloration of face variable, usually spotted; wing, head, male forefemur, and setae of male forefemur variable 5
5. Body covered with dense whitish-gray microtomentum; frons, scutum, and scutellum orange tinged or yellowish brown; face whitish gray usually with a large golden triangular or trapezoidal spot on carina extended over more than basal half of face 6
- Body, frons, scutum, scutellum, and face with other characters; if the body and face is covered with whitish-gray microtomentum, then the large golden spot on carina lacking 7
6. Large golden spot on carina present; frons with a large grayish-brown velvety spot on anterolateral margin, above and lateral to antenna; pedicel with a silvery white spot dorsally, basal flagellomere brown [Figure 163]; pleurae without spots; male forefemur not concave ventrally, bearing anteroventral row of very short, curved, flattened, and with blunt tip setae; posteroventral setae inconspicuous; crossvein dm–cu with infuscate halo; presurstylus not bifurcate, with horizontal process almost straight [Figure 6] *P. argyrostoma* Cresson
- Large golden spot on carina present or absent; frons without a large grayish-brown velvety spot on anterolateral margin, if present spot on anterolateral margin is small and dark gray; pedicel predominantly gray, orange, or brown tinged dorsally, without a distinct white spot dorsally, basal flagellomere gray [Figure 171]; male forefemur with ventral surface concave on distal 1/3, posteroventral setae short, arranged in more than 1 row and concentrated on basal 1/3 of femur [Figure 211]; crossvein dm–cu without infuscate halo; presurstylus with basoventral process somewhat developed, horizontal process shallowly curved [Figure 50] *P. flexineuris* Cresson
7. Male foretibia with ventral surface irregular, wavy; male forefemur concave ventrally near apex, with anteroventral series of long and widely flattened setae [e.g., Figure 213] 8

- Male foretibia with ventral surface regular, straight, or only slightly concave; male forefemur not concave ventrally, if so, then the anteroventral setae of forefemur are not long nor widely flattened.....12
- 8. Pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites brown) *P. pectinata* Hendel
- Mesopleuron unicolorous, ventral and dorsal pleurites mostly unicolorous, anepisternum frequently spotted.....9
- 9. General coloration of body light, densely silvery or yellowish gray; spots of scutum pale brown; anepisternum with or without spots; basoventral process of presurstylus developed10
- General coloration of body dark gray; scutum and anepisternum with dark brown spots; basoventral process of presurstylus variable11
- 10. Male forefemur bearing a row of setae along posteroventral margin, usually interrupted for a short distance before apex; anepisternum usually without distinct spot; crossveins with gray infuscate halos; banded maculation pattern on tergites not as extensive, often lacking on tergite 5, medial stripe at most faintly evident; basoventral process of presurstylus with ventral margin tapered and bearing strong setae [Figure 138] *P. texana* Cresson
- Male forefemur bearing a posteroventral patch of setae only near base or along entire margin; anepisternum usually brownish on dorsal margin; crossveins without infuscate halos; tergites with extensive brown to dark brown anterior, bilaterally symmetrical band, posterior margin of band convex on both sides and with a conspicuous medial stripe extended to posterior margin; basoventral process of presurstylus with ventral margin rather rounded and bearing slender setae [Figure 142]..... *P. thomae* Wiedemann
- 11. Face dark gray with 3 brown spots, 1 on carina and 2 longitudinal parallel brown spots on ventral half, extended to margin of face; gena brown with dorsal margin silvery gray [Figure 186]; pleurae predominantly brown, anepisternum with ventral margin and a large, central, rounded stain brown, dorsal margin spotted by brown insertion of setae, the remaining gray; lateroventral margin of tergites brown; posteroventral surface of male forefemur with very long setae inserted on basal $\frac{1}{3}$ of femur; ventral surface of male foretibia not setose *P. piger* Cresson
- Face gray with a golden-brown, sometimes inconspicuous, rectangular spot on carina, height equal to length of antenna; gena silvery gray [Figure 188]; anepisternum with a small brown spot on dorsal and ventral margin; lateral margin of tergites gray; setae of posteroventral surface of male forefemur long and spaced, evenly distributed along femur; male foretibia with conspicuous dense, rather elongate setae on posteroventral surface..... *P. plumbiceps* Cresson
- 12. Gray coloration of body dark, rather bluish gray13
- Gray coloration of body light, silvery or yellowish gray.....14
- 13. Face with a wide and short dark grayish-brown spot on carina, lateral margin brown and ventral half wholly gray; gena gray, lacking spots [Figure 193]; anepisternum with dorsal and ventral margins brown, central area mostly gray, sometimes with bases of setulae brown; male forefemur concave ventrally near apex; tergites predominately dark brown with a slender gray band on posterior margin; presurstylus with long, slender setae [Figure 122], lateral aedeagal process very large [Figure 124], postsurstylus slender in lateral view, lacking a developed medial posterior process [Figure 123]
- *P. sera* Cresson
- Face with 3 brown spots, 1 large rectangular spot on carina, as long as length of antenna, and 2 rectangular transverse spots between larger facial setae; gena with a small golden-brown spot on anterior margin [Figure 175]; anepisternum with ventral and dorsal margins and central area mostly brown, remainder mostly gray; male forefemur not concave ventrally; gray band of tergites occupying about half of tergite length; presurstylus with short setae [Figure 62], lateral aedeagal process normally developed [Figure 64], postsurstylus widened medially in lateral view, medial posterior process developed [Figure 63] *Paralimna (Paralimna) maculata*, sp. nov.
- 14. Pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites brown)15
- Pleural area unicolor, ventral and dorsal pleurites unicolorous, mostly gray, anepisternum frequently spotted and sometimes ventral half of anepimeron tinged.....16
- 15. Wing lacking stump veins on vein M; male forefemur with anteroventral, comb-like row of flattened setae
- *P. fellerae* Mathis
- Wing with one to several perpendicular infuscate short stump veins on second section of vein M, sometimes reduced, rarely absent [Figure 206]; male forefemur lacking flattened setae..... *P. punctipennis* (Wiedemann)
- 16. Face, anepisternum, and katepisternum predominantly brown
- Face, anepisternum, and katepisternum predominantly gray, dark gray, silvery, or yellowish gray
- 17
- 18
- 17. Face uniformly dark brown, only antennal groove yellowish gray [Figure 165]; brown spots of the body faded; posteroventral surface of male forefemur bearing rows of longer, with variable length, setae [Figure 210]; lateroventral margin

- of tergites 2–5 brown; basoventral process of presurstylus developed, rounded ventrally [Figure 14] *P. brunneiceps* Cresson
- Face brown to dark brown with an inverted U shape, yellowish-gray band on middle [Figure 195]; brown spots of the body well distinct; forefemur of male without outstanding setae; lateroventral margin of all tergites widely brown; basoventral process of presurstylus not developed, horizontal process not bifurcate [Figure 130] *Paralimna (Paralimna) stigmata*, sp. nov.
18. Antenna black velvety with a whitish dorsal spot on pedicel; ventral fronto-orbit with a large, rounded, dark purple spot lateral to antennal bases; anterior margin of the frons shiny gray mediolaterally, and 1 central, small shiny gray spot extended until near anterior ocellus; face yellowish or silvery gray, antennal groove golden or gray, carina with a shiny silvery or gray spot between antennal insertion followed by a golden spot below and 2 small, rounded, diffuse golden stains between larger facial setae [Figure 197]; forefemur of male without outstanding setae *Paralimna (Paralimna) velutina*, sp. nov.
- With other character set. 19
19. Coloration of body washed out, particularly the abdomen, whose bands do not have well-defined contours; face with 1 short, slender pale brown spot on carina, lacking spots on distal half [Figure 183]; scutum yellowish brown; posteroventral setae of male forefemur numerous, forming more than 1 series of unaligned, elongate, and strong setae; ventral surface of foretibia with rather ruffled short setae; aedeagal process short and robust [Figures 84–85]; presurstylus slender [Figure 82] *Paralimna (Paralimna) pallida*, sp. nov.
- Coloration of body distinct; face with spot on carina and usually on distal half; scutum mostly brown; posteroventral setae of male forefemur and ventral surface of foretibia variable; aedeagal process and presurstylus variable 20
20. Frons almost horizontal, rather protuberant on distal margin, above bases of antennae in lateral view; face long in anterior view, about twice height of frons 21
- Frons normal, convex and oblique; face shorter than twice height of frons 22
21. Ventral surface of male forefemur distinctly concave near apex, femur bluntly narrowed on distal $\frac{1}{3}$ in lateral view; face with 2 golden, parallel, large spots extended along the length of face and reaching ventral margin; pedicel dark brown with a whitish-gray spot dorsally [Figure 167]; presurstylus bifurcate, falciform, with basoventral process long, about $\frac{2}{3}$ of length of horizontal process, horizontal process slender [Figure 22] *Paralimna (Paralimna) crinita*, sp. nov.
- Ventral surface of male forefemur not concave near apex, femur gradually narrowed toward apex in lateral view; coloration of face and pedicel variable; surstylus variable 23
22. Face gray with an inconspicuous, short pale brown spot on carina; eye round, about as wide as high; pedicel lacking a silvery-white spot dorsally; mesopleuron and legs densely silvery gray; scutum, scutellum, and anepisternum with brown dot at bases of setae; wing hyaline *P. taurus* Cresson
- Face yellowish gray to golden brown in the most part, silvery gray on central portion and distal margin, with 2 longitudinal, parallel golden-brown spots in middle [Figure 187]; eye rather rectangular, wider than high in lateral view; pedicel with a silvery-white spot dorsally; mesopleuron with a wide golden-brown stripe extended from prostigma to anepimeron, only ventral and dorsal margins of anepisternum paler, anepimeron wholly brown; wing slightly brown, transverse veins with infuscate halo [Figure 205] *P. pleurivittata* Cresson
23. Face dark gray with dark brown spots, 1 widened distally on carina, and 2 elongate and parallel on distal half of face [Figure 168]; wing brownish; abdomen mostly brown with reduced yellow half-moon-shaped bands on lateral of tergites 2–4, lateroventral margins of tergites brown; anepisternum brown with a distinct wide, gray, longitudinal stripe on middle; legs blackish brown, anteroventral and posteroventral setae of male forefemur very small and sparse, inconspicuous; aedeagal process very short, about $\frac{1}{4}$ length of the aedeagus [Figure 28] *Paralimna (Paralimna) curta*, sp. nov.
- Coloration of face variable; wing hyaline or semi-hyaline, yellow bands of abdomen normally developed; lateroventral margins of tergites and anepisternum variable; legs usually brown, anteroventral series of male forefemur slightly flattened or only blunted apex, posteroventral series variable; aedeagal process at least half of the aedeagus length 24
24. Posteroventral setae of male forefemur rather disordered, organized in more than 1 series, only 1 series complete, extended until the apex of femur, setae numerous and short 25
- Posteroventral setae of male forefemur organized in 1 series extended until the apex of femur, series continuous or interrupted for a short distance before apex or more sparse on distal half, setae long or short, numerous or sparse 28
25. Face gray or yellowish gray with brown spots: 1 elongate spot on carina and usually 2 spots of variable shapes on ventral half of face [Figure 192]; rarely ventral spots are absent; anepisternum with dorsal and ventral margins brown and with dotted aspect in the middle by small brown spots on insertion of setae; anepimeron usually without spots, wholly gray, and lateroventral margins of tergites usually gray; presurstylus broad, lacking basoventral process, cercus fused at the apex of dorsal margin of presurstylus [Figure 118]; lateral aedeagal process long and slender [Figure 120] *P. secunda* Schiner

- Coloration of face, anepisternum, anepimeron, and lateroventral margins of tergites variable; presurstylus not as above, basoventral process present or absent; lateral aedeagal process variable 26
- 26. Face dark gray with an elongate golden spot on carina, usually without spots on ventral half but, if present, the spots are very small and inconspicuous; pedicel with dorsal marginal spot whitish gray [Figure 164]; scutum with 2 dorsal stripes; lateral aedeagal process short and broad, shorter than half the length of aedeagus [Figures 12–13]; presurstylus not bifurcate, horizontal process slightly concave ventrally and with dorsal margin rather wavy [Figure 10] *Paralimna (Paralimna) aurantia*, sp. nov.
- Face, antenna, and scutum variable; lateral aedeagal process long and slender, reaching half the length of aedeagus; basoventral process of presurstylus variable, dorsal margin of presurstylus not wavy 27
- 27. Face with coloration variable, mostly dark gray with dark brown area adjacent to or through lateral facial setae or dark to pale gray with a golden spot on carina and 2 triangular or rather rounded spots on ventral half of face [Figures 177, 178]; pleurae gray with dark gray or yellowish gray microtomentum; anepisternum with dorsal and ventral margin widely or narrowly brown; basoventral process of presurstylus developed, setose [Figure 70]; medial anterior lobe of postsurstylus small and digitiform [Figure 71] *P. meridionalis* Cresson
- Face gray to dark gray with 3 brown spots, 1 rectangular on carina and 2 small rather triangular spots between larger facial setae [Figure 169]; pleurae dense and homogenously gray, only anepisternum with 1 brown spot on dorsal margin and ventral margin slightly brown tinged, stains of bases of setae brown in middle; basoventral process of presurstylus not developed, horizontal process slender [Figure 30]; medial anterior lobe of postsurstylus large and triangular [Figure 31]. *Paralimna (Paralimna) ecuadorensis*, sp. nov.
- 28. Posteroventral series of male forefemur with setae short, numerous, and proximate to each other; presurstylus with basoventral process developed or not developed 29
- Posteroventral series of male forefemur with setae sparse, elongate, and widely separated from each other; basoventral process of presurstylus not developed 32
- 29. Basoventral process of presurstylus not developed, presurstylus with horizontal process wide basally and gradually narrowed toward the apex [Figure 114]; face silvery gray with 1 golden-brown, elongate, drop-shaped spot on carina as apex of antenna, and sometimes 2 small, inconspicuous, rectangular, slender, and horizontal pale brown spots between larger facial setae are present [Figure 191]; male forefemur with posteroventral row of setae shortened near apex of femur, more concentrated on basal half *P. sana* Cresson
- Basoventral process of presurstylus developed [e.g., Figures 2, 18, 66]; face silvery to yellowish gray with large spots, 1 on carina, not drop shaped, and 2 between larger facial setae; male forefemur with posteroventral row of setae the same length and equally distributed along the posteroventral surface 30
- 30. Ventral surface of male forefemur concave on distal half; posteroventral series short and slightly longer at base of femur, inserted only on basal half of femur; face silvery gray with distinct brown spots, 1 over carina, black for a short distance between bases of antennae and brown in the remaining, slightly longer than the antennal length and twice the width of the distance between bases of antennae, and 2 large triangular spots extended almost until the ventral margin of face, and lateral of face with a brown band [Figure 176]; abdomen mostly brown, brown bands more developed, extended dorsally, tergite 2 with basal brown band extended until posterior margin in middle of each side *Paralimna (Paralimna) malleata*, sp. nov.
- Ventral surface of male forefemur not concave on distal half; posteroventral series extended by over the whole length of the femur; face gray or vaguely yellowish in the background, with variable spots; tergite 2 with basal brown band normally developed, not extended to distal margin 31
- 31. Face predominantly brown due to the big brown spots, gray only on laterodistal margin and on small V-like mark in middle [Figure 166]; wing hyaline or brownish tinged with infuscate halo on crossveins r-m and dm-cu [Figure 198]; anteroventral setae of male forefemur curved, moderately long-pointed setae, not flattened; posteroventral surface with dense, somewhat irregular row of rather short setae along most of length of femur; anteroventral margins of tergites brown; basoventral process of presurstylus rather triangular [Figure 18] *Paralimna (Paralimna) castanea*, sp. nov.
- Face predominantly yellowish gray [Figure 162]; wing hyaline without infuscate halo on crossveins r-m and dm-cu; anteroventral setae of male forefemur moderately elongate, only the more distal setae flattened; posteroventral setae elongate, conspicuous, as long as width of femur; lateroventral margins of tergites gray; basoventral process of presurstylus slender, hook-like [Figure 2] *Paralimna (Paralimna) adunca*, sp. nov.
- 32. Pedicel with a distinct silvery-white spot dorsally; face yellowish to golden gray with golden-brown lateral margins and 3 large golden-brown spots, 1 on carina and 2 longitudinal, parallel, rectangular spots on ventral half [Figure 189]; anepisternum with 3 brown, well-delimited spots, 1 dorsal, 1 ventral, and 1 rounded spot on central portion, the latter

- sometimes inconspicuous; katepisternum mostly yellowish gray with a large triangular brown spot anteriorly; legs brown to dark brown *P. puncticornis* Cresson
- Pedicel without a silvery-white spot dorsally, only distal margin of pedicel paler; face gray or yellowish gray, when present the spots of the ventral half are small and triangular, if the spots of the ventral half are large, the ventral half of face is dark gray; coloration of anepisternum variable; katepisternum without large spot; legs gray 33
33. Face variable, dark gray with 1 golden, elongate spot on carina, 2 large, golden-brown spots between larger facial setae and lateral margins of face golden tinged, or wholly golden tinged without distinct spots or yellowish gray with golden-brown spots, 1 on carina and 2 short inconspicuous spots on ventral half [Figures 179, 180]; ventrolateral margins of tergites of male usually brown; wing slightly brownish, crossvein r_m slightly infuscate; presurstylus slender and elongate, also sinuous [Figure 74] *Paralimna (Paralimna) molossus* Schiner
- Face dark gray with 3 golden spots, 1 elongate spot on carina and 2 parallel, elongate, rectangular spots below, in middle of face [Figure 184]; ventrolateral margins of tergites of male gray; wing hyaline, crossvein r_m not infuscate; presurstylus slender, with horizontal process abruptly narrowed in distal half [Figure 86] *Paralimna (Paralimna) pauca*, sp. nov.

1. *Paralimna (Paralimna) adunca*, sp. nov.

FIGURES 2–5, 162, MAP 1

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face yellowish gray with 3 pale golden-brown spots—a single, long, widened distally spot on carina, a little longer than the length of antenna, and 2 small, rounded spots between larger facial setae; forefemur of male with anteroventral series of moderately long setae, not flattened, with rounded apex, shorter than width of femur, posteroventral surface with 1 series of long, sparse, and conspicuous setae, as long as width of femur; basoventral process of presurstylus long, falciform, about $\frac{2}{3}$ of length of horizontal process.

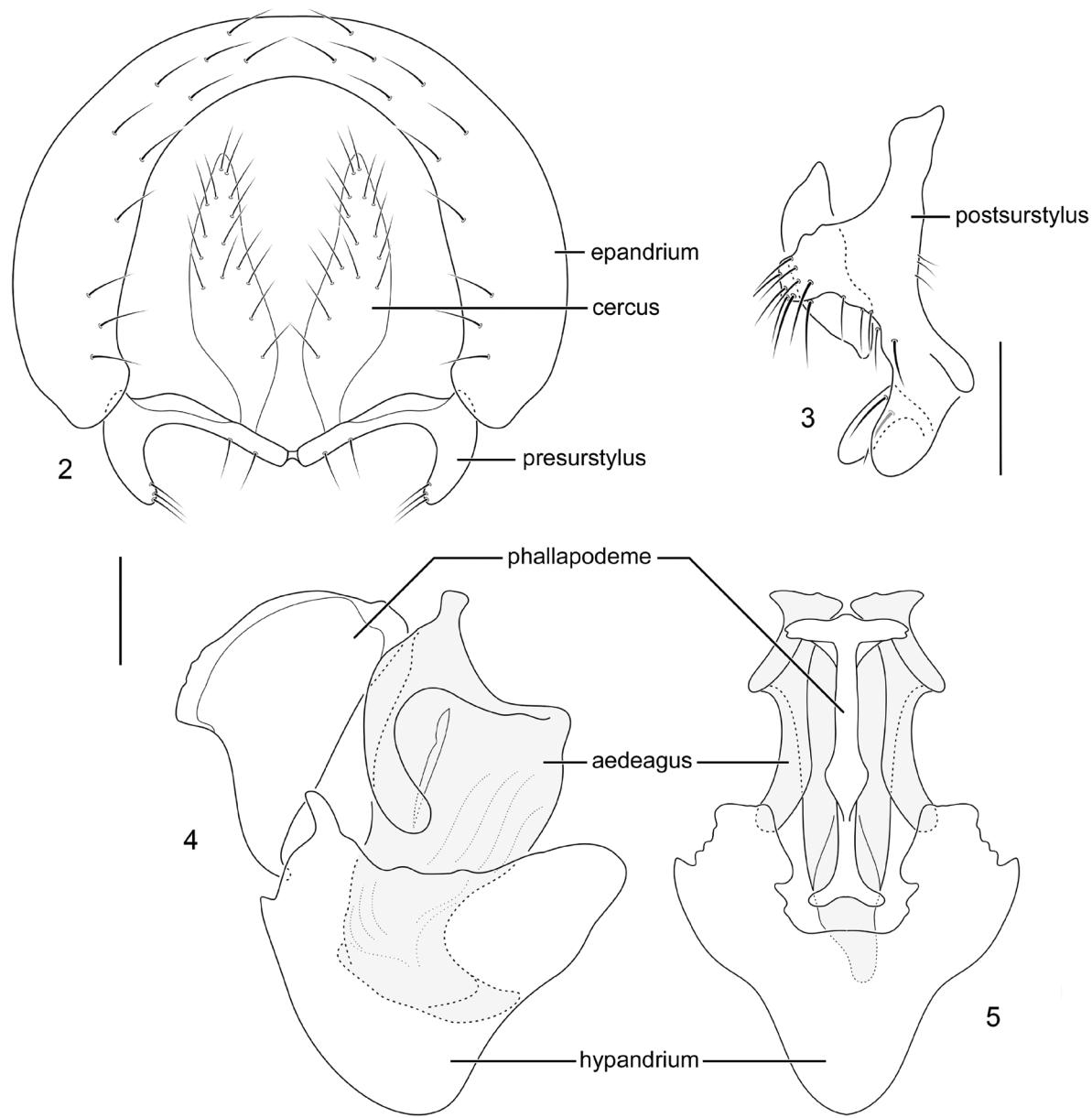
DESCRIPTION. Body length 4.0–5.5 mm; body generally bicolored, dark brown dorsally, lateral surfaces gray, sometimes yellowish gray.

Head: (See Figure 162) Frons brown with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, short, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 small, inconspicuous brown spots lateral to antenna, separated by yellow spot. Antenna pale brown, covered by dense yellow microtomentum; basal flagellomere with slender, elongate, pale setae on dorsal margin; arista with 11 long, dorsal rays. Postcranium with 2 complete series of postocular setae, the second series irregular. Face yellowish gray with 3 pale golden-brown spots—a single, long, widened distally spot on carina, a little longer than the length of antenna, and 2 small, rounded spots between larger facial setae; parafacial and gena yellowish gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye round, about as wide as high, height about twice the height of gena. Gena high, height longer than length of basal flagellomere; gena-to-eye ratio 0.36–0.42.

Thorax: Mesonotum yellowish gray with dark brown spots, 2 stripes between dorsocentral rows, 1 short stripe on supra-alar area plus some small lateral spots; insertion of setae brown, giving a spotted aspect to scutum; postpronotum, notopleuron, and supra-alar areas yellowish gray; scutellum mostly yellowish gray with base brown, apex blackish brown, and dorsal surface spotted at insertion of setae brown. Pleurae yellowish gray, anepisternum with spotted aspect given by brown bases of setae. Wing hyaline; veins pale brown; costal-vein ratio 0.39–0.43; M-vein ratio 0.87–0.90. Legs blackish brown with dense silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally, last 3 segments darkened dorsally; forefemur of male with anteroventral series of moderately long setae, not flattened, with rounded apex, shorter than width of femur, posteroventral surface with 1 series of long, sparse, and conspicuous setae, as long as width of femur; foretibia of male straight.

Abdomen: Tergites distinctly bicolored, dark brown along anterior $\frac{2}{3}$ and medially, otherwise gray. Male terminalia: (Figures 2–5) Presurstylus bifurcate, bearing basoventral process long, falciform, about $\frac{2}{3}$ of length of horizontal process, horizontal process slender; in lateral view postsurstylus widest medially, medial anterior lobe developed bearing moderately elongate and robust setae, medial posterior process slender, digitiform; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, rather slender, conspicuously arcuate in lateral view; aedeagus slender in dorsal view, progressively narrowed apically, robust in lateral view with apex bent backwards; phallapodeme triangular in lateral view; hypandrium moderately deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna adunca* is labeled “MEXICO [Morelos: Puente de] Ixtla. 400–600m 23.ii.1998 [23 Feb 1998] A. FREIDBERG/USNM ENT 00118261 [plastic bar code label]/HOLOTYPE ♂ *Paralimna adunca* Ale-Rocha & Mathis, USNM [red].” The holotype is double mounted (minuten pin in a block of plastic), is in excellent condition (abdomen not dissected), and is deposited in the USNM. Seven paratypes (3♂, 4♀; INPA, USNM) bear the

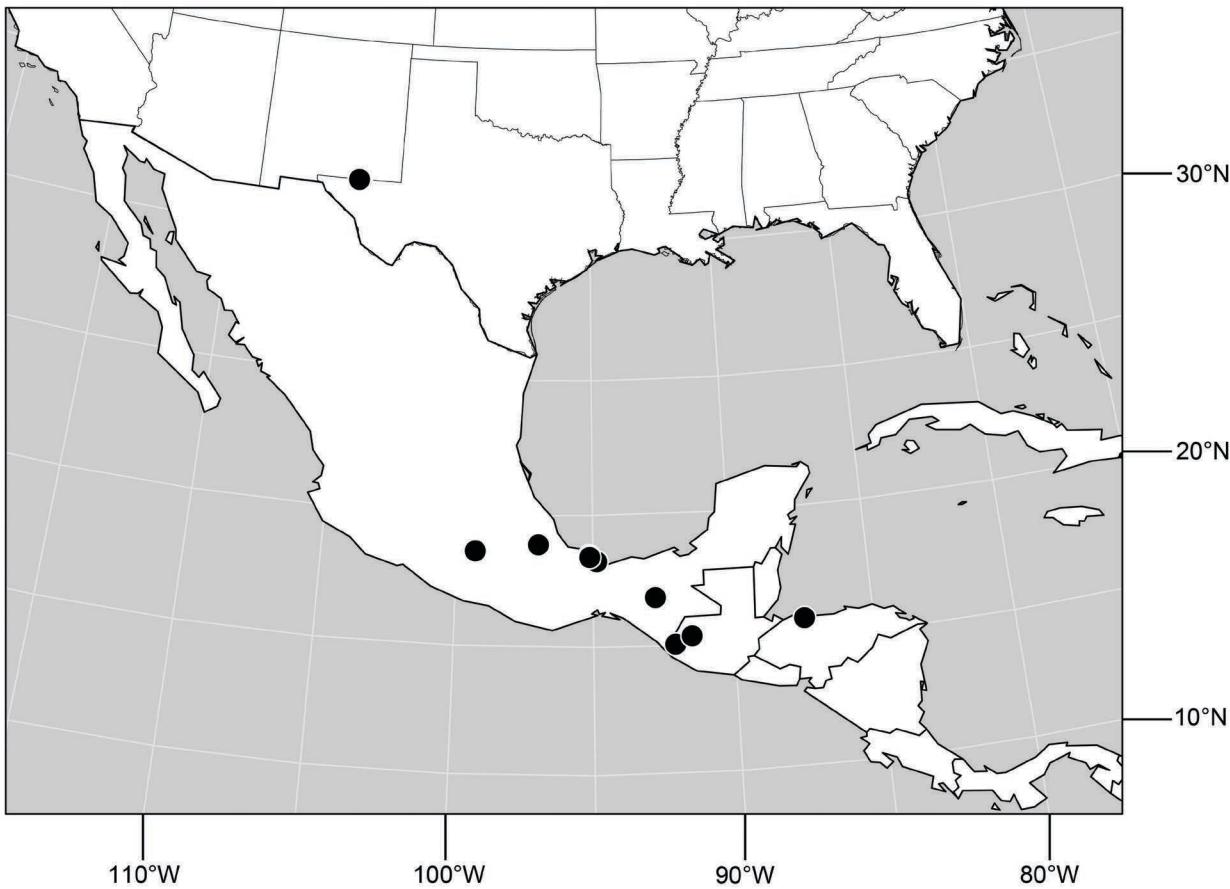


FIGURES 2–5. Structures of male terminalia of *Paralimna (Paralimna) adunca*, sp. nov. (Mexico. Morelos: Puente de Ixtla): (2) epandrium, cerci, and presurstyli, posterior aspect; (3) postsurstylus, lateral aspect; (4) aedeagus, phallapodeme, and hypandrium, lateral aspect; (5) same, ventral aspect. Scale bar = 0.1 mm.

same label data as the holotype. Other paratypes are as follows: MEXICO. Chiapas: Corralito (7 km W Abasolo; 16°51'N, 92°45.2'W), 21 May 1981, C. M. and O. S. Flint (6♀, 4♂; INPA, USNM); Union Juárez (9 km S; 15°02.2'N, 92°05.4'W), 23 Apr 1983, W. N. Mathis (1♀; USNM). Veracruz-Llave: Ocotal Chico (18°15.6'N, 94°51.5'W; 600 m), 4–5 May 1985, W. N. Mathis (2♂, 4♀; USNM); Fortin de las Flores (18°54'N,

97°W; 952 m), 2 May 1985, W. N. Mathis (2♂, 2♀; USNM); Estación biología Los Tuxlas (~15 km N Catemaco; 18°28.8'N, 95°07.7'W), 15–17 Sep 1987, A. L. Norrbom (2♂; INPA, USNM).

OTHER SPECIMENS EXAMINED. Nearctic: UNITED STATES. Texas. Culberson: Guadalupe National Park, McKittrick Canyon (31°58.7'N, 104°45.3'W), 7 Aug 1976 (2♂; USNM);



MAP 1. Distribution map for *Paralimna (Paralimna) adunca*, sp. nov.

Guadalupe National Park, West Dog Canyon ($31^{\circ}59.8'N$, $104^{\circ}49.9'W$), 4 Aug 1975 (1♂; USNM).

Neotropical: GUATEMALA. *Huehuetanango*: Ruins at Zaculeu ($15^{\circ}20'N$, $91^{\circ}29.6'W$), 18 Aug 1972, G. F. and S. Hevel (1♂; USNM).

HONDURAS. *Atlantida*: Lancertilla, Atlantida ($15^{\circ}44.1'N$, $87^{\circ}27.4'W$; 75–110 ft [~ 23 – 34 m]), 7 Sep 1930 (2♂; ANSP).

MEXICO. *Veracruz-Llave*: Lake Catemaco ($18^{\circ}25.3'N$, $95^{\circ}06.8'W$), 1 May 1969, H. J. Teskey (4♂, 1♀; CNC).

TYPE LOCALITY. Nearctic. Mexico. Morelos: Puente de Ixtla ($18^{\circ}37'N$, $99^{\circ}19.4'W$; 400–600 m).

DISTRIBUTION. (Map 1) *Nearctic*: Mexico (Morelos), United States (Texas). *Neotropical*: Guatemala (Huehuetanango), Honduras (Atlantida), Mexico (Chiapas, Veracruz-Llave).

ETYMOLOGY. The species epithet, *adunca*, is of Latin derivation and means bent inward or hooked, alluding to the shape of the basoventral process of the postsurstylius.

REMARKS. Structures of the male terminalia of this species are very similar to those of *P. crinita* sp. nov., especially

the shape of the falciform basoventral process of the presurstylius, the hypandrium, and the aedeagus; however, the lateral aedeagal process is slender in *P. adunca* sp. nov. while in *P. crinita* sp. nov. it is wide and elongate, and the medial posterior process is digitiform in *P. adunca* sp. nov. whereas in *P. crinita* sp. nov. this structure is rather truncate. These species can be distinguished further by several other characters: in *P. crinita* sp. nov. the facial coloration has 2 parallel, golden-brown, wide spots extended along the length of face; the frons, being almost horizontal, is slightly projected over the antennal bases; the ventral surface of the male forefemur is distinctly concave on the distal $\frac{1}{3}$ with several series of numerous, moderately long setae; and the foretibia of males is densely pilose on the ventral surface. In *P. adunca* sp. nov., the face has a pale golden-brown, long, distally widened spot on the carina, and there are 2 small, rounded spots between the larger facial setae; the frons is normally convex; the ventral surface of the male forefemur is not concave ventrally and has 1 series of sparse long setae; and the foretibia of males is not densely pilose along the ventral surface.

2. *Paralimna* (*Paralimna*) *argyrostoma* Cresson

FIGURES 6–9, 163, MAP 2

Paralimna argyrostoma Cresson 1916:120 [Costa Rica. Limón: Río Banano (9°50.5'N, 82°56'W); HT ♂, ANSP (6094)]; 1918:47 [review; Costa Rica]. *Paralimna* (*Paralimna*) *argyrostoma*.—Cresson 1947:53 [review; Neotropical species].—Wirth 1968:14 [Neotropical catalog]. *Paralimna* (*Paralimna*) *argyrostoma* [sic].—Mathis and Zatwarnicki 1995:118 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: frons, scutum, and scutellum with orange-yellow coloration; face whitish gray, with a single wide, golden, irregular triangular spot on the carina, ventral fronto-orbits with a large grayish-brown velvety spot that extends above base and lateral to antenna; pedicel with a silvery-white dorsal spot near apex; pleurae wholly silvery gray, lacking spots; forefemur of male bearing anteroventral row of very short, slightly curved, with blunt tip, slightly flattened setae, posteroventral setae very short; wing semi-hyaline, crossvein dm–cu with infuscate halo.

DESCRIPTION. Body length 2.65–2.80 mm; body generally bicolored, golden brown dorsally, lateral surfaces silvery gray.

Head: (See Figure 163) Frons predominantly orange yellow with anterior margin grayish brown; linear silvery spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching anterior margin of frons, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a large grayish-brown spot that extends above base and lateral to antenna, and dorsal parafacial with a brown spot lateral to antenna, separated by silvery-gray spot. Antennal scape and pedicel brown with some purple shiny and sparse gray microtomentum, a silvery-white dorsal spot near apex of pedicel; basal flagellomere pale brown to brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 10–12 long, dorsal rays. Postcranium with 2 irregular series of postocular setae. Face densely silvery to slightly yellowish gray, with a single wide, golden, irregular triangular spot on the carina; parafacial and gena silvery gray, but golden spots can occur; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye rounded, about as wide as high. Gena high, height about equal to length of basal flagellomere; gena-to-eye ratio 0.38.

Thorax: Mesonotum mostly golden brown with silvery-gray areas, usually along setal tracks, 3 well-defined golden-brown stripes between dorsocentral rows, becoming more silvery gray laterally through postpronotum, notopleuron, and supra-alar areas; scutellum golden dorsally, with apex

blackish brown and yellowish gray laterally. Mesopleuron wholly densely silvery gray, without spots. Wing semi-hyaline; veins yellowish brown; crossvein dm–cu with infuscate halo; costal-vein ratio 0.50; M-vein ratio 0.88. Legs: Femora and tibiae brown with knees and apex of tibiae yellow, sparse silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally, the more distal darkened; forefemur of male bearing anteroventral row of short, slightly curved, with blunt tip, none conspicuously flattened setae, ventral series short and thin; foretibia straight.

Abdomen: Tergites distinctly bicolored; tergite 1 golden brown in the most part and silvery gray laterally, tergites 2–5 golden brown along anterior $\frac{2}{3}$ and medially, otherwise silvery gray. Male terminalia: (Figures 6–9) Presurstylus not bifurcate, with horizontal process almost straight, slightly widened basally; postsurstylus in lateral view widest medially with a medial anteriorly pointed lobe bearing long and slender setae, and a medial small digitiform process posteriorly; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, slightly curved subapically, bluntly rounded; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view; hypandrium shallowly concave.

TYPE MATERIAL. The holotype male of *Paralimna argyrostoma* is labeled “Banana River [Río Banano] 9 XI '09[9 Nov 1909] C[osta]R[ica]. Limón:] P P Calvert/Sweeping up- per [sic] reservoir 100 ft. [30.5 m] alt./♂/TYPE Paralimna argyrostoma [sic] E.T.Cresson,Jr. [maroon; “*Paralimna argyrostoma*” handwritten]” (ANSP No. 6094). The holotype is double mounted (minuten pin in a vertical card), is in excellent condition (abdomen not dissected), and is deposited in the ANSP (6094).

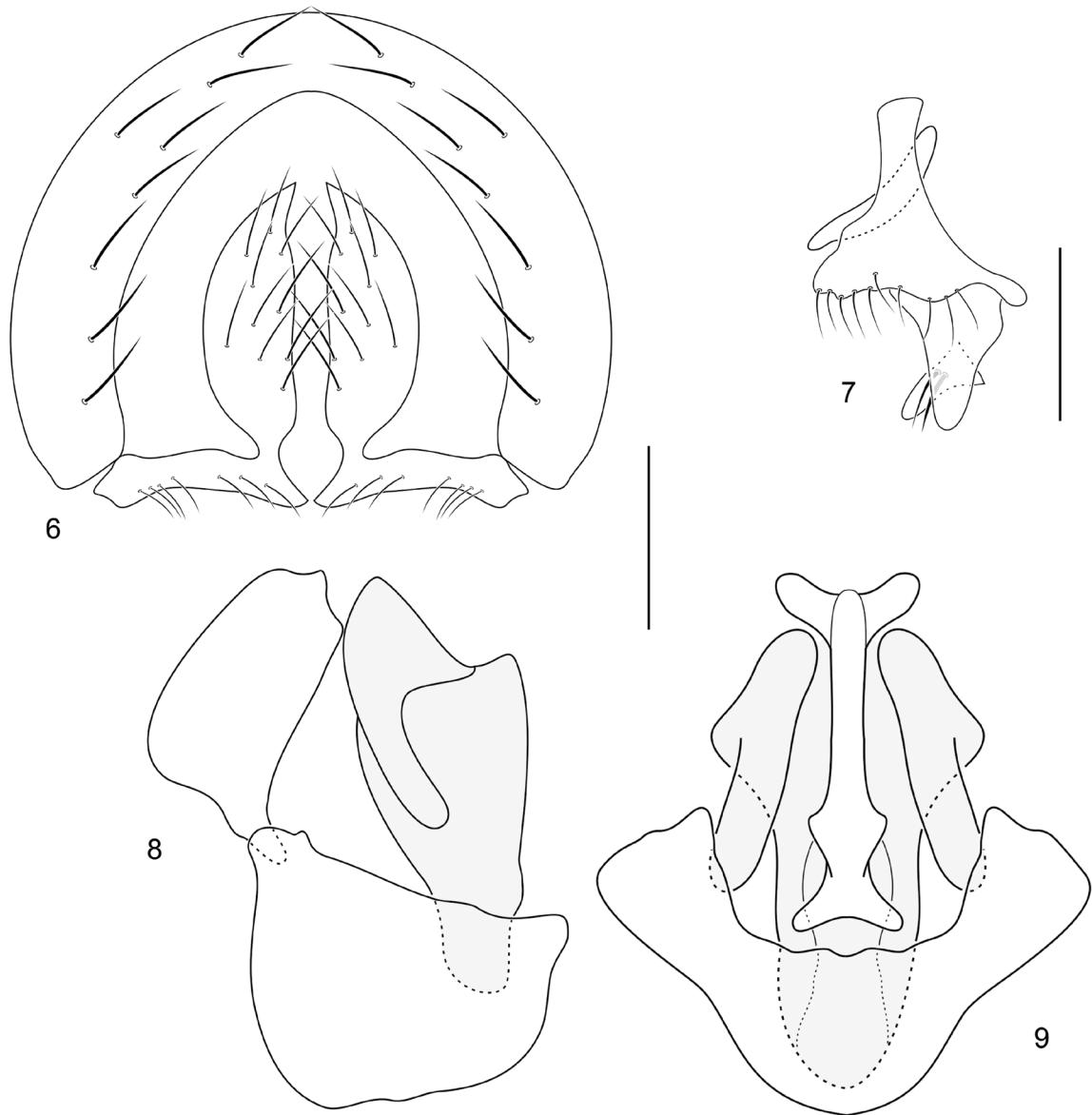
OTHER SPECIMENS EXAMINED. COSTA RICA. **Limón:** Río Banano (9°50.5'N, 82°56'W), 9 Nov 1909, P. P. Calvert (paratypes: 4♂; 1♀ allotype; ANSP).

TYPE LOCALITY. Neotropical. Costa Rica. Limón: Río Banano (9°50.5'N, 82°56'W).

DISTRIBUTION. (Map 2) *Neotropical*: Costa Rica (Limón), Ecuador (Cresson 1947).

REMARKS. Cresson (1916) first cited this species on pages 106–107 with the spelling “*argyrostoma*.” Then on page 120, which is the description of this species, he used the spelling “*argyostoma*.” Subsequent authors, including Cresson, used “*argyrostoma*” as the spelling.

The number of dorsal aristal rays varies from 10–12, although Cresson (1916) wrote that their number is from 8–10. *Paralimna argyrostoma* is very similar to *P. flexineuris* in general body coloration, but in *P. argyrostoma*, the male forefemur is not concave ventrally; there is a silvery-white spot on the pedicel; the mesopleuron lacks spots; the setae on the anteroventral and posteroventral surfaces of the male forefemur are very short, almost inconspicuous; the presurstylus is wider; and the lateral aedeagal process is more slender than in *P. flexineuris*.



FIGURES 6–9. Structures of male terminalia of *Paralimna (Paralimna) argyrostoma* Cresson (Costa Rica. Limón); (6) epandrium, cerci, and presurstyli, posterior aspect; (7) postsurstylus, lateral aspect; (8) aedeagus, phallapodeme, and hypandrium, lateral aspect; (9) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

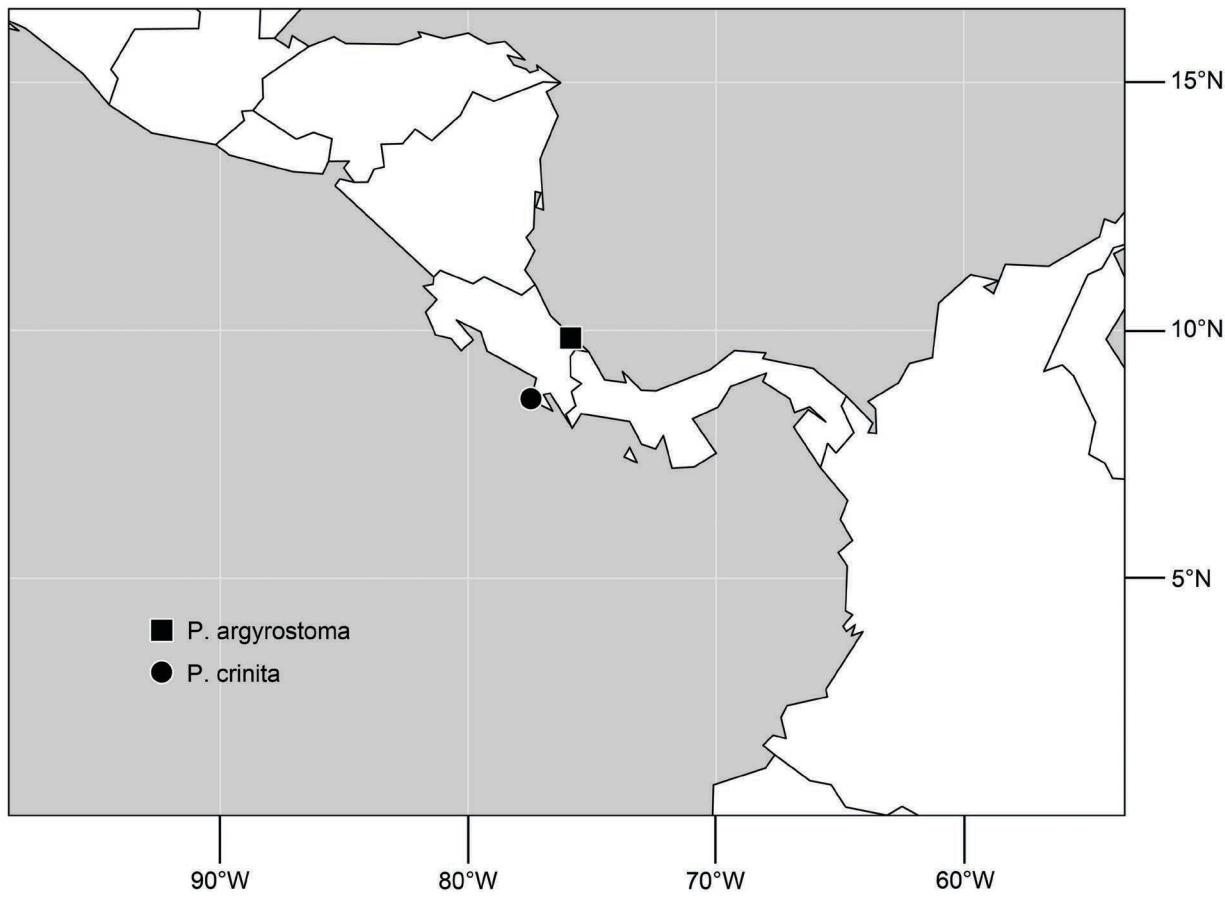
3. *Paralimna (Paralimna) aurantia*, sp. nov.

FIGURES 10–13, 164, MAP 3

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face gray to dark gray with lateral margins yellowish gray, with 3 golden spots, a single, elongate spot on carina, and 2 small, rounded, almost inconspicuous pale brown spots between larger facial setae; pedicel with silvery-gray spot dorsally;

2 brown, slender, widely separated stripes lateral to acrostichal line; insertion of setae brown, giving a spotted aspect to scutum; presurstyli not bifurcate, with horizontal process slightly concave ventrally; in lateral view postsurstylus bearing an elongate, pointed digitiform process posteriorly; lateral aedeagal process short, less than $\frac{1}{2}$ length of aedeagus, strongly swollen.

DESCRIPTION. Body length 2.4–3.8 mm; body generally bicolored, pale brown dorsally, lateral surfaces gray, sometimes dark gray.

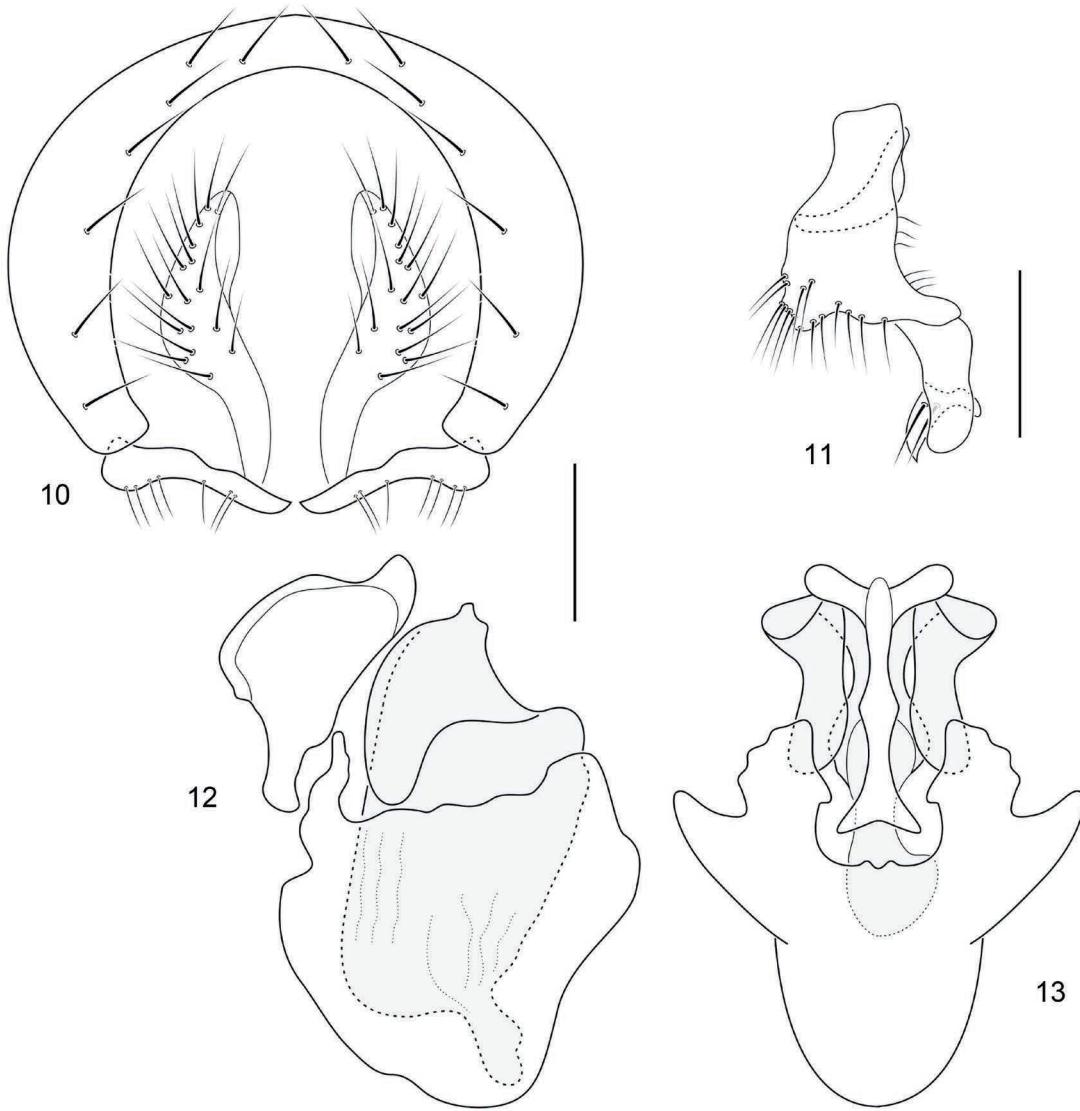


MAP 2. Distribution map for *Paralimna* (*Paralimna*) *argyrostoma* Cresson and *P.* (*Paralimna*) *crinita*, sp. nov.

Head: (See Figure 164) Frons pale brown with linear, yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a dark brown spot and dorsal parafacial with a dark gray spot lateral to antenna, separated by yellow spot. Antennal scape and pedicel blackish brown, pedicel with silvery-gray spot dorsally; basal flagellomere pale brown to brown according to incidence of light, with slender elongate pale setae on margin; arista with 11–12 long, dorsal rays. Postcranium with 1 complete series of postocular setae. Face gray to dark gray with lateral margins yellowish gray, with 3 golden spots, a single, elongate spot on carina, as long as the length of antenna, and 2 small, rounded, almost inconspicuous pale brown spots between larger facial setae; parafacial silvery gray and gena yellowish gray; gena with only few setae on middle and distal margin; clypeus silvery gray. Eye round, as wide as high, height about twice the height of gena. Gena high, height longer than length of basal flagellomere; gena-to-eye ratio 0.35–0.40.

Thorax: Mesonotum yellowish gray with brown spots, 2 brown, slender, widely separated stripes between dorsocentral rows ending before posterior dorsocentral seta, plus 1 short brown stripe on intra-alar area; insertion of setae brown, giving a spotted aspect to scutum; postpronotum, notopleuron, and supra-alar areas pale gray; scutellum brown basally, with apex blackish brown and yellowish gray laterally and in middle. Pleurae yellowish gray, sometimes darkened according to incidence of light, anepisternum brown tinged dorsally and ventrally, a small, rounded spot in middle, and bases of setae brown; anepimeron brown on anteroventral corner. Wing hyaline; veins brown; cross-vein dm–cu slightly infuscate; costal-vein ratio 0.43–0.50; M-vein ratio 1.15–1.21. Legs blackish brown with sparse silvery-gray microtomentum darker dorsally; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with anteroventral and ventral complete series of short robust but not flattened setae; foretibia straight.

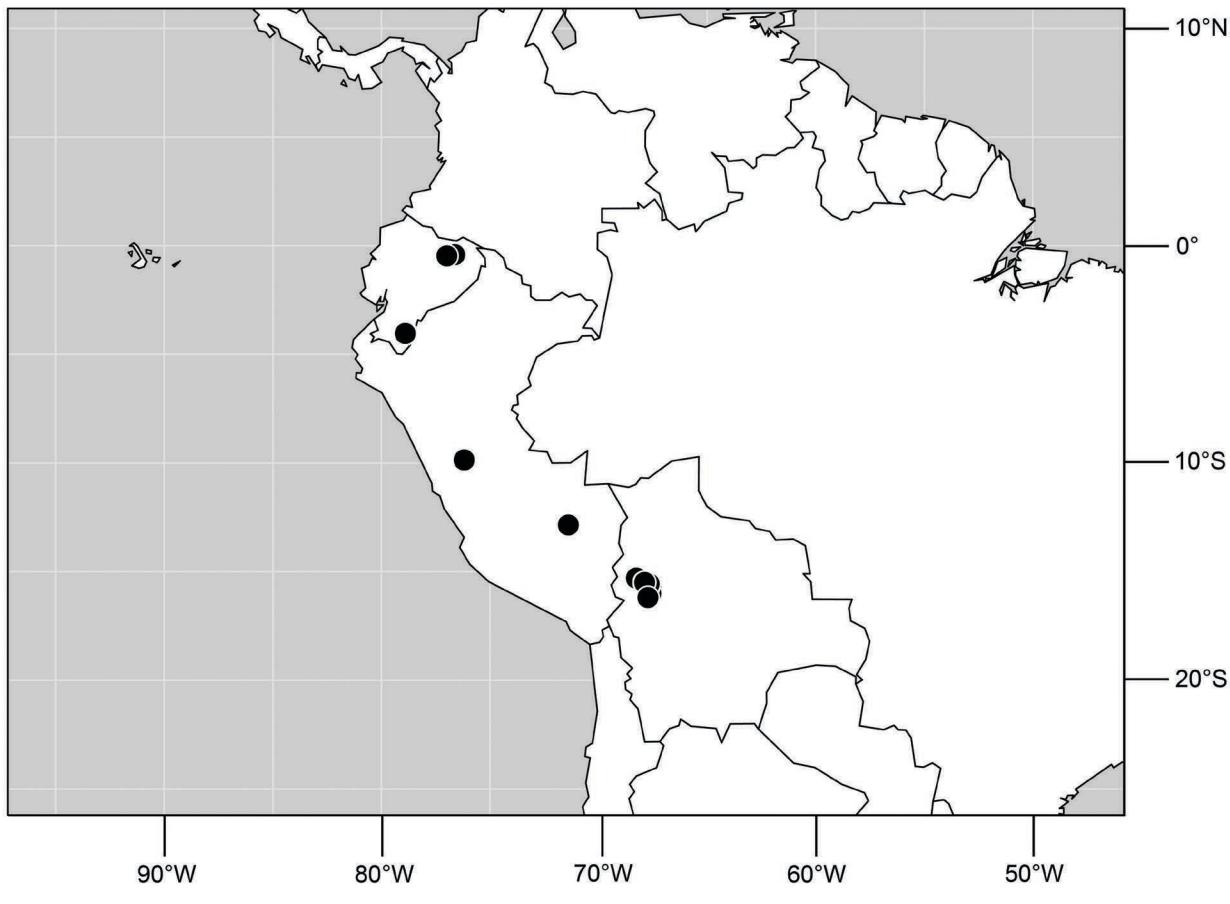
Abdomen: Tergites distinctly bicolored, dark brown along anterior ⅓ and medially, medial brown portion of tergite 2 very reduced, inconspicuous, otherwise yellowish gray dorsally



FIGURES 10–13. Structures of male terminalia of *Paralimna (Paralimna) aurantia*, sp. nov. (Bolivia. La Paz): (10) epandrium, cerci, and presurstyli, posterior aspect; (11) postsurstylus, lateral aspect; (12) aedeagus, phallapodeme, and hypandrium, lateral aspect; (13) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

and silvery gray laterally; lateroventral margins of tergites gray in males and brown in females. Male terminalia: (Figures 10–13) Presurstyli not bifurcate, with horizontal process long, slightly concave ventrally; in lateral view postsurstylus with medial anterior lobe poorly developed, bearing moderately elongate setae and an elongate pointed digitiform process posteriorly; lateral aedeagal process short, less than $\frac{1}{2}$ length of aedeagus, strongly swollen, rounded distally, and almost straight in lateral view; aedeagus slender in dorsal view, wider and blunt, constricted apically in lateral view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave, abruptly narrowed on distal half in dorsal view.

TYPE MATERIAL. The holotype male of *Paralimna aurantia* is labeled “BOLIVIA. La Paz: Guanay (22km SE; 15°17.8'S, 68°15.6'W, 540m), 17 Mar 2001[,] Wayne N. Mathis/USNM ENT 00118268 [plastic bar code label]/HOLOTYPE ♂ *Paralimna aurantia* Ale-Rocha & Mathis, USNM [red].” The holotype is double mounted, is in excellent condition, and is deposited in the USNM. Four paratypes (3♂, 1♀; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: BOLIVIA. La Paz: Guanay (1 km E; 15°29.8'S, 67°52.7'W; 580 m), 13 Mar 2001 (3♂, 5♀; USNM); Guanay (9 km NW; 15°29.5'S, 67°53.8'W; 850 m), 13 Mar 2001, W. N. Mathis (1♂; USNM);



MAP 3. Distribution map for *Paralimna (Paralimna) aurantia*, sp. nov.

Guanay (8 km E; 15°30.3'S, 67°50.8'W; 510 m), 13 Mar 2001, W. N. Mathis (2♂, 1♀; INPA, USNM); Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W. N. Mathis (8♂, 1♀; INPA, USNM); Caranavi (15°50.2'S, 67°33.4'W; 670 m), 12 Mar 2001, A. Freidberg (1♂; USNM); Mapiri (5 km W; 15°17.8'S, 68°15.6'W; 750 m), 16 Mar 2001 (1♂; USNM); San Pedro (3 km NE; 16°S, 67°35.3'W; 780 m), 12 Mar 2001, A. Freidberg (1♂; USNM); Tajuihui (15°40.8'S, 67°41.7'W; 590 m), 12 Mar 2001, S. D. Gaimari, W. N. Mathis (5♂, 2♀; USNM); N Yungas between Alcoche and Teoponte (38 km SW of Guanay; 15°33.6'S, 67°40.1'W), 12 Apr 2001, A. L. Norrbom (2♀; USNM).

ECUADOR. Napo: Limoncocha (00°24.7'S, 76°37.5'W), 15 Jun 1977, P. J. Spangler, D. R. Givens (1♂, 5♀; INPA, USNM).

PERU. Cuzco: Paucartambo, Atalaya (Río Alto Madre de Dios; 12°53.3'S, 71°21.6'W; 600 m), 4 Sep 1988, W. N. Mathis (1♂; USNM). **Huánuco:** Huánuco (10 km N on Rio Huallaga; 09°51'S, 76°09.1'W), 4 Feb 1984, W. N. Mathis (5♂; INPA, USNM). **Madre de Dios:** Río Manu, Erika (near Salvación; 12°50.7'S, 71°23.3'W; 550 m), 5–6 Sep 1988, W. N. Mathis (2♂; USNM).

OTHER SPECIMENS EXAMINED. **BOLIVIA. La Paz:** Coroico (16°11.6'S, 67°43.7'W; 1600 m), 6–7 Jan 1976, L. E. Peña (2♂; CNC); Guanay (9 km NW; 15°29.5'S, 67°53.8'W; 850 m), 13 Mar 2001, W. N. Mathis (1♂; USNM).

ECUADOR. Orellana: Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–13 Apr 1965, L. E. Peña (2♂, 4♀; CNC). **Zamora-Chinchipe:** Cumbaratza (03°59.5'S, 78°51.9'W; 700 m), 30–31 Mar 1965, L. E. Peña (1♀; CNC); Río Jumboé (04°04'S, 78°55.8'W; 1200 m), 1–2 Apr 1965, L. E. Peña (2♀; CNC); Timbara (04°01.9'S, 78°54.1'W; 1400 m), 4 Apr 1965, L. E. Peña (1♂, ♀; CNC).

PERU. Madre de Dios: Río Manu, Erika (near Salvación; 12°50.7'S, 71°23.3'W; 550 m), 5–6 Sep 1988, W. N. Mathis (1♂; USNM).

TYPE LOCALITY. Neotropical. Bolivia. La Paz: Guanay (22 km SE; 15°17.8'S, 68°15.6'W).

DISTRIBUTION. (Map 3) *Neotropical*: Bolivia (La Paz), Ecuador (Napo, Orellana, Zamora-Chinchipe), Peru (Cuzco, Huánuco, Madre de Dios).

ETYMOLOGY. The species epithet, *aurantia*, is of Latin derivation and means orange, alluding to the orange coloration on the facial carina.

REMARKS. Externally this species is similar to *P. thomae* but can be distinguished from it by the dark gray face, the spotted anepisternum, and the lack of flattened setae on the anteroventral surface of the male forefemur and foretibia, which are straight and without a ventral groove. Structures of the male terminalia also distinguish between these two species, mainly the lateral aedeagal process in *P. aurantia* sp. nov. is short and robust, the basoventral process of presurstylus is less well developed, and the hypandrium is deeper than in *P. thomae*.

4. *Paralimna (Paralimna) brunneiceps* Cresson

FIGURES 14–17, 165, 210, MAP 4

Paralimna brunneiceps Cresson 1916:120 [Costa Rica. Alajuela: Turrucares ($9^{\circ}57.6'N$, $84^{\circ}19.2'W$); HT ♂, ANSP (6093)]; 1918:47 [review; Costa Rica].

Paralimna (Paralimna) brunneiceps.—Cresson 1947:49 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarczki 1995:119 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: general coloration of body brown, faded; face uniformly dark brown with antennal groove gray; katepisternum and most of anepisternum brown; cross-vein dm–cu with infuscate halo; femora and tibiae mostly dark brown; forefemur of male bearing anteroventral row of acutely pointed, curved or straight setae, none conspicuously flattened; posteroventral margin of forefemur bearing rows of longer, of different lengths setae; lateral margin of tergites 2–5 brown.

DESCRIPTION. Body length 3.2–3.9 mm; body generally bicolored, dark brown dorsally, lateral surfaces with dorsal half silvery gray and ventral half brown, sometimes yellowish gray.

Head: (See Figure 165) Frons brown with linear, yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbital with a dark brown spot, the spot on dorsal parafacial inconspicuous. Antennal scape and pedicel dark brown, pedicel with pale microtomentum; basal flagellomere pale brown to brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 11–12 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face uniformly dark brown, only antennal groove gray; parafacial gray and gena yellowish gray to pale brown; gena with some setae on middle and ventral margin; clypeus gray to yellowish gray. Eye rounded, about as wide as high, height more than the height of gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.29–0.35.

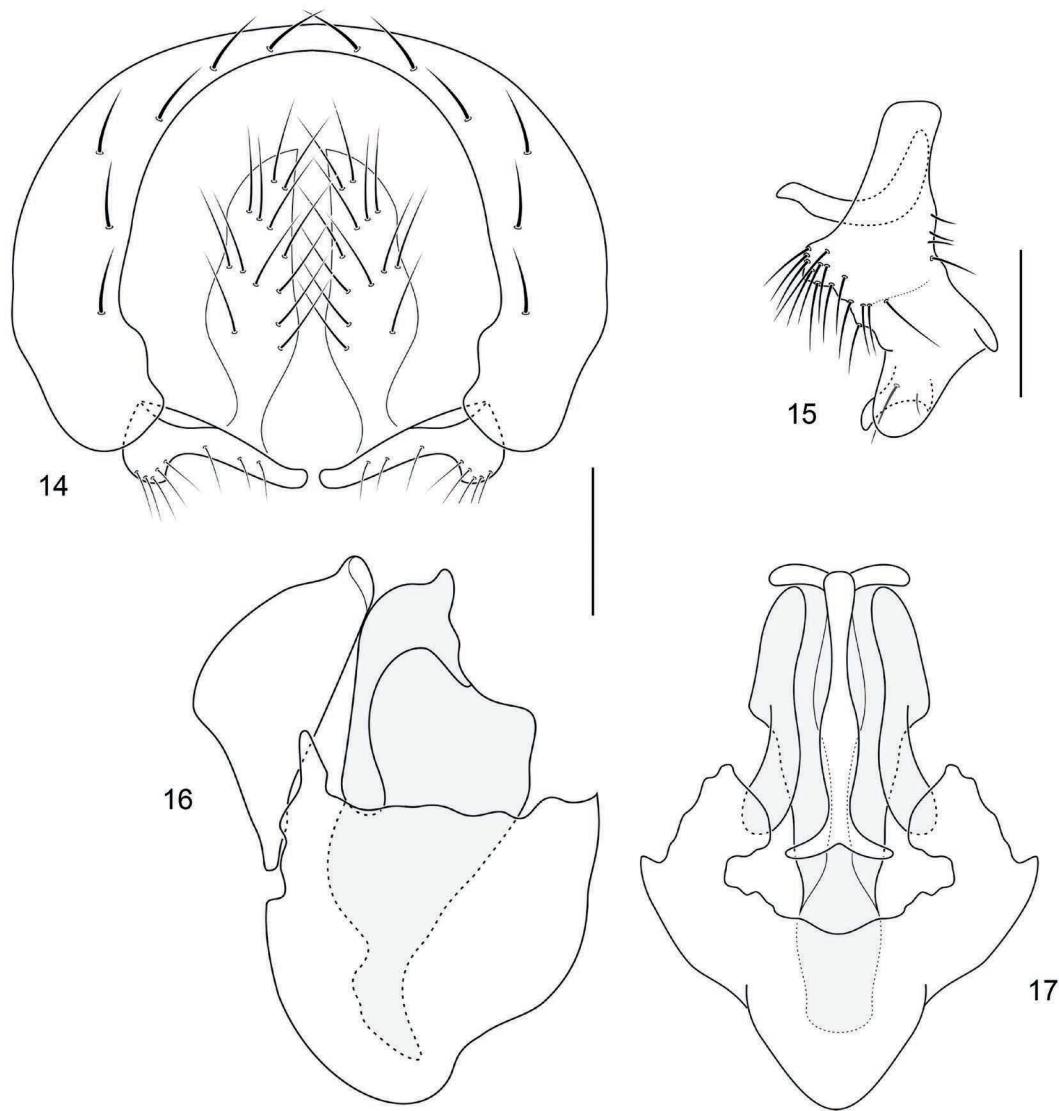
Thorax: Mesonotum mostly brown with yellowish-gray areas, usually along setal tracks, 3 well-defined brown stripes along acrostichal line, sometimes the stripes join together forming

a broad dorsal brown stripe, becoming more silvery gray laterally through postpronotum, notopleuron, and supra-alar areas; scutellum brown with apex blackish brown, silvery gray to yellowish gray laterally and on middle. Pleurae with proepisternum and laterotergite silvery gray, anepisternum brown with anterior and posterior margins silvery gray, anepimeron silvery gray on dorsal half and brown on ventral half, katepisternum brown. Wing semi-hyaline; veins brown, crossvein dm–cu with infuscate halo; costal-vein ratio 0.47–0.48; M-vein ratio 1.00–1.10. Legs blackish brown with sparse silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally and on tarsi 1–3; forefemur of male (see Figure 210) bearing anteroventral row of conspicuous pointed, slightly curved setae, none flattened; posteroventral margin of forefemur bearing 2 rows of denser, longer, of different lengths setae; foretibia straight.

Abdomen: Tergites distinctly bicolored, tergite 1 brown in the most part and silvery gray laterally; tergites 2–5 dark brown along anterior $\frac{1}{2}$ – $\frac{2}{3}$ dorsally, medially, and on lateroventral margin, otherwise silvery gray; female with lateroventral margin of the abdomen brown. Male terminalia: (Figures 14–17) Presurstylus with basoventral process somewhat developed, length about $\frac{1}{3}$ of horizontal process length, horizontal process shallowly curved; in lateral view postsurstylus widest medially with medial, anterior, weakly produced lobe bearing long and slender setae on external surface and a medial elongate digitiform process posteriorly; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, slightly curved subapically, bluntly rounded; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view; hypandrium somewhat deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna brunneiceps* is labeled “Turrucares[,] 22XII[19]09 C[osta] R[ica,] P P Calvert/Sweeping over mud/♂ /TYPE Paralimna BRUNNEICEPS E.T.Cresson,Jr. [maroon; “Paralimna BRUNNEICEPS” handwritten].” The holotype is double mounted (minuten pin in a vertical rectangular card), is in good condition (left basal flagellomere and 3 distal tarsomeres of left leg missing; abdomen not dissected), and is deposited in the ANSP (6093).

OTHER SPECIMENS EXAMINED. COSTA RICA. **Alajuela:** Alajuela ($10^{\circ}01'N$, $84^{\circ}13'W$; 945 m), 15 Sep 1909, P. P. Calvert (2♂, 1♀; ANSP); Turrucares ($09^{\circ}57.6'N$, $84^{\circ}19.2'W$), 22 Dec 1909, P. P. Calvert (paratype: 1♀; allotype: 1♀; ANSP); Turrucares, Río Siquiares ($09^{\circ}58'N$, $84^{\circ}17'W$), 19 Dec 1909, P. P. Calvert (1♂, 1♀; ANSP). **Guanacaste:** Santa Cruz (14 km S; $10^{\circ}10.4'N$, $85^{\circ}35.7'W$; 160 m), La Casona, 23 Jun 2001, W. N. Mathis (4♂, 1♀; USNM). **Puntarenas:** Manuel Antonio National Park ($09^{\circ}23.5'N$, $84^{\circ}08.7'W$; coastal rainforest), 23–28 Aug 1986, L. Masner (1♂; CNC). **San José:** San José ($09^{\circ}56'N$, $84^{\circ}05'W$), A. Alfaro (5♂, 3♀; ANSP); Ciudad Colón ($09^{\circ}55'N$, $84^{\circ}15'W$; 800 m; Malaise trap), Dec 1989, P. Hanson (1♀; USNM); Rio Virilla (near Colon; $09^{\circ}53.3'N$, $84^{\circ}16'W$), 26 Jun 2001, W. N. Mathis (4♂, 3♀; USNM); El Rodeo ($09^{\circ}54.6'N$, $84^{\circ}16.2'W$; 1880 m), 26 Jun 2001, W. N. Mathis (3♂, 1♀; USNM); Río Paraíso ($09^{\circ}33.8'N$, $84^{\circ}7.4'W$; 350–400 m), 15–17 Feb 2003, D. and W. N. Mathis (39♂, 6♀; USNM).



FIGURES 14–17. Structures of male terminalia of *Paralimna (Paralimna) brunneiceps* Cresson (Costa Rica. Alajuela): (14) epandrium, cerci, and presurstyli, posterior aspect; (15) postsurstylius, lateral aspect; (16) aedeagus, phallapodeme, and hypandrium, lateral aspect; (17) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

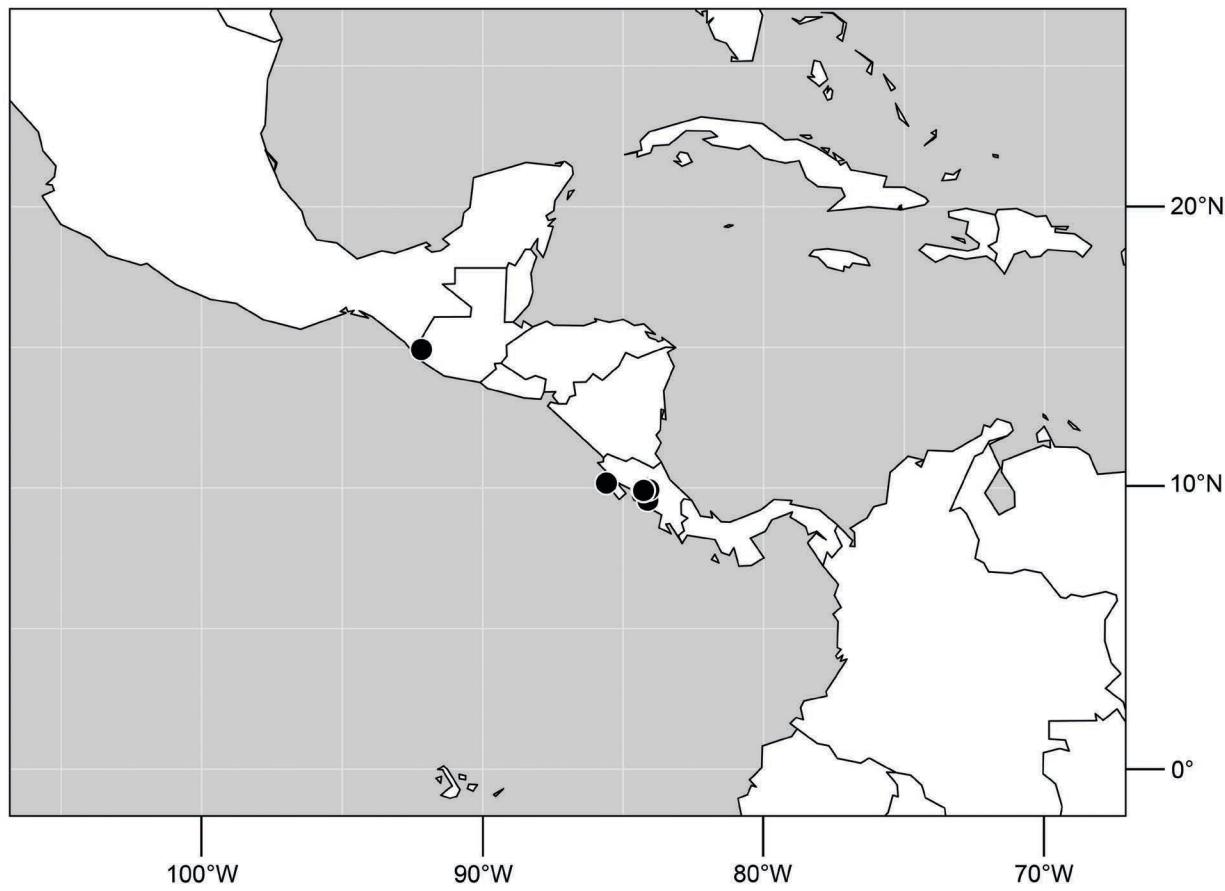
MEXICO. Chiapas: Río Izapa ($14^{\circ}55.4'N$, $92^{\circ}10.7'W$), 21 Apr 1983, W. N. Mathis (8♂, 4♀; USNM).

TYPE LOCALITY. Neotropical. Costa Rica. Alajuela: Turrúcares ($09^{\circ}57.6'N$, $84^{\circ}19.2'W$).

DISTRIBUTION. (Map 4) Neotropical: Costa Rica (Alajuela, Guanacaste, Puntarenas, San José), Mexico (Chiapas).

REMARKS. Cresson (1916, 1947) wrote that *P. brunneiceps* is probably merely a form of *P. meridionalis*. Indeed, our study shows that these two species have similar male terminalia. *Paralimna brunneiceps*, however, can be distinguished from *P. meridionalis* by the coloration of the mesopleuron and lateral

margins of the tergites, which are predominantly brown, and by males having the forefemur with a posteroventral row of flattened setae. In specimens of *P. meridionalis*, the mesopleuron and lateral margins of the tergites are predominantly gray, and the male forefemur lacks posteroventral flattened setae. *Paralimna brunneiceps*, *P. fellerae*, *P. meridionalis*, *P. nigropicta*, and *P. punctipennis* all have very similar structures of the male terminalia, mainly the presurstylius, which has a well-developed basoventral process that is rounded along its ventral margin. However, *P. brunneiceps*, *P. fellerae*, and *P. nigropicta* also have flattened setae along the male forefemur. These species can also be easily



MAP 4. Distribution map for *Paralimna (Paralimna) brunneiceps* Cresson.

distinguished by the uniformly dark brown face with antennal grooves that are gray, by the infuscate halo over crossvein dm-cu, and by the katepisternum and most of anepisternum being dark brown. In addition, the posteroventral margin of the forefemur bears rows of long setae in *P. brunneiceps*; the dorsal half of the mesopleuron is distinctly light colored, in contrast to being dark ventrally in *P. fellerae*; and in *P. nigropicta*, there is a dark brown to black velvety quadrangular spot between the antennal bases, the ventral fronto-orbits have a dark brown spot laterad to the antenna that form horizontal dark brown bands at the level of the antennal bases, and the male forefemur is distinctly concave on the distal half with a posteroventral row of setae present only on the basal half.

5. *Paralimna (Paralimna) castanea*, sp. nov.

FIGURES 18–21, 166, 198, MAP 5

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: body somewhat

bicolored, although more extensively brown, especially frons and mesonotum, but also much of pleural areas, only katepisternum and anepimeron mostly gray, sometimes silvery white, anepisternum mostly to almost entirely brown, only central area sometimes gray with brown at base of setulae; face mostly to entirely brown or grayish brown, gray only on laterodistal margin and on small V-like mark in middle; gena with a small, rounded pale brown spot in the center; wing brownish to hyaline; crossveins r-m and dm-cu with a distinctly infuscate halo; forefemur of male bearing anteroventral, comb-like row of curved, moderately long, pointed setae, not flattened; and posteroventral surface of male forefemur bearing dense, somewhat irregular row of rather short setae along most of length.

DESCRIPTION. Body length 4.5–5.2 mm; body generally bicolored, brown dorsally, lateral surfaces gray, sometimes dark gray.

Head: (See Figure 166) Frons brown, reddish stained, mottled, with linear yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, short, not reaching the anterior margin of the frons, between inner vertical and interfrontal

setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral front orbita and dorsal parafacial with 2 dark brown spots lateral to antenna, separated by yellowish-gray spot. Antenna brown with pale brown microtomentum; pedicel paler on distal margin; basal flagellomere with slender, elongate, sparse pale setae on margin; arista with 12–13 long, dorsal rays. Postcranium with 2 series of postocular setae, the second series irregular. Face mostly to entirely brown or grayish brown, gray only on laterodistal margin and on small V-like mark in middle; parafacial and gena silvery gray, gena with a small, rounded, pale brown spot in the center; clypeus reddish brown; gena with only few setae on middle and ventral margin. Eye rounded, about as wide as high, height about three times the height of gena. Gena high, height slightly greater than the length of basal flagellomere; gena-to-eye ratio 0.30–0.32.

Thorax: Mesonotum predominantly brown, reddish stained on dorsum, the same color of the frons, with 4 slender yellow stripes between dorsocentral rows, and numerous small yellow areas dorsally and laterally, postalar callus yellow; scutellum brown with lateral margins yellow, middle yellow spotted, and apex blackish brown. Pleurae and forecoxa gray; anepisternum with margins and a transverse spot in the center brown, sometimes the central spot faded; anepimeron brown on anteroventral corner. Wing (see Figure 198) brownish to hyaline with veins brown, crossveins r-m and dm-cu with a distinctly infuscate halo; costal-vein ratio 0.50–0.52; M-vein ratio 1.26–1.39. Legs brown with very sparse gray microtomentum, except tarsomeres lighter with yellowish-orange coloration ventrally and dorsally, the more distal segments darkened; forefemur of male bearing anteroventral, comb-like row of curved, moderately long, pointed setae, not flattened; and posteroventral surface of male forefemur bearing dense, somewhat irregular row of rather short setae along most of length; foretibia straight.

Abdomen: Tergites distinctly bicolored dorsally except tergite 1 wholly dark brown; tergite 2 dark brown on basal half and tergites 3–5 dark brown along anterior half and medially, on dorsum, otherwise yellowish gray; lateroventral margin of tergites brown. Male terminalia: (Figures 18–21) Presurstylus bifurcate, bearing basoventral process developed, horizontal process slender; in lateral view posturstylus widest medially, medial anterior lobe poorly developed, bearing moderately elongate and slender setae; lateral aedeagal process long, about $\frac{1}{2}$ length of aedeagus, slender almost straight in lateral view; aedeagus slender in dorsal view, slightly wider and bluntly constricted apically; phallapodeme broadly triangular in lateral view; hypandrium deeply concave, abruptly narrowed on distal $\frac{1}{3}$ in lateral view and wider in dorsal view.

TYPE MATERIAL. The holotype male of *Paralimna castanea* is labeled "TOBAGO. St. John: Charlotteville (2 km S; 11°19'N, 60°33'W)[,] 10Jun1993[,] WNM Mathis/USNM ENT 00118291 [plastic bar code label]/HOLOTYPE ♂ *Paralimna castanea* Ale-Rocha&Mathis, USNM [red]." The holotype is double mounted (minuten pin in a white plastic block), is in ex-

cellent condition, and is deposited in the USNM. Ten paratypes (10♂; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: **GUATEMALA. Izabal:** Matías de Gálvez (also known as Santo Tomás de Castilla; 15°41.3'N, 88°36.7'W), 14–15 Aug 1965, P. J. Spangler (18♂, 16♀; INPA, USNM).

TRINIDAD and TOBAGO. Tobago. St. John: Charlotteville (beach; 11°19.5'N, 60°32.9'W), 16 Apr–16 Jun 1993, 1994, D. and W. N. Mathis (1♂; USNM); Charlotteville (5 km S; 11°18.9'N, 60°34.5'W), Hermitage River and beach, 22 Apr–11 Jun 1993, 1994, D. and W. N. Mathis (4♂; INPA, USNM); Kings Bay Reservoir (11°17'N, 60°33'W), 15 Jun 1993, W. N. Mathis (1♀; USNM); Parlatuvier (creek; 11°17.9'N, 60°35'W), 20 Apr 1994, W. N. Mathis (6♂; USNM); Speyside (Doctor River; 1 km NW; 11°18'N, 60°32'W), 12–13 Jun 1993, W. N. Mathis (7♂; INPA, USNM). **St. Paul:** Argyle Falls (11°15'N, 60°35'W), 21 Apr 1994, W. N. Mathis (1♂; USNM); Roxborough (6 km NNW; 11°16'N, 60°35.4'W), 20 Apr 1994, W. N. Mathis (7♂, 1♀; USNM); Roxborough (6.5 km N; 11°17'N, 60°35'W), 14 Jun 1993, W. N. Mathis (3♂; USNM). **Trinidad. St. George:** Lalaja Road (10°43'N, 61°17'W; streamlet), 26 Jun 1993, W. N. Mathis (1♂, 1♀; INPA); Mount St. Benedict (10°39'N, 61°24'W; creek near base), 19 Jun 1993, W. N. Mathis (3♂, 1♀; USNM).

OTHER SPECIMENS EXAMINED. **BELIZE. Stann Creek:** Middlesex (17°02.4'N, 88°33.2'W; 125 m), 15 Mar 1965, E. C. Welling (1♂, 2♀; CNC).

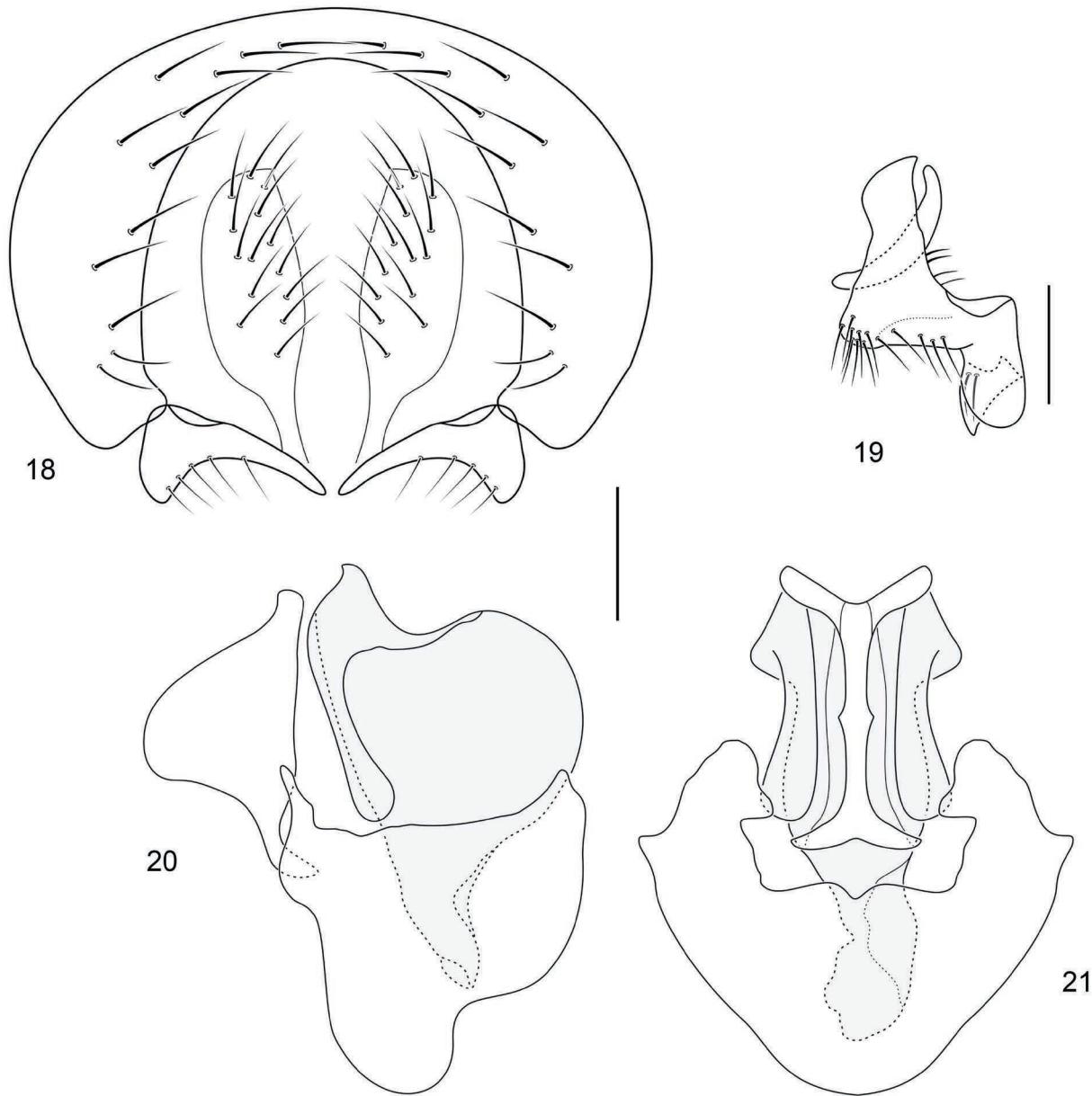
TRINIDAD and TOBAGO. Trinidad. Morne Blue (10°43'N, 61°17'W; 825 m), 23 Aug 1969, H. and A. Howden (1♂; CNC).

TYPE LOCALITY. Neotropical. Trinidad and Tobago. Tobago, Charlotteville (2 km S; 11°19'N, 60°33'W).

DISTRIBUTION. (Map 5) Neotropical: Belize (Stann Creek), Guatemala (Izabal), Trinidad and Tobago.

ETYMOLOGY. The species epithet, *castanea*, is of Latin derivation and means the color of chestnuts, alluding to the chestnut-colored brown spots on the face.

REMARKS. This species is generally similar to *P. curta* sp. nov. in having a brownish body and wing coloration but can be distinguished by the setation along the anteroventral and posteroventral surfaces of the male forefemur being moderately elongate and also by having conspicuous brown bands on the abdomen that are normally developed in *P. castanea* sp. nov. In specimens of *P. curta* sp. nov. the male forefemur lacks outstanding setae and the abdomen is mostly brown with gray-yellowish half-moon-shaped spots on the lateral portions of tergites 2–4. Structures of the male terminalia of these two species are also quite different: in *P. castanea* sp. nov. the presurstylus is bifurcate and bears a well-developed basoventral process and the lateral aedeagal process is elongate and slender, about half the length of the aedeagus and almost straight in lateral view; in *P. curta* sp. nov. the presurstylus is not bifurcate and has a slender horizontal process that is almost straight and the lateral aedeagal process is very short.



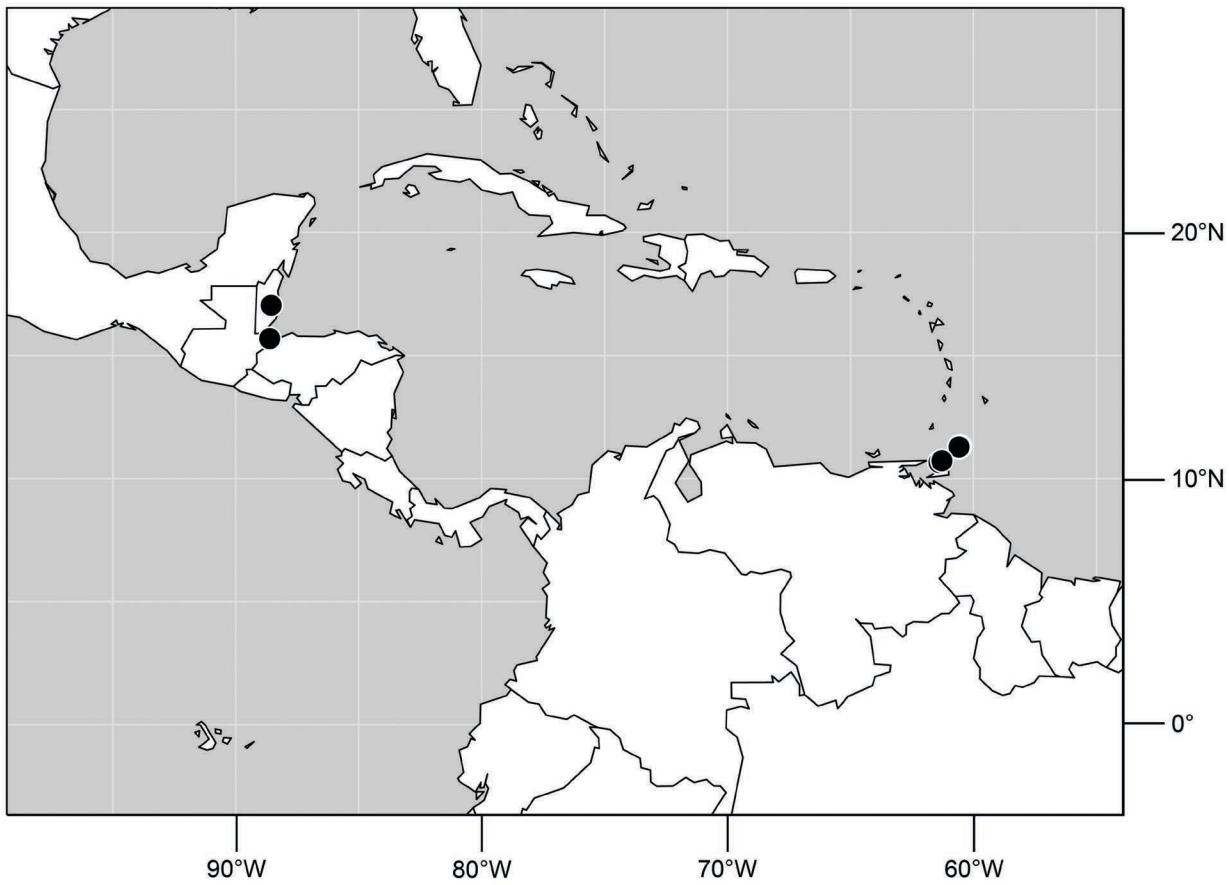
FIGURES 18–21. Structures of male terminalia of *Paralimna (Paralimna) castanea*, sp. nov. (Trinidad and Tobago. Tobago: St. John): (18) epandrium, cerci, and presurstyli, posterior aspect; (19) posturstylius, lateral aspect; (20) aedeagus, phallapodeme, and hypandrium, lateral aspect; (21) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

6. *Paralimna (Paralimna) crinita*, sp. nov.

FIGURES 22–25, 167, 199, MAP 2

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: frons almost horizontal, slightly projected over antennal bases; face yellow-

ish gray with 2 pale goldenbrown, parallel, wide spots extended along the length of face reaching the ventral margin, confluent and united on carina; pedicel dark brown with a whitish-gray spot dorsally; forefemur of male with anteroventral series of moderately long and slender, not flattened setae, ventral surface distinctly concave on distal $\frac{1}{3}$, with several series of numerous, moderately long setae; foretibia of male straight, with dense and



MAP 5. Distribution map for *Paralimna* (*Paralimna*) *castanea*, sp. nov.

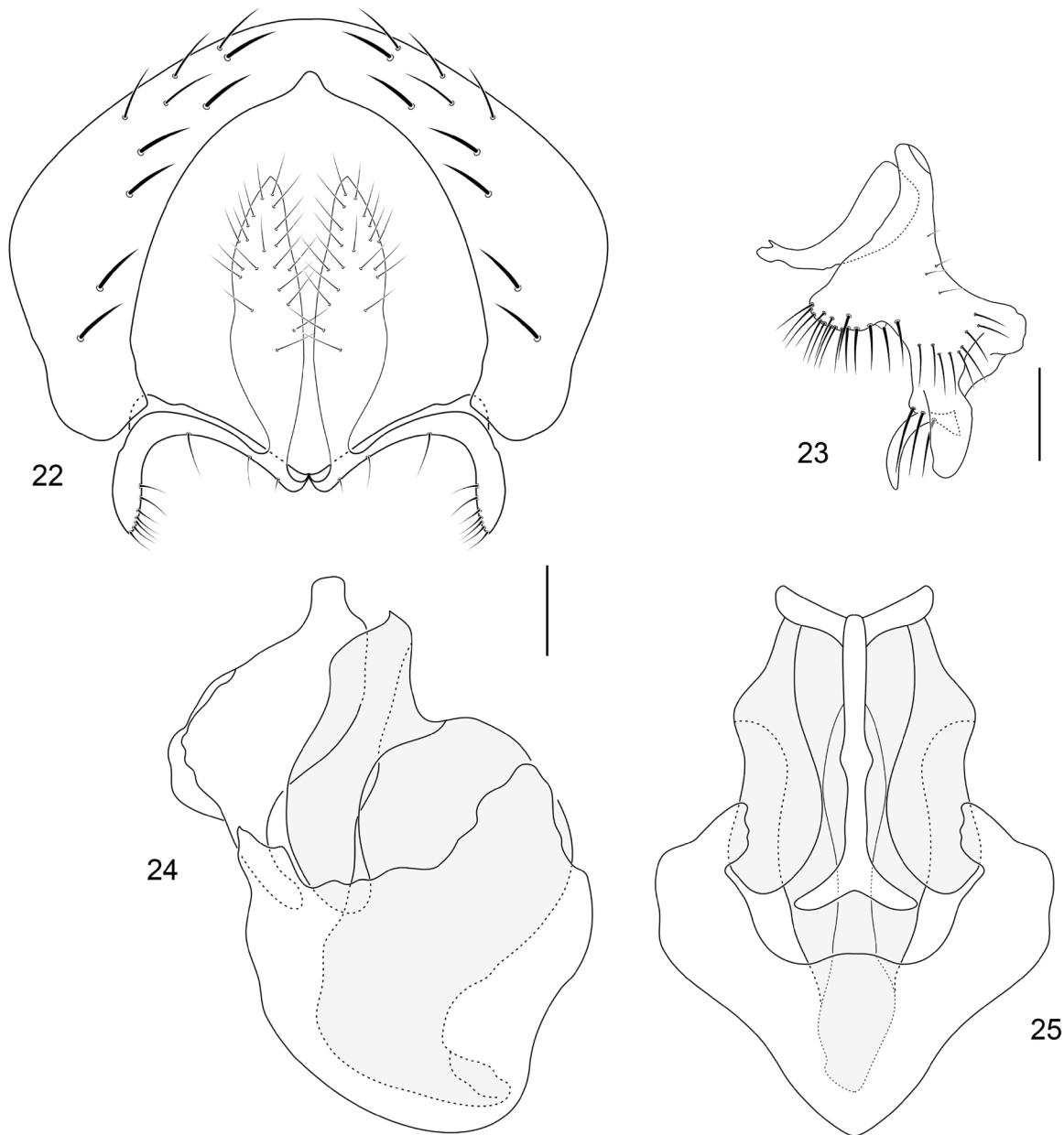
bristling setae on ventral surface; basoventral process of presurstylus falciform.

DESCRIPTION. Body length 5.2–6.0 mm; body generally bicolored, dark brown dorsally, lateral surfaces yellowish gray.

Head: (See Figure 167) Frons almost horizontal, slightly protracted over antennal bases, pale brown to dark brown with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, extended to anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbital seta above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbital and dorsal parafacial with 2 dark brown spots lateral to antenna, separated by yellow spot. Antenna inserted high on head; scape and pedicel dark brown; pedicel with a whitish-gray spot dorsally; basal flagellomere pale brown, covered by dense yellow microtomentum; basal flagellomere with slender, elongate, pale setae on margin; arista with 8 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face yellowish gray with 2 pale golden-brown, parallel, wide spots extended from below

antenna and reaching the ventral margin of face, confluent and united on carina; parafacial and gena yellowish gray; gena with only few setae on middle and ventral margin; clypeus yellowish gray. Eye round, as wide as high, height more than twice the height of gena. Gena high, height longer than the length of basal flagellomere; gena-to-eye ratio 0.40–0.45.

Thorax: Mesonotum yellowish gray with 2 dark brown stripes between dorsocentral rows, plus some small spots laterally; insertion of setae brown, giving a spotted aspect to scutum; postpronotum, notopleuron, and supra-alar areas yellowish gray; scutellum yellowish gray with apex blackish brown, brown sprinkled by base of setae. Pleurae yellowish gray, anepisternum brown tinged on dorsal and ventral margins, brown sprinkled in middle by base of setae, katepisternum slightly brown tinged anteriorly. Wing (see Figure 199) hyaline; veins brown; costal-vein ratio 0.44–0.46; M-vein ratio 0.85–0.90. Legs blackish brown with dense silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally, the more apical darkened; forefemur of male with anteroventral series of moderately long and slender, not flattened setae; ventral surface distinctly concave



FIGURES 22–25. Structures of male terminalia of *Paralimna (Paralimna) crinita*, sp. nov. (Costa Rica. Puntarenas): (22) epandrium, cerci, and presurstyli, posterior aspect; (23) postsurstylus, lateral aspect; (24) aedeagus, phallapodeme, and hypandrium, lateral aspect; (25) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

on distal $\frac{1}{3}$ and setulose, with several series of numerous moderately long setae; foretibia of male straight, densely pilose on ventral surface.

Abdomen: Tergites distinctly bicolored, tergite 1 dark brown with laterodistal corner yellow, tergites 2–5 dark brown along anterior half and medially, otherwise yellowish gray. Male terminalia: (Figures 22–25) Presurstylus bifurcate, with

basoventral process long and falciform, about $\frac{2}{3}$ length of horizontal process, horizontal process slender; in lateral view postsurstylus widest medially, medial anterior lobe developed, rather triangular, bearing elongate and robust setae, medial lobe truncate distally, becoming a wide process posteriorly; lateral aedeagal process long, about $\frac{2}{3}$ length of aedeagus, strongly swollen and slightly arcuate in lateral view; aedeagus slender in dorsal view,

progressively narrowed apically; phallapodeme rather slender in lateral view; hypandrium moderately deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna crinita* is labeled “COSTA RICA. Punta[renas].: San Pedrillo (8°37.2'N, 83°44.1'W), 12–15 August 2001, D.& Wayne N. Mathis/USNM ENT 00190644 [plastic bar code label]/HOLO-TYPE ♂ *Paralimna crinita* Ale-Rocha&Mathis, USNM [red].” The holotype is directly pinned, is in excellent condition, and is deposited in the USNM. Eight paratypes (2♂, 6♀; INPA, USNM) bear the same label data as the holotype.

TYPE LOCALITY. Neotropical. Costa Rica. Puntarenas: San Pedrillo (8°37.2'N, 83°44.1'W).

DISTRIBUTION. (Map 2) *Neotropical*: Costa Rica (Puntarenas).

ETYMOLOGY. The species epithet, *crinita*, is of Latin derivation and means hairy, alluding to the setose ventral surface of the male foretibia.

REMARKS. Structures of the male terminalia of this species are very similar to those of *P. adunca* sp. nov., and we discuss distinguishing characters in the “Remarks” for the latter species.

7. *Paralimna (Paralimna) curta*, sp. nov.

FIGURES 26–29, 168, MAP 6

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face dark gray laterally with margins dark brown and 3 brown spots, a single triangular spot on carina, slightly shorter than length of basal flagellomere and apex 3× width of base, and 2 parallel, slender, vertical grayish-brown stripes that extend to the ventral margin; wing brownish colored; abdomen mostly brown with gray-yellowish half-moon-shaped spots on lateral of tergites 2–4; presurstylus with horizontal process slender, almost straight; lateral aedeagal process very short.

DESCRIPTION. Body length 4.0–5.5 mm; body generally bicolored, dark brown dorsally, lateral surfaces gray, sometimes yellowish gray.

Head: (See Figure 168) Frons brown with linear yellowish spots from lateral margins of ocellar triangle to frontal anterior ocellar seta and extended to near anterior margin of the frons, 1 stripe between inner vertical and interfrontal seta, on fronto-orbits between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a black spot and dorsal parafacial with a dark gray spot, lateral to antenna, separated by silvery-gray spot. Antenna brown; pedicel with dorsal rounded silvery-gray spot, with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere densely covered by pale gold microtomentum and slender pale setae on margin, not distinctly elongate; arista with 13–15 long, dorsal rays. Postcranium with 1 complete series of postocular setae. Face dark gray, laterally with margins dark brown and 3 brown spots, a single triangular spot on carina, slightly shorter than length of basal flagellomere and apex 3× width of base, and 2 parallel slender vertical

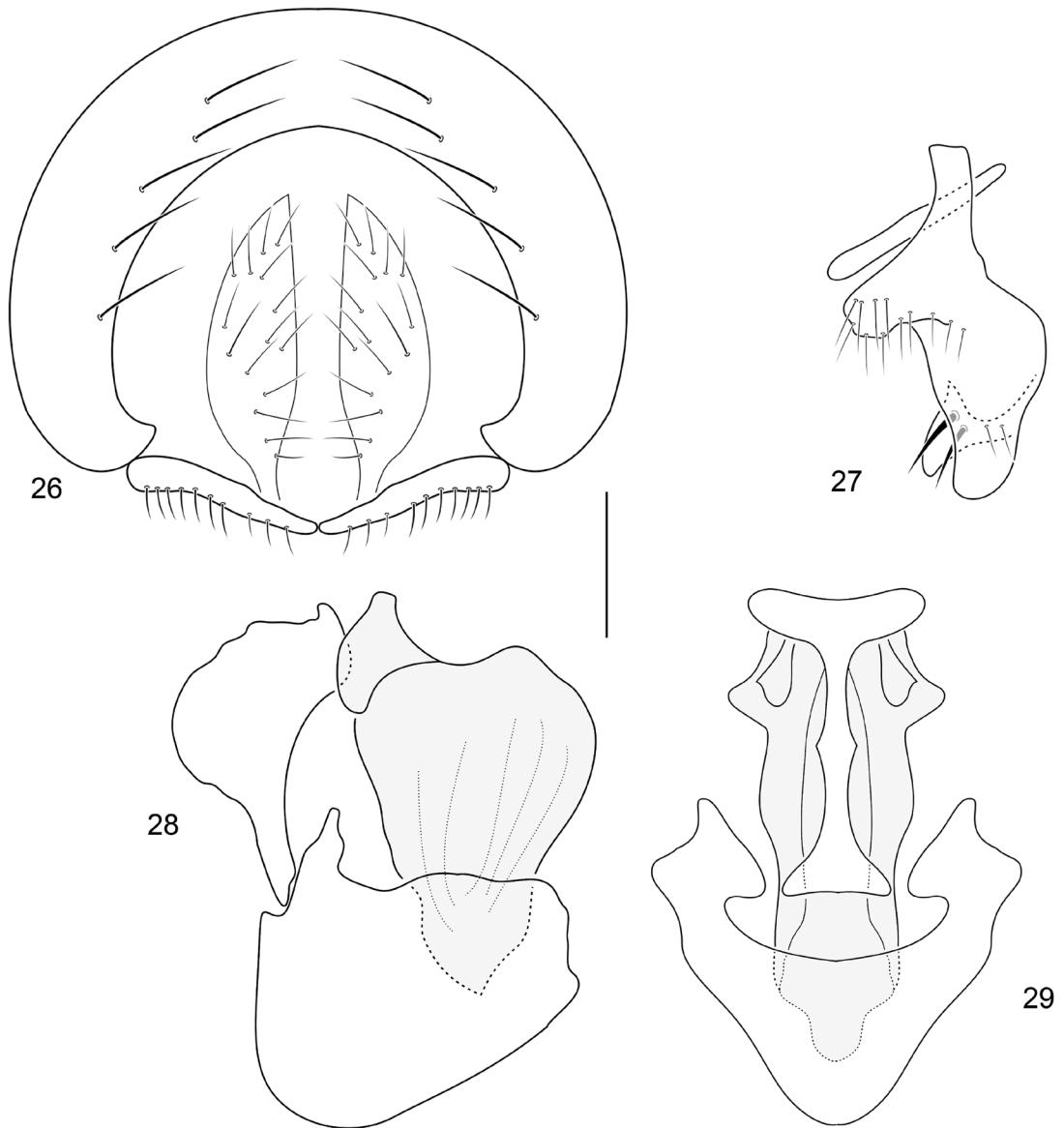
grayish-brown stripes that extend to the ventral margin; parafacial and gena silvery gray; few setae on middle of gena; clypeus dark gray. Eye round, as wide as high, height about three times the height of gena. Gena high, height slightly longer than the length of basal flagellomere; ratio 0.32–0.38.

Thorax: Mesonotum dark brown with gray spots, a small spot on acrostichal line posteriorly and little small spots along of dorsocentral, supra-alar, and intra-alar tracks; postpronotal lobe gray; notopleuron brown with a little gray spot on anterior margin; scutellum brown with apex darkness, 1 small, paler spot on lateral margin and a preapical dorsal faint gray spot. Pleurae with dorsal and ventral margin of anepisternum, ventral half of anepimeron, and central portion of katepisternum brown, the remaining gray. Wing brownish colored; veins brown, crossvein dm-cu slightly infuscate; costal-vein ratio 0.42–0.50; M-vein ratio 1.00–1.10. Legs: coxae and trochanters with dense gray microtomentum; femora black with fine brown microtomentum; tibiae dark brown; tarsi pale brown to orange yellow; forefemur without outstanding setae; foretibia straight.

Abdomen: Tergites brown with yellowish-gray half-moon-shaped spots on lateral of tergites 2–4, on tergite 5 the spot is wide, covering almost completely the dorsum of segment; lateroventral margin of tergites brown. Male terminalia: (Figures 26–29) Presurstylus not bifurcate, with horizontal process slender and almost straight with slender setae along the ventral surface; in lateral view postsurstylus moderately wider medially with a medial anterior lobe prominent, bearing sparse, elongate, and slender setae, medial posterior process not developed; lateral aedeagal process very short, about ¼ the length of aedeagus, robust, almost triangular, and slightly curved medially in lateral view, pointed apically; aedeagus rather robust and abruptly narrowed in the apex in posterior view; phallapodeme triangular in lateral view, prolonged distally; hypandrium gradually narrowed toward apex, moderately deeply concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna curta* is labeled “BRASIL, AM[AZONAS], Ipixuna, Rio Liberdade, Estirão da Preta[,] 07°21'46.7"S - 71°52'07.1"W/11–15.v.2011. Varredura[,] J.A.Rafael, J.T.Câmara, R.F Silva, A. Somavilla, R.Ale-Rocha/USNM ENT 00118262 [plastic bar code label]/HOLOTYPE ♂ *Paralimna curta* Ale-Rocha&Mathis, INPA [red].” The holotype is double mounted (glued to a paper triangle), is in excellent condition, and is deposited in INPA. Seven paratypes (4♂, 3♀; INPA, USNM) bear the same locality label data as the holotype but with varying dates and collectors: Ipixuna, Rio Liberdade, Estirão da Preta (07°21.8'S, 71°52.1'W), 11–15 May 2011, Varredura, J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla, R. Ale-Rocha, R. W. H. Honegger, R. S. G. Hutchings. Other paratypes are as follows: BRAZIL. Amazonas: Rio Gregório, Comunidade Lago Grande (07°10.2'S, 70°49.2'W; some from light and Malaise traps), 18–23 May 2011 (31♂, 11♀; INPA, USNM).

TYPE LOCALITY. Neotropical. Brazil. Amazonas: Ipixuna, Rio Liberdade, Estirão da Preta (07°21.8'S, 71°52.1'W).



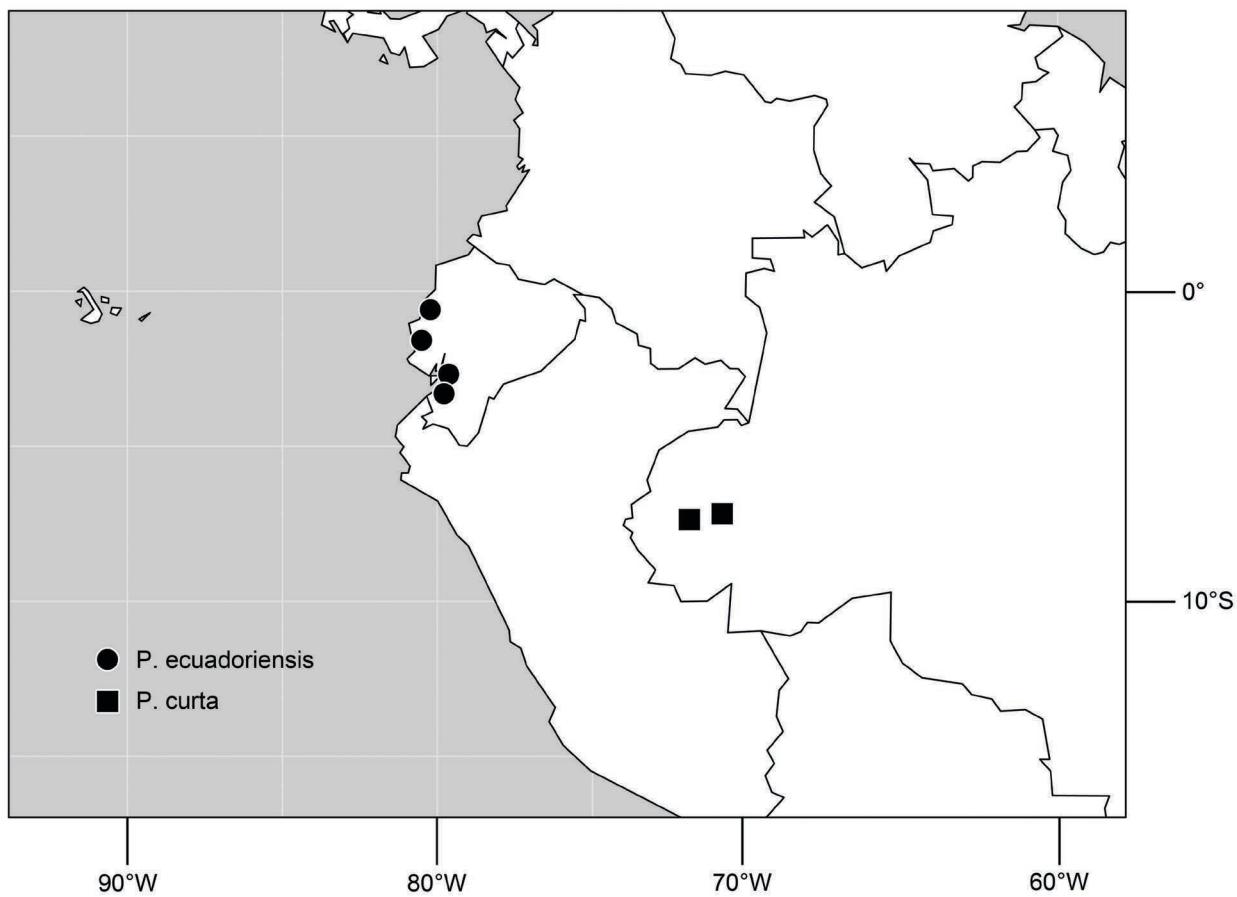
FIGURES 26–29. Structures of male terminalia of *Paralimna (Paralimna) curta*, sp. nov. (Brazil. Amazonas): (26) epandrium, cerci, and presurstyli, posterior aspect; (27) postsurstylius, lateral aspect; (28) aedeagus, phallapodeme, and hypandrium, lateral aspect; (29) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

DISTRIBUTION. (Map 6) *Neotropical*: Brazil (Amazonas).

ETYMOLOGY. The species epithet, *curta*, is of Latin derivation and means short, alluding to the very short aedeagal process.

REMARKS. The facial coloration of this species is similar to that of *P. meridionalis* but can be easily distinguished from the latter by the shape of the structures of the male terminalia and the pattern of body coloration. In *P. curta* sp. nov.

the abdomen is mostly brown with gray-yellowish half-moon-shaped spots on the lateral margins of tergites 2–4; the presurstylius is not bifurcate and with a slender horizontal process that is almost straight; the lateral aedeagal process is very short; in lateral view the postsurstylius has a prominent medioanterior lobe, and the medial posterior process is not well developed. In *P. meridionalis* the tergites have better developed brown bands that extend dorsally, tergite 2 has a basal brown band



MAP 6. Distribution map for *Paralimna (Paralimna) curta*, sp. nov. and *P. (Paralimna) ecuadorensis*, sp. nov.

that extends to the posterior margin in the middle on each side (otherwise the tergites are silvery or dark gray); the presurstylus is bifurcate with a short, basoventral process that is somewhat tapered ventrally, the horizontal process is fairly arcuate, sometimes rather straight; the lateral aedeagal process is about $\frac{1}{2}$ or less the length of the aedeagus, which in lateral view is thin and weakly curved medially; in lateral view, the postsurstylus has a medioanterior, weakly produced lobe and a small, medial, pointed process posteriorly.

Similarities and differences between *P. curta* sp. nov. and *P. castanea* sp. nov. were discussed in the "Remarks" for the latter species.

8. *Paralimna (Paralimna) ecuadorensis*, sp. nov.

FIGURES 30–33, 169, MAP 6

DIAGNOSIS. This species is distinguished from congeners by the following characters: face gray to dark gray with 3 brown spots, a single rectangular spot on carina and 2 small

rather triangular spots between larger facial setae; mesonotum mostly brown, with 3 dorsal brown stripes coalescing for most of the length and forming a wide brown dorsal area; forefemur of male with anteroventral row of very short, sparse, acutely pointed, curved, not flattened setae; posteroventral surface with complete series of somewhat elongate, robust conspicuous setae, more numerous, with 2–3 series, on medial portion.

DESCRIPTION. Body length 3.2–3.7 mm; body generally bicolored, brown dorsally, lateral surfaces gently dark gray.

Head: (See Figure 169) Frons brown, reddish brown tinged on anterior half, with linear, poorly marked pale yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with dark brown and gray spots, respectively, separated by yellowish-gray area. Antennal scape and pedicel dark brown, pedicel with distal margin paler; basal flagellomere pale brown to yellowish brown according to incidence of light, with slender,

elongate, pale setae on margin; arista with 12–14 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face gray to dark gray with 3 brown spots, a single rectangular spot on carina and 2 small rather triangular spots between larger facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye rounded, about as wide as high, height about three times the height of gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.33–0.35.

Thorax: Mesonotum mostly brown, the 3 dorsal brown stripes coalescing for most of the length, forming a wide brown dorsal area with few small gray areas or slender stripes along setal tracks and laterally, base of setae brown; postpronotum and supralar areas gray; scutellum mostly brown dorsally, with small pale gray spots dorsally, apex blackish brown and gray laterally. Pleurae gray; anepisternum with 1 brown spot on dorsal margin and ventral margin slightly brown tinged, stains of bases of setae brown in middle. Wing hyaline; veins brown; costal-vein ratio 0.50–0.51; M-vein ratio 0.95–0.97. Legs brown with sparse silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with anteroventral row of very short, sparse, acutely pointed, curved, not flattened setae; posteroventral surface with complete series of somewhat elongate, robust, conspicuous setae, more numerous, with 2–3 series, on medial portion; male foretibia straight with rather ruffled setae on ventral surface.

Abdomen: Tergites distinctly bicolored; tergite 1 brown dorsally and on lateroventral margin, pale brown on anterior corner; tergites 2–5 brown along anterior half and medially, otherwise gray. Male terminalia: (Figures 30–33) Presurstylus not bifurcate, with horizontal process slender and shallowly curved, gradually narrowed toward distal apex; in lateral view postsurstylus widest medially with a medial, anteriorly wide lobe, bearing moderately long strong setae, medial posterior process very prominent, triangular; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, slender, slightly curved medially in lateral view; aedeagus slender, narrowed on distal $\frac{1}{3}$ in the membranous apex; phallapodeme triangular, somewhat narrow in lateral view; hypandrium moderately deep.

TYPE MATERIAL. The holotype male of *Paralimna ecuadoriensis* is labeled "ECUADOR: Guayas Pr[ovincia]. Machala (49.5 km. NNE.)[,] 40 m. elev[ation].[,] 13 Jan 1978[,] WNM Mathis/USNM ENT 00118289 [plastic bar code label]/ HOLOTYPE ♂ *Paralimna ecuadoriensis* Ale-Rocha&Mathis, INPA [red]." The holotype is double mounted (minuten pin in a white plastic block), is in very good condition (some setae missing), and is deposited in the USNM. Nine paratypes (3♂, 6♀; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: ECUADOR. *El Oro*: Pasaje (6 km E; 03°18.1'S, 79°47.1'W), 13 Jan 1978, W. N. Mathis (1♂; USNM). *Manabi*: Pedro Carbo (45 km NW; 01°35'S, 80°30'W), 11 Jan 1978, W. N. Mathis (2♀; USNM); Bahia de Caraquez (35.6 km E; 00°35.8'S, 80°13.5'W; 20 m), 8–9 Jan 1978, W. N. Mathis (1♂; USNM).

TYPE LOCALITY. Neotropical. Ecuador. Guayas: Machala (49.5 km NNE; 02°40.6'S, 79°37.7'W; 40 m).

DISTRIBUTION. (Map 6). *Neotropical*: Ecuador (El Oro, Guayas, Manabi).

ETYMOLOGY. The species epithet, *ecuadoriensis*, alludes to the country of Ecuador where the type series was collected.

REMARKS. We did not find external distinguishing characters for this species and have had to rely on structures of the male terminalia to make accurate identifications. The most conspicuous characters of the terminalia are the postsurstylus with a wide, rounded, medioanterior process; the medioposterior process is very prominent and triangular; the aedeagus and phallapodeme are elongated; and the lateral aedeagal process has a truncated apex (see Figures 31, 32).

9. *Paralimna (Paralimna) fellerae Mathis*

FIGURES 34–49, 170, MAP 7

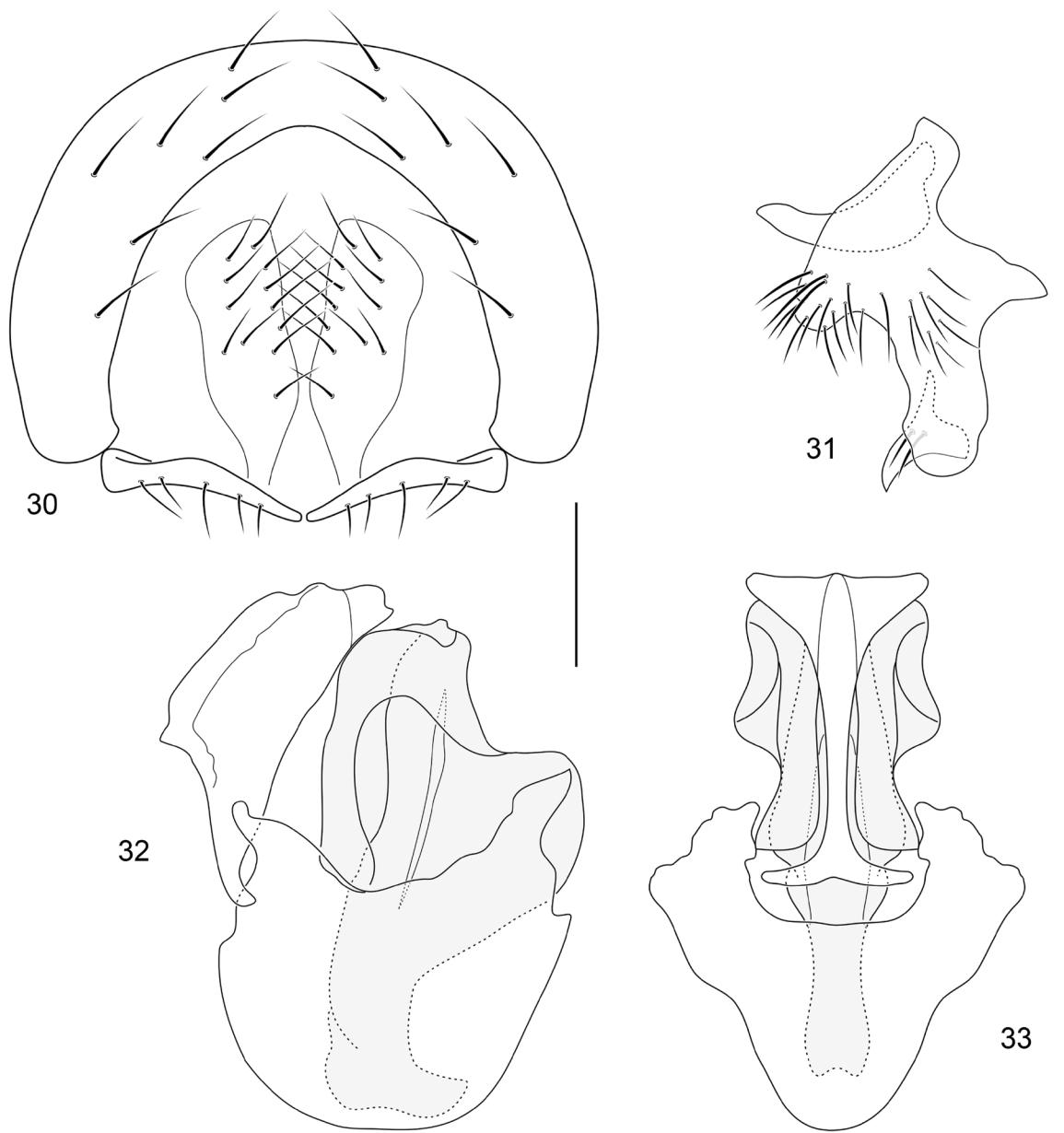
Paralimna (Paralimna) fellerae Mathis, 1997:54 [Belize. Stann Creek: Grovers Reef, Middle Cay; HT ♂, USNM].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face silvery gray with 3 golden-brown spots, a single linear area on the carina and 2 rounded spots between larger facial seta; pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites brown); forefemur of male with anteroventral, comb-like row of flattened setae; cross-veins r-m and dm-cu infuscate.

DESCRIPTION. Body length 2.20–3.30 mm; body generally bicolored, dark brown dorsally and ventrally, lateral medial surfaces mostly gray, sometimes blackish gray.

Head: (Figures 34–38, 170) Frons mostly brown to dark brown with linear, silvery-white spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, and on fronto-orbits between proclinate fronto-orbital setae and, in some specimens, just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 black spots lateral to antenna, separated by silvery-white spot. Antenna black with some gray microtomentum medially; basal flagellomere with long, slender, dorsal pale setae; arista with 11 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face, parafacial, and gena mostly silvery gray; face with 3 golden brown spots, a single linear area on the carina and 2 rounded spots between larger facial seta; gena with only few setae on middle and ventral margin; clypeus darker gray than face. Eye rounded, about as wide as high, height more than twice the height of gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.34–0.45.

Thorax: (Figures 39–45) Mesonotum generally brown, at most slightly lighter in color than frons; with some silvery-gray areas, usually along setal tracks, becoming grayer laterally through postpronotum and notopleuron; scutellar margins gray, apex blackish brown. Pleural area distinctly lighter on dorsal half (dorsal pleurites

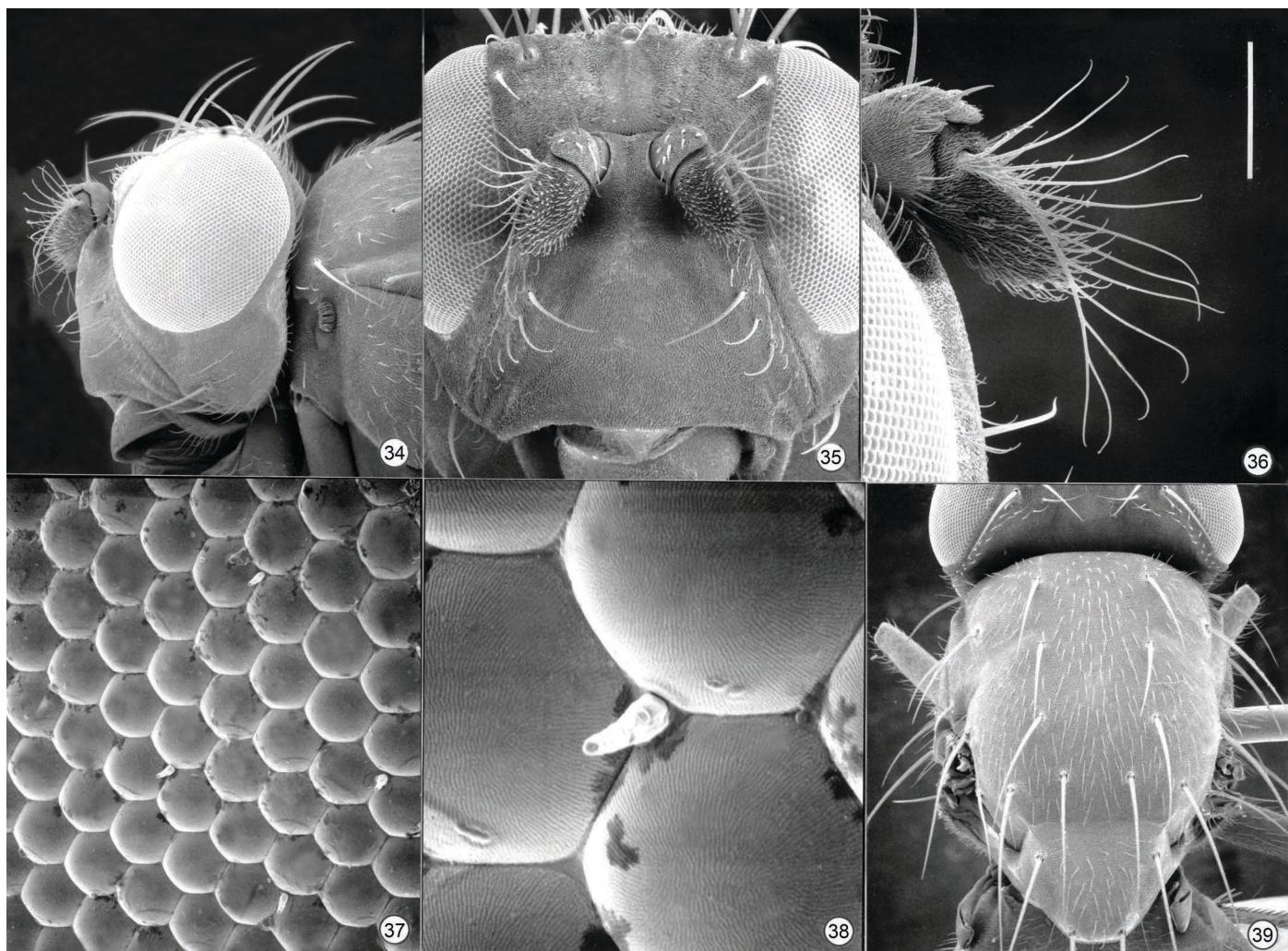


FIGURES 30–33. Structures of male terminalia of *Paralimna (Paralimna) ecuadoriensis*, sp. nov. (Ecuador. Guayas): (30) epandrium, cerci, and presurstyli, posterior aspect; (31) postsurstylus, lateral aspect; (32) aedeagus, phallapodeme, and hypandrium, lateral aspect; (33) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

gray, only thin band on ventral margin of anepisternum and anepimeron blackish brown) and darker on ventral half (ventral pleurites blackish brown). Wing semi-hyaline; veins brown; crossveins r-m and dm-cu infuscate; costal-vein ratio 0.53–0.55; M-vein ratio 1.00–1.22. Legs generally dark colored; coxae, femora, and tibiae blackish brown; tarsi lighter with some yellowish-orange coloration, especially ventrally; forefemur with anteroventral, comb-like

row of flattened setae, setae short, length less than width of femur; and posteroventral surface of forefemur bearing some setae but not as a distinct linear patch at basal half; foretibia straight.

Abdomen: Tergites distinctly bicolored, dark brown along anterior half and medially, otherwise gray, except tergite 1 brown with lateral distal corner silvery gray. Male terminalia: (Figures 46–49) Presurstylus bifurcate, with horizontal process



FIGURES 34–39. Scanning electron micrographs of *Paralimna (Paralimna) fellerae* Mathis (Belize. Stann Creek); scale length for each figure follows in parentheses (scale bar for all photographs is in Figure 36): (34) head, lateral aspect (0.43 mm); (35) face, anterior aspect (0.30 mm); (36) antenna, lateral aspect (150 mm); (37) ommatidia and occasional interfacetal setae of compound eye, lateral aspect (30 μ m); (38) enlargement of same, lateral aspect (6.0 μ m); (39) mesonotum, dorsal aspect (0.50 mm).

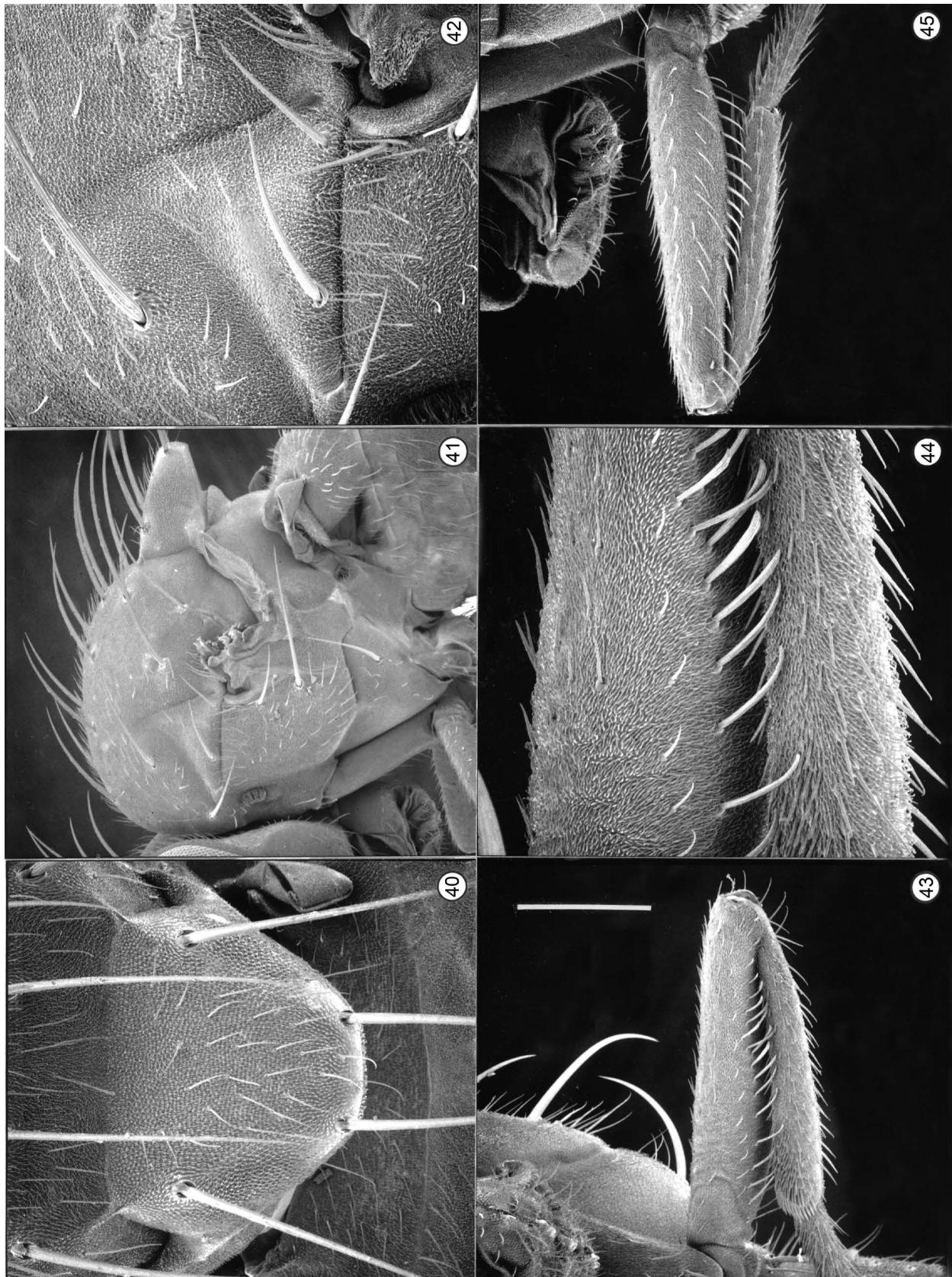
long, slender, shallowly curved, extended medially, basoventral process short, wide, length less than $\frac{1}{4}$ horizontal process; poststylus widest medially with medial, anteriorly produced wide lobe; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, thinly developed, parallel sided, slightly curved subapically, bluntly rounded; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view; hypandrium deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna fellerae* is labeled “BELIZE. Stann Creek District: Glover’s Reef, Middle Cay[,] 28 July 1989, W.N. Mathis, H. Williams/ HOLOTYPE ♂ *Paralimna fellerae* W. N. Mathis USNM [“♂ *Paralimna fellerae*” handwritten; red].” The allotype female and 42 paratypes (30♂, 12♀; USNM) bear the same label data as

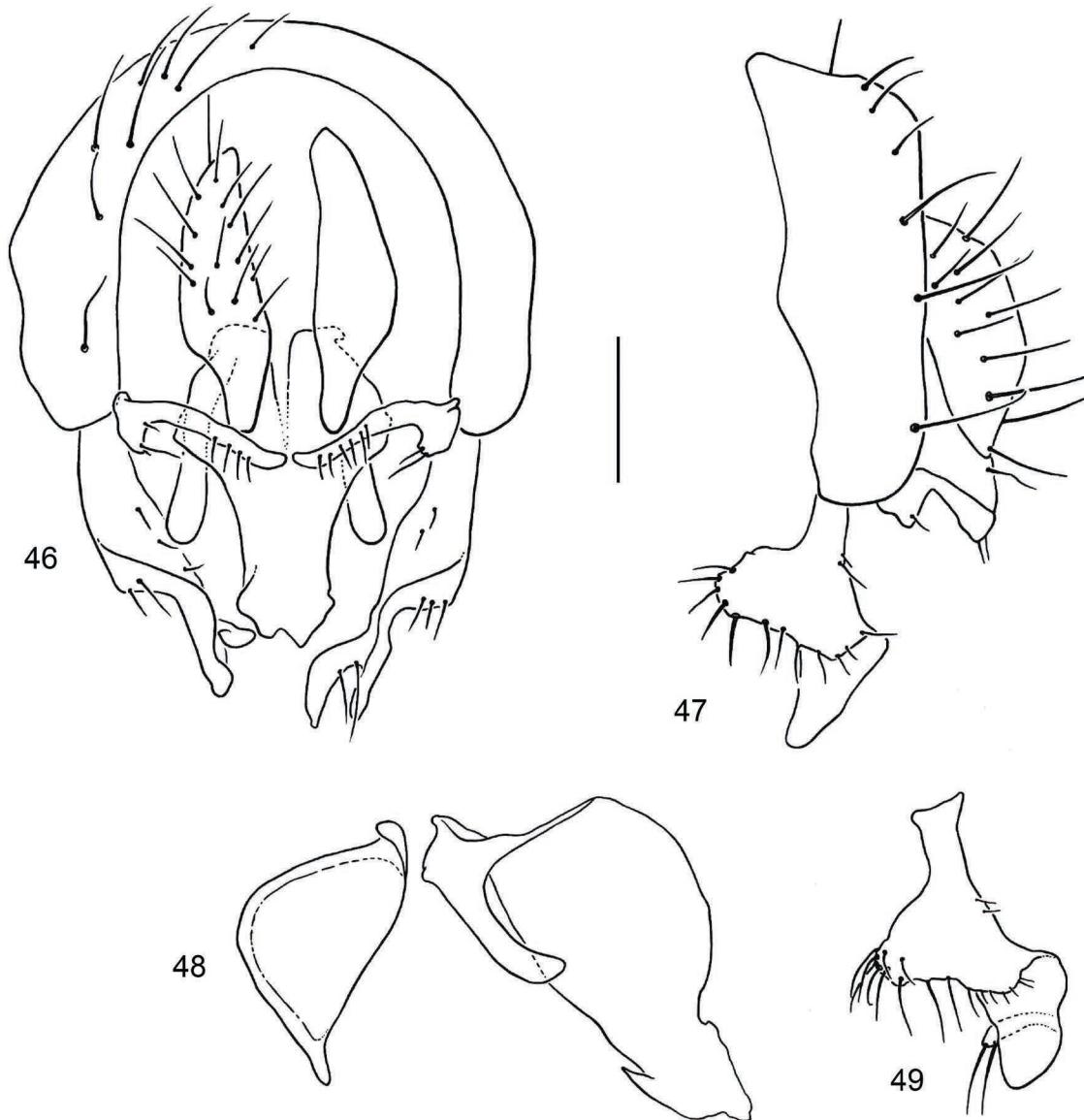
the holotype. The holotype is double mounted (minute pin in a block of plastic), is in excellent condition, and is deposited in the USNM. Other paratypes are as follows: **BELIZE. Belize:** Turneffe Islands, Calabash Cays (17°17'N, 87°48'W), Mar 1993, W. N. Mathis (2♂; USNM). **Stann Creek:** Wee Wee Cay (16°45.9'N, 88°08.6'W), Nov 1987, Mar 1988, W. N. Mathis, C. Feller (1♂, 1♀; USNM).

OTHER SPECIMENS EXAMINED. Nearctic. **UNITED STATES. Florida. Marion:** Ocala National Forest, Juniper Springs, Hwy. 40 (29°11'N, 81°42.'W), 22 Apr 1967, B. V. Peterson (1♂; CNC).

Neotropical. **BELIZE. Stann Creek:** Carrie Bow Cay (16°48.1'N, 88°04.9'W), 8–10 Apr 1977, R. J. Larson (1♀;



FIGURES 40–45. Scanning electron micrographs of *Paralimna (Paralimna) fellerae* Mathis (Belize, Stann Creek); scale length in parentheses; scale bar for all photographs in Figure 43: (40) scutellum, dorsal aspect (231 µm); (41) pleural sclerites, lateral aspect (0.50 mm); (42) rotopleuron, lateral aspect (167 µm); (43) left foreleg, anterior aspect (250 µm); (44) enlargement of same, anterior aspect (86 µm); (45) left foreleg, posterior aspect (0.27 mm).



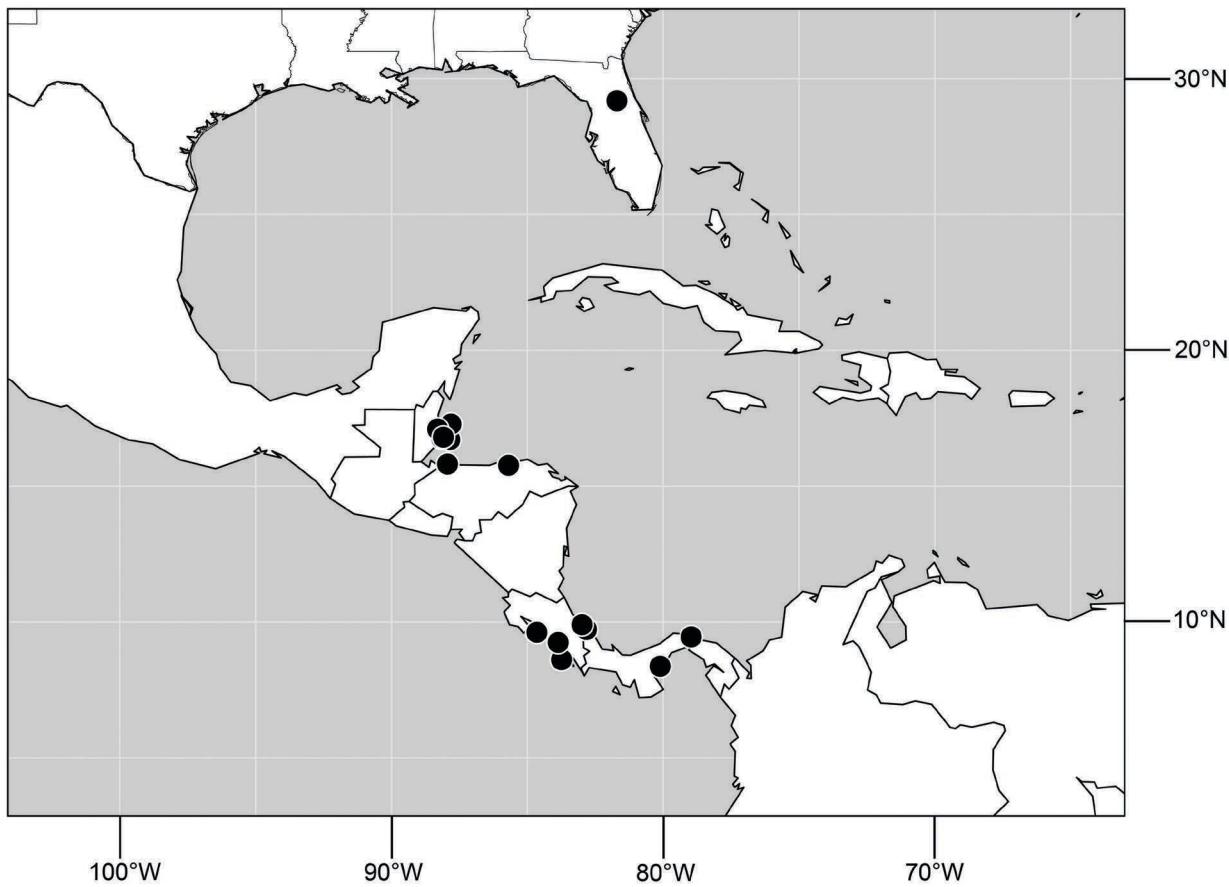
FIGURES 46–49. Structures of male terminalia of *Paralimna (Paralimna) fellerae* Mathis (Belize, Stann Creek): (46) epandrium, cerci, presurstyli, and postsurstylus, posterior aspect; (47) same, lateral aspect; (48) phallapodeme and aedeagus, lateral aspect; (49) postsurstylus, lateral aspect. Scale = 0.1 mm. (See Figures 2–5 for labels of structures.)

USNM); Mullins River (17 km N Dangriga; 17°06.2'N, 88°17.8'W), 29 Mar 1988, W. N. Mathis (1♂, 1♀; USNM).

COSTA RICA. Limón: Puerto Vargas (09°43.9'N, 82°48.9'W; beach), 27–28 Jun 2001, W. N. Mathis (4♂, 1♀; USNM); Westfalia (4 km S, 09°54.5'N, 82°59'W, beach), 27 Jun 2001, W. N. Mathis (3♂, 2♀; USNM). Puntarenas: San Pedrillo (08°37.2'N, 83°44.1'W), 12–15 Aug 2011, D. and W. N. Mathis (26♂, 2♀; USNM); Jacó (09°37.5'N, 84°38.5'W; beach), 13 Jun 2003, D. and W. N. Mathis (1♂; USNM); Dominical (09°14.8'N, 83°51.4'W), 12 Jun 2003, D. and W. N. Mathis (1♂; USNM).

HONDURAS. Atlántida: Corrozal (15°46'N, 85°41'W), 30 Aug 1967, G. Lacy (1♂, 2♀; USNM). Cortés: Puerto Cortés/Omoa (15°49'N, 87°56.2'W), 26 Sep 1995, D. and W. N. Mathis (4♂, 3♀; USNM).

PANAMÁ. Coclé: Playa Santa Clara (08°22.4'N, 80°06.3'W), 2 Jul 1967, W. W. Wirth (1♂, 4♀; USNM). Darién: Patino Point (08°15'N, 78°17.4'W), 1–6 Sep 1952, F. S. Blanton (5♂, 1♀; USNM). Guna Yala: San Blas, Rio Carti Grande near coast (09°27.3'N, 78°57.8'W), 2 Mar 1985, O. S. Flint Jr., J. E. Louton (2♂; USNM).



MAP 7. Distribution map for *Paralimna (Paralimna) fellerae* Mathis.

TYPE LOCALITY. Neotropical. Belize. Stann Creek: Glover's Reef, Middle Cay (16°44.5'N, 87°48.7'W).

DISTRIBUTION. (Map 7) Nearctic: United States (Florida). Neotropical: Belize (Belize, Stann Creek), Costa Rica (Limón, Puntarenas), Honduras (Atlantida, Cortés), Panamá (Coclé, Darién, Guna Yala).

REMARKS. All specimens of this species came from Wee Wee Cay and were collected from a large muddy area with a covering mat of blue-green algae. Structures of the male terminalia of *P. fellerae* are very similar to those of *P. brunneiceps*, *P. meridionalis*, *P. nigropicta*, and *P. punctipennis*. We discuss distinguishing characters of these species in the "Remarks" for *P. brunneiceps*. The external colorational pattern of *P. fellerae* is also very similar to that of *P. punctipennis* and can easily be confused with the latter. Both species have a mesopleuron that is distinctly light colored dorsally in contrast to a darkened ventral half. The wing of *P. fellerae*, however, lacks short perpendicular stump veins along the second section of vein M (the wing of *P. punctipennis* has a stump vein or two), and the ventral surface of the male forefemur has flattened setae, unlike *P. punctipennis*.

10. *Paralimna (Paralimna) flexineurus* Cresson

FIGURES 50–53, 171, 211, MAP 8

Paralimna flexineurus Cresson 1916:111 [Peru. Lima: Chosica (11°56.2'S, 76°42.1'W); HT ♂, USNM (19684)]; 1947:49–50 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:120 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face usually wholly whitish gray, without spots, but sometimes with two parallel, distally widened, very close spots forming a large, golden, rather trapezoidal spot on carina, extended until near ventral margin of face; frons and dorsum of thorax orange tinged, frons with conspicuous dark gray rounded spot on ventral fronto-orbital; scutum with 2 golden-brown stripes between dorso-central rows; pleurae whitish gray, only a small, inconspicuous, lightly brown to orange-brown stripe on dorsal margin of anepisternum; forefemur with ventral surface convex, anteroventral

series of flattened setae short, posteroventral surface with rather numerous setae concentrated in basal $\frac{1}{3}$, and foretibia with ventral surface slightly wavy.

DESCRIPTION. Body length 3.6–4.2 mm; body generally bicolored, pale orange brown dorsally, lateral surfaces light gray.

Head: (See Figure 171) Frons brown, orange stained, grayish on anterior margin, with linear gray spots at lateral margins of ocellar triangle, in front of anterior ocellar seta and weakly extended anteriorly but not reaching the anterior margin of the frons, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral front orbita and dorsal parafacial with 2 dark gray spots lateral to antenna, separated by silvery-gray spot. Antenna brown with gray microtomentum; pedicel with brown microtomentum on dorsum, with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere with slender, sparse, pale setae on margin; arista with 14 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face, parafacial, gena, and clypeus densely silvery gray, face usually without spots but sometimes with two parallel, distally widened, very close spots forming a large, golden, rather trapezoidal spot on carina, extended until near ventral margin of face; gena with only few setae on middle and ventral margin. Eye rounded, slightly higher than wide, height about twice the height of gena. Gena high, height subequal the length of basal flagellomere; gena-to-eye ratio 0.40–0.44.

Thorax: Mesonotum whitish gray, orange stained on dorsum, the same color of the frons, with 2 golden brown stripes between dorsocentral rows, visible according to incidence of light, and numerous small silvery-gray areas dorsally, lateral of scutum silvery gray, except the notopleuron orange tinged; scutellum with lateral margins gray and apex blackish brown. Pleurae and forecoxa light gray, dorsal margin of anepisternum lightly orange brown. Wing semi-hyaline, slightly orange tinged; veins orange tinged; costal-vein ratio 0.46–0.48; M-vein ratio 0.90–0.97. Legs brown with sparse gray microtomentum, except tarsomeres lighter with yellowish-orange coloration ventrally and dorsally; forefemur of male (see Figure 211) with ventral surface convex, anteroventral series of flattened setae short, of same length, anteroventral surface with rather numerous setae concentrated in basal $\frac{1}{3}$; foretibia with ventral surface slightly wavy.

Abdomen: (Lost in holotype.) Tergites distinctly bicolored, dark brown along anterior half and medially on dorsum, otherwise whitish gray; anterior brown portion of tergite 2 reduced to 3 small spots, 1 in middle and 2 dorsolateral. Male terminalia: (Figures 50–53) Presurstylus bearing long, slender setae, with basoventral process somewhat developed with rounded ventral margin, length about $\frac{1}{3}$ of horizontal process length; horizontal process shallowly curved; in lateral view presurstylus widest with medial anteriorly and posteriorly produced lobes, anterior lobe bearing long and robust setae on ventral margin; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, somewhat robust in lateral view, slightly curved in middle and rounded apically; aedeagus slightly constricted in the apical $\frac{1}{3}$ and gently widened to membranous apex; in lateral view

phallapodeme wider on basal $\frac{2}{3}$ and slender on the remainder; hypandrium deeply concave; cerci long and narrowed, almost 3× longer than wide.

TYPE MATERIAL. The holotype male of *Paralimna flexineurus* is labeled "TD 4197 [written in pencil]/Chosica[,] Peru [handwritten]/ CHTTowsend coll/HoloTYPE Paralimna flexinervis [sic] ETCressonJr [pink; "Paralimna flexinervis" handwritten]/Type No 19684 U S N M [red; "19684" handwritten]." The holotype is pinned directly, is in fair condition (apex of left wing torn, abdomen missing), and is deposited in the USNM (19684). Two paratypes bear the same data as the holotype (1♀; ANSP), (1♀ allotype; USNM).

OTHER SPECIMENS EXAMINED. **CHILE.** *Arica and Parinacota:* Arica ($18^{\circ}28.5'S$, $70^{\circ}18.9'W$), Oct 1932, F. Jaffuel (1♂; USNM).

ECUADOR. *El Oro:* Pasaje (6 km E; $03^{\circ}18.1'S$, $79^{\circ}47.1'W$), 13 Jan 1978, W. N. Mathis (11♂, 4♀; USNM); Rio Grande (15 km S Zaruma; $03^{\circ}42.8'S$, $79^{\circ}36.8'W$; 850 m), 9 Apr 1965, L. E. Peña (2♂, 4♀; CNC). *Guayas:* Boliche (14.5 km S; $02^{\circ}07.7'S$, $79^{\circ}35.5'W$), 14 Jan 1978, W. N. Mathis (4♂; USNM); El Triunfo (60 km N Guayaquil; $01^{\circ}55.3'S$, $80^{\circ}0.7'W$), 11 Feb 1973, M. A. Deyrup (1♀; USNM); Guayaquil (airport; $02^{\circ}09.5'S$, $79^{\circ}53'W$), 27 Feb 1973, M. A. and E. Deyrup (8♂; USNM); Machala (49.5 km NNE; $02^{\circ}40'S$, $79^{\circ}13.4'W$; 40 m), 13 Jan 1978, W. N. Mathis (4♂, 12♀; USNM). *Manabi:* Chone ($00^{\circ}41.7'S$, $80^{\circ}05.3'W$), 9 Jan 1978, W. N. Mathis (4♂; USNM); Pedro Carbo ($01^{\circ}48.7'S$, $80^{\circ}13.9'W$), 11 Jan 1978, W. N. Mathis (4♂, 7♀; USNM); Bahia de Caraquez (35.6 km E; $00^{\circ}35.8'S$, $80^{\circ}13.5'W$), 8–9 Jan 1978, W. N. Mathis (5♂, 3♀; USNM).

MEXICO. *Morelos:* Cuernavaca (12 km E; $18^{\circ}58.1'N$, $99^{\circ}07.7'W$; 1310 m), 14 Aug 1954, J. G. Chillcott (1♂, 3♀; CNC). *Sonora:* Ciudad Obregón ($27^{\circ}29.6'N$, $109^{\circ}56.3'W$), 17 May 1961, W. W. Gibson (1♀; CNC). *Tamaulipas:* Morelos Antiguo ($22^{\circ}33.1'N$, $99^{\circ}05.1'W$; 305 m), 21 Jul 1954, J. G. Chillcott (1♀; CNC).

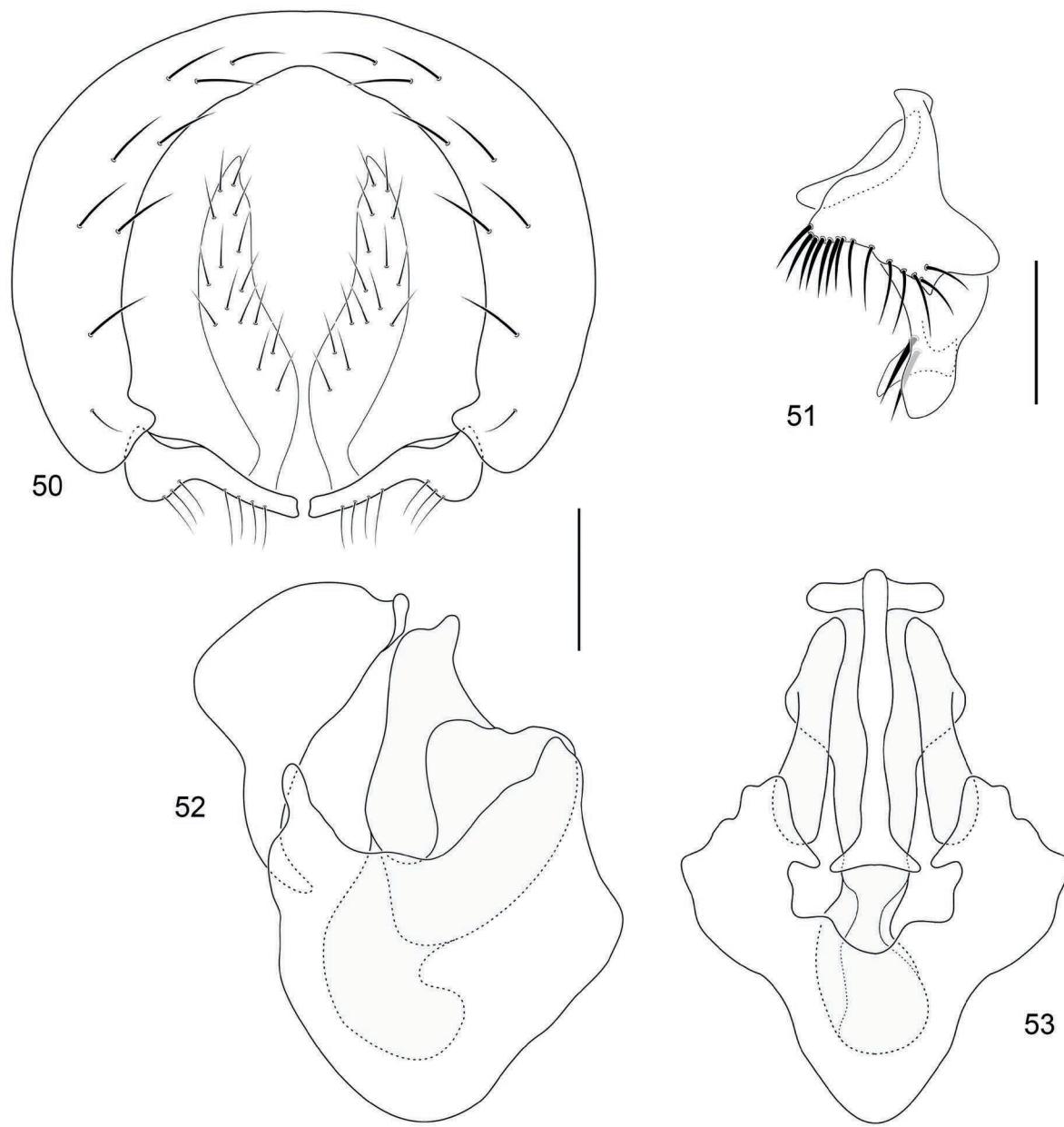
PERU. *Lima:* Callao ($12^{\circ}02'S$, $77^{\circ}08'W$), 17 Nov 1950, E. S. Ross, A. E. Michelbacher (1♂; USNM); Cocachacra (18 km E Chosica; $11^{\circ}55.3'S$, $76^{\circ}32'W$), 11 Feb 1984, W. N. Mathis (1♂; USNM); Lima ($12^{\circ}01.6'S$, $77^{\circ}04.6'W$), 2 Feb 1984, W. N. Mathis (1♂; USNM).

VENEZUELA. *Lara:* Barquisimeto (S Medina; $10^{\circ}03.8'N$, $69^{\circ}19.3'W$; on vegetation, sugarcane field), 7 Jun 1965, I. Gaud, L. F. Martorell (1♂; USNM); Carora ($10^{\circ}10.7'N$, $70^{\circ}04.4'W$), 5 Apr 1981, L. Hollenberg, A. S. Menke (1♂; USNM).

TYPE LOCALITY. Neotropical. Peru. Lima: Chosica ($11^{\circ}56.2'S$, $76^{\circ}42.1'W$).

DISTRIBUTION. (Map 8) *Nearctic:* Mexico (Morelos, Sonora, Tamaulipas). *Neotropical:* Chile (Arica and Parinacota), Ecuador (El Oro, Guayas, Manabi), Peru (Lima), Venezuela (Lara).

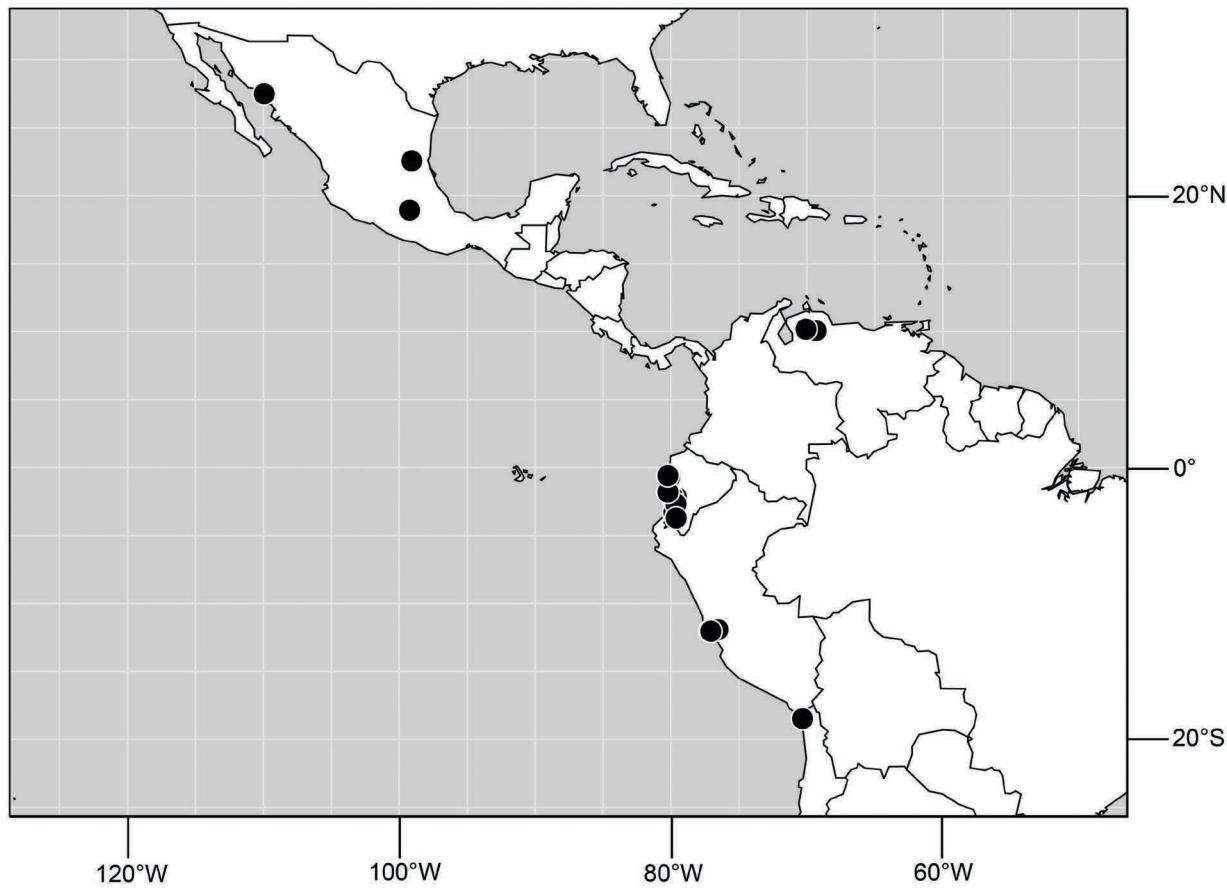
REMARKS. Cresson (1916) described this species from a specimen that was missing its abdomen and included only females in the paratype series. We have examined the holotype and two paratypes, one being the allotype female. The



FIGURES 50–53. Structures of male terminalia of *Paralimna* (*Paralimna*) *flexineuris* Cresson (Venezuela. Lara): (50) epandrium, cerci, and presurstyli, posterior aspect; (51) postsurstylus, lateral aspect; (52) aedeagus, phallapodeme, and hypandrium, lateral aspect; (53) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

paratypes, however, are not conspecific with the holotype. Other specimens have been erroneously identified as this species, probably based on study of the paratypes (e.g., Cresson, 1947). Despite lacking its abdomen, the other diagnostic characters of the holotype are adequate to distinguish this species from congeners and to identify other conspecific specimens, thus allowing us to illustrate and analyze structures of the male terminalia.

This species is similar to *P. thomae*, especially the male forefemur, but can be distinguished from it by the orange coloration of the frons and scutum and the gray face. The characters of the male terminalia also contribute to distinguishing between these two species. In *P. flexineuris*, the presurstylus has a basoventral process with a rounded ventral margin, the anterior lobe of the postsurstylus bears a long, strong seta on the ventral margin, and the lateral aedeagal process is somewhat robust and slightly



MAP 8. Distribution map for *Paralimna (Paralimna) flexineuris* Cresson.

curved in the middle with rounded apices. In *P. thomae*, the presurstylus has a basoventral process with a truncate ventral margin, the anterior lobe of the postsurstylus bears short and very thin setae along the ventral margin, and the lateral aedeagal process is somewhat slender, almost straight, and has a pointed apex.

Cresson (1916) wrote about the similarity of this species and *P. texana* and also noted differences found in the setation of the male foreleg. Along the ventral surface the setae are located on the basal half in *P. flexineuris*; in *P. texana*, the series extends to the femoral apex. Both species have numerous, conspicuously flattened setulae along the anteroventral surface of the forefemur. Additionally, the face of *P. flexineuris* lacks a spot between the antennae, whereas in *P. texana* there is a golden-brown, elongate, and slender spot between the antennae. The abdominal pattern may also help in distinguishing these two species. In *P. texana* the basal brown tergal bands are reduced and very slender and are lacking on tergite 5. Additionally in *P. texana*, the presurstylus has a basoventral process with a pointed ventral margin that bears strong setae (with rounded ventral margin and

thin setae in *P. flexineuris*), the posterior lobe of the postsurstylus is short and pointed (wide and rounded in *P. flexineuris*), and the lateral aedeagal process is very thin and almost straight (somewhat robust and slightly curved in middle with rounded apex in *P. flexineuris*).

11. *Paralimna (Paralimna) fulgifrons*, sp. nov.

FIGURES 54–57, 172, 200, MAP 9

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: brown wing with hyaline halos; face brownish bronze, in profile carina strongly protuberant; scape and pedicel velvety black, basal flagellomere orange colored; anterior half of frons velvety black lateral of antenna and with a ovate, shiny black, slightly protuberant area between bases of antennae and anterior ocellus; crossvein dm–cu concave, curved to base; lateral aedeagal process short and slender, about $\frac{1}{3}$ length of aedeagus.

DESCRIPTION. Body length 3.5–4.7 mm; body predominantly dark brown with small pale gray spots dorsally and on mesopleuron and yellowish-gray spots on lateral surfaces of abdomen.

Head: (See Figure 172) Frons bicolored, posterior half brown with pale gold spots, a triangular spot lateral to posterior ocellus, a triangular spot in front of anterior ocellar setae, and a stripe between inner vertical seta and lateral margin of frons below ventral proclinate fronto-orbital seta; anterior half of frons velvety black lateral of antenna and with a ovate, shiny black, slightly protuberant area between bases of antennae and anterior ocellus. Antennal scape and pedicel velvety black; pedicel with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere orange with slender, elongate, pale setae on margin; arista with 14–15 long, dorsal rays. Postcranium with 1 complete series of postocular setae. Face, parafacial, and gena reddish brown, pale orange spot between bases of antennae and silvery gray on antennal groove; parafacial with a pale gold spot just below the level of antenna; gena with dorsal margin pale golden, few setae on middle of gena; clypeus concolorous with face. Eye rounded, about as wide as high, height more than three times the height of gena. Gena height equal to length of basal flagellomere; gena-to-eye ratio 0.26–0.32.

Thorax: Mesonotum brown with small pale yellow spots on dorsocentral line and other lateral, irregular pale yellow spots; notopleuron with 3 small pale spots; scutellum brown with apex blackish brown. Pleurae predominantly brown, margins of katepisternum with gray microtomentum, laterotergite gray, some little gray spots on lateral and dorsal margins of anepisternum and dorsal margin of anepimeron. Wing (see Figure 200) brown with hyaline rounded halos; veins brown, crossvein dm–cu concave, curved to base; costal-vein ratio 0.37–0.57; M-vein ratio 0.80–0.82. Coxae and trochanters with silvery microtomentum, femora and tibiae with brown microtomentum; tarsomeres 1 and 2 with yellowish-orange coloration, the remaining brown. Forefemur of male with short, flattened, sparse setae on distal half of anteroventral surface; foretibia straight.

Abdomen: Tergites mostly brown with triangular yellowish-gray spots on sides of tergites 2–5; lateroventral margins of tergites brown. Male terminalia: (Figures 54–57) Presurstylus not bifurcate, with horizontal process slightly widened basally and rather constricted in middle; in lateral view postsurstylus widest medially with a medial anterior large lobe bearing quite long and slender setae, posterior process rounded, poorly developed; lateral aedeagal process short, about $\frac{1}{3}$ length of aedeagus, slender and slightly curved medially in lateral view; aedeagus somewhat slender, not tapered to membranous apex, quite truncate distally in dorsal view; phallapodeme broadly triangular in lateral view, prolonged distally; hypandrium widened basally, shallowly concave in lateral view.

TYPE MATERIAL. The holotype male of *Paralimna fulgifrons* is labeled "PERU. Loreto: Rio Momon (~25 km NW Iquitos)[,] 17 Feb 1984[,] W.N.Mathis/USNM ENT 00118267 [plastic bar code label]/HOLOTYPE ♂ *Paralimna fulgifrons* Ale-

Rocha&Mathis, USNM [red]." The holotype is double mounted (minuten pin in a red block of plastic), is in excellent condition, and is deposited in the USNM. Twenty-four paratypes (21♂, 3♀; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: **BRAZIL. Amazonas:** Barcelos, Bacuquara ($00^{\circ}09.1'S$, $63^{\circ}10.6'W$; Malaise trap; igarapé), Jul 2007, A. S. Filho, T. Krolow (1♂, 3♀; INPA); Barcelos, Serrinha ($00^{\circ}25.1'S$, $63^{\circ}23.1'W$; Malaise trap; forest), Jul-Aug 2007 (1♂, 2♀; INPA); Barcelos, Igarapé Ererê/Coruja ($00^{\circ}06.3'N$, $63^{\circ}51'W$; Malaise trap), 18–25 Jun 2008, F. F. Xavier-Filho (1♀; INPA); Rio Demeni, Pirico ($00^{\circ}19.5'S$, $62^{\circ}47.3'W$; Armadilha suspense lamina d'água), Aug 2008, A. Silva, R. Machado (14♀, 1♂; INPA, USNM).

PERU. Loreto: Iquitos (12 km W; $03^{\circ}48.4'S$, $73^{\circ}20.5'W$), 16 Feb 1984, W. N. Mathis (5♂; USNM); Iquitos (14 km W; $03^{\circ}52.1'S$, $73^{\circ}28.2'W$), 16 Feb 1984, W. N. Mathis (2♂; USNM).

VENEZUELA. Territorio Federal Amazonas: Basecamp, Cerro de la Neblina ($00^{\circ}54.4'N$, $66^{\circ}10'W$; 140 m; Malaise trap over small stream at east side of basecamp), 20–24 Mar 1984, O. S. Flint Jr., J. E. Louton (1♂; USNM).

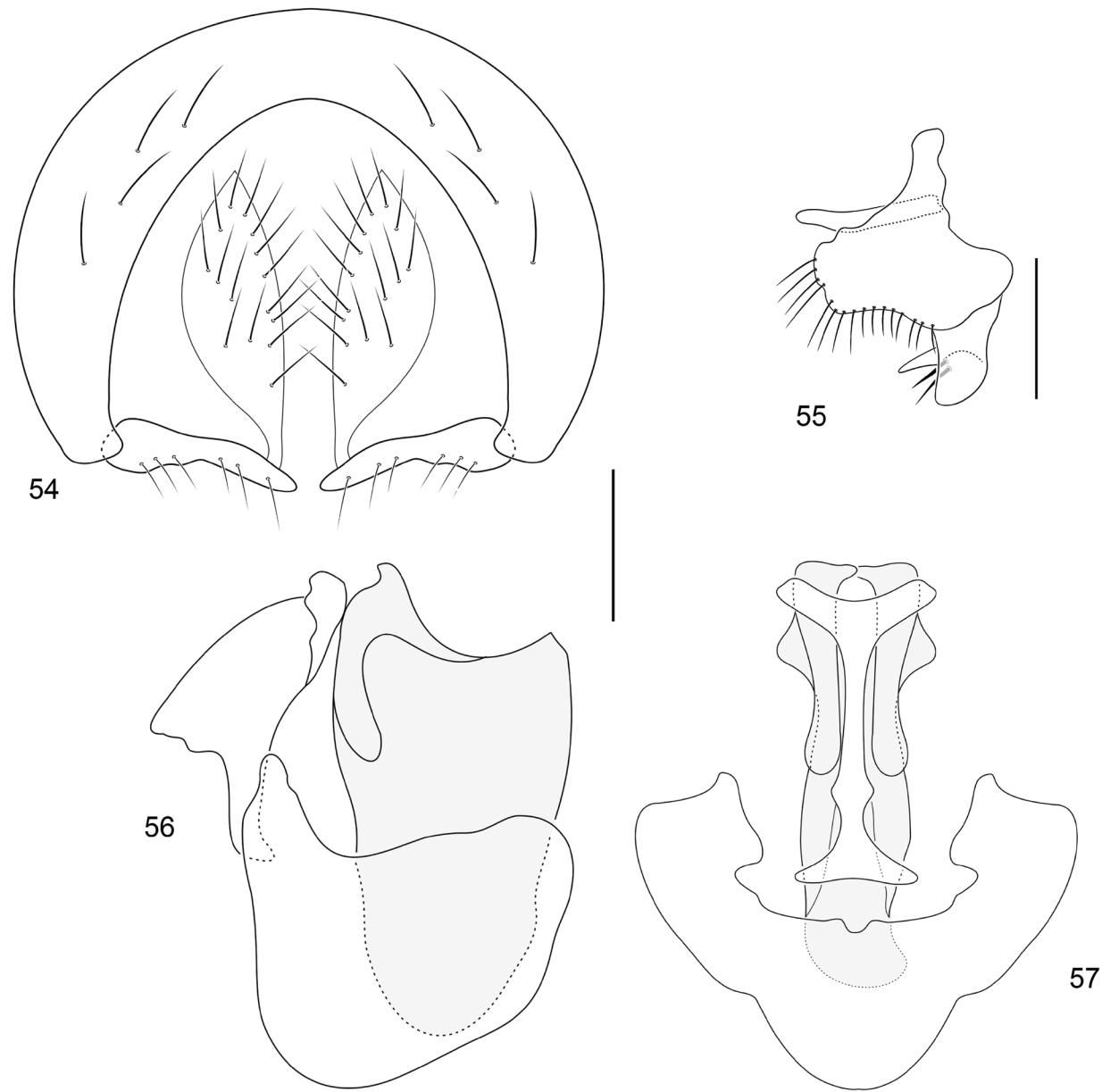
OTHER SPECIMENS EXAMINED. **BRAZIL. Pará:** Belém ($01^{\circ}26.7'S$, $48^{\circ}35.2'W$), Sep 1952, Th. Dobzhansky (2♂, 2♀; USNM).

TYPE LOCALITY. Neotropical. Peru. Loreto: Río Momon (~25 km NW Iquitos; $03^{\circ}41.2'S$, $73^{\circ}15.9'W$).

DISTRIBUTION. (Map 9) Neotropical: Brazil (Pará, Amazonas), Peru (Loreto), Venezuela (Territorio Federal Amazonas).

ETYMOLOGY. The species epithet, *fulgifrons*, is of Latin derivation and means flash (*fulgeo*) and frons (*frons*), alluding to the shiny mark on the frons.

REMARKS. This species is part of a monophyletic group that includes *P. guttata* sp. nov. and *P. stellata* sp. nov. The group shares a concave, basally curved crossvein dm–cu, eyes that are higher than wide, a brown wing with hyaline halos, and a slightly protuberant facial carina among others characters. Structures of the male terminalia are very similar with a simple, horizontal presurstylar process that lacks a developed basoventral process and a shortened lateral aedeagal process. *Paralimna fulgifrons* sp. nov., however, can be easily distinguished from the other species of the group by the ovate, shiny black, slightly protuberant area between the antennal bases and the anterior ocellus, and the basal flagellomere is tinged with orange. Specimens from Venezuela have a complete series of flattened setulae on the male forefemur, covering the entire anteroventral surface, and the scutellum is darkened. With respect to male terminalia, the most conspicuous difference between this species and the other mentioned species can be seen in the length of the lateral aedeagal process, which is shorter, in the setae of the horizontal process of the presurstylus, which are slender and short (long and robust in *P. stellata* sp. nov.), and in the anteromedial lobe of the postsurstylus, which is large (small in *P. guttata* sp. nov.).



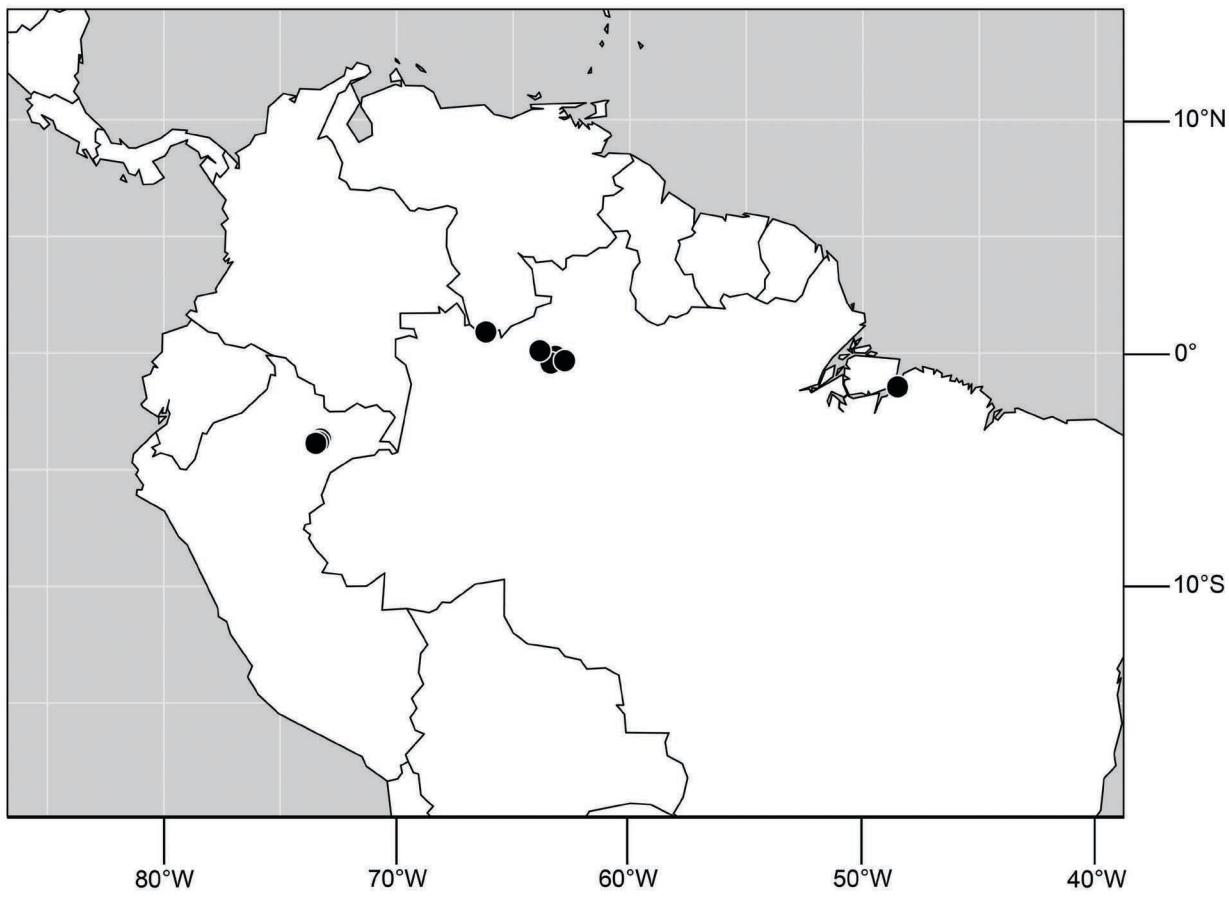
FIGURES 54–57. Structures of male terminalia of *Paralimna (Paralimna) fulgifrons*, sp. nov. (Peru. Loreto): (54) epandrium, cerci, and presurstyli, posterior aspect; (55) posturstylos, lateral aspect; (56) aedeagus, phallapodeme, and hypandrium, lateral aspect; (57) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

12. *Paralimna (Paralimna) guttata*, sp. nov.

FIGURES 58–61, 173–174, 201–202, MAP 10

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face brown with paler small area in middle or predominantly brown with laterodistal region paler; gena generally dark brown, yellowish in the margin of eyes, sometimes with a small, rounded yellow

spot; postcranium with 1 series of postocular setae; mesonotum predominantly brown with small yellow stripes along the setal tracks; pleurae predominantly brown; wing pale brown tinged with brown spots, 2 above discal cell and 1 bigger spot on distal half of R_5 ; veins infuscate, mainly crossveins $r-m$, $dm-cu$, and vein CuA_1 , frequently small infuscate stumps below vein R_{4+5} and above vein M ; crossvein $dm-cu$ concave, curved to base; forefemur of male with anteroventral series of short, arcuate, and slightly flattened setae.



MAP 9. Distribution map for *Paralimna (Paralimna) fulgifrons*, sp. nov.

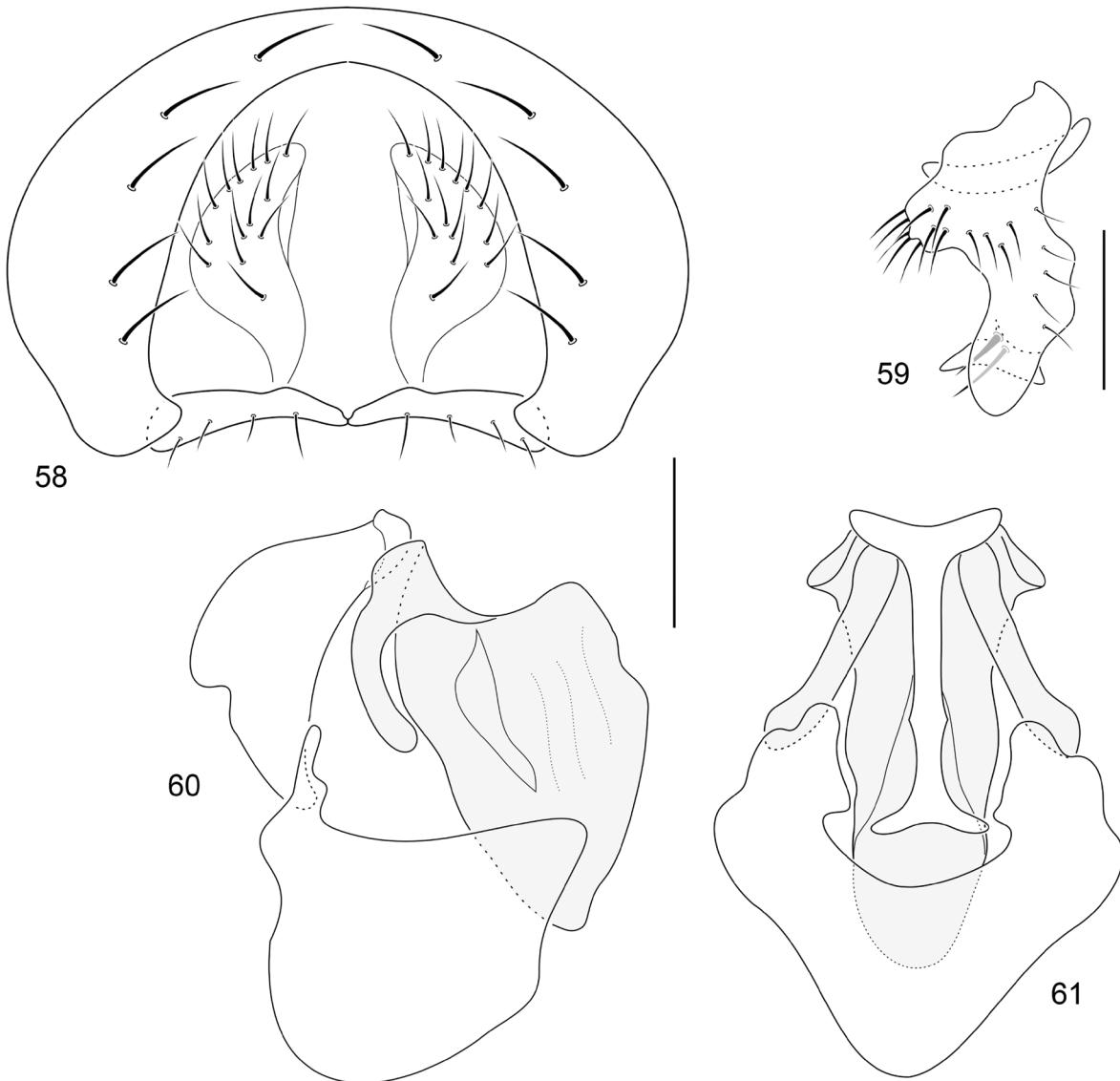
DESCRIPTION. Body length 3.2–4.5 mm; predominantly dark golden brown with numerous small gray or yellowish-gray areas dorsally and laterally on thorax and yellowish-gray areas on lateral surfaces of abdomen.

Head: (See Figures 173–174) Frons brown to dark brown with linear silvery-white or yellow spots at lateral margins of ocellar triangle in front of anterior ocellar seta and slightly convergent distally until near anterior margin of the frons, between inner vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 brown spots lateral to antenna, separated by yellowish-gray spot. Antennal scape and pedicel brown to dark brown; pedicel brown with distal margin paler; basal flagellomere pale brown to yellow according of incidence of light, with dorsal slender elongate hairs; arista with 11–15 long dorsal rays. Postcranium with 1 series of postocular setae. Face brown with small paler area in middle and antennal groove yellowish, sometimes brown mainly in middle and lateral margins paler; parafacial silvery gray and gena wholly brown or with a small yellowish-gray spot in middle, a silvery-gray microtomentum around margin of the eyes; gena with only few setae

on middle and distal margin; clypeus golden brown with distal margin paler. Eye rounded, about as wide as high, height three times the height of the gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.27–0.33.

Thorax: Mesonotum predominantly brown with small yellow stripes along the setal tracks, postpronotal lobe yellow; scutellum brown to yellowish gray with apex blackish brown, lateral margins and a small, rounded dorsal spot yellowish gray. Pleurae dark brown with some small areas yellow: anepisternum and katepisternum with dorsal margin yellow, anepimeron yellow on dorsal half, laterotergite silvery gray. Wing (see Figures 201–202) pale brown to brown tinged with hyaline rounded spots; veins strongly infuscate, mainly crossveins r–m, dm–cu, and vein CuA₁, frequently small infuscate stumps below vein R₄₊₅ and above vein M; crossvein dm–cu concave, curved to base; costal-vein ratio 0.62–0.69; M-vein ratio 1.00–1.10. Legs brown except tarsi yellow, especially ventrally; forefemur of male with only slender setae ventrally, flattened setae absent; foretibia straight.

Abdomen: Tergites distinctly bicolored, golden brown or brown bronze with rather triangular band of silvery-gray to yellowish-gray microtomentum on laterodistal

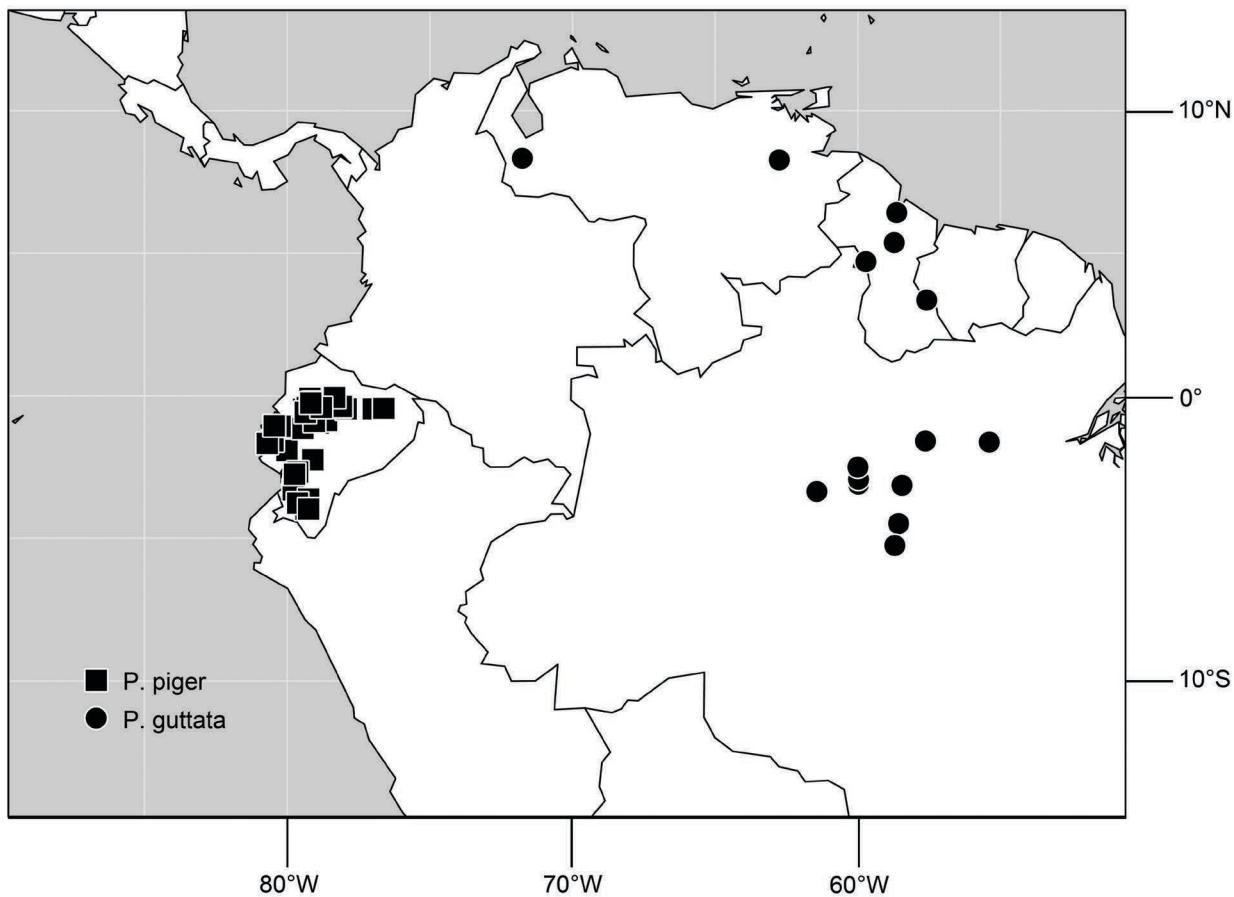


FIGURES 58–61. Structures of male terminalia of *Paralimna* (*Paralimna*) *guttata*, sp. nov. (Brazil. Amazonas): (58) epandrium, cerci, and presurstyli, posterior aspect; (59) postsurstylus, lateral aspect; (60) aedeagus, phallapodeme, and hypandrium, lateral aspect; (61) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

margin, tergite 2 with distal half yellowish gray and tergites 3–5 brown bronze shiny along anterior $\frac{2}{3}$ and medially; ventrolateral margin of tergites brown to bronze shiny. Male terminalia: (Figures 58–61) Presurstylus not bifurcate, with horizontal process slender and shallowly curved; in lateral view postsurstylus widest medially with a medial, anteriorly wide lobe bearing moderately long, slender, sparse setae, medial posterior process developed, triangular, or poorly developed; lateral aedeagal process shortened, about $\frac{1}{2}$ length of aedeagus, slightly curved medially in lateral view, bluntly rounded; aedeagus gradually tapered to membranous apex, moderately robust or slender in posterior view; phallapodeme

broadly triangular in lateral view; hypandrium wide and moderately concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna guttata* is labeled “BRASIL: AM[AZONAS.] C. UNIV [Campus Universitário] 7-VI-1982[,] J.A. RAFAEL/AR: MALAISE/USNM ENT 00118271 [plastic bar code label]/HOLOTYPE ♂ *Paralimna guttata* Ale-Rocha & Mathis, INPA [red].” The holotype is double mounted (glued to a paper triangle), is in excellent condition (some Lepidoptera scales), and is deposited in INPA. Twenty-four paratypes (8♂, 16♀; INPA, USNM) bear the same locality data as the holotype. Other paratypes are as follows: **BRAZIL. Amazonas:** Comissão Executiva do Plano da Lavoura



MAP 10. Distribution map for *Paralimna (Paralimna) guttata*, sp. nov., and *P. (Paralimna) piger* Cresson.

Cacaueira (km 31, Est. AM 010 BR; 02°52.7'S, 59°57.1'W), 3 May 1976, M. Dantas (1♀; INPA); Reserva Ducke (26 km NE Manaus; 02°55.8'S, 59°58.5'W), 24 Aug–16 Sep 1982, 1986, U. Barbosa, L. Aquino (3♂, 15♀; INPA); Reserva Ducke (26 km NE Manaus; 02°55.8'S, 59°58.5'W; 40 m), 5 May 2010, D. and W. N. Mathis (9♂; USNM); Reserva Biológica da Campina (02°30'S, 60°00'W; km 60 da Rodovia BR-174, Manaus/Boa Vista), 17–20 Feb 1976, L. P. Albuquerque (1♀; INPA); Borba, Rio Abacaxis Paxiúba (04°28.8'S, 58°34.4'W; Malaise trap), 2–4 Jun 2008, J. A. Rafael and team (2♂, 3♀; INPA, USNM); Borba, Rio Abacaxis Paxiúba (05°15.1'S, 58°41.9'W; Malaise trap), 26–28 May 2008, J. A. Rafael and team (1♀; INPA); Rio Abacaxis, Flona Pau Rosa (05°15.1'S, 58°41.9'W), 27–29 May 2008, J. A. Rafael and team (1♂, 2♀; INPA). **Pará:** Óbidos, Fazenda Pajurá (01°37.4'S, 55°23.2'W; Malaise trap), 5–11 Sep 2001, J. A. Rafael, J. F. Vidal (1♂; INPA); Rio Nhamundá (01°35.2'S, 57°37.5'W; 25 m; Malaise trap), 17–20 May 2008, J. A. Rafael and team (6♂, 9♀; INPA). **Roraima:** Rio Uraricoera, Ilha de Maracá (03°21.7'S, 61°26'W), 18–28 Aug 1987, J. A. Rafael, L. S. Aquino, J. F. Vidal, E. Binda (1♀; INPA).

GUYANA. Paramakatoi (04°42'N, 59°42.8'W), 24–25 Aug 1997, W. N. Mathis (11♂, 2♀; INPA, USNM).

OTHER SPECIMENS EXAMINED. BRAZIL. AMAZONAS: Reserva Ducke (26 km N of Manaus; 02°55.8'S, 59°58.5'W), 31 Aug 1982 (1♀; INPA); Rio Nhamundá (01°35.2'S, 57°37.5'W; 25 m; Malaise trap), 17–20 May 2008, J. A. Rafael and team (2♂, 2♀; INPA).

GUYANA. Mazaruni (06°25.2'N, 58°37.7'W; high forest), 13 Aug 1937, Richards and Smarts, (3♀; BMNH). New River (03°21.2'N, 57°35'W; 228 m), 7–8 May 1938, C. A. Hudson (1♀; BMNH). Essequibo River (05°22.2'N, 58°43.4'W; source), J. Ogilvie (1♀; BMNH).

VENEZUELA. BOLÍVAR: Gran Sabana, Akuriman (08°16'N, 62°45.3'W), Nov–Dec 1940, P. Anduze (2♂, 3♀; USNM). **MÉRIDA:** Tovar (08°19.7'N, 71°45.6'W), 7 Aug 1943, P. Anduze (1♂; USNM).

TYPE LOCALITY. Neotropical. Brazil. Amazonas: Manaus, Universidade Federal do Amazonas (Campus Universitário; 03°06'S, 59°58.5'W).

DISTRIBUTION. (Map 10) Neotropical: Brazil (Amazonas, Pará, Roraima), Guyana, Venezuela (Bolívar, Mérida).

ETYMOLOGY. The species epithet, *guttata*, is of Latin derivation and means drop or spot, alluding to the hyaline halos of the wing.

REMARKS. This species forms a monophyletic group with *P. fulgifrons* sp. nov. and *P. stellata* sp. nov. In the "Remarks" for *P. fulgifrons* sp. nov., distinguishing characters are noted. Additionally, *P. guttata* sp. nov. can be distinguished from the other two species by having a brown to pale brown face with gray areas on the dorsal half, gray antennal grooves laterad of the facial carina, a brown pedicel with yellowish ventral and distal margins, and a frons that lacks a large black velvety spot on the ventral portion of the fronto-orbits.

13. *Paralimna (Paralimna) maculata*, sp. nov.

FIGURES 62–65, 175, MAP 11

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face and gena dark bluish gray, face with 3 brown spots, a single large rectangular spot on carina, as long as the length of antenna, and 2 also rectangular transverse spots between larger facial setae, lateral margin brown, gena with a small golden-brown spot on anterior margin; anepisternum with ventral and dorsal margins and central area mostly brown, remainder mostly gray; forefemur of male with anteroventral series of moderately long setae, shorter and slightly flattened on distal half of the femur.

DESCRIPTION. Body length 2.6–3.2 mm; body generally bicolored, dark brown dorsally, lateral surfaces dark bluish gray.

Head: (See Figure 175) Frons almost to entirely uniformly chestnut brown with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, short, not reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbital and dorsal parafacial with a small dark brown spot lateral to antenna. Antenna brown, covered by yellow microtomentum; basal flagellomere with slender, elongate, pale setae on margin; arista with 9–11 long, dorsal rays. Postcranium with 2 series of post-ocular setae, the second series irregular. Face dark bluish gray to gray with 3 brown spots, 1 large rectangular spot on carina, as long as the length of antenna, and 2 also rectangular transverse spots between larger facial setae, and lateral margin brown, toward parafacial; parafacial and gena dark gray, gena with a small golden-brown spot on anterior margin; gena with only few setae on middle and ventral margin; clypeus brown. Eye rounded, about as wide as high, height about three times the height of the gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.30–0.33.

Thorax: Mesonotum predominantly dark brown with small yellow spots along setal tracks and laterally; postpronotum silvery gray; scutellum brown dorsally, paler on distal $\frac{1}{3}$, with apex blackish brown and yellowish gray otherwise. Pleurae gray to dark gray, anepisternum with dorsal and ventral margins

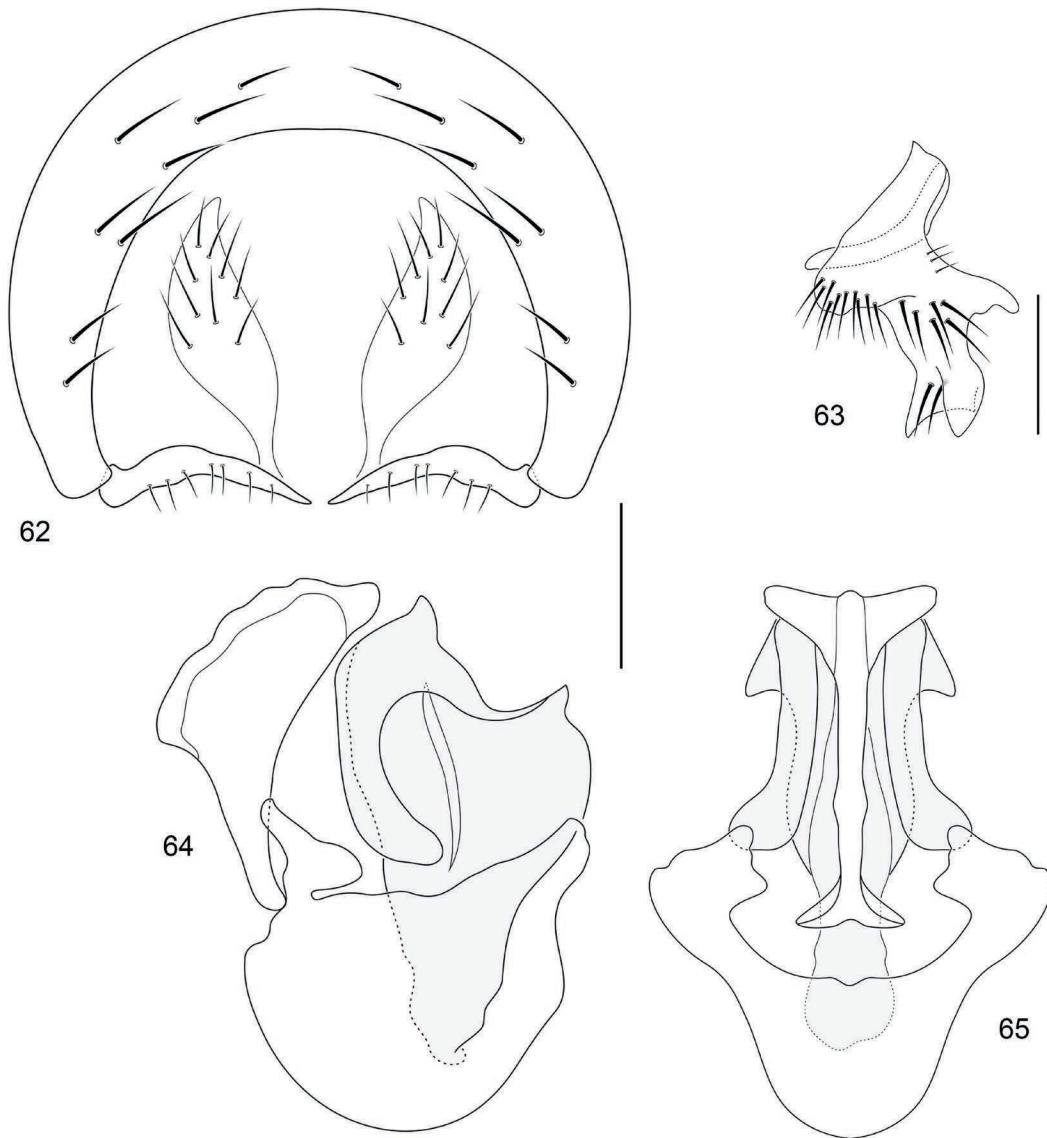
brown and a small, rounded brown spot in middle. Wing hyaline; veins brown; costal-vein ratio 0.44–0.48; M-vein ratio 0.96–1.04. Legs brown with sparse silvery-gray microtomentum; foretarsus brown, mid and hind tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with anteroventral series of moderately long setae, shorter and slightly flattened on distal half of the femur, ventral surface without outstanding setae, posteroventral setae very slender and short, inconspicuous; foretibia of male slightly arcuate.

Abdomen: Tergites distinctly bicolored except tergite 1 wholly dark brown, tergites 2–5 dark brown along anterior $\frac{1}{2}$ – $\frac{2}{3}$ and medially, otherwise yellowish gray; lateroventral margins of tergites brown. Male terminalia: (Figures 62–65) Presurstylus not bifurcate, with horizontal process slender and shallowly curved; in lateral view postsurstylus widest medially with a medial, anteriorly wide lobe bearing moderately long strong setae, medial posterior process very prominent; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, slightly curved medially in lateral view; aedeagus gradually tapered before apex and widened in the membranous apex; phallapodeme broadly triangular in lateral view, prolonged distally; hypandrium wide and shallowly concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna maculata* is labeled "DOMINICAN R[E]P[UBLIC]. Monseñ[or]. Nouel: nr. Jima, 670m, 19°01.6'N, 70°28.9'W[,] 29Mar1999, W. Mathis/USNM ENT 00090309 [plastic bar code label]/HOLOTYPUS ♂ *Paralimna maculata* Ale-Rocha & Mathis, USNM [red]." The holotype is double mounted (minuten pin in a white block of plastic), is in excellent condition, and is deposited in the USNM. Eighteen paratypes (13♂, 5♀; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows:

CUBA. Havana: Baracoa (23°03.7'N, 82°21.2'W), Sep 1901 (1♂; USNM).

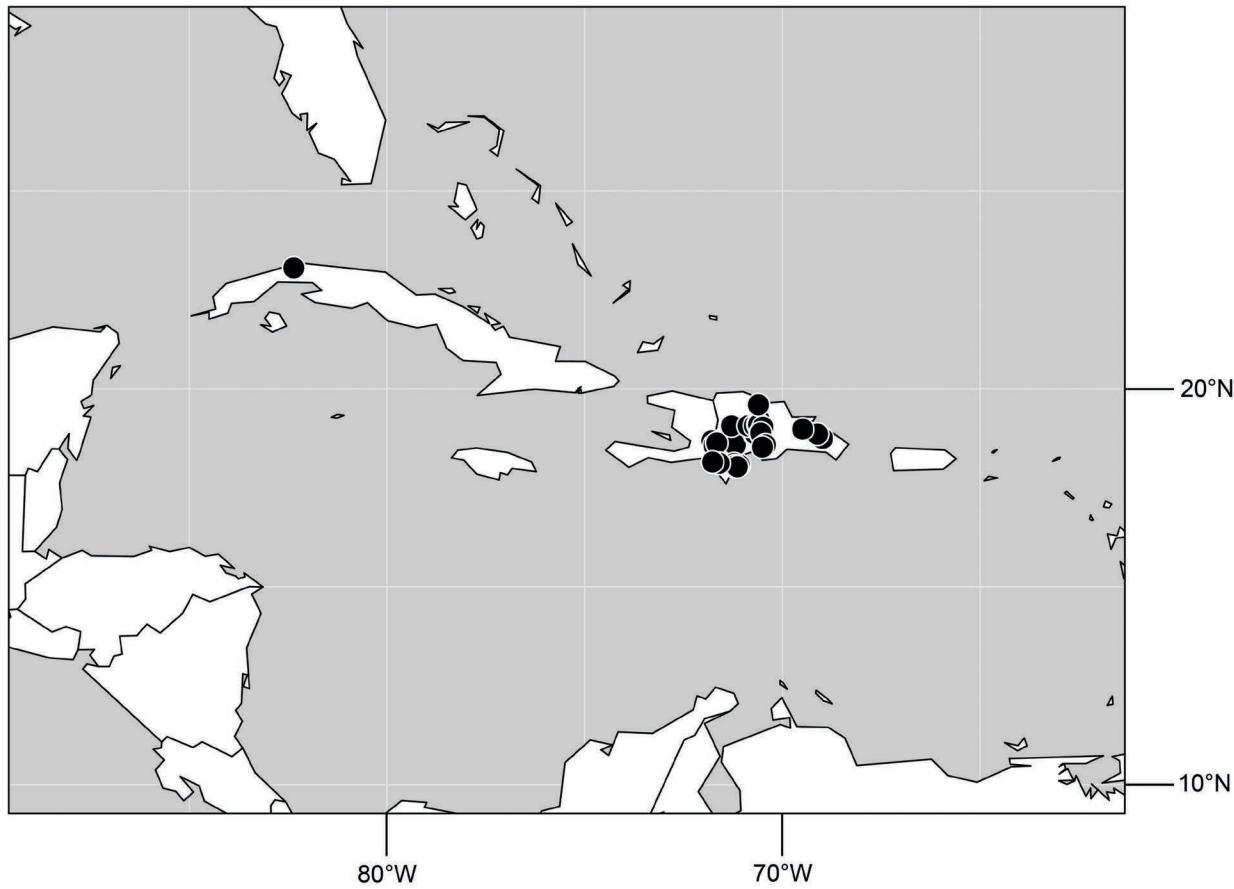
DOMINICAN REPUBLIC. Barahona: Baoruco (8.3 km S; 18°01.9'N, 71°08.4'W), 15 May 1995, W. N. Mathis (9♂; USNM); Baoruco (beach and river; 18°04.6'N, 71°05.5'W), 19 May 1998, D. and W. N. Mathis (8♂; USNM); Baoruco (Sierra de Neiba, Los Guineos; Rio Colorado; 18°35'N, 71°11'W), 11–12 Aug 1990, J. Rawlins, S. Thompson (8♂, 8♀; CMP); Cortico (La Mina; 18°06.7'N, 71°13.4'W; 1300 m), 23 Mar 1999, W. N. Mathis (1♂; USNM); Paraíso (5 km N; 18°01.5'N, 71°11.6'W; 150 m), 21 Mar 1999, W. N. Mathis (1♂; USNM); Paraíso (6 km NW; Rio Nizao; 18°02'N, 71°12'W; 170 m), 25–26 Jul 1990, J. Rawlins, S. Thompson, C. Young (16♂, 34♀; CMP); Paraíso (9.2 km NW; 18°03'N, 71°12'W; Rio Nizao and Rio Coltico; 230 m), 9–10 Aug 1990, J. Rawlins, S. Thompson (1♀; CMP); San Rafael (18°01.9'N, 71°08.4'W), 22 Mar 1999, W. N. Mathis (1♂; USNM). **El Seibo:** El Seibo (5 km E; 18°44.73'N, 68°59.2'W; 120 m), 12 May 1995, W. N. Mathis (5♂; USNM); Pedro Sánchez (18°51.4'N, 69°6.5'W), 26 May 1998, D. and W. N. Mathis (3♂, 1♀; USNM). **Hato Mayor:** El Valle (9.5 km W; 18°59'N, 69°29'W; 170 m), 6 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1♀; CMP). **Independencia:** Angel Feliz (5 km NNW; Sierra de Neiba,



FIGURES 62–65. Structures of male terminalia of *Paralimna (Paralimna) maculata*, sp. nov. (Dominican Republic. Barahona): (62) epandrium, cerci, and presurstyli, posterior aspect; (63) postsurstylos, lateral aspect; (64) aedeagus, phallapodeme, and hypandrium, lateral aspect; (65) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

just S crest; 18°41'N, 71°47'W; 1780 m), 13–15 Oct 1991, R. Davidson, J. Rawlins, S. Thompson, C. Young (1♂, 2♀; CMP); Angel Feliz (5.5 km NNW; Sierra de Neiba, near crest; 18°41'N, 71°47'W; 1750 m), 21–22 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1♂; CMP); La Descubierta (32 km NW; Sierra de Neiba; 18°38.6'N, 71°46.4'W; 1850 m), 1–5 Dec 1991, S. Peck (1♀; CMP); Los Bolos (18°37.8'N, 71°39.2'W; 1370 m), 24 Mar 1999, W. N. Mathis (4♂; USNM). *La Vega*: Paso de la Vaca, Monseñor-Nouel-Constanza Road (19°04'N,

71°17'W; 1500 m), 27 Dec 1955, J. Maldonado-Capriles (8♂, 5♀; USNM); Constanza (9 km SW; 18°52'N, 70°43'W; road to Pinar Bonito; 1433 m), 29 Jul 1991, D. A. Grimaldi, J. Stark (130♂, 153♀; AMNH); Constanza (11.5 km S; 18°51.7'N, 70°41'W; 1410 m), 27 Mar 1999, W. N. Mathis (1♀; USNM); El Rio (9.5 km E; 19°0.9'N, 70°33.5'W; 980 m), 6 May 1995, W. N. Mathis (1♂; USNM); Jarabacoa (1–2 km S; 19°06.9'N, 70°37'W; 520 m), 8–21 May 1995, 1998, D. and W. N. Mathis (43♂, 6♀; INPA, USNM); Jarabacoa (5 km S; 19°05.8'N,



MAP 11. Distribution map for *Paralimna (Paralimna) maculata*, sp. nov.

70°36.5'W; 640 m), 8–20 May 1995, W. N. Mathis (24♂, 4♀; USNM); La Cienega de Manabao (19°03.9'N, 70°51.8'W; 1050 m), 28 Mar 1999, W. N. Mathis (20♂; USNM); Rio Camu (3.5 km NW La Vega; 19°13.8'N, 70°35.2'W; 100 m), 18 May 1998, D. and W. N. Mathis (2♂; USNM); Salto Baiguate (near Jarabacoa; 19°05.5'N, 70°36.9'W; 570 m), 9 May 1995, W. N. Mathis (13♂, 3♀; USNM); Salto Baiguate (near Jarabacoa; 19°05.7'N, 70°37'W, 570m), 16 May 1998, D. and W. N. Mathis (8♂, 1♀; USNM); Salto Guasara (near Jarabacoa; 19°04.4'N, 70°42.1'W; 680 m), 9 May 1995, W. N. Mathis (11♂, 1♀; USNM); Salto de Jimenoa (19°06'N, 70°35.9'W; 575 m), 20 May 1995, W. N. Mathis (1♂, 1♀; USNM). **Monseñor Nouel:** Bonao (8.7 km W; 19°01.8'N, 70°29.4'W), 10 May 1995, W. N. Mathis (1♂; USNM); dam near Rodeo (18°53.1'N, 70°33.5'W), 22 May 1998, D. and W. N. Mathis (1♂, 1♀; USNM); Rodeo (1 km NE; 18°52.9'N, 70°32.7'W), 22 May 1998, D. and W. N. Mathis (3♂; USNM). **Pedernales:** Alcoa Road (km 30; N Cabo Rojo; 18°07.3'N, 71°35.8'W; 1080 m), 20 Mar 1999, W. N. Mathis (1♀; USNM); Rio Mulito (13 km N Pedernales; 18°09'N, 71°46'W; 230 m), 17 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (2♂, 8♀; CMP). **Peravia:** Rio Ocoa (San

José Ocoa; 18°31.7'N, 70°30.4'W), 21 May 1998, D. and W. N. Mathis (1♂; USNM); San José de Ocoa (18 km N; 830 m), 24 Jul, 1986, D. A. Grimaldi (18♂, 19♀; AMNH); San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W. N. Mathis (18♂, 1♀; USNM). **Puerto Plata:** Sonador (19°35.9'N, 70°36.2'W; 440 m), 18 May 1995, W. N. Mathis (3♂; USNM).

TYPE LOCALITY. Neotropical. Dominican Republic. Monseñor Nouel: near Jima (670m, 19°01.6'N, 70°28.8'W).

DISTRIBUTION. (Map 11) Neotropical: West Indies (Cuba, Dominican Republic).

ETYMOLOGY. The species epithet, *maculata*, is of Latin derivation and means spot or stain, alluding to the brown spot on the gena.

REMARKS. This species is similar to *P. sera* in having a darkened body that is somewhat bluish with gray micromentum. It can be distinguished from *P. sera*, however, by the pattern of facial spots, including a brown genal spot, and by the simple male forefemur. The male terminalia offers definitive characters to distinguish these species. The horizontal process of the presurstylus in *P. maculata* sp. nov. is slender and has short setae, the postsurstylus is widened medially with an anterior and

posterior medial process that are well developed, and the lateral aedeagal process is typical. In *P. sera*, the horizontal process of the presurstylus is widened basally, bearing long ventral setae; the postsurstylus is not widened medially with a weakly developed anteromedial process; the posteromedial process is undeveloped; and the lateral aedeagal process is peculiarly large and has striations on the lateral surface.

14. *Paralimna (Paralimna) malleata*, sp. nov.

FIGURES 66–69, 176, 203, MAP 12

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face mostly dark or silvery gray but with lateral margin brown and 3 distinct brown spots, 1 on carina and 2 parallel triangular spots between larger facial setae, the spot on carina black for a short distance between bases of antennae and brown in the remaining; anepisternum with dorsal margin brown, central area with bases of numerous setulae brown, otherwise mostly gray; forefemur of male concave ventrally on distal half, with a posteroventral row of short setae at basal half and apex of femur, absent on concave region, slightly longer at base of femur; anteroventral row of curved and moderately short and slightly flattened setae; abdomen with brown bands more developed, extended dorsally, tergite 2 with basal brown band extended until posterior margin in middle of each side; with basoventral process large, as long as $\frac{1}{2}$ length of horizontal process.

DESCRIPTION. Body length 3.2–4.2 mm; body generally bicolored, dark brown dorsally, lateral surfaces gray, sometimes silvery gray.

Head: (See Figure 176) Frons chestnut, reddish brown, and pale brown mottled with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, short, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 small dark brown to pale brown spots lateral to antenna, separated by yellow spot. Antenna brown, covered by dense paler microtomentum; basal flagellomere with slender elongate pale setae on margin; arista with 11–13 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face dark gray or silvery gray but with lateral margin brown and 3 distinct brown spots, 1 on carina, black for a short distance between bases of antennae and as long as length of antenna, and 2 large parallel triangular spots between larger facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye rounded, about as wide as high, height about three times the height of gena. Gena high, height subequal or slightly greater than length of basal flagellomere; gena-to-eye ratio 0.33–0.42.

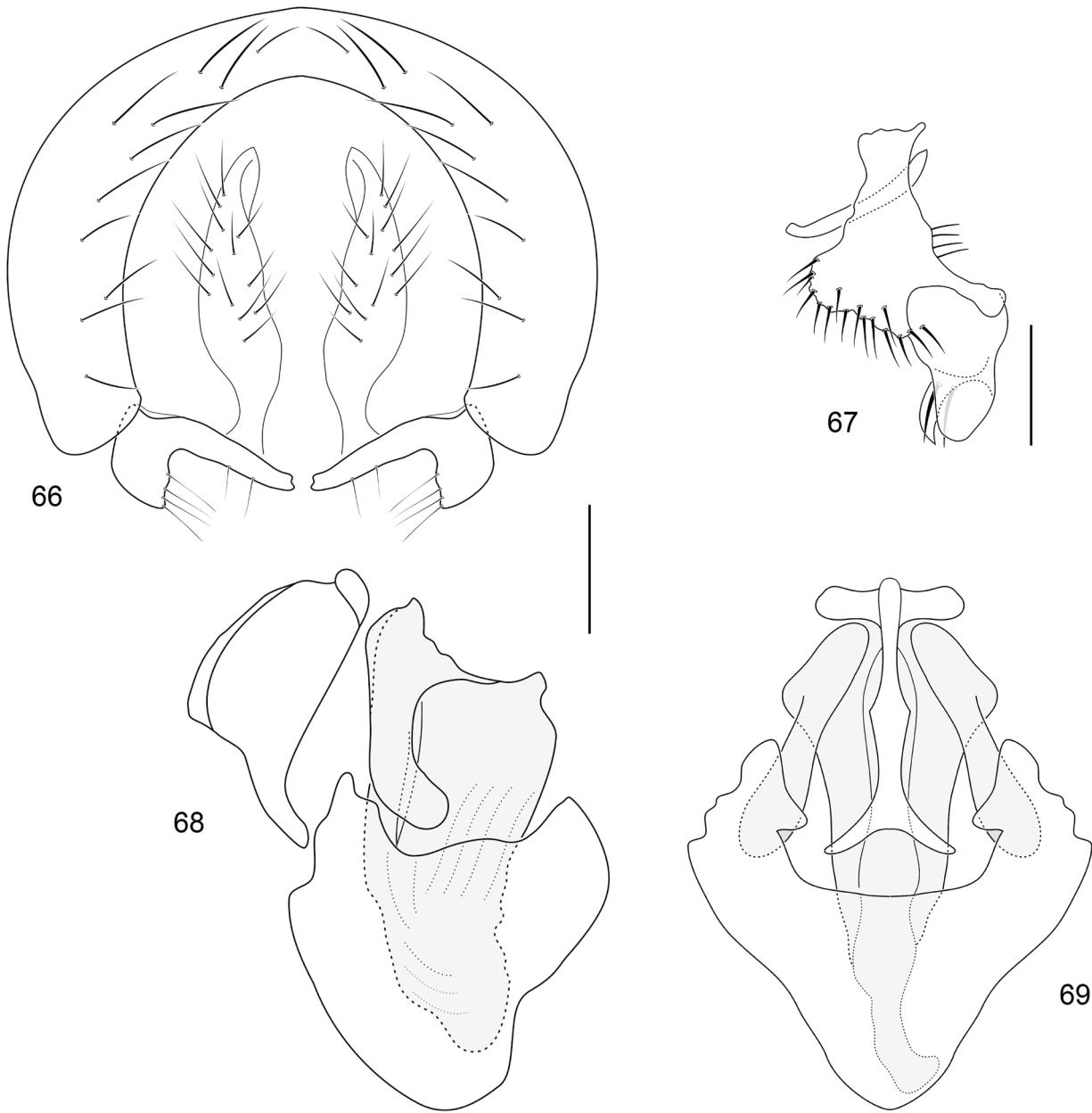
Thorax: Mesonotum yellowish gray with dark brown spots, 3 slender stripes between dorsocentral rows, 1 wide stripe

laterally from level of first dorsocentral seta to last dorsocentral seta, plus some small spots laterally; postpronotum yellowish gray; scutellum brown dorsally, yellow spotted, with apex blackish brown and yellowish gray laterally. Pleurae densely gray or silvery gray, with dorsal margin of anepisternum and insertion of numerous setae brown tinged. Wing (see Figure 203) subhyaline; veins pale brown; costal-vein ratio 0.36–0.41; M-vein ratio 1.07–1.15. Legs blackish brown with dense silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally, the apical segments darkened; forefemur of male concave ventrally on distal half, with a posteroventral row of short setae at basal half and apex of femur, absent on concave region, slightly longer at base of femur; anteroventral row of curved and moderately short and slightly flattened setae; foretibia of male straight.

Abdomen: Tergites distinctly bicolored, tergite 1 dark brown with lateral corner yellowish gray; tergite 2–5 dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray. Male terminalia: (Figures 66–69) Presurstylus bifurcate, with basoventral process large, as long as $\frac{1}{2}$ length of horizontal process, horizontal process robust and straight; in lateral view postsurstylus widest medially with a medial, anterior, moderately wide lobe bearing short robust setae, medial posterior process developed, clavate distally; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, slightly curved medially in lateral view, robust; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view, prolonged distally; hypandrium wide and shallowly concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna malleata* is labeled "DOMINICA, W. I[,] ClarkeHallEst[ate]. May 20 1966["20" handwritten] G. Steyskal/Bredin-Archbold-Smithsonian Bio.Surv.Dominica/USNM ENT 000118263 [plastic bar code label]/HOLOTYPE ♂ *Paralimna malleata* Ale-Rocha & Mathis, USNM [red]." The holotype is double mounted (minuten pin in a white block of plastic), is in excellent condition, and is deposited in the USNM. Thirty-nine paratypes (28♂, 11♀; INPA, USNM) bear the same locality data as the holotype but with different dates and collectors. DOMINICA. Clarke Hall (15°24.5'N, 61°23.7'W; Malaise trap), 11 Jan–23 Aug 1964, 1965, 1966, light trap, D. M. Anderson, D. Bray, R. J. Gagné, H. Robinson, T. J. Spilman, G. C. Steyskal, W. W. Wirth. Other paratypes are as follows: DOMINICA. Hampstead River (15°33.9'N, 61°22.3'W), 22 Mar 1989, W. N. Mathis (10♂; USNM). Fond Figues River (15°24.5'N, 61°18.1'W; 122 m), 9–12 Mar 1965, W. W. Wirth (1♂; USNM). Hodges River (15°35.5'N, 61°20'W; mouth; swamp forest), 27 Feb 1965, W. W. Wirth (1♀; USNM).

OTHER SPECIMENS EXAMINED. ECUADOR. *El Oro:* Rio Grande (15 km S Zaruma; 03°42.8'S, 79°36.8'W; 850 m), 9 Apr 1965, L. E. Peña (1♂, 1♀; CNC). *Loja:* San Pedro, Zaruma Road (03°45.8'S, 79°38.1'W; 1100 m), 9 Apr 1965, L. E. Peña (1♀; CNC). *Orellana:* Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–130 Apr 1965, L. E. Peña (1♀; CNC).



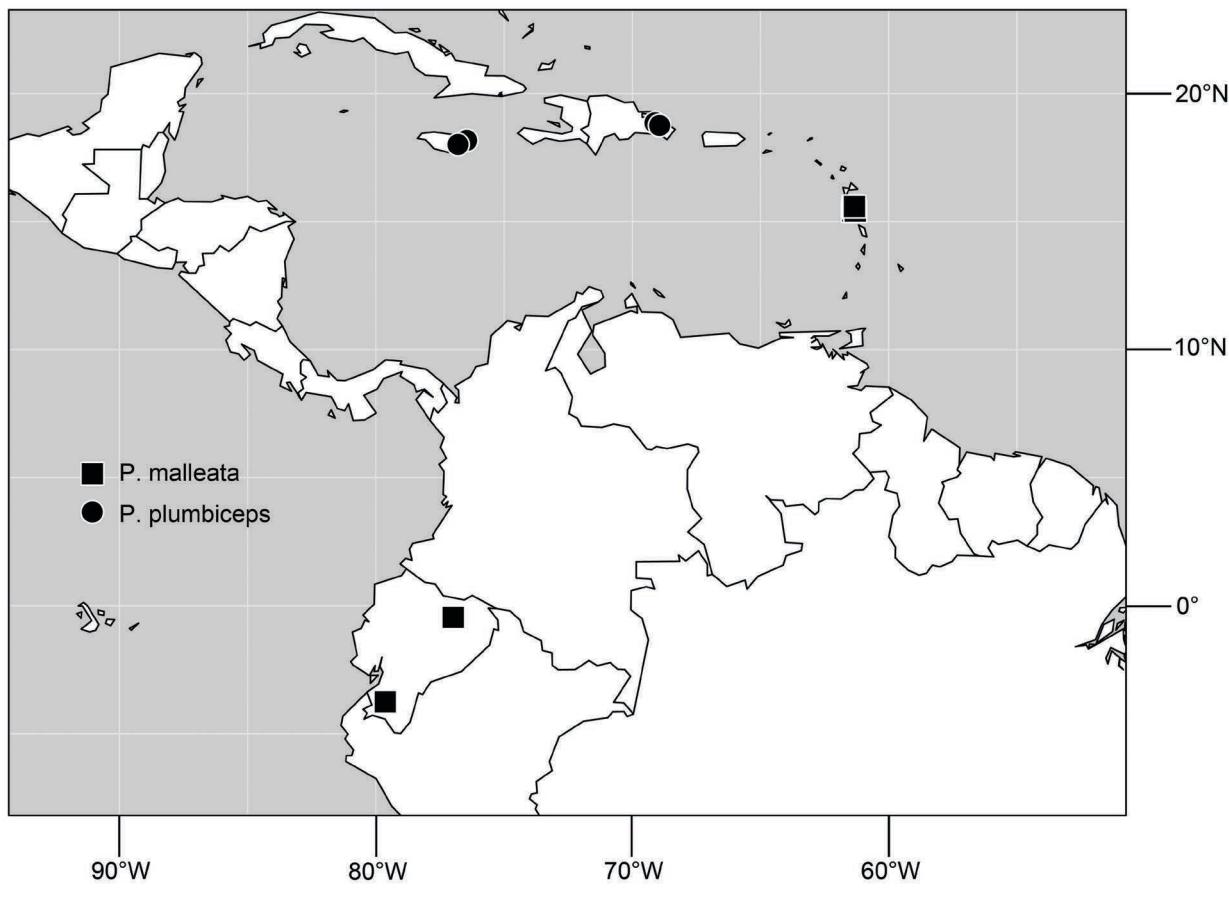
FIGURES 66–69. Structures of male terminalia of *Paralimna (Paralimna) malleata*, sp. nov. (Dominica. Clarke Hall): (66) epandrium, cerci, and presurstyli, posterior aspect; (67) postsurstylius, lateral aspect; (68) aedeagus, phallapodeme, and hypandrium, lateral aspect; (69) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

TYPE LOCALITY. Neotropical: Dominica. Layou Valley, Clarke Hall Estate ($15^{\circ}24.5'N$, $61^{\circ}23.7'W$).

DISTRIBUTION. (Map 12) Neotropical: Ecuador (El Oro, Loja, Orellana), West Indies (Dominica).

ETYMOLOGY. The species epithet, *malleata*, is of Latin derivation and means hammer, alluding to the hammer-like shape of the presurstylius.

REMARKS. Externally this species is generally rather common but is distinguished from congeners as follows: the male forefemur is concave ventrally, the basal brown tergal bands are well developed, almost reaching the posterior margins, the basal brown band of tergite two is extended to the posterior margin on each side, and the basoventral process is notably large.



MAP 12. Distribution map for *Paralimna (Paralimna) malleata*, sp. nov., and *P. (Paralimna) plumbiceps* Cresson.

15. *Paralimna (Paralimna) meridionalis* Cresson

FIGURES 70–73, 177–178, MAP 13

Paralimna meridionalis Cresson 1916:119 [Costa Rica. Cartago: La Carpintera (9°53.9'N, 83°58.8'W); HT ♂, ANSP (6092)]; 1918:47 [review; Costa Rica].

Paralimna (Paralimna) meridionalis.—Cresson 1947:49 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:122 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: face with coloration variable, without distinct spots, dark gray with lateral margins dark brown, wholly brown or slightly grayish brown with central portion dark brown and becoming yellowish or silvery gray toward distal and lateral margins, sometimes face gray with 3 distinct golden-brown spots, 1 on carina and 2 small spots between larger facial setae; mesonotum mostly brown with few small yellowish-gray areas or slender stripes along setal tracks

and laterally; forefemur of male with anteroventral row of short, acutely pointed, curved, slightly flattened setae on distal half of femur; posteroventral surface with 2 series of numerous and conspicuous setae.

DESCRIPTION. Body length 3.2–4.5 mm; body generally bicolored, dark brown dorsally, lateral surfaces pale or dark gray.

Head: (See Figures 177–178) Frons brown, reddish brown tinged on anterior half, with linear yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with gray spot separated by yellowish-gray area. Antennal scape and pedicel dark brown, pedicel with distal margin paler; basal flagellomere pale brown to yellowish brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 10–17 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face with coloration variable: without distinct spots, dark gray but dark brown through

lateral facial setae, wholly brown or slightly grayish brown with central portion dark brown and becoming yellowish or silvery gray toward distal and lateral margins, both hardly contrasting with silvery-gray antennal groove; or face dark to pale gray with 3 distinct spots, 1 pale golden-brown spot on carina, the same length of antenna, and 2 small ovate horizontal or triangular golden-brown spots between larger facial setae; parafacial and gena silvery gray or yellowish gray; gena with only few setae on middle and ventral margin; clypeus silvery or yellowish gray. Eye rounded, slightly higher than wide, height two or three times the height of gena. Gena high, height slightly longer than length of basal flagellomere; gena-to-eye ratio 0.30–0.62.

Thorax: Mesonotum yellowish or silvery gray with brown spots, 3 stripes between dorsocentral rows, complete or incomplete, not reaching the posterior margin of scutum, plus some small spots laterally, base of setae brown; postpronotum, notopleuron, and supra-alar areas mostly yellowish or silvery gray; scutellum brown dorsally, with apex blackish brown and silvery or yellowish gray laterally. Pleurae mostly silvery or yellowish gray, with dark gray or yellowish gray microtomentum; anepisternum variable, gray with stains of bases of setae brown, sometimes coalescing to form a large spot at middle area, with dorsal and ventral margin widely or narrowly brown, sometimes with a rectangular brown spot on dorsal margin or with dorsal $\frac{1}{3}$ and posteroventral margin with a rounded spot brown. Wing usually slightly brown tinged; veins brown, sometimes with cross-veins r-m and dm-cu with infuscate halo and a short stump on R_5 ; costal-vein ratio 0.35–0.45; M-vein ratio 0.95–1.15. Legs blackish brown with silvery-gray microtomentum and a dorsal green reflection; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with anteroventral series of short setae, slightly flattened on distal half of femur; posteroventral surface with 2 series of numerous and conspicuous setae; foretibia straight.

Abdomen: Tergites distinctly bicolored, mostly brown, brown bands more developed, extended dorsally, tergite 2 with basal brown band extended until posterior margin in middle of each side, otherwise silvery or dark gray. Male terminalia: (Figures 70–73) Presurstylus bearing short, slender setae, bifurcate, with basoventral process short, somewhat tapered ventrally, length almost $\frac{1}{3}$ of horizontal process length; horizontal process fairly arcuate, sometimes rather straight; in lateral view postsurstylus widest medially with medial weakly produced lobe bearing small, slender, sparse setae, and a medial small pointed process posteriorly; lateral aedeagal process about $\frac{1}{2}$ or less than $\frac{1}{2}$ length of aedeagus, thin, weakly curved in middle, rounded apically; aedeagus long, slightly constricted in the apical $\frac{1}{3}$ and gently widened to membranous apex, sometimes moderately tapered to membranous apex; in lateral view phallapodeme triangular, prolonged distally; hypandrium deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna meridionalis* is labeled "La Carpintera[,] Cartago[,] C[osta] Rica[,] 4 XII 1909/♂/TYPE Paralimna MERIDIONALIS E.T.Cresson,Jr. [maroon; "Paralimna MERIDIONALIS"

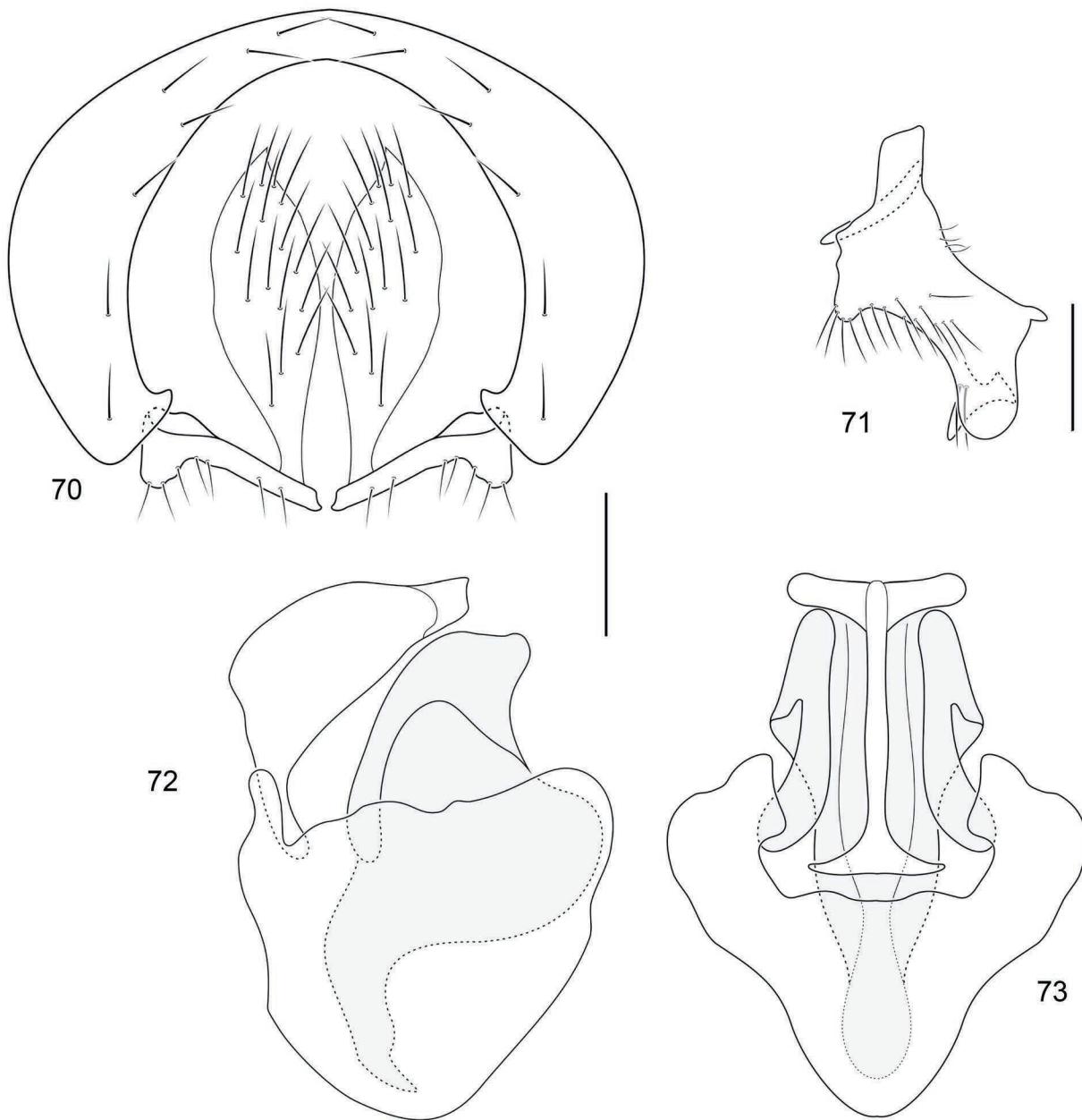
handwritten]." The holotype is double mounted (minuten pin in a vertical rectangular card), is in good condition (thorax partly torn by the pin; abdomen not dissected), and is deposited in the ANSP (6092).

OTHER SPECIMENS EXAMINED. COLOMBIA.

Santander: Aljibes, Providencia (about 33 km SW Zaragosa; $06^{\circ}46.1'N$, $73^{\circ}32.7'W$), 13 Oct 1970, R. W. Pinger (8♂, 6♀; USNM). **Valle del Cauca:** Buenaventura 70 km E, Anchicayá ($03^{\circ}36.9'N$, $76^{\circ}54.8'W$; 400 m), 17–20 Feb 1970, D. M. Wood (1♀; CNC).

COSTA RICA. **Alajuela:** Peñas Blancas ($10^{\circ}04'N$, $84^{\circ}37'W$; 700 m; rain forest), 18 Aug 1986, L. Masner (3♂, 1♀; CNC). **Cartago:** Cartago ($9^{\circ}51.4'N$, $83^{\circ}55.2'W$), 4 Jul 1909, P. P. Calvert (2♂, 1♀; ANSP); Cartago (near; $09^{\circ}51.3'N$, $83^{\circ}55.2'W$), 15 Dec 1909, P. P. Calvert (2♂, 2♀; ANSP); La Carpintera ($09^{\circ}53.9'N$, $83^{\circ}58.8'W$), 4 Dec 1909, P. P. Calvert (3♂, 1♀; paratypes; allotype ♀; ANSP); Pejibaye ($09^{\circ}49'N$, $83^{\circ}42'W$), 22–24 Mar 1987, W. E. Steiner (1♀; USNM); 24 Mar 1987, at black light in cut-over forest near river (2♂; USNM); Turrialba ($09^{\circ}54.1'N$, $83^{\circ}41.1'W$), Nov 1922, P. Schild (1♀; USNM). **Guanacaste:** La Palma ($10^{\circ}15.2'N$, $85^{\circ}03.3'W$), Aug 1923 (2♂; ANSP). **Heredia:** Santo Domingo, Instituto Nacional de Biodiversidad (INBio) ($09^{\circ}58.4'N$, $84^{\circ}5.6'W$), 18 Feb 2003, W. N. Mathis (1♂; USNM); La Selva Biological Station ($10^{\circ}27.2'N$, $84^{\circ}0.2'W$; trap in garden), Jan 1993, P. Hanson (14♂, 15♀; USNM). **Limón:** Puerto Vargas ($09^{\circ}43.9'N$, $82^{\circ}48.9'W$; beach), 27–28 Jun 2001, W. N. Mathis (4♂; USNM). **Paraíso:** Navarro ($09^{\circ}48.6'N$, $83^{\circ}52.7'W$; light trap), Jul 1962, F. S. Blanton (1♀; USNM). **Puntarenas:** Monte Lirio ($08^{\circ}46.8'N$, $82^{\circ}49.8'W$), 27 Aug 1923, R. C. Shannon (4♂, 1♀; ANSP); Piedras Blancas (24 km W; $08^{\circ}47'N$, $83^{\circ}15'W$; 200 m; Malaise trap), Dec 1990, P. Hanson (1♂; USNM); San Vito, Las Cruces ($08^{\circ}49.3'N$, $82^{\circ}58.3'W$; 1200 m), 9 Jul 1983, B. Gill (1♂; CNC); San Vito, Las Alturas ($08^{\circ}57'N$, $82^{\circ}50'W$, 1500 m; Malaise trap), Dec 1991, P. Hanson (4♂, 3♀; USNM). **San José:** Ciudad Colón ($09^{\circ}55'N$, $84^{\circ}15'W$; 800 m; Malaise trap), Dec 1989, P. Hanson (4♀; USNM); El Rodeo ($09^{\circ}54.6'N$, $84^{\circ}12.2'W$, 1860 m), 26 Jun 2001, W. N. Mathis (5♂, 1♀; USNM); Río Savegre ($09^{\circ}33'N$, $83^{\circ}48.5'W$; 2180 m), 7–8 Aug 2001, D. and W. N. Mathis (1♂, 1♀; USNM); Zurquí ($10^{\circ}2.6'N$, $84^{\circ}0.4'W$), 19 Feb 2003, W. N. Mathis (4♂; 3♀; USNM); Zurquí de Mora-via ($10^{\circ}05'N$, $84^{\circ}01'W$, 160 m; Malaise trap), Mar 1991, P. Hanson (3♂, 8♀; USNM).

ECUADOR. **El Oro:** El Guabo ($0^{\circ}38.2'S$, $76^{\circ}08.9'W$), Dec 1955, R. Levi-Castillo (12♂; USNM); Pasaje (6 km E; $03^{\circ}18.1'S$, $79^{\circ}47.1'W$), 13 Jan 1978, W. N. Mathis (1♀; USNM). **Cotopaxi:** Latacunga (N; $00^{\circ}52.2'S$, $78^{\circ}37.1'W$; 3300 m), Dec 1970, L. E. Peña (2♂, 2♀; INPA, USNM). **Guayas:** Machala (49.5 km NNE; $02^{\circ}40'S$, $79^{\circ}13.4'W$; 40 m), 13 Jan 1978, W. N. Mathis (1♂; USNM). **Loja:** La Toma, W of Loja ($03^{\circ}59'S$, $79^{\circ}21'W$; 1500 m), Nov 1970, L. E. Peña (1♀; MZUSP); Loja ($03^{\circ}59.4'S$, $79^{\circ}12.3'W$; 1200 m), 26 Mar–23 Nov 1965, 1970, L. E. Peña (3♂; CNC, MZUSP). **Napo:** Limoncocha ($00^{\circ}24.7'S$, $76^{\circ}37.5'W$), 9 Mar–15 Jun 1976, 1977, P. J. Spangler,

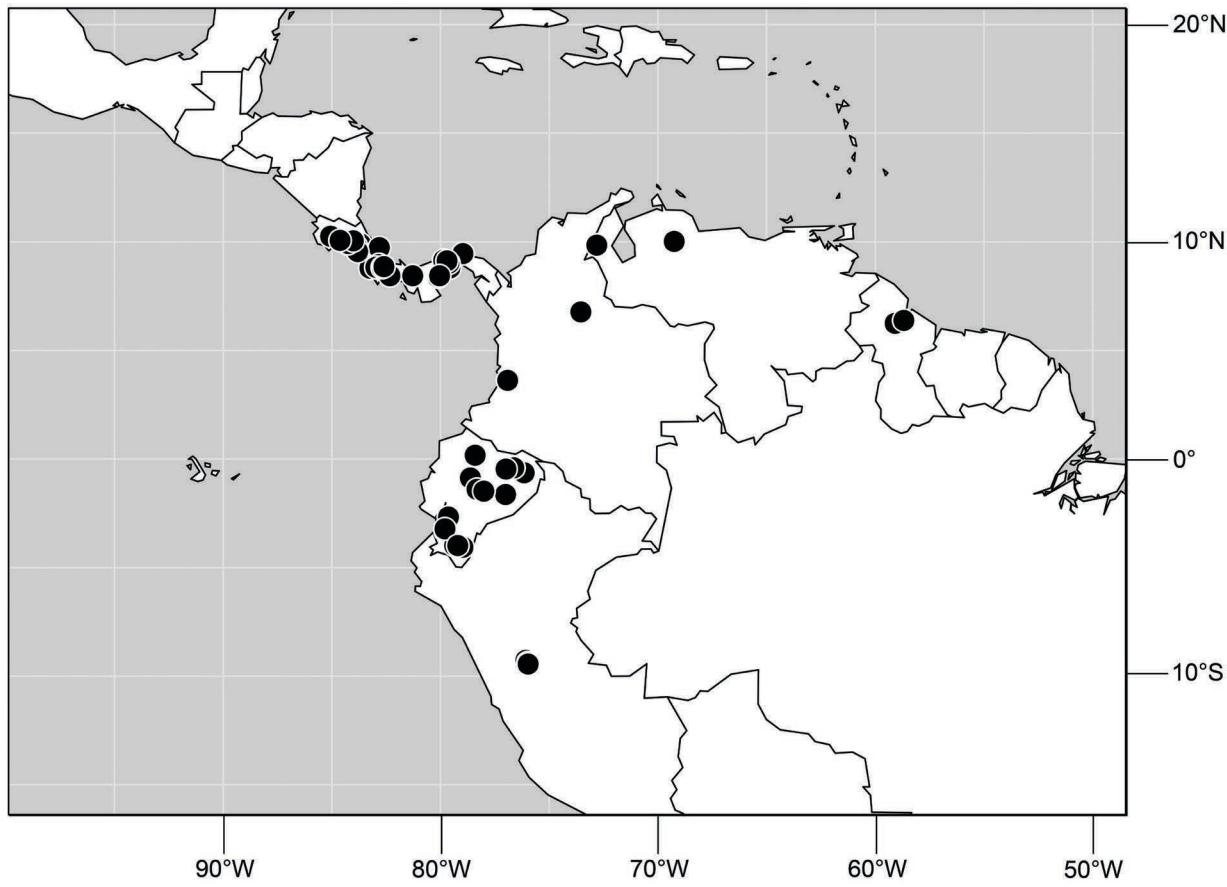


FIGURES 70–73. Structures of male terminalia of *Paralimna (Paralimna) meridionalis* Cresson (Costa Rica. Cartago): (70) epandrium, cerci, and presurstyli, posterior aspect; (71) posturstylos, lateral aspect; (72) aedeagus, phallapodeme, and hypandrium, lateral aspect; (73) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

D. R. Givens, G. E. Shewell (2♂, 2♀; CNC, USNM). **Orellana:** Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–13 Apr 1965, L. E. Peña (1♀; CNC); Rio Tiputini (0°38.2'S, 76°8.9'W), 12–26 Aug 1999, W. N. Mathis, A. Baptista, M. Kotrba (5♂; USNM). **Pastaza:** Río Puyo (01°29.1'S, 77°59.7'W), R. Levi-Castillo (4♂; USNM). **Pichincha:** Peruco (N; 00°10.2'N, 78°24.4'W; 2000 m), Jan 1971, L. E. Peña (1♂; MZUSP). **Tungurahua:** Banos (11 km SE; 01°23.8'S, 78°19'W; 1660 m), 25 Jan 1976, P. J.

Spangler (7♂; INPA, USNM). **Zamora-Chinchipe:** W Zamora (04°03.8'S, 78°57.9'W; 1200 m), Nov 1970, L. E. Peña (3♂; MZUSP).

GUYANA. **Mazaruni-Potaro:** Takutu Mountains (06°15'N, 59°5'W; Malaise trap near stream in montane rainforest, Earth Research Expedition), 3–19 Dec 1983, P. J. Spangler, W. E Steiner (7♂, 4♀; USNM); Kartabo Point (06°23'N, 58°41'W), 22–26 Dec 1983, W. E. Steiner (1♂, 1♀; USNM).



MAP 13. Distribution map for *Paralimna* (*Paralimna*) *meridionalis* Cresson.

PANAMÁ. *Chiriquí*: Cerro Punta (2 km W; 08°51.1'N, 82°35.9'W; 1700 m), 19 May–8 Jun 1977, S. Peck, H. Howden (1♀; CNC); Hato del Volcán (15 km NW; 08°48.8'N, 82°40.6'W; 1200 m), 24–31 May 1977, S. Peck, H. Howden (2♂, 4♀; CNC); Monte Lirio (08°47.5'N, 82°49.5'W), 27 Aug 1923, R. C. Shannon (5♂, 1♀; ANSP); El Valle (08°25.9'N, 82°19.8'W), Dec 1953 (1♂; USNM). *Coclé*: Playa Santa Clara (08°22.4'N, 80°06.3'W), 2 Jul 1967, W. W. Wirth (2♂, 8♀; USNM). *Guna Yala*: San Blas, Rio Carti Grande near coast (09°27.3'N, 78°57.8'W), 2 Mar 1985, O. S. Flint Jr., J. E. Louton (2♂; USNM). *Panamá*: Canal Zone (08°48'N, 79°34'W), Dec 1946, N. L. H. Krauss (1♀; USNM); La Hermita (08°26.2'N, 80°02.7'W), 18 Sep 1952 (1♀; USNM); Pedro Miguel (09°01.1'N, 79°36.7'W), R. C. Shannon (1♀; ANSP); Barro Colorado Island (09°09.1'N, 79°50.8'W), 16 Jun–25 Dec 1928, 1967, 1978, A. Aiello, R. Silberglied, W. W. Wirth, N. E. Woodley (3♂, 6♀; USNM); Gamboa, Pipeline Road (09°07'N, 79°42'W; Malaise trap), Jul 1967, W. W. Wirth (7♂, 1♀; USNM). *Veraguas*: Cerro Campana (08°25.9'N, 81°16.9'W), Jul 1967, W. W. Wirth (1♂, 1♀; USNM).

PERU. *Huánuco*: Tingo Maria, Río Monzon Valley (09°16.2'S, 76°04.2'W), 23 Dec 1954, E. L. Schlinger, E. S. Ross

(4♂; USNM); Tingo Maria (6 km S; 09°22.7'S, 75°58.4'W), 8 Feb 1984, W. N. Mathis (1♀; USNM); Las Palmas, Río Huallaga (09°26.5'S, 75°58.3'W), 8 Feb 1984, W. N. Mathis (1♂; USNM).

VENEZUELA. *Lara*: Yacambú (10°0.7'N, 69°14.6'W; 1200 m), 10 May 1981, H. K. Townes (16♂, 12♀; CNC). *Zulia*: El Tucuco (45 km SW of Maquiches; 09°50.7'N, 72°48.7'W), 5–6 Jun 1976, A. S. Menke, D. Vincent (4♂, 20♀; USNM).

TYPE LOCALITY. Neotropical. Costa Rica. Cartago: La Carpintera (9°53.9'N, 83°58.8'W).

DISTRIBUTION. (Map 13) *Neotropical*: Costa Rica (Alajuela, Cartago, Guanacaste, Heredia, Paraíso, Puntarenas, San José), Colombia (Santander), Ecuador (Cotopaxi, El Oro, Guayas, Loja, Napo, Orellana, Pastaza, Pichincha, Tungurahua, Zamora-Chinchipe), Guyana (Mazaruni-Potaro), Panamá (Chiriquí, Coclé, Guna Yala, Panamá, Veraguas), Peru (Huánuco), Venezuela (Lara, Zulia).

REMARKS. *Paralimna brunneiceps*, *P. fellerae*, *P. meridionalis*, *P. nigropicta*, and *P. punctipennis* have very similar male terminalia, especially the presurstylus with a developed basoventral process that is rounded on its ventral margin.

Additionally, the anteroventral margin of the male forefemur of *P. meridionalis* and *P. punctipennis* has simple setae that are not flattened. *Paralimna meridionalis*, however, can be easily distinguished from *P. punctipennis* by lacking short perpendicular stump veins on the second section of vein M and by the wholly gray mesopleuron with some small spots. Specimens of *P. punctipennis* have one or more short, perpendicular, stump veins on the second section of vein M, and its mesopleuron is distinctly light colored on the dorsal half and dark ventrally.

16. *Paralimna (Paralimna) molossus* Schiner

FIGURES 74–77, 179–180, 212, MAP 14

Paralimna molossus Schiner 1868:242.—Cresson 1947:52 [review, Neotropical species].—Lizarralde de Grosso 1989:38 [list, Argentina].—Mathis and Zatwarnicki 1995:122 [world catalog].

Paralimna puncticornis variety *captiosa* Cresson 1916:122 [Trinidad. Montserrat; HT ♂, USNM (19685)].—Cresson 1929:192 [synonymy].

Paralimna luctans Cresson 1933:66 [Argentina. Misiones: Posadas; HT ♂, BMNH].—Cresson 1947:52 [synonymy].

Paralimna bistriata Hendel 1930:128 [Bolivia. El Cairo, Santa Cruz de la Sierra; LT ♂, SMN].—Cresson 1947:53 [list, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:119 [world catalog]. NEW SYNONYM.

DIAGNOSIS. This species is distinguished from congeners by the following characters: general coloration rust; face bicolor, golden gray on dorsal half and lateral margins, becoming gray in the ventral half, carina sometimes golden tinged; parafacial and gena silvery gray; scutellum wholly reddish brown with lateral margin golden; anepisternum wholly brown or slightly paler in middle; pedicel with a pale golden dorsal spot; legs brown with dense reddish-brown microtomentum, forefemur of male with anteroventral and posteroventral series of setae complete with 1 series of long, slender, and sparse setae as long as width of femur, shortened near apex of femur; ventrolateral margins of tergites brown.

DESCRIPTION. Body length 3.5–4.6 mm; body generally bicolored, pale brown dorsally, lateral surfaces yellowish or dark gray.

Head: (See Figures 179–180) Frons golden brown to reddish brown with linear pale golden spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with small inconspicuous brown and pale brown spots, respectively, lateral to antenna and separated by yellow spot. Antennal scape and pedicel brown, pedicel with distal margin paler with a pale golden dorsal spot; basal flagellomere brown to yellow, according to incidence of light, with slender, elongate, pale setae on margin; arista with 9 long, dorsal rays. Postcranum with 2 complete series of postocular setae, the second series irregular.

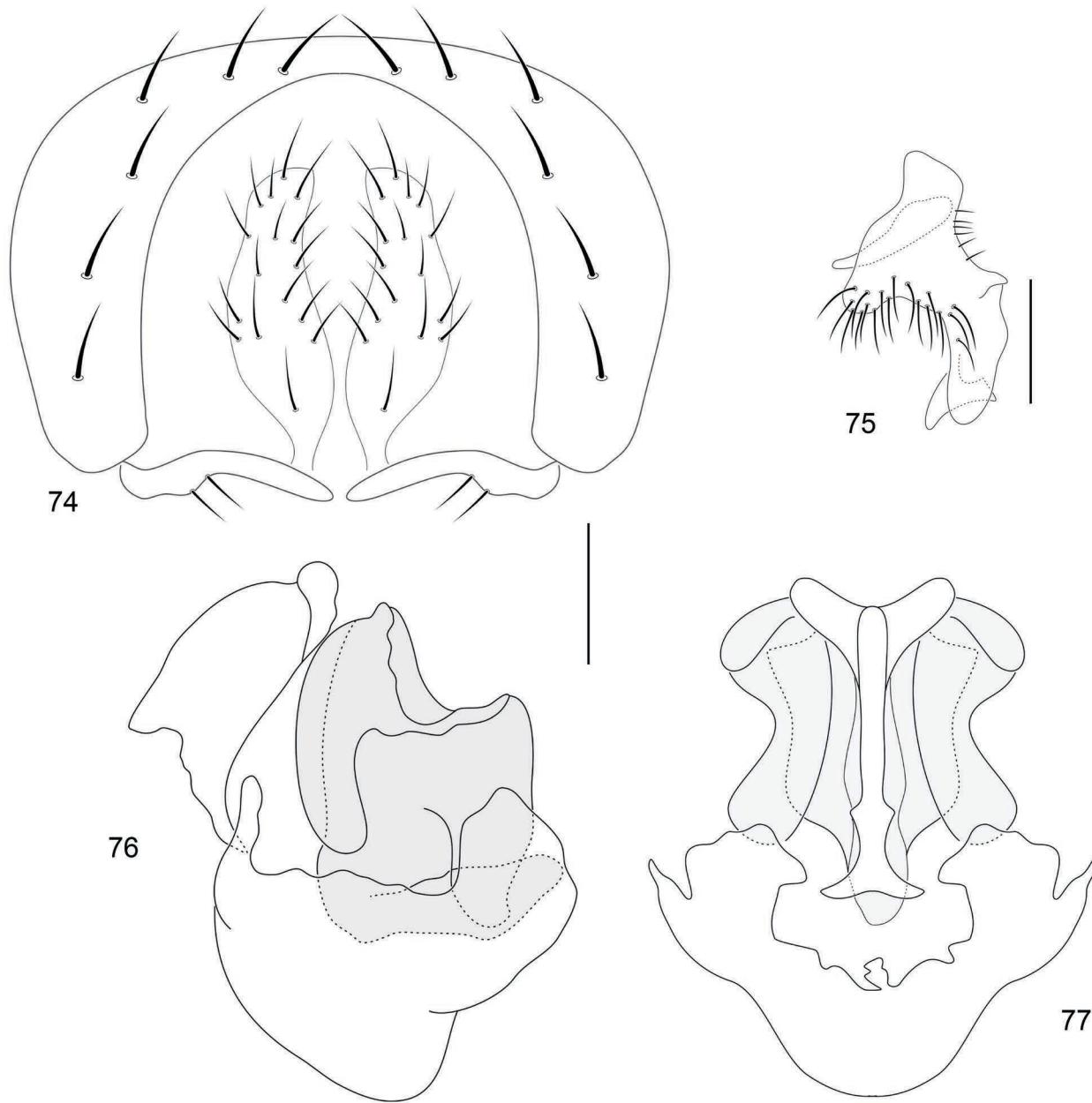
Face bicolor, pale golden on dorsal half and lateral margins and becoming dark gray in the ventral half; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus gray. Eye rounded, about as wide as high, height about twice the height of gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.36–0.50.

Thorax: Mesonotum yellowish gray to pale golden with golden to reddish-brown spots, 3 slender stripes between dorso-central rows, the lateral ones brown and the central one reddish brown, plus golden brown areas laterally; postpronotum, notopleuron, and supra-alar areas mostly yellowish gray; scutellum wholly reddish brown with lateral margin golden. Pleurae yellowish gray to pale brown with anepisternum wholly brown or slightly paler in middle; anepimeron slightly brownish on ventral margin. Wing slightly brownish; veins pale brown; costal-vein ratio 0.33–0.57; M-vein ratio 0.92–1.05. Legs brown with dense reddish-brown microtomentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male (see Figure 212) with anteroventral and posteroventral series of setae complete with 1 series of long, slender, and sparse setae, as long as width of femur, shortened near apex of femur; foretibia of male slightly arcuate.

Abdomen: Tergites distinctly bicolored, tergite 1 brown with lateral corner yellowish gray, tergites 2–5 brown along anterior half and medially, otherwise silvery gray dorsally, ventrolateral margins of tergites brown, sometimes silvery gray. Male terminalia: (Figures 74–77) Presurstylus not bifurcate, horizontal process slender, slightly convex dorsally, with sparse slender setae, usually 2; in lateral view posturstylus widest medially with wide, medial, anteriorly produced lobe bearing several slender, moderately elongate setae extended until half the medial region on external surface, a thin medial lobe poorly produced posteriorly; lateral aedeagal process more than $\frac{1}{2}$ length of aedeagus, robust, apex rounded; aedeagus short, narrowed apically in posterior view, short and broad in lateral view; phallapodeme triangular in lateral view; hypandrium shallowly concave.

TYPE MATERIAL. The lectotype female of *Paralimna molossus* Schiner (designated by Cresson 1929:192) is labeled “TYPE [red]/Lindig 1894 Venezuela/Paralimna molossus Schin[er].[handwritten]/molo[s]sus [sic; handwritten] Alte Sammlung.” The lectotype is double mounted (minute pin in a block of wood), is in good condition (left basal flagellomere and arista and hindtarsomeres 2–5 of both legs missing; vertical setae broken; abdomen not dissected), and is deposited in NMW.

The lectotype male of *Paralimna bistriata* Hendel, designated herein, is labeled “El Cairo.Boliv.VIII.26.Lind.D.Chaco-Exped [black margin]/Paralimna bistriata Hend. [handwritten] F. Hendel det./Type. Hendel 1930 [handwritten; red ink; label with a black border]/SMN/Lectotype ♂ *Paralimna bistriata* Hendel, designated by Ale-Rocha&Mathis [red].” The lectotype is double mounted (minuten pin in a rectangular card), is in excellent condition (abdomen not dissected), and is deposited in the SMN. We also examined two female paralectotypes from the same locality.



FIGURES 74–77. Structures of male terminalia of *Paralimna (Paralimna) molossus* Schiner (Paraguay. Pirapó): (74) epandrium, cerci, and presurstyli, posterior aspect; (75) postsurstylus, lateral aspect; (76) aedeagus, phallapodeme, and hypandrium, lateral aspect; (77) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

OTHER SPECIMENS EXAMINED. Neotropical.
ARGENTINA. *Misiones*: Santa Ana ($27^{\circ}22.1'S$, $55^{\circ}34.9'W$), 9 Nov 1949, M. Aczel (5♀; USNM).

BOLIVIA. *Beni*: Puerto Cavinas ($12^{\circ}32.1'S$, $66^{\circ}55'W$), Jan 1921–1922, W. Mann, Bio. Expl. (2♀; USNM). *La Paz*: Coroico ($16^{\circ}11.30'S$, $67^{\circ}43.6'W$) (1♂; ANSP); Apa Apa (8 km S Chulumani; $16^{\circ}22'S$, $67^{\circ}30.4'W$; 1960 m), 9–10 Mar

2001, W. N. Mathis (68♂, 7♀; USNM); Chulumani (8 km S; $16^{\circ}35.6'S$, $68^{\circ}51.2'W$, 3840 m), 9–10 Mar 2001, A. Freidberg, W. N. Mathis (3♂, 3♀; USNM); Chulumani (8 km S; $16^{\circ}22'S$, $67^{\circ}30.4'W$; 1950–2100 m), 23 Mar 2001, S. D. Gaimari (1♂; USNM); Chulumani (8 km S; $16^{\circ}35.6'S$, $68^{\circ}51.2'W$, 1960 m), 9 Mar 2001, A. Freidberg (2♂, 2♀; USNM); Chulumani (2 km S; $16^{\circ}23.5'S$, $67^{\circ}31.8'W$; 1750 m), 9–10 Mar 2001, A. Freidberg

(10♂, 1♀; USNM); Mapiri (15°18.6'S, 68°13'W; 720 m), 15 Mar 2001, S. D. Gaimari (1♂; USNM); Puente Villa (2 km E; 16°24'S, 67°38'W; 1960 m), 11 Mar 2001, W. N. Mathis (40♂, 1♀; USNM); Puente Villa (17 km W; 16°20.9'S, 67°49'W; 2070 m), 11 Mar 2001, W. N. Mathis (16♂; USNM). **Santa Cruz:** Pedro Lorenzo (15 km S; 18°01.40'S, 63°11.84'W, 540 m), 1 Sep 2000, S. D. Gaimari (4♀, 1♂; USNM); 1 Nov 2000, S. D. Gaimari (1♀; USNM); Buena Vista Hotel Flora y Fauna (4–6 km SSE; 17°29.49'S, 63°33.152'W; 400–500 m), 1–10 Sep 2002, R. Leschen (1♀; USNM); Campo Guairay (24 km S Camini; 20°11.8'S, 63°28.6'W; 870 m) 2 Sep 2000, S. D. Gaimari (1♂; USNM);

BRAZIL. Minas Gerais: Passos (10 km ENE; 20°43.9'S, 46°43.4'W), 1 Jun 1991, A. L. Norrbom, R. A. Zucchi (1♂, 3♀; USNM); **Minas Gerais:** Delfinópolis, Serra da Canastra, Pousada Cachoeira Paraíso (20°20.3'S, 46°47.1'W; 790–860 m; sweeping), 3 Jan 2007, D. Amorim, G. Ribeiro (1♀; MZUSP); Delfinópolis, Serra da Canastra, Pousada Cachoeira Paraíso (20°20.5'S, 46°47.5'W; 800 m; light trap), 3 Jan 2007 (1♂; 2♀; MZUSP); 3–7 Jan 2007 (2♂, 6♀; MZUSP). **Santa Catarina:** Nova Teutônia (27°11'S, 52°23'W; 300–500 m), Apr 1950, F. Plaumann (2♂; USNM). **São Paulo:** São Paulo (23°33.6'S, 46°35.8'W) (4♂, 4♀; ANSP); Cássia do Coqueiros, Municipalidade Cajuru (21°16.5'S, 47°18.3'W), Jan 1947, M. P. Barreto (1♀; MZUSP); Córrego Azul, Araçatuba (21°12.7'S, 50°25.5'W), Mar 1947, M. P. Barreto (1♂; MZUSP); Fazenda Pau D'Alho (80 km N São Paulo), 28–29 Oct 1972, R. B. Peterson (3♂; CNC). **Distrito Federal:** Parque Nacional (15°45'S, 47°50'W), 3 Mar 1970, J. M. and B. A. Campbell (1♀; CNC).

CHILE. Arica and Parinacota: Arica (18°28.5'S, 70°18.9'W), Oct 1932, F. Jaffuel (1♂; USNM). **Tarapaca:** Azapa (18°31'S, 70°11'W), 8–10 Nov 1955, L. E. Peña (2♂; CNC)

COLOMBIA. Magdalena: Aracataca (10°35.5'N, 74°11.3'W; in heavy forest with dense undergrowth), 13 Aug 1920 (1♂; ANSP); Ujhelyi (Sierra Nevada de Santa Marta, San Lorenzo; 11°07'N, 74°02'W) (1♂; ANSP).

ECUADOR. Azuay: Pante (02°46.8'S, 78°45.5'W; 1800 m), 8 Mar 1965, L. E. Peña (3♂, 3♀; CNC). **El Oro:** Rio Grande (15 km S Zaruma; 03°42.8'S, 79°36.8'W; 850 m), 9 Apr 1965, L. E. Peña (2♂, 1♀; CNC). **Guayas:** Machala (49.5 km NNE; 02°40'S, 79°13.4'W; 40 m), 13 Jan 1978, W. N. Mathis (1♀; USNM). **ECUADOR.** “Ecuador,” 1914, H. A. Parish (1♂, 1♀; USNM).

PARAGUAY. Guaira: Independencia (25°41.7'S, 56°15.5'W), 2 Oct 1951, J. Foster (1♂, 2♀; USNM); Estancia Molina Cue (25°03.7'S, 56°35.8'W), Oct 1939, F. Schade (1♀; USNM). **Pirapó:** Villarica (26°51.3'S, 55°32.5'W), May–Sep 1937, 1938, 1939, F. Schade (13♂, 12♀; USNM).

PERU. “Peru,” 1914, H. A. Parish (1♀; USNM). **Cuzco:** Paucartambo, Atalaya (Río Alto Madre de Dios; 12°53.1'S, 71°21.6'W; 600 m), 4 Sep 1988, W. N. Mathis (11♂, 5♀; USNM); Quincemil (13°13.7'S, 70°45.6'W; 740 m), 13–31 Aug

1962, L. E. Peña (3♂, 2♀; CNC). **Huánuco:** Cochicoto (09°13'S, 76°12.8'W), 5 Sep 1965, J. C. Hitchcock Jr. (2♂, 2♀; USNM); Tingo Maria, Río Monzon Valley (09°16.2'S, 76°04.2'W), 23 Dec 1954, E. L. Schlinger, E. S. Ross (4♂; USNM); Tingo María (6 km S; 09°22.7'S, 75°58.4'W), 8 Feb 1984, W. N. Mathis (4♂, 6♀; USNM); Tingo Maria (1 km S; 09°19.6'S, 75°59.8'W), 4–6 Feb 1984, W. N. Mathis (3♀, 2♂; USNM); La Esperanza (11 km N Huánuco; 09°53.6'S, 76°13.3'W) 5 Feb 1984, W. N. Mathis (8♂, 5♀; USNM); Las Palmas (1 km S; 09°26.9'S, 75°58.6'W), 8 Feb 1984, W. N. Mathis (12♂, 3♀; USNM); Las Palmas, Río Huallaga (09°26.5'S, 75°58.3'W), 8 Feb 1984, W. N. Mathis (1♂; USNM); Las Palmas (1 km N; 09°26.3'S, 75°58'W; small waterfall), 8 Feb 1984, W. N. Mathis (2♂; USNM). **Junín:** Perené (10°56.8'S, 75°13.6'W), R. C. Shannon (1♀; USNM). **Lima:** Lima (12°02.8'S, 77°03.7'W), Aug 1914, H. S. Parish (2♂; USNM); Lima (12°02.9'S, 77°03.7'W), 2 Feb–Aug 1914, 1984, W. N. Mathis, H. S. Parish (15♂, 7♀; USNM); Chosica (11°56.3'S, 76°41.6'W), C. H. T. Townsend (1♀; USNM). **Madre de Dios:** Río Manu, Erika (near Salvación; 12°50.7'S, 71°23.3'W; 550 m), 5–6 Sep 1988, W. N. Mathis (17♂, 1♀; USNM); Río Manu, Cocha Salvador (11°59.9'S, 71°13.9'W; 300 m), 14 Sep 1988, W. N. Mathis (1♂; USNM); Río Manu, Pakitza (11°56.6'S, 71°16.9'W; 250 m), 9–23 Sep 1988, W. N. Mathis (1♀; USNM). **El Conde:** San Bartolomé (01°08'S, 78°36'W), Jul 1913, C. T. Brues (3♂, 5♀; USNM). **Loreto:** Iquitos (12 km W; 03°48.4'S, 73°20.5'W), 16 Feb 1984, W. N. Mathis (1♂; USNM).

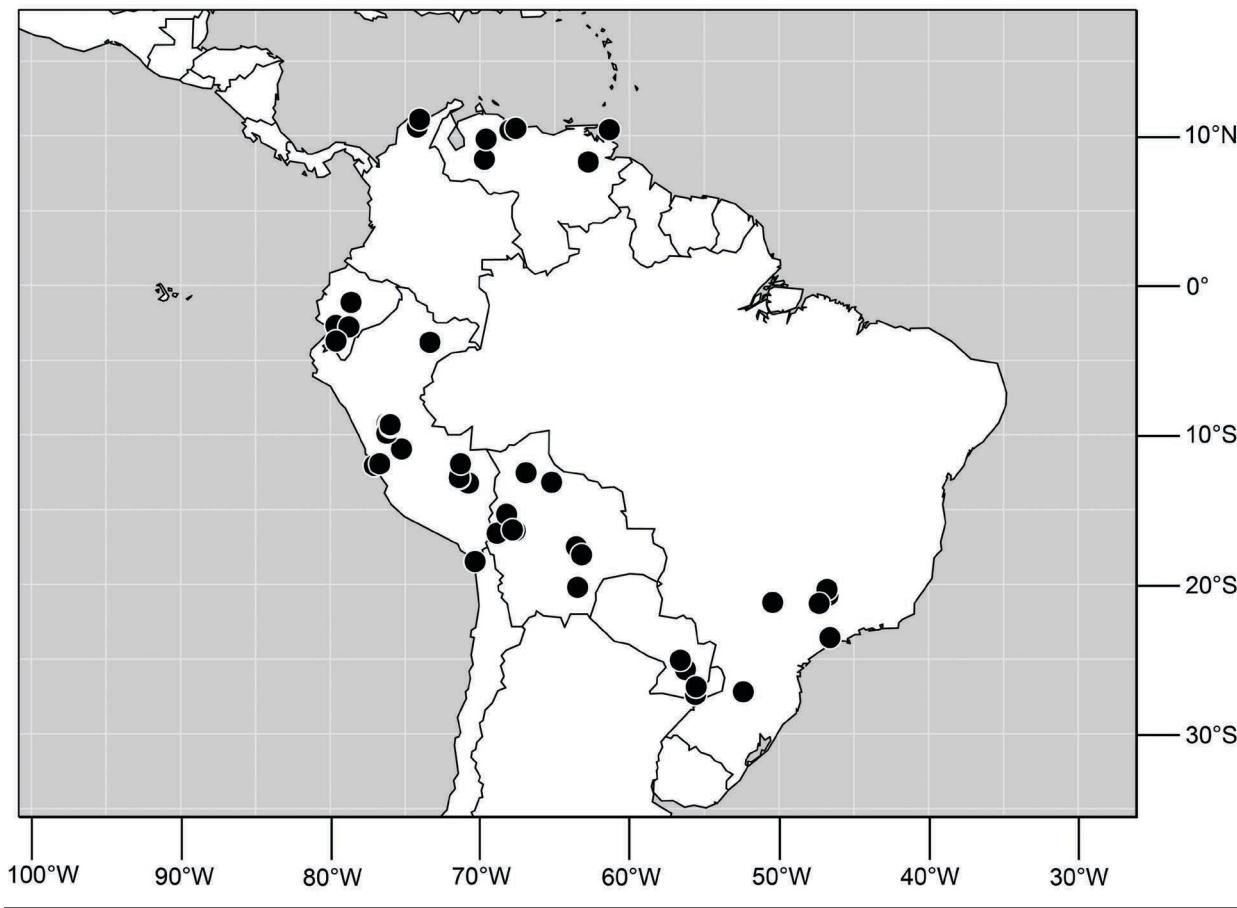
TRINIDAD AND TOBAGO. Trinidad. Montserrat Hills (10°25'N, 61°20'W), 4 Jul 1905, A. Busck (1♂; paratype of *P. captiosa*; USNM).

VENEZUELA. “Caife,” Jan 1943, P. Anduze (1♂, 2♀; USNM). **Barinas:** Santa Rosa (08°26.4'N, 69°42'W), Dec 1942, P. Anduze (1♀; 1♂; USNM). **Bolívar:** Gran Sabana, Akuriman (08°16'N, 62°45.3'W), Nov–Feb 1940 (3♂; USNM). **Carabobo:** San Esteban (10°23.5'N, 67°58.8'W), 26 Nov–27 Dec 1939, P. Anduze (4♂, 7♀; USNM); Valle Seco (10°30.5'N, 67°35.3'W), Jan 1940, P. Anduze (2♂; 6♀; ANSP, USNM). **Lara:** Parque Nacional Yacambú (09°47.1'N, 69°35'W), 6–8 Apr 1981, L. Holenberg, A. S. Menke (1♀; USNM).

TYPE LOCALITY. Neotropical. “Venezuela.”

DISTRIBUTION. (Map 14) **Neotropical:** Argentina (Misiones), Bolivia (Beni, La Paz, Santa Cruz), Brazil (Minas Gerais, Santa Catarina, São Paulo), Chile (Arica and Parinacota, Tarapaca), Colombia (Magdalena), Ecuador (Azuay, Guayas, El Oro), Paraguay (Guaira, Pirapó), Peru (Cuzco, El Conde, Huánuco, Junín, Lima, Loreto, Madre de Dios), Trinidad and Tobago, Venezuela (Barinas, Bolívar Carabobo, Lara).

REMARKS. The male terminalia of *P. molossus* resemble those of *P. stigmata* sp. nov., especially the simple presurstylus and the robust lateral aedeagal process. The other structures of the male terminalia, however, are quite different. Additionally, these species can be easily distinguished by the staining on the body, especially on the face.



MAP 14. Distribution map for *Paralimna (Paralimna) molossus* Schiner.

17. *Paralimna (Paralimna) nigropicta* Cresson

FIGURES 78–81, 182, MAP 15

Paralimna nigropicta Cresson 1916:118 [Guatemala. Puerto Barrios (15°43.5'N, 88°35.6'W); HT ♀, OSUC].

Paralimna (Paralimna) nigropicta.—Cresson 1947:51 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:123 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: face silvery gray or yellowish gray with a dark brown to black velvety quadrangular short spot between antennal bases, face uniformly silvery or yellowish gray, rarely an inconspicuous pale golden-brown stripe below black velvety spot on the carina and sometimes paired small pale golden spots between largest facial setae; ventral fronto-orbits with a dark brown spot lateral to antenna forming a horizontal dark brown band at level of antennal bases; pleurae silvery gray, only anepisternum with dorsal margin pale brown tinged; forefemur of male concave ventrally near apex, bearing anteroventral

row of curved, flattened setae and a posterovenital linear patch of short, acutely pointed, curved or straight setae, ending at $\frac{1}{3}$ distal of femur; tergite 1 brown with lateral angles silvery gray.

DESCRIPTION. Body length 3.1–4.6 mm; body generally bicolored, pale brown, sometimes dark brown, dorsally, lateral surfaces silvery, yellowish, or dark gray.

Head: (See Figure 182) Head wider than high in anterior view; frons pale brown to dark brown with linear pale yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbit with a dark brown spot at level of base of antenna and dorsal parafacial with a dark gray spot lateral of antenna, separated from the dark brown spot by silvery-gray spot. Antennal scape and pedicel brown, pedicel with distal margin paler; basal flagellomere pale brown, with slender, elongate, pale setae on margin; arista with 10–13 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face uniformly silvery or yellowish gray, with a dark brown to black quadrangular velvety short spot between antennal bases, rarely an inconspicuous pale golden-brown stripe

on the carina below the dark brown spot and extended until middle of face, and sometimes paired small pale golden spots between largest facial setae; parafacial and gena silvery or yellowish gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye slightly higher than high, height about twice the height of gena. Gena high, height slightly longer than the length of basal flagellomere; gena-to-eye ratio 0.38–0.45.

Thorax: Mesonotum mostly pale brown with pale yellowish-gray areas, usually along setal tracks, 3 stripes between dorsocentral rows, sometimes coalesced to form a large brown area; postpronotum, notopleuron, and supra-alar areas gray; scutellum brown dorsally, with apex dark brown and pale gray laterally. Pleurae silvery gray, only anepisternum with dorsal margin pale brown tinged. Wing semi-hyaline; veins brown; costal-vein ratio 0.38–0.39; M-vein ratio 0.97–1.15. Legs pale brown to brown with sparse silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male bearing anteroventral row of curved, flattened setae and a posteroventral linear patch of short, acutely pointed, curved or straight setae, ending at distal 1/3 of femur; foretibia straight.

Abdomen: Tergites distinctly bicolored; tergite 1 brown with lateral angles silvery gray; tergites 2–6 dark brown along anterior 2/3 and medially, otherwise silvery gray. Male terminalia: (Figures 78–81) Presurstylus bifurcate, with basoventral process somewhat developed, length about 1/3 of horizontal process length, horizontal process shallowly curved; in lateral view postsurstylus widest medially with medial, anterior weakly produced lobe bearing long and slender setae extended along anterior 2/3 of external surface medially and an elongate digitiform curved process anterodistally; lateral aedeagal process less than 1/2 length of aedeagus, slightly curved subapically, bluntly rounded; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view; hypandrium somewhat deeply concave.

TYPE MATERIAL. The holotype female of *Paralimna nigropicta* is labeled “Pt. Barrios[,] Guatemala[,] M[ar]ch.3–14°05’/Holo-TYPE Paralimna NIGROPICTA E. T. Cresson Jr [maroon; “Paralimna NIGROPICTA” handwritten]/OSUC 0319623 [bar code].” The holotype is double mounted (glued to a paper triangle), is in excellent condition (abdomen not dissected), and is deposited in the OSUC.

OTHER SPECIMENS EXAMINED. Nearctic. UNITED STATES. Texas. *Aransas*: Aransas National Wildlife Refuge (28°06.9'N, 96°48'W), 22 Apr 1965, R. H. Jones, W. W. Wirth (3♂, 4♀; USNM); 20 May 1972 (1♀; USNM); Salt Creek (28°17.4'N, 96°57.9'W), 5 Jun 1953 (1♀; USNM). *Cameron*: Brownsville (25°54.1'N, 97°51.8'W), Jun–22 Nov 1910 (2♂, 1♀; ANSP); Harlingen (28°02.8'N, 97°51.8'W), 23 Feb–Aug 1945, D. E. Hardy, V. L. Wooley (3♂, 8♀; USNM). *Gonzales*: Ottine, Palmetto State Park (29°35.2'N, 97°35'W), 10 Jul 1950 (2♂, 1♀; USNM). *Hidalgo*: Mercedes (26°09'N, 97°54.7'W), 7 Jun 1948 (1♀; USNM); Mission (26°13'N, 98°19.5'W), 15 Oct 1948 (1♂; USNM); Progresso (26°05.5'N, 97°57.4'W), 1 Jul 1938, R. H. Beamer (1♂; USNM). *Jim Wells*: Mathis (7.5

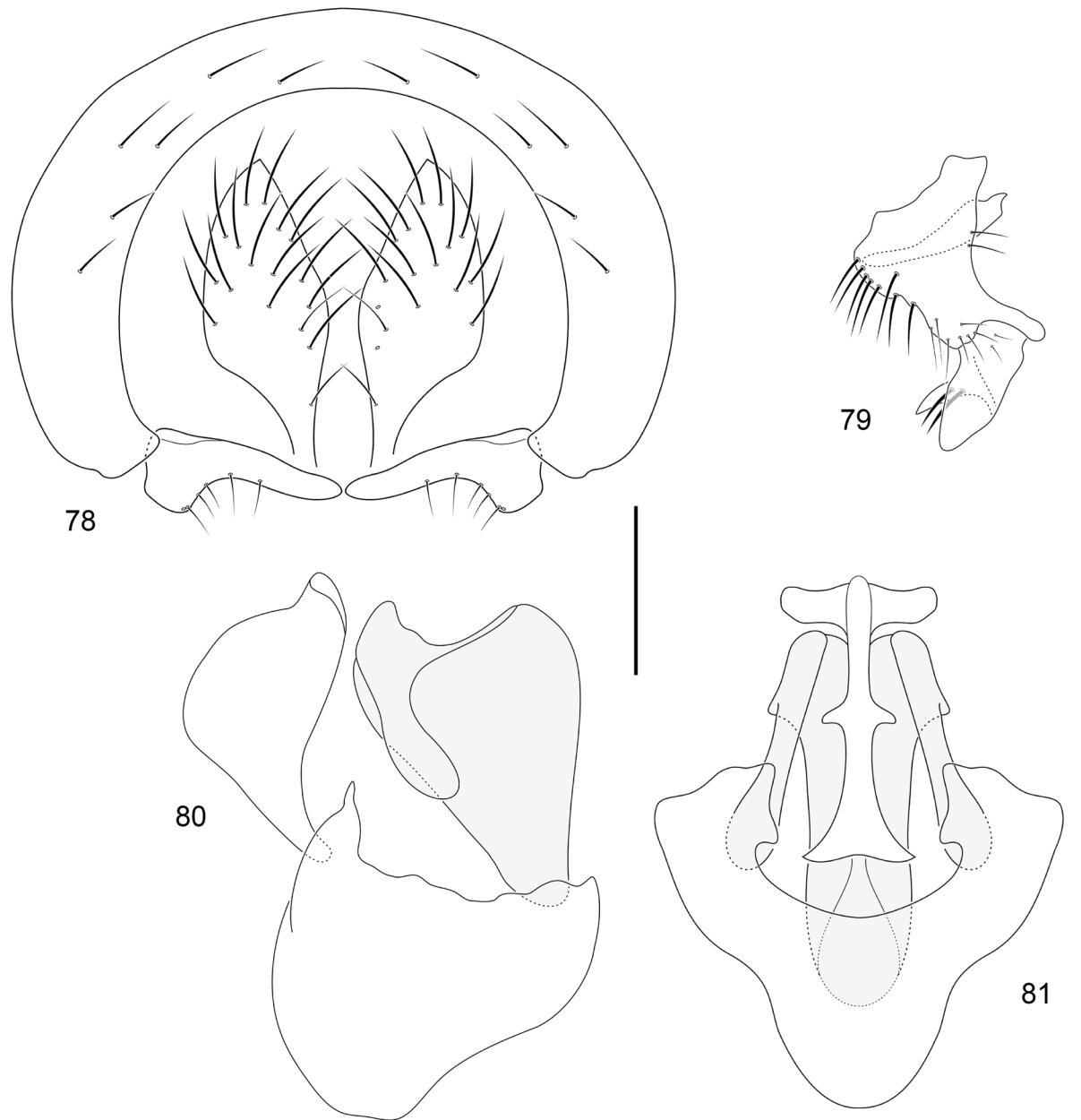
km S; 28°02.2'N, 97°52.2'W; 15 m; Nueces River), 6 Jun 2004, W. N. Mathis (5♂, 1♀; USNM). *Kleberg*: Kingsville (27°31'N, 97°51.4'W), 7 Jun 1921, F. M. Hull (1♂; USNM). *Mills*: Star (31°28.1'N, 98°19'W), 4 Apr 1946, F. A. Cowan (3♂; USNM). *San Patricio*: Mathis (28°05.7'N, 97°49.7'W), 17 Jul 1954, R. R. Dreisbach (1♂, 1♀; USNM); Mathis (5 km SW at Nueces River; 28°02.3'N, 97°51.5'W), 9 Dec 1984, W. Steiner, B. Gill, D. Whitehead (2♀; USNM); Mathis (6.5 km S; 28°02.8'N, 97°51.8'W; 18 m; Nueces River), 6 Jun 2004, W. N. Mathis (5♂; USNM). *Victoria*: Victoria (28°48.3'N, 97°0.2'W), 21 Jun 1909, J. D. Mitchell (1♀; USNM).

Neotropical. BELIZE. *Stann Creek*: Cockscorn Basin Wildlife Sanctuary (16°47'N, 88°30'W), 5–6 Apr 1993, W. N. Mathis (2♂; USNM); Maya Center: Cabbage Haul Creek (16°48'N, 88°23'W), 3 Apr 1993, W. N. Mathis (1♂; USNM); Wee Wee Cay (16°45.9'N, 88°08.6'W), Jan, Nov 1987, 1988, C. Feller, W. N. Mathis (8♂, 10♀; USNM); Hopkins (16°52'N, 88°17'W), 3 Apr 1993, W. N. Mathis (2♂, 1♀; USNM); Dangriga (16°58.2'N, 88°13.8'W), 30 Mar–4 Apr 1988, 1993, W. N. Mathis (5♂; USNM); Silk Grass Creek (16°54'N, 88°26'W), 3 Apr 1993, W. N. Mathis (7♂; USNM); Sittee Point (16°48.5'N, 88°15'W), 25 Apr 1987, R. Faitoute, P. J. Spangler (1♂; USNM); Sittee River, Possum Point Biological Station (16°52.1'N, 88°22.5'W), 6 Nov 1987, D. and W. N. Mathis (2♂, 2♀; USNM).

COSTA RICA. *Guanacaste*: Liberia (10°37.8'N, 85°26.4'W), 27 Mar 1987, J. M. Hill (1♂; USNM); Liberia (16 km NW; Rio Ahogados; 10°45.2'N, 85°30.9'W; black light), 25 Jul 1965, P. J. Spangler (5♂, 1♀; USNM). *Heredia*: La Selva Biological Station (10°27.2'N, 84°0.2'W; trap in garden), Jan 1993, P. Hanson (3♂; USNM). *Limón*: Río Banano (09°50.5'N, 82°56'W), 9 Nov 1909, P. P. Calvert (1♂; ANSP); Westfalia (4 km S; 09°54.5'N, 82°59'W; beach), 27 Jun 2001, W. N. Mathis (2♂, 2♀; USNM); Puerto Vargas (09°43.9'N, 82°48.9'W; beach), 27–28 Jun 2001, W. N. Mathis (2♂, 1♀; USNM). *Puntarenas*: Puerto Jiminez (5 km N; 10°13'N, 83°43'W; Malaise trap), Nov–Dec 1990, P. Hanson (1♂, 3♀; USNM); Rincón (3 km SW; 08°42.5'N, 83°29.2'W), Oct–Dec 1990, P. Hanson (1♀; USNM); San Pedrillo (08°37.2'N, 83°44.1'W), 12–15 Aug 2001, D. and W. N. Mathis (11♂, 1♀; USNM); Montezuma (1 km S; 09°39'N, 85°4.3'W), 20 Jun 2001, W. N. Mathis (1♂, 2♀; USNM); Malpais (09°37.6'N, 85°09.1'W; beach), 2 Jun 2001, W. N. Mathis (5♂, 2♀; USNM); Jacó (09°37'N, 84°38.5'W, beach), 13 Jun 2003, D. and W. N. Mathis (1♂; USNM).

EL SALVADOR. *La Libertad*: La Libertad (13°40.9'N, 89°21.6'W), 29 Oct 1965, N. L. H. Krauss (1♂; USNM). *Sonsonte*: Sonzacate (13°44'N, 89°43'W), 25 Jun 1958, L. J. Bottimer (1♀; USNM).

GUATEMALA. *Escuintla*: Nueva Concepción (14°11'N, 91°18.4'W; 50 ft [15 m]), 17 Aug 1963, D. Q. Cavagnaro, M. E. Irwin (2♂; USNM). *Izabal*: Puerto Barrios (15°43.5'N, 88°35.6'W), 3–14 Mar 1905 (1♀ paratype; ANSP). *Zacapa*: Gualán (15°06.9'N, 89°21.7'W), 15 Feb 1905 (1♀ paratype, 1♂; ANSP).

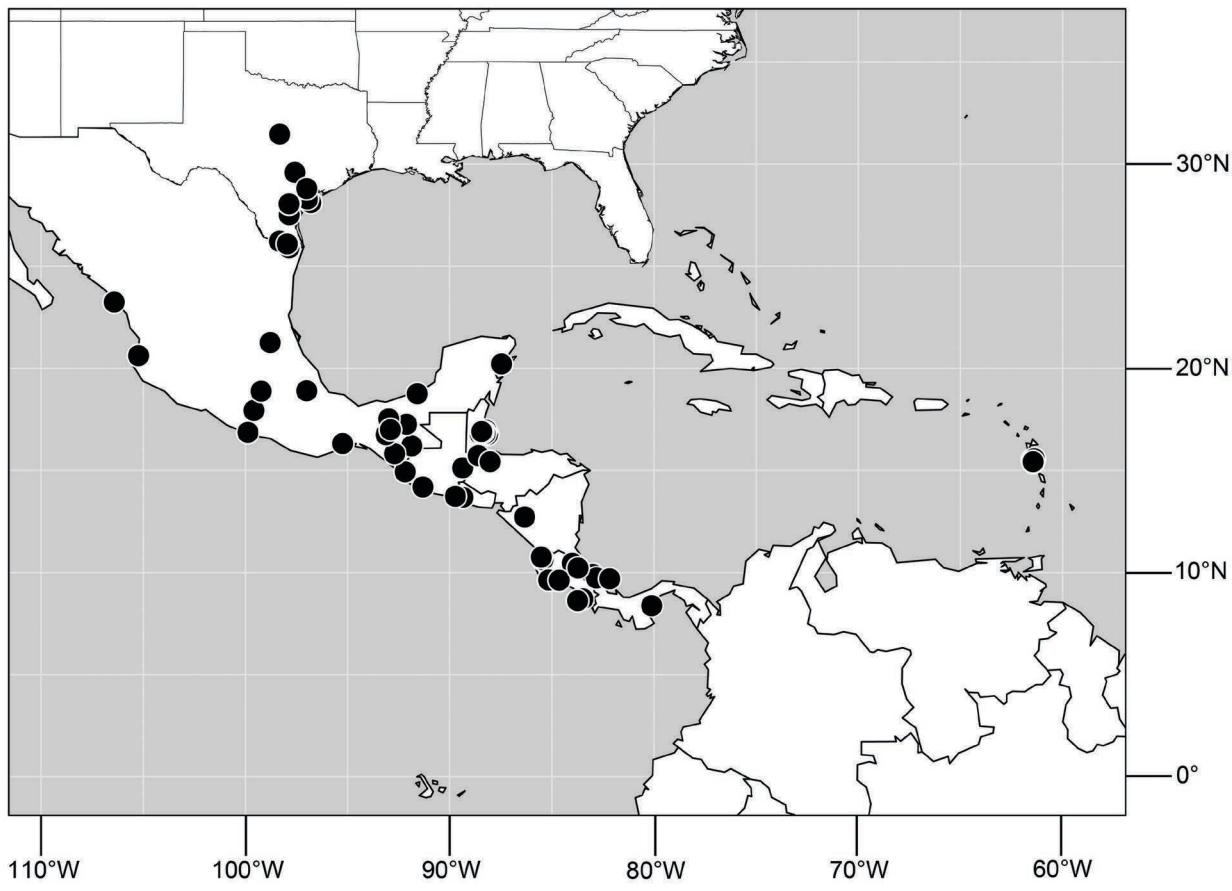


FIGURES 78–81. Structures of male terminalia of *Paralimna (Paralimna) nigropicta* Cresson (Belize. Stan Creek): (78) epandrium, cerci, and presurstyli, posterior aspect; (79) posturstyulus, lateral aspect; (80) aedeagus, phallapodeme, and hypandrium, lateral aspect; (81) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

HONDURAS. Cortés: San Pedro Sula (8 km S; 15°25.7'N, 88°01.4'W), 25–26 Sep 1995, D. and W. N. Mathis (2♂; USNM).

MEXICO. Campeche: Quinta Chilla (18°45.1'N, 91°34.8'W), 20 Dec 1948, H. B. Leech (2♂; USNM). **Chiapas:** Bochil (4 km N; 16°59.8'N, 92°53.8'W), 4 Jun 1969, J. J. Teskey (1♂, 1♀; CNC); Cascadas de Agua Azul (62 km SW

Palenque; 17°15.3'N, 92°06.9'W), 7 May 1985, W. N. Mathis (2♀; USNM); El Triunfo, (49 km S Jaltenango; 15°39.4'N, 92°48.5'W), 14 May 1985, W. N. Mathis (1♂, 1♀; USNM); Finca Prusia (33 km S Jaltenango; 15°49'N, 92°42'W), 10–12 May 1985, W. N. Mathis (3♂, 5♀; USNM); Jaltenango (21 km S; 15°54'N, 92°40'W), 16 May 1985, W. N. Mathis (31♂, 2♀; USNM); Río Izapa (14°55.4'N, 92°10.7'W), 21 Apr 1983, W. N. Mathis (4♂,



MAP 15. Distribution map for *Paralimna (Paralimna) nigropicta* Cresson.

3♀; USNM); Tuxtla Gutiérrez ($16^{\circ}44.8'N$, $93^{\circ}06.6'W$), 2 Aug 1969, D. Kritsch (3♂; CNC). **Guerrero:** Acapulco ($16^{\circ}51.8'N$, $99^{\circ}52.9'W$), 6 Aug 1954, J. G. Chillcott (3♀; CNC); Iguala near Río Balsas (72 km S; $17^{\circ}56.1'N$, $99^{\circ}35.3'W$), 16 Nov 1946, F. E. Skinner (1♂; USNM). **Jalisco:** Puerto Vallarta ($20^{\circ}36.9'N$, $105^{\circ}13.8'W$), 10 Mar 1983, J. R. Vockeroth (1♂, 6♀; CNC). **Morelos:** Cuernavaca ($18^{\circ}56.1'N$, $99^{\circ}13.9'W$), Mar-May 1965, N. L. H. Krauss (1♀; USNM); Cuernavaca (24 km S; $18^{\circ}50.6'N$, $99^{\circ}13.1'W$), 15 Nov 1946, F. E. Skinner (1♂; 1♀; USNM). **Oaxaca:** Tehuantepec ($16^{\circ}19.2'N$, $95^{\circ}14.5'W$; light trap), 15–23 Jul 1964, P. J. Spangler (8♂, 15♀; USNM). **Quintana Roo:** Tulum ($20^{\circ}12.7'N$, $87^{\circ}27.9'W$), 8 Jan 1992, J. R. Vockeroth (6♂, 2♀; CNC). **San Luis Potosí:** Tamazunchale ($21^{\circ}15.3'N$, $98^{\circ}47.3'W$), 23 Nov 1964, F. E. Skinner (17♂, 5♀; USNM). **Sinaloa:** Mazatlán ($23^{\circ}14.2'N$, $106^{\circ}24.9'W$), 7 Aug 1964, J. F. McAlpine (1♀; CNC). **Tamaulipas:** Teapa (8 km SW; $17^{\circ}27.2'N$, $93^{\circ}01.2'W$), 6 May 1985, W. N. Mathis (13♂, 7♀; USNM). **Veracruz-Llave:** Fortín de las Flores ($18^{\circ}54'N$, $97^{\circ}W$; 952 m), 2 May 1985, W. N. Mathis (1♂; 2♀; USNM).

NICARAGUA. **Leon:** La Cruz de La India (5 km SW, Hwy. 26; $12^{\circ}43.2'N$, $86^{\circ}19.86'W$; 215 m), 22 Jun 2007, N. E. Woodley (2♂; USNM).

PANAMÁ. **Bocas del Toro:** Bananas ($09^{\circ}41.5'N$, $82^{\circ}10'W$), 22 Sep 1932 (1♂; USNM). **Coclé:** Playa Santa Clara ($08^{\circ}22.4'N$, $80^{\circ}06.3'W$), 2 Jul 1967, W. W. Wirth (1♂, 1♀; USNM).

WEST INDIES. DOMINICA. Coulibistrie ($15^{\circ}27.1'N$, $61^{\circ}26.8'W$), 21 Mar 1989, W. N. Mathis (4♂, 2♀; USNM). Dublanc ($15^{\circ}30.9'N$, $61^{\circ}28.1'W$), 21 Mar 1989, W. N. Mathis (22♂, 1♀; USNM). Hampstead River ($15^{\circ}33.9'N$, $61^{\circ}22.3'W$), 22 Mar 1989, W. N. Mathis (1♂; USNM). Layou River mouth ($15^{\circ}23.6'N$, $61^{\circ}25.5'W$), 9 Jan–24 Mar 1965, D. F. Bray, A. B. Gurney, H. Robinson, W. W. Wirth (9♂, 11♀; USNM). Macoucherie ($15^{\circ}27.1'N$, $61^{\circ}26.7'W$; seashore), 1–15 Feb 1965, W. W. Wirth (2♂, 2♀; USNM).

TYPE LOCALITY. Neotropical. Guatemala. Puerto Barrios ($15^{\circ}43.5'N$, $88^{\circ}35.6'W$).

DISTRIBUTION. (Map 15) **Nearctic:** Mexico (Morelos, San Luis Potosí, Sinaloa). United States (Texas). **Neotropical:** Belize

(Stann Creek, Cockscomb, Maya Center), Costa Rica (Guanacaste, Heredia, Limón, Puntarenas), El Salvador, Guatemala (Izabal, Esquitla, Zacapa), Mexico (Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz-Llave), Honduras, Nicaragua, Panamá (Bocas del Toro, Coclé), West Indies (Dominica).

REMARKS. Although this species is generally very distinctive, its facial coloration varies from golden to silvery gray. Sometimes, besides the pale brown spot on the carina, there are paired small, rounded, faint, golden spots between the dorsal facial setae on specimens with a silvery gray face; also the anterior margin of the frons is dark gray on specimens with a silvery gray face.

Cresson (1947) wrote that this species is similar to *P. thomae*. We have also generally noted that structures of the male terminalia of these two species are similar, except for the shape of the postsurstylus. Some external characters of the body, however, such as the shape of the male foretibia (ventral surface straight in *P. nigropicta* and wavy in *P. thomae*) and posteroventral series of setae of male forefemur (short, numerous, and present on basal $\frac{1}{2}$ or $\frac{2}{3}$ of femur in *P. nigropicta*; in *P. thomae* these setae are long, fewer in number, and restricted to the basal $\frac{1}{3}$ or $\frac{1}{4}$) distinguish them. Externally the most conspicuous character to distinguish between these two species is the small, dark, velvety spot between the antennal bases in *P. nigropicta* (small, dark, velvety spots are lacking in *P. thomae*).

Specimens of *P. nigropicta* have also been confused with *P. texana*. The dark spot between the antennal bases, arrangement of posteroventral setae along the male forefemur, the shape of male foretibia, the wing without infuscate halos on crossveins, the normally developed brown bands on the abdomen, plus characters of the male terminalia are usually sufficient to distinguish between them.

18. *Paralimna (Paralimna) pallida*, sp. nov.

FIGURES 82–85, 183, MAP 16

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: general aspect of body yellowish gray with coloration washed out; scutum lighter laterally, dorsal stripes inconspicuous; palpus very slender; postcranium with 2 complete series of postocular setae; pleurae without spots, pale gray to silvery gray; forefemur of male with more than 1 series of setae dense, developed, and strong on posteroventral surface, and a series of short setae on anteroventral surface, not flattened; male foretibia also with conspicuous, erect numerous setae on ventral surface.

DESCRIPTION. Body length 4.5–5.0 mm; body generally bicolored, with faded coloration, pale brown dorsally, lateral surfaces silvery gray, sometimes yellowish gray.

Head: (See Figure 183) Frons pale brown with pale gray spots, 1 stripe at lateral margins of ocellar triangle in front of anterior ocellar seta extended to anterior margin of frons, between inner vertical and interfrontal setae, margin of eye from outer vertical seta

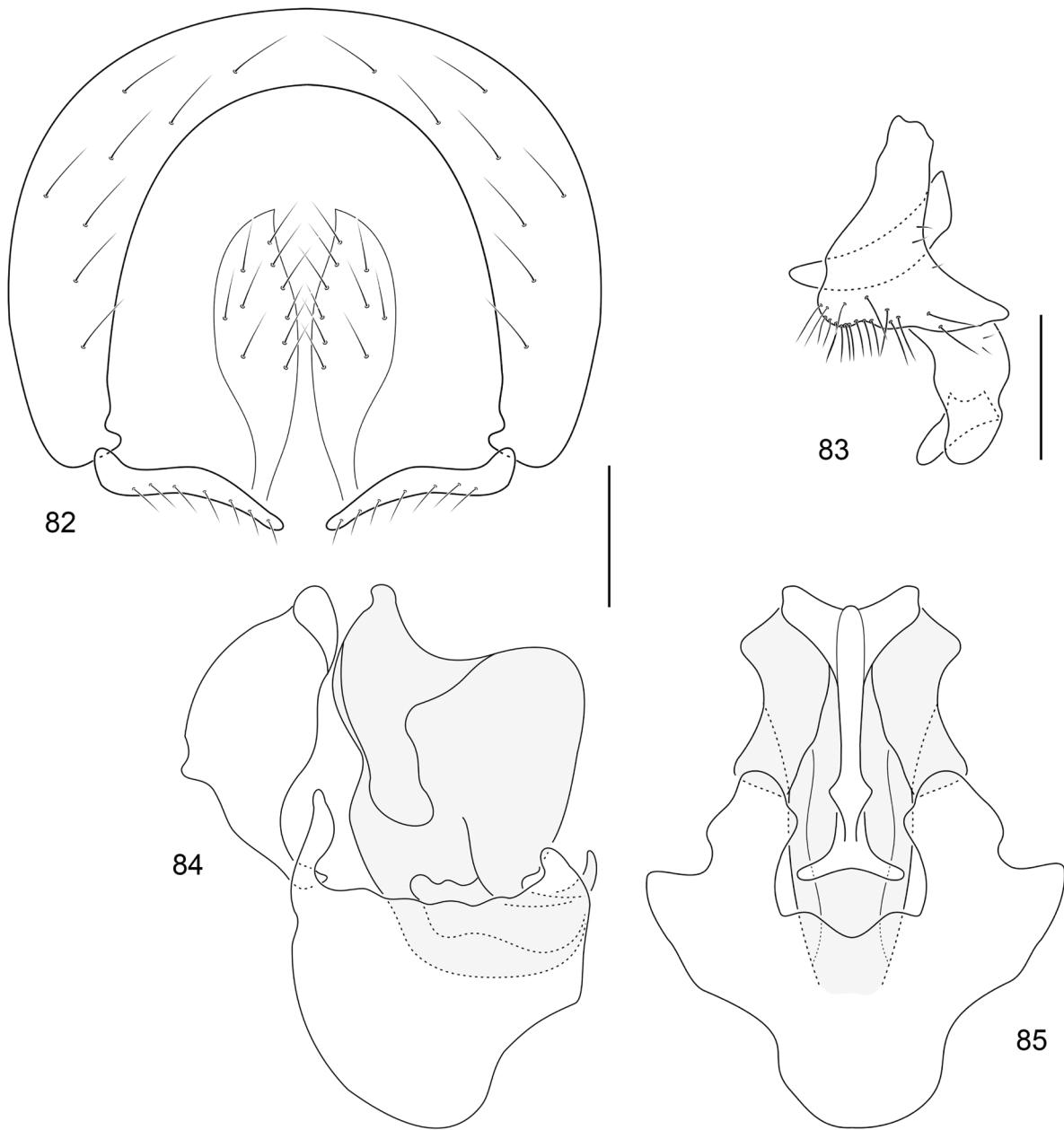
to just above antennal bases; ventral fronto-orbits with a dark gray spot and dorsal parafacial with a pale brown spot lateral to antenna, separated by pale gray spot. Antenna pale gray; pedicel with a brown dorsolateral spot, with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere with slender, elongate, pale setae on margin; arista with 12–15 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face pale gray with a single slender, short, pale brown spot on carina, as long as the length of basal flagellomere; parafacial and gena silvery gray; gena almost nude, few setae only on distal margin and in middle; clypeus silvery gray. Palpus very slender. Eye rounded, about as wide as high, height twice the height of gena. Gena high, height slightly longer than the length of basal flagellomere; gena-to-eye ratio 0.44–0.46.

Thorax: Thorax with faded coloration: mesonotum pale gray with 3 pale brown stripes between dorsocentral rows, the central stripe more slender than the others, linear anteriorly and widened posteriorly; postpronotal lobe gray; scutellum pale gray with distal margin dark brown, distal ocellar pair crossing distally. Pleurae pale gray to silvery gray, without spots. Wing brownish tinged; veins brown to orange brown; lacking infuscation; costal-vein ratio 0.43–0.46; M-vein ratio 0.95–1.10. Legs with silvery-gray microtomentum laterally and dark gray dorsally, except basitarsomere yellow and the remaining tarsomeres become brown distally; forefemur of male with dense series of developed setae on posteroventral surface and a series of short setae on anteroventral surface, not flattened; foretibia straight also with conspicuous erect numerous setae on ventral surface.

Abdomen: Tergites bicolored but the bands are less defined, washed out, with pale grayish-brown bands on laterobasal half of tergites 2 and 3, plus medially on tergites 4 and 5, otherwise gray (more yellowish dorsally and silvery gray laterally). Male terminalia: (Figures 82–85) Presurstylus not bifurcate, with horizontal process slender and slightly curved with short, slender, sparse setae along the length; in lateral view postsurstylus widest medially with a medial, anteriorly protuberant lobe bearing moderately long and slender setae and a pointed process posteriorly; lateral aedeagal process shortened, less than $\frac{1}{2}$ length of aedeagus, robust and slightly curved medially in lateral view, truncated apically in posterior view; aedeagus rather robust and gradually narrowed toward membranous apex in dorsal view; phallapodeme broadly triangular in lateral view; hypandrium moderately deeply concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna pallida* is labeled "BRAZIL. Amazonas: Manaus, INPA (03°55.8'S, 59°59.1'W, 60m), 4 May 2010[,] D. & W. N. Mathis/USNM ENT 00118269 [plastic bar code label]/HOLOTYPE ♂ *Paralimna pallida* Ale-Rocha&Mathis, INPA [red]." The holotype is double mounted, is in excellent condition, and is deposited in INPA. Five paratypes (3♂, 2♀; INPA, USNM) bear the same data as the holotype.

OTHER SPECIMENS EXAMINED: BRAZIL. Amazonas: Manaus, Campus Universitário (03°06'S, 59°58.5'W; Malaise trap), 21 Jun 1982, J. A. Rafael (1♀; INPA).



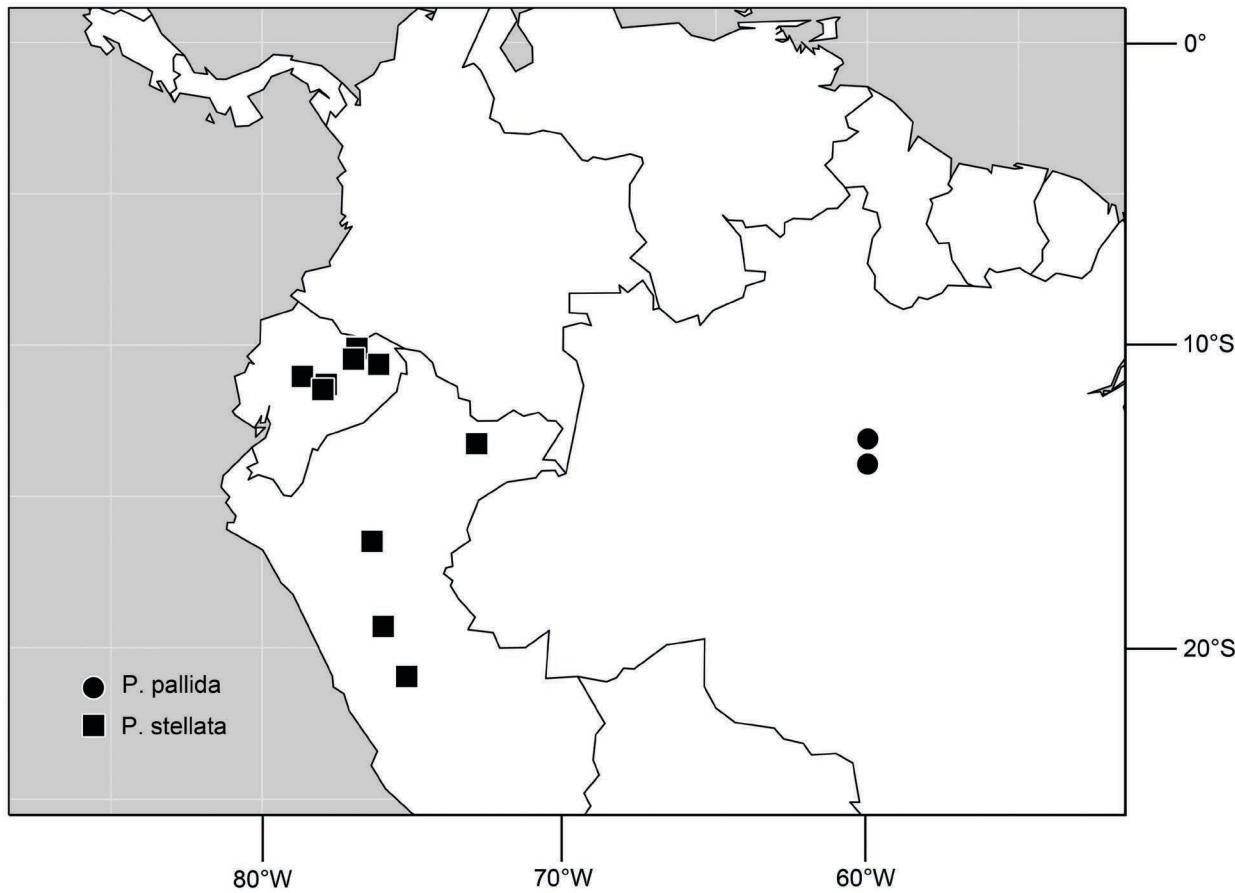
FIGURES 82–85. Structures of male terminalia of *Paralimna (Paralimna) pallida*, sp. nov. (Brazil. Amazonas): (82) epandrium, cerci, and presurstyli, posterior aspect; (83) posturstylius, lateral aspect; (84) aedeagus, phallapodeme, and hypandrium, lateral aspect; (85) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

TYPE LOCALITY. Neotropical. Brazil. Amazonas: Manaus, INPA (03°55.8'S, 59°59.1'W).

DISTRIBUTION. (Map 16) Neotropical: Brazil (Amazonas).

ETYMOLOGY. The species epithet, *pallida*, is of Latin derivation and means ashen or wan, alluding to the faded coloration of the body.

REMARKS. The male terminalia of *P. pallida* sp. nov. resembles that of *P. molossus* in some respects, such as the simple presurstylius and the rather robust and shortened lateral aedeagal process, but it is a very easily distinguished from this species by its coloration (body yellowish gray with coloration washed out; scutum lighter laterally and dorsal stripes inconspicuous).



MAP 16. Distribution map for *Paralimna (Paralimna) pallida*, sp. nov., and *P. (Paralimna) stellata*, sp. nov.

19. *Paralimna (Paralimna) pauca*, sp. nov.

FIGURES 86–89, 184, 204, MAP 17

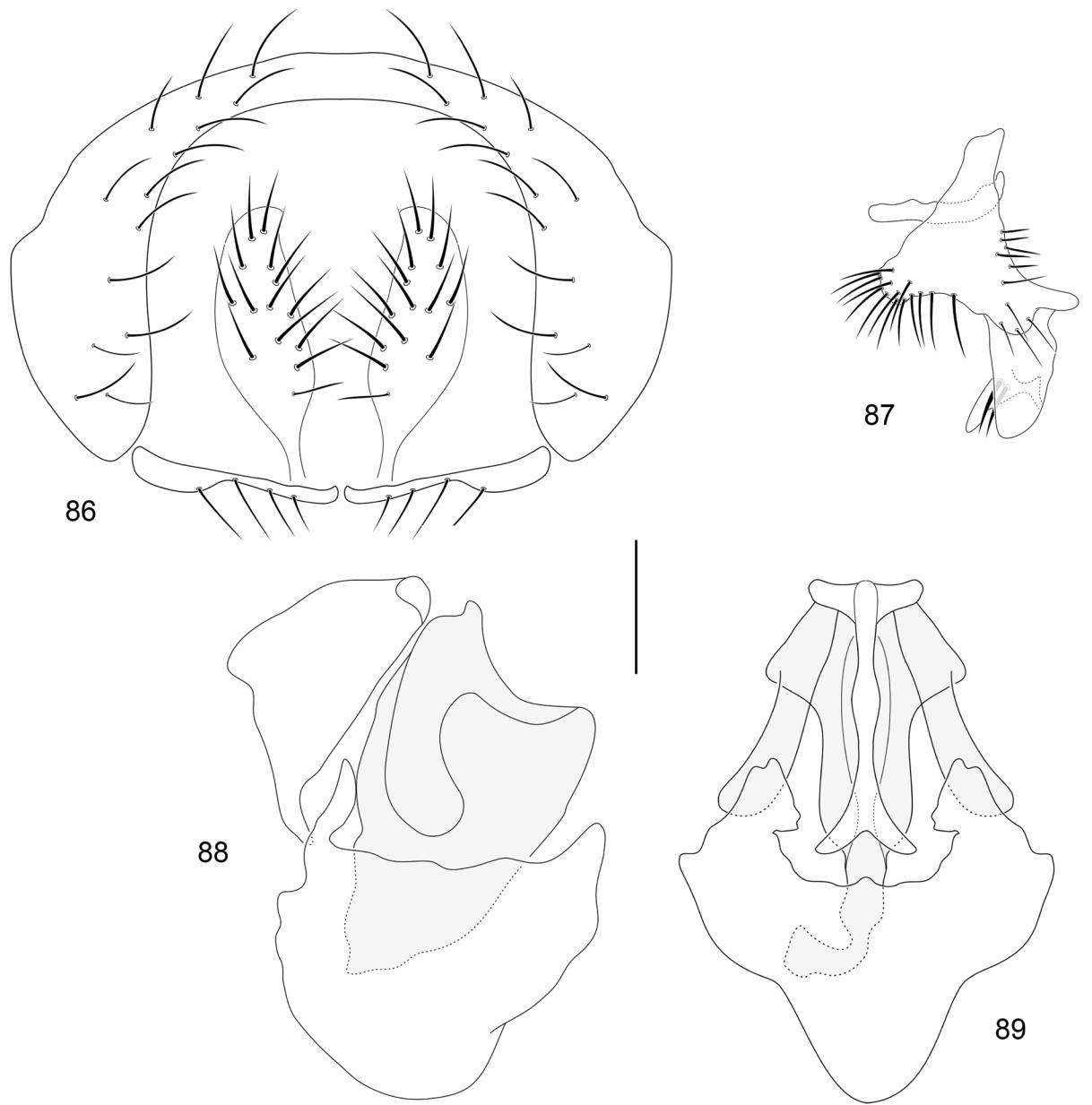
DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face dark gray with 3 pale golden-brown spots, 1 elongate spot on carina, the same length of antenna, and 2 parallel elongate rectangular spots between largest facial setae; pedicel with a very small, not well-defined, silvery-white spot dorsally; anepisternum mostly gray but dorsal and ventral margins brown mottled, bases of setae and setulae brown in middle; wing hyaline, crossvein dm-cu lacking infuscate halo; forefemur of male bearing anteroventral, comb-like row of not flattened, long, and numerous setae; and posteroventral surface of male forefemur bearing row of long and widely spaced setae, longest setae as long as width of femur.

DESCRIPTION. Body length 3.2–4.2 mm; body generally bicolored, pale brown dorsally, lateral surfaces silvery gray.

Head: (See Figure 184) Frons brown with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta extended to anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbita above dorsal

proclinate fronto-orbital seta, between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 small pale brown to dark brown spots lateral to antenna, separated by yellow spot. Antenna brown, covered by yellow microtomentum; pedicel with a very small, not well-defined, silvery-white spot dorsally; basal flagellomere with slender, elongate, pale setae on margin; arista with 9–11 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face dark gray with 3 pale golden-brown spots, 1 elongate spot on carina, the same length of antenna, and 2 parallel elongate rectangular spots between largest facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye slightly higher than wide, height more than twice the height of gena. Gena high, height slightly longer than length of basal flagellomere; gena-to-eye ratio 0.36–0.38.

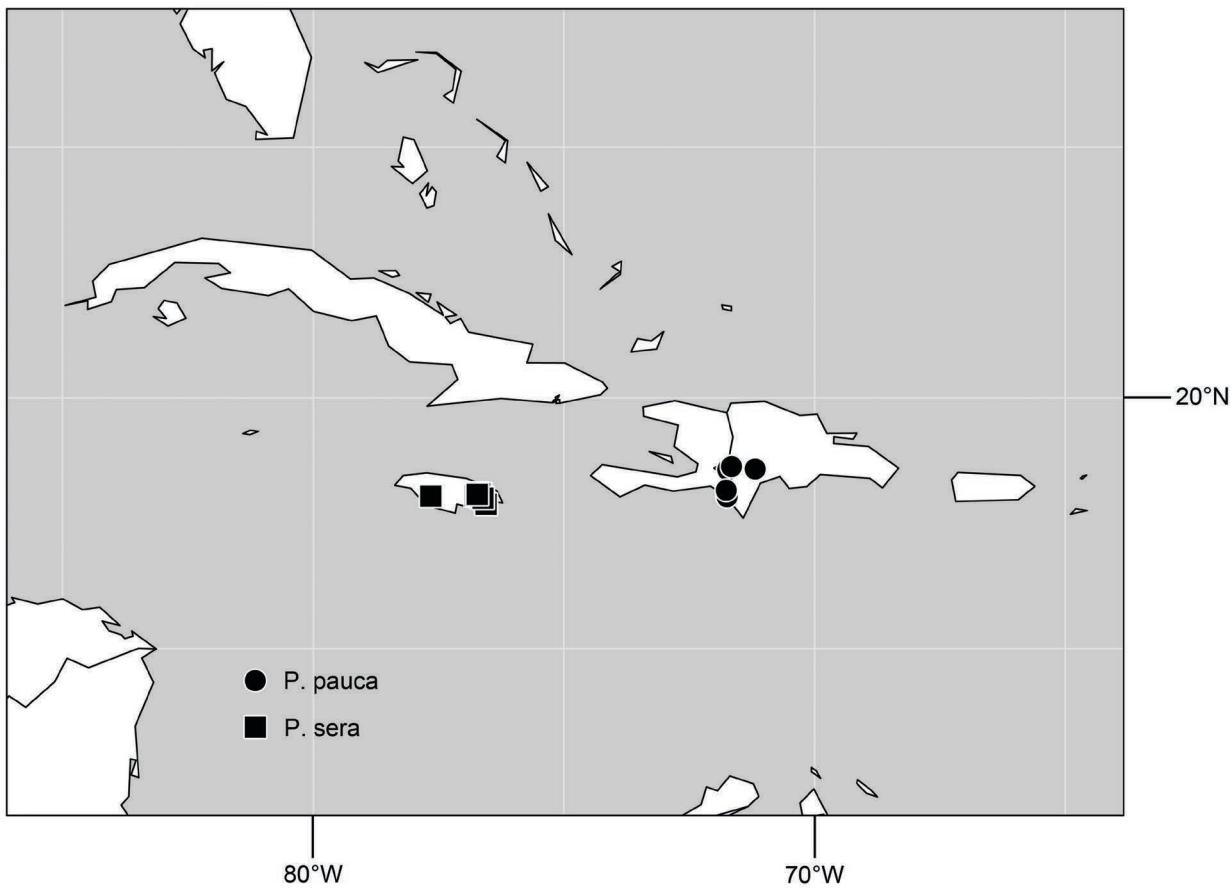
Thorax: Mesonotum yellowish gray with pale brown spots, 3 wider stripes between dorsocentral rows, plus several short to moderately long stripes on supra-alar area; postpronotum yellowish gray; scutellum yellowish gray with base and insertion of setae brownish, with apex blackish brown. Pleurae silvery gray, anepisternum with dorsal and ventral brown spots and base of setae brown tinged in middle, small brown spots in middle sometimes



FIGURES 86–89. Structures of male terminalia of *Paralimna (Paralimna) pauca*, sp. nov. (Dominican Republic. Independencia): (86) epandrum, cerci, and presurstyli, posterior aspect; (87) postsurstylius, lateral aspect; (88) aedeagus, phallapodeme, and hypandrium, lateral aspect; (89) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

clustered as larger brown area, anteroventral corner of anepimeron brown. Wing (see Figure 204) hyaline; veins pale brown; costal-vein ratio 0.30–0.44; M-vein ratio 1.10–1.16. Legs brown with silvery-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally, the distal segments darkened; forefemur of male with anteroventral series of long, curved, numerous and not flattened setae, as long as width of femur, posteroventral surface with a row of long and widely spaced setae, longest setae as long as width of femur; foretibia of male slightly arcuate.

Abdomen: Tergites distinctly bicolored, tergite 1 dark brown with laterodistal corner yellow, tergites 2–5 dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray. Male terminalia: (Figures 86–89) Presurstylius not bifurcate, with horizontal process long, slender, and straight, slightly widened on basal half, with 3 long setae; in lateral view postsurstylius widest medially with a medial, anteriorly protuberant lobe bearing long and slender setae and a digitiform process posteriorly; lateral aedeagal process long, longer than $\frac{1}{2}$ length of aedeagus, robust and slightly curved



MAP 17. Distribution map for *Paralimna (Paralimna) pauca*, sp. nov., and *P. (Paralimna) sera* Cresson.

medially in lateral view, rounded apically; aedeagus slender, hardly narrowed on distal $\frac{1}{3}$ in posterior view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave in posterior view.

TYPE MATERIAL. The holotype male of *Paralimna pauca* is labeled "DOM[INICAN]. REP[UBLIC]. Independ[encia].: La Descubierta, 18°34.1'N, 71°43.8'W, 0 m, 25 Mar 1999, Wayne N. Mathis/USNM ENT 00089872 [plastic bar code label]/HOLOTYPE ♂ *Paralimna pauca* Ale-Rocha&Mathis, USNM [red]." The holotype is double mounted (minuten pin in a block of plastic), is in excellent condition (tarsus of right midleg missing), and is deposited in the USNM. Two paratypes (1♂, 1♀; USNM) bear the same label data as the holotype. Other paratypes are as follows: DOMINICAN REPUBLIC. *Barahona*: Baoruco (Sierra de Neiba, Los Guineos; Rio Colorado; 18°35'N, 71°11'W), 11–12 Aug 1990, J. Rawlins, S. Thompson (45♂, 34♀; CMP). *Independencia*: Los Bolos (18°37.8'N, 71°39.2'W; 1370 m), 24 Mar 1999, W. N. Mathis (4♂, 1♀; INPA, USNM). *Pedernales*: Pedernales (18°01.8'N, 71°44.7'W), 19–20 Mar 1999, W. N. Mathis (1♀; USNM); Pedernales (21 km N; Rio Mulito; 18°09.3'N, 71°45.6'W; 270 m), 18 Mar 1999, W. N. Mathis (1♂; USNM).

TYPE LOCALITY. Neotropical. Dominican Republic. Independencia: La Descubierta (18°34.1'N, 71°43.8'W).

DISTRIBUTION. (Map 17) *Neotropical*: West Indies (Dominican Republic).

ETYMOLOGY. The species epithet, *pauca*, is of Latin derivation and means few or little, alluding to the relatively sparse setae on the anteroventral and posteroventral surfaces of the forefemur.

REMARKS. Externally this species is very similar to *P. molossus*, but it can be distinguished from the latter by the length of the setae along the male forefemur and by structures of the male terminalia, such as the shape of the presurstylus (singular in *P. pauca* sp. nov.) and the setulae of the pre- and postsurstylus that are more robust than in *P. molossus*.

20. *Paralimna (Paralimna) pectinata* Hendel

FIGURES 90–93, 185, 213, MAP 18

Paralimna pectinata Hendel 1930:131 [Argentina. Lapango, Pilcomayo (25°22'S, 57°39.3'W); HT ♂, SMN].—Cresson 1947:51 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Lizarralde de Grosso 1989:38 [list, Argentina].—Mathis and Zatwarnicki 1995:123 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face gray or dark gray with a single slender longitudinal brown spot on carina; pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites brown); forefemur of male concave ventrally on distal half, with distinctly long and flattened setae on anteroventral surface and rows of setae on basal half of posteroventral surface; foretibia of male with irregular ventral surface, wavy.

DESCRIPTION. Body length 2.8–4.3 mm; body generally bicolored, brown dorsally and ventrally, lateral medial surfaces mostly gray, sometimes dark gray.

Head: (See Figure 185) Frons brown to reddish brown with linear yellowish-gray spots at lateral margins of ocellar triangle in front of anterior ocellar seta but not reaching the anterior margin of frons; 1 pale brown less-defined and slender stripe between inner vertical and interfrontal setae, on front-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a dark brown spot and dorsal parafacial with a gray spot, lateral to antenna, separated by silvery-gray spot. Antennal scape and basal flagellomere dark gray to pale gray; pedicel brown with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere with slender, elongate, pale setae on margin; arista with 9–11 long dorsal rays. Postcranium with 2 complete series of postocular setae. Face silvery gray to dark gray with a single linear short spot with orange-brown microtomentum on carina, as long as the length of basal flagellomere; parafacial and gena silvery gray; gena almost nude, with setae only on distal margin; clypeus orange brown to silvery gray. Eye rounded, about as wide as high, height more than twice the height of gena. Gena high, height slightly longer than the length of basal flagellomere; gena-to-eye ratio 0.40–0.44.

Thorax: Mesonotum gray to yellowish gray with brown spots, 3 stripes between dorsocentral rows being 2 lateral, well-defined stripes ending at level of third dorsocentral seta and 1 irregular, slender, and less-defined acrostichal stripe; a slender and short stripe on supra-alar area and small brown spots on base of setae; postpronotal lobe silvery gray; notopleuron gray with a little brown spot on dorsal margin; scutellum silvery gray with distal margin dark brown and basal margin pale brown. Pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron blackish brown) and darker on ventral half (ventral pleurites blackish brown). Wing semi-hyaline; veins brown, crossveins r–m and dm–cu with infuscate halo; costal-vein ratio 0.37–0.50; M-vein ratio 1.04–1.05. Legs brown to black except foretarsus lighter ventrally and the remaining tarsi yellow; forefemur of male (see Figure 213) concave ventrally on distal half, with elongate flattened setae on anteroventral surface and a dense series of setae on basal half of ventral surface; foretibia of male irregular on ventral surface, wavy.

Abdomen: Tergites distinctly bicolored, dark brown along anterior half and medially, otherwise yellowish gray

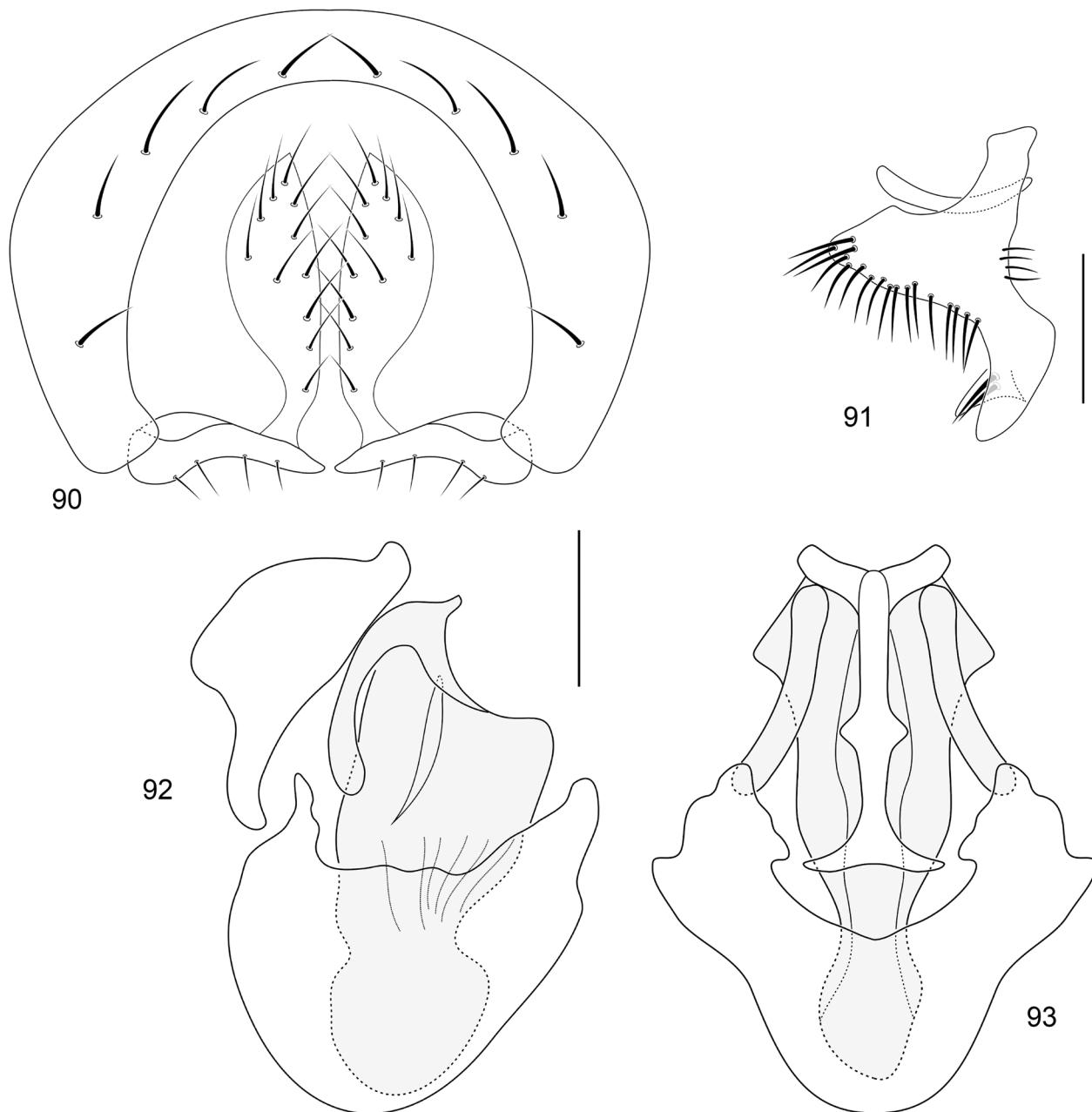
dorsally and silvery gray laterally, except tergite 2 predominantly yellowish gray with medial brown line reduced and dorsolateral brown spot on $\frac{1}{2}$ basal half. Male terminalia: (Figures 90–93) Presurstylus not bifurcate, with horizontal process wide basally and narrowed distally, shallowly curved; in lateral view posturstylus widest medially with a medial anteriorly protuberant lobe bearing long and robust setae and a bulged process posteriorly; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, slightly curved subapically in lateral view, bluntly rounded; aedeagus gradually tapered to membranous apex; phallapodeme broadly triangular in lateral view; hypandrium deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna pectinata* Hendel is labeled “[ARGENTINA.] Lapango.Pilc. IX.1925.Lind.D.Chaco-Exped [black margin]/Paralimna pectinata Hend. ♂ [handwritten] F. Hendel det./Type. Hendel 1930 [handwritten; red ink; label with a black border]/SMN.” The holotype is double mounted (minuten pin in a paper card), is in excellent condition (left wing slightly torn; abdomen not dissected), and is deposited in the SMN.

OTHER SPECIMENS EXAMINED. ARGENTINA. *Catamarca*: El Pintado, S La Viña ($28^{\circ}03.3'S$, $65^{\circ}35.1'W$; 650 m), 27–28 Sep 1968, L. E. Peña (2♂; CNC); La Merced ($28^{\circ}09.9'S$, $65^{\circ}41.1'W$; 650 m), 26 Sep 1968, L. E. Peña (1♀; CNC); Yunka Suma, N Aconquja ($27^{\circ}23.1'S$, $65^{\circ}58.9'W$; 5 m), 2 Oct 1968, L. E. Peña (1♀; CNC). *Jujuy*: Aqua Caliente (NE Guemes; $24^{\circ}02.7'S$, $66^{\circ}31.2'W$; 1100 m), 18–19 Oct 1968, L. E. Peña (1♂; CNC); Ing. Ledesma, near Gen. San Martín ($23^{\circ}50.1'S$, $64^{\circ}47.5'W$; 1100 m), 10 Oct 1968, L. E. Peña (1♂; CNC); Mendoza ($24^{\circ}10.7'S$, $65^{\circ}17.9'W$), Feb 1970, L. E. Peña (1♀; MZUSP). *Córdoba*: Ascochinga ($30^{\circ}57'S$, $64^{\circ}16'W$), 28 Feb 1971, L. E. Peña (10♂, 11♀; MZUSP). *Misiones* ($27^{\circ}S$, $54^{\circ}35'W$): 1927, F. and M. Edwards (1♂, 1♀; ANSP). *Salta*: Rio Juramento (60 km S Guemes; $24^{\circ}49.4'S$, $65^{\circ}24.4'W$; 650 m), 18 Oct 1968, L. E. Peña (1♀; CNC). *Tucumán*: Arroyo (14 km S El Tala; $26^{\circ}56.4'S$, $65^{\circ}09.7'W$; 700 m), 13–14 Oct 1968, L. E. Peña (2♂, 2♀; CNC).

BOLIVIA: *Cochabamba*: Cochabamba ($17^{\circ}23.3'S$, $66^{\circ}07'W$; 2610 m), 26 Jan–25 Mar 1976, 2001, W. N. Mathis, L. E. Peña (15♂, 2♀; CNC, USNM).

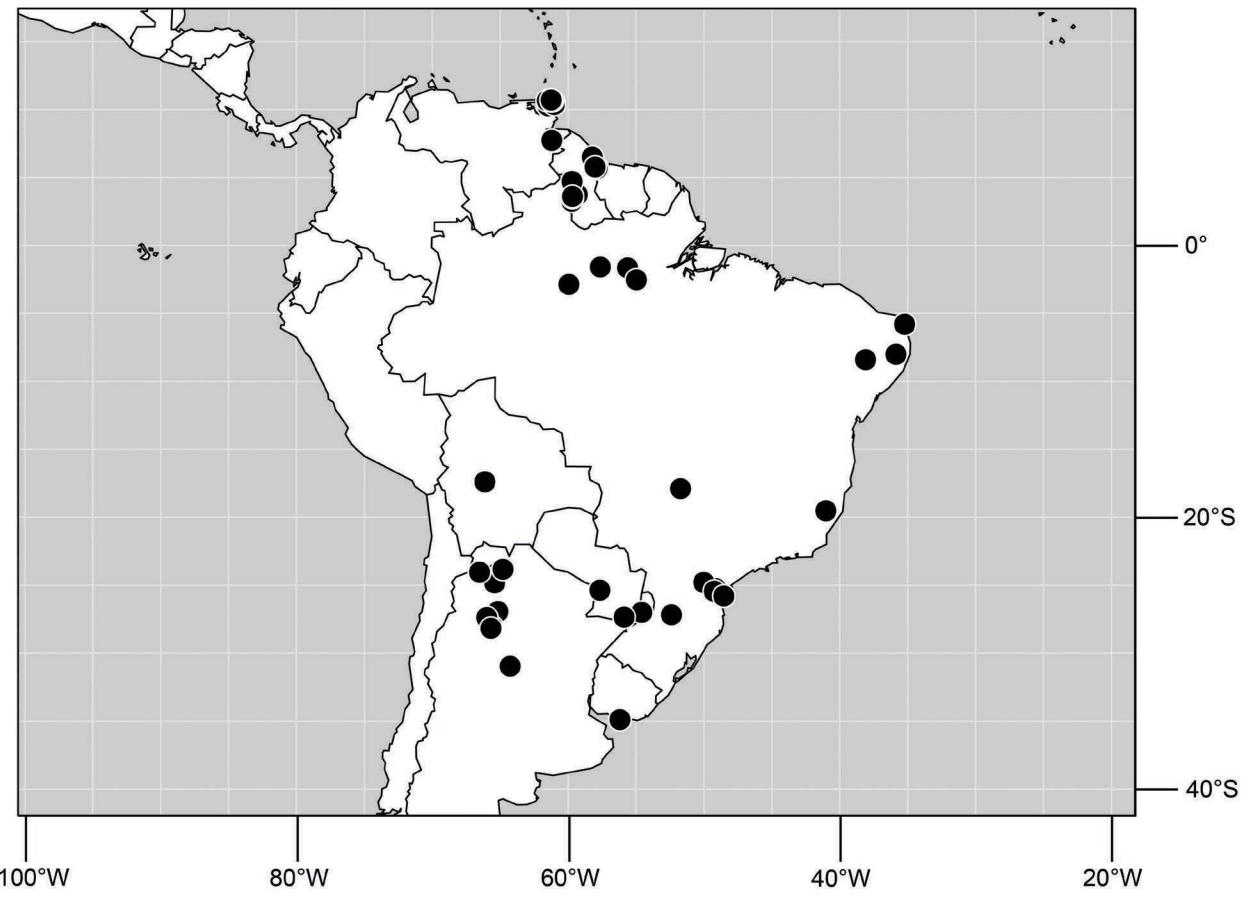
BRAZIL: *Amazonas*: Sítio Vida tropical ($02^{\circ}51.9'S$, $59^{\circ}55.9'W$, 60m), 5 May 2010, D. and W. N. Mathis (15♂, 7♀; INPA, USNM). *Espírito Santo*: Baixo Guandu ($19^{\circ}31'S$, $41^{\circ}01.1'W$), Sep 1970, P. C. Elias (8♂, 19♀; MZUSP). *Goiás*: Jataí ($17^{\circ}53.6'S$, $51^{\circ}42.9'W$), Jan 1955, M. Carrera (1♂; MZUSP). *Pará*: Oriximiná-Obidos ($01^{\circ}38.7'S$, $55^{\circ}37'W$), Nov 1969, Expedição Permanente da Amazônia (1♀; MZUSP); Tapirinha, Santarém ($02^{\circ}31.9'S$, $54^{\circ}17.7'W$), Nov 1970 (1♂; MZUSP); Belterra, Flona Tapajós ($02^{\circ}36.1'S$, $54^{\circ}56.6'W$; 100 m; light trap), 15–16 Apr 2008, J. A. Rafael, F. F. Xavier (1♀; INPA); Rio Nhamundá, Igarapé Areias ($01^{\circ}35.2'S$, $57^{\circ}37.6'W$; 25 m; Malaise trap), 17–20 May 2008, J. A. Rafael and team (1♀; INPA); Alter do Chão, Igarapé Sonrisal ($02^{\circ}31.4'S$, $54^{\circ}57.5'W$; light trap), 18 Apr 2008, J. A. Rafael, F. F. Xavier (2♂; INPA). *Paraná*: Bocaiúva do Sul ($25^{\circ}14.9'S$, $49^{\circ}8.9'W$; 890 m), 2–4



FIGURES 90–93. Structures of male terminalia of *Paralimna (Paralimna) pectinata* Hendel (Argentina. Córdoba): (90) epandrion, cerci, and presurstyli, posterior aspect; (91) postsurstylus, lateral aspect; (92) aedeagus, phallapodeme, and hypandrium, lateral aspect; (93) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

Nov 2010, D. and W. N. Mathis (1♂, 1♀; USNM); Castro (24°47.4'S, 50°0.3' W; wetlands), 24–25 Dec 2009, D and W. N. Mathis (2♂; USNM); Curitiba, UFPR [Universidade Federal do Paraná], (25°26.9'S, 49°14'; 915 m), 6 Feb 2010, D. and W. N. Mathis (2♂; USNM); 28 Dec–15 Jan 2009, 2010, D. and W. N. Mathis (3♂; USNM); Matinhos (N; 25°47.4'S, 48°31.6' W; 1 m), 30 Jan 2010, D. and W. N. Mathis (3♂; USNM); Rio Da Onça

(25°47.4'S, 48°31.6' W; 3 m), 12 Nov 2010, D. and W. N. Mathis (8♂; USNM). **Pernambuco:** Olinda (08°0.6'S, 35°51.3' W), Oct 1961, N. L. H. Krauss (1♂; USNM); Tapera (08°24'S, 38°05' W), 17 Apr 1969, H. S. Lopes (1♂; MZUSP). **Rio Grande do Norte:** Natal (05°47.7'S, 35°12.6' W), Jul 1955, P. Pereira (4♀, 4♂; MZUSP). **Santa Catarina:** Nova Teutônia (27°11'S, 52°23' W; 300–500 m), 1971, F. Plaumann (1♀; MZUSP).



MAP 18. Distribution map for *Paralimna (Paralimna) pectinata* Hendel.

GUYANA. Conservation of Ecological Interactions and Biotic Associations (~40 km S Georgetown; 06°29.9'N, 58°13.1'W), 13 Apr 1994 (1♂; USNM). Dubulay Ranch-Aramatani Creek (05°40.9'N, 57°51.5'W), 9–11 Apr 1994, W. N. Mathis (12♂; USNM). Kanuku Mountains, Kumu River and Falls (03°15.9'N, 59°43.5'W), 28–30 Apr 1995, W. N. Mathis (3♂, 1♀; USNM). Karanambo, Rupununi River, ox bow (03°45.1'N, 59°18.6'W), 31 Mar–2 Apr 1994, W. Mathis (32♂, 3♀; USNM). Kumo Pond, Lethem (~20 km S; 03°16.7'N, 59°43.5'W), 30 Apr 1995, W. N. Mathis (1♂; USNM). Paramakatoi (04°42'N, 59°42.8'W), 24–25 Aug 1997, W. N. Mathis (2♂; USNM). Pirara Ranch, Cashew Creek (03°37.3'N, 59°44.2'W), 23 Apr 1995, W. N. Mathis (26♂, 3♀; USNM). Pirara Ranch and River (03°32.1'N, 59°40.5'W), 24–25 Apr 1995, W. N. Mathis (10♂; USNM). Wiruni River (05°46.6'N, 58°0.8'W), 11 Apr 1994, W. N. Mathis (1♀; USNM).

PARAGUAY. *Itapúa:* Encarnación (27°20.4'S, 55°52'W), 16 Jan 1927, F. and M. Edwards (1♂, 1♀; ANSP).

TRINIDAD and TOBAGO. *Trinidad. Mayaro:* Plaisance (5 km N; 10°16'N, 61°28'W), 23 Mar 1985, G. F. and J. F. Hevel (49♂, 33♀; USNM). *Port of Spain:* Port of Spain

(10°40'N, 61°31'W), Jun 1953, U.S. Army, 25 Medical Detachment (1♂; USNM). *St. Andrew:* Lower Manzanilla (5 km S; 10°28'N, 61°03'W), 20 Jun 1993, W. N. Mathis (1♂; USNM); Lower Manzanilla (12 km S; 10°24'N, 61°02'W), bridge over Nariva River, 20–27 Jun 1993, W. N. Mathis (2♂; USNM); Lower Manzanilla (16 km S; 10°22'N, 61°01'W), 20 Jun 1993, W. N. Mathis (6♂, 1♀; USNM); Valencia (1 km W; 10°39'N, 61°13'W), Aripo River, 20 Jun 1993, W. N. Mathis (7♂, 1♀; USNM); Valencia (near; 10°39.4'N, 61°09.1'W), 23 Mar 1985, G. F. and J. F. Hevel (1♂; USNM). *St. George:* Caura River Valley (end of Caura Royal Road; 10°42'N, 61°21'W), 31 Mar 1996, C. Chaboo (13♂, 15♀; AMNH).

URUGUAY. *Montevideo:* Montevideo (35°53'S, 56°10.9'W), 21–22 Jan 1927, F. and M. Edwards (1♀; ANSP).

VENEZUELA: *Bolívar:* Guasipati (40 km N; 07°43.7'N, 61°11.6'W; at marsh, lake), 20 Mar 1982, G. F. and J. F. Hevel (29♂, 26♀; USNM).

TYPE LOCALITY. Neotropical. Argentina. Formosa: Lapango, Pilcomayo (25°22'S, 57°39.3'W).

DISTRIBUTION. (Map 18) Neotropical: Argentina (Catamarca, Córdoba, Jujuy, Misiones, Salta, Tucumán), Bolivia

(Cochabamba), Brazil (Amazonas, Espírito Santo, Goiás, Pará, Paraná, Pernambuco, Rio Grande do Norte, Santa Catarina), Guyana, Paraguay (Itapúa), Trinidad and Tobago, Uruguay (Montevideo), Venezuela (Bolívar).

REMARKS. This species has a variable abdominal pattern; specimens from Bolivia have the coloration of abdomen very uniform. This species is similar to *P. fellerae* by the coloration of mesopleuron that is distinctly bicolored, silvery gray on the dorsal half and brown on the ventral half, but differs by the coloration of the face and the shape of the male forefemur and foretibia. There is 1 brown spot on the carina in *P. pectinata* and 3 spots on *P. fellerae*; both species have flattened setae on the anteroventral surface of the male forefemur, but in *P. pectinata* the forefemur is concave ventrally on the distal half, the flattened setae are longer, curved, and wider than in *P. fellerae*, and the foretibia has the ventral surface distinctly sinuous (straight in *P. fellerae*).

This species differs from *P. punctipennis* by the male forefemur being concave ventrally and the foretibia is sinuous ventrally (not sinuous in *P. punctipennis*). Additionally, the basoventral process of the presurstylus is distinctly developed and the horizontal process is slender in *P. fellerae* and *P. punctipennis*, and the basoventral process is undeveloped and the horizontal process is robust in *P. pectinata*.

21. *Paralimna (Paralimna) piger* Cresson

FIGURES 94–97, 186, MAP 10

Paralimna piger Cresson 1933:65 ["Ecuador"; HT ♂, USNM (44805)]; 1947:51 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:123 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: face dark gray with 3 brown spots, 1 on the carina and 2 longitudinal, parallel brown spots between largest facial setae, extending to margin of face; gena brown with dorsal margin silvery gray; pleurae predominantly brown, anepisternum brown on ventral margin, dorsal margin spotted by brown bases of setae, and a large central rounded stain, the remaining gray; propleuron, anterior and posterior margins of katepisternum, anatergite, and katatergite gray; forefemur with ventral surface slightly convex, with very long posteroventral setae on basal half of the femur, longer than the larger region of the femur, anteroventral series of flattened setae occupying basal $\frac{3}{4}$ length of femur; lateral margin of tergites brown; male foretibia with ventral surface irregular, wavy.

DESCRIPTION. Body length 2.7–4.2 mm; body predominantly brown with slender gray stripes on scutum and small gray areas on pleurae and on lateral of abdomen.

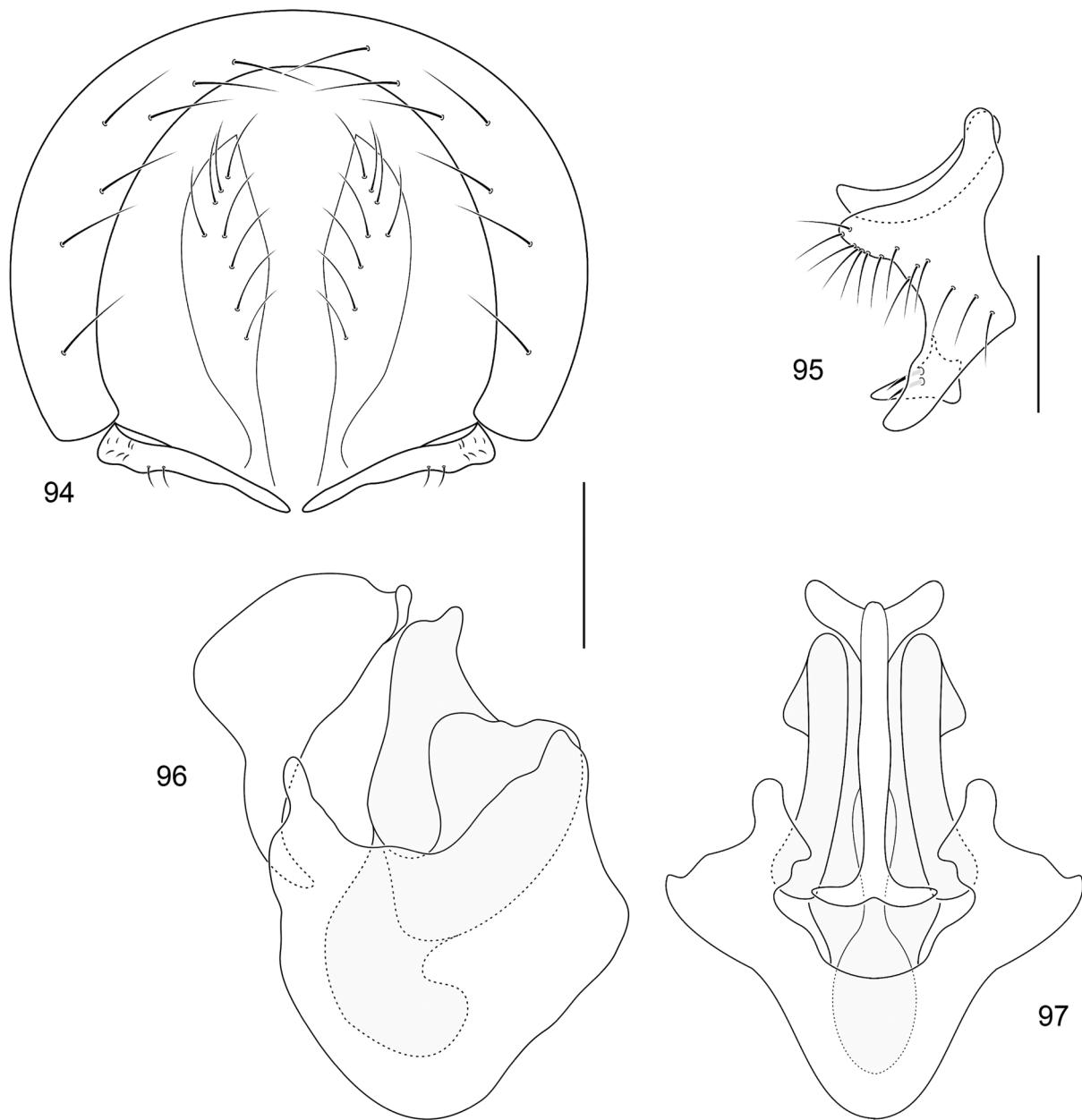
Head: (See Figure 186) Frons brown with linear gray spots at lateral margin of ocellar triangle, in front of anterior ocellar seta and extended anteriorly discreetly to the anterior margin

of frons, a linear inconspicuous spot between inner vertical setae and interfrontal seta, with a small quadrate spot just below inner vertical setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 dark brown spots lateral to antenna, separated by silvery-white spot. Antennal scape and pedicel brown with silvery-gray microtomentum, pedicel with silvery-gray microtomentum on distal margin; basal flagellomere pale brown covered by dense pale micropilosity, longer on dorsal margin; arista with 10 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face dark gray with antennal groove whitish gray; lateral margins brown; with 3 brown spots, 1 longitudinal spot on the carina, as long as antennal length, and 2 longitudinal, parallel brown spots between largest facial setae, extending to margin of face; gena bicolored, brown with dorsal margin silvery gray, parafacial and clypeus silvery gray; gena with few setae only on middle and ventral margin. Eye rounded, about as wide as high, height more than three times the height of gena. Gena high, height subequal to length of basal flagellomere; gena-to-eye ratio 0.27–0.30.

Thorax: Mesonotum mostly brown with longitudinal linear gray spots, usually along setal tracks, becoming more gray laterally through postpronotum and notopleuron, postalar area and lateral margin of scutellum gray, dorsum of scutellum brown. Pleurae predominantly brown, anepisternum brown on ventral margin and on a large central rounded stain, dorsal margin spotted by brown insertion of setae, the remaining gray; propleuron, anterior and posterior margins of katepisternum, anatergite, and katatergite gray; setae of anepisternum brown, short, slender, several longer setae below middle of anepisternum. Wing semi-hyaline; veins brown; costal-vein ratio 0.45–0.46; M-vein ratio 1.00–1.05. Legs brown with very sparse gray microtomentum, except tarsomeres lighter with yellow coloration. Forefemur with ventral surface slightly convex, with anteroventral series of flattened setae, the setae longer on middle of femur and occupying basal $\frac{3}{4}$ length of femur; setae of anteroventral surface very long on basal half of the femur, longer than the larger region of the femur; male foretibia with ventral surface wavy.

Abdomen: Tergites distinctly bicolored, dark brown along anterior half, medially, and on lateral margin, otherwise gray. Male terminalia: (Figures 94–97) Presurstylus bearing short, slender setae, not bifurcate, horizontal process almost straight; in lateral view postsurstylus widest medially with sparse slender setae in middle; lateral aedeagal process less than $\frac{1}{2}$ length of aedeagus, slightly curved in middle and rounded apically; aedeagus slightly narrowed apically in anterior view; in lateral view phallapodeme wider on basal $\frac{2}{3}$ and slender on the remainder; hypandrium shallowly concave; cerci long and narrowed, almost 4× longer than wide.

TYPE MATERIAL. The holotype male of *Paralimna piger* is labeled "ECUADOR[,] HA Parish[,] 1914/♂/TYPE Paralimna PIGER E. T.Cresson,Jr. ["Paralimna PIGER" handwritten; pink]/Type No 44805 U S N M ["44805" handwritten; red]." The holotype is pinned directly, is in good condition



FIGURES 94–97. Structures of male terminalia of *Paralimna (Paralimna) piger* Cresson (Ecuador): (94) epandrium, cerci, and presurstyli, posterior aspect; (95) postsurstylus, lateral aspect; (96) aedeagus, phallapodeme, and hypandrium, lateral aspect; (97) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

(some Lepidoptera scales; abdomen not dissected), and is deposited in the USNM (44805).

OTHER SPECIMENS EXAMINED. ECUADOR. *Carachi*: Los Duendes ($0^{\circ}28'S$, $77^{\circ}56'W$; 2000 m), 10 Jun 1965, L. E. Peña (8♂, 2♀; CNC). *Chimborazo*: Chilicay ($02^{\circ}15'S$, $79^{\circ}06'W$), Jul 1955, R. Levi-Castillo (7♂; USNM). *Cotopaxi*: Latacunga (79 km E Quevedo; $00^{\circ}52.2'S$, $78^{\circ}37.1'W$; 3300 m), 12 May 1975,

A. Gurney (2♂, 1♀; USNM); Quevedo (66 km E; $00^{\circ}57.7'S$, $78^{\circ}54.1'W$), 15 Jan 1978, W. N. Mathis (2♂, 1♀; USNM); Tingo ($0^{\circ}54'S$, $79^{\circ}03'W$; 1000 m), 5–6 Jul 1965, L. E. Peña (1♀; CNC). *El Oro*: Pasaje (6 km E; $03^{\circ}18.1'S$, $79^{\circ}47.1'W$), 13 Jan 1978, W. N. Mathis (9♂, 6♀; USNM). *Esmeraldas*: Río Guayllabamba ($00^{\circ}29'S$, $79^{\circ}25.6'W$; 1600 m), Jan 1971, L. E. Peña (2♂, 3♀; MZUSP). *Guayas*: El Triunfo (60 km N Guayaquil;

01°55.3'S, 80°0.7'W), 11 Feb 1973, M. A. Deyrup (4♂, 3♀; USNM); Machala (49.5 km NNE; 03°03.9'S, 79°44.8'W; 40 m), 13 Jan 1978, W. N. Mathis (29♂, 14♀; USNM); Rio Frio, Balao Chico (02°45.1'S, 79°44.6'W), 26–30 Apr 1965, L. E. Peña (2♀; CNC). *Imbabura*: Río Tagundo, NW Ibarra (0°24.1'S, 78°08'W; 1650–1900 m), 9 Jun 1965, L. E. Peña (72♂, 31♀; CNC); Yaguarcocha (3 km N Ibarra; 0°22.4'S, 78°06.1'W; 1950 m), 8–9 Jun 1965, L. E. Peña (11♂, 5♀; CNC). *Loja*: Catamayo (03°59'S, 79°21'W; 1500 m), 24 Mar 1965, L. E. Peña (8♂, 2♀; CNC); Loja (S; 03°59.4'S, 79°12.3'W; 1200 m), 26 Mar 1965, L. E. Peña (4♂, 6♀; CNC); Loja (W; 03°58.5'S, 79°14.8'W; 2500 m), 25 Mar 1965, L. E. Peña (1♀; CNC); San Pedro, Zaruma Road (03°45.8'S, 79°38.1'W; 1100 m), 9 Apr 1965, L. E. Peña (22♂, 25♀; CNC); Saraguro (S; 03°37.5'S, 79°14.6'W; 2900 m), Nov 1970, L. E. Peña (5♂, 3♀; MZUSP). *Los Ríos*: Quevedo (11 km S; 01°09'S, 79°26.7'W), 3 Jul 1975 (1♂; USNM); Río Palenque (0°35'S, 79°22'W; 150 m), 22–26 Feb 1976, G. E. Shewell (1♂, 1♀; CNC). *Manabi*: Pedro Carbo (45 km NW; 01°42.7'S, 80°24.7'W), 11 Jan 1978, W. N. Mathis (8♂, 8♀; USNM); Quevedo (117 km W; 01°03.9'S, 80°14.7'W; 915 m), 1 Jul 1975, A. Langley, J. Cohen (30♂, 12♀; USNM); Quevedo Road, Portoviejo (01°03.3'S, 80°27.2'W; 400 m), 13 Apr 1965, L. E. Peña (1♂; CNC). *Orellana*: Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–130 Apr 1965, L. E. Peña (6♂, 4♀; CNC); Pomeya, Napo River (0°26.5'S, 76°36.6'W), 25–30 Apr 1965, L. E. Peña (1♂; CNC). *Pichincha*: Guallabamba (0°03.5'S, 78°20.5'W; 1850 m), 7 Jun 1965, L. E. Peña (2♂, 1♀; CNC); Tandapi (40 km SW Quito; 0°24.9'S, 78°48'W; 1300–1500 m), 15–21 Jun 1965, L. E. Peña (69♂, 36♀; CNC); Tinalandia (00°15.3'S, 79°10.4'W; 800–1000 m), 8 Feb 1983, L. Huggert, L. Masner (1♂, 1♀; CNC, USNM). *Santa Elena*: Rio Ayampe (01°40.3'S, 80°42.2'W), 26 Jul 1976, J. Cohen (1♂; USNM). *Santo Domingo de los Tsáchilas*: Río Toachi (4 km E of Alburquin; 00°05.4'S, 79°12'W), 17 Apr 1977, E. R. S. Hodges (1♂; USNM); Santo Domingo de Los Colorados (00°15.3'S, 79°10.4'W), 27 Feb–6 Mar 1973, M. A. Deyrup, M. R. Wheeler (2♂, 6♀; USNM); Santo Domingo de Los Colorados (14 km E; 00°13.9'S, 79°05.7'W), 5 Jul 1976, J. Cohen, A. Langley (1♂; USNM); Santo Domingo de Los Colorados (47 km S; 00°24.5'S, 79°18'W; 220 m), 7 Jan–29 Jul 1976, 1978, J. Cohen, W. N. Mathis (23♂, 20♀; USNM).

TYPE LOCALITY. Neotropical. "Ecuador."

DISTRIBUTION. (Map 10). *Neotropical*: Ecuador (Carchi, Chimborazo, Cotopaxi, El Oro, Esmeraldas, Guayas, Imbabura, Loja, Los Ríos, Manabi, Pichincha, Santa Elena, Santo Domingo de los Tsáchilas).

REMARKS. This species is very similar to *P. puncticornis* in the coloration of the face and mesopleuron but can be distinguished by the brown gena, the sinuous ventral surface of the foretibia of males, the anteroventral setae that are long and widely flattened, and the posteroventral setae that are very long (longer than width of femur) and present along only the basal half of the femur in *P. piger* (gena gray, tibia straight, anteroventral setae slightly flattened, and ventral series complete and not so long in *P. puncticornis*). The more distinctive feature of the

male terminalia is the shape of the presurstylus and the antero-medial process that is pointed apically in *P. piger*, whereas it is larger and with a rounded margin in *P. puncticornis*.

22. *Paralimna* (*Paralimna*) *pleurivittata* Cresson

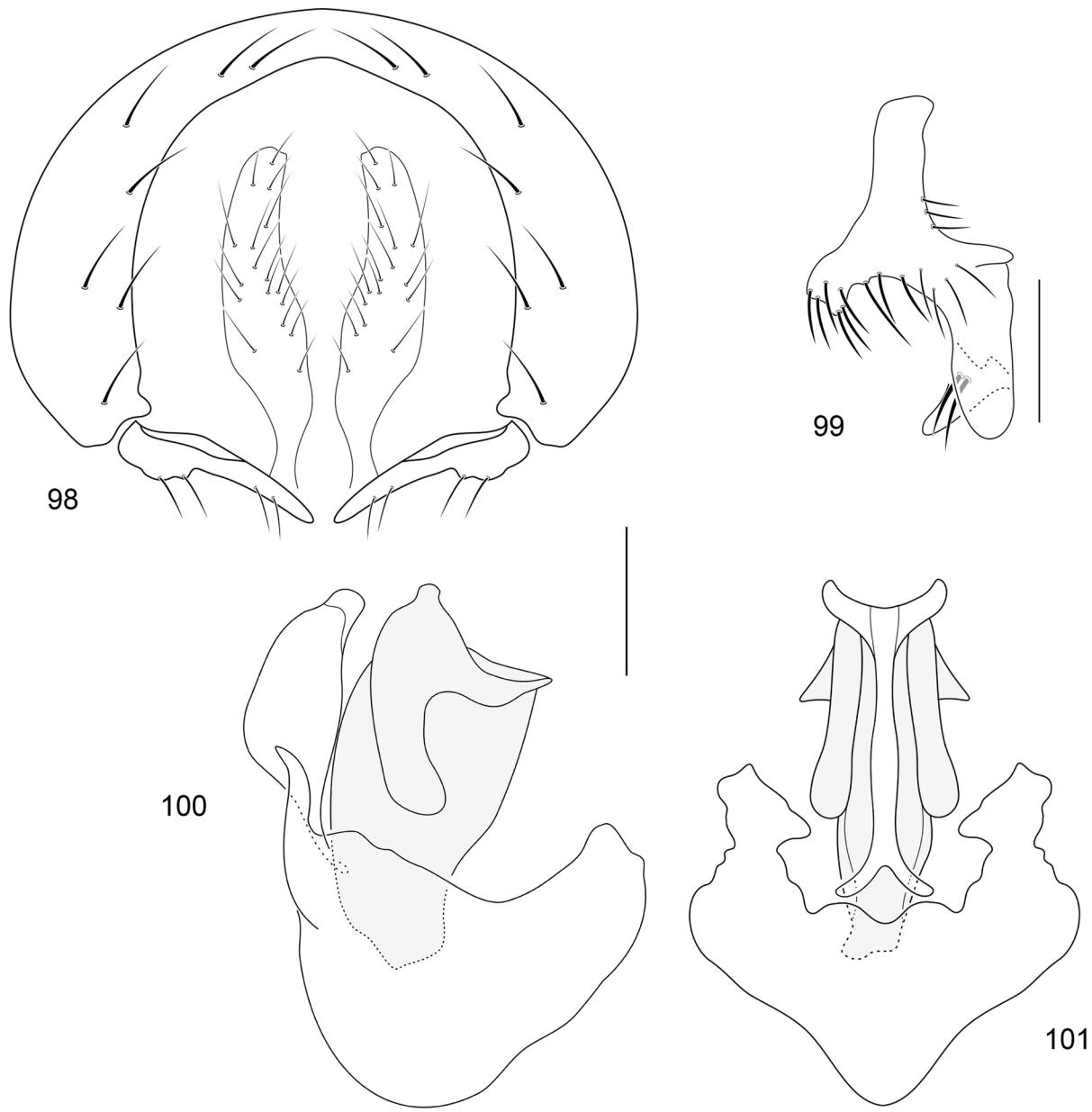
FIGURES 98–101, 187, 205, MAP 19

Paralimna pleurivittata Cresson 1916:122 [Peru. Lima: Callanga (12°19'S, 75°35.6'W); HT ♂, HNHM]; 1947:53 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:123 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: frons protuberant and almost horizontal; face long, about twice the length of frons, yellowish gray to golden brown in the most part, silvery gray on central portion and distal margin, with 2 longitudinal, parallel golden-brown spots between largest facial setae; eye rather rectangular, wider than high in lateral view; mesopleuron with a wide golden-brown stripe extending from prostigma over mostly anepisternum to wholly anepimeron, dorsal and ventral margins of anepisternum paler; lateroventral margin of tergites brown; forefemur with anteroventral row of setae, elongate on basal half of forefemur, short and flattened on distal half, and posteroventral series of elongate setae; wing slightly brown, transverse veins with infuscate halo; pedicel with a silvery white spot dorsally.

DESCRIPTION. Body length 2.5–4.6 mm; body predominantly brown dorsally, gray or dark gray ventrally, and lateral medial surfaces mostly brown.

Head: (See Figure 187) Frons protuberant and almost horizontal, pale brown with linear pale yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits above dorsal proclinate fronto-orbital seta, silvery gray between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits with a dark brown spot and dorsal parafacial with a pale brown spot lateral to antenna, separated by silvery-gray spot. Antenna inserted high on face; scape and pedicel red brown, pedicel with silvery-white spot dorsally; basal flagellomere pale brown to brownish golden yellow according to incidence of light, with slender, elongate, pale setae on margin; arista with 15 long, dorsal rays. Postcranium with 1 complete series of postocular setae. Face long, about twice the length of frons; yellowish gray to golden brown in the most part, silvery gray on central portion and distal margin, with 2 longitudinal, parallel golden-brown spots between largest facial setae; parafacial silvery gray and gena yellowish gray; gena with only few setae on middle and ventral margin; clypeus gray. Eye rather rectangular, slightly wider than high in lateral view, height twice the height of gena. Gena high, height slightly longer than length of basal flagellomere; gena-to-eye ratio 0.40–0.44.

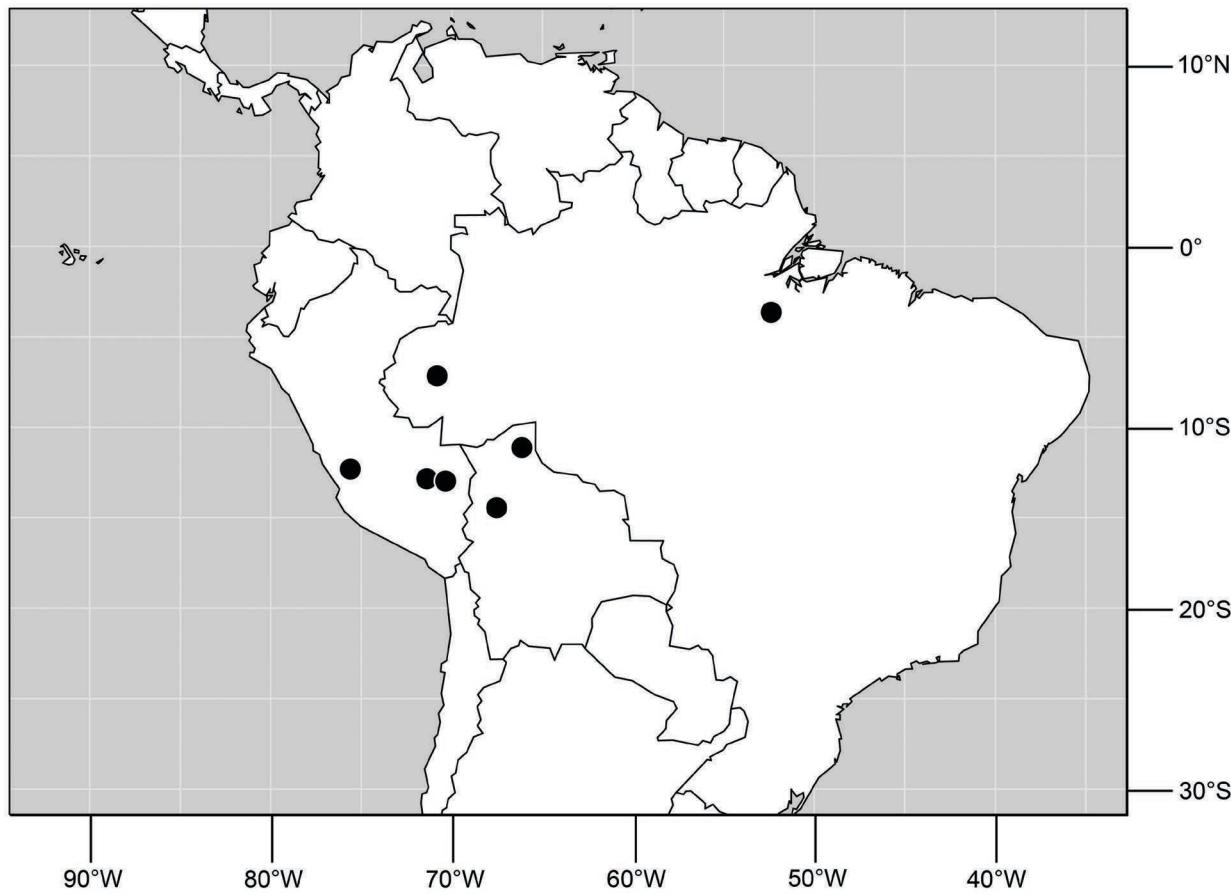


FIGURES 98–101. Structures of male terminalia of *Paralimna (Paralimna) pleurivittata* Cresson (Peru. Lima): (98) epandrum, cerci, and presurstyli, posterior aspect; (99) posturstylius, lateral aspect; (100) aedeagus, phallapodeme, and hypandrium, lateral aspect; (101) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

Thorax: Mesonotum with coloration faded, mostly pale golden brown with yellowish gray areas, usually along setal tracks, 2 pale golden-brown stripes between dorsocentral rows; postpronotum, notopleuron, and supra-alar areas gray; scutellum brown dorsally, with apex blackish brown and silvery gray laterally. Pleurae: a wide golden-brown stripe extending from prostigma over most of anepisternum to whole of anepimeron, dorsal and ventral margins of anepisternum paler; metapleuron, laterotergite, katepisternum, and meron gray. Wing (see Figure 205) faintly brown,

transverse veins with infuscate halo; costal-vein ratio 0.46–0.51; M-vein ratio 1.12–1.20. Legs brown with sparse silvery-gray micromentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur with anteroventral series of setae, elongate on basal half of forefemur, short and flattened on distal half, and posteroventral series of elongate setae; foretibia straight.

Abdomen: Tergites distinctly bicolored, brown along anterior half, medially, and on lateroventral margin, otherwise gray. Male terminalia: (Figures 98–101) Presurstylius not obviously



MAP 19. Distribution map for *Paralimna (Paralimna) pleurivittata* Cresson.

bifurcate, just widened basoventrally, with 2 short and robust setae inserted over tuberculate bases, horizontal process almost straight, bearing 2 slender setae near apex; in lateral view posturstylus widened medially with anteromedial lobe large with truncate apex bearing elongate, slender setae, setae extended over median line of external surface, and a short, pointed anteromedial process; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, robust, slightly curved in middle, rounded apex; aedeagus rather slender, tapering gradually toward membranous apex in posterior view; in lateral view phallapodeme triangular, not much developed; hypandrium moderately deeply concave; cerci long, slender, almost 5× longer than wide.

TYPE MATERIAL. The holotype male of *Paralimna pleurivittata* was not examined, but we examined the male and female paratypes (USNM) from the same series.

OTHER SPECIMENS EXAMINED: **BOLIVIA.** Beni: Ivón (Mulford Biological Expedition; 11°07.6'S, 66°07.9'W), Feb 1921–1922, W. M. Mann (1♀; USNM); Rurrenabaque (14°26.5'S, 67°31.7'W; 175 m), 10–23 Oct 1956, L. E. Peña (1♀; CNC).

BRAZIL. Amazonas: Ipixuna, Rio Gregório, Comunidade Lago Grande (07°09.9'S, 70°48.9'W; light trap), 21 May 2011, J. A. Rafael, J. Câmara, R. Silva. A. Somavilla (1♂; INPA). Pará: Rio Xingu (camp, about 60 km S Altamira; 03°39'S, 52°22'W), 8–16 Oct 1986, O. S. Flint Jr., P. J. Spangler (3♂, 10♀; USNM).

PERU. Lima: Callanga (12°19'S, 75°35.6'W) (1♂, 1♀; paratypes; USNM). Madre de Dios: Avispas (12°58.7'S, 70°20.8'W; 400 m), 1–15 Oct 1962, L. E. Peña (22♂, 22♀; CNC); Río Manu, Erika (near Salvación; 12°50.7'S, 71°23.3'W; 550 m), 5–6 Sep 1988, W. N. Mathis (6♂, 1♀; USNM).

TYPE LOCALITY. Neotropical. Peru. Lima: Callanga (12°19'S, 75°35.6'W).

DISTRIBUTION. (Map 19) Neotropical: Bolivia (Beni), Brazil (Amazonas, Pará), Peru (Lima, Madre de Dios).

REMARKS. This species is very easily distinguished from other species of *Paralimna* by the set of characters presented in the diagnosis. In addition, the male terminalia have a presurstylus with a weakly developed basoventral process, the postsurstylus has an anteromedial lobe that is rather quadrate

and bears strong setae, and the posteromedial process is digitiform.

23. *Paralimna (Paralimna) plumbiceps* Cresson

FIGURES 102–105, 188, MAP 12

Paralimna plumbiceps Cresson 1916:110 [West Indies. "Jamaica"; HT ♂, ANSP (6090)].

Paralimna (Paralimna) plumbiceps.—Cresson 1947:51 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:123 [world catalog].

DIAGNOSIS. This species is distinguished from congenera by the following combination of characters: face mostly entirely gray to whitish gray, sometimes slightly yellowish or with an inconspicuous, rather rectangular golden-brown spot on carina and 2 small, rounded spots between largest facial setae; frons mottled, dark to whitish brown; scutellum guttate, mostly brown, especially base of setae; anepisternum and katepisternum mostly concolorous (anepisternum with dorsal margin sometimes brown), faintly yellowish gray to silvery gray; forefemur of male concave ventrally near apex, bearing anteroventral, comb-like row of distinctly flattened, long setae; posteroventral surface of male forefemur bearing row of long setae along most of length; foretibia of male with ventral surface wavy, covered by conspicuous dense elongate ventral setae.

DESCRIPTION. Body length 3.0–3.5 mm; body generally bicolored, brown dorsally, lateral surfaces dark or silvery gray.

Head: (See Figure 188) Frons grayish brown becoming dark gray anteriorly, with yellowish-gray spots poorly defined, a stripe at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; spots on ventral fronto-orbits and dorsal parafacial little evident. Antennal scape and pedicel grayish brown, pedicel with distal margin paler; basal flagellomere pale brown, with slender, elongate, pale setae on margin; arista with 9 long dorsal rays. Postcranium with 2 series of postocular setae, the inner series irregular. Face gray to whitish gray with a golden-brown, sometimes inconspicuous, rectangular spot on the carina, the same length of antenna, and 2 small, rounded spots between largest facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus gray. Eye rounded, about as wide as high, height two or three times the height of gena. Gena high, height subequal or slightly greater than length of basal flagellomere; gena-to-eye ratio 0.28–0.35.

Thorax: Mesonotum mostly brown to grayish brown with yellowish-gray areas, usually along setal tracks, 3

well-defined brown stripes between dorsocentral rows; postpronotum and supra-alar areas silvery gray; scutellum brown basally, yellowish gray laterally and in middle, with apex blackish brown. Pleurae silvery gray, anepisternum with a small, rounded brown spot on dorsal margin and ventral margin brown tinged. Wing hyaline; veins brown; crossvein dm-cu lacking infuscate halo; costal-vein ratio 0.40–0.46; M-vein ratio 1.06–1.12. Legs dark brown with sparse gray microtrichia; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with ventral surface concave near apex, anteroventral surface with a row of very long flattened setae on distal ¾ of forefemur, posteroventral surface with 1 row of very long and spaced setae, longer than width of femur; foretibia of male with ventral surface wavy, covered by conspicuous, dense, elongate setae.

Abdomen: Tergite 1 brown with a slender, small band on each side of anterior margin; tergites 2–5 distinctly bicolored, tergite 2 brown on anterior half and silvery gray on the remaining, tergites 3–5 brown along anterior ⅓ and medially, otherwise silvery gray. Male terminalia: (Figures 102–105) Presurstylus bearing short, slender, sparse setae, widened basally, basoventral process not distinctly developed, horizontal process slightly curved; in lateral view postsurstylus widened medially with ventral margin rounded, bearing dense, elongate, slender setae and an elongated, pointed anteromedial process; lateral aedeagal process shortened, about ¼ length of aedeagus, thin, slightly curved in middle, rounded apex; aedeagus rather robust tapering gradually toward membranous apex; in lateral view phallapodeme triangular; hypandrium moderately deeply concave; cerci long, rather deeply concave on distal half of internal margin.

TYPE MATERIAL. The holotype male of *Paralimna plumbiceps* is labeled "♂/JAMAICA/HoloTYPE 6090 [red; "6090" handwritten]/TYPE Paralimna PLUMBICEPS E.T.Cresson,Jr. [maroon; "Paralimna PLUMBICEPS" handwritten]." The holotype is double mounted (minuten pin in a block of cork), is in good condition (left basal flagellomere missing; abdomen not dissected), and is deposited in the ANSP (6090). Three paratypes, including the allotype (1♂, 2♀; ANSP), bear the same label data as the holotype.

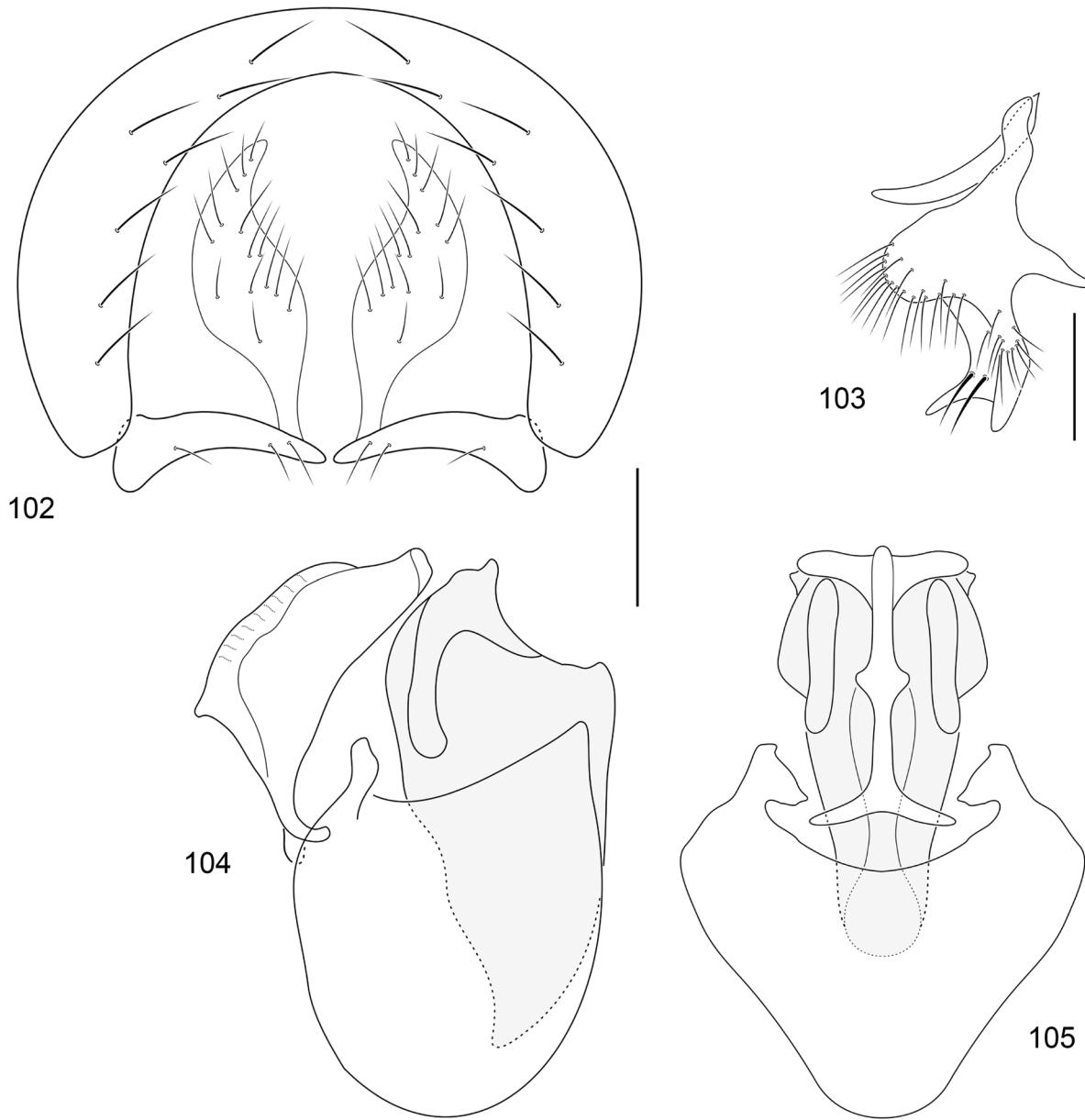
OTHER SPECIMENS EXAMINED: WEST INDIES. DOMINICAN REPUBLIC. *El Seibo*: Pedro Sánchez (18°51.4'N, 69°6.5'W), 26 May 1998, D. and W. N. Mathis (3♂; USNM); Rincón (near; 18°45.3'N, 68°55.7'W), 12 May 1995, W. N. Mathis (2♂; USNM).

JAMAICA. *Portland*: Port Antonio (18°10.5'N, 76°27'W), Apr 1891 (3♂; ANSP, USNM). *St. Andrew*: Kingston (18°01'N, 76°47.6'W), Apr (1♀; USNM).

PUERTO RICO. Adjuntas (18°09.8'N, 66°43.2'W), 8–13 Jun 1915 (6♂, 3♀; AMNH, ANSP).

TYPE LOCALITY. Neotropical. "Jamaica."

DISTRIBUTION. (Map 12). *Neotropical*: West Indies (Dominican Republic, Jamaica, Puerto Rico).



FIGURES 102–105. Structures of male terminalia of *Paralimna (Paralimna) plumbiceps* Cresson (Jamaica): (102) epandrium, cerci, and presurstyli, posterior aspect; (103) postsurstylus, lateral aspect; (104) aedeagus, phallapodeme, and hypandrium, lateral aspect; (105) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

REMARKS. *Paralimna plumbiceps* is easily distinguished from congeners by the sinuous ventral surface of the male foretibia that bears conspicuous, dense, and elongate setae. The male terminalia also provides useful characters for the recognition of this species. The postsurstylus has a conspicuously elongated and pointed posteromedial lobe, the lateral aedeagal process is short, less than $\frac{1}{2}$ the aedeagal length, and the horizontal process of the presurstyli is widened basally and gradually narrowed toward the apex (similar to *P. sera* but lacking the long, slender ventral setae).

24. *Paralimna (Paralimna) puncticornis* Cresson

FIGURES 106–109, MAP 20

Paralimna puncticornis Cresson 1916:121 [Costa Rica. Cartago: Peralta ($9^{\circ}58.1'N$, $83^{\circ}36.9'W$); HT ♀, ANSP (6095)]; 1918:47 [review; Costa Rica].

Paralimna (Paralimna) puncticornis.—Cresson 1947:52–53 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:124 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following characters: face yellowish to golden gray with golden-brown lateral margin and 3 brown spots, 1 on carina and 2 longitudinal parallel also rectangular large spots between largest facial setae, occupying almost the entire width of face and reaching the ventral margin; pedicel with a conspicuous silvery-gray spot dorsally; pleurae mostly gray or yellowish gray, katepisternum with darkened area anteriorly and anepisternum with 3 brown, well-defined spots—1 dorsal, 1 ventral, and 1 rounded, central spot in middle, sometimes the central spot is inconspicuous or the spots expand and become completely brown anepisternum; forefemur of the male bearing posterovenentral row of widely spaced and elongate setae and anteroventral row of sparse setae, elongate on basal half and shortened and slightly flattened on distal half of forefemur, setae of anterior row less than half length of setae of posterior row; crossvein dm-cu with faintly infuscate halo.

DESCRIPTION. Body length 6.5–8.2 mm; body generally bicolored, dark brown dorsally and brown ventrally, lateral medial surfaces mostly gray.

Head: (See Figure 189) Frons reddish brown with frontal design well-defined; linear gray or yellowish-gray spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, converging anteriorly, reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits and dorsal parafacial with a dark gray spot lateral to antenna, separated by gray spot. Antennal scape and pedicel dark brown, pedicel with a conspicuous silvery-gray spot dorsally; basal flagellomere pale brown to brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 12–15 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face yellowish to golden gray with golden-brown lateral margin and 3 brown spots, 1 on the carina, same length of antenna, and 2 longitudinal, parallel, rectangular large spots between largest facial setae, occupying almost the entire width of face and reaching the ventral margin; parafacial and gena gray; gena with only few setae on middle and ventral margin; clypeus brownish gray with silvery-gray distal margin. Eye rounded, about as wide as high, height more than three times the height of gena. Gena high, subequal to length of basal flagellomere; gena-to-eye ratio 0.26–0.28.

Thorax: Mesonotum predominantly brownish copper with small gray or yellowish gray areas or stripes along the setal tracks; postpronotum, notopleuron, and supra-alar areas yellowish gray; scutellum brown dorsally with small gray spots, blackish brown apex, and gray laterally. Pleurae gray or yellowish gray except anepisternum with 3 brown, well-delimited spots—1 dorsal, 1 ventral, and 1 rounded spot in middle, sometimes the central spot is inconspicuous or the spots expand and become completely brown anepisternum; anepimeron brown on anteroventral corner and katepisternum with a darkened area anteriorly. Wing semi-hyaline, crossvein dm-cu with

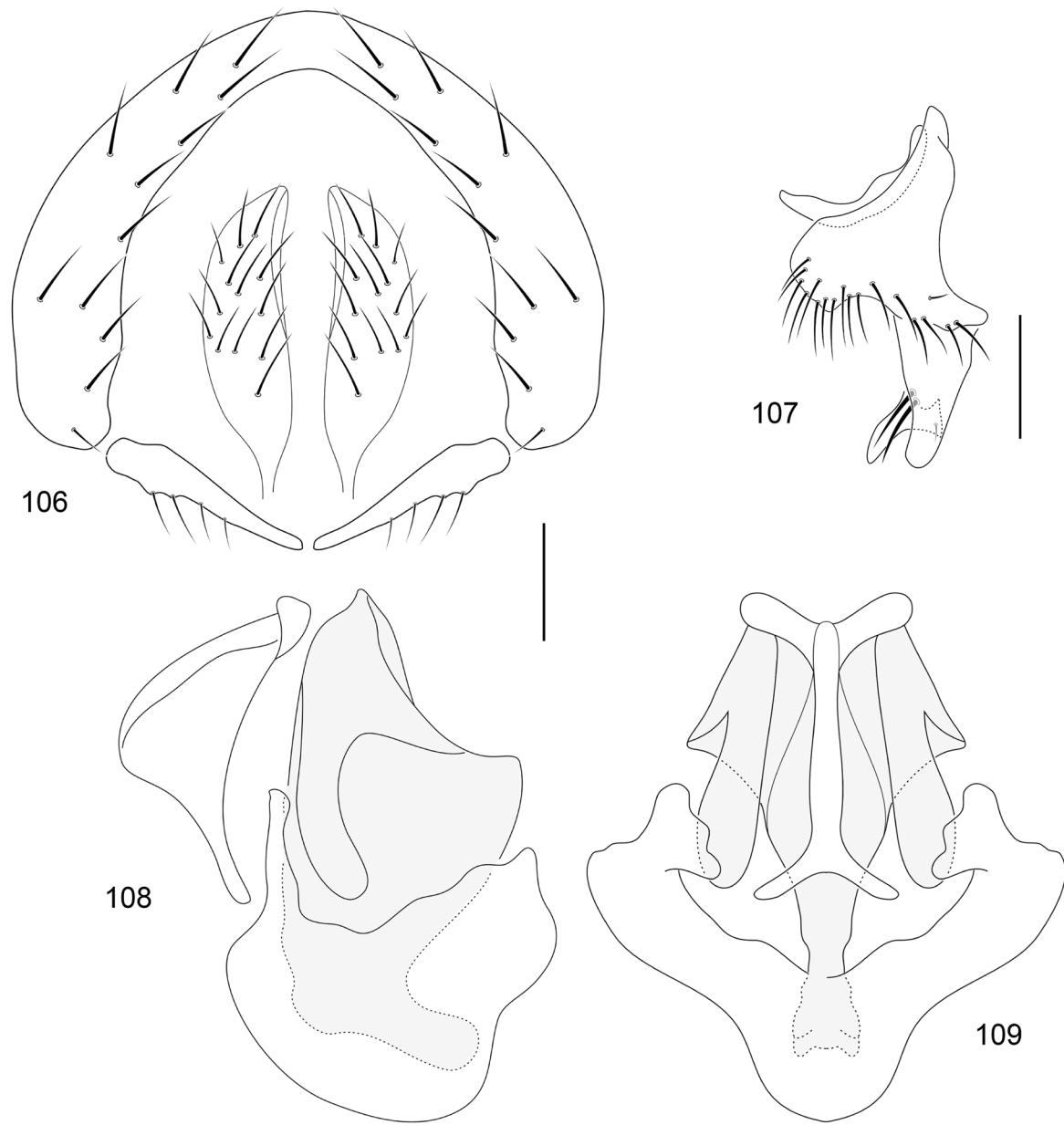
faintly infuscate halo; veins brown; costal-vein ratio 0.38–0.45; M-vein ratio 0.98–1.19. Legs blackish brown with sparse silvery-gray microtomentum; tarsi yellow; forefemur of the male with posteroventral row of widely spaced and elongate setae, and anteroventral surface with a row of sparse setae, elongate on basal half of forefemur, shortened and slightly flattened on distal half of the forefemur; foretibia straight.

Abdomen: Tergites distinctly bicolored, tergite 1 dark brown medially and gray on lateral corners; tergites 2–5 dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray; lateroventral margin of tergites brown. Male terminalia: (Figures 106–109) Presurstylus not bifurcate, horizontal process long, almost straight, with 4 or more strong and long setae inserted on tubercle; in lateral view postsurstylus widest medially with wide, medial, anteriorly produced lobe, bearing several stout, elongate setae extended through medial region of external surface, distal half of postsurstylus also slender; lateral aedeagal process robust, about $\frac{1}{2}$ length of aedeagus, slightly curved subapically, bluntly rounded; aedeagus gradually tapered toward membranous apex in posterior view; in lateral view phallapodeme wider on basal $\frac{2}{3}$ and slender on the remainder; hypandrium shallowly concave; cerci elongate, about 4× longer than wide.

TYPE MATERIAL. The holotype female of *Paralimna puncticornis* is labeled “Peralta[,] 24III [19]10C[osta]R[ica][,] P P Calvert/Sweeping over muddy road/TYPE Paralimna PUNCTICORNIS E.T.Cresson,Jr. [maroon; “Paralimna PUNCTICORNIS” handwritten].” The holotype is double mounted (minuten pin in a vertical rectangular card), is in very good condition (left wing with a small tear in anal vein region, some setae disoriented; abdomen not dissected), and is deposited in the ANSP (6095).

OTHER SPECIMENS EXAMINED. *BOLIVIA. La Paz:* El Choro ($16^{\circ}19' S$, $68^{\circ}03.5' W$; 900 m), 7 Jan 1976, L. E. Peña (1♂; CNC).

COSTA RICA. Alajuela: Higuito, San Mateo ($09^{\circ}56.7' N$, $84^{\circ}32.8' W$), P. Schild (1♂, 1♀; ANSP); Peñas Blancas ($10^{\circ}04' N$, $84^{\circ}37' W$; 700 m; rain forest), 18 Aug 1986, L. Masner (1♀; CNC). *Cartago:* Turrialba ($09^{\circ}54.1' N$, $83^{\circ}41.1' W$; light trap), Mar–4 Sep 1954, 1986, C. H. Batcherder, L. Masner (2♂, 4♀; CNC, USNM); Turrialba ($09^{\circ}54.1' N$, $83^{\circ}41.1' W$), 15 Jul 1965, P. J. Spangler (5♂; USNM); La Suiza ($09^{\circ}51.5' N$, $83^{\circ}37.5' W$), 6 May 1926, P. Schild, A. L. Melander (1♂; USNM) (1♂, 3♀; ANSP). *Heredia:* La Selva Field Station near Puerto Viejo ($10^{\circ}27.2' N$, $84^{\circ}0.2' W$), Feb–28 Mar 1980, 1988, W. Mason, W. E. Steiner (3♂, 2♀; CNC, USNM); La Selva ($10^{\circ}27.2' N$, $84^{\circ}0.2' W$; trap in garden), Jan 1993, P. Hanson (125♂; 108♀; USNM); Santo Domingo (INBio Parque; $09^{\circ}58.4' N$, $84^{\circ}5.6' W$), 14 Jun 2003, D. and W. N. Mathis (10♂, 12♀; USNM). *Limón:* Bribri (4 km E; $10^{\circ}00' N$, $83^{\circ}15' W$; 50 m; Malaise trap), Jul–Sep 1990, P. Hanson (14♀; USNM). *Puntarenas:* Manuel Antonio National Park ($09^{\circ}23.5' N$, $84^{\circ}08.7' W$; coastal rainforest), 23–28 Aug 1986, L. Masner (1♂; CNC); Puerto Jiminez (5 km N; $10^{\circ}13' N$, $83^{\circ}43' W$; Malaise trap), Nov–Dec 1990, P. Hanson (6♀; USNM); Piedras Blancas (24 km W; $08^{\circ}47' N$, $83^{\circ}15' W$; 200 m), Dec 1990 (1♂, 10♀; USNM);

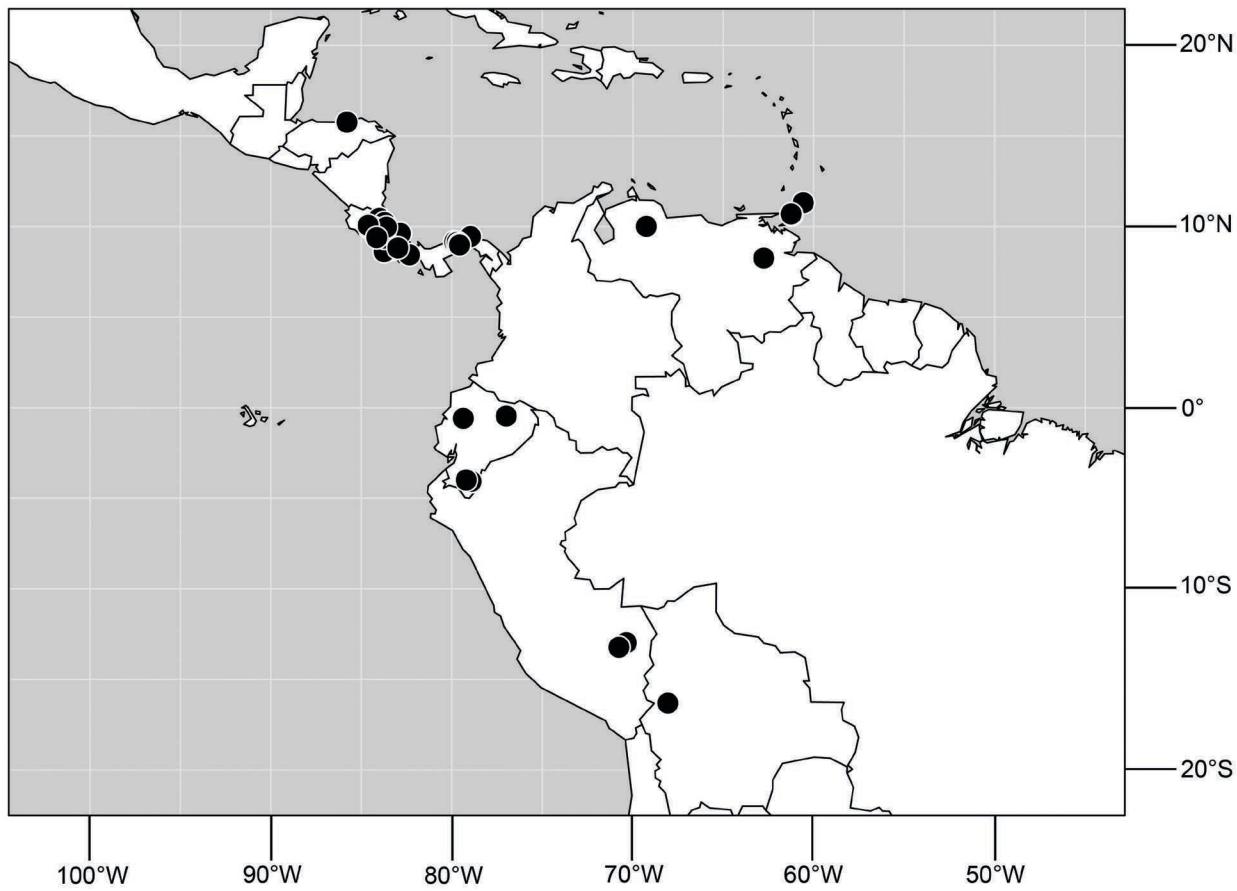


FIGURES 106–109. Structures of male terminalia of *Paralimna (Paralimna) puncticornis* Cresson (Costa Rica. Heredia): (106) epandrium, cerci, and presurstyli, posterior aspect; (107) postsurstylos, lateral aspect; (108) aedeagus, phallapodeme, and hypandrium, lateral aspect; (109) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

Rincón (3 km SW; 08°42.5'N, 83°29.2'W), Oct-Dec 1990, P. Hanson (4♂, 12♀; USNM); Res. For. Golfo Dulce, Rincón (3 km SW; 08°42.5'N, 83°29.2'W), Dec 1989–Mar 1990, P. Hanson (8♂; USNM); San Pedrillo (08°37.2'N, 83°44.1'W), 12–14 Aug 2001, D. and W. N. Mathis (1♂, 4♀; USNM); San Vito, Las Cruces (08°49.3'N, 82°58.3'W; 1200 m), 9 Jul 1983, B. Gill (1♀; CNC). **San José:** Ciudad Colón (09°55'N, 84°15'W; 800 m; Malaise trap), Dec 1989, P. Hanson (4♂, 2♀; USNM);

Pedregoso (09°22'N, 83°43'W), D. L. Rounds (3♂, 1♀; ANSP); Río Paraíso (09°33.8'N, 84°7.4'W; 350–400 m), 15–17 Feb 2003, D. and W. N. Mathis (3♂, 6♀; USNM).

ECUADOR. **Loja:** Loja (S; 03°59.4'S, 79°12.3'W; 1200 m), 26 Mar 1965, L. E. Peña (1♂, 1♀; CNC). **Los Ríos:** Río Palenque (0°35'S, 79°22'W; 150 m), 22–26 Feb 1976, G. E. Shewell (1♀; CNC). **Orellana:** Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–13 Apr 1965, L. E. Peña (12♂, 17♀;



MAP 20. Distribution map for *Paralimna (Paralimna) puncticornis* Cresson.

CNC). **Zamora-Chinchipe:** Río Jumboé (04°04'S, 78°55.8'W; 1200 m), 1–2 Apr 1965, L. E. Peña (1♂, 1♀; CNC).

HONDURAS. Colon: Corocito (15°46.4'N, 85°47.4'W), 3 Apr 1924 (3♀; ANSP).

PANAMÁ. Chiriquí: El Valle (08°25.9'N, 82°19.8'W), Nov 1943, N. L. H. Krauss (1♂; USNM). **Guna Yala:** San Blas, Rio Carti Grande near coast (09°27.3'N, 78°57.8'W), 2 Mar 1985, O. S. Flint Jr., J. E. Louton (1♂, 1♀; USNM). **Panamá:** Barro Colorado Island (09°09.1'N, 79°50.8'W, Canal Zone), 21 Dec 1928, C. H. Curran (1♀; ANSP); Barro Colorado Island (09°09.1'N, 79°50.8'W; Malaise trap), Jul 1967, W. W. Wirth (1♂, 1♀; USNM); Chiva Chiva, Road 8, 8 air km N Ft. Clayton (09°02'N, 79°35'W), 23 Jul 1978, N. E. Woodley (1♂; USNM); Gamboa, Pipeline Road (09°07'N, 79°42'W; Malaise trap), Jul 1967, W. W. Wirth (4♀; USNM). **Veraguas:** Corozal (08°59'N, 79°34.1'W; Canal Zone), 16 Jan 1929, C. H. Curran (1♂; ANSP).

PERU. Cuzco: Quincemil (13°13.7'S, 70°45.6'W; 740 m), 13–31 Aug 1962, L. E. Peña (2♂, 2♀; CNC). **Madre de Dios:** Avispas (12°58.7'S, 70°20.8'W; 400 m), 1–30 Oct 1962, L. E. Peña (1♂, 2♀; CNC).

TRINIDAD and TOBAGO. Tobago. St. John: Charlotteville (5 km S; 11°18.9'N, 60°34.5'W), Hermitage River and beach, 22 Apr–11 Jun 1993, 1994, D. and W. N. Mathis (1♂; USNM). **Trinidad. St. Andrew:** Valencia (1 km W; Aripo River; 10°39'N, 61°13'W), 20 Jun 1993, W. N. Mathis (3♂, 1♀; USNM). **St. George:** Arima (8 km N; 10°41'N, 61°18'W), Verdant Vale (10°41'N, 61°17'W), 19 Jun 1993, W. N. Mathis (1♂; USNM); Caura River Valley (end of Caura River Road; 10°42.5'N, 61°21.5'W), 31 Mar 1996, C. Chaboo (10♂, 7♀; AMNH).

VENEZUELA. Bolívar: Gran Sabana (N edge at Pioneer Monument; 08°16'N, 62°45.3'W), 21 Mar 1982, G. F. and J. F. Hevel (1♂; USNM). **Lara:** Yacambú (10°0.7'N, 69°14.6'W; 1200 m), 10 May 1981, H. K. Townes (1♂, 4♀; CNC).

TYPE LOCALITY. Neotropical. Costa Rica. Cartago: Peralta (9°58.1'N, 83°36.9'W).

DISTRIBUTION. (Map 20) *Neotropical:* Bolivia (La Paz), Costa Rica (Alajuela, Cartago, Heredia, Limón, Puntarenas, San José), Ecuador (Loja, Los Ríos, Orellana, Zamora-Chinchipe), Honduras (Colon), Panamá (Chiriquí, Guna Yala,

Panamá, Veraguas), Peru (Cuzco, Madre de Dios), Trinidad and Tobago, Venezuela (Bolívar, Lara).

REMARKS. This species has facial coloration that is similar to *P. crinita* sp. nov.; however, it can be easily distinguished by characters of the male terminalia: the basoventral process of the presurstylus is falciform and the lateral aedeagal process is large in *P. crinita*, and the basoventral process is not developed and the lateral aedeagal process is normally developed in *P. puncticornis*. The legs also differ: the male forefemur has the ventral surface distinctly concave on its distal $\frac{1}{3}$, and the male foretibia bears dense and bristling setae on the ventral surface in *P. crinita*; the ventral surface of the male forefemur is not concave and the male foretibia lacks dense and bristling setae on the ventral surface in *P. puncticornis*. Some specimens of *P. molossus* have large golden-brown spots on the ventral half of the face that can be confused with *P. puncticornis*, but features of the male terminalia are dissimilar.

25. *Paralimna (Paralimna) punctipennis* (Wiedemann)

FIGURES 110–113, 190, 206, MAP 21

Notiphila punctipennis Wiedemann 1830:590.

Paralimna punctipennis.—Cresson 1929:184 [generic combination]; 1946:229 [review].—Wirth 1965:748 [Nearctic catalog].—Mathis and Zatwarnicki 1995:124 [world catalog].

Paralimna appendiculata Loew 1862a:138 [United States. "Middle States" and "Georgia"; ST ♂♀, MCZ (11134)].—Cresson 1929:184 [synonymy].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face silvery gray to yellowish gray with 3 golden-brown spots, a rectangular spot on the carina, and 2 small, rounded spots between largest facial setae; pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites blackish brown); wing hyaline, second section of vein M with 1 to several perpendicular stumps, the stumps and remaining transversal veins infuscate; forefemur of male bearing simple setae on anteroventral and posteroventral surface.

DESCRIPTION. Body length 3.1–5.7 mm; body generally bicolored, brown dorsally and blackish brown ventrally, lateral medial surfaces mostly pale to yellowish gray.

Head: (See Figure 190) Frons mottled, dark to whitish brown with almost inconspicuous pale yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits without conspicuous spot; dorsal parafacial with a gray spot lateral to antenna. Antennal scape and pedicel brown, pedicel paler on distal margin dorsally; basal flagellomere pale brown to brown according

to incidence of light, with slender, elongate, pale setae on margin; arista with 11–13 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face silvery gray to yellowish gray with 3 golden-brown spots, a rectangular spot on the carina, shorter than the length of antenna, and 2 small, rounded spots between largest facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery to yellowish gray. Eye rounded, slightly higher than wide, height about twice the height of gena. Gena high, height subequal or slightly greater than length of basal flagellomere; gena-to-eye ratio 0.42–0.57.

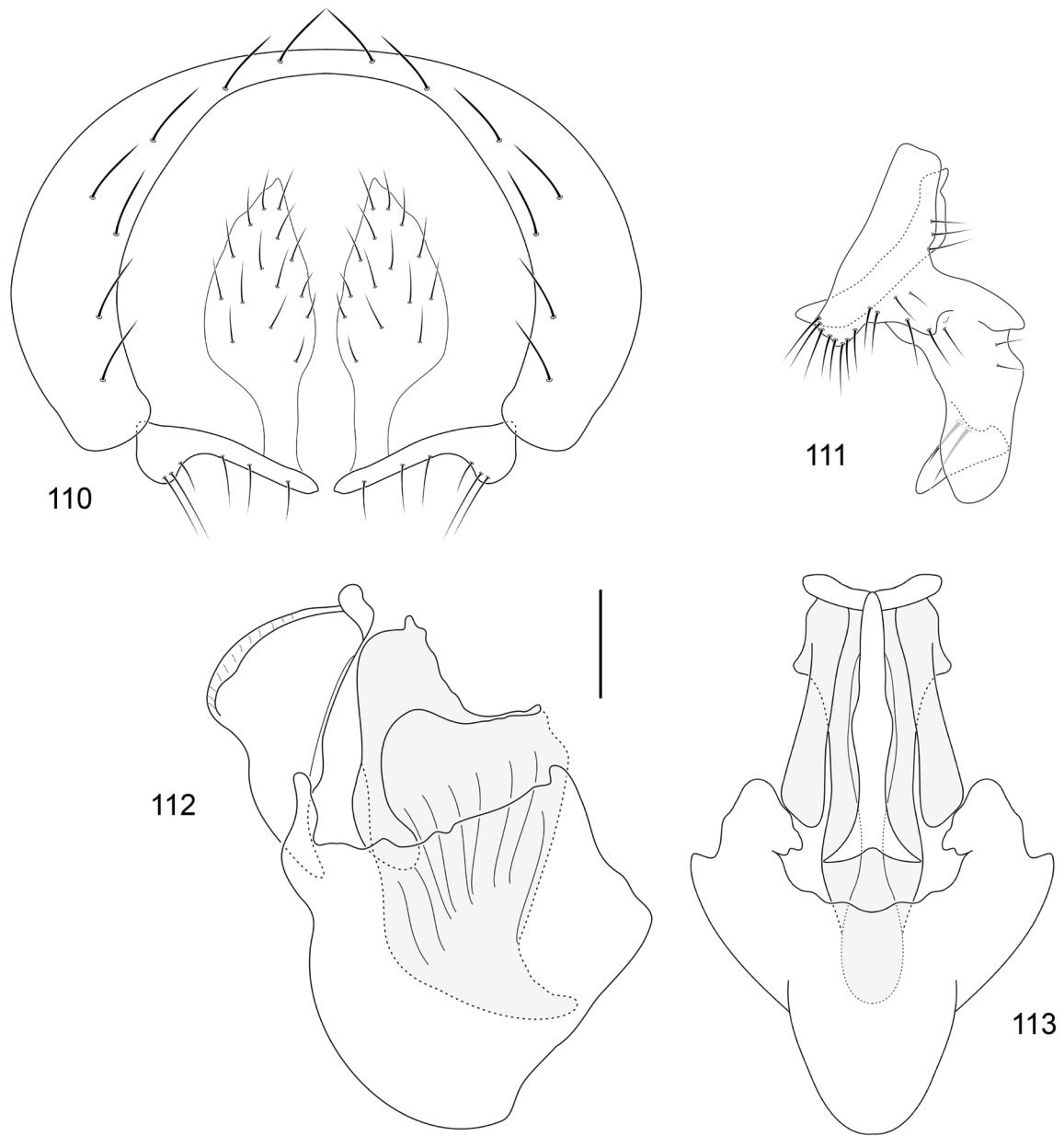
Thorax: Mesonotum mostly grayish brown to brown, lateral surfaces mostly gray, sometimes silvery white, 3 brown stripes between dorsocentral rows; postpronotum, notopleuron, and supra-alar areas silvery gray; scutellum brown dorsally, with apex blackish brown and pale gray laterally. Pleural area distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites blackish brown). Wing (see Figure 206) hyaline; veins pale brown; second section of vein M with 1 to several perpendicular stumps, the stumps and remaining transversal veins infuscate; costal-vein ratio 0.43–0.47; M-vein ratio 0.95–1.05. Legs brown with brown microtomentum; tarsi lighter with some yellow coloration, especially ventrally on first and second tarsomeres; forefemur of male with anteroventral and ventral series of short setae, ventral series more numerous, flattened setae absent; foretibia straight.

Abdomen: Tergites distinctly bicolored, dark brown along anterior $\frac{2}{3}$ and medially, otherwise silvery to yellowish gray and lateral margins brown, except tergite 1 wholly brown. Male terminalia: (Figures 110–113) Presurstylus with basoventral process weakly developed, short, wide, length about $\frac{1}{3}$ horizontal process; horizontal process long, slender with long, slender setae; in lateral view posturstylus widest medially with wide, medial, anteriorly produced lobe bearing several stout, elongate setae extended until half the medial region on external surface, a stout medial short lobe posteriorly produced, distal half of posturstylus large, widened in lateral view; lateral aedeagal process constricted in middle, about $\frac{1}{2}$ length of aedeagus, curved subapically, bluntly rounded; aedeagus slender in posterior view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave; cerci widened, almost 2x longer than wide.

TYPE MATERIAL. The lectotype female of *Notiphila punctipennis* Wiedemann (designated by Cresson 1929:184) is labeled "punctipennis [handwritten] Alte Sammlung/TYP Notiphila punctipennis ["Notiphila punctipennis" handwritten; red]." The lectotype is pinned directly, is in good condition (mesonotum cracked where pin is inserted; abdomen not dissected), and is deposited in NMW.

OTHER SPECIMENS EXAMINED. UNITED STATES. *Alabama. Lauderdale:* Shoal Creek near Killen ($34^{\circ}51.8'N$, $87^{\circ}32.3'W$; 150 m), 8 Aug 1939, J. A. G. Rehn, J. W. H. Rehn (1♀; ANSP).

Arizona. Cochise: Douglas ($31^{\circ}20.9'N$, $109^{\circ}32.6'W$), Aug, F. H. Snow (1♀; ANSP); San Bernardino Ranch ($31^{\circ}20.2'N$, $109^{\circ}16.8'W$), Aug, F. H. Snow (1♀; ANSP).



FIGURES 110–113. Structures of male terminalia of *Paralimna (Paralimna) punctipennis* (Wiedemann) (United States. Virginia): (110) epandrium, cerci, and presurstyli, posterior aspect; (111) postsurstylus, lateral aspect; (112) aedeagus, phallapodeme, and hypandrium, lateral aspect; (113) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

Colorado. Baca: Regnier (37°N, 102°50'W), 6–9 Jun (1♂; ANSP). *Boulder:* Longmont, Ute Creek (40°10'N, 105°06'W), 7 Aug, R. W. Dawson (1♀; ANSP). *Crowley:* Olney Springs (38°09.8'N, 103°56.4'W), 28 May 1932, M. T. James. *El Paso:* Colorado Springs (38°50'N, 104°49'W; 1570 m), Jul, E. S. Tucker (1♀; ANSP). *Weld:* Roggoo (40°10.1'N, 104°22.3'W), 31 Aug 1938, M. T. James (1♀; ANSP).

Delaware. Kent: Dover (39°09.5'N, 75°31.5'W), 24 Jun 1939, A. L. Melander (1♂, 3♀; ANSP, USNM). *Sussex:*

Delaware Seashore State Park (38°40.6'N, 75°04.1'W; beach), 17 May 2006, D. and W. N. Mathis (1♀; USNM); Dewey Beach (38°41.5'N, 75°05.5'W), 27 Aug 1972, L. V. Knutson (3♂, 4♀; USNM); Lewes Angola Neck Park (38°40.3'N, 75°09.1'W), 21 Sep 2007, G. A. Foster, A. M. Welch (1♀; USNM); Rehoboth (38°43.2'N, 75°04.6'W), 25 Jun–1 Sep 1939, 1977, A. L. Melander, W. W. Wirth (2♂, 8♀; ANSP, USNM).

District of Columbia. Anacostia (38°52'N, 76°59'W), 4 Jun 1913, P. R. Myers (1♂; USNM); Rock Creek, Boundary Bridge

12♀; USNM); Bethesda (38°58.8'N, 77°06'W), 2 Aug–12 Sep 1964, 1981, G. C. Steyskal, N. E. Woodley (3♂, 1♀; USNM); Cabin John (38°58.5'N, 77°09.5'W), 25 Jul 1972, G. C. Steyskal (3♂, 3♀; USNM); Clarksburg, Little Bennett Regional Park (39°16'N, 77°16.8'W), 9 Jul–21 Sep 1989, 1990, M. J. and R. Mollineaux, W. E. Steiner (15♂, 15♀; USNM); Colesville (39°04.8'N, 77°00.1'W), 14 Jun–31 Jul 1975, W. W. Wirth (6♂, 11♀; USNM); Cropley (38°58.8'N, 77°13.2'W), 12 Jul 1970, L. V. Knutson (2♂; USNM); Forest Glen (39°00.9'N, 77°03.2'W), 20 Aug 1966, W. W. Wirth (1♀; USNM); Pennyfield Lock, C&O Canal (39°03.2'N, 77°17.3'W), 5 Jul 1953, A. Stone (1♀; USNM); Plummers Island (38°58.2'N, 77°10.6'W), 20 May–17 Aug 1914, 1988, 1989, A. Freidberg, F. K. Knab, R. C. Shannon, P. J. Spangler (3♂, 4♀; USNM); Takoma Park (38°58.7'N, 77°00.4'W), 4 Aug 1987, W. E. Steiner (1♀; USNM); Wheaton (39°02.3'N, 77°03.3'W), 26 Jul 1979, A. Freidberg (8♂, 7♀; USNM). *Prince George's*: Adelphi (NW Branch Creek; 39°00.2'N, 76°58.3'W), 27 Nov 1981, E. R. S. Hodges (8♂, 3♀; USNM); Beltsville (39°02.1'N, 76°54.5'W), 15 Jun 1913, W. L. McAtee (2♂, 5♀; USNM); Bladensburg (38°56.4'N, 76°56'W), 23 Sep–2 Oct 1914, 1915, R. C. Shannon (1♂, 5♀; USNM); Camp Springs (38°48.2'N, 76°54.4'W), 18 Jun 1969, G. F. Hevel (1♀; USNM); Cheverly (38°56'N, 76°55'W), 4–22 Aug 1995, W. E. Steiner, J. M. Swearingen (2♂; USNM); College Park (38°58.8'N, 76°56.2'W), 25 May–5 Sep 1913, 1914, 1977, C. T. Greene, F. K. Knab, W. N. Mathis (8♂, 7♀; USNM); Hyattsville (38°57.4'N, 76°56.7'W), 1 Sep 1912, J. R. Malloch (1♂, 1♀; ANSP, USNM); Oxon Hill (38°48.2'N, 76°59.4'W), 30 Jun–22 Jul 1971, 1978, G. F. Hevel (2♂, 3♀; USNM); Patuxent Wildlife Research Center (39°03'N, 76°48.2'W), 14 Jul 1978, W. W. Wirth (1♀; USNM). *Talbot*: McDaniel (Wades Point; 38°49.6'N, 76°17.9'W), 21 Sep 1985, W. E. Steiner (1♂, 1♀; USNM).

Michigan. *Allegan*: Saugatuck (42°39.3'N, 86°12.1'W), 25 Jun 1938, C. W. Sabrosky (1♂; ANSP). *Livingston*: Hamburg (42°26.9'N, 83°49.1'W), 21 May 1939, G. C. Steyskal (1♀; ANSP). *Midland*: Midland (43°36.8'N, 84°14.9'W), 6–7 Jun 1936, C. W. Sabrosky (1♂, 1♀; ANSP).

Mississippi. *Hinds*: Jackson (32°17.9'N, 90°11.1'W), 30 Oct 1944 (2♂; ANSP); Utica (32°06.6'N, 90°37.4'W), Aug (1♂, 1♀; ANSP). *Lafayette*: Oxford (34°22'N, 89°31.1'W), Jun 1943 (1♀; ANSP). *Lowndes*: Artesia (33°24.9'N, 88°38.6'W), 1 May 1921, A. McIntosh (1♂; ANSP). *Oktibbeha*: Agriculture College (State College; 33°27.1'N, 88°47'W), 10 Mar–25 Sep 1921, 1928, H. W. Allen, J. M. Langston, W. Stafford (1♂, 4♀; ANSP).

Missouri. *Boone*: Columbia (38°57.1'N, 92°20'W; Malaise trap), 26 May–5 Sep 1906, 1968, C. R. Crosby, F. D. Parker (6♂, 21♀; ANSP, USNM). *Greene*: Springfield (24 km W; 37°11.7'N, 93°26.6'W), 15–21 Jun 1982, S. E. and P. M. Miller (4♀; USNM); Willard (37°18.3'N, 93°25.7'W), 30 Mar (1♂; USNM). *Howard*: Boonslick Salt Spring (39°03.4'N, 92°52.5'W), 17 May 1969, W. W. Wirth (1♂; USNM). *Jackson*: Atherton (39°11.2'N, 94°18.3'W), Jul–Sep (3♂, 4♀; ANSP).

Nebraska. *Dodge*: Fremont (41°26'N, 96°29.9'W), 18 Jul 1900 (1♂; ANSP).

New Jersey. *Burlington*: Riverton (40°0.1'N, 75°0.9'W), 19 Sep 1909 (1♀; ANSP). *Camden*: Ashland (39°51.8'N, 75°0.4'W), 13 May 1906 (1♂; ANSP). *Cape May*: Cape May (38°56.1'N, 74°54.4'W), 22 Jul–24 Aug 1936, 1938, W. Stone (1♂, 1♀; ANSP). *Mercer*: Trenton (40°13'N, 74°44.6'W), 19–23 Aug 1909 (4♂, 3♀; ANSP). *Ocean*: Tuckerton (16 km N; 39°53.3'N, 74°22.8'W), 26 Sep 2003, D. and W. N. Mathis (2♂; USNM).

New Mexico. *Otero*: High Rolls (32°57'N, 105°50.1'W), 31 May–2 Jun 1902 (2♂, 4♀; ANSP).

North Carolina. *Columbus*: Lake Waccamaw (34°18.5'N, 78°29.7'W), 6 Jul 1985, A. Gerberich, W. Steiner (3♀; USNM). *Dare*: Kill Devil Hills (36°01.8'N, 75°40.6'W), 23 Jun 1954, K. V. Krombein (1♀; USNM). *Graham*: Lake Santeetlah (35°29.8'N, 83°52'W; 460 m), 6 Aug 1939, J. A. G. Rehn, J. W. H. Rehn (1♀; ANSP). *Jones*: Kinston (25 km SE; 35°08.1'N, 77°28.2'W), 23 Apr 1988, M. J. Mollineaux (1♀; USNM). *Onslow* (34°39'N, 77°28'W): 25 Jun 1964, J. R. Cornell (1♂; USNM). *Swain*: Clingmans Dome, Great Smoky Mountains National Park (35°33.7'N, 83°30'W), 5 Aug 1939 (1♀; ANSP). *Wake*: Crabtree Creek (3.2 km NW Raleigh; 35°49.1'N, 78°37.8'W), 23 Apr 1964, G. A. Matuzta (3♂, 7♀; USNM); Raleigh (35°46.3'N, 78°38.3'W), 14 Oct 1971, P. W. Oman (1♂, 1♀; USNM). *Watauga*: Pisgah National Forest, Mortimer Recreational Area (35°25.3'N, 81°48.6'W; 460 m), 25 May 1999, S. D. Gaimari (1♂, 3♀; USNM).

Ohio. *Butler*: Four-Mile Creek, near Oxford (39°28'N, 84°36.2'W), 26 May 1979, B. A. Steinly (1♂, 1♀; USNM); Indian Creek C. P. near Oxford (39°28.5'N, 84°47.6'W), 25 May 1976, B. A. Steinly (1♀; USNM). *Erie*: Sandusky (41°27'N, 82°42.5'W), Jul 1913 (1♂; ANSP). *Franklin*: Columbus (39°57'N, 83°0.4'W), 23 May (1♀; ANSP). *Fulton*: Wauseon (41°32'N, 84°08.5'W), 23–25 Aug 1902 (3♂, 2♀; ANSP). *Muskingum*: Zanesville (39°56.4'N, 82°0.8'W), 24 Aug 1952, C. W. Sabrosky (1♂; USNM).

Oklahoma. *Cherokee*: Scraper (1.6 km NE; 36°0.3'N, 94°51.9'W), 7 May 1974, G. F. and J. F. Hevel (1♂; USNM). *Mayes*: Spavinaw Recreation Area (36°23.5'N, 95°02.8'W), 9 May 1984, G. F. and J. F. Hevel (5♂, 7♀; USNM). *Woods*: Alabaster Caverns State Park, near Freedom (36°47.5'N, 95°58.4'W), 11 May 1984, G. F. and J. F. Hevel (1♀; USNM).

Pennsylvania. *Delaware*: Swarthmore (39°54.1'N, 75°21'W), 6 Jun–26 Sep 1905, 1908, 1909, E. T. Cresson Jr. (10♂, 24♀; ANSP). *Montgomery*: Lansdale (40°14.5'N, 75°17'W), 30 May 1909, E. T. Cresson Jr. (1♀; ANSP); Narberth (3.2 km N; 40°0.5'N, 75°15.6'W), 9 Sep 1915, E. T. Cresson Jr. (1♀; ANSP). *Pennsylvania*: Fern Rock (40°02.6'N, 75°08.4'W), 29 Jun 1905 (1♂; ANSP); Germantown (40°01.7'N, 75°10.5'W), 12 Jun 1906 (1♀; ANSP); Manayunk (40°01.8'N, 75°13.3'W) (1♂; ANSP).

South Carolina. *Aiken*: Kitchens Mill (4 km S; 33°33.2'N, 81°28'W), 8 May 1986, W. E. Steiner (1♀; USNM). *Berkeley*: Jamestown (33°17.1'N, 79°41.4'W), 2 Jul 1953, M. R. Wheeler (1♂; USNM). *Charleston*: Isle of Palms (32°48'N, 79°45'W), 23 Jun 1957, G. C. Steyskal (1♀; USNM). *Clarendon*: Manning (33°41.7'N, 80°12.6'W), 29–30 May 1914, W. Stone (1♀; ANSP). *Spartanburg*: Cross Anchor (34°38.6'N, 81°51.5'W),

3 Jul 1953, M. R. Wheeler (1♂; USNM); Spartanburg (34°57'N, 81°56'W), 8 May 1961 (1♂; USNM).

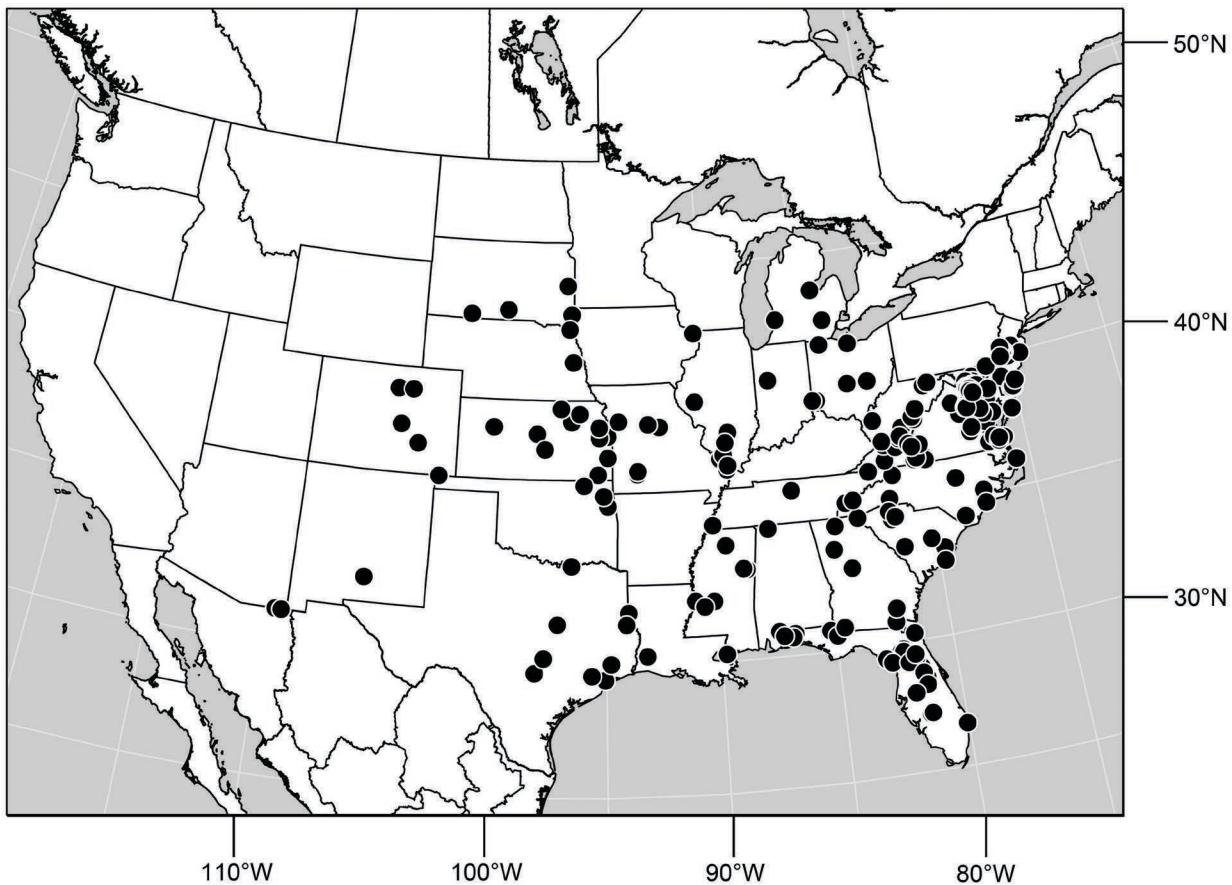
South Dakota. *Bennett*: Martin (43°10.4'N, 101°44'W), 6 Jul 1924 (2♂, 2♀; ANSP). *Canton*: Newton Hills (43°13.6'N, 96°35'W), 24 Jun 1935, H. C. Severin (1♀; ANSP). *Brookings*: Brookings (44°18.7'N, 96°48'W), 4 Jun 1928, H. C. Severin (1♀; ANSP). *Tripp*: Winner (43°22.6'N, 99°51.5'W), 3–6 Jul 1924 (1♂, 3♀; ANSP). *Union*: Elk Point (42°40'N, 96°41'W), 12 Jun 1925, H. C. Severin (1♀; ANSP).

Tennessee. *Granger*: Rutledge (36°16.5'N, 81°31.3'W), Jul 1954, M. R. Wheeler (1♀; USNM). *Humphreys*: Buffalo (34°43.5'N, 81°41'W), 19 May 1979, G. C. Steyskal (1♂; USNM). *Shelby*: Memphis (35°09'N, 90°03'W), 23 Sep 1924 (1♀; ANSP). *Wilson*: Lebanon (36°12.5'N, 86°17.5'W), 9 Jun 1946, G. C. Steyskal (1♂; USNM).

Texas. *Comal*: New Braunfels, Comal River (29°42.2'N, 98°06.8'W), 24 Mar 1942, A. L. Melander (2♀; USNM). *Fort Bend*: Sugar Land (29°37.2'N, 95°38.1'W), 11 Dec 1933, C. W. Sabrosky (1♀; ANSP). *Galveston*: Dickinson (29°27.6'N, 95°03.1'W), Jun 1929 (2♂, 3♀; ANSP). *Grayson*: Denison (33°45.3'N, 96°32.2'W), 22 Jun 1904, H. S. Barber (1♀; ANSP). *Liberty*: Liberty (30°03.5'N, 94°47.7'W), 18 Mar 1908, E. S. Tucker (2♀; ANSP). *McLennan*: Waco (31°33'N, 97°08.8'W), G. W. Belfrage (1♂; ANSP). *San Augustine*: San Augustine (31°31.8'N, 94°06.4'W), 13 Oct 1895 (1♀; ANSP). *Travis*: Austin (30°16'N, 97°44.6'W), Oct 1900 (1♂; ANSP).

Virginia. *Accomack*: Assateague Island, near Refuge headquarters (37°54.5'N, 75°21.6'W), 19 Sep–3 Oct 2005, 2007, D. and W. N. Mathis (10♂, 3♀; USNM); Assateague Island, wildlife loop (37°54.6'N, 75°21.1'W), 15 Jun–20 Sep 2007, D. and W. N. Mathis (1♂, 2♀; USNM); Chincoteague (37°55.4'N, 75°21.2'W), 15 Jun–20 Sep 2007, D. and W. N. Mathis (3♂, 1♀; USNM). *Arlington*: Arlington (38°52'N, 77°05.9'W), Jun 1938, J. R. Malloch (1♂; USNM); 4-Mile Run (38°50.4'N, 77°02.7'W), 17 Jun–24 Sep 1976, 1977, W. N. Mathis, H. B. Williams (17♂, 36♀; USNM); Glencarlyn (38°51.8'N, 77°7.8'W), 17 Jun 1914, 1925, N. Banks, J. R. Malloch, W. L. McAtee (2♂; ANSP, USNM); Glencarlyn Park, 4-Mile Run (38°51.5'N, 77°07.5'W), 20 Aug 1977, H. B. Williams (3♂, 1♀; USNM); Rosslyn (38°53.8'N, 77°4.3'W), 15 May 1913, R. C. Shannon (1♂, 2♀; ANSP, USNM). *Chesterfield*: Pocahontas State Park (37°23.1'N, 77°32.4'W), 11 May 2002, D. and W. N. Mathis (13♂; USNM). *Essex*: Tappahannock (37°55.8'N, 76°51.4'W; Rappahannock River), 18 Sep 2004, D. and W. N. Mathis (4♂, 1♀; USNM). *Fairfax*: Dead Run (38°58'N, 77°10.3'W), 29 Jun 1915, R. C. Shannon (1♀; USNM); Dead Run (swamp; 38°57.8'N, 77°10.3'W), 4 May 2006, D. and W. N. Mathis (4♂, 3♀; USNM); Dyke Marsh (38°46.1'N, 77°02.9'W), 13 Aug 1978, W. N. Mathis (1♂, 2♀; USNM); Great Falls (38°59.9'N, 77°15.3'W), 26 Jun–9 Jul 1913, 1920, A. L. Melander, R. C. Shannon (3♂, 2♀; ANSP, USNM); Great Falls (Clay Pond; 39°00.1'N, 77°15.4'W), 12 May–17 Aug 2006, 2007, D. and W. N. Mathis, F. C. and B. J. Thompson (5♂, 1♀; USNM); Great Falls (Patowmack Canal; 39°00.1'N, 77°15.2'W), 27 Jun–25 Jul 2006, 2007, 2008, D. and W. N. Mathis (6♂, 1♀; USNM);

Great Falls (Potomac River; 39°0.2'N, 77°15.2'W), 4 Oct 2007, D. and W. N. Mathis (1♂; USNM); Great Falls (swamp trail; 38°59.4'N, 77°15.2'W), 12 May 2006, D. and W. N. Mathis (3♂, 1♀; USNM); Holmes Run (38°50.9'N, 77°10.4'W; at light), 4 Jul–6 Sep 1961, W. W. Wirth (1♂, 3♀; USNM); Lake Barcroft (38°50.9'N, 77°09.4'W), 28 May 1977, W. N. Mathis (7♂, 8♀; USNM); Turkey Run (38°57.8'N, 77°09.4'W), 4 May–10 Jul 2006, 2008, D. and W. N. Mathis (3♂, 1♀; USNM); Turkey Run (mouth; 38°57.9'N, 77°09.4'W), 22 May–17 Sep 2006, 2007, 2008, D. and W. N. Mathis, H. B. Williams (26♂, 5♀; USNM). *Giles*: Mountain Lake (37°22.5'N, 80°31.5'W; 260 m), 26 May 1962, J. G. Chillcott (2♂, 1♀; CNC). *Henry*: Martinsville Reservoir (36°44.7'N, 79°52.2'W), 17 May 2005, D. and W. N. Mathis (5♂, 2♀; USNM); Martinsville, Smith River (36°39.9'N, 79°53'W; 225 m), 18 May 2005, D. and W. N. Mathis (2♂; USNM). *Isle of Wight*: Zuni (6 km S at Blackwater River; 36°51.9'N, 76°45.9'W), 14–15 Jun 1989, W. E. Steiner (1♀; USNM). *King George*: Dahlgren Wayside (38°21.6'N, 77°00.9'W; Potomac River), 19 May–8 Jun 2006, 2007, D. and W. N. Mathis (7♂, 1♀; USNM). *Lancaster*: Belle Isle State Park (Humphreys Picnic area; 37°46.4'N, 76°35.6'W; Rappahannock River), 28 Apr 2007, D. and W. N. Mathis (1♂, 1♀; USNM); Belle Isle State Park (Watch House; 37°46.4'N, 76°36.1'W; Rappahannock River), 28 Apr 2007, D. and W. N. Mathis (1♀; USNM). *Louisa*: Lake Anna (38°05.8'N, 77°53.6'W; Christopher Run Campground), 4 May 2007, D. and W. N. Mathis (6♂; USNM). *Middlesex*: Dragon Run (37°38'N, 76°41.7'W), 17 Sep 2004, D. and W. N. Mathis (10♂, 3♀; USNM). *Montgomery*: Blacksburg (37°13.8'N, 80°24.8'W; 640 m), 28 May 1962, J. G. Chillcott (1♀; CNC). *Northumberland*: Vir-Mar Beach (37°55.8'N, 76°18.5'W), 18 Sep 2004, D. and W. N. Mathis (4♂, 1♀; USNM). *Patrick*: Meadows of Dan (36°44.2'N, 80°22.9'W), 18 May 2005, D. and W. N. Mathis (1♂, 1♀; USNM); Woolwine (36°47.4'N, 80°16.7'W; 300 m), 17 May 2005, D. and W. N. Mathis (2♂, 2♀; USNM). *Prince William*: Prince William Forest Park (38°34'N, 77°22'W; Carter Pond), 13 Aug 1993, D. and W. N. Mathis (6♂, 4♀; USNM); Prince William Forest Park, South Quantico Creek (38°34'N, 77°22'W; shoreline), 10–30 Jul 1993, D. and W. N. Mathis (16♂, 15♀; USNM). *Rappahannock*: Hazel River (NW Culpeper; 38°33.8'N, 78°11.6'W, 171 m), 28 Jun–24 Jul 2008, D. and W. N. Mathis, T. Zatwarnicki (8♂, 1♀; USNM). *Richmond*: Warsaw (37°57.4'N, 76°45.6'W), 27 Aug 2004, D. and W. N. Mathis (7♂, 3♀; USNM). *Roanoke*: Salem (Roanoke River; 37°16.1'N, 80°02.2'W; 300 m), 23 Sep 2007, D. and W. N. Mathis (4♂; USNM). *Smyth*: Saltville (N at N Fork Holston River; 36°32.9'N, 82°36.7'W), 25 Sep 1981, O. S. Flint Jr. (7♂, 8♀; USNM); Saltville (36°52.3'N, 81°46.4'W; 521 m), 24 Sep 2007, D. and W. N. Mathis (2♂; USNM). *Spotsylvania*: Motts Reservoir (38°19'N, 77°33.5'W), 15 Apr 2006, D. and W. N. Mathis (3♂, 4♀; USNM); Rappahannock River (38°18.8'N, 77°32.5'W), 14 Aug–10 Oct 2006, D. and W. N. Mathis (6♂; USNM). *Stafford*: Aquia Creek (38°29.1'N, 77°23.8'W), 6 Jun 2005, D. and W. N. Mathis (3♂; USNM); Aquia Harbour (38°27.7'N, 77°23.3'W), 15 May–21 Jul 1988, 2000, D. and W. N. Mathis (14♂, 3♀; USNM); Aquia



MAP 21. Distribution map for *Paralimna (Paralimna) punctipennis* (Wiedemann).

Harbour, Aquia Creek ($38^{\circ}27.8'N$, $77^{\circ}23.1'W$), 2 Sep 2006, D. and W. N. Mathis (3♂; USNM); Aquia Harbour, Lions Park ($38^{\circ}27'N$, $77^{\circ}23.3'W$), 3 May–16 Nov 2003, 2004, 2005, 2006, 2007, 2008, D. and W. N. Mathis (45♂, 6♀; USNM); Aquia Landing ($38^{\circ}23.2'N$, $77^{\circ}19'W$), 7 May–5 Sep 2005, D. and W. N. Mathis (7♂, 1♀; USNM); Falmouth ($38^{\circ}19.2'N$, $77^{\circ}28.1'W$; Rappahannock River; 9 m), 18 Apr–30 Jun 2007, 2008, D. and W. N. Mathis (4♂, 3♀; USNM). **Westmoreland:** Westmoreland State Park ($38^{\circ}09.7'N$, $76^{\circ}51.9'W$), 16 Sep 1994, D. and W. N. Mathis (3♂; USNM). **York:** Maury Lake (near James River; $37^{\circ}02.5'N$, $76^{\circ}29.2'W$), 19 Aug 2006, D. and W. N. Mathis (6♂, 3♀; USNM). **Independent Cities:** Alexandria ($38^{\circ}48.3'N$, $77^{\circ}02.8'W$), 14 Jun 1952, C. W. Sabrosky (1♂; USNM). Falls Church ($38^{\circ}52.9'N$, $77^{\circ}10.3'W$), 4 May–3 Aug 1914, 1954, 1968, N. Banks, G. M. Greene, R. C. Shannon, W. W. Wirth (16♂, 14♀; ANSP, MCZ, USNM). Fredericksburg (Alum Park; $38^{\circ}17.4'N$, $77^{\circ}28.9'W$), 30 Apr 2007, D. and W. N. Mathis (5♂, 1♀; USNM). Norfolk, Hickory (10 km SSE; $36^{\circ}50.8'N$, $76^{\circ}17.1'W$; Northwest River Park), 24–25 Aug 1985, D. Bogar, W. E. Steiner (1♀; USNM). Norfolk, Ocean View ($36^{\circ}56.6'N$, $76^{\circ}14.5'W$), 9 Aug, A. N. Candell (3♀; USNM). Richmond ($37^{\circ}32.6'N$, $77^{\circ}26.1'W$), 24 Oct 1915, A. H. Sturtevant (2♂;

USNM). Virginia Beach ($36^{\circ}55.9'N$, $76^{\circ}01.2'W$), 14 Aug 1913, F. K. Knab (2♂, 8♀; ANSP, USNM).

West Virginia. *Cavell:* Culloden ($38^{\circ}25.2'N$, $82^{\circ}03.3'W$), Jul 1954, M. R. Wheeler (1♀; USNM). *Greenbrier:* Charmco ($38^{\circ}00.1'N$, $80^{\circ}44.2'W$), 6 Sep 1982, G. F. and J. F. Hevel (3♀; USNM). *McDowell:* Roderfield ($37^{\circ}26.7'N$, $81^{\circ}42.2'W$; 335 m), 25 Sep 2007, D. and W. N. Mathis (4♂; USNM). *Mercer:* Ceres (Kee Reservoir; $37^{\circ}18.4'N$, $81^{\circ}10.4'W$; 757 m), 24 Sep 2007, D. and W. N. Mathis (3♂; USNM). *Pocahontas:* Marlinton (Greenbriar River; $38^{\circ}13.5'N$, $80^{\circ}05.7'W$), 21 Jun 2007, D. and W. N. Mathis (3♂; USNM); Tea Creek (Right Fork; $38^{\circ}20'N$, $80^{\circ}9.9'W$), 29 Jul 1982, O. S. Flint Jr., W. N. Mathis (1♂; USNM). *Randolph:* Cheat Mountain ($38^{\circ}36.5'N$, $79^{\circ}56.5'W$), A. H. Sturtevant (1♀; USNM). *Summers:* Bluestone State Park ($37^{\circ}36.7'N$, $80^{\circ}56.1'W$; 440 m), 26 Sep 2007, D. and W. N. Mathis (3♂; USNM); Hinton ($37^{\circ}41.8'N$, $80^{\circ}53'W$; New River; 427 m), 26 Sep 2007, D. and W. N. Mathis (2♂; USNM). *Wyoming:* R. D. Bailey Lake ($37^{\circ}35.7'N$, $81^{\circ}46.8'W$; 324 m), 25 Sep 2007, D. and W. N. Mathis (3♂; USNM).

TYPE LOCALITY. Nearctic: “United States.”

DISTRIBUTION. (Map 21) Nearctic: United States (Alabama, Arizona, Colorado, Delaware, District of Columbia,

Florida, Georgia, Illinois, Indiana, Kansas, Louisiana, Maryland, Michigan, Mississippi, Missouri, Nebraska, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, West Virginia).

REMARKS. This species is similar to *P. pectinata* and *P. fellerae* in having the coloration of mesopleuron distinctly bicolored, silvery or yellowish gray on the dorsal half and brown on the ventral half. This species can be distinguished from these two species by the presence of small stump veins on vein R_1 (absent in *P. pectinata* and *P. fellerae*), coloration of the face, and shape of male forefemur and foretibia. In *P. punctipennis*, the face has 3 spots (1 in *P. pectinata*), the forefemur of males lacks flattened setulae (flattened setulae present in *P. pectinata* and *P. fellerae*), and the male forefemur and foretibia are simple (concave along ventral surface in *P. pectinata*). We discuss the distinguishing characters of the male terminalia of these species in the "Remarks" for *P. pectinata*.

26. *Paralimna (Paralimna) sana* Cresson

FIGURES 114–117, 191, MAP 22

Paralimna sana Cresson 1929:185 [Paraguay. San Bernardino ($25^{\circ}16' S$, $57^{\circ}19.4' W$); HT ♂, ANSP (6338)].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:125 [world catalog].

Paralimna secunda sana Cresson 1947:48 [review, Neotropical species].

Paralimna cilifera Hendel 1930:130 [Argentina. Aguarai; Bolivia. El Cairo, Santa Cruz de la Sierra; ST ♂♀, SMN].—Cresson 1947:53–54 [list, Neotropical species].—Lizarralde de Grosso 1989:38 [list, Argentina].—Mathis and Zatwarnicki 1995:119 [world catalog]. NEW SYNONYM.

DIAGNOSIS. This species is distinguished from congeners by the following characters: face silvery gray with 1 golden-brown, elongate, rather triangular spot on the carina, as long as the length of antenna, sometimes with 2 small inconspicuous, rounded pale brown spots between largest facial setae; anepisternum with dorsal and ventral margins golden brown tinged and bases of setae brown; forefemur of male with anteroventral row of elongate setae, as long as half the width of femur, all the same length and slightly flattened; posteroventral row shortened near apex of femur, shorter than anteroventral setae and arranged in a series.

DESCRIPTION. Body length 3.0–3.5 mm; body generally bicolored, brown dorsally, lateral surfaces gray, silvery, or yellowish gray.

Head: (See Figure 191) Frons pale brown to brown with linear, pale yellow spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a dark brown spot and dorsal parafacial with a dark gray spot lateral to antenna, separated by silvery-gray spot.

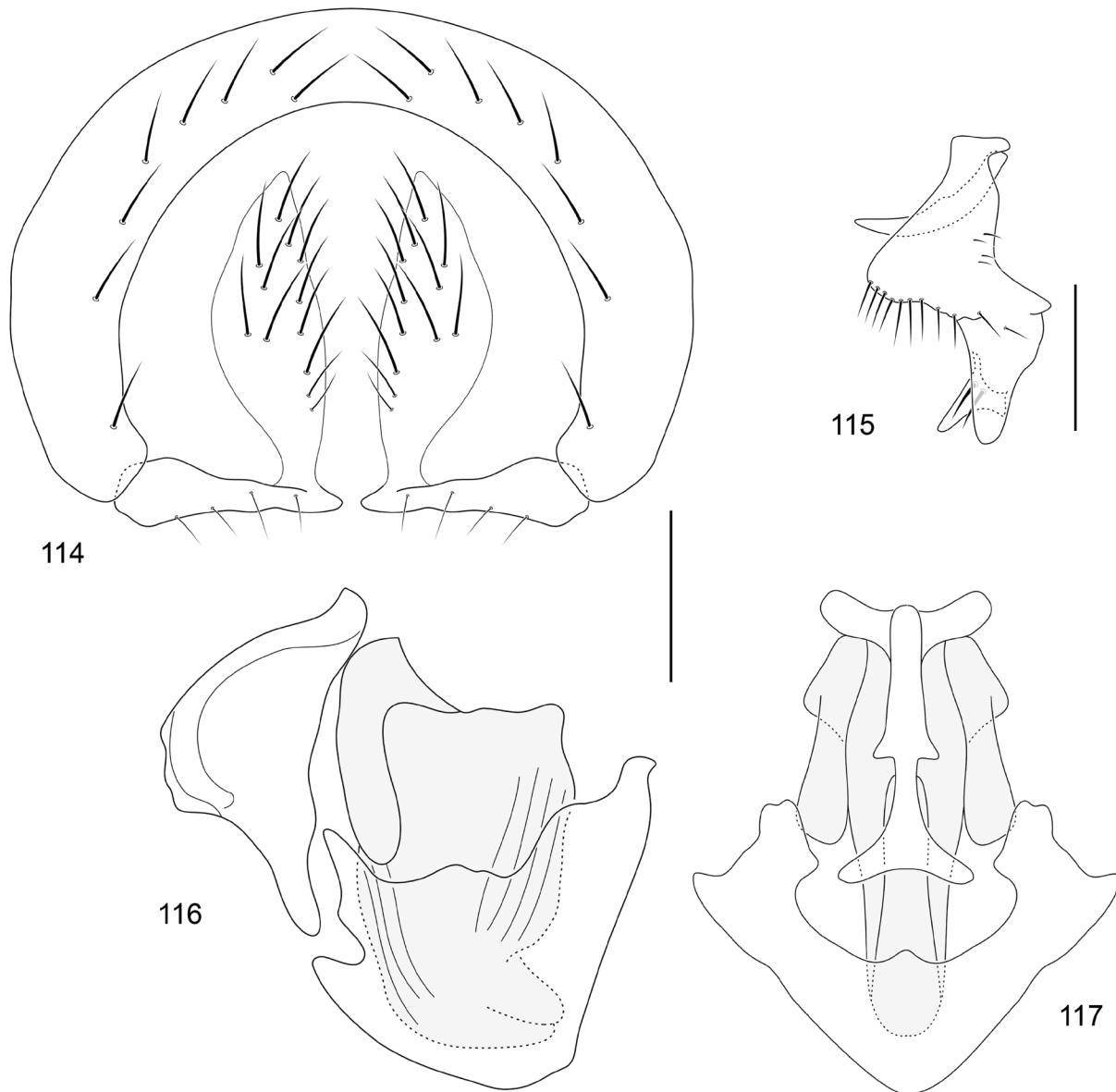
Antennal scape and pedicel dark brown, pedicel with silvery-gray margin; basal flagellomere pale brown to brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 9–12 long, dorsal rays. Postcranium with 1 complete series or 2 irregular series of postocular setae. Face silvery gray, sometimes dark gray, with 1 golden-brown elongate, rather triangular, spot on the carina, as long as the length of antenna, sometimes with 2 small, inconspicuous, rounded pale brown spots between largest facial setae; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye round, as wide as high, height about twice the height of gena. Gena high, height longer than length of basal flagellomere; gena-to-eye ratio 0.36–0.50.

Thorax: Mesonotum mostly golden brown with silvery or yellowish gray areas, usually along setal tracks, 2 well-defined, wide brown stripes between dorsocentral rows and a acrostichal irregular stripe; postpronotum, notopleuron, and supra-alar areas silvery gray; scutellum golden brown, with apex blackish brown and silvery gray laterally. Pleurae silvery to yellowish gray, anepisternum with dorsal and ventral margins golden brown tinged and bases of setae brown. Wing hyaline; veins brown; transverse veins infuscate; costal-vein ratio 0.46–0.47; M-vein ratio 0.95–1.33. Legs brown with sparse silvery-gray microtomentum; tarsi lighter with some yellow coloration, darkened on distal tarsomeres; forefemur of male with anteroventral row of elongate setae, as long as half the width of femur, all the same length and slightly flattened; posteroventral row shortened near apex of femur, shorter than anteroventral setae and arranged in a series; foretibia straight.

Abdomen: Tergite 1 wholly brown; tergites 2–5 distinctly bicolored, dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray dorsally and silvery gray laterally. Male terminalia: (Figures 114–117) Presurstylus not bifurcate, horizontal process wide basally and gradually tapering toward apex, with sparse slender setae; in lateral view postsurstylus widest medially with wide, medial, anteriorly produced lobe bearing several slender, elongate setae extended until half of medial region on external surface, a thin medial lobe posteriorly produced; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, almost straight, bluntly rounded; aedeagus slender in posterior view; phallapodeme broadly triangular in lateral view; hypandrium shallowly concave.

TYPE MATERIAL. The holotype male of *Paralimna sana* is labeled "[K.] Fiebrig[,] Paraguay[,] S. Bernardino/TYPE Paralimna SANA ["Paralimna SANA" handwritten] E. T. Cresson, Jr. 6338 [maroon]." The holotype is double mounted (minuten pin in a foam block), is in excellent condition (abdomen not dissected), and is deposited in the ANSP (6338).

The lectotype male of *Paralimna cilifera* Hendel, designated herein, is labeled "Aguarai arg. VI.26.Lind. D.Chaco-Exped [black margin]/Paralimna cilifera H. [handwritten] F. Hendel det./Type. Hendel 1930 [handwritten; red ink; label with a black border]/SMN/LECTOTYPE ♂ *Paralimna cilifera* Hendel, designated by Ale-Rocha&Mathis [red]." The lectotype is double mounted (minuten pin in a rectangular card), is in excellent condition (abdomen not dissected), and is deposited

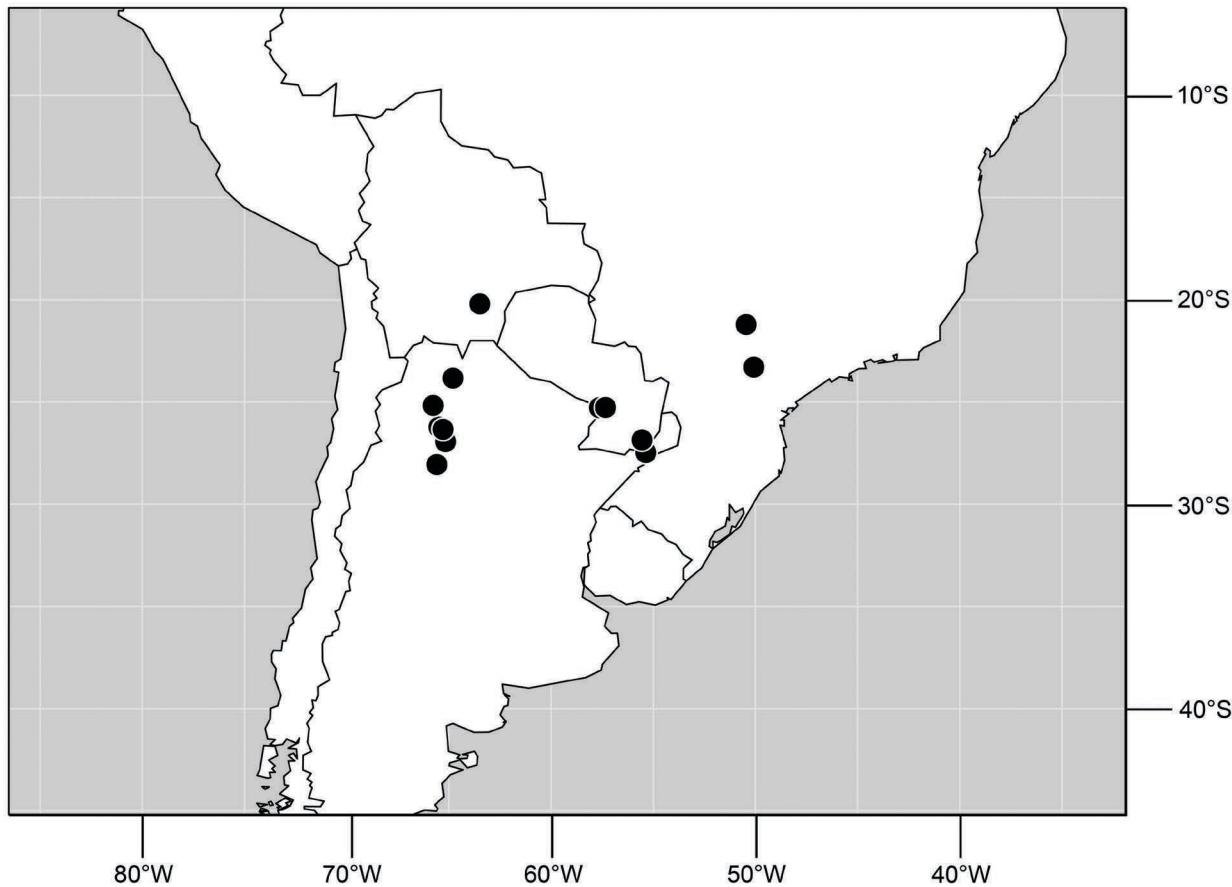


FIGURES 114–117. Structures of male terminalia of *Paralimna (Paralimna) sama* Cresson (Argentina. Misiones): (114) epandrum, cerci, and presurstyli, posterior aspect; (115) postsurstylus, lateral aspect; (116) aedeagus, phallapodeme, and hypandrium, lateral aspect; (117) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

in the SMN. In the original description, Hendel (1930:130) wrote that the syntype series comprised three specimens: two (1δ , 1φ) from Aguarai, Argentina, and one (1δ) from El Cairo, Bolivia. Our study of the type series indicates that the two specimens from Argentina are conspecific and that the third from Bolivia is another (*P. molossus*). The female from Aguarai is a paralectotype.

OTHER SPECIMENS EXAMINED. ARGENTINA. **Catamarca:** El Pintado, S La Viña ($28^{\circ}03.3'S$, $65^{\circ}35.1'W$; 650 m), 27–28 Sep 1968, L. E. Peña (18δ , 17φ ; CNC). **Jujuy:**

Ing. Ledesma, near Gen. San Martín ($23^{\circ}50.1'S$, $64^{\circ}47.5'W$; 1100 m), 10 Oct 1968, L. E. Peña (1δ , 2φ ; CNC). **Misiones:** Rompland ($27^{\circ}28.5'S$, $55^{\circ}21'W$), 13–14 Jan 1927, F. and M. Edwards (1δ , 1φ ; ANSP). **Salta:** Escoipe (38 km SW Salta; $25^{\circ}10'S$, $65^{\circ}46'W$; 1900 m), 8 Oct 1968, L. E. Peña (3φ ; CNC). **Tucumán:** Arroyo (14 km S El Tala; $26^{\circ}56.4'S$, $65^{\circ}09.7'W$; 700 m), 13–14 Oct 1968, L. E. Peña (4δ ; CNC); San Miguel de Tucumán ($26^{\circ}48.5'S$, $65^{\circ}13'W$), 18 Apr–4 May 1913, 1914, T. C. Barber, A. H. Rosenfeld (3δ ; ANSP, USNM); San Pedro de Colalao ($26^{\circ}14'S$, $65^{\circ}29'W$), 14 Oct 1968, L. E. Peña (3δ , 1φ).



MAP 22. Distribution map for *Paralimna (Paralimna) sana* Cresson.

CNC); Tucumán (30 km N; 26°20.2'S, 65°16.9'W; 700 m), 15 Oct 1968, L. E. Peña (2♂; CNC).

BOLIVIA. Santa Cruz: Campo Guiray (24 km S Camini; 20°11.8'S, 63°28.6'W; 870 m) 2 Sep 2000, S. D. Gaimari (13♂, 8♀; USNM).

BRAZIL. Paraná: Santo Antonio da Platina, Fazenda Dora (23°17.9'S, 50°04.1'W), Jun 1965, N. Papavero (1♀; MZUSP). **São Paulo:** Araçatuba, Corrego Azul (21°05'S, 50°32'W), Mar 1947, M. P. Barreto (1♂; MZUSP).

PARAGUAY. Asunción: Asunción (25°16.9'S, 57°38.1'W), 7 Oct. 1980, D. C. Lowrie (1♂, 1♀; USNM); 10–12 Oct 1980 (1♂, 1♀; USNM). **Cordillera:** San Bernardino (25°16'S, 57°19.4'W), K. Fiebrig (paratype 1♀; ANSP; 1♂; USNM). **Pirapó:** Villarica (26°51.3'S, 55°32.6'W), Sep 1931, F. Schade (1♂; USNM).

TYPE LOCALITY. Neotropical. Paraguay. Cordillera: San Bernardino (25°16'S, 57°19.4'W).

DISTRIBUTION. (Map 22) *Neotropical*: Argentina (Catamarca, Jujuy, Misiones, Salta, Tucumán), Bolivia (Santa Cruz), Brazil (Paraná, São Paulo), Paraguay (Asunción, Cordillera, Pirapó).

REMARKS. Cresson (1947) suggested that this species is a southern South American subspecies of *P. secunda*. However, the posteroventral setae of the male forefemur are sparse and arranged in a single series and the wing has infuscate halos on crossvein dm–cu in *P. sana* (the posteroventral setae are numerous and usually arranged in more than 1 series, and the wing lacks an infuscate halo on crossvein dm–cu in *P. secunda*). Additionally, the features of male terminalia are dissimilar in these two species, such as the shape of the presurstylus. The pattern of coloration of the face and body is not useful to distinguish between these species due to variation in both.

27. *Paralimna (Paralimna) secunda* Schiner

FIGURES 118–121, 192, MAP 23

Paralimna secunda Schiner 1868:241.

Paralimna (Paralimna) secunda.—Cresson 1947:47–48 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:125 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face gray or yellowish gray with 3 brown spots, 1 elongate spot on carina and usually 2 spots of variable shapes between largest facial setae, rarely ventral spots are absent; pleurae gray with dorsal and ventral margins of anepisternum brown and with dotted aspect in the middle by small brown spots on insertion of setae; forefemur with conspicuous but not flattened setae on anteroventral surface, ventral and posteroventral surface with numerous robust setae; presurstylus lacking basoventral process, horizontal process broad; cercus fused at the apex of dorsal margin of horizontal process; lateral aedeagal process long and slender.

DESCRIPTION. Body length 3.6–5.5 mm; body generally bicolored, brown dorsally, lateral surfaces mostly gray.

Head: (See Figure 192) Frons mostly pale brown with linear, silvery-white spots at lateral margins of ocellar triangle and weakly extended to anterior margin of the frons, between inner vertical and reclinate fronto-orbital setae, and on margin of eye from dorsal proclinate fronto-orbital to just above antennal bases; margin of the frons with a black spot lateral to antenna and dorsal parafacial with a dark gray spot. Region of insertion of all setae blackish. Antenna with gray microtomentum on scape; pedicel with gray microtomentum on margin and ventrally, dorsum dark gray to blackish microtomentum, with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere densely covered by silvery-white microtomentum and slender, elongate, pale setae on margin; arista with 13 long, dorsal rays. Ocellar pair inserted at the same line of anterior ocellus. Postcranium with 2 complete series of postocular setae. Face, parafacial, and gena gray or yellowish gray, face with brown spots: 1 elongate spot on carina, as wide as the distance between lateral bases of antennae and as long as length of scape and pedicel together, and usually 2 spots of variable shapes between largest facial setae, rarely ventral spots are absent; gena almost nude, few setae only on ventral margin and in middle; clypeus densely silvery gray or darker gray according to incidence of light. Eye rounded, about as wide as high, height twice the height of gena. Gena high, height subequal the length of basal flagellomere; gena-to-eye ratio 0.36–0.48.

Thorax: Mesonotum generally brown, the same color of the frons, with gray stripes, 2 acrostichal and 1 dorsocentral; lateral of scutum predominantly gray with brown spots; scutellum mostly gray with apex and base brown to blackish brown. Pleurae gray, dorsal and ventral margins of anepisternum brown and with dotted aspect in the middle by small brown spots on insertion of setae; anepimeron usually without spots, wholly gray. Wing: hyaline, lacking infuscation; costal-vein ratio 0.38–0.44; M-vein ratio 0.80–1.06. Legs: coxae, trochanters, femora, and tibiae brown with gray microtomentum; tarsomeres yellow. Forefemur with conspicuous setae on anteroventral surface, but the setae are not flattened, ventral and posteroventral surface with numerous robust setae; midfemur with strong anteroventral setae on base of distal 1/3.

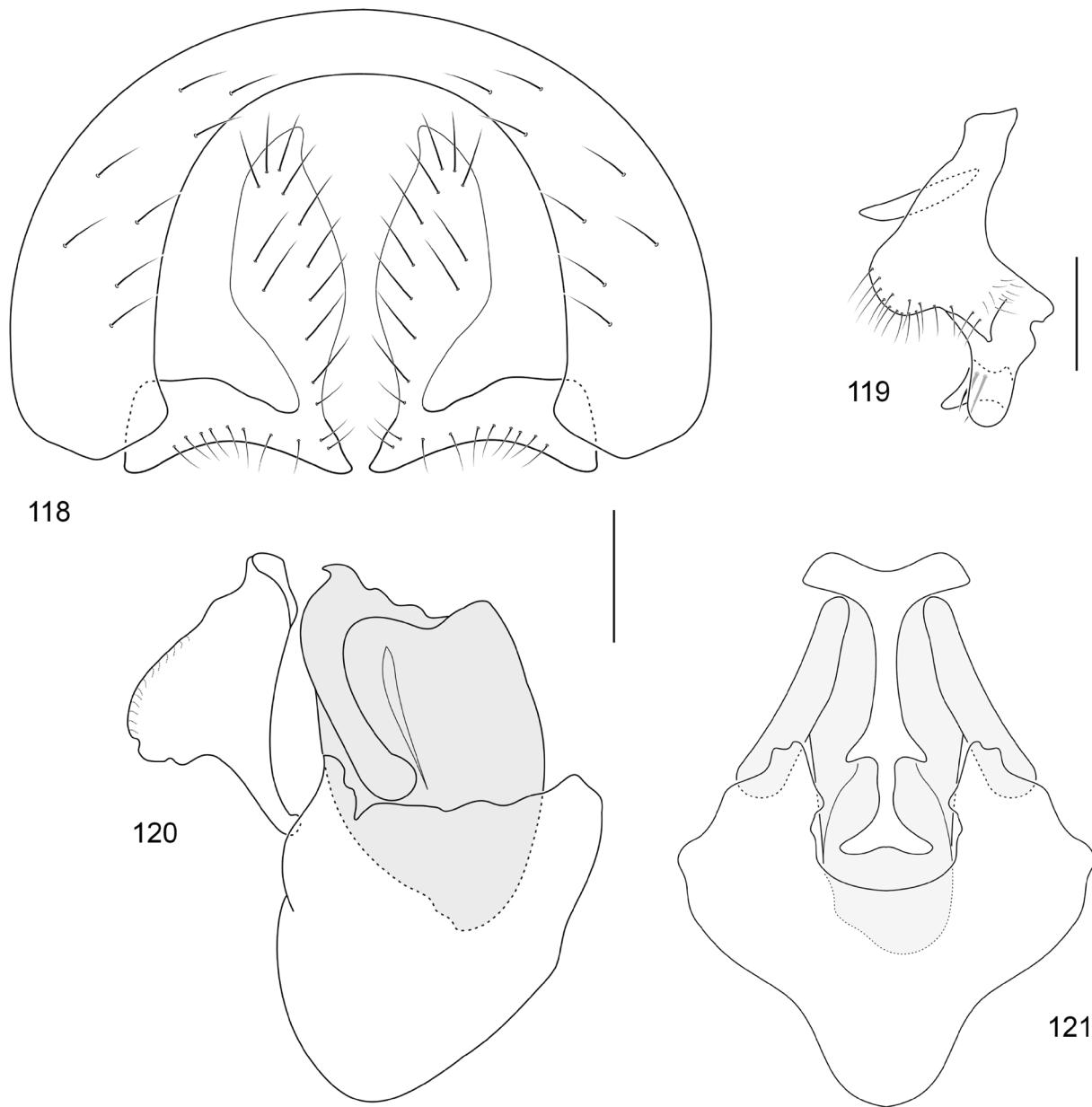
Abdomen: Tergites 3–4 distinctly bicolored, dark brown on anterior half and medially, remaining portion gray; tergite 1 gray only in sides; tergite 2 predominantly gray with brown lateral spot basally and a longitudinal median spot basally, not extended to apical margin of segment. Male terminalia: (Figures 118–121) Presurstylus not bifurcate, horizontal process broad, concave ventrally, cercus fused at the apex of dorsal margin of horizontal process; in lateral view postsurstylus weakly widest medially with wide, medial, anteriorly produced lobe bearing several slender elongate setae extended until the half of medial region on external surface, a small medial lobe posteriorly produced; lateral aedeagal process slender, longer than 1/2 of length of aedeagus, almost straight, bluntly rounded; aedeagus slender in posterior view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave.

TYPE MATERIAL. The lectotype female of *Paralimna secunda* Schiner (designated by Cresson 1929:185) is labeled “Lindig 1864 Venezuela/secunda [handwritten] Alte Sammlung/Paralimna secunda Schi[ner]. [handwritten]/TYPE Paralimna secunda [red; species name handwritten by E. T. Cresson, Jr.]”. There is also a female paralectotype bearing the same locality data as the lectotype. The lectotype is double mounted (cut pin in a rectangular card), is in good condition, and is deposited in the NMW.

OTHER SPECIMENS EXAMINED. **BELIZE.** *Stan Creek District:* Sittee River, Possum Point Biological Station (16°52.1'N, 88°22.5'W), 22–29 Apr 1987, R. Faitoute, P. J. Spangler (1♂, 5♀; USNM); Kendal (16°47.4'N, 88°22.9'W), 1 May 1987, R. Faitoute, P. J. Spangler (1♀; USNM); Maya Center Cabbage Haul Creek (16°48' N, 88°22' W), 3 Apr 1993, W. N. Mathis (3♂, 1♀; USNM); Silk Grass Creek (16°54' N, 88°26' W), 3 Apr 1993, W. N. Mathis (1♂, 1♀; USNM); Cockscomb Basin Wildlife Sanctuary (16°45'N, 88°30'W), 5–6 Apr 1993, W. N. Mathis (1♂; USNM); Dangriga (16°58' N, 88°13' W), 3–4 Apr 1993, W. N. Mathis (2♂, 1♀; USNM).

BOLIVIA. Bení: Rurrenabaque (14°26.5'S, 67°31.7'W; 175 m), 10–23 Oct 1956, L. E. Peña (1♂; CNC). **La Paz:** Apa Apa (8 km S Chulumani; 16°22'S, 67°30.4'W; 1960 m), 9–10 Mar 2001, W. N. Mathis (5♂, 2♀; USNM); El Choro (16°19'S, 68°03.5'W; 900 m), 7 Jan 1976, L. E. Peña (1♂; CNC); Puente Villa (16°28.9'S, 68°07.1'W; 1200 m), 12–20 Dec 1955, L. E. Peña (1♂; CNC); Puente Villa (2 km E; 16°24'S, 67°38'W; 1969 m) 1 Mar 2001, W. N. Mathis (5♂, 3♀; USNM); Ganay (1 km E; 15°30.2'S, 69°52.3'W; 580 m), 13 Feb 2001, S. D. Gaimari (2♂; USNM); Ganay (3 km E; 15°30.2'S, 67°52.3'W; 200 m), 14 Mar 2001, W. N. Mathis (3♂, 1♀; USNM).

BRAZIL. Amazonas: Autaz Mirim, Fazenda S. Lucas (03°04.1'S, 59°57.1'W; Malaise trap), 16 Jul 1994, J. Vidal (1♀; INPA); Balawa-u (01°48.4'N, 63°47.1'W; Malaise trap), 14 Sep 1995, L. S. Aquino (1♀; INPA); Igarapé Cabeça Branca (2°35.1'S, 60°01.9'W; 65 m), 8 May 2010, W. N. Mathis (1♂; USNM); Ipixuna, Rio Liberdade, Estirão da Preta (07°03.1'S, 71°41.7'W; sweeping), 11–15 May 2011, J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla, R. Ale-Rocha (5♂, 5♀; INPA);



FIGURES 118–121. Structures of male terminalia of *Paralimna (Paralimna) secunda* Schiner (Venezuela. Territorio Federal Amazonas): (118) epandrium, cerci, and presurstyli, posterior aspect; (119) postsurstylus, lateral aspect; (120) aedeagus, phallapodeme, and hypandrium, lateral aspect; (121) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

Manaus, Reserva Biológica da Campina (02°30'S, 60°00'W; Malaise trap), 2–3 Dec 1981, J. A. Rafael, E. Binda (3♀; INPA); Manaus, Universidade Federal do Amazonas (Campus Universitário; 03°06'S, 59°58.5'W; Malaise trap), 7 Apr–28 Jul 1982, J. A. Rafael (5♂, 8♀; INPA); Manaus, INPA (03°55.8'S, 59°59.1'W, 60m), 4 May 2010, D. and W. N. Mathis (2♂; USNM); Maués,

Rio Abacaxis, Campina Pacamiri (04°35.8'S, 58°13.2'W; Malaise trap), 30–31 May 2008, J. A. Rafael et al. (1♀; INPA); Parque Nacional do Jaú, Rio Carabinani, Igarapé Ipiranga (02°03.6'S, 61°33.5'W; Malaise trap), 29–31 Jul 1995, J. A. Rafael, J. Vidal (1♀; INPA); Reserva Ducke (26 km NE Manaus; 02°55.8'S, 59°58.5'W; 40 m; Malaise trap), 9 Feb–16 Sep 1976,

1982, J. A. Rafael (7♂, 13♀; INPA); Rio Abacaxis, Flona Pau Rosa (01°15.2'S, 58°41.9'W; Malaise trap), 28–29 May 2008, J. A. Rafael et al. (1♀; INPA); Rio Gregório, Comunidade Lago Grande (07°10.2'S, 70°49.2'W; some from light and Malaise traps), 18–23 May 2011, J. A. Rafael et al. (2♂, 1♀; INPA); Rio Nhamundá (01°35.2'S, 57°37.5'W; 25 m; Malaise trap), 17–20 May 2008, J. A. Rafael et al. (4♂, 12♀; INPA); Rio Nhamundá, Igarape Areias (01°35.2'S, 57°37.6'W; 25 m; Malaise trap), 17–20 May 2008, J. A. Rafael et al. (6♂, 9♀; INPA); Santa Izabel do Rio Negro, Maturacá (00°32.5'S, 66°08.2'W), 11–13 May 1990 (1♂; INPA). **Pará:** Belém (01°27.3'S, 48°30.1'W), Sep 1952, Th. Dobzhansky (1♂; USNM); Castanhal (01°17.8'S, 47°55.3'W), Aug 1952, Th. Dobzhansky (1♂; USNM); Óbidos, Sítio Curió (01°47.1'S, 55°07.1'W; Malaise trap), 29 Aug–8 Sep 2001, J. A. Rafael, J. Vidal (6♂, 5♀; INPA); Óbidos, Fazenda Pajurá (01°37.4'S, 55°23.2'W; Malaise trap), 5–11 Sep 2001, J. A. Rafael, J. Vidal (2♀; INPA); Óbidos, Estrada Oriximiná–Óbidos (01°38.7'S, 55°37'W), Nov 1969, Expedição Permanente da Amazônia (2♂, 1♀; MZUSP); Oriximiná, Rio Trombetas (01°27.9'S, 56°18.6'W), Oct 1969, Expedição Permanente da Amazônia (3♂, 1♀; MZUSP); Rio Iriri (~100 km S Altamira; 03°50'S, 52°40'W), 17–18 Oct 1986, O. S. Flint, P. J. Spangler (2♂; USNM); Rio Xingu (camp, about 60 km S Altamira; 03°39'S, 52°22'W; Igarapé Jabuti; Malaise trap), 8–16 Oct 1986, O. S. Flint, P. J. Spangler (8♂, 9♀; USNM); Taperinha, Santarém (02°31.9'S, 54°17.7'W), Oct–Nov 1970, Expedição Permanente da Amazônia (1♂; MZUSP). **São Paulo:** São Paulo (23°33.6'S, 46°35.8'W), G. G. Barbrellini (6♂, 1♀; ANSP). **Tocantins:** Jalapão, Mateiros, Rio Novo (10°33.4'S, 46°35.6'W; 400 m; light trap), 31 Mar 2008, J. A. Rafael, F. F. Xavier (12♂, 8♀; INPA).

COLOMBIA. **Magdalena:** Aracataca (10°35.9'N, 74°11.3'W), 24 Aug 1920 (5♂, 1♀; ANSP); Cali (10 km W Valle de Cauca; 03°26.3'N, 76°33.9'W; 1630 m), Mar 1955, E. S. Ross, E. I. Schlinger (2♂; USNM); Sevilla (17 km W; 10°46'N, 74°10.5'W), Mar 1955, E. S. Ross, E. I. Schlinger (1♀; USNM).

COSTA RICA. **Alajuela:** Alajuela (10°01'N, 84°13'W; 945 m), 15 Sep 1909, P. P. Calvert (1♂; ANSP); Higuito, San Mateo (09°56.7'N, 84°32.8'W), P. Schild (1♀; ANSP); Rio Surubres (09°56.1'N, 84°35'W; Bonnefil farm; 245 m; sweeping), 21 Oct 1909, P. P. Calvert (1♂, 1♀; ANSP); Turrúcares (09°57.6'N, 84°19.2'W), 22 Dec 1909, P. P. Calvert (1♀; ANSP). **Cartago:** Cachí (09°49.7'N, 83°48.7'W; stagnant pool, bank of Rio Reventazon), 10 Mar 1910, P. P. Calvert (1♀; ANSP); Cartago (9°51.4'N, 83°55.2'W), 4 Jul–12 Dec 1909, P. P. Calvert (6♂, 1♀; ANSP); Cartago (near; 09°51.3'N, 83°55.2'W; 1525 m), 15 Dec 1909, P. P. Calvert (1♀; ANSP); Turrialba (09°54.1'N, 83°41.1'W), Nov 1922, P. Schild (3♂, 2♀; ANSP). **Limón:** Río Banano (09°50.5'N, 82°56'W), 9 Nov 1909, P. P. Calvert (1♂; ANSP). **San José:** San José (09°56'N, 84°05'W), Dec 1919, 1925, A. Alfaro (3♂, 1♀; ANSP).

ECUADOR. **El Oro:** Rio Grande (15 km S Zaruma; 03°42.8'S, 79°36.8'W; 850 m), 9 Apr 1965, L. E. Peña (1♂;

CNC). **Guayas:** Machala (49.5 km NNE; 02°40'S, 79°13.4'W; 40 m), 13 Jan 1978, W. N. Mathis (9♂, 6♀; USNM). **Loja:** San Pedro-Zarumard (04°04'S, 79°12.4'W; 850–1100 m), 9 Apr 1965, L. E. Peña (1♂; CNC). **Orellana:** RíoTiputini (0°38.2'S, 76°8.9'W), 12–26 Aug 1999, W. N. Mathis, A. Baptista, M. Kotrba (14♂, 1♀; USNM). **Sucumbios:** Lago Agrio (8 km W; 0°04.9'S, 77°0.3'W; Malaise trap), 28 Aug 1975, J. Cohen, A. Langley (1♂, 2♀; USNM).

EL SALVADOR. **La Libertad:** La Libertad (13°40.9'N, 89°21.6'W), 29 Oct 1965, N. L. H. Krauss (1♂; USNM); Quegaltepeque (13°50.1'N, 89°16.1'W), 11 Feb 1965, W. D. Duckworth (1♂; USNM). **San Salvador:** Nejapa (13°48.5'N, 89°13.7'W), 6 Jul 1959, P. A. Berry (2♂, 2♀; USNM). **Santa Ana:** Santa Ana (13°59.7'N, 89°33.1'W), Oct 1959, N. L. H. Krauss (1♀; USNM).

GUATEMALA. **Chimaltango:** Yepocapa (14°30'N, 90°57'W), 20 Feb 1948 (1♂; USNM). **Escuintla:** San José (13°55.7'N, 90°49.3'W), 20 Jul 1943, D. G. Hall (2♀; USNM). **Guatemala:** La Providencia (14°39'N, 90°26.8'W), 14 Apr 1926, J. M. Aldrich (1♂, 2♀; ANSP). **Izabal:** Puerto Barrios (15°43'N, 88°35'W), 3–14 Mar 1905 (2♂, 1♀; ANSP); Piña Conchita (14°44'N, 91°43'W), 20 Apr 1948, H. Dalmat (1♂; USNM). **Zacapa:** El Jicaral (14°30'N, 89°33'W), 11 May 1926 (1♂; ANSP); Santa Lucia (14°54.6'N, 89°31.4'W), 2 Feb 1905 (2♀; ANSP).

GUYANA. Atkinson Airport Road (06°29.9'N, 58°15.2'W; in Teobroma cacao plantation), 2 Jun 1965, S. Medina, L. F. Martore (2♀; USNM). Bartica District, Kartabo (06°23'N, 58°41'W), 12 Jun 1922 (1♂; ANSP). Berbice River (05°40.9'N, 57°51.5'W), 9–11 Apr 1994, W. N. Mathis (6♂, 1♀; USNM). Conservation of Ecological Interactions and Biotic Associations (~40 km S Georgetown; 06°29.9'N, 58°13.1'W), 13 Apr–28 Aug 1994, 1995, 1997 (29♂; USNM). Dubulay Ranch-Aramatani Creek (05°40.9'N, 57°51.5'W), 9–11 Apr 1994, W. N. Mathis (3♂; USNM). Dubulay Ranch, Warniabo Creek (05°39.8'N, 57°53.4'W), 10–11 Apr 1994, W. N. Mathis (1♂, 1♀; USNM). Dubulay Ranch, small creek (05°40.9'N, 57°51.5'W), 10 Apr 1994, W. N. Mathis (17♂; USNM). Kaieteur Falls (05°10.7'N, 59°29.2'W; 570 m), 7 Apr 1994, W. N. Mathis (13♂, 4♀; USNM). Kaieteur Falls (05°10.5'N, 59°28.9'W), 21–24 Aug 1997, W. N. Mathis (4♂, 2♀; USNM). Karanambo (03°45.1'N, 59°18.6'W), 31 Mar 1994, W. N. Mathis (2♂; USNM). Karanambo, Rupununi River (03°45.1'N, 59°18.6'W; ox bow), 2 Apr 1994, W. N. Mathis (1♂, 1♀; USNM). Kanuku Mountains, Moco Moco River (03°18.2'N, 59°38.9'W), 29 Apr 1995, W. N. Mathis (6♂, 4♀; USNM). Kanuku Mountains, Kumu River and Falls (03°15.9'N, 59°43.5'W), 28–30 Apr 1995, W. N. Mathis (6♂, 1♀; USNM). Kartabo Point (Mazaruni; 06°23'N, 58°41'W; Malaise trap at edge of secondary forest and farmed field), 22–27 Dec 1982, 1983, W. E. Steiner (3♂, 1♀; USNM). Kato, Chiung River (04°39.7'N, 59°50.0'W), 1 May 1995, W. N. Mathis (5♂, 3♀; USNM). Kumu River, Lethem (25 km SE; 03°15.9'N, 59°43.6'W), 4–5 Apr 1994, W. N. Mathis (5♂, 3♀;

USNM). Menzies Landing (near Kaieteur Falls; 05°10.1'N, 59°29.5'W), 23 Aug 1997, W. N. Mathis (8♂; 4♀; USNM). Moco Moco (30 km E Lethem; 03°18.2'N, 59°39.0'W), 3–6 Apr 1994, W. N. Mathis (11♂, 2♀; USNM). Paramakatoi (04°42'N, 59°42.8'W), 24–25 Aug 1997, W. N. Mathis (39♂, 6♀; USNM). Takutu Mountains (06°15'N, 59°5'W; Malaise trap, near stream in montane rainforest), 6–19 Dec 1983, EARTHWATCH Research Expedition, P. J. Spangler, W. E. Steiner (40♂, 29♀; USNM). Wiruni River (05°46.6'N, 58°0.8'W), 11 Apr 1994, W. N. Mathis (13♂, 4♀; USNM).

MEXICO. *Chiapas:* Río Izapa (14°55.4'N, 92°10.7'W), 21 Apr 1983, W. N. Mathis (16♂, 10♀; USNM); Cacahoatán (7 km N; 15°03.8'N, 92°09.1'W), 22 Apr 1983, W. N. Mathis (7♂, 2♀; USNM); Union Juárez (9 km S; 15°02.2'N, 92°05.4'W), 23 Apr 1983, W. N. Mathis (3♂; USNM). *Veracruz-Llave:* Ciudad Alemán (18°11.3'N, 96°05.6'W; 100 m), 3 May 1985, W. N. Mathis (8♂, 5♀; USNM); Fortín de las Flores (18°54'N, 97°W; 952 m), 2 May 1985, W. N. Mathis (2♂; USNM); Ocotal Chico (18°15.6'N, 94°51.5'W; 600 m), 4–5 May 1985, W. N. Mathis (1♀; USNM).

PANAMÁ. *Cocle:* Playa Santa Clara (08°22.4'N, 80°06.3'W), 2 Jul 1967, W. W. Wirth (9♂, 5♀; USNM). *Panamá:* Balboa (08°56.9'N, 79°33.9'W), Feb 1958, M. R. Wheeler (1♂; USNM).

PARAGUAY. *Asunción:* Asunción (25°16.9'S, 57°38.1'W), 7 Oct 1980, D. C. Lowrie (1♂, 2♀; USNM). *Presidente Hayes:* Toldo-cué (22°52'S, 58°36'W) (1♀; ANSP).

PERU. *Cuzco:* Paucartambo, Atalaya (Río Alto Madre de Dios; 12°53.1'S, 71°21.6'W; 600 m), 4 Sep 1988, W. N. Mathis (1♂, 2♀; USNM); Paucartambo, Puente San Pedro (~50 km NW Pilcopata; 13°03.3'S, 71°32.8'W; 1600 m), 3 Sep 1988, W. N. Mathis (1♂; USNM). *Loreto:* Explornapo Camp on Rio Sucusari, 2 km upstream from Rio Napo (160 km NE Iquitos; 03°15.4'S, 72°55.2'W; Malaise trap), 24 Jun–20 Aug 1990, B. Awertschenko, A. Menke (6♀; USNM); Granja UNAP, near Iquitos (03°42'S, 73°13.7'W), 23 Feb 1984, W. N. Mathis (29♂, 3♀; USNM); Iquitos (12 km W; 03°48.4'S, 73°20.5'W), 16 Feb 1984, W. N. Mathis (13♂, 8♀; USNM); Iquitos (14 km W; 03°52.1'S, 73°28.2'W), 16–21 Feb 1984, W. N. Mathis (25♂, 8♀; USNM); Iquitos (15 km W; 03°52.1'S, 73°29'W), 16 Feb 1984, W. N. Mathis (5♂, 4♀; USNM); Iquitos (5 km E; 03°50.3'S, 73°11.1'W), 17 Feb 1984, W. N. Mathis (4♂; USNM); Rio Itaya (25 km S Iquitos; 04°11.3'S, 73°15'W), 22 Feb 1984, W. N. Mathis (2♂; USNM); Río Momón (~25 km NW Iquitos; 03°40.1'S, 73°17.6'W), 17 Feb 1984, W. N. Mathis (1♂; USNM).

TRINIDAD AND TOBAGO. *Tobago.* *St. John:* Bloody Bay River (11°18'N, 60°38'W), 14 Jun 1993, W. N. Mathis (3♂; USNM); Charlotteville (beach; 11°19.5'N, 60°32.9'W), 16 Apr–16 Jun 1993, 1994, D. and W. N. Mathis (24♂, 4♀; USNM); Charlotteville (5 km S; 11°18.9'N, 60°34.5'W), Hermitage River and beach, 22 Apr–11 Jun 1993, 1994, D. and W. N. Mathis (16♂, 1♀; USNM); Kings Bay Reservoir (11°17'N, 60°33'W), 15 Jun 1993, W. N. Mathis (1♂; USNM); Parlatuvier (creek;

11°17.9'N, 60°35'W), 14 Jun 1993, W. N. Mathis (9♂; USNM); Speyside (11°18'N, 60°32'W), 13–15 Jun 1993, W. N. Mathis (3♂, 1♀; USNM); Speyside (Doctor River; 1 km NW; 11°18'N, 60°32'W), 12–13 Jun 1993, W. N. Mathis (6♂; USNM). *St. Paul:* Argyle Falls (11°15'N, 60°35'W), 21 Apr 1994, W. N. Mathis (2♂, 1♀; USNM); Delaford, Kings Bay (11°16'N, 60°32.8'W), 13 Jun 1993, W. N. Mathis (5♂; USNM). *Trinidad.* *St. George:* Filette (1 km SE; 10°47'N, 61°21'W; Yarra River), 25 Jun 1993; W. N. Mathis (2♂, 1♀; USNM); Marianne River (9 km S; 10°46'N, 61°18'W), 25 Jun 1993, W. N. Mathis (2♂, 1♀; USNM).

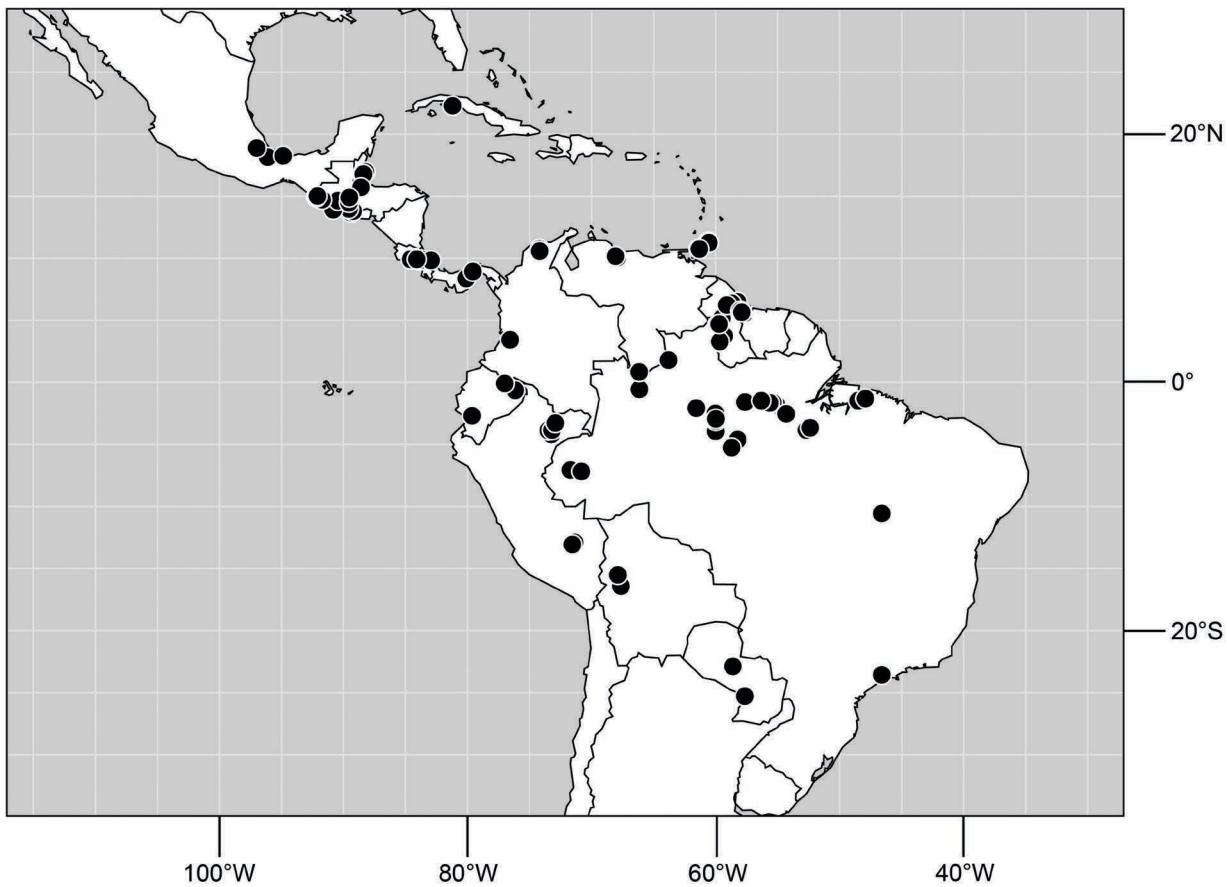
VENEZUELA. *Territorio Federal Amazonas:* Cerro de la Neblina, basecamp (bank of Rio Baria; 00°50'N, 66°09.7'W; 140 m), 27 Jan–24 Mar 1984, 1985, W. E. Steiner (49♂, 59♀; USNM); Cerro de la Neblina (basecamp; 00°50'N, 66°10'W), 5–18 Feb 1985 (2♂; USNM); Cerro de la Neblina (00°51'N, 66°10'W; 140 m), 13–19 Mar 1984, D. Davis, T. McCabe, W. E. Steiner (10♂, 3♀; USNM). *Carabobo:* Boquerón (Cumbres; 10°04'N, 67°55.4'W; frente a Bajo Seco; 1600 m), 16 Apr 1972 (1♂; USNM); Embalse de Guataparo, W Valencia (10°10.9'N, 68°03.5'W), 13 Apr 1972, L. V. Knutson (1♂; USNM).

WEST INDIES. *CUBA.* *Matanzas:* Buena Ventura (7 km N; 22°18.1'N, 81°11.7'W), 1 May 1983, W. N. Mathis (1♂; USNM).

TYPE LOCALITY. Neotropical. "Venezuela."

DISTRIBUTION. (Map 23) *Neotropical:* Belize (Stann Creek), Bolivia (Bení, La Paz), Brazil (Amazonas, Pará, São Paulo, Tocantins), Colombia (Magdalena), Ecuador (El Oro, Guayas, Loja, Orellana, Sucumbíos), El Salvador (La Libertad, San Salvador, Santa Ana), Guatemala (Chimaltango, Escuintla, Guatemala, Iazabal, Zacapa), Guyana, Mexico (Chiapas, Veracruz-Llave), Panamá (Cocle, Panamá), Paraguay (Asunción, President Hayes), Peru (Cuzco, Loreto), Trinidad and Tobago, Venezuela (Amazonas, Carabobo), West Indies (Cuba).

REMARKS. The type material of *P. secunda* includes only females and is thus a difficult species to identify. Cresson (1947) presented a diagnosis of the species, including males, that helped us in the identification of this species in addition to the material determined by Cresson that is in the ANSP and USNM. This species shows a wide range of colorational variation. Brazilian specimens have a face with a single rectangular spot of pale brown microtomentum as long as the length of the antenna; the dorsal and ventral margins of the anepisternum are brown, there are small brown spots at the base of the setae in the middle; the tarsomeres are lighter with yellowish-orange coloration ventrally and dorsally on the first tarsomeres; and tergite 2 has lateral, marginal, silvery bands that are nearly approximate medially, separated medially by a slender pale brown stripe. In the male terminalia of *P. secunda*, the presurstylus varies in width, but the characteristic convex dorsal margin and cercus inserted at the apex of the horizontal process is distinctive and constant.



MAP 23. Distribution map for *Paralimna (Paralimna) secunda* Schiner.

28. *Paralimna (Paralimna) sera* Cresson

FIGURES 122–125, 193, MAP 17

Paralimna sera Cresson 1933:67 [West Indies. Jamaica. St. Thomas: Yallahs Valley, Blue Mountains; HT ♂, AMNH].

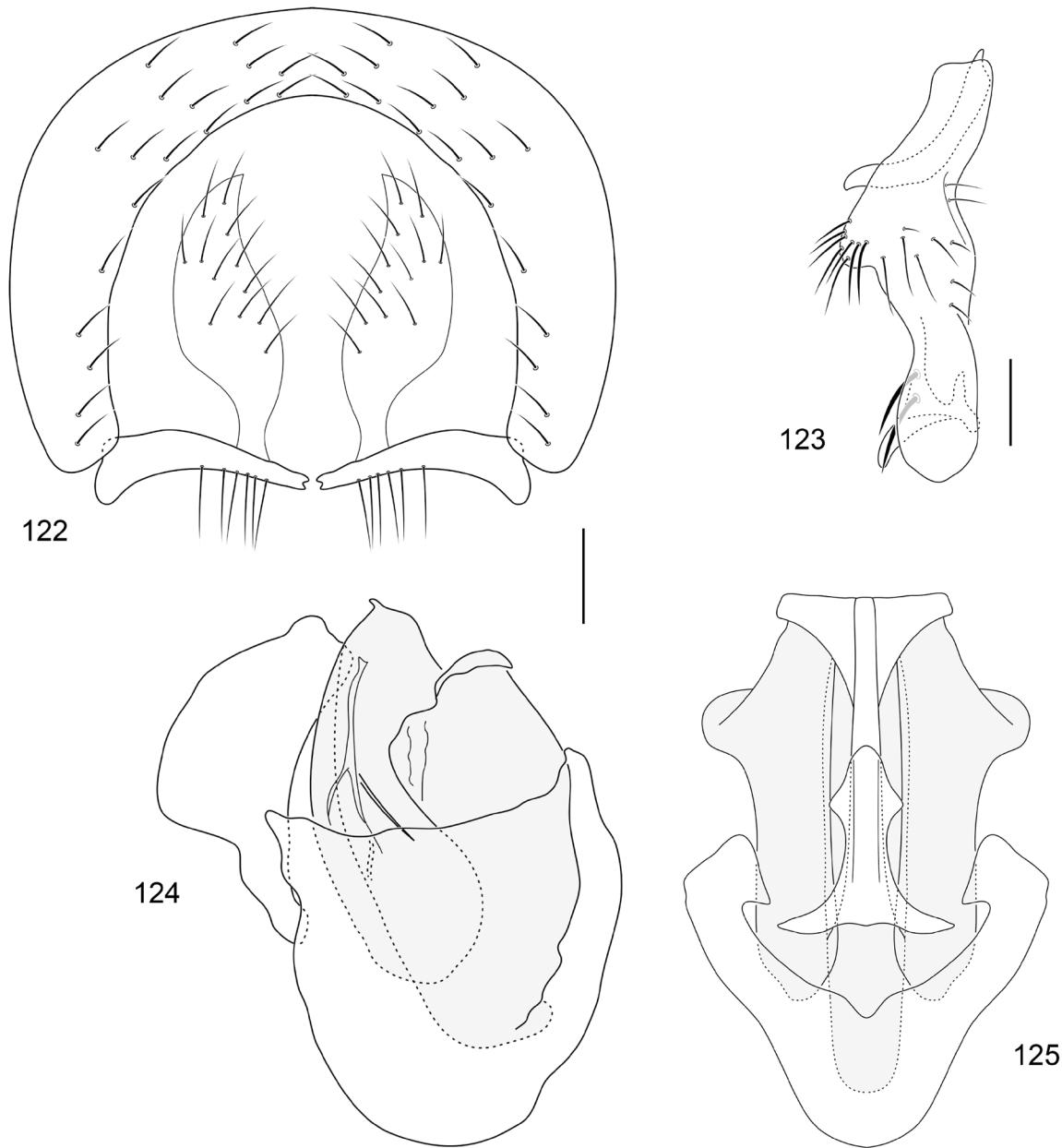
Paralimna (Paralimna) sera.—Cresson 1947:52 [review, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:125 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face dark gray with a wide and short dark grayish-brown spot on carina, lateral margins dark gray to brown, thereafter ventrally mostly to entirely gray; anepisternum with dorsal and ventral margins brown, central area mostly gray, sometimes with bases of setulae brown; katepisternum mostly whitish gray to dark gray, concolorous with anepimeron; legs unusually slender, forefemur of male bearing anteroventral comb-like row of distinctly flattened, moderately long setae, concave ventrally near apex, foretibia of male with slightly wavy ventral surface; tergites predominantly dark brown with a slender gray band on posterior margin.

DESCRIPTION. Body length 4.0–4.2 mm; body generally bicolored, dark brown dorsally, lateral surfaces dark, rather bluish gray.

Head: (See Figure 193) Frons brown to pale brown, with linear gray spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, reaching the anterior margin of frons, between inner vertical and interfrontal seta, and on fronto-orbits just above antennal bases; ventral fronto-orbits and dorsal parafacial without outstanding spots. Antennal scape and pedicel dark brown, pedicel with pale gray margin; basal flagellomere pale brown to brown according to incidence of light, few and short setae on margin; arista with 8–9 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face dark gray with a wide and short dark grayish-brown spot on carina, lateral margins dark gray to brown, thereafter ventrally mostly to entirely gray; parafacial and gena gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye rounded, about as wide as high, height more than twice the height of gena. Gena high, height slightly greater than length of basal flagellomere; gena-to-eye ratio 0.35–0.36.

Thorax: Mesonotum predominantly brown with gray spots along dorsocentral track and laterally; postpronotum and supra-alar areas gray; scutellum brown basally, with apex blackish



FIGURES 122–125. Structures of male terminalia of *Paralimna (Paralimna) sera* Cresson (Jamaica. St. Andrew): (122) epandrium, cerci, and presurstyli, posterior aspect; (123) postsurstylius, lateral aspect; (124) aedeagus, phallapodeme, and hypanandrium, lateral aspect; (125) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

brown and grayish brown laterally. Pleurae dark gray, anepisternum with dorsal and ventral margins brown, central area mostly gray, sometimes with bases of setulae brown; katepisternum mostly whitish gray to dark gray, concolorous with anepimeron. Wing hyaline; veins brown; costal-vein ratio 0.37–0.39; M-vein ratio 1.00–1.04. Legs brown with sparse silvery-gray microtomentum, tarsi lighter with some yellow coloration, especially ventrally and on tarsi 1–3; legs unusually slender; forefemur of male concave ventrally near apex, bearing anteroventral comb-like row of

distinctly flattened, moderately long setae and anteroventral surface bearing sparse row of short setae along most of length; forefibia of male with slightly wavy ventral surface.

Abdomen: Tergites predominantly dark brown with a slender gray band on posterior margin; tergites 1 and 2 brown with a complete gray band; tergites 3–5 with gray band incomplete, interrupted medially, brown bands of tergites 4 and 5 extended laterally to lateral margin of tergite. Male terminalia: (Figures 122–125) Presurstylius not bifurcate, only bulged

basoventrally, horizontal process gradually tapering toward apex, shallowly curved with very long, slender setae on distal half; in lateral view postsurstylus not obviously wider medially, medial anterior lobe poorly produced, elongate setae extended over medial region of external surface, more dense and close to each other on medial anterior lobe; lateral aedeagal process large, longer than $\frac{1}{3}$ length of aedeagus, widened and slightly curved in middle, broadly rounded distally; aedeagus slender in posterior view; phallapodeme broadly triangular in lateral view, with anteroventral side waved; hypandrium moderately concave.

TYPE MATERIAL. The holotype male of *Paralimna sera* is labeled "Yallahs Valley[,] Blue Mts.[,] Jamaica[,] Feb. 24. 1911/♂/Am. Mus. Nat. Hist. Dept. Invert. Zool. No./TYPE Paralimna SERA E. T. Cresson,Jr. ["Paralimna SERA" handwritten; pink]." The holotype is pinned directly, is in good condition (mesonotum cracked where pin is inserted; abdomen not dissected), and is deposited in the AMNH.

OTHER SPECIMENS EXAMINED. *JAMAICA. Portland:* Green Hills ($18^{\circ}05.7'N$, $76^{\circ}43'W$; 780 m), 28 Apr 2000, W. N. Mathis (5♂; USNM); Hollywell ($18^{\circ}05.5'N$, $76^{\circ}43.6'W$; 1170 m), 27 Apr 2000, W. N. Mathis (11♂, 1♀; USNM); Section (0.5 km E; $18^{\circ}05.2'N$, $76^{\circ}43.9'W$; 1020 m), 28 Apr 2000, W. N. Mathis (11♂, 3♀; USNM). *St. Andrew:* Cinchona ($18^{\circ}04.4'N$, $76^{\circ}39.3'W$), 28 Jul 1928, C. C. Gowdey (1♀; USNM); Cinchona ($18^{\circ}04.4'N$, $76^{\circ}39.3'W$; 1400 m), 29 Apr 2000, W. N. Mathis (1♂, 1♀; USNM); Clydsdale ($18^{\circ}04.9'N$, $76^{\circ}40.2'W$; 1030 m), 29 Apr 2000, W. N. Mathis (9♂, 1♀; USNM); Hardwar Gap ($18^{\circ}04.2'N$, $76^{\circ}44'W$; 1170 m), 10 Mar–8 Jun 1970, 1989, 1996, 2000, E. Becker, T. H. Farr, H. Howden, D. and W. N. Mathis, B. and M. Sorensson, H. B. Williams, W. W. Wirth (33♂, 16♀; CNC, USNM, ZIL); Hardwar Gap (2.5 km E; at Fairy Glades Trail; $18^{\circ}04.4'N$, $76^{\circ}43.8'W$; 1350 m), 9 Jun 1989, B. and M. Sorensson (1♀; ZIL); Hollywell ($18^{\circ}05.2'N$, $76^{\circ}43.9'W$; 1100 m), 28 Apr–13 Jun 1989, W. N. Mathis, B. and M. Sorensson (27♂, 16♀; USNM, ZIL); Newcastle Road (mi 17 [km 27] from Kingston; $18^{\circ}04.1'N$, $76^{\circ}42.8'W$), 3 May 1954, T. H. Farr (1♀; USNM); Mavis Bank (near coffee factory; $18^{\circ}01.4'N$, $76^{\circ}39.7'W$; waterfall), 21–23 Apr 2000, W. N. Mathis (14♂, 4♀; USNM); Mavis Bank (1.7 km E; $18^{\circ}02.4'N$, $77^{\circ}39.5'W$; 575 m), Yallahs River, 21–22 Apr–1 May 2000, W. N. Mathis (16♂, 2♀; USNM); Mavis Bank (4.3 km SE; $18^{\circ}01.4'N$, $76^{\circ}38.1'W$; 480 m), Yallahs River, 22–23 Apr 2000, W. N. Mathis (4♂; USNM); Newcastle (6 km S; $18^{\circ}04.3'N$, $76^{\circ}42.6'W$; 950 m; waterfall), 30 Apr 2000, W. N. Mathis (6♂, 1♀; USNM); Second Breakfast Spring ($18^{\circ}03'N$, $76^{\circ}46'W$), 3 May–29 Aug 1954, T. H. Farr (2♂, 1♀; USNM); Silver Hill Gap ($18^{\circ}05.1'N$, $76^{\circ}41.1'W$; 920 m), 26 Apr 2000, W. N. Mathis (13♂, 2♀; USNM); Silver Hill Gap ($18^{\circ}05.3'N$, $76^{\circ}43'W$; 940 m), 29 Apr 2000, W. N. Mathis (7♂; USNM). *St. Thomas:* Blue Mountains, Yallahs Valley ($17^{\circ}52.6'N$, $76^{\circ}33.1'W$), 24 Feb 1911 (3♀; AMNH, ANSP, USNM); Hagley Gap (1 km E; $18^{\circ}00.1'N$, $76^{\circ}36.7'W$), 16 May 1996, D. and W. N. Mathis, H. B. Williams (12♂, 20♀; USNM).

TYPE LOCALITY. Neotropical. Jamaica. St. Thomas: Blue Mountains, Yallahs Valley ($17^{\circ}52.6'N$, $76^{\circ}33.1'W$).

DISTRIBUTION. (Map 17). *Neotropical:* West Indies (Jamaica).

REMARKS. This species is apparently endemic to Jamaica and is similar to *Paralimna (Paralimna) maculata* sp. nov. Distinguishing characters are discussed in the "Remarks" for *P. maculata*.

29. *Paralimna (Paralimna) stellata*, sp. nov.

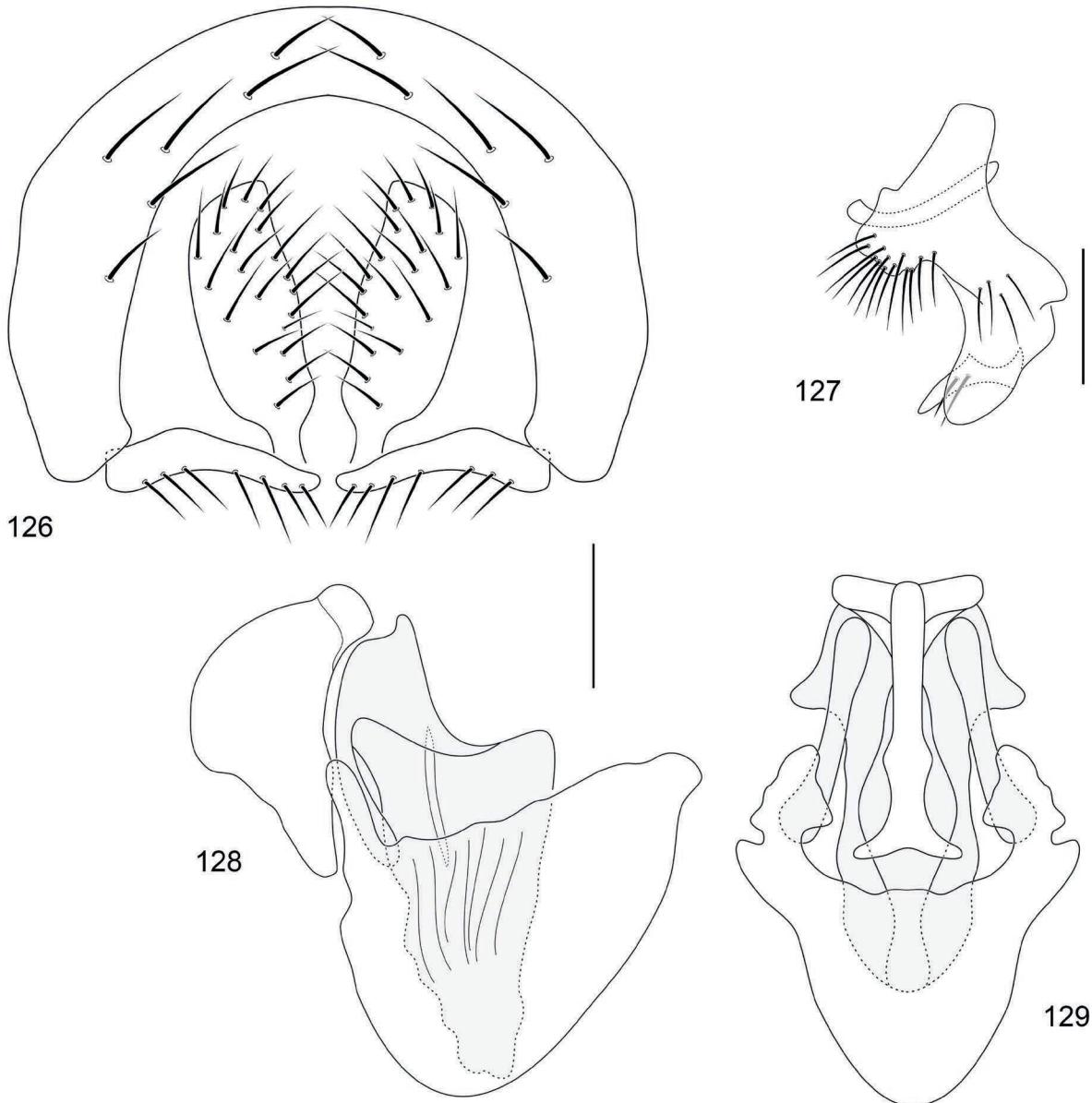
FIGURES 1, 126–129, 194, 207, MAP 16

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: species with body predominantly brown with long face and notably protuberant carina; frons brown with a wide central portion yellow and a large black velvety spot on ventral front orbit lateral to antenna; face reddish brown; scape and pedicel black velvety; wing brown with hyaline halos, crossvein dm–cu concave, curved to base; vein M with short perpendicular stump veins; tergites brown with laterodistal triangular yellow spots.

DESCRIPTION. Body length 3.5–4.1 mm; body generally dark colored, dark brown dorsally and lateral surfaces dark gray.

Head: (See Figure 194) Frons stained reddish brown and yellow: brown region extends from interfrontal seta to inner and outer vertical setae reaching the lateral margin of frons, yellow region extends from between inner vertical setae toward anterior fronto-orbital seta reaching the lateral margin of frons forming a triangular stain, slender longitudinal stripes visible on yellow region depending of incidence of light, the more conspicuous brown stripe extends from anterior ocellus to anterior margin of frons, margin anterolateral of frons with a wide black velvety spot lateral to antenna; dorsal parafacial with 1 elongate pale brown spot lateral to antenna, separated from black velvety dorsal fronto-orbital spot by a yellow spot. Antennal scape and pedicel black velvety; basal flagellomere brown, covered by yellowish-orange microtomentum; basal flagellomere with slender, elongate, pale setae on margin; arista with 13 long, dorsal rays. Postcranium with 2 complete series of postocular setae, the second series irregular. Face long, in anterior view twice height of frons; reddish brown with a yellowish-gray small spot in middle; parafacial yellow and gena reddish brown; carina notably protuberant; gena with only few setae on middle and ventral margin; clypeus reddish brown. Eye rounded, about as wide as high, height more than twice the height of gena. Gena high, height slightly greater than length of basal flagellomere; gena-to-eye ratio 0.36–0.40.

Thorax: Mesonotum yellow with brown spots, 3 stripes between dorsocentral rows, plus several short stripes laterally; postpronotum and supra-alar areas yellow; scutellum brown dorsally with a slender longitudinal yellow stripe, with apex blackish brown and yellow otherwise. Pleurae stained with brown and yellow, anepisternum brown with small area yellow surrounding the ventral anepisternal setae, anepimeron brown on ventral half and yellow above, katepisternum brown with margins yellow, the remaining yellow. Wing (see Figure 207) brown with hyaline halos;



FIGURES 126–129. Structures of male terminalia of *Paralimna* (*Paralimna*) *stellata*, sp. nov. (Ecuador. Pastaza): (126) epandrum, cerci, and presurstyli, posterior aspect; (127) postsurstylus, lateral aspect; (128) aedeagus, phallapodeme, and hypandrium, lateral aspect; (129) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

costal-vein ratio 0.37–0.39; M-vein ratio 1.00–1.04; veins brown, crossvein dm–cu concave, curved to base; vein M with short perpendicular stump veins. Legs blackish brown with dense reddish-brown microtomentum; tarsi lighter with some yellow coloration, especially ventrally, the distal tarsomeres brown; forefemur of male with anteroventral series of short and slightly flattened setae, ventral surface with a comb of very short and slender setae; forefibia of male straight.

Abdomen: Tergites brown with laterodistal triangular yellow spots, lateroventral margin brown. Male terminalia: (Figures 126–129) Presurstylus not bifurcate, horizontal process somewhat robust, shallowly curved with very long, slender setae along the length; in lateral view postsurstylus widest medially with a medial, anteriorly protuberant, apically truncate lobe bearing long and slender setae and a rounded process posteriorly; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, slender and mostly

straight in lateral view; moderately robust in posterior view and slender in lateral view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna stellata* is labeled "ECUADOR. Past[aza]. Puyo (22 Kms. E) 2 February 1976[,] Spangler, et al./ECUADOR-PEACE CORPS-SMITHSONIAN INSTITUTION AQUATIC INSECT SURVEY/USNM ENT 00118288 [plastic bar code label]/HOLOTYPUS ♂ *Paralimna stellata* Ale-Rocha&Mathis, USNM [red]." The holotype is double mounted (glued to a paper triangle), is in excellent condition, and is deposited in the USNM. One paratype (♂; USNM) bears the same label data as the holotype. Other paratypes are as follows: ECUADOR. **Pastaza:** Puyo (01°29'S, 78°0.1'W), 30 Jan 1976, P. J. Spangler et al. (1♀; USNM); Puyo (21 km E; 01°17.9'S, 77°52.9'W), 14 Jul 1976, J. Cohen (1♀; USNM). **Sucumbios:** Lago Agrio (Nueva Loja; 00°05.1'S, 76°53'W), 16 Apr 1976, A. Langley (1♂; USNM); Lago Agrio (3 km NE; 00°06.4'S, 76°52.6'W; at pozo number 3), 17 May 1975, A. Gurney (1♀; USNM).

OTHER SPECIMENS EXAMINED. ECUADOR. **Napo:** Puerto Misahualli (01°02'S, 78°40.2'W; 350 m), Feb 1993, M. Sharkey (1♂; CNC). **Orellana:** Coca, Napo River (0°27.8'S, 76°59'W; 250 m), 12–13 Apr 1965, L. E. Peña (1♂; CNC); Río Tiputini (0°38.2'S, 76°08.9'W), 12–26 Aug 1999, W. N. Mathis, A. Baptista, M. Kotrba (4♂, 2♀; USNM). **Pastaza:** Puyo, (3–4 km N; 01°28.1'S, 77°59.7'W; 953 m), 9 Feb 1955 (2♂, 1♀; USNM).

PERU. **Huánuco:** Tingo María (09°17.7'S, 75°59.8'W; 800 m), 5–9 Apr 1962, L. E. Peña (1♂; CNC). **Junín:** Perené (10°56.8'S, 75°13.6'W), R. C. Shannon (2♂, 1♀; USNM). **Loreto:** Explornado Camp on Rio Sucusari, 2 km upstream from Rio Napo (160 km NE Iquitos; Malaise trap), 24 Jun–20 Jul 1990, B. Awertschenko, A. Menke (1♀; USNM). **San Martin:** Tarapoto (06°29'S, 76°22'W), Sept 1955, Th. Dobzhansky, C. Pavan (1♂; USNM).

TYPE LOCALITY. Neotropical. Ecuador. Pastaza: Puyo (22 km E; 01°17.9'S, 77°52.9'W).

DISTRIBUTION. (Map 16) *Neotropical:* Ecuador (Napo, Orellana, Pastaza, Sucumbios), Peru (Huánuco, Junín, Loreto, San Martin).

ETYMOLOGY. The species epithet, *stellata*, is of Latin derivation and means starred or spotted, alluding to the spotted aspect of the body and wing.

REMARKS. This species forms a monophyletic group that also includes *P. guttata* sp. nov. and *P. fulgifrons* sp. nov. The differences between these species are discussed in the "Remarks" for *P. guttata* sp. nov.

30. *Paralimna (Paralimna) stigmata*, sp. nov.

FIGURES 130–133, 195, 208, MAP 24

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face brown to dark brown with lateral margin silvery gray to pale gray and an

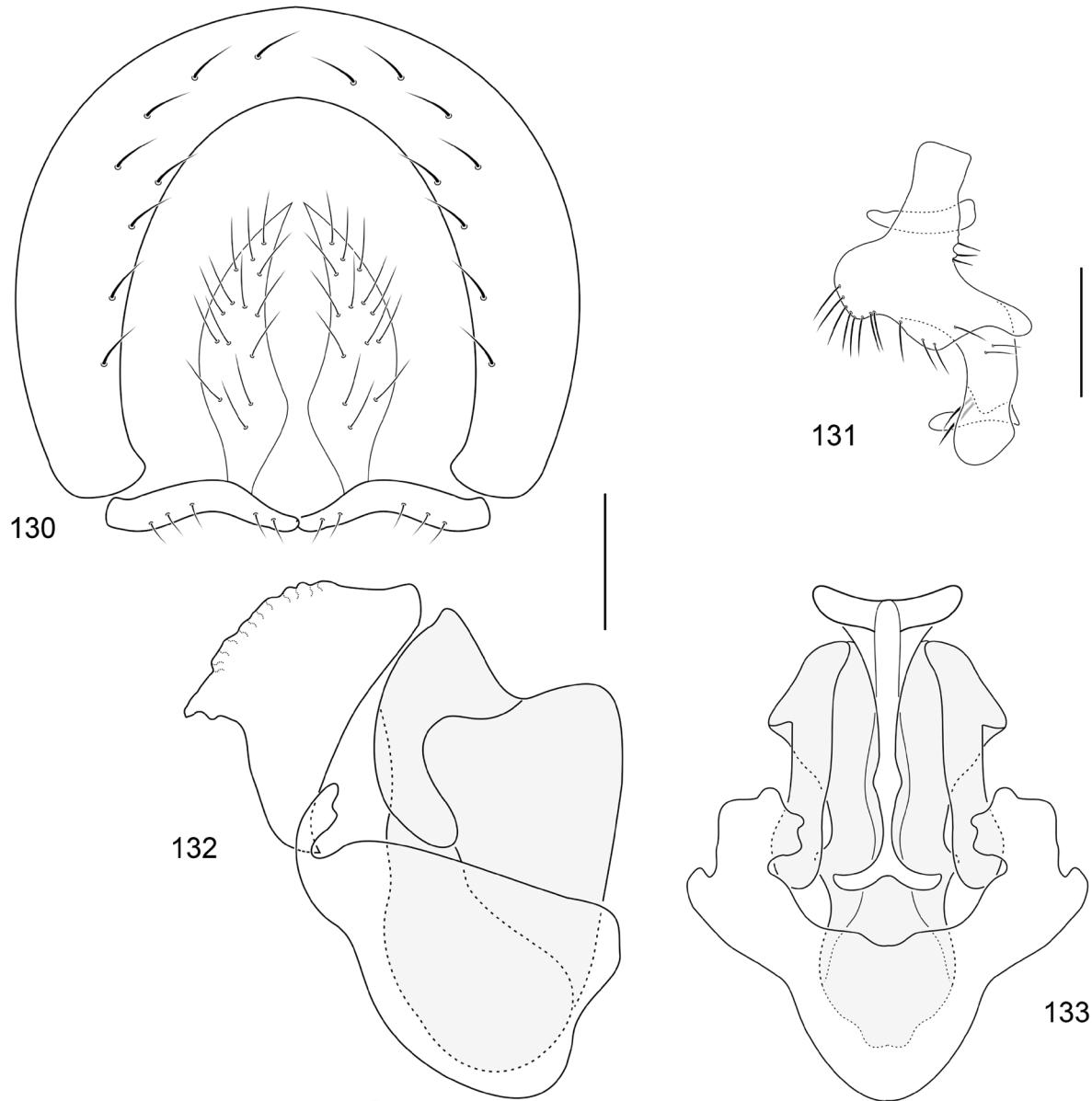
inverted U-shaped, wide, gray to pale gray band on middle of face; pleurae predominantly brown with dorsal portion of proepimeron, posterodorsal corner and a small semicircular anterior medial spot on anepisternum, dorsal half of anepimeron, laterotergite, and anterodorsal portion of katepisternum gray; forefemur of male without outstanding setae.

DESCRIPTION. Body length 3.3–3.7 mm; body generally bicolored, dark brown dorsally, lateral surfaces predominantly brown with some small areas gray.

Head: (See Figure 195) Frons brown with gray spots, a slender stripe at lateral margins of ocellar triangle, in front of anterior ocellar seta but not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on front-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 brown spots lateral to antenna, separated by gray spot. Antennal scape and pedicel dark brown, pedicel with dorsal distal margin silvery gray, with 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere gray with slender, elongate pale brown setae on margin; arista with 12–13 long dorsal rays. Postcranium with 2 series of postocular setae, the posterior series is somewhat irregular. Face brown to dark brown with lateral margin silvery gray to pale gray and an inverted U-shaped, wide, gray to pale gray band on middle of face; parafacial and gena silvery gray to pale gray; gena with setae only on distal margin; clypeus gray. Eye round, as wide as high, height more than twice the height of gena. Gena high, height subequal or slightly greater than length of basal flagellomere; gena-to-eye ratio 0.30–0.36.

Thorax: Mesonotum pale gray with brown spots, 3 stripes between dorsocentral rows being 2 lateral, well-defined stripes and 1 irregular, slender, and less-defined acrostichal stripe; 1 slender short stripe on supra-alar area and several small spots in the base of setae; postpronotal lobe gray; notopleuron gray with a little brown spot on dorsal margin; scutellum pale gray, slightly tinged of brown dorsally, with distal margin dark brown. Pleurae predominantly brown with dorsal portion of proepimeron, dorsal posterior corner and a small anterior medial spot on anepisternum, dorsal half of anepimeron, laterotergite, and anterodorsal portion of katepisternum gray. Wing (see Figure 208) pale brown tinged or semi-hyaline; veins brown; crossvein dm–cu slightly infuscate; costal-vein ratio 0.45–0.46; M-vein ratio 1.09–1.17. Legs brown except basitarsus lighter, yellowish tinged; forefemur of male without outstanding setae; foretibia straight.

Abdomen: Tergites distinctly bicolored, dark brown along anterior 2/3 and medially, the remaining yellowish gray dorsally and silvery gray laterally, except tergite 2 predominantly yellowish gray with only a dorsolateral small brown spot on basal half; lateroventral margin of tergites brown. Male terminalia: (Figures 130–133) Presurstylus not bifurcate, with horizontal process slender and slightly wavy; in lateral view postsurstylus widest medially with a medial, anteriorly protuberant lobe bearing rather short and slender setae and a robust digitiform process posteriorly; lateral aedeagal process about 1/2 length of aedeagus, robust and slightly curved

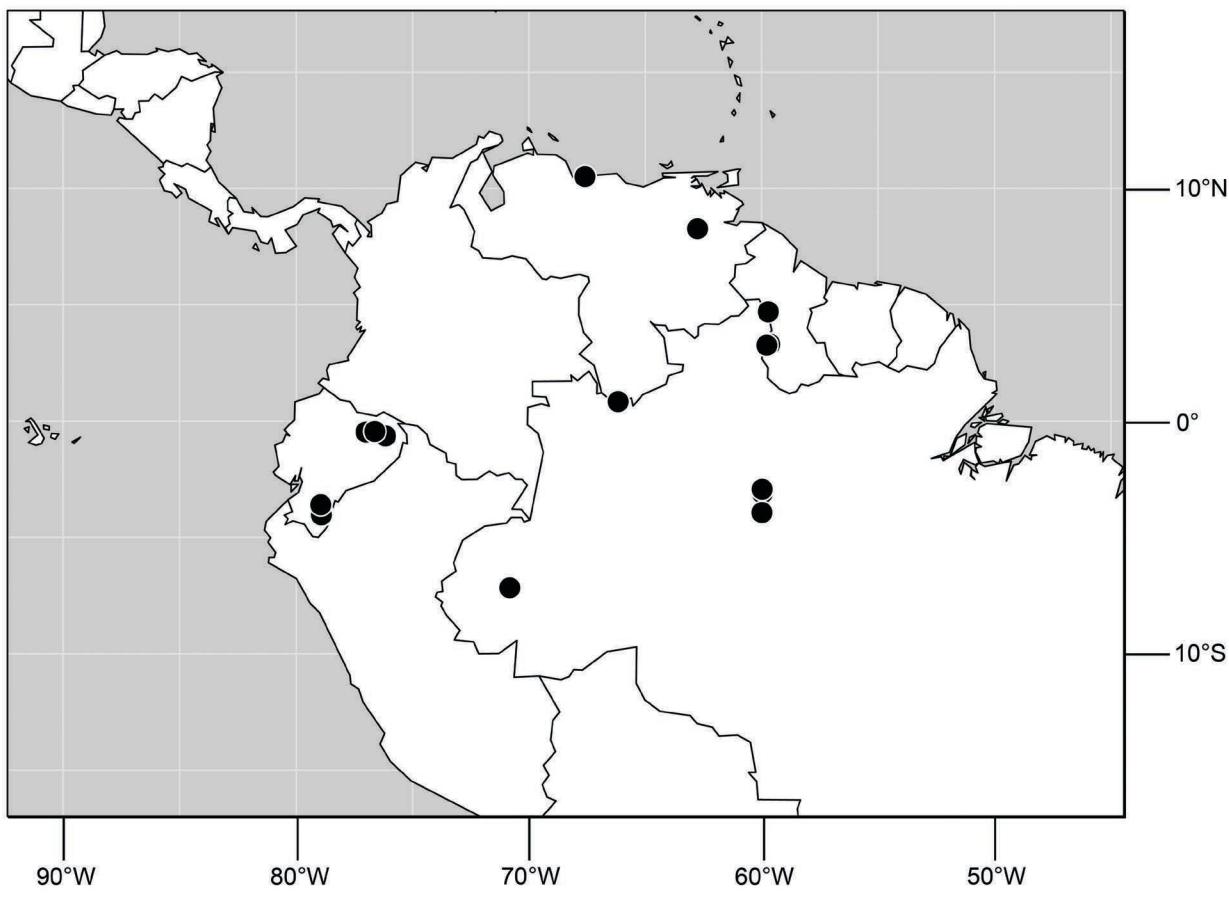


FIGURES 130–133. Structures of male terminalia of *Paralimna (Paralimna) stigmata*, sp. nov. (Brazil. Amazonas): (130) epandrium, cerci, and presurstyli, posterior aspect; (131) posturstylos, lateral aspect; (132) aedeagus, phallapodeme, and hypandrium, lateral aspect; (133) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

subapically in lateral view, bluntly rounded; aedeagus rather robust, rounded on membranous apex; phallapodeme broadly triangular in lateral view; hypandrium shallowly concave.

TYPE MATERIAL. The holotype male of *Paralimna stigmata* is labeled “BRAZIL. Amazonas: Manaus, UFAM [Univeridade Federal do Amazonas] (03°05.9'S, 59°58.2'W, 50 m), 7 May 2010/D. & W. N. Mathis/USNM ENT 00118266 [plastic bar code label]/HOLOTYPE ♂ *Paralimna stigmata* Ale-

Rocha&Mathis, INPA [red].” The holotype is double mounted (minuten pin in a white block of plastic), is in excellent condition, and is deposited in INPA. Six paratypes (6♂; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: BRAZIL. Amazonas: Manaus, Reserva Ducke (km 24; 02°55.8'S, 59°58.5'W; Malaise trap), 21 Aug 1990, J. Vidal (1♂; INPA); Manaus, INPA (03°55.8'S, 59°59.2'W; 60 m), 4 May 2010, D. and W. N. Mathis (8♂; INPA, USNM); Ipixuna,



MAP 24. Distribution map for *Paralimna (Paralimna) stigmata*, sp. nov.

Rio Gregório, Comunidade Lago Grande ($07^{\circ}09.9'S$, $70^{\circ}48.9'W$; sweeping), 18–23 May 2011, J. A. Rafael; J. T. Camara, R. F. Silva, A. Somavilla, R. Ale-Rocha (1♀; INPA).

ECUADOR. *Orellana*: Río Tiputini ($0^{\circ}38.2'S$, $76^{\circ}8.9'W$), 12–26 Aug 1999, W. N. Mathis, A. Baptista, M. Kotrba (1♂, 3♀; INPA, USNM).

GUYANA. Kanuku Mountains, Kumu River and Falls ($03^{\circ}15.9'N$, $59^{\circ}43.5'W$), 28–30 Apr 1995, W. N. Mathis (6♂, 3♀; USNM); Kumu River Lethem (25 km SE; $03^{\circ}15.9'N$, $59^{\circ}46.6'W$), 4–5 Apr 1994, W. N. Mathis (14♂; 5♀; USNM); Moco-Moco (30 km E Lethem; $03^{\circ}18.2'N$, $59^{\circ}39.0'W$), 3–6 Apr 1994, W. N. Mathis (11♂, 4♀; INPA, USNM); Paramakatoi ($04^{\circ}42'N$, $59^{\circ}42.8'W$), 24–25 Aug 1997, W. N. Mathis (1♂; USNM).

VENEZUELA. Territorio Federal Amazonas: Cerro de La Neblina (basecamp; $00^{\circ}51'N$, $66^{\circ}10'W$; 140 m; Malaise trap), 20–24 Mar 1984, O. S. Flint, J. Louton (1♀; USNM). *Carabobo*: Valley Seco ($10^{\circ}28'N$, $68^{\circ}01'W$), Jan 1940, P. Adams (1♂; ANSP).

OTHER SPECIMENS EXAMINED. **ECUADOR.** *Orellana*: Coca, Napo River ($0^{\circ}27.8'S$, $76^{\circ}59'W$; 250 m),

12–13 Apr 1965, L. E. Peña (2♂; CNC); Pomeya, Napo River ($0^{\circ}26.5'S$, $76^{\circ}36.6'W$), 25–30 Apr 1965, L. E. Peña (1♂, 1♀; CNC). *Zamora-Chinchipe*: Cumbaratza ($03^{\circ}59.5'S$, $78^{\circ}51.9'W$; 700 m), 30–31 Mar 1965, L. E. Peña (2♂; CNC); Río Jumboé ($04^{\circ}04'S$, $78^{\circ}55.8'W$; 1200 m), 1–2 Apr 1965, L. E. Peña (3♂, 2♀; CNC); Timbara ($04^{\circ}01.9'S$, $78^{\circ}54.1'W$; 1400 m), 4 Apr 1965, L. E. Peña (5♂; CNC); Yacuambi ($03^{\circ}35.7'S$, $78^{\circ}55.7'W$; 1000 m), 4 Apr 1965, L. E. Peña (1♂; CNC).

VENEZUELA. Bolívar: Gran Sabana, Akuriman ($08^{\circ}16'N$, $62^{\circ}45.3'W$), Nov–Dec 1940, P. Anduze (2♂; USNM).

TYPE LOCALITY. Neotropical. Brazil. Amazonas: Manaus, Universidade Federal do Amazonas ($03^{\circ}05.9'S$, $59^{\circ}58.2'W$; 50 m).

DISTRIBUTION. (Map 24) Neotropical: Brazil (Amazonas), Ecuador (Orellana, Zamora-Chinchipe), Guyana, Venezuela (Territorio Federal Amazonas, Bolívar, Carabobo).

ETYMOLOGY. The species epithet, *stigmata*, is of Latin derivation and means mark or bank, alluding to the inverted U-shaped golden spot on the face.

REMARKS. The presurstylus of this species is a horizontal, simple process that is rather sinuous, similar to that of

P. molossus and *P. stellata* sp. nov., but it can be distinguished from these species by the brown face that has an inverted U-shaped, wide, gray to pale gray band in the middle of the face. The similarity of the male terminalia of *P. molossus* and *P. stigmata* sp. nov. is discussed in the "Remarks" for *P. molossus*.

31. *Paralimna (Paralimna) taurus* Cresson

FIGURES 134–137, MAP 25

Paralimna taurus Cresson 1916:123 [Brazil. Mato Grosso do Sul: Corumbá (19°0.6'S, 57°39.3'W); HT ♂, ANSP (6096)].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 25 [world catalog].

Paralimna secunda taurus Cresson 1947:48 [review, Neotropical species].
Paralimna sticta Hendel 1930:127 [Argentina. San José; HT ♂, SMN]. Cresson 1947:53 [list, Neotropical species].—Wirth 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:125 [world catalog]. NEW SYNONYM.

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: face gray with a faint, short pale brown spot on carina, half the length of antenna; face long in anterior view, about twice height of frons; frons horizontal; mesopleuron and legs densely silvery gray; anepisternum with dorsal margin brown tinged, with a dotted aspect in the remaining by bases of setae brown; base of scutal setae brown giving a dotted aspect to scutum; forefemur of male with ventral and anteroventral series of short setae, the anteroventral setae discreetly flattened and shortened toward the apex of the femur.

DESCRIPTION. Body length 3.5–5.5 mm; body generally bicolored, pale brown dorsally, lateral surfaces densely silvery gray.

Head: Frons horizontal, pale brown to brown with linear, gray, faded spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits, between proclinate fronto-orbital setae and just above antennal bases; ventral fronto-orbits with a dark gray spot and dorsal parafacial spot inconspicuous. Antennal scape and pedicel dark brown; basal flagellomere pale brown with slender, elongate, pale setae on margin; arista with 12–13 long, dorsal rays. Postcranium with 2 complete series of postocular setae. Face long in anterior view, about twice height of frons, gray with a faint, short pale brown spot on carina, half of the length of antenna; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray. Eye rounded, about as wide as high. Gena high, height subequal to length of basal flagellomere.

Thorax: Mesonotum gray with pale brown spots, 3 poorly defined wide stripes between dorsocentral rows, plus some short brown stripes on intra- and supra-alar areas, and base of setae

brown giving a dotted aspect to scutum; postpronotum and supra-alar areas silvery gray; scutellum brown basally, with apex blackish brown and yellowish gray laterally and in middle. Pleurae densely silvery gray, anepisternum with dorsal margin slightly brown tinged, with a dotted aspect in the remaining by bases of setae brown. Wing hyaline; veins brown. Legs somewhat slender, pale brown with dense silvery-gray microtrichia; tarsi lighter with some yellow coloration, darkened on distal tarsomeres; forefemur of male with posteroventral and anteroventral complete series of short setae, the anteroventral setae discreetly flattened and shortened toward the apex of the femur; foretibia straight.

Abdomen: Tergites distinctly bicolored; tergite 1 brown in the most part with laterodistal corner silvery gray; tergites 2–5 brown along anterior half and medially, otherwise silvery gray, except tergite 2 predominantly silvery gray with medial brown line reduced and dorsolateral brown spot on basal $\frac{1}{2}$ – $\frac{1}{3}$. Male terminalia: (Figures 134–137) Presurstylus not bifurcate, only bulged basoventrally, horizontal process rather robust, shallowly curved with long, slender setae; in lateral view postsurstylus widest medially, with medial, anterior lobe greatly produced, bearing short and stout setae extended over medial region until near posterior margin, a medial developed projection on posterior margin; lateral aedeagal process thin, about $\frac{1}{3}$ length of aedeagus, almost straight; aedeagus slender in posterior view; phallapodeme broadly triangular in lateral view; hypandrium deeply concave.

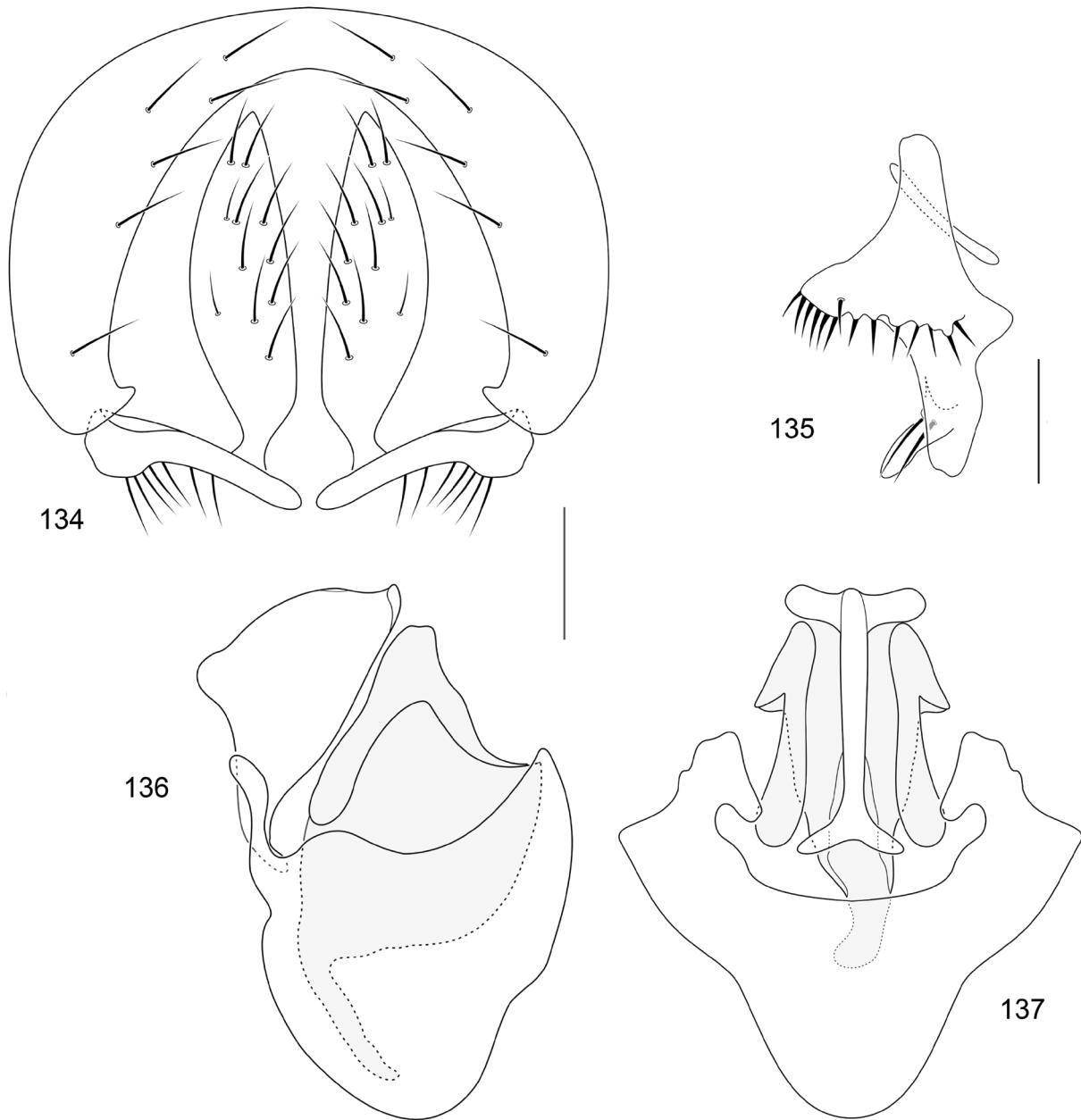
TYPE MATERIAL. The holotype male of *Paralimna taurus* is labeled "May (above the cork block)/Corumbá/♂/TYPE Paralimna TAURUS E. T. Cresson, Jr. [maroon; "Paralimna TAURUS" handwritten]." The holotype is double mounted (pin in a rectangular block of cork, is in excellent condition (wings slightly torn), and is deposited in the ANSP (6096). Two paratypes (1♂, 1♀; ANSP), including the allotype, bear the same label data as the holotype.

The lectotype male of *Paralimna sticta* Hendel, designated herein, is labeled "San José, N-Arg X.25. Lindner. D. Chaco-Exped [black margin]/Paralimna sticta Hend. [handwritten] F. Hendel det./Type. Hendel 1930 [handwritten; red ink; label with a black border]/SMN/Lectotype ♂ *Paralimna sticta* Hendel, designated by Ale-Rocha & Mathis [red]." The lectotype is double mounted (minuten pin in a rectangular card), is in good condition (right antenna and some setae missing, wing slightly torn; abdomen not dissected), and is deposited in the SMN. We also examined two male paralectotypes from the same locality.

OTHER SPECIMENS EXAMINED. ARGENTINA.
Formosa: Lapango, Pilcomayo (25°22'S, 57°39.3'W), Sep 1925, E. Lindner (1♀; SMN).

PARAGUAY. *Cordillera:* San Bernardino (25°16'S, 57°19.4'W), K. Fiebrig (1♀; ANSP).

TYPE LOCALITY. Neotropical. Brazil. Mato Grosso do Sul: Corumbá (19°0.6'S, 57°39.3'W).

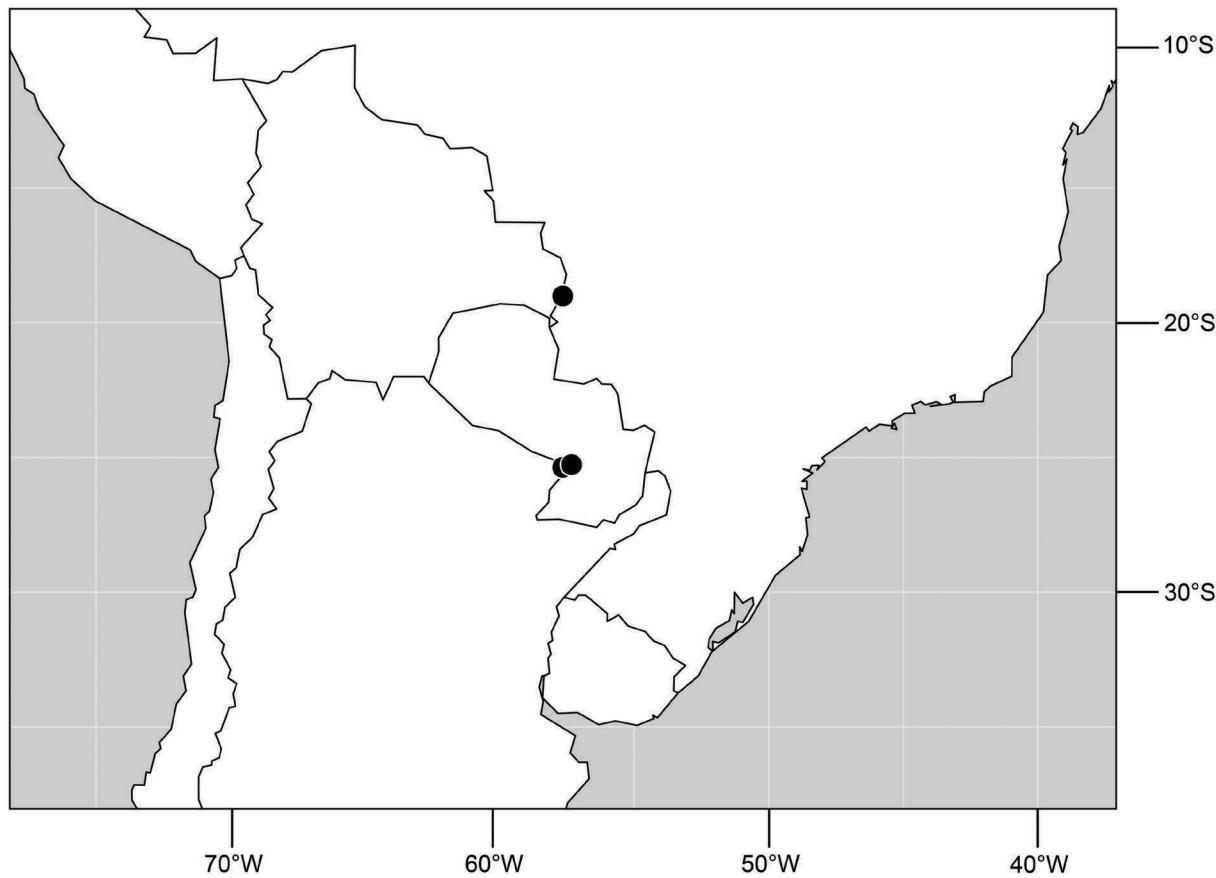


FIGURES 134–137. Structures of male terminalia of *Paralimna (Paralimna) taurus* Cresson (Brazil. Mato Grosso do Sul): (134) epandrium, cerci, and presurstyli, posterior aspect; (135) postsurstyli, lateral aspect; (136) aedeagus, phallapodeme, and hypandrium, lateral aspect; (137) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

DISTRIBUTION. (Map 25) *Neotropical*: Argentina (Formosa), Brazil (Mato Grosso do Sul), Paraguay (Cordillera).

REMARKS. Like *P. crinita* sp. nov. and *P. pleurivittata*, this species has an almost horizontal frons that is slightly projected above the antennal bases. In *P. taurus*, however, the eye is rounded, the pedicel lacks a dorsal, silvery-white spot (some-

what rectangular eye, wider than high in *P. pleurivittata*; pedicel with a dorsal silvery white spot in *P. pleurivittata* and *P. crinita* sp. nov.), and the ventral surface of the male forefemur is not concave (concave near apex in *P. crinita* sp. nov.). Structures of the male terminalia of these species are quite different and are useful to distinguish between them.



MAP 25. Distribution map for *Paralimna (Paralimna) taurus* Cresson.

32. *Paralimna (Paralimna) texana* Cresson

FIGURES 138–141, 196, MAP 26

Paralimna texana Cresson 1915:69 [USA. Texas. Travis: Austin (30°16'N, 97°44.6'W); HT ♂, USNM]; 1946:229 [review].—Wirth 1965:748 [Nearctic catalog]; 1968:15 [Neotropical catalog].—Mathis and Zatwarnicki 1995:125–126 [world catalog].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: general aspect of body densely whitish to yellowish gray; face silvery to yellowish gray with 3 golden-brown spots, 1 slender linear spot on carina and 2 paired, small, rounded, very weak golden-brown spots between largest facial seta; mesonotum predominantly silvery to yellowish gray with 2 pale brown stripes between dorsocentral rows and few small pale brown spots on intra- and postalar areas; forefemur of male with ventral surface concave, anteroventral row with long and conspicuous yellow setae, flattened on distal ½ of forefemur, basal ½ of posteroventral surface with row of long and robust setae, sometime discontinuous, longer than width of femur; foretibia slightly arcuate with ventral

surface concave in middle; tergite 2 whitish gray for the most part with a paired small brown spot on ¼ anterior, tergites 3–4 with a narrow band on ½ anterior and a slender, medial, faded line golden brown; tergite 5 in male wholly whitish gray and in the female with a narrow band on ¼ anterior and a slender, medial, faded line golden brown; insertion of abdominal setae brown, abdomen with mottled appearance.

DESCRIPTION. Body length 3.5–4.7 mm; body generally pale colored, pale brown dorsally, lateral surfaces whitish gray, sometimes yellowish gray.

Head: (See Figure 196) Frons golden brownish gray, more gray on anterior margin, with silvery spots at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits above dorsal proclinate fronto-orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits with a dark grayish-brown spot and dorsal parafacial with a dark gray spot lateral to antenna, separated by silvery-gray spot. Antennal scape and pedicel brown, with golden-gray microtomentum; basal flagellomere pale brown to brown according to incidence of light, with slender, elongate, pale setae on margin; arista with 7–9 long, dorsal rays.

Postcranium with 2 complete series of postocular setae. Face silvery to yellowish gray with 3 golden-brown spots, 1 slender linear spot on carina, shorter than the length of antenna, and 2 paired, small, rounded, very weak golden-brown spots between largest facial seta; parafacial and gena silvery gray; gena with only few setae on middle and ventral margin; clypeus silvery gray with yellowish gray distal margin. Eye rounded, about as wide as high, height more than twice the height of gena. Gena high, height more than twice the length of basal flagellomere; gena-to-eye ratio 0.35–0.41.

Thorax: Mesonotum predominantly silvery to yellowish gray with 2 wide pale brown stripes between dorsocentral rows, plus few small pale brown spots on intra- and supra-alar areas; postpronotum, notopleuron, and supra-alar areas silvery to yellowish gray; scutellum brown dorsally, with apex dark brown and silvery gray laterally. Pleurae with sparse silvery-gray microtomentum, anepisternum with bases of setae pale brown, without distinct spot. Wing hyaline; veins pale brown; crossveins r-m and dm-cu with smooth gray infuscate halo; costal-vein ratio 0.35–0.38; M-vein ratio 0.97–1.12. Legs pale brown with sparse whitish- to yellowish-gray microtomentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur with ventral surface concave, anteroventral series of long and conspicuous yellow setae, flattened on distal 1/3 of forefemur, basal 2/3 of posteroventral surface with a row of long and robust setae, longer than width of femur; foretibia with ventral surface concave in middle, slightly arcuate.

Abdomen: Tergites distinctly bicolored; tergite 1 with central region brown with laterodistal corners whitish gray, tergite 2 whitish gray for the most part with a paired, small brown spots on anterior margin, tergites 3–4 with a narrow band on anterior 1/3 and a slender, medial, faded line golden brown; tergite 5 in male wholly whitish gray and in the female with a narrow band on anterior 1/4 and a slender, medial, faded, golden brown line; insertion of abdominal setae brown, abdomen with mottled appearance. Male terminalia: (Figures 138–141) Presurstylus bifurcate, basoventral process short, rather triangular, about 1/3 length horizontal process, with dense brush of setae on apex, horizontal process rather robust, shallowly curved; in lateral view postsurstylus widest medially, with medial, anteriorly produced, pointed lobe bearing elongate and robust setae, some small, slender setae over the medial region, a medial developed projection pointing downward on posterior margin; lateral aedeagal process thin, about 2/3 length of aedeagus in lateral view; aedeagus slender, gradually tapered to membranous apex in posterior view; phallapodeme broadly triangular in lateral view; hypandrium rather deeply concave.

TYPE MATERIAL. The holotype male of *Paralimna texana* is labeled “Austin Oct. [19]00 Tex[as.]//Holo-TYPE Paralimna TEXANA E. T. Cresson, Jr [maroon; “Paralimna TEXANA” handwritten]/ALMELander Collection 1961/Type No 70634 U S N M [red; “70634” handwritten].” The holotype is directly pinned, is in very good condition (left wing partially torn; abdomen not dissected), and is deposited in the USNM (70634).

OTHER SPECIMENS EXAMINED. Nearctic. MEXICO. *Aguascalientes*: Aguascalientes (21°52.9'N, 102°17.3'W), 3–5 Aug 1963, P. J. Spangler (1♂, 1♀; USNM). *Durango*: Durango (24°01.7'N, 104°39.2'W), 3 Aug 1972, R. Mangan,

T. P. Sluss (1♂, 1♀; USNM). *Morelos*: Cuernavaca (18°56.1'N, 99°13.9'W), Jul 1965, N. L. H. Krauss (1♀; USNM).

UNITED STATES. Arizona. *Cochise*: Herb Martyr (31°52.4'N, 109°14.1'W; 2133 m), 7 Jun–1 Jul 1969, 1973, W. N. Mathis, S. L. Wood (3♂, 4♀; USNM); John Hands Park (31°52.6'N, 109°13.4'W), 12 Sep 1958, H. V. Weems (1♀; USNM); Pinery Canyon (31°56'N, 109°16.3'W; 1825 m), 21 Jun 1919 (1♂, 1♀; ANSP); Portal (8 km SW; Southwest Research Station; 31°53'N, 109°12.3'W; 1545 m), 5–25 Sep 1965, C. W. Sabrosky (3♂, 3♀; USNM); Sunnyside Canyon (31°20.4'N, 110°29.5'W), 8–12 Jul 1940, D. G. Hall (2♂, 2♀; ANSP).

Florida. *Marion*: Salt Springs (29°21'N, 81°44.1'W), 14 Apr 1989, D. and W. N. Mathis (5♂, 4♀; USNM); Salt Springs (8 km N; 29°29.7'N, 81°44.1'W), 14 Apr 1989, D. and W. N. Mathis (1♂, 2♀; USNM).

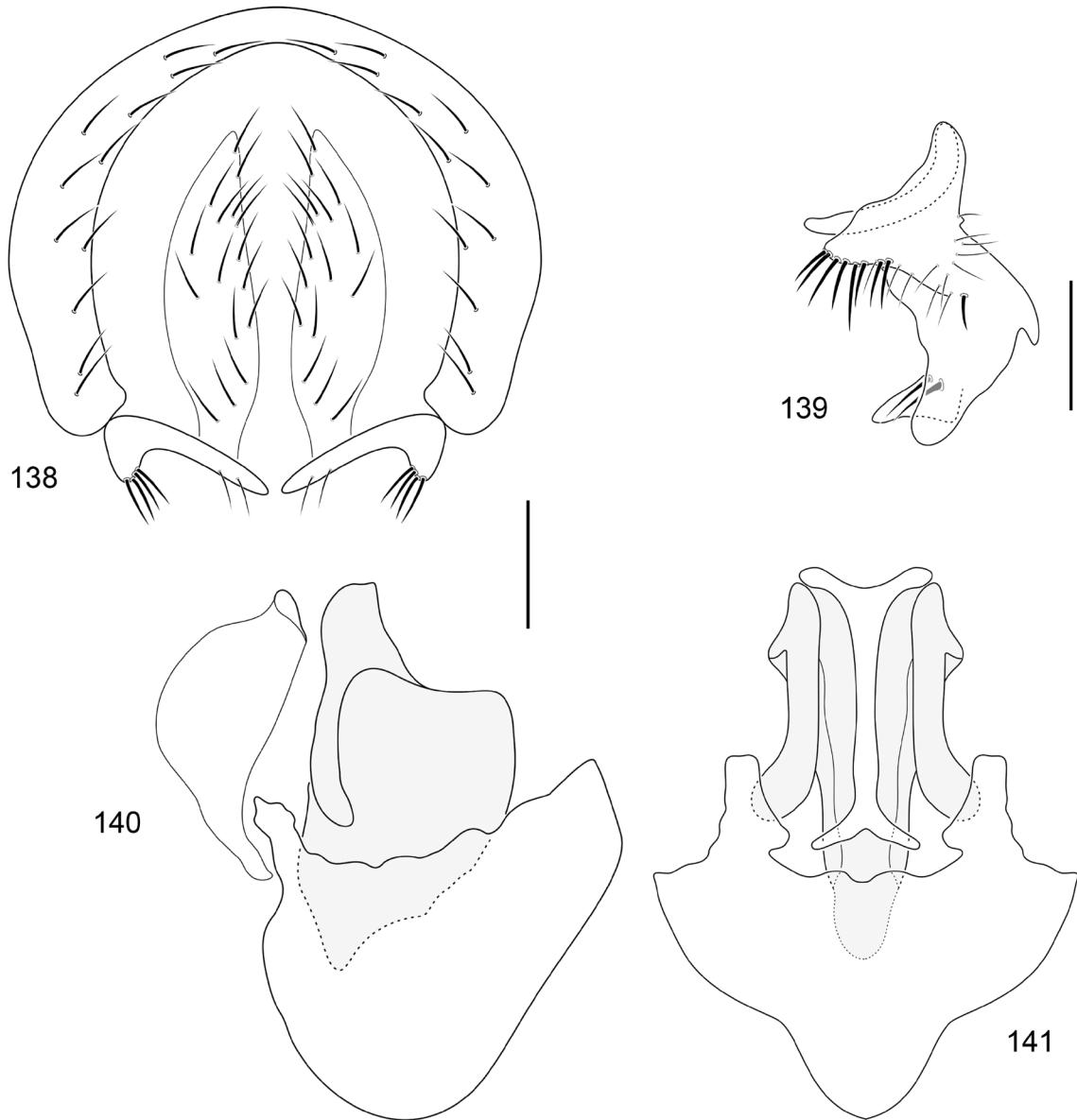
Nebraska. *Cherry*: Big Alkali (42°38.3'N, 100°36.7'W), 2 Jun 1969, W. W. Wirth (1♂; USNM); Snake River (42°40.5'N, 100°51'W; river margin), 2 Jun 1969, W. W. Wirth (3♂; USNM).

Lancaster: Lincoln (40°48.6'N, 96°40.9'W; salt lake), 19 Jun 1969, W. W. Wirth (1♂, 3♀; USNM).

Nevada. *Clark*: Las Vegas (36°10.5'N, 114°30'W; 600 m), 15–20 May 2004, D. and W. N. Mathis (1♂, 1♀; USNM); Las Vegas Springs (36°10.4'N, 115°11'W), 11 May 2001, D. and W. N. Mathis (3♂, 8♀; USNM).

New Mexico. *Arriba*: Espanola (35°59.5'N, 106°04.9'W), 11 Aug 1953, W. B. Heed (1♂, 1♀; USNM). *Colfax*: Cimarron (36°30.4'N, 104°55.5'W; river margin), 26 May 1969, W. W. Wirth (7♂, 4♀; USNM). *Grant*: Mimbres River (NM Hwy. 61 & Royal John Mine Road; 32°43.8'N, 107°52'W; 1665 m), 21 Aug 2009, W. N. Mathis (1♀; USNM). *Otero*: Cloudcroft (4 km E; 32°57.7'N, 105°41.6'W), 28 Jun 1973, W. N. Mathis (17♂, 29♀; USNM). *Sandoval*: La Cueva (Junction of Hwys. 126 & 4; 35°52'N, 106°38.4'W; 2342 m), 6–7 Aug 2007, D. and W. N. Mathis (4♂; USNM); Valles Caldera National Preserve (E Fork Jemez River; 35°51'N, 106°29.5'W; 2580 m), 6 Aug 2007, D. and W. N. Mathis (14♂, 1♀; USNM); Valles Caldera National Preserve, Rincon de los Soldados (stock pond 2; 35°54.6'N, 106°25.3'W; 2727 m), 14 Jun–6 Aug 2008, 2011, D. and W. N. Mathis (1♂, 1♀; USNM); Valles Caldera National Preserve, Rincon de los Soldados (stock pond 1; 35°52.7'N, 106°26.2'W; 2610 m), 6 Aug 2008, D. and W. N. Mathis (2♂; USNM); Valles Caldera National Preserve, San Antonio Creek (35°58.3'N, 106°34.7'W; 2564 m), 5 Aug 2008, D. and W. N. Mathis (1♂; USNM); Valles Caldera National Preserve, Union Building (1.6 km N; pond; 35°53.3'N, 106°34.9'W; 2666 m), 5 Aug 2008, D. and W. N. Mathis (1♂; USNM). *San Miguel*: Montezuma (0.6 km NE; 35°39.3'N, 105°17.4'W), 26 Jun 1973, W. N. Mathis (44♂, 71♀; USNM). *Socorro*: Socorro (34°03.5'N, 106°53.5'W), 1916, S. W. Williston (1♀; ANSP). *Union*: Des Moines (36°45.7'N, 103°50'W), 18 Jun 1910, F. C. Bishop (1♂; ANSP).

Oklahoma. *Alfalfa*: Great Salt Plains (36°45'N, 98°15.1'W), 22 May 1969, W. W. Wirth (1♂; USNM). *Garfield* (36°26.5'N, 97°52.2'W): 9 Jul 1977, J. F. Reinert (1♀; USNM). *Marshall*: Texoma Lake (53°33.7'N, 96°40.5'W), 15 Jul 1954, J. G. Chillcott (1♀; CNC).

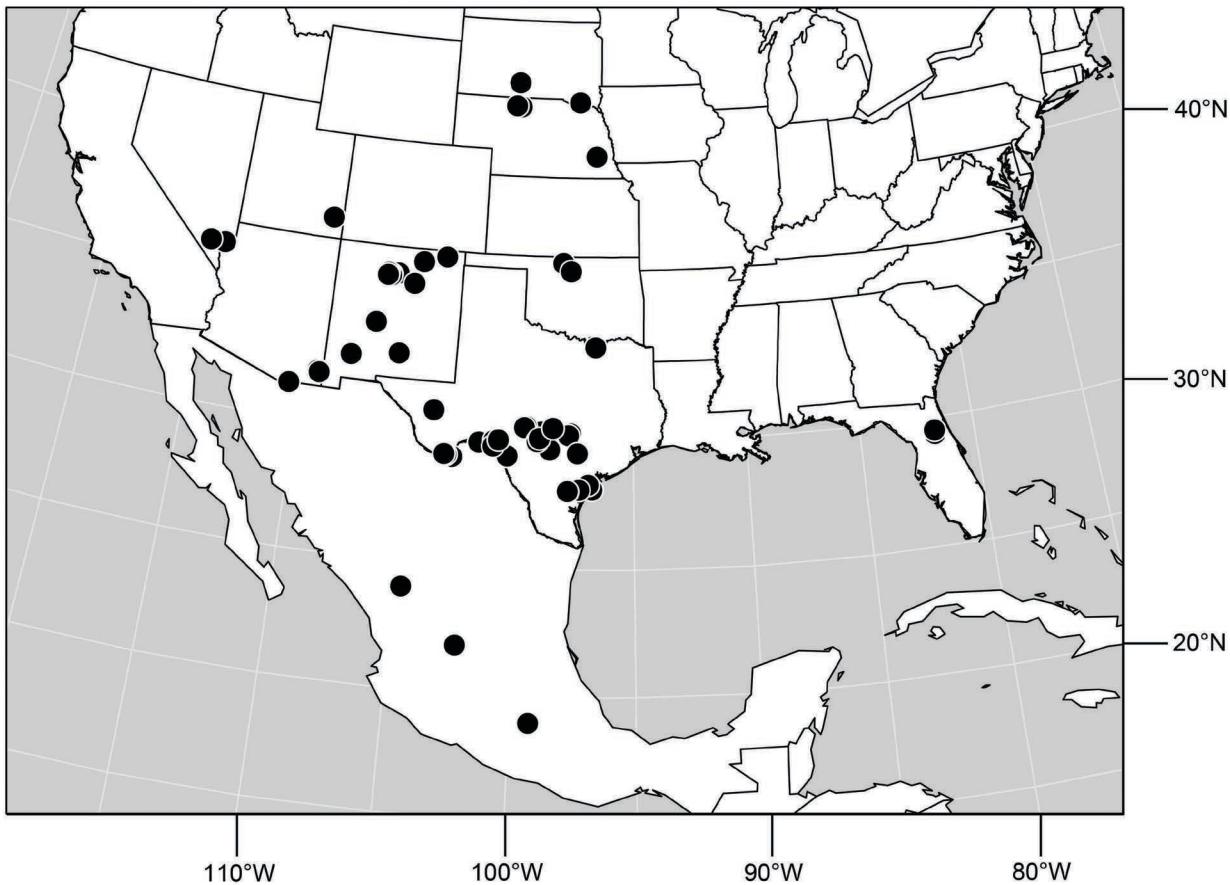


FIGURES 138–141. Structures of male terminalia of *Paralimna (Paralimna) texana* Cresson (United States. Texas): (138) epandrium, cerci, and presurstyli, posterior aspect; (139) postsurstylus, lateral aspect; (140) aedeagus, phallapodeme, and hypandrium, lateral aspect; (141) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

South Dakota. Mellette: Little White River ($43^{\circ}33.7'N$, $100^{\circ}44.5'W$; river margin), 4 Jun 1969, W. W. Wirth (1♀; USNM). **Yankton:** Gavins Point ($42^{\circ}51.7'N$, $97^{\circ}33.5'W$), 17 Jun 1969, W. W. Wirth (1♀; USNM).

Texas. Aransas: Aransas National Wildlife Refuge ($28^{\circ}06.9'N$, $96^{\circ}48'W$), 20 May 1972, W. W. Wirth (2♀; USNM); Salt Creek ($28^{\circ}15.4'N$, $96^{\circ}56.5'W$), 5 Jun 1953 (1♀; USNM). **Blanco:** Davis Ranch (NW Blanco; $30^{\circ}27'N$, $98^{\circ}32.9'W$), 26 Apr 1959, J. F. McAlpine (12♂, 8♀; CNC);

Miller Creek ($30^{\circ}15.2'N$, $98^{\circ}31.7'W$; 410 m), 3 Jun 2004, W. N. Mathis (4♂; USNM). **Brewster:** Big Bend National Park, Boquillas Crossing ($29^{\circ}11.4'N$, $102^{\circ}56.8'W$; 550 m), 8 May 1959, J. F. McAlpine (28♂, 21♀; CNC); Big Bend National Park, Pine Canyon ($29^{\circ}15.3'N$, $103^{\circ}12.6'W$; 1225–1830 m), 4 May 1959, J. F. McAlpine (3♂, 1♀; CNC); Big Bend National Park, Chisos Basin ($29^{\circ}16.5'N$, $103^{\circ}18.1'W$), 29 May 1959, J. F. McAlpine (1♂, 1♀; CNC). **Gillespie:** Spring Creek (17 km E Harper; $30^{\circ}18.2'N$, $99^{\circ}03.4'W$; 580 m), 3 Jun 2004,



MAP 26. Distribution map for *Paralimna (Paralimna) texana* Cresson.

W. N. Mathis (3♂; USNM). **Gonzales:** Guadalupe River (29°29.8'N, 97°27.3'W), 22 Apr 1956, W. W. Wirth (3♂, 1♀; USNM). **Jeff Davis:** Fort Davis (30°55.3'N, 103°53.7'W; 1525 m), 1 Jun 1959, J. F. McAlpine (1♀; CNC). **Jim Wells:** Mathis (7.5 km S; Nueces River; 28°02.2'N, 97°52.2'W; 15 m), 6 Jun 2004, W. N. Mathis (12♂, 1♀; USNM). **Kerr:** Adam Wilson's Cave (6.5 km SE Hwy. 39, 60 km SSW Kerrville; 29°55.6'N, 99°14.2'W), 31 Mar 1959, J. F. McAlpine (2♀; CNC); Kerrville (30°02.8'N, 99°08.4'W), 1 Apr 1959, J. F. McAlpine, J. R. Vockeroth (4♂, 14♀; CNC). **Kimble:** Junction (South Llano River; 30°29.6'N, 99°45.1'W; 510 m), 4 Jun 2004, W. N. Mathis (9♂, 2♀; USNM); Llano River (30°27'N, 99°49'W), 23 May 1972, W. W. Wirth (6♂, 1♀; USNM). **Kinney:** Del Rio (30 km E; Pinto Creek; 29°20'N, 100°31.6'W), 5 Jun 2004, W. N. Mathis (7♂, 4♀; USNM). **Real:** Leakey, Rio Frio (29°37.6'N, 98°40.4'W), 23 May 1972, W. W. Wirth (8♂, 4♀; USNM). **San Patricio:** Mathis (6.5 km S; Nueces River; 28°02.8'N, 97°51.8'W; 18 m), 6 Jun 2004, W. N. Mathis (12♂; USNM); Mathis (5 km SW at Nueces River; 28°02.4'N, 97°51.5'W), 9 Dec 1984, B. Gill, W. E. Steiner, D. Whitehead (22♂, 35♀; USNM); Sinton (12 km NE; Welder Wildlife Refuge; 28°06.1'N, 97°22'W), 8

Dec 1984, B. Gill, W. E. Steiner, D. Whitehead (16♂, 19♀; USNM). **Terrell:** Lozier Canyon (29°48.1'N, 101°48.2'W), 14 Jun 1992, R. W. Baumann, L. Liu (6♂, 12♀; BYU). **Travis:** Austin (Zilker Park; 30°15.8'N, 97°46.3'W), 2 Jun 2004, W. N. Mathis (5♂, 1♀; USNM); South Austin (Slaughter Park; 30°11.2'N, 97°51.6'W; 235 m), 3 Jun 2004, W. N. Mathis (6♂; USNM); Austin (paratype 1♀; ANSP); 6–20 Oct 1901 (paratype 2♂; ANSP); 7 Oct 1889 (2♀; paratypes; ANSP, USNM); 6 Oct 1901 (paratype 1♂; ANSP); 2 Mar 1900 (1♂; paratype; ANSP, 1♀ USNM). **Val Verde:** Comstock (16 km N; Pecos River; 29°53.7'N, 101°09.1'W), 28 Apr–4 Jun 1959, 2004, W. N. Mathis, J. F. McAlpine (7♂, 8♀; CNC, USNM); Devils River (29°56.2'N, 100°56.6'W; 550 m), 26 Apr 1959, J. F. McAlpine (2♂, 1♀; CNC).

Utah. **San Juan:** Johnson Creek meadow (22 km N Blanding; 37°47.5'N, 109°30.5'W; 2384 m), 25 Aug 2014, D. and W. N. Mathis (1♂; USNM).

TYPE LOCALITY. Nearctic: United States. Texas. Travis: Austin (30°16'N, 97°44.6'W).

DISTRIBUTION. (Map 26) Nearctic: Mexico (Aguascalientes, Durango, Morelos). United States (Arizona, Florida, Nebraska, Nevada, New Mexico, Oklahoma, South Dakota, Texas, Utah).

REMARKS. This species is similar to and has been confused with *P. thomae* but can be distinguished from the latter by the coloration of the frons, scutum, and abdomen; the infuscation on the crossveins; the setulae of the male forefemur; and the structures of the male terminalia. Additional details are in the "Remarks" for *P. thomae*.

33. *Paralimna (Paralimna) thomae* (Wiedemann)

FIGURES 142–145, 181, MAP 27

Ephydra thomae Wiedemann 1830:593.

Paralimna thomae.—Cogan and Wirth 1977:335 [generic combination].
Paralimna multipunctata Williston 1896:390.—Grossbeck 1912:378 [types in AMNH].—Wirth 1956:17 [review, Bahamas].—Woodruff et al. 1998:68 [list, Grenada]. **NEW SYNONYM.**

Paralimna (Paralimna) multipunctata.—Cresson 1946:229 [review]; 1947:50 [review, Neotropical species].—Wirth 1965:748 [Nearctic catalog]; 1968:15 [Neotropical catalog].—Mathis and Edmiston 1991:832 [review of Williston's St. Vincent species].—Mathis and Zatwarnicki 1995:122 [world catalog].—Mathis 1997:54 [review, Belize].

Paralimna ciliata Cresson 1916:111 [Costa Rica. Cartago: Cartago; HT ♂, ANSP (6091)]; 1918:46 [review; Costa Rica]; 1946:229 [synonymy]; 1947:50.—Thaxter 1917:671–675 [parasites: *Stigmatomyces curvirostris* Thaxter, *S. paralimnae* Thaxter (Laboulbeniaceae)]; 1917:676; 1931:145–155 [parasites: *S. jamaicensis* Thaxter, *S. gracilior* Thaxter, *S. recurvatus* Thaxter, *S. rostratus* Thaxter (Laboulbeniaceae)]; Curran 1928:60 [list, Puerto Rico, St. Thomas].

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: body predominantly gray, dorsum, especially frons and mesonotum, mostly grayish brown to brown, lateral surfaces mostly gray, sometimes silvery white; frons mottled, dark to whitish brown; scutellum guttate, mostly brown, especially base of setae; anepisternum and katepisternum mostly concolorous (anepisternum with dorsal margin usually brownish), faintly yellowish gray to silvery gray; wing mostly hyaline; crossvein dm–cu lacking infuscate halo; forefemur of male bearing anteroventral comb-like row of distinctly flattened, long setae; and posteroventral surface of male forefemur bearing patch of long setae at basal $\frac{1}{3}$; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, robust, curved in middle, rounded apex.

DESCRIPTION. Body length 2.3–3.6 mm; body generally gray, some pale brown spots dorsally, lateral surfaces yellowish gray, sometimes whitish gray.

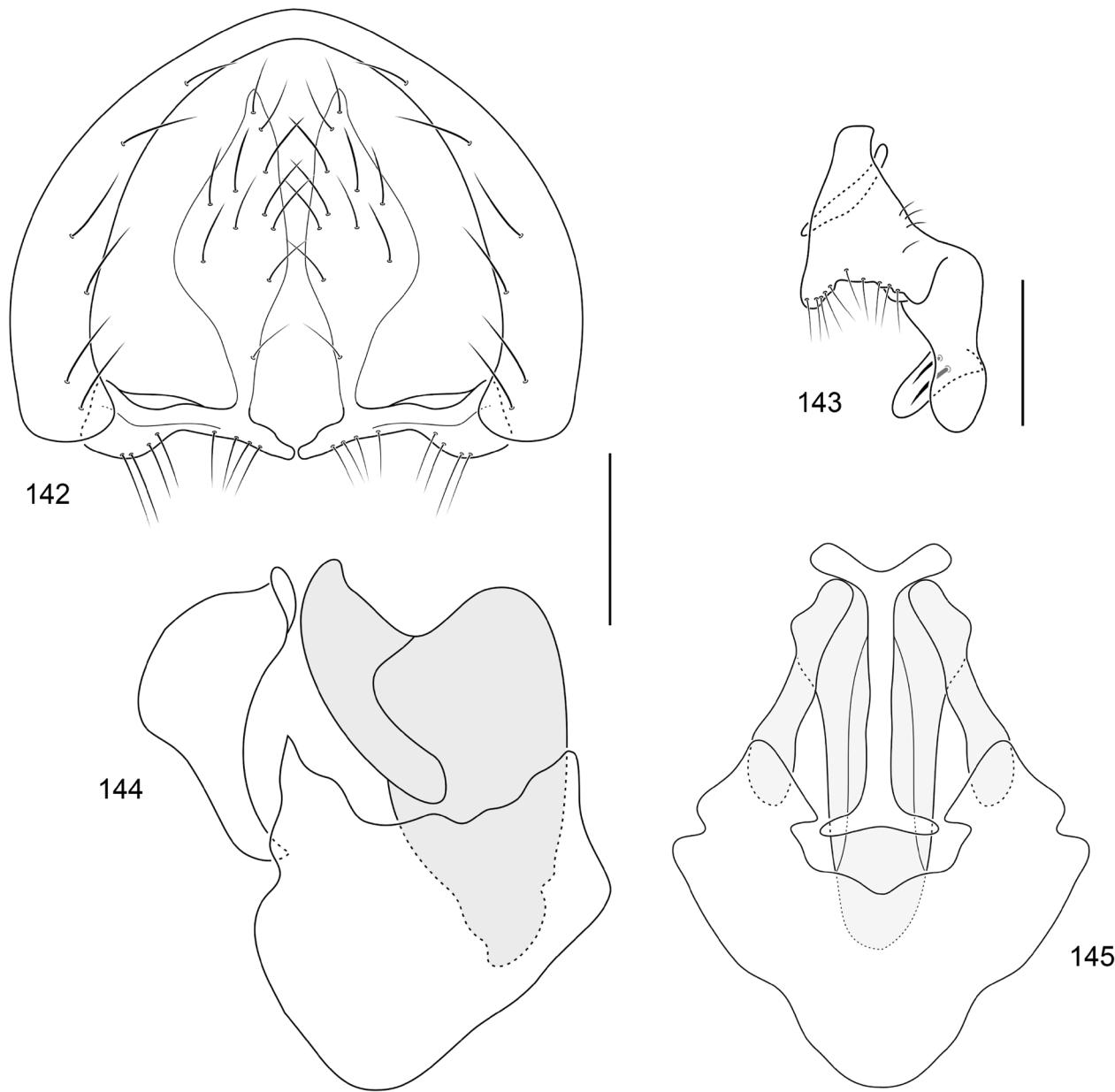
Head: (See Figure 181) Frons pale brown with linear pale yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, short, not reaching the anterior margin of frons, between inner vertical and interfrontal setae, and on fronto-orbits above dorsal proclinate fronto-orbital seta,

between proclinate fronto-orbital setae, and just above antennal bases; ventral fronto-orbits and dorsal parafacial with 2 small, inconspicuous pale brown spots lateral to antenna, separated by yellow spot. Antenna pale brown, covered by dense yellow micro-tomentum; basal flagellomere with slender, elongate, pale setae on margin; arista with 11 long, dorsal rays. Postcranium with 2 complete series of postocular setae, the second series irregular. Face yellowish gray to golden with a single pale golden-brown spot on the carina, shorter than the length of antenna; parafacial silvery gray and gena yellowish gray; gena with only few setae on middle and ventral margin; clypeus yellowish gray with silvery gray distal margin. Eye rounded, slightly higher than wide, height about twice the height of gena. Gena high, height subequal to half the length of basal flagellomere; gena-to-eye ratio 0.36–0.47.

Thorax: Mesonotum mostly pale brown with yellowish-gray areas, usually along setal tracks, 2 slender, widely separated, pale brown stripes between dorsocentral rows, plus 1 short stripe on supra-alar area; insertion of setae brown giving a spotted aspect to scutum; postpronotum, notopleuron, and supra-alar areas yellowish gray; scutellum brown basally, with apex blackish brown and yellowish gray otherwise. Pleurae yellowish gray, anepisternum usually with dorsal margin brownish, sometimes without spots. Wing hyaline; veins pale brown, crossveins without infuscate halos; costal-vein ratio 0.40–0.42; M-vein ratio 0.97–1.05. Legs blackish brown with dense silvery-gray to yellowish-gray micro-tomentum; tarsi lighter with some yellow coloration, especially ventrally; forefemur of male with anteroventral series of long and wide flattened setae, as long as width of femur, anteroventral surface with a comb of long and robust setae near base; foretibia of male arcuate, with a groove ventrally.

Abdomen: Tergites distinctly bicolored, dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray, posterior margin of brown band convex on both sides and with a conspicuous medial stripe extended to posterior margin. Male terminalia: (Figures 142–145) Presurstylus bearing somewhat elongate, slender setae, bifurcate, with basoventral process weakly developed, length more than $\frac{1}{3}$ of horizontal process length; horizontal process slightly curved; in lateral view postsurstylus robust, widest medially with medial, anteriorly produced, somewhat pointed lobe bearing sparse, slender, short setae, distal portion of postsurstylus widened; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, robust, curved in middle, rounded apex; aedeagus rather robust tapering gradually toward membranous apex; in lateral view phallapodeme triangular, prolonged distally; hypandrium moderately deeply concave.

TYPE MATERIAL. The lectotype of *Ephydra thomae* Wiedemann, designated herein, is labeled "E[phydra]. thomae Wied. Isle S. Thomas [H. B.] Hornbeck/LECTOTYPE ♂ *Ephydra thomae* Wied. det. B. H. Cogan 1978["8" handwritten; this lectotype designation was never published]/Paralimna thomae ♂ (Wied.) det. B. H. Cogan 197 /Mus. Westerm[ann]. [black submargin across top and left side of label]/TYPE [red]/ZMUC 00025029/LECTOTYPE ♂ *Ephydra thomae* Wiedemann, designated by Ale-Rocha&Mathis [red]." The lectotype



FIGURES 142–145. Structures of male terminalia of *Paralimna (Paralimna) thomae* (Wiedemann) (Grenada. St. George): (142) epandrium, cerci, and presurstyli, posterior aspect; (143) postsurstylos, lateral aspect; (144) aedeagus, phallapodeme, and hypandrium, lateral aspect; (145) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

is directly pinned, is in good condition (abdomen not dissected), and is deposited in the ZMUC. We also examined a male paralectotype, designated herein and also from St. Thomas.

The lectotype male of *Paralimna multipunctata* (designated by Mathis and Edmiston 1991:832) is labeled “Co-type [circular label with a yellow border]/Leeward side St. Vincent, W.I. H. H. Smith./W. Indies. 1907-66./*Paralimna multipunctata* Will [handwritten, faint red ink] /LECTOTYPE *Paralimna multipunctata*

Will. ♂ By W. N. Mathis [handwritten except for “LECTOTYPE” and “By”, black submarginal border].” The lectotype is double mounted (pin in a rectangular piece of cardboard), is in good condition, and is deposited in the BMNH. There are also 10 paralectotypes as follows: BMNH (2♂, 2♀, 1ex), KU (1♂, 1♀), AMNH, (3♀, 20329a, 20327, 20327a). In the original description, Williston indicated that there were “numerous specimens” in the type series.

(03°32.1'N, 59°40.5'W), 24–25 Apr 1995, W. N. Mathis (4♂, 1♀; USNM).

HONDURAS. *Cortés:* Omoa (16°47.8'N, 87°58.4'W), 26 Sep 1995, D. and W. N. Mathis (10♂; USNM); San Pedro Sula (8 km S; 15°25.7'N, 88°01.4'W), 25–26 Sep 1995, D. and W. N. Mathis (10♂; USNM).

MEXICO. *Chiapas:* Río Izapa (14°55.4'N, 92°10.7'W), 21 Apr 1983, W. N. Mathis (1♀; USNM); Puente Macalapa (16°30'N, 92°30'W; light trap), 22 May 1964, F. S. Blanton (3♂, 5♀; USNM); Tuxtla Gutiérrez (16°44.8'N, 93°06.6'W), 2 Aug 1969, D. Kritsch (1♀; CNC). *Guerrero:* Acapulco (16°51.8'N, 99°52.9'W), 6 Aug 1954, J. G. Chillcott (1♂; CNC). *Oaxaca:* Tehuantepec (16°19'N, 95°14.5'W), 15–16 Jul 1964, P. J. Spangler (1♂; USNM). *Tabasco:* Teapa (8 km SW; 17°27.2'N, 93°01.2'W), 6 May 1985, W. N. Mathis (6♂, 1♀; USNM). *Ventracruz-Llave:* Fortín de las Flores (18°54'N, 97°W; 952 m), 2 May 1985, W. N. Mathis (17♂, 6♀; USNM); Puente Nacional (19°19.7'N, 96°29'W), 23–24 Jul 1965, O. S. Flint Jr., A. Ortiz (1♀; USNM).

NICARAGUA. *León:* La Cruz de la India (5 km SW, on Hwy. 26; 12°43.2'N, 86°19.8'W; 215 m), 22 Jun 2007, N. E. Woodley (7♂, 11♀; USNM).

PANAMÁ. *Coclé:* Playa Santa Clara (08°22.4'N, 80°06.3'W), 2 Jul 1967, W. W. Wirth (3♂, 2♀; USNM). *Colón:* Mojingas Swamp, Fort Sherman (09°21.8'N, 79°57.2'W), Jan 1953 (1♂; USNM). *Darién:* El Real (08°07'N, 79°44'W), 19 Mar 1953, F. S. Blanton (1♀; USNM). *Herera:* Chitre (07°57.9'N, 80°25.3'W), Jul 1981, N. L. H. Krauss (1♀; USNM).

PERU. *Lima:* Cocachacra (18 km E Chosica; 11°55.3'S, 76°32'W), 11 Feb 1984, W. N. Mathis (1♂; USNM); Lima, Laguna de Villa (12°03.3'S, 77°03'W), 30 Aug 1988, W. N. Mathis (1♂; USNM). *Loreto:* Indiana (15 km NE; 03°30'S, 73°02.7'W), 20 Feb 1984, W. N. Mathis (3♂; USNM). *Madre de Dios:* Río Manu, Pakitzá (11°56.6'S, 71°16.9'W; 250 m), 9–23 Sep 1988, W. N. Mathis (1♂, 1♀; USNM).

TRINIDAD and TOBAGO. *Tobago.* *St. John:* Charlotteville (beach; 11°19.5'N, 60°32.9'W), 16 Apr–16 Jun 1993, 1994, D. and W. N. Mathis (16♂; USNM); Speyside (Doctor River; 11°18.2'N, 60°31'W), 19 Apr 1994, D. and W. N. Mathis (3♂, 2♀; USNM); Speyside (Doctor River; 1 km NW; 11°18'N, 60°32'W), 12–13 Jun 1993, W. N. Mathis (2♂; USNM); Charlotteville (5 km S; 11°18.9'N, 60°34.5'W), Hermitage River and beach, 22 Apr–11 Jun 1993, 1994, D. and W. N. Mathis (6♂, 1♀; USNM). *St. Paul:* Delaford, Kings Bay (11°16'N, 60°32.8'W), 13 Jun 1993, W. N. Mathis (8♂; USNM); Kendall (11°14.3'N, 60°35.7'W), 21 Apr 1994, W. N. Mathis (9♂; USNM). *Trinidad.* *Caroni:* Caroni (3 km W; 10°36.9'N, 61°24.7'W), 22 Mar 1985, G. F. and J. F. Hevel (13♂, 10♀; USNM). *St. Andrew:* Ventral Manzanilla (5 km S; 10°28'N, 61°03'W), 20 Jun 1993, W. N. Mathis (5♂, 1♀; USNM).

VENEZUELA. *Carabobo:* Valle Seco (10°30.5'N, 67°35.3'W), Jan 1940, P. Anduze (1♀; ANSP). *Lara:* Barquisimeto (S Medina; 10°03.8'N, 69°19.3'W), 7 Jun 1965, I. Gaud, L. F. Martorel (3♂; USNM). *Zulia:* Rosario (10°01.8'N, 71°13.8'W), 14 Jun 1976, A. S. Menke, D. Vincent (1♂; USNM).

WEST INDIES. BARBADOS. *Christ Church:* Graeme Hall Swamp (13°04.2'N, 59°34.7'W), 31 Aug–2 Sep 1997, W. N. Mathis (5♂; USNM); Rockley Beach (13°04.3'N, 59°35.2'W), 21 May–11 Sep 1996, 1997, D. and W. N. Mathis, H. B. Williams (27♂, 2♀; USNM). *St. Andrew:* Bawdens Ponds (13°14.8'N, 59°34.9'W), 2 Sep 1997, W. N. Mathis (1♂; USNM); Baxters (13°13.2'N, 59°34.1'W), 21 May 1996, D. and W. N. Mathis, H. B. Williams (1♂; USNM); Belleplaine (13°14.8'N, 59°33.6'W), 21 May–1 Sep 1996, 1997, D. and W. N. Mathis, H. B. Williams (11♂, 2♀; USNM); Long Pond (13°15.1'N, 59°33.3'W), 1 Sep 1997, W. N. Mathis (5♂; USNM). *St. Joseph:* Joes River (13°12.8'N, 59°32.3'W), 10 Sep 1996, W. N. Mathis (5♂, 1♀; USNM). *St. Peter:* Six Men's Bay (13°16.5'N, 59°38.8'W), 22 May–12 Sep 1996, D. and W. N. Mathis, H. B. Williams (10♂, 1♀; USNM). *St. Philip:* Gemswick (13°05'N, 59°28.5'W), 31 Aug 1997, W. N. Mathis (4♂; USNM). *St. Thomas:* Farmers (13°12.8'N, 59°35.5'W), 2 Sep 1997, W. N. Mathis (5♂; USNM).

BRITISH VIRGIN ISLANDS. Guano Island (18°27.9'S, 64°34.3'W; 0–80 m; North Bay, Coccooba forest, sea level; Malaise trap), 13–26 Jul 1986, S. E. Miller, M. G. Pogue (1♂; USNM).

CUBA. *Cienfuegos:* Soledad, Jardín Botánico (22°7.5'N, 80°19.2'W), Jan–13 Dec 1927, 1994, C. T. and B. B. Brues, W. N. Mathis (9♂, 4♀; ANSP, USNM); Topes de Collantes (5 km WNW; 21°56.5'N, 80°2.3'W; 600 m), 11 Dec 1994, W. N. Mathis (1♀; USNM). *Guantánamo:* Guantánamo (20°08.6'N, 75°12.5'W), 10 Nov 1914, H. Skinner (7♂, 4♀; ANSP). *Havana:* Havana (beach; 23°5.8'N, 82°27.7'W), 2–14 Dec 1994, W. N. Mathis (11♂; USNM); Ojo de Agua (22°54.6'N, 82°29.1'W), 8 Dec 1994, W. N. Mathis (21♂, 4♀; USNM); Playa Jibacoa (57 km E Havana; 23°08.9'N, 81°51'W), 26 Apr 1983, W. N. Mathis (2♀; USNM). *Holguín:* Holguín (N; 20°55.5'N, 76°15.8'W), Feb 1992, M. von Tschirnhaus (2♂, 8♀; USNM). *Mayabeque:* Palmarejo (67 km E Havana; 23°08.5'N, 81°40.6'W), 26 Apr 1983, W. N. Mathis (20♂, 1♀; USNM); Puerto Escondido (18°19.6'N, 71°35'W; 1370 m), 26 Apr 1983, W. N. Mathis (11♂, 10♀; USNM). *Matanzas:* Buena Ventura (7 km N; 22°18.1'N, 81°11.7'W), 1 May 1983, W. N. Mathis (9♂, 4♀; USNM); Palpite (1 km NE; 22°20.2'N, 81°10.8'W), 2 May 1983, W. N. Mathis (1♀; USNM). *Pinar del Rio:* Pinar del Rio (10 km S; 22°22.7'N, 83°40.3'W), 12–23 Sep 1913 (1♂, 1♀; AMNH); Soroa (22°47.7'N, 83°W), 27 Apr–6 Dec 1983, 1994, W. N. Mathis (6♂, 6♀; USNM); Soroa (2 km NW; 22°48.6'N, 83°1.0'W), 4–5 Dec 1994, W. N. Mathis (2♂, 2♀; USNM); Soroa (2 km E; 22°47.7'N, 83°W), 29 Apr 1983, W. N. Mathis (11♂, 5♀; USNM). *Sancti Spiritus:* Playa Ancón (21°44.1'N, 79°59.9'W), 12 Dec 1994, W. N. Mathis (6♂, 5♀; USNM); Topes de Collantes (21°54.4'N, 80°01.4'W; 670 m), 9–11 Dec 1994, W. N. Mathis (4♂; USNM).

DOMINICA. Cabrits Swamp (15°35'N, 61°29'W), 10 May–19 Jun 1965, 1991, D.R. Davis, D. and W. N. Mathis, (10♂, 7♀; USNM). Coulibistrie (15°27.1'N, 61°26.8'W), 21 Mar 1989, W. N. Mathis (2♂; USNM). Dublanc (15°30.9'N, 61°28.1'W), 21 Mar 1989, W. N. Mathis (4♂, 1♀; USNM).

USNM); Toll Gate (7.7 km S; 17°58'N, 77°22.3'W), 9 May 1996, D. and W. N. Mathis, H. B. Williams (3♂; USNM). **Manchester:** Alligator Pond (17°52.1'N, 77°33.9'W), 8 May 1996, D. and W. N. Mathis, H. B. Williams (5♂; USNM); near Clandon (18°09'N, 77°28.3'W), 8 May 1996, D. and W. N. Mathis, H. B. Williams (2♂, 2♀; USNM); Mandeville (18°03.5'N, 77°31.9'W), 7–13 May 1996, D. and W. N. Mathis, H. B. Williams (3♂; USNM); near Mandeville (18°03.5'N, 77°31.9'W), 15–18 Apr 2000, W. N. Mathis (1♂, 3♀; USNM); near Warwick (17°54.1'N, 77°25.5'W), 7 May 1996, D. and W. N. Mathis, H. B. Williams (13♂, 1♀; USNM). **Portland:** Berridale (18°06.5'N, 76°20'W), Rio Grande River, 25 Apr 2000, W. N. Mathis (5♂, 1♀; USNM); Crystal Springs (18°12.5'N, 76°37.9'W), 18 May 1996, D. and W. N. Mathis, H. B. Williams (2♂; USNM); Long Bay (2.3 km W; 18°06.5'N, 76°20'W), 24 Apr 2000, W. N. Mathis (5♂, 1♀; USNM); Reach (4 km N; 18°03.6'N, 76°20.4'W), 15 May 1996, D. and W. N. Mathis, H. B. Williams (3♂, 1♀; USNM). **St. Andrew:** Cinchona (18°04.4'N, 76°39.3'W; 1400 m), 29 Apr 2000, W. N. Mathis (1♂; USNM); Clydsdale (18°04.9'N, 76°40.2'W; 1030 m), 29 Apr 2000, W. N. Mathis (1♂; USNM); Irish Town (8 km SW; 18°03.9'N, 76°44.5'W), 7 Dec 1975, G. F. Hevel (2♂, 2♀; USNM); Mavis Bank (1.7 km E; Yallahs River; 18°02.4'N, 77°39.5'W; 575 m), 21 Apr–1 May 2000, W. N. Mathis (10♂, 1♀; USNM); Mavis Bank (4.3 km SE; Yallahs River; 18°01.4'N, 76°38.1'W; 480 m), 22–23 Apr 2000, W. N. Mathis (1♂; USNM). **St. Ann:** Runaway Bay (18°27.4'N, 77°19.6'W), Feb 1969, W. W. Wirth (6♂, 5♀; USNM). **St. Elizabeth:** Black River (18°01.4'N, 77°51.1'W), 11 May 1996, D. and W. N. Mathis, H. B. Williams (1♂; USNM); Elim (18°07.1'N, 77°40.6'W), 10 May 1996, D. and W. N. Mathis, H. B. Williams (3♂; USNM). **St. Mary:** Port Maria (1 km W; 18°22.8'N, 76°53.6'W), 18 May 1996, D. and W. N. Mathis, H. B. Williams (3♂; USNM). **St. Thomas:** Bath Fountain Spring (17°57.6'N, 76°21.3'W), 15 May 1996, D. and W. N. Mathis, H. B. Williams (1♀; USNM); Bath River, Bath (17°56.8'N, 76°21.6'W), 16 May 1996, D. and W. N. Mathis, H. B. Williams (5♂; USNM); Hagley Gap (1 km E; 18°00.1'N, 76°36.7'W), 16 May 1996, D. and W. N. Mathis, H. B. Williams (6♂, 2♀; USNM); Mt. Lebanon (17°58.2'N, 76°32.7'W), 16 May 1996, D. and W. N. Mathis, H. B. Williams (2♂; USNM); Yallahs River (mouth; 17°53'N, 76°35.6'W), 14 May 1996, D. and W. N. Mathis, H. B. Williams (11♂, 2♀; USNM). **Westmoreland:** Negril Beach (18°16.4'N, 78°21.2'W; mangrove, rocky shore), 12 Mar 1970, W. W. Wirth (1♂, 1♀; USNM); Savanna-La-Mar (18°13'N, 78°08'W), 13 Mar 1970, W. W. Wirth (12♂, 3♀; USNM).

NAVASSA ISLAND. Ruins near Lulu Bay (18°23.75'N, 75°01.07'W; 22 m), 29 Jul 1998, W. E. Steiner, J. M. Swearingen (1♂, 3♀; USNM).

PUERTO RICO. Aibonito (18°08.1'N, 66°15.6'W), 14–17 Jul 1914 (1♂; AMNH). Coamo Springs (18°02.4'N, 66°22.4'W), 17–19 Jul 1914 (3♂, 3♀; AMNH). Fajardo, Las Croabas (Seven Seas Beach; 18°23'N, 65°37'W), 17 Feb 1996, W. E. Steiner, J. M. Swearingen (33♂, 10♀; USNM). Jayuya (2

km E; Rio Saliente; 18°12.8'N, 66°33.9'W), 22 Sep 1995, D. and W. N. Mathis (1♂, 1♀; USNM). Lajas (17°59.5'N, 67°02.8'W), Sep–Nov 1960, R. Cotte (4♂; USNM). Guayama area (17°59'N, 66°07'W), 3 Apr 1956, T. W. Fischer (1♂; USNM). Maricao (4 km WNW; 18°10.7'N, 66°59.6'W), 21 Sep 1995, D. and W. N. Mathis (1♂; USNM). Playa de Guayanilla (18°0.4'N, 66°46.1'W), 19 Sep 1995, D. and W. N. Mathis (7♂; USNM). Ponce (road through Bo. Arus; 18°0'N, 66°32'W), 26 Feb 1965, S. Medina Gaud (1♂; USNM). Salinas (17°57.5'N, 66°15.6'W), 19 Feb 1964, S. Medina, I. Gaud, R. Gaspar (1♂; USNM). San Juan (18°28'N, 66°06'W), 14 Jan–14 Feb 1914, 1946, G. M. Young (1♂; 1♀; AMNH, ANSP).

ST. LUCIA. Black Bay (13°44.1'N, 60°58.7'W), 26 Feb–1 Mar 1978, S. A. Marshall (1♂; CNC). Castries (5 km S; 13°59'N, 60°00'W), 16 Jun 1991, D. and W. N. Mathis (1♀; USNM). Dauphin Boguis (1.6 km S Marquis; 14°01'N, 60°55'W), 17 Jun 1991, D. and W. N. Mathis (4♂; USNM). Micoud (13°49'N, 60°54'W), 15 Jun 1991, D. and W. N. Mathis (3♂, 1♀; USNM). Sulphur Spring (13°50'N, 61°03'W), 14 Jun 1991, D. and W. N. Mathis (3♂, 2♀; USNM).

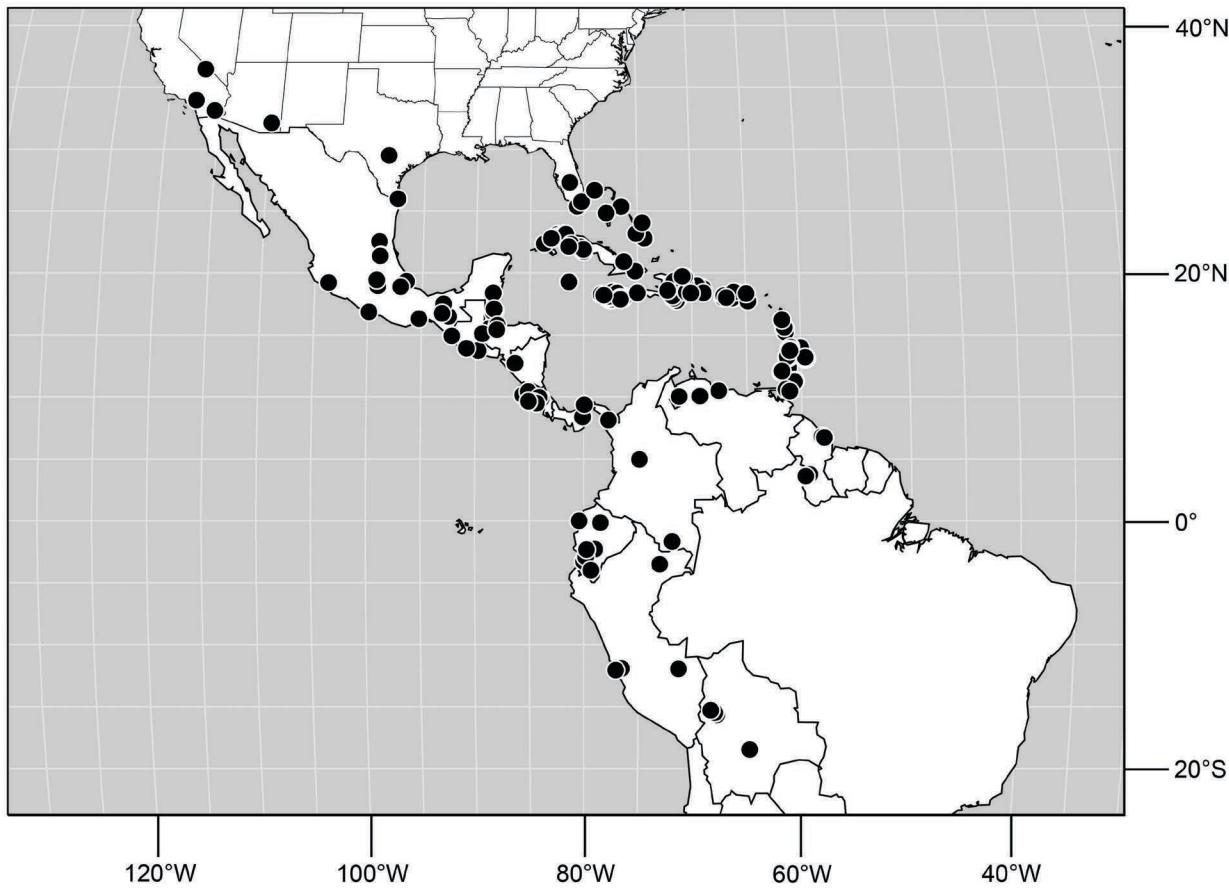
ST. THOMAS. (18°20.5'N, 64°56'W) 8 Feb (1♂, 1♀; ANSP).

ST. VINCENT. **Charlotte:** Owia Salt Pond (13°22.5'N, 61°08.5'W), 6 Sep 1997, W. N. Mathis (6♂; USNM); Peruvian Vale (13°10.7'N, 61°08.7'W), 6–8 Sep 1997, W. N. Mathis (6♂; USNM); South Rivers (13°14.6'N, 61°09.3'W), 8 Sep 1997, W. N. Mathis (1♂; USNM); Spring (13°11.1'N, 61°08.5'W), 6 Sep 1997, W. N. Mathis (4♂, 1♀; USNM); Yambou River (13°09.8'N, 61°08.7'W), 8–10 Sep 1997, W. N. Mathis (7♂; USNM). **St. Andrew:** Buccament Bay (near beach; 13°11'N, 61°16'W), 25–28 Mar 1989, W. N. Mathis (20♂, 5♀; USNM); Camden Park (13°10.2'N, 61°14.7'W), 25 Mar–4 Sep 1989, 1997, A. Freidberg, W. N. Mathis (10♂; USNM); Layou (13°12'N, 61°17'W), 8 Jun 1991, D. and W. N. Mathis (1♂, 3♀; USNM). **St. George:** Yambou Head (13°10.4'N, 61°09'W), 27 Mar 1989, W. N. Mathis (1♂, 2♀; USNM). **St. Patrick:** Cumberland Bay (13°16'N, 61°16'W), 28 Mar–15 Sep 1989, 1997, W. N. Mathis (9♂; USNM); Ferret (13°12.5'N, 61°15.7'W), 5 Sep 1997, W. N. Mathis (10♂; USNM); Palmiste Park (13°12.7'N, 61°14.9'W), 5 Sep 1997, W. N. Mathis (4♂, 1♀; USNM); Wallilabou (beach; 13°15'N, 61°16'W), 27 Mar 1989, W. N. Mathis (4♂, 1♀; USNM). **St. Philip:** Gemswick (13°05'N, 59°35.5'W), 31 Aug 1997, W. N. Mathis (4♂; USNM). **St. Thomas:** Farmers (13°12.8'N, 59°35.5'W), 2 Sep 1997, W. N. Mathis (5♂; USNM).

VIRGIN ISLANDS. **St. Croix:** (17°44'N, 64°46'W), 4–6 Mar 1925 (1♂, 2♀; AMNH). **St. Thomas:** (18°21'N, 64°56'W), 23 Feb–2 Aug 1925, A. Busck (14♂, 16♀; AMNH).

TYPE LOCALITY. Neotropical. St. Thomas (18°21'N, 64°56'W).

DISTRIBUTION. (Map 27) **Nearctic:** Mexico (Colima, México, Morelos, San Luis Potosí, Tamaulipas). United States (Arizona, California, Florida, Texas). **Neotropical:** Bahamas, Belize (Corazal, Stann Creek), Bolivia, Colombia, Costa Rica (Cartago, Guanacaste, Heredia, Puntarenas), Ecuador (Chimborazo,



MAP 27. Distribution map for *Paralimna* (*Paralimna*) *thomae* (Wiedemann).

El Oro, Guayas, Loja, Manabí, Pastaza), El Salvador, Guatemala (Escuintla, Izabal, Zacapa), Guatemala (Escuintla), Guyana, Honduras (Cortés), Mexico (Chiapas, Cuernavaca, Oaxaca, Tabasco, Veracruz-Llave), Nicaragua, Panamá (Cocle, Herera), Peru (Lima, Loreto, Madre de Dios), Trinidad and Tobago, Venezuela (Carabobo, Lara, Zulia), West Indies (Barbados, British Virgin Islands, Cuba, Dominica, Dominican Republic, Grand Cayman, Grenada, Guadeloupe, Haiti, Jamaica, Navassa, Puerto Rico, St. Croix, St. Lucia, St. Thomas, St. Vincent, Trinidad).

REMARKS. In the New World, this is the most common and most widespread species of *Paralimna* and was one of the first species of this genus to be described (Williston 1896). This species can be confused with *P. texana*, which has similar yellowish-gray coloration of the face and body. This species is distinguished from *P. texana* by the coloration of the frons (brown in *P. thomae*, orange in *P. texana*), pattern of the coloration on the thorax (with 2 brown stripes, mostly brown in *P. thomae*, stripes very weak, not distinct, mostly silvery- to yellowish-gray in *P. texana*), abdomen (brown band on the basal half in *P. thomae*, reduced to basal 1/3 or less, frequently tergite 5 without brown band in *P. texana*), gray infuscation on transverse

veins (absent versus present). Definitive characters, however, to distinguish these species are those of the male forefemur (ventral row of setae short, present only on base of femur versus long, frequently extended until apex of femur) and differences in structures of the male terminalia (basoventral process of presurstylus short and widened in *P. thomae*, more slender and tapered distally in *P. texana*). Distinguishing between females of *P. thomae* and *P. texana* can be very difficult.

Although *P. thomae* (as *P. multipunctata*) was previously reported from Brazil (Cresson 1947), our examination of specimens from Brazil (São Paulo: São Paulo, Barbrillini collector) reveal them to be *P. secunda*.

This species was listed in recent catalogs (Cogan and Wirth, 1977:335; Mathis and Zatwarnicki, 1995:126) as being from the Oriental Region, specifically from Saint Thomas Island in the Indian Ocean. The lectotype and paralectotype, however, were collected by Dr. H. B. Hornbeck (see label data), who was a medical doctor from 1825 to 1844 in the Lesser Antilles, where he also made collections of insects that were mostly sent to Denmark. Wiedemann studied some of Hornbeck's specimens, including the type series of this species, which is the most common

and widespread species in the West Indies. Being relatively common and widespread, it is not surprising that this species was described three times. We thank Tadeusz Zatwarnicki for bringing the syntypes of *P. thomae* to our attention and suggesting its probable conspecificity with *P. multipunctata*.

34. *Paralimna (Paralimna) velutina*, sp. nov.

FIGURES 146–149, 197, 209, MAP 28

DIAGNOSIS. This species is distinguished from congeners by the following combination of characters: anterior margin of the frons shiny gray mediolaterally and 1 central, small shiny gray spot extended until near anterior ocellus, ventral fronto-orbits with a large, dark purple, rounded spot and dorsal parafacial with a dark gray spot lateral to antenna; face yellowish or silvery gray, antennal groove golden or gray, carina with a shiny silvery or gray spot between antennal insertion followed by a golden spot below and 2 small, rounded, diffuse golden stains between largest facial setae; antenna black velvety with a whitish dorsal spot on pedicel, forefemur of male without outstanding setae.

DESCRIPTION. Body length 3.5–4.1 mm; body generally bicolored, dark brown dorsally and brown ventrally, lateral medial surfaces mostly gray.

Head: (See Figure 197) Frons brown, orange tinged, with yellow-gray or silvery-gray spots, 1 stripe at lateral margins of ocellar triangle, in front of anterior ocellar seta, not reaching the anterior margin of the frons, 1 quite inconspicuous stripe between inner vertical and interfrontal setae and on fronto-orbits above dorsal proclinate front orbital seta, between proclinate fronto-orbital setae, and just above antennal bases; anterior margin of the frons shiny gray mediolaterally and 1 central, small shiny gray spot extended until near anterior ocellus, according of incidence of light, ventral fronto-orbits with a large, dark purple, rounded spot, and dorsal parafacial with a dark gray spot lateral to antenna. Antenna black velvety (basal flagellomere with reddish-brown microtomentum according to incidence of light); pedicel with a dorsal whitish-gray spot, 1 dorsal, thicker seta and some short setae on the margin; basal flagellomere with slender, elongate, pale setae on margin; arista with 13 long, dorsal rays. Postcranium with 1 complete series of postocular setae. Face with yellowish or silvery-gray microtomentum, antennal groove golden or gray, carina with a shiny silvery or gray spot between antennal insertion followed by a golden spot below and 2 small, rounded, diffuse golden stains between largest facial setae; parafacial silvery gray and gena pale gray, gena almost nude, few setae only on distal margin and in middle; clypeus silvery gray. Eye round, as wide as high, height more than twice the height of gena. Gena exceptionally high, height longer than the length of basal flagellomere; gena-to-eye ratio 0.41–0.42.

Thorax: Mesonotum pale gray to yellowish gray with brown spots, 2 well-defined longitudinal stripes between dorsocentral rows, short, ending between third and fourth dorsocentral

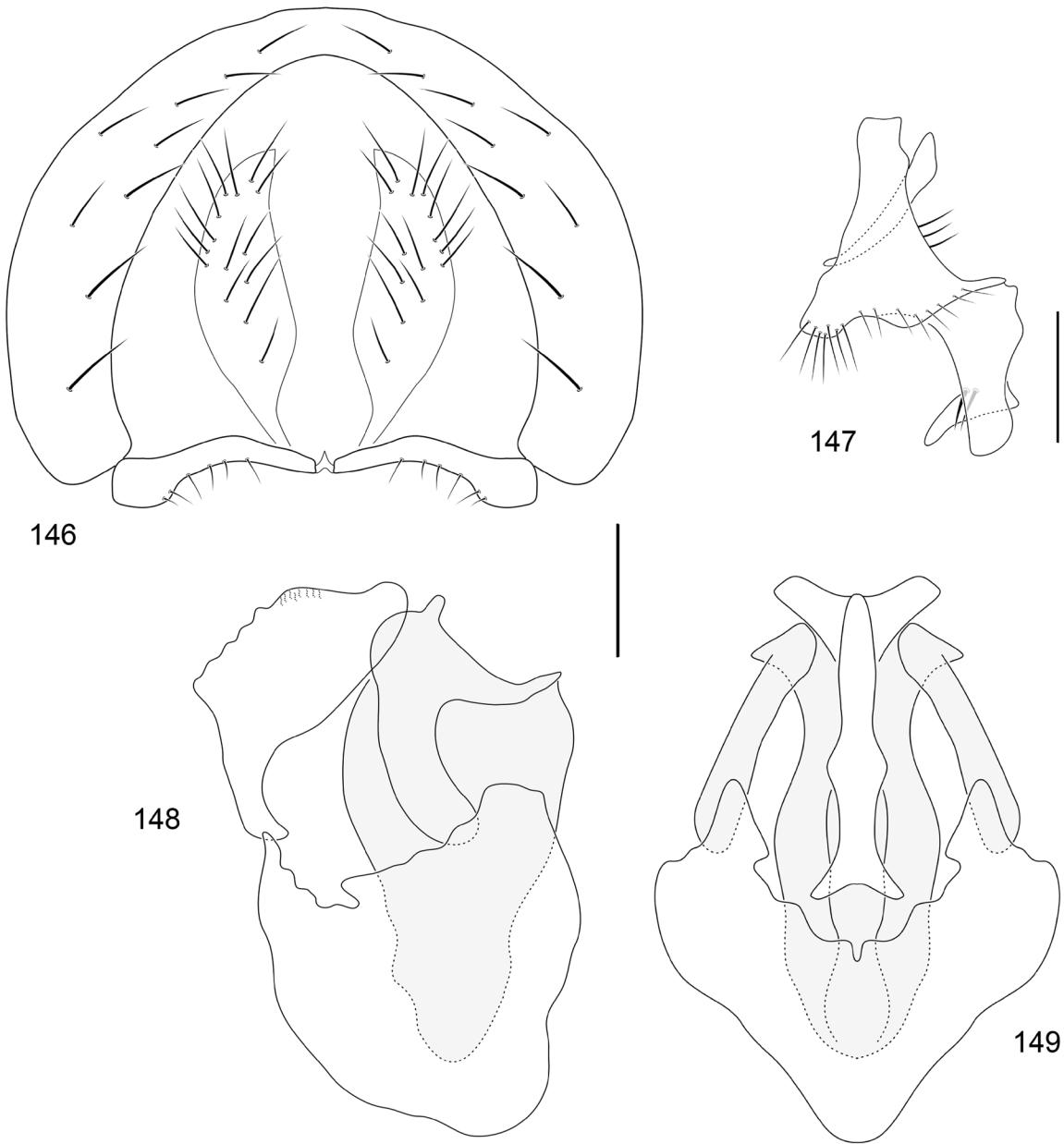
setae, and 1 central, less-defined stripe more slender than the others, 1 stripe laterally between first dorsocentral seta and intrapostalar seta; postpronotal, notopleuron, and supra-alar area gray; scutellum gray with distal margin dark brown and basal margin brown. Pleurae silvery gray except anepisternum with dorsal and ventral margins pale, brown tinged, anepimeron with ventral half brown and katepisternum brown on anterior half. Wing (see Figure 209) slightly brown tinged; veins pale brown; costal-vein ratio 0.47–0.53; M-vein ratio 0.96–1.00. Legs with silvery-gray microtomentum laterally and brown dorsally, except basitarsus yellow and the remaining tarsomeres become brown distally; forefemur of male without outstanding setae; foretibia straight.

Abdomen: Tergites distinctly bicolored, dark brown along anterior $\frac{2}{3}$ and medially, otherwise yellowish gray dorsally and silvery gray laterodorsally, except tergite 2 yellowish gray medially; lateroventral margin of tergites brown. Male terminalia: (Figures 146–149) Presurstylus not bifurcate, horizontal process slightly enlarged basally and slightly curved; in lateral view postsurstylus widest medially with a medial, anteriorly protuberant, pointed lobe bearing rather short and slender setae and a thin digitiform process posteriorly; lateral aedeagal process about $\frac{1}{2}$ length of aedeagus, robust and slightly curved in lateral view, rounded distally; aedeagus rather robust in posterior view, rounded on membranous apex; phallapodeme broadly triangular in lateral view; hypandrium moderately deeply concave.

TYPE MATERIAL. The holotype male is labeled “BRAZIL. Para: Rio Xingu Camp (52°22'W, 3°39'S)[,] ~60 km S. Altamira[,] 8–16 Oct 1986[,] P. Spangler & O. Flint/Igarape Jabuti[,] malaise trap[,] day collection/USNM ENT 00118270 [plastic bar code label]/HOLOTYPE ♂ *Paralimna velutina* Ale-Rocha&Mathis, USNM [red].” The holotype is double mounted (minuten pin in a red block of plastic), is in excellent condition, and is deposited in the USNM. Five paratypes (3♂, 2♀; INPA, USNM) bear the same label data as the holotype. Other paratypes are as follows: BRAZIL. Pará: Obidos, Igarapé Curucambá (01°50.1'S, 55°29.4'W; Malaise trap), 01–08 Sep 2001, J. A. Rafael, J. Vidal (1♀; INPA); Rio Iriri, Camp (03°50'S, 52°40'W), Altamira (~60 km S), 17–18 Oct 1986, O. S. Flint Jr., P. J. Spangler (1♂; USNM).

GUYANA. Essequibo River, Moraballi Creek (06°12.3'N, 58°33.9'W), 3 Sep–14 Oct 1929 (2♀; BMNH); Mazaruni (06°25.2'N, 58°37.7'W; high forest), 20 Aug 1937, Richards, Smarts, B.M 1937-776 (1♀; BMNH); Mazaruni-Potaro District, Takutu Mountains (06°15'N, 59°5'W; Malaise trap near stream in montane rainforest, Earth Research Expedition), 3–19 Dec 1983, P. J. Spangler, W. E Steiner (5♂, 1♀; INPA, USNM); Paramakatoi (04°42'N, 59°42.8'W), 24–25 Aug 1997, W. N. Mathis (34♂, 6♀; INPA, USNM); Rockstone (05°58.6'N, 58°31.4'W), 9 Jul 1011 (1♂; AMNH).

VENEZUELA. Barinas: Santa Rosa (08°36.6'N, 70°14.7'W), Feb–Dec 1942, 1943, P. Anduze (2♂; USNM). Merida: Tovar (08°19.7'N, 71°45.6'W), 7 Aug 1943, P. Anduze (4♂; USNM).



FIGURES 146–149. Structures of male terminalia of *Paralimna (Paralimna) velutina*, sp. nov. (Brazil. Pará): (146) epandrium, cerci, and presurstyli, posterior aspect; (147) postsurstylius, lateral aspect; (148) aedeagus, phallapodeme, and hypandrium, lateral aspect; (149) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

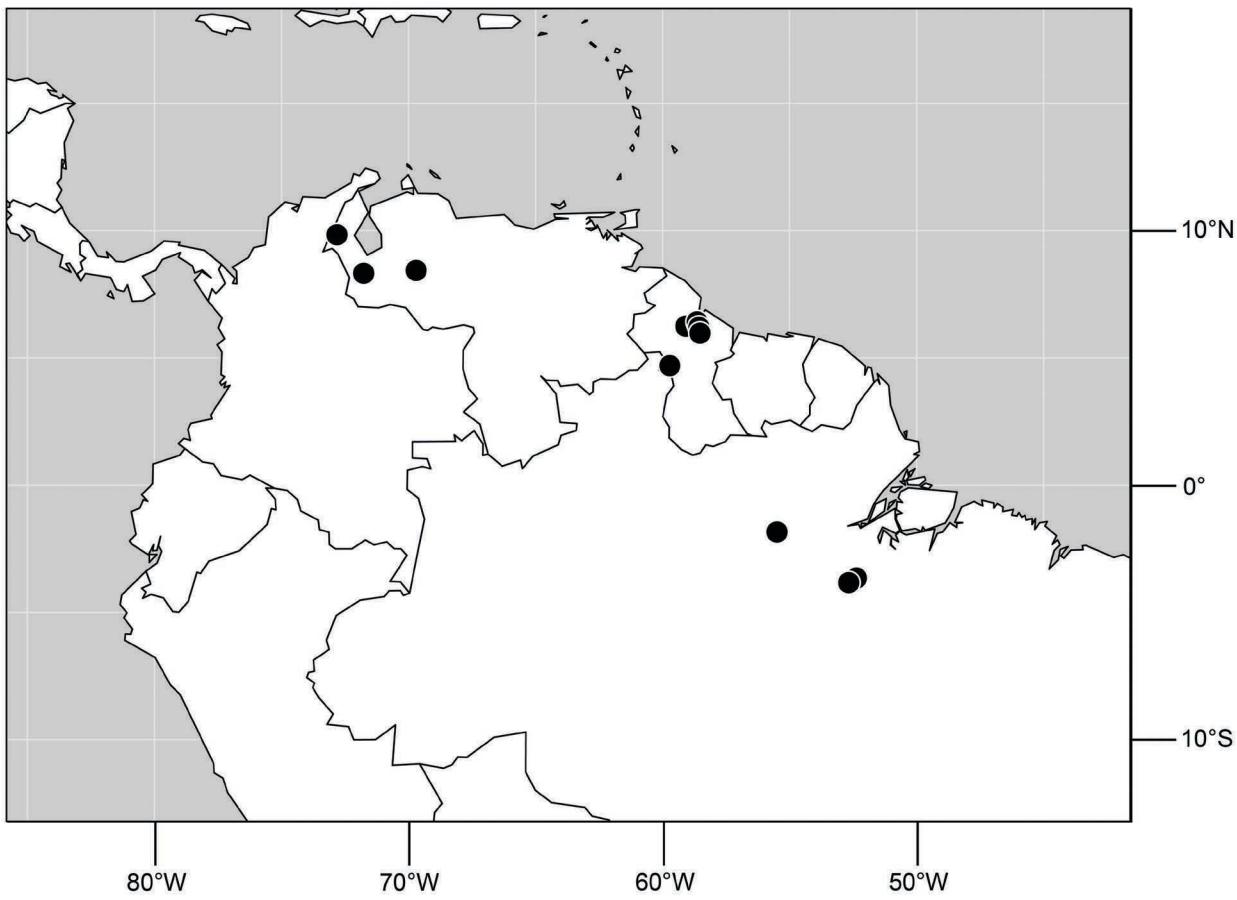
Zulia: El Tucuco (45km SW Machiques; 09°50.7'N, 72°48.7'W), 5–6 Jun 1976, A. S. Menke, D. Vincent (1♂, 3♀; USNM).

TYPE LOCALITY. Neotropical: Brazil. Pará: Rio Xingu (camp; 52°22'W, 3°39'S).

DISTRIBUTION. (Map 28) *Neotropical*: Brazil (Pará, Roraima), Guyana, Venezuela (Barinas, Merida, Zulia).

ETYMOLOGY. The species epithet, *velutina*, is of Latin derivation and means velvety, alluding to the velvety aspect of the antennae.

REMARKS. This species is easily distinguishable from congeners by the color of the frons and face in addition to characters of the male terminalia.



MAP 28. Distribution map for *Paralimna* (*Paralimna*) *velutina*, sp. nov.

SUBGENUS *PHAIOSTERNA* CRESSON

Phaiosterna Cresson 1916:104. Type species: *Paralimna decipiens* Loew 1878, original designation.—Wirth 1968:16 [Neotropical catalog].—Mathis and Zatwarnicki 1995:126–127 [world catalog]; 2002:68–88 [revision].

DIAGNOSIS. This subgenus is distinguished from other congeneric subgenera by the following combination of characters: small to moderately sized shore flies, body length 1.85–3.85 mm; body usually with darkened infuscate uniform coloration, with rather metallic subshining or shining aspect.

Head: Ocelli arranged in equilateral triangle. Basal flagellomere broadly rounded apically, usually with parallel sides, length at most 1.5× width; arista bearing 6–8 long hairs along dorsal surface. Face short, nearly flat, carina and antennal groove not evident. Eye with oblique orientation, ovate, higher than wide. Gena short, about ¼ eye height; wholly densely setulose.

Thorax: Mesonotum and pleural area mostly unicolorous and grayish brown to black; dorsal surface of scutellum gently convex. Wing with crossvein and veins and rest of wing

essentially unicolorous. Forefemur of male lacking comb-like row of modified setae on anteroventral surface; posteroventral series of setae short.

Abdomen: Lacking distinctive fasciate pattern, tergites with infuscate uniform coloration. First sternite fully microtomentose (shiny with microtomentose edges in Neotropical species). Male terminalia: Presurstylus L-shaped, basoventral process developed, horizontal process connected dorsally; aedeagus wide with pointed apex; lateral aedeagal process subequal in length or longer than aedeagus and usually wide, not arched ventrally in lateral view.

DISTRIBUTION. The subgenus *Phaiosterna* occurs in Afrotropical, Nearctic, and Neotropical Regions.

DISCUSSION. The cladistic analysis of the species group of *Paralimna* shows that the subgenus *Phaiosterna* is a monophyletic group supported by following synapomorphies: scutum unicoloored, dark; aedeagus wide in dorsal view, not tubular; and lateral aedeagal process so long as the aedeagus. The Neotropical species of the subgenus *Phaiosterna* constitute a clade with the first sternite being shiny in the middle and with microtomentose edges.

KEY TO NEW WORLD SPECIES OF THE SUBGENUS PHAIOSTERNA

1. Ventral apex of foretibia of male bearing numerous long, slender setulae; forebasitarsus of male bearing long setulae along posterior surface (Neotropical) *P. longiseta* Mathis and Zatwarnicki
- Foreleg of male lacking long, slender setulae 2
2. Abdomen subshiny to shiny, sparsely microtomentose; aedeagus in posterior view higher than wide, narrow (Nearctic, Neotropical) *P. obscura* Williston
- Abdomen appearing dull, microtomentose, tannish gray; aedeagus in posterior view wider than high; wide (Nearctic, Neotropical) *P. decipiens* Loew

35. *Paralimna (Phaiosterna) decipiens* Loew

FIGURES 150–153, MAP 29

Paralimna decipiens Loew 1878:195 [United States. "Texas"; ST ♂, MCZ (11136)].—Osten Sacken 1878:201 [Nearctic catalog].—Becker 1896:270 [list, Texas].—Coquillett 1900:259 [list, Puerto Rico].—Aldrich 1905:624 [Nearctic catalog].—Jones 1906:178–179 [key, catalog].—Thaxter 1917:672–675 [parasites: *Stigmatomyces rostratus* Thaxter, *S. paralimnae* Thaxter]; 1931:145–146 [parasite: *S. gracilior* Thaxter].—Wirth and Stone 1956:470 [list, California].

Paralimna (Phaiosterna) decipiens.—Cresson 1916:105 [subgeneric combination], 108 [revision, figure of head]; 1918:45 [revision]; 1946:230 [review, Nearctic Region]; 1947:54–55 [review].—Wirth 1965:748 [Nearctic catalog]; 1968:16 [Neotropical catalog].—Cole 1969:396 [list, western United States].—Mathis 1995:633–635 [list, Galápagos Islands]; 1997:59–60 [list, Belize, figures of male terminalia].—Mathis and Zatwarnicki 1995:126 [world catalog]; 2002:72–76 [revision].

DIAGNOSIS. This species is distinguished from congeners, especially those of the subgenus *Phaiosterna*, by the following combination of characters: coloration variable but tending to be more tan to grayish brown than other congeners, moderately microtomentose, at most subshiny; small- to medium-sized shore flies, body length 1.85–3.60 mm; generally dark, gray brown to black species, moderately densely microtomentose, dorsum appearing more or less uniform in color, dull to subshiny, especially mesonotum.

Head: Generally gray brown to black. Basal flagellomere bearing short, generally inconspicuous fringe of whitish setulae along dorsum and dorsal portion of apex, length setulae far less than half height of basal flagellomere. Face gray to grayish brown, microtomentose, appearing dull, subdued. Eye-to-gena ratio 0.23–0.29.

Thorax: Generally gray brown to black, legs darker, black with some grayish microtomentum; mesonotum moderately densely gray to grayish-brown microtomentose, appearing dull to subshiny, frequently with brown, short to long stripes between dorsocentral setae, especially anteriorly. Costal-vein ratio 0.41–0.50; M-vein ratio 0.94–0.97. Ventral apex of foretibia lacking

numerous, long, slender setulae; posterior surface of forebasitarsus lacking scattered long, slender setulae.

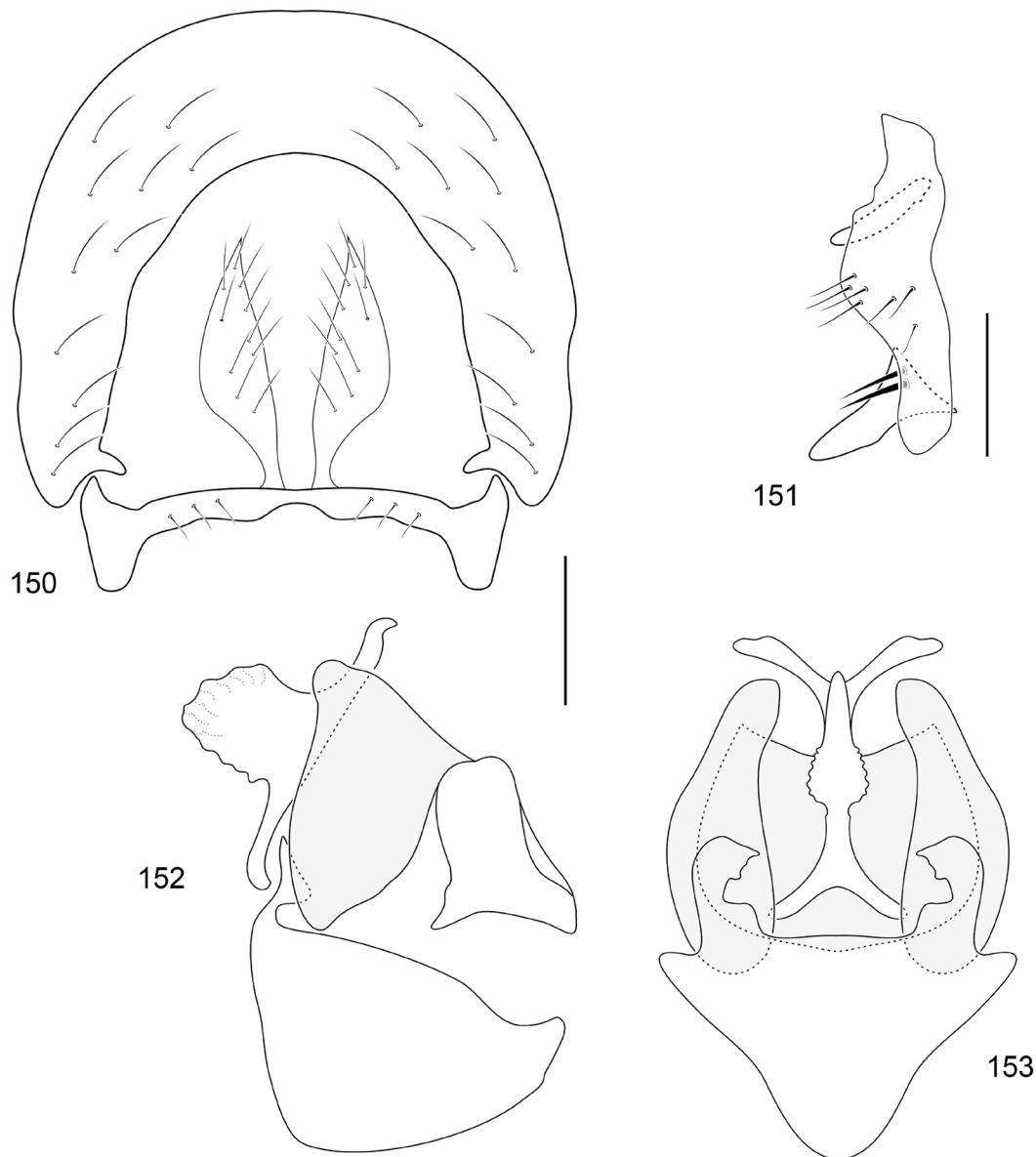
Abdomen: Slightly to distinctly lighter in color than mesonotum, mostly brownish gray to brownish black; tergites usually fasciate, with anterior portion of tergites darker gray to brownish black, less microtomentose, posterior portion more densely microtomentose, grayer. Male terminalia: (Figures 150–153) Presurstylus bifurcate, basoventral process about half the length of horizontal process, rather triangular, horizontal process connected medially, forming a shallowly arched band at ventral margin of cercus, with few setae; in lateral view postsurstylus slender, not widest medially, medial anterior process not developed, bearing few setae, medial posterior process lacking; lateral aedeagal process longer than aedeagus, wide throughout length, broadly rounded apically, triangular in lateral view, held close to lateral margins of aedeagus; aedeagus wide in posterior view, short, broadly rounded apically, thereafter forming a short, narrow point; phallapodeme, in lateral view, with anterior margin rounded; hypandrium deeply invaginated, pocket-like; cercus acutely pointed dorsomedially and ventrally.

SPECIMENS EXAMINED. Nearctic: UNITED STATES. Arizona. *Coconino*: Bill Williams Fork (35°12'N, 112°12'W), F. H. Snow (6♂, 6♀; ANSP). *Pima*: Kits Peak (near, 32°01.9'N, 111°32'W; 1100 m), Baboquivari Mountains, 7–9 Aug 1916 (2♀; AMNH).

Arkansas. *Garland*: Hot Springs (34°30.2'N, 93°03.3'W), 24 Jun, H. S. Barber (1♂, 1♀; ANSP).

California. *Del Norte*: Crescent City (41°45.4'N, 124°12.1'W), 19 Apr 1908, M. C. Van Duzee (1♀; AMNH). *Imperial*: Calipatria (33°07.5'N, 115°30.8'W), 13 Nov 1921, E. R. Kalmbach (1♂, 2♀; ANSP); Salton Sea (33°28.6'N, 116°05.1'W), 24 Nov 1921, E. R. Kalmbach (1♂, 1♀; ANSP). *San Diego*: Palm Canyon (33°13.2'N, 116°20.1'W), 7 Nov 1934, A. L. Melander (2♂, 1♀; ANSP).

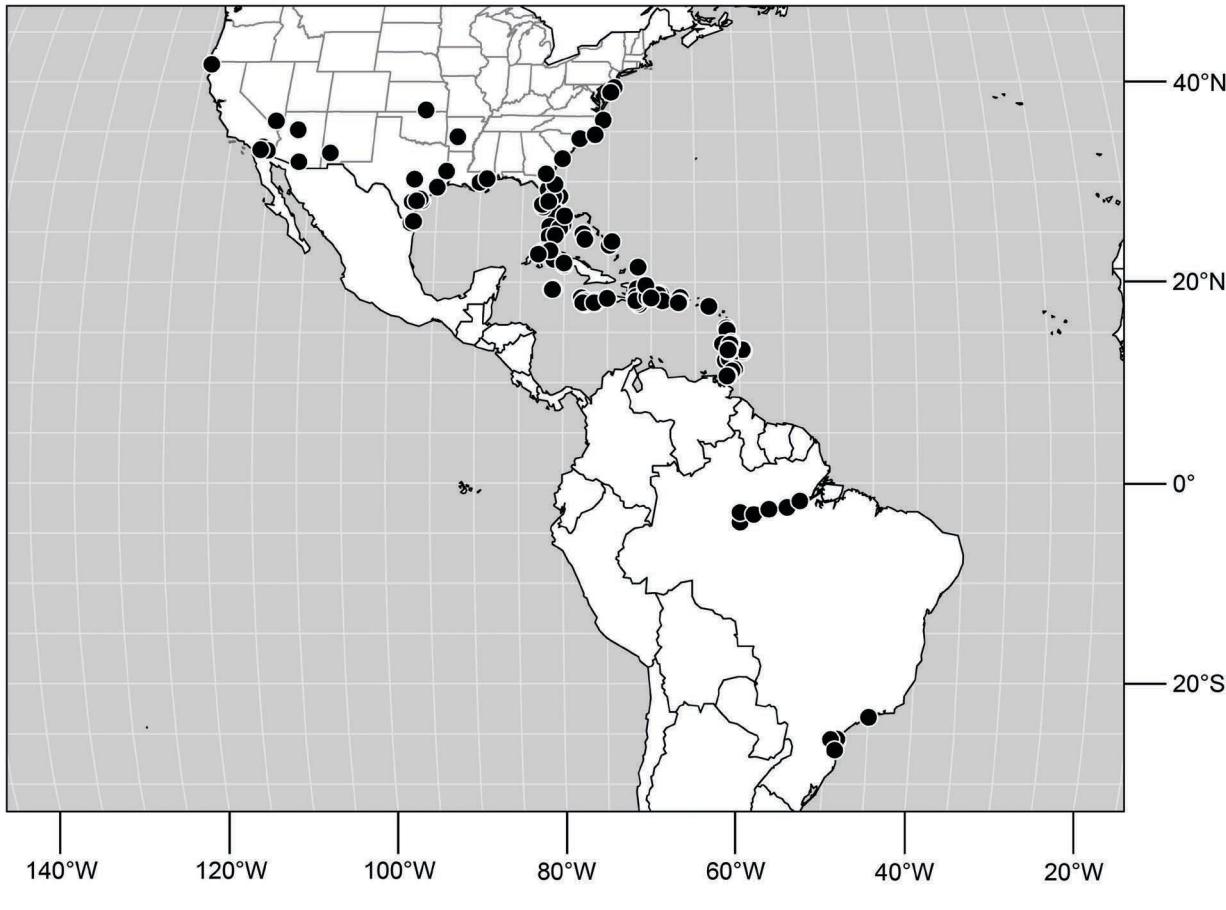
Florida. *Brevard*: Merritt Island National Wildlife Refuge (28°32.4'N, 80°40.3'W), 29 Mar 1984, B. A. Foote (2♂, 4♀; CMP). *Henry*: Clewiston (26°45.3'N, 80°56'W), 20 Jan 1938, A. L. Melander (1♂; ANSP). *Highlands*: Archbold Biological Station (27°12.6'N, 81°20.9'W), 7 Feb 2000, D. and W. N. Mathis (7♂, 1♀; USNM); Archbold Biological Station (27°10.8'N, 81°21.1'W), 9 Feb 2000, D. and W. N. Mathis (6♂; USNM); Archbold Biological Station (27°11.3'N, 81°20.3'W),



FIGURES 150–153. Structures of male terminalia of *Paralimma (Phaiosterna) decipiens* Loew (Brazil. Pará): (150) epandrium, cerci, and presurstyli, posterior aspect; (151) postsurstyli, lateral aspect; (152) aedeagus, phallapodeme, and hypandrium, lateral aspect; (153) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

15 Jan–2 Nov 1989, M. A. Deyrup (6♂, 16♀; ABSF); Lake Istokpoga, Windy Point Park (27°18.4'N, 81°18.9'W; 18 m), 15–16 Jan 2009, D. and W. N. Mathis (21♂; USNM); Rte. 70, cattle pond (27°12.5'N, 81°23.3'W), 7 Feb 2000, D. and W. N. Mathis (6♂, 1♀; USNM). **Manatee:** Bradenton (27°29.9'N, 82°34.5'W), Mar, M. C. Van Duzee (1♂; ANSP). **Marion:** Salt Springs (29°21'N, 81°44.1'W), 14 Apr 1989, D. and W. N. Mathis (12♂, 6♀; USNM); Silver Springs (29°13'N, 82°03.5'W), 2 Apr 1932, A. L. Melander (1♂; ANSP). **Miami-Dade:** Biscayne

Bay (25°33.9'N, 80°13'W), A. T. Slosson (1♀; AMNH); Everglades National Park (25°22.9'N, 80°36.6'W), 20 Mar 1967, B. A. Foote (1♀; CMP); Florida City (25°26.9'N, 80°28.8'W), 13 Jan 2007, D. and W. N. Mathis (3♂; USNM); Miami (25°46'N, 80°12'W), 23 Feb 1912, F. Knab (1♂; ANSP); Royal Palm Park Ranger Station (25°22.9'N, 80°36.6'W), 28–29 Jan 1933, 1939, A. L. Melander (1♂, 2♀; ANSP). **Monroe:** Key West (beach; 24°32.8'N, 81°47.7'W), 13 Jan 2007, D. and W. N. Mathis (1♂; USNM); Key West (Willie Ward Park; 24°32.9'N, 81°47.9'W),



MAP 29. Distribution map for *Paralimna (Phaiosterna) decipiens* Loew.

Spring (17°57.6'N, 76°21.3'W), 15 May 1996, D. and W. N. Mathis, H. B. Williams (1♂; USNM); Mt. Lebanon (17°58.2'N, 76°32.7'W), 16 May 1996, D. and W. N. Mathis, H. B. Williams (2♂; USNM). Apr 1891 (2♂, 2♀; ANSP).

NAVASSA ISLAND. Ruins near Lulu Bay (18°23.75'N, 75°01.07'W; 22 m), 29 Jul 1998, W. E. Steiner, J. M. Swearingen (2♂, 3♀; USNM).

PUERTO RICO. Adjuntas (18°09.8'N, 66°43.2'W), 22 Sep 1995, D. and W. N. Mathis (2♂; USNM). Arecibo (beach; 18°28.7'N, 66°42'W), 23 Sep 1995, D. and W. N. Mathis (5♂, 1♀; USNM). Playa de Guayanilla (18°0.4'N, 66°46.1'W), 19 Sep 1995, D. and W. N. Mathis (5♂; USNM). Punta Jacinto (near Guanica; 17°57'N, 66°52.6'W), 20 Sep 1995, D. and W. N. Mathis (1♂; USNM).

ST. LUCIA. Dauphin Boguis (1.6 km S Marquis; 14°01'N, 60°55'W), 17 Jun 1991, D. and W. N. Mathis (4♂; USNM). Micoud (13°49'N, 60°54'W), 15 Jun 1991, D. and W. N. Mathis (3♂; USNM). Soufrière (beach; 13°51'N, 16°54'W), 11–12 Jun 1991, D. and W. N. Mathis (5♂, 1♀; USNM). Sulphur Spring (13°50'N, 61°03'W), 14 Jun 1991, D. and W. N. Mathis (4♂, 3♀; USNM).

ST. VINCENT. *Charlotte*: Owia Salt Pond (13°22.5'N, 61°08.5'W), 6 Sep 1997, W. N. Mathis (1♂, 1♀; USNM); Peruvian Vale (13°10.7'N, 61°08.7'W), 6–8 Sep 1997, W. N. Mathis (6♂; USNM). *St. Andrew*: Camden Park (13°10.2'N, 61°14.7'W), 25 Mar–4 Sep 1989, 1997, W. N. Mathis (20♂, 5♀; USNM); Layou (13°12'N, 61°17'W), 8 Jun 1991, D. and W. N. Mathis (10♂, 3♀; USNM). *St. Patrick*: Cumberland Bay (13°16'N, 61°16'W), 28 Mar 1989, A. Freidberg, W. N. Mathis (1♂; USNM); Wallilabou (beach; 13°15'N, 61°16'W), 27 Mar–8 Jun 1989, 1991, D. and W. N. Mathis (3♂, 1♀; USNM).

DISTRIBUTION. (Map 29) *Nearctic*: United States (Alabama, Arizona, Arkansas, California, Delaware, Florida, Georgia, Indiana, Michigan, Mississippi, Louisiana, Nevada, New Jersey, New Mexico, North Carolina, South Carolina, Texas, Virginia). *Neotropical*: Bahamas, Brazil (Amazonas, Pará, Paraná, Santa Catarina, São Paulo), Trinidad and Tobago, West Indies (Barbados, British West Indies, Cuba, Dominica, Dominican Republic, Grand Cayman, Grenada, Jamaica, Navassa Island, Puerto Rico, St. Lucia, St. Vincent, Virgin Islands).

REMARKS. Mathis and Zatwarnicki (2002) revised the New World species of the subgenus *Phaiosterna* and observed that this species and *P. obscura* are very similar in appearance. Externally it is difficult to distinguish between them due to variation in coloration and microtomentum; coloration from dark to pale in both species, although there is a tendency for specimens of *P. decipiens* to be paler and duller (more microtomentose) but with considerable variation, sometimes overlapping with *P. obscura*. Accurate identification may require examination of the aedeagus and gonites, which are very distinctive: the aedeagus in *P. obscura* is narrower from dorsal view, slightly longer than wide, and the distal end of the sclerotized portion is distinctly pointed; the aedeagus in *P. decipiens* is much broader than long in a dorsal view, somewhat rectangular with the distal angles rounded, and in lateral view the distal aspect of the sclerotized portion is slightly concave and with the actual apex of the aedeagus as a pointed process that is extended from an anteroventral angle (Mathis and Zatwarnicki 2002). Additionally, whereas in *P. decipiens* the hypandrium is shallow and broad (approximately 2x wider than high) and the phallapodeme is poorly developed, in *P. obscura* the hypandrium is deep (as wide as high) and tapering in apical ½, in anterior or posterior view, and the phallapodeme is strongly projected ventrally in middle.

36. *Paralimna (Phaiosterna) longiseta* Mathis and Zatwarnicki

FIGURES 154–157, MAP 30

Paralimna (Phaiosterna) longiseta Mathis and Zatwarnicki 2002:81 [West Indies. Dominican Republic. Azua: near Pueblo Viejo ($18^{\circ}24.8'N$, $70^{\circ}44.7'W$); HT ♂; USNM].

DIAGNOSIS. This species is distinguished from congeners, especially those of the subgenus *Phaiosterna*, by the following combination of characters: moderately small to medium-sized shore flies, body length 2.35–3.85 mm; generally dark, yellowish gray to brown species, moderately densely to densely microtomentose, dorsum appearing relatively uniform in color, dull to slightly subshiny, especially mesonotum.

Head: Generally grayish brown to golden brown. Basal flagellomere bearing short, generally inconspicuous fringe of whitish setulae along dorsum and dorsal portion of apex, length setulae far less than half height of basal flagellomere. Face yellowish gray to golden brown, microtomentose, appearing dull, subdued. Eye-to-gena ratio 0.39–0.40.

Thorax: Generally grayish yellow to golden brown, legs darker, black with some grayish microtomentum; mesonotum moderately densely grayish-yellow to golden-brown microtomentose, appearing dull to very slightly subshiny, infrequently with darker brown, short to long stripes between dorsocentral setae. Costal-vein ratio 0.40–0.43; M-vein ratio 0.86–0.96. Ventral apex of foretibia bearing numerous, long, slender setulae; posterior surface of forebasitarsus bearing scattered long, slender setulae.

Abdomen: Slightly lighter in color than mesonotum, mostly grayish to yellowish brown; tergites uniformly colored or anterior portion of tergites very fasciate, darker gray to brown, less microtomentose. Male terminalia: (Figures 154–157) Presurstylus bifurcate, basoventral process large, about the same length of horizontal process, rather truncate ventrally, at margin horizontal process connected medially, forming a shallowly arched band at ventral margin of cercus, with few setae; in lateral view postsurstylus slender, not distinctly wide medially, medial anterior process not developed, bearing few setae, medial posterior process lacking; lateral aedeagal process the same length of aedeagus, narrow, curved medially, acutely pointed apically; aedeagus wide, rather ovate in posterior view, short, narrowed at apex; phallapodeme, in lateral view, with anterior margin rounded; hypandrium deeply invaginated, pocket-like; cercus acutely pointed dorsomedially, medial margin sinuous, ventral margin with shallow, narrow indentation, slightly produced ventrolaterally; hypandrium deeply invaginated, pocket-like.

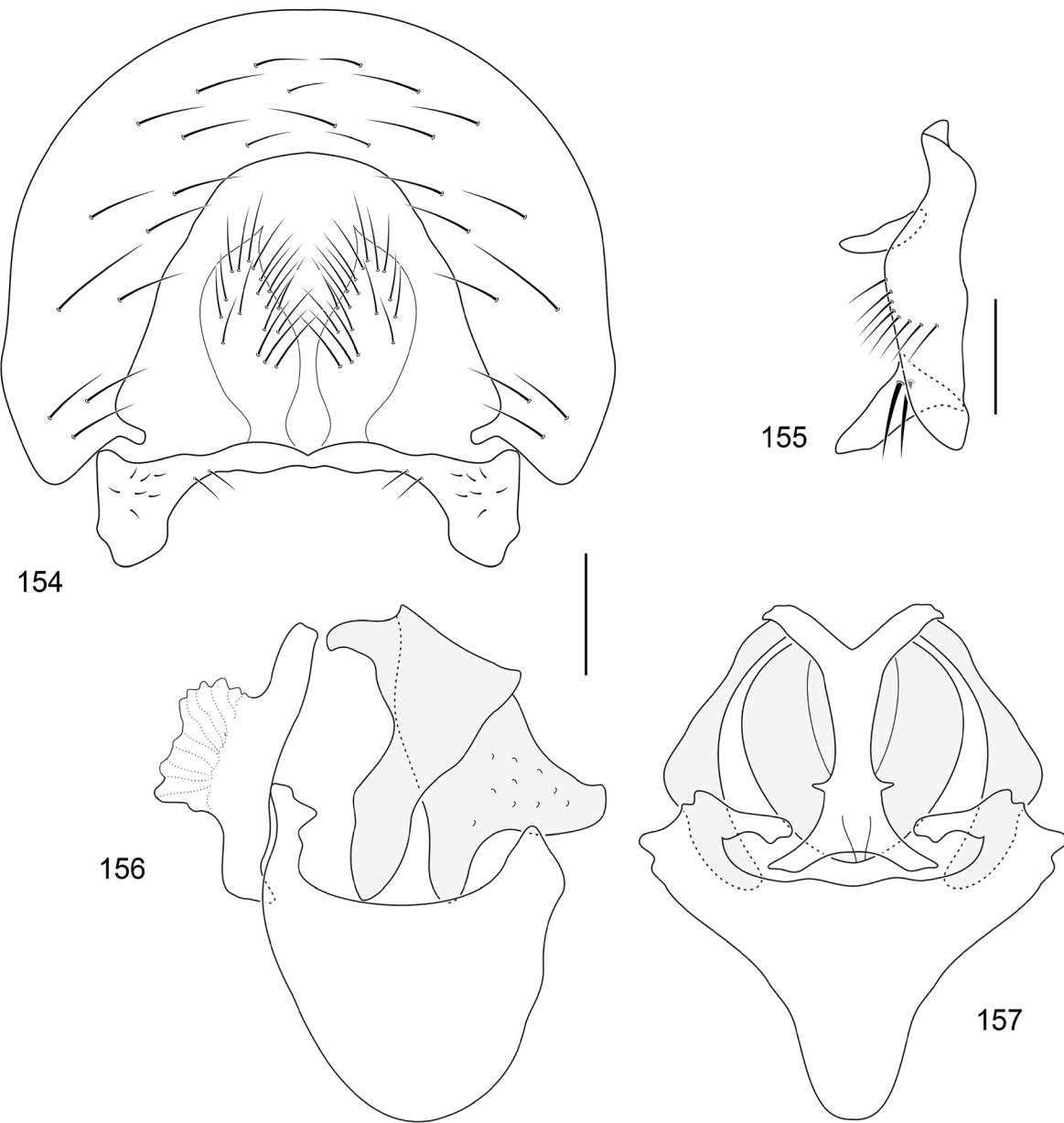
SPECIMENS EXAMINED. BRAZIL. Amazonas: Parintins ($02^{\circ}37.7'S$, $56^{\circ}44.2'W$), Oct 1969, Expedição Permanente da Amazônia (13♂, 11♀; MZUSP, INPA). Pará: Santarém ($02^{\circ}26.4'S$, $54^{\circ}41.9'W$), Sep–Oct 1969, 1970 (6♂, 3♀; MZUSP); Ilha Cará-açu, mun. Almeirim ($01^{\circ}31.2'S$, $52^{\circ}34.9'W$), Nov 1969 (2♂, 1♀; MZUSP); Lago Jacaré, Rio Trombetas ($01^{\circ}27.9'S$, $56^{\circ}18.6'W$), Oct 1969 (1♂; MZUSP).

HONDURAS. Cortés: Omoa ($15^{\circ}47.8'N$, $87^{\circ}58.4'W$), 26 Sep 1995, D. and W. N. Mathis (3♂, 1♀; USNM); San Pedro Sula (8 km S; $15^{\circ}25.7'N$, $88^{\circ}01.4'W$), 25–26 Sep 1995, D. and W. N. Mathis (2♂; USNM).

WEST INDIES. DOMINICAN REPUBLIC. Azua: near Pueblo Viejo ($18^{\circ}24.8'N$, $70^{\circ}44.7'W$), 19 May 1998, D. and W. N. Mathis (14♂, 8♀; USNM). La Vega: El Rio (9.5 km E; $19^{\circ}0.9'N$, $70^{\circ}33.5'W$; 980 m), 6 May 1995, W. N. Mathis (2♂; USNM); El Rio (9.5 km E; $19^{\circ}0.7'N$, $70^{\circ}33.6'W$; 980 m), 24 May 1998, D. and W. N. Mathis (1♂; USNM); Rio Camu (3.5 km NW La Vega; $19^{\circ}13.7'N$, $70^{\circ}35.2'W$; 100 m), 10 May 1995, W. N. Mathis (6♂, 1♀; USNM); Rio Camu (3.5 km NW La Vega; $19^{\circ}13.8'N$, $70^{\circ}35.2'W$; 100 m), 18 May 1998, D. and W. N. Mathis (6♂, 4♀; USNM). Peravia: Rio Ocoa (San José Ocoa; $18^{\circ}31.7'N$, $70^{\circ}30.4'W$), 21 May 1998, D. and W. N. Mathis (5♂, 1♀; USNM). Puerto Plata: Rio Camu (14 km E Puerto Plata; $19^{\circ}41.9'N$, $70^{\circ}37.5'W$), 23 May 1998, D. and W. N. Mathis (6♂; USNM); Rio Pérez (near Imbert; $19^{\circ}44.1'N$, $70^{\circ}50.2'W$), 24 May 1998, D. and W. N. Mathis (2♂; USNM).

JAMAICA. Portland: Berridale ($18^{\circ}06.5'N$, $76^{\circ}20'W$), Rio Grande River, 25 Apr 2000, W. N. Mathis (5♂, 1♀; USNM). St. Andrew: Mavis Bank (1.7 km E; $18^{\circ}02.4'N$, $77^{\circ}39.5'W$; 575 m), Yallahs River, 21–22 Apr–1 May 2000, W. N. Mathis (14♂, 2♀; USNM); Wag Water River, 25 Feb 1969, W. W. Wirth (1♂; USNM); Mavis Bank (4.3 km SE; $18^{\circ}01.4'N$, $76^{\circ}38.1'W$; 480 m); Yallahs River, 22–23 Apr 2000, W. N. Mathis (6♂; USNM). St. Thomas: Yallahs River (mouth; $17^{\circ}53'N$, $76^{\circ}35.6'W$), 14 May 1996, D. and W. N. Mathis, H. B. Williams (8♂, 1♀; USNM).

PUERTO RICO. Rio Hoconuco ($18^{\circ}7.6'N$, $67^{\circ}2.6'W$), 20 Sep 1995, D. and W. N. Mathis (1♂; USNM).

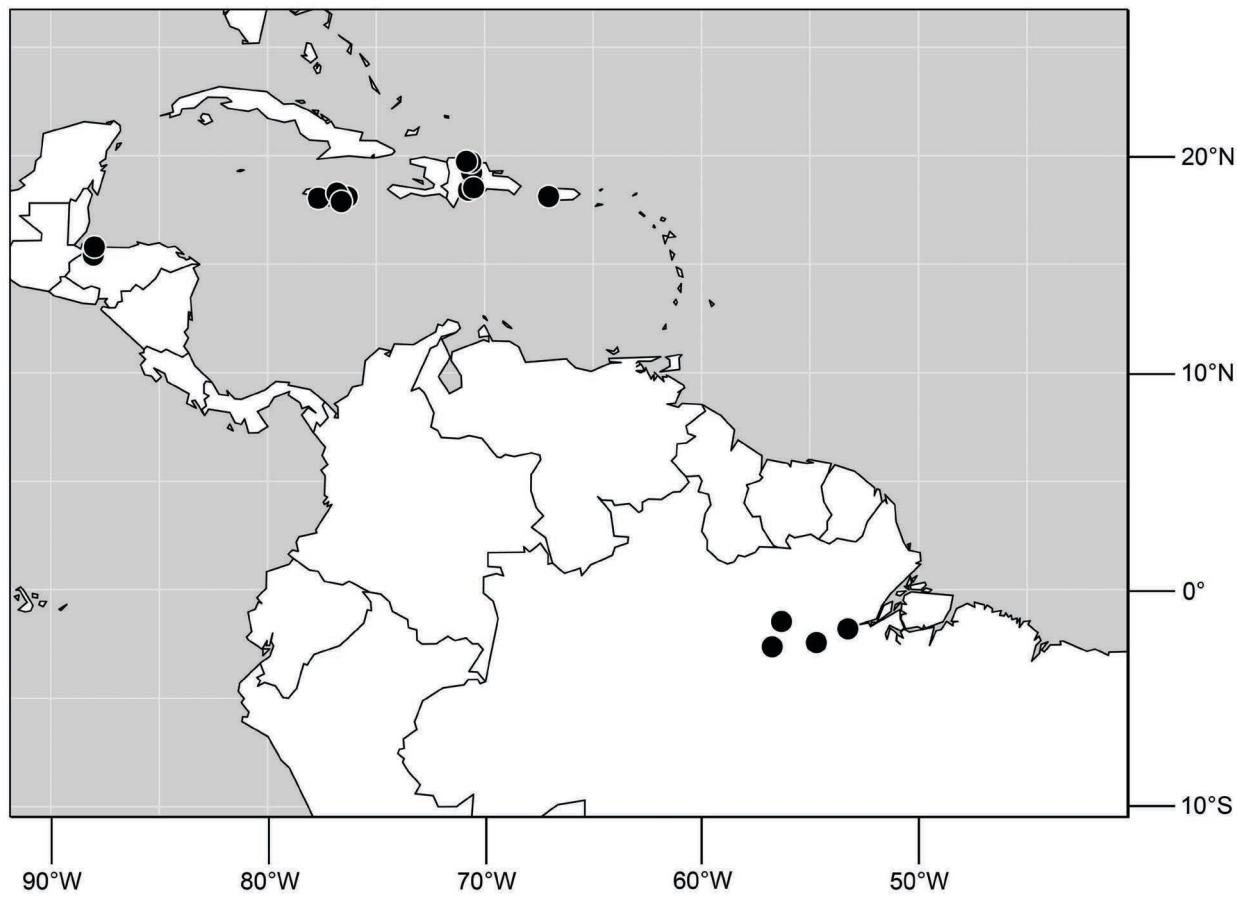


FIGURES 154–157. Structures of male terminalia of *Paralimna (Phaiosterna) longiseta* Mathis and Zatwarnicki (Brazil, Amazonas): (154) epandrium, cerci, and presurstyli, posterior aspect; (155) postsurstylus, lateral aspect; (156) aedeagus, phallapodeme, and hypandrium, lateral aspect; (157) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

DISTRIBUTION. (Map 30) *Neotropical*: Brazil (Amazonas, Pará), Honduras (Cortés), West Indies (Dominican Republic, Jamaica, Puerto Rico).

REMARKS. This species is similar to *P. decipiens* but is distinguished as follows: the 3 brown stripes on the scutum are fused

on distal half of the scutum; the phallus is round with a sharp large protuberance on the medial dorsal surface (usually perceptible on undissected specimens). This species is distinguished from *P. obscura* by the grayish coloration of the body, by the lack of distinctive dorsal bands on the tergites, and by characters of the male terminalia.



MAP 30. Distribution map for *Paralimna (Phaiosterna) longiseta* Mathis and Zatwarnicki.

37. *Paralimna (Phaiosterna) obscura* Williston

FIGURES 158–161, MAP 31

Paralimna obscura Williston 1896:391 [West Indies, St. Vincent; LT ♂ (designated by Mathis and Edmiston, 1991:832–834), BMNH].—Woodruff et al. 1998:68 [list, Grenada].

Paralimna (Phaiosterna) obscura.—Cresson 1918:45 [revision]; 1947:54 [review].—Wirth 1968:16 [Neotropical catalog].—Mathis and Edmiston 1991:832–834 [review of Williston's St. Vincent species].—Wirth 1965:748 [Nearctic catalog]; 1968:16 [Neotropical catalog].—Woodley and Hilburn 1994:31 [list, Bermuda].—Mathis and Zatwarnicki 1995:127 [world catalog]; 2002:83–88 [revision].—Mathis 1997:56–57, 59 [review, Belize, figures].

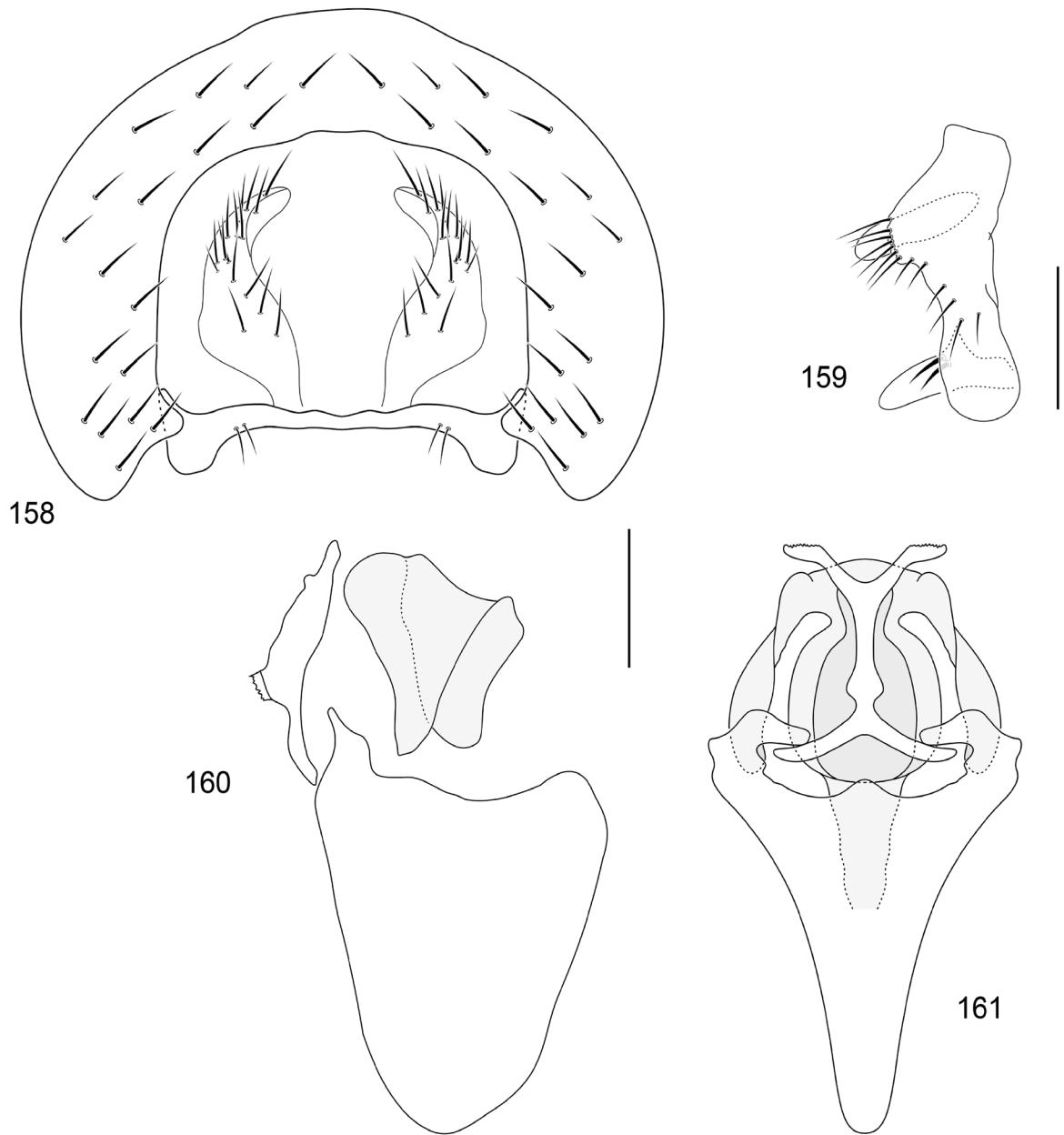
DIAGNOSIS. This species is distinguished from congeners, especially those of the subgenus *Phaiosterna*, by the following combination of characters: specimens tending to be dark brown to black, shiny, sparsely microtomentose; moderately small- to medium-sized shore flies, body length 2.25–3.50 mm;

generally dark, gray brown to black species, moderately densely microtomentose, dorsum appearing relatively uniform in color, dull to subshiny, especially mesonotum.

Head: Generally gray brown to black. Basal flagellomere bearing short, generally inconspicuous fringe of whitish setulae along dorsum and dorsal portion of apex, length setulae far less than half height of basal flagellomere. Face gray to grayish brown, microtomentose, appearing dull, subdued. Eye-to-gena ratio 0.24–0.27.

Thorax: Generally gray brown to black, legs darker, black with some grayish microtomentum; mesonotum moderately densely gray brown to brownish black, microtomentose, appearing dull to subshiny, frequently with lighter brown, short to long stripes between dorsocentral setae, especially anteriorly. Costal-vein ratio 0.48–0.53; M-vein ratio 0.95–1.0. Ventral apex of foretibia lacking numerous, long, slender setulae; posterior surface of forebasitarsus lacking scattered, long, slender setulae.

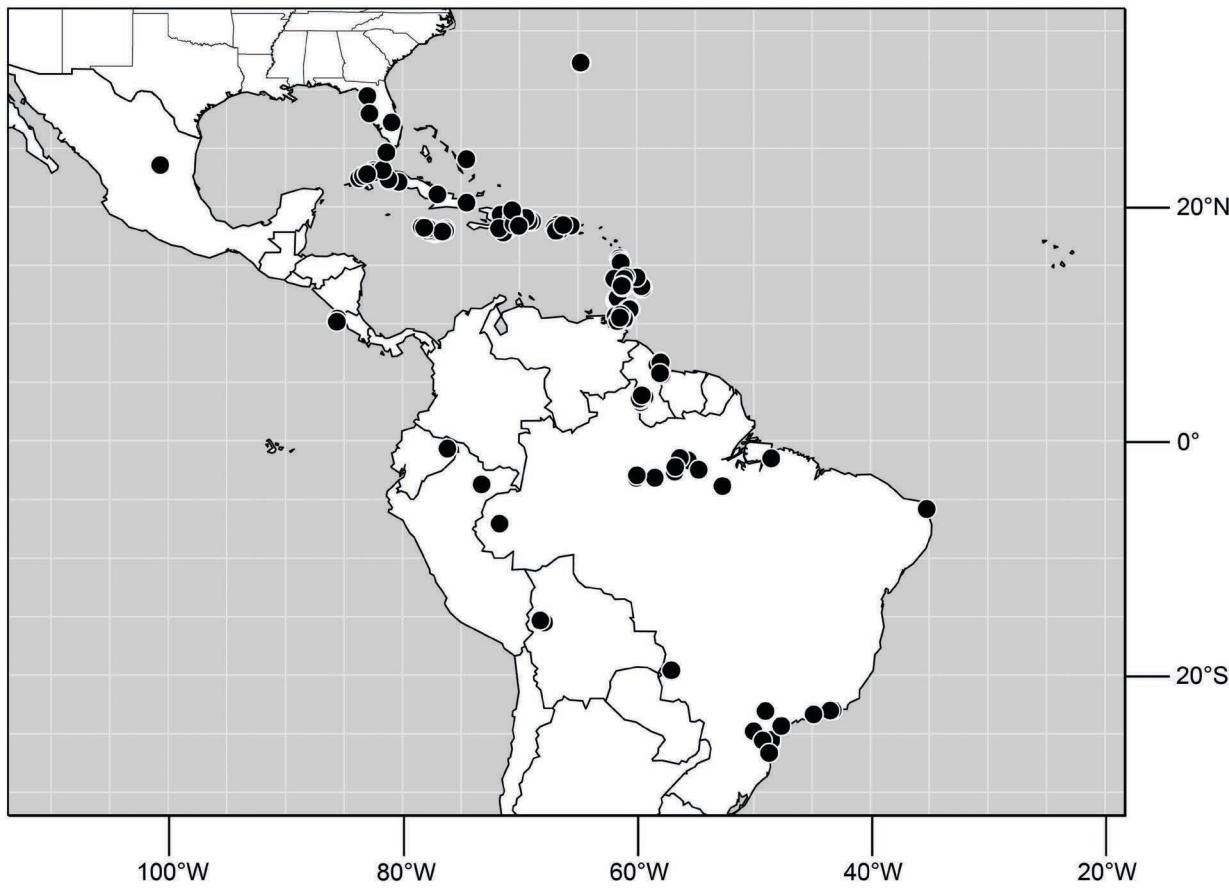
Abdomen: Slightly to distinctly lighter in color than mesonotum, mostly brownish gray to brownish black; tergites usually



FIGURES 158–161. Structures of male terminalia of *Paralimna (Phaiosterna) obscura* Williston (Brazil. Amazonas): (158) ephandrium, cerci, and presurstyli, posterior aspect; (159) postsurstylus, lateral aspect; (160) aedeagus, phallapodeme, and hypandrium, lateral aspect; (161) same, ventral aspect. Scale bar = 0.1 mm. (See Figures 2–5 for labels of structures.)

fasciate, with anterior portion of tergites darker gray to brownish black, less microtomentose, posterior portion more densely microtomentose, grayer. Male terminalia: (Figures 158–161) Presurstyli bifurcate, basoventral process small, rounded ventrally, horizontal process connected medially, forming a shallowly arched band at ventral margin of cercus, with few setae; in lateral view postsurstylus robust, with anterior margin swollen medially,

bearing several setulae, medial anterior process not developed, bearing few setae; lateral aedeagal process the same length of aedeagus, triangular, acutely pointed apically; aedeagus somewhat triangular in lateral view, with a long, narrow, medial process apically; phallapodeme, in lateral view, with keel asymmetrical and only moderately produced, with a shallow indentation toward ventral margin; hypandrium very deeply invaginated, pocket-like;



MAP 31. Distribution map for *Paralimna (Phaiosterna) obscura* Williston.

6♀; USNM). Maricao (4 km WNW; 18°10.7'N, 66°59.6'W), 21 Sep 1995, D. and W. N. Mathis (5♂, 1♀; USNM). Playa de Guayanilla (18°0.4'N, 66°46.1'W), 19 Sep 1995, D. and W. N. Mathis (6♂; USNM). Punta Jacinto (near Guanica; 17°57'N, 66°52.6'W), 20 Sep 1995, D. and W. N. Mathis (2♂, 1♀; USNM). Toa-Baja (18°26.7'N, 66°15.3'W), 17 Jan 1915, G. Garb (1♀; ANSP).

ST. LUCIA. Castries (5 km S; 13°59'N, 60°00'W), 16 Jun 1991, D. and W. N. Mathis (3♂; USNM). Dauphin Boguis (1.6 km S Marquis; 14°01'N, 60°55'W), 17 Jun 1991, D. and W. N. Mathis (5♂; USNM). Soufrière (beach; 13°51'N, 16°54'W), 11–12 Jun 1991, D. and W. N. Mathis (3♂; USNM). Sulphur Spring (13°50'N, 61°03'W), 14 Jun 1991, D. and W. N. Mathis (6♂; USNM).

ST. VINCENT. St. Vincent (2♂; CU; “Lot. 662 Sub. 75”; one of the males lacks its head. The determination label, which is handwritten, reads “*Paralimna brunnea* Will. [cursive] mss. may be *obscura*”). **Charlotte:** Montreal (13°12'N, 61°11'W), 26 Mar 1989, A. Freidberg (1♂, 1♀; USNM); Peruvian Vale (13°10.7'N, 61°08.7'W), 6–8 Sep 1997, W. N. Mathis (1♂; USNM); Spring (13°11.1'N, 61°08.5'W), 6 Sep 1997, W. N.

Mathis (5♂; USNM); Yambou River (13°09.8'N, 61°08.7'W), 8–10 Sep 1997, W. N. Mathis (7♂; USNM). **St. Andrew:** Buccament Bay (near beach; 13°11'N, 61°16'W), 25–28 Mar–8 Jun 1989, 1991, D. and W. N. Mathis (10♂, 6♀; USNM); Camden Park (13°10.2'N, 61°14.7'W), 25 Mar–4 Sep 1989, 1997, W. N. Mathis (11♂, 4♀; USNM); Layou (13°12'N, 61°17'W), 8 Jun 1991, D. and W. N. Mathis (4♂; USNM). **St. David:** Richmond Beach, 28 Mar 1989, W. N. Mathis (2♂; USNM). **St. George:** Yambou Head, 27 Mar 1989, W. N. Mathis (5♂, 2♀; USNM). **St. Patrick:** Cumberland Bay (13°16'N, 61°16'W), 8–10 Jun–15 Sep 1991, 1997, D. and W. N. Mathis (14♂; USNM); Hermitage (13°15'N, 61°12.9'W), 9 Sep 1997, W. N. Mathis (2♂; USNM); Palmiste Park (13°12.7'N, 61°14.9'W), 5 Sep 1997, W. N. Mathis (3♂; USNM); Wallilabou (beach; 13°15'N, 61°16'W), 8 Jun 1991, D. and W. N. Mathis (6♂, 1♀; USNM).

DISTRIBUTION. (Map 31) **Nearctic:** Bermuda, Mexico (San Luis Potosí), United States (California, Florida, Texas). **Neotropical:** Bahamas, Belize (Belize, Stann Creek), Bolivia (La Paz), Brazil (Amazonas, Mato Grosso do Sul, Pará, Paraná, Rio de Janeiro, Rio Grande do Norte, Santa Catarina, São Paulo), Costa Rica (Guanacaste), Honduras (Cortés), Ecuador

(Orellana), Guyana, Paraguay, Peru (Loreto), Trinidad and Tobago, West Indies (Barbados, Cuba, Dominica, Dominican Republic, Grenada, Jamaica, Puerto Rico, St. Lucia, St. Vincent, Virgin Islands).

REMARKS. On Wee Wee Cay (Belize, Stann Creek), all specimens were collected from a large muddy area with a covering mat of blue-green algae. This species and *Paralimna decipiens* Loew are closely related and are very similar in external appearance. A discussion of the distinguishing characteristics of these two species is presented in the “Remarks” for *P. decipiens*. Both *P. decipiens* and *P. obscura* frequently occur sympatrically (Mathis and Zatwarnicki 2002).

PARALIMNA (COGANOLIMNA), SUBGEN. NOV.

Type species *Paralimna limbata* Loew 1862b:13.

DIAGNOSIS. This subgenus is distinguished from other congeneric subgenera by the following combination of characters: small to moderately sized shore flies, body length 2.7–3.5 mm; body vittate, broad brown striped on thorax with darkened infuscate coloration, yellowish to brownish gray between brown stripes, subshining aspect.

Head: Ocelli arranged in equilateral triangle; pseudopostvertical pair thin, not developed. Basal flagellomere narrowed toward the apex, elongated, slender, dorsal margin slightly concave, and length at most 1.7× width, dorsal setae scarcely developed; arista bearing 12–14 long hairs along dorsal surface. Face nearly flat, carina and antennal groove not evident. Eye slightly rounded, higher than wide. Gena short, about ¼ eye height.

Thorax: Mesonotum and pleurae striped, yellowish to brownish gray between brown stripes. Wing hyaline with variable pattern, with strong infuscation on veins or cells fully brown spotted. Forefemur of male lacking comb-like row of modified setae on anteroventral surface.

Abdomen: With fasciate pattern. Sternite 1 fully microtomentose. Male terminalia: Epandrium as wide as high; cercus well developed, bearing numerous setulae; presurstylus variable, horizontal process well developed or not, presurstylus not connected dorsally; aedeagus wide with pointed apex; aedeagus and lateral process subequal in length; lateral aedeagal process usually wide, not arched ventrally in lateral view.

DISTRIBUTION. The *Paralimna (Coganolimna)* subg. nov. occurs in the Afrotropical Region and includes the species previously included in former *limbata* species group.

DISCUSSION. The cladistic analysis of the species group of *Paralimna* showed that the *Paralimna (Coganolimna)* subg. nov. is a monophyletic group supported by following synapomorphies: basal flagellomere elongated, slender with dorsal margin slightly concave, scutum and pleural area striped, with defined bands. *Paralimna (Coganolimna)* subg. nov. included species very similar to species of subgenus *Phaiosterna*, where they have been previously placed (Mathis and Zatwarnicki, 1995). The subgenus *Phaiosterna*, however, is a very well-supported

clade with homogeneous species sharing a very homogeneous and characteristic male terminalia. In *Paralimna (Coganolimna)* subg. nov. the male terminalia is very variable between species and differs considerably from that of *Phaiosterna*, and Mathis and Zatwarnicki (2002) allocated these species in the genus *Paralimna* as part of the *limbata* group.

PHYLOGENETIC CONSIDERATIONS

In this study, we have re-examined the evidence, all morphological characters, in an attempt to discover more definitively the phylogenetic placement of *Paralimna* and related taxa, especially those taxa that have been treated as subgenera within *Paralimna*. We asked the basic question, what are the phylogenetic relationships (hypothetical) among taxa closely related to or within *Paralimna*? As background, we first present a summary of the evidence and relationships at the tribal level (within Hydrelliinae) and then proceed to the evidence and our analysis of it for taxa within Dryxini.

The tribe Dryxini is one of five tribes placed in the subfamily Hydrelliinae (Mathis and Zatwarnicki, 1995, 2002). The sister group relationship of Dryxini with Notiphilini is corroborated by five synapomorphies (Mathis and Zatwarnicki, 2002): (1) ventral anepisternal seta elongate, twice length of dorsal seta (secondarily reduced in a few taxa); (2) midtibia with prominent, erect, extensor setae along the dorsal surface; (3) only reclinate fronto-orbital seta well developed, proclinate seta(e) reduced or lacking; (4) abdominal tergites fasciate (secondarily reduced in some taxa); and (5) subepandrial plate reduced.

Dryxini are distinguished from Notiphilini and the tribe's monophyly is established by the following characters (synapomorphies are noted by an asterisk [*]) (Mathis and Zatwarnicki, 2002): *gena high (secondarily short in some species); *face wide, transversely arched, and generally projected anteriorly (the face in *Notiphila* is comparatively narrower and much flatter); dorsocentral setae 4 (1+3; secondarily reduced in some genera of Dryxini, whereas in Notiphilini there are 3 setae [1+2], a synapomorphy for Notiphilini); costa elongate, extended to vein M (the costa is short, extended only to vein R₄₊₅ in Notiphilini, a synapomorphy for Notiphilini); male terminalia with surstyli divided into a presurstylus (clasper) and postsurstylus (surstylus) (postsurstylus reduced or fused with epandrium with only presurstylus present in Notiphilini, a synapomorphy for Notiphilini); *presurstylus with apex angulate and bifurcate; *pre- and postgonite reduced or lacking (the structure remaining may represent a fused and/or reduced pre- and postgonite); and *hypandrium connected basally with postsurstylus, not with epandrium.

With the phylogenetic background for further study of the tribe Dryxini within the subfamily Hydrelliinae established and the monophyly of Dryxini documented, we now proceed with the cladistic analysis and resultant relationships among lineages within the genus *Paralimna*, the most species-rich genus within

Dryxini, but with a few explanatory remarks first. In the presentation on relationships within *Paralimna* that follows, the characters used in the analysis are noted first. Each character is immediately followed by a discussion to explain its states and to provide perspective and any qualifying comments about that character. After presentation of the information on character evidence, a hypothesis of the cladistic relationships is presented and briefly discussed. The cladogram (see Figure 215) is the primary mode to convey relationships, and the discussion is to supplement the cladogram and is intended only to complement the latter. In the discussion of character data, a "0" indicates the state of the outgroup; a "1" or "2" or greater indicates the derived states. All characters were treated as nonadditive. The numbers used for characters in the presentation are the same as those on the cladogram, and the sequence is the same as noted in the character matrix (Table 1). The genera *Afrolimna* Cogan, *Oedenops* Becker, and *Papuama* Mathis and Zatwarnicki were the outgroups in our cladistic analysis.

CHARACTERS USED IN THE ANALYSIS

1. Facial height: (0) short, about 1.5× the length of frons; (1) long, at least 2× the length of frons.
2. Ventral margin of eye: (0) rounded or almost truncate, eye rather rounded; (1) distinctly tapered, eye ovate; (2) reniform.
3. Silvery white spot on dorsum of pedicel: (0) absent; (1) present.
4. Insertion of ocellar pair of setae: (0) before the anterior ocellus; (1) lateral to the anterior ocellus.
5. Shape of the facial carina: (0) depressed, antennal groove indistinct; (1) high, antennal groove shallow; (2) very elevated or projected, antennal groove deep.
6. Shape of the frons: (0) horizontal or nearly so, antenna almost aligned with the dorsal region of the eye; (1) convex, antenna inserted beneath the dorsal line of the eye or well above half the height of the eye in lateral view.
7. Coloration of the frons: (0) lacking characteristic pattern of spots; (1) with characteristic pattern of spots, brown with linear yellow spots at lateral margins of ocellar triangle and in front of anterior ocellar seta, between medial vertical and interfrontal setae, and on fronto-orbits between proclinate fronto-orbital setae and just above antennal bases.
8. Aspect of pseudopostocellar setae: (0) undeveloped, thin, poorly differentiated, as long as or slightly longer than adjacent ocellar setae; (1) distinctly more robust and at least twice length of adjacent ocellar setae.
9. Genal setae: (0) gena partially setose, post-cranial series not mixing with genal setae; (1) completely setulose, post-cranial series extended to gena.
10. Genal height: (0) height greater than length of basal flagellomere; (1) height less than or equal to the length of basal flagellomere.
11. Post-cranial setae: (0) arranged in a single series; (1) arranged in two series.
12. Dorsal setulae of basal flagellomere: (0) short and usually sparsely setulose; (1) long setulae, usually numerous, sometimes irregular and longer on base of basal flagellomere.
13. Shape of basal flagellomere: (0) parallel sided, rounded at the apex; (1) tapered toward the apex.
14. Length of the basal flagellomere: (0) short, stout, dorsal margin straight or slightly convex; (1) elongated, slender, dorsal margin slightly concave.
15. General aspect of coloration of body: (0) matte; (1) metallic.
16. General scutal coloration: (0) dorsum dark and lighter on sides, usually 2 or 3 light stripes dorsally; (1) unicolorous, dark; (2) striped body dorsally and laterally, with defined bands; (3) unicolorous, pale with some poorly defined stains gently darkened.
17. Coloration of mesopleuron: (0) homogeneously colored (light or dark); (1) predominantly gray, with or without spots; (2) predominately brown, dorsal and ventral portions predominantly brown (katepisternum completely brown); (3) distinctly lighter on dorsal half (dorsal pleurites gray, only thin band on ventral margin of anepisternum and anepimeron brown) and darker on ventral half (ventral pleurites brown); (4) horizontally striped.
18. Crossvein dm-cu: (0) straight; (1) concave toward the base of the wing.
19. Coloration of the wing: (0) hyaline or semi-hyaline; (1) predominantly brown with hyaline halos or predominantly hyaline with small brown spots.
20. Anteroventral setae of the male forefemur: (0) long and conspicuously flattened; (1) long or short, with blunt apex, but not conspicuously flattened; (2) setae simple, with sharpened apex, not differentiated from adjacent setae.
21. Posteroventral setae of the male forefemur: (0) differentiated from adjacent setae; (1) not differentiated from adjacent setae.
22. Ventral surface of the male foretibia: (0) not modified, straight or slightly arcuate; (1) sinuous, with a groove along ventral surface.
23. Ventral surface of the male forefemur: (0) normal, gradually tapered toward the apex; (1) distinctly concave at distal $\frac{1}{2}$ or $\frac{2}{3}$.
24. Coloration of tergites: (0) distinctly bicolored with a dark basal band and distal margin pale; (1) homogeneously colored.
25. Sternite 1: (0) fully microtomentose; (1) bare in the middle but margins microtomentose; (2) bare.
26. Dark shiny stain on the posteroventral margin of tergite 5: (0) absent; (1) present.
27. Shape of horizontal process of presurstylus: (0) disconnected dorsally; (1) connected dorsally.
28. Shape of postsurstylus in lateral view: (0) not widest medially, anterior and posterior process undeveloped; (1) widest medially with an anteriorly protuberant lobe and a variable process posteriorly in the middle.

29. Shape of aedeagus in dorsal view: (0) tubular, slightly flattened laterally; (1) wide, not tubular.
30. Lateral aedeagal process: (0) longer than $\frac{1}{2}$ length of the aedeagus; (1) as long as the aedeagus; (2) $\frac{1}{2}$ the length or slightly shorter than the aedeagus; (3) very short, about $\frac{1}{6}$ aedeagal length.
31. Shape of the lateral aedeagal process: (0) curved, robust, comma shaped; (1) triangular, wide; (2) long and slender.
32. Basoventral process of presurstylus: (0) greatly developed, large, robust, horizontal process very short or absent; (1) basoventral process undeveloped; (2) developed, with varied shapes, horizontal process well developed.
33. Appendages of the aedeagus: (0) lacking appendages; (1) with lateral aedeagal process separated from the aedeagus; (2) with lateral aedeagal process fused with the aedeagus.
34. Setae at apex of postsurstylus: (0) absent; (1) 2 setae near apex.
35. Position of the gonite relative to the postsurstylus: (0) positioned at apical $\frac{1}{4}$ – $\frac{1}{3}$ of the postsurstylus; (1) positioned at apex of the postsurstylus.
36. Horizontal process of surstylus: (0) absent; (1) short and robust; (2) long and slender.

ANALYSIS, RESULTS, AND DISCUSSION

The heuristic analysis of the data matrix (Table 1), using the multiple TBR + TBR option of NONA (Goloboff, 1999), generated 100 cladograms from the analysis of the 36 unordered characters and 67 taxa. The cladograms have a length of 127 steps and consistency and retention indices of 0.40 and 0.81, respectively. From that pool of cladograms we produced a strict consensus, collapsing 21 nodes (Figure 214). The WinClada software (Nixon, 2002) was used to map the characters on the cladograms by means of the slow optimization option. The following discussion of the distribution of character states is graphically portrayed on the first of the 100 obtained trees (Figure 215).

In summary, and as indicated on the cladogram (Figure 215), the genus *Paralimna* is a monophyletic lineage supported by the following synapomorphies (included in parentheses are character numbers and in some cases, annotations): post-cranial setae arranged in two series (arranged in one series in *P. reticulata*, *P. monstruosa*, and in a group of species within *Paralimna* (*Paralimna*) sensu stricto formed by *P. confluens*, *P. cressoni*, *P. curta*, *P. fulgifrons*, *P. guttata*, and *P. stellata*) (11₁); basoventral process of surstylus developed and quite variable, especially the horizontal process well developed (a very homoplastic character) (32₂); lateral aedeagal process fused with the aedeagus (33₂); postsurstylus with two setae present near apex (34₁); gonite positioned at apex of postsurstylus (35₁); and horizontal process of surstylus long and slender (36₂).

Paralimna is closely related to *Afrolimna*, which shares the following characters: ocellar pair of setae lateral to the anterior ocellus (a very homoplastic characters) (4₁); gena completely setulose (9₁) (gena partially setose in *P. reticulata*, *P. picta*,

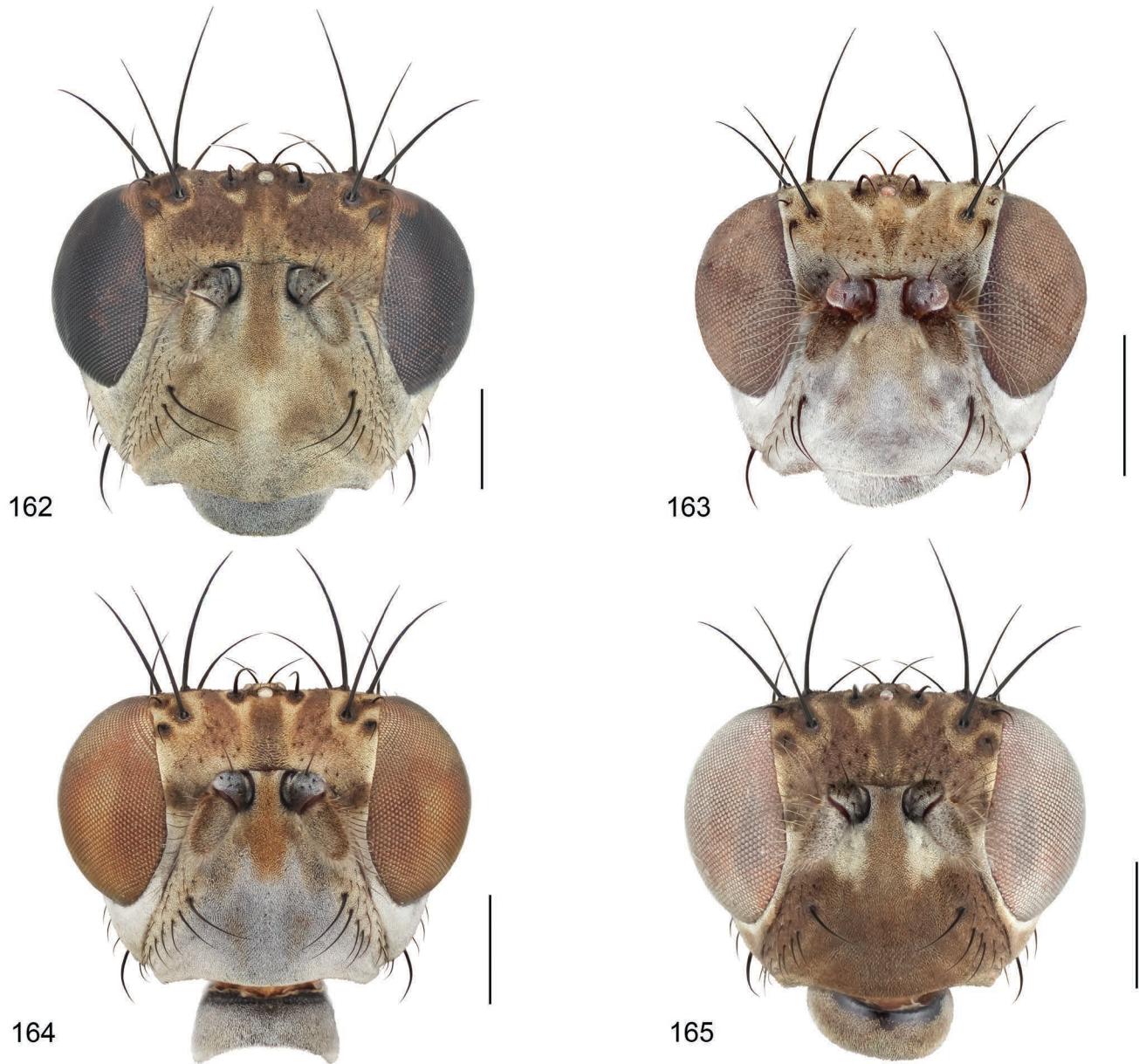
P. millepuncta, *P. monstruosa*, and in the major group formed by all Neotropical species and some Afrotropical species); basal flagellomere with long setae on dorsal margin (12₁) (in *P. limbata* and in the subgenus *Phaiosterna*, except *P. fusca*, the dorsal setae of basal flagellomere are short); basal flagellomere narrowed toward the apex (13₁) (with parallel sides, rounded at the apex in the group formed by *P. bicolor*, *P. longiseta*, *P. decipiens*, and *P. obscura*).

The topology of the lineages within *Paralimna* showed three distinct monophyletic clades including the *limbata* species group, the subgenus *Phaiosterna*, and the largest clade formed by subgenus *Paralimna* sensu stricto (excluding the *limbata* species group). Although not all species of *Paralimna* have been included in the analysis, it is evident that the subgenus *Paralimna* sensu lato (including the *limbata* group) is not monophyletic as currently known. The analysis does demonstrate, however, that the subgenus *Paralimna* sensu stricto (without the *limbata* group) is a monophyletic group that is supported by two unambiguous synapomorphies—frons with characteristic pattern of spots (7₁) and mesopleuron predominantly gray with or without spots (17₁) (this character is secondarily modified within the subgenus to pleural area predominantly brown [17₂], and mesopleuron distinctly lighter on dorsal half with dorsal pleurites predominantly gray, darker on ventral half with ventral pleurites brown [17₃])—and one homoplasious synapomorphy—face long, at least twice the length of frons (shared with *limbata* group; this character is secondarily modified within the subgenus to short, about 1.5× the length of frons, in *P. boensis*, a big group formed by one Afrotropical species, *P. hirticornis*, and several Neotropical species inside *Paralimna* (*Paralimna*) sensu stricto) (1₁).

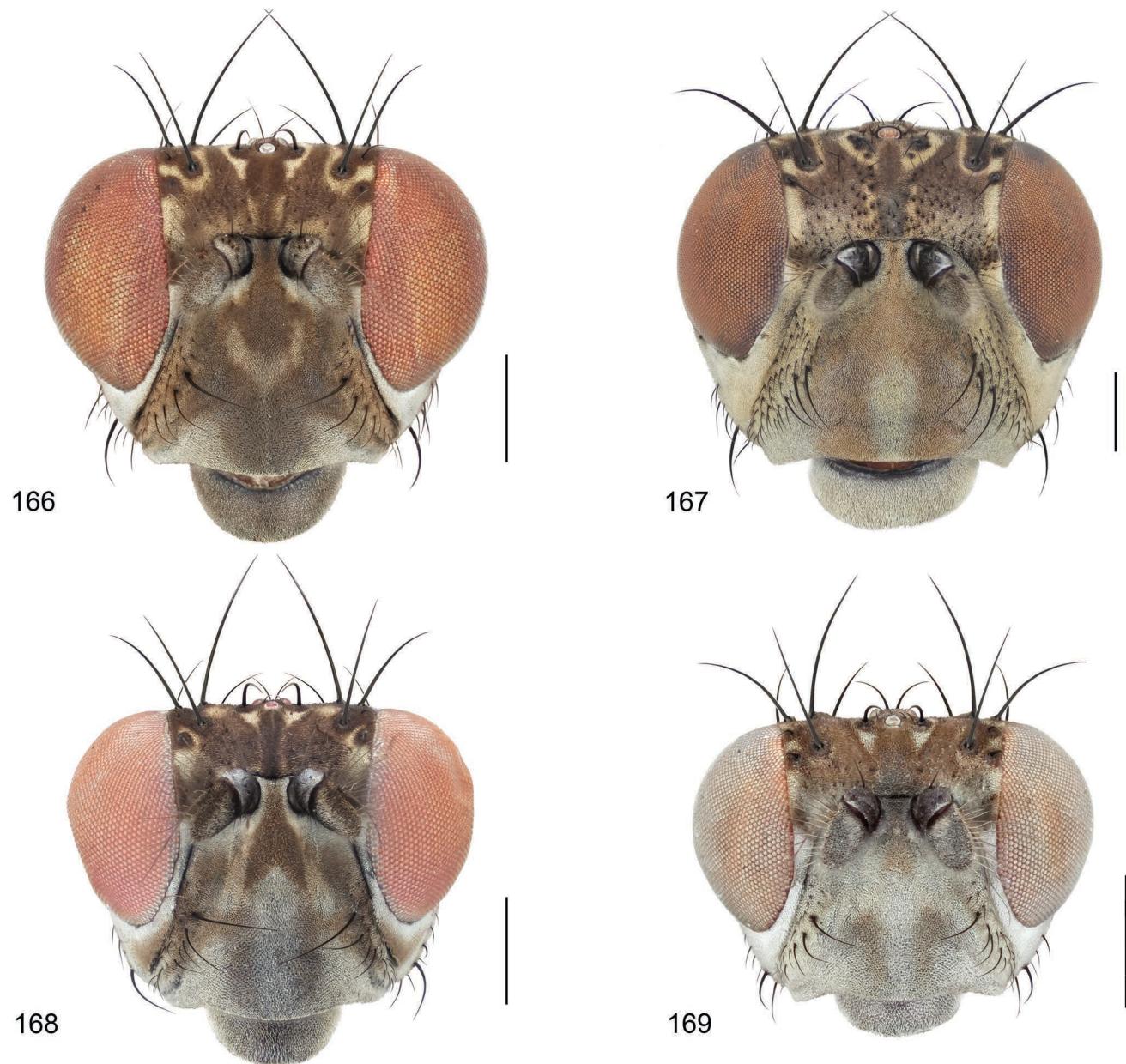
Cogan (1968) recognized seven species groups among Afrotropical species of the subgenus *Paralimna*: the *limbata* group (3 species), the *nigripes* group (12 species), the *nidor* group (3 species), the *arabica* group (8 species), the *confluens* group (6 species), the *albonotata* group (1 species), and the *wirthi* group (1 species). All species groups proposed by Cogan (1968) were represented in the analysis (at least two species of each species group) plus we sampled species from all zoogeographical regions. None of the groups proposed by Cogan (1968) was confirmed except for the *limbata* group, which is supported by three synapomorphies: basal flagellomere elongated and slender with dorsal margin concave (14₁); general coloration of the body striped dorsally and laterally, with defined bands (16₂); and pleural area horizontally striped (17₄); and two homoplasious synapomorphies: face long, at least twice the length of frons (1₁) and posteroventral setae of the male forefemur not differentiated from adjacent setae (21₁).

The subgenus *Phaiosterna* emerged as a monophyletic group supported by six synapomorphies: scutum unicolorous, dark (16₁); aedeagus wide in dorsal view, not tubular (29₁); lateral aedeagal process as long as the aedeagus (30₁); coloration of body metallic (15₁); tergites homogeneously colored (24₁); and horizontal process of presurstylus connected dorsally (27₁) (the last three are homoplasious characters). A clade is formed by the

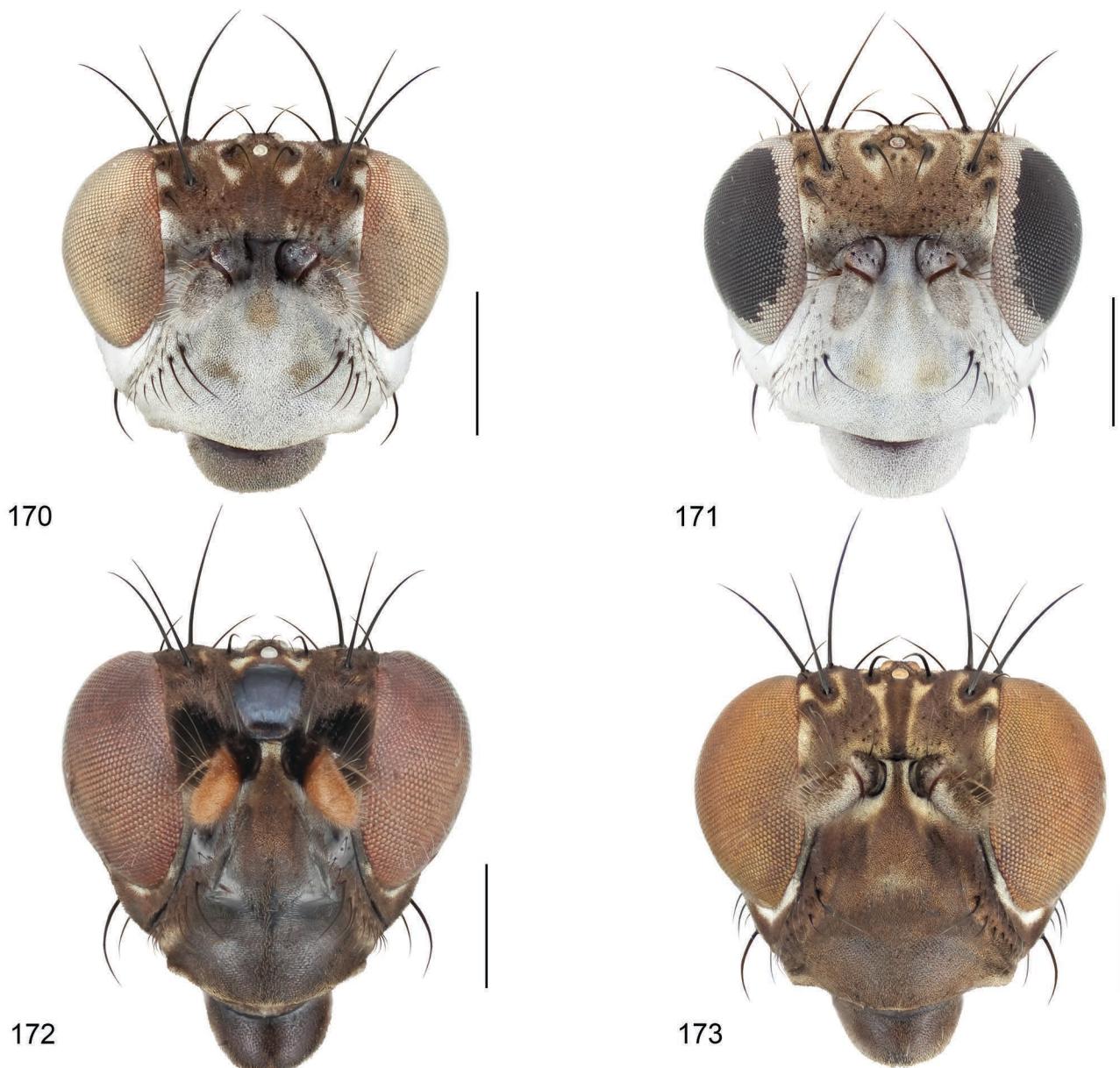
FIGURES 162-215



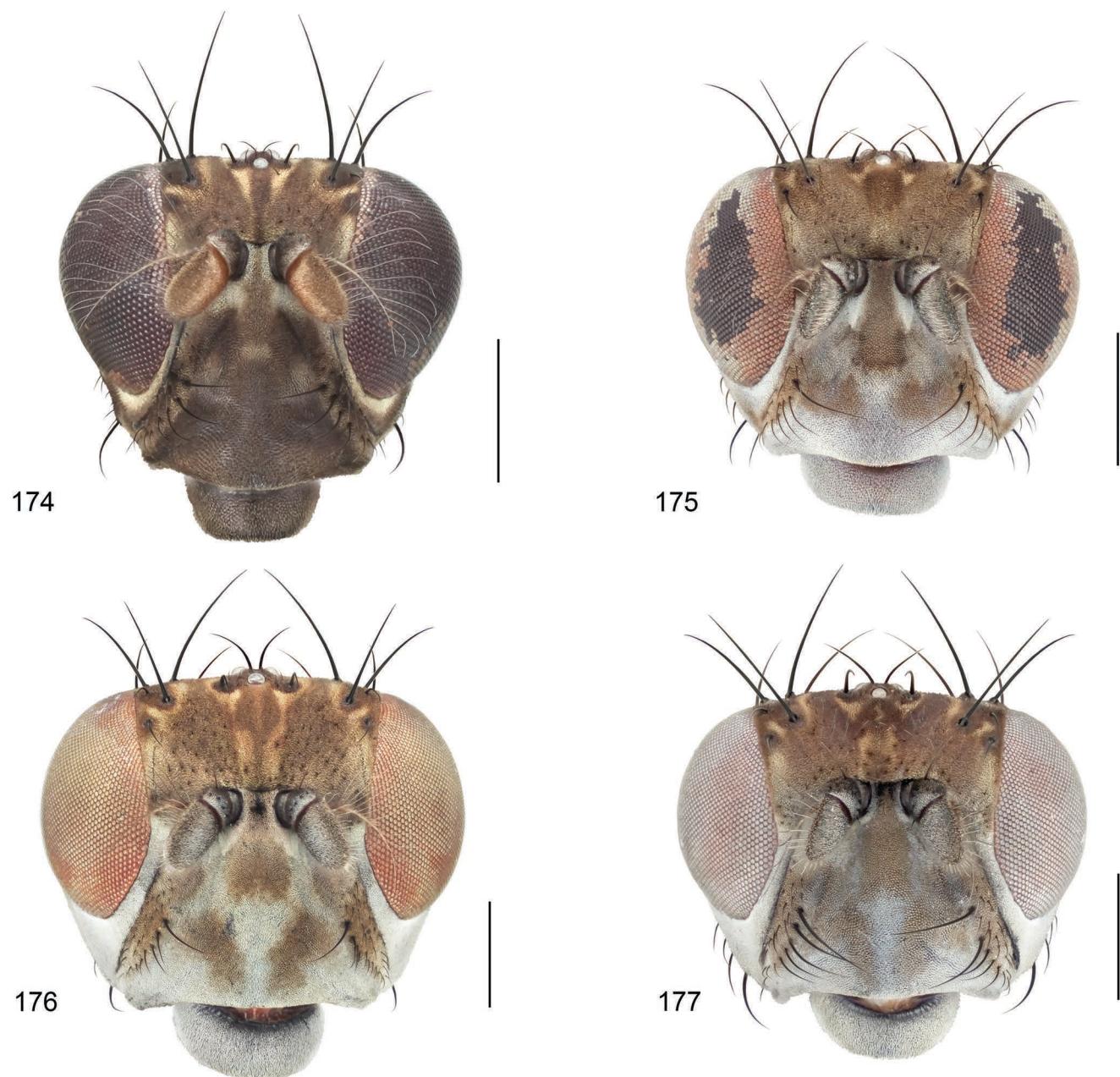
FIGURES 162-165. Photographs of heads, anterior aspect (all scale bars = 0.5 mm): (162) *Paralimna adunca*, sp. nov. (Mexico. Morelos); (163) *Paralimna argyrostoma* Cresson (Costa Rica. Limón); (164) *Paralimna aurantia*, sp. nov. (Bolivia. La Paz); (165) *Paralimna brunneiceps* Cresson (Costa Rica. Guanacaste).



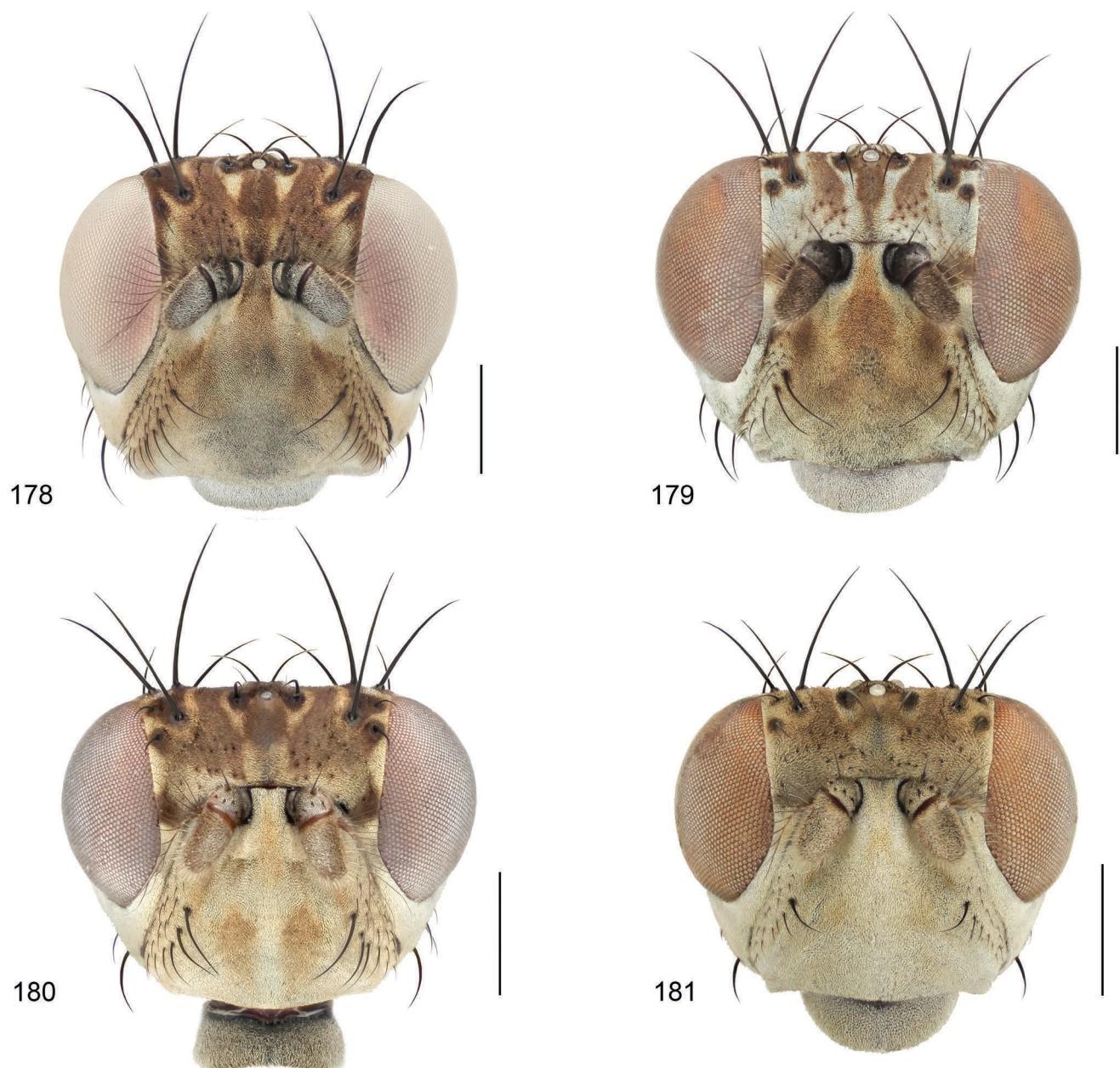
FIGURES 166–169. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (166) *Paralimna castanea*, sp. nov. (Trinidad and Tobago. Tobago); (167) *Paralimna crinita*, sp. nov. (Costa Rica. Puntarenas); (168) *Paralimna curta*, sp. nov. (Brazil. Amazonas); (169) *Paralimna ecuadorensis*, sp. nov. (Ecuador. Manabí).



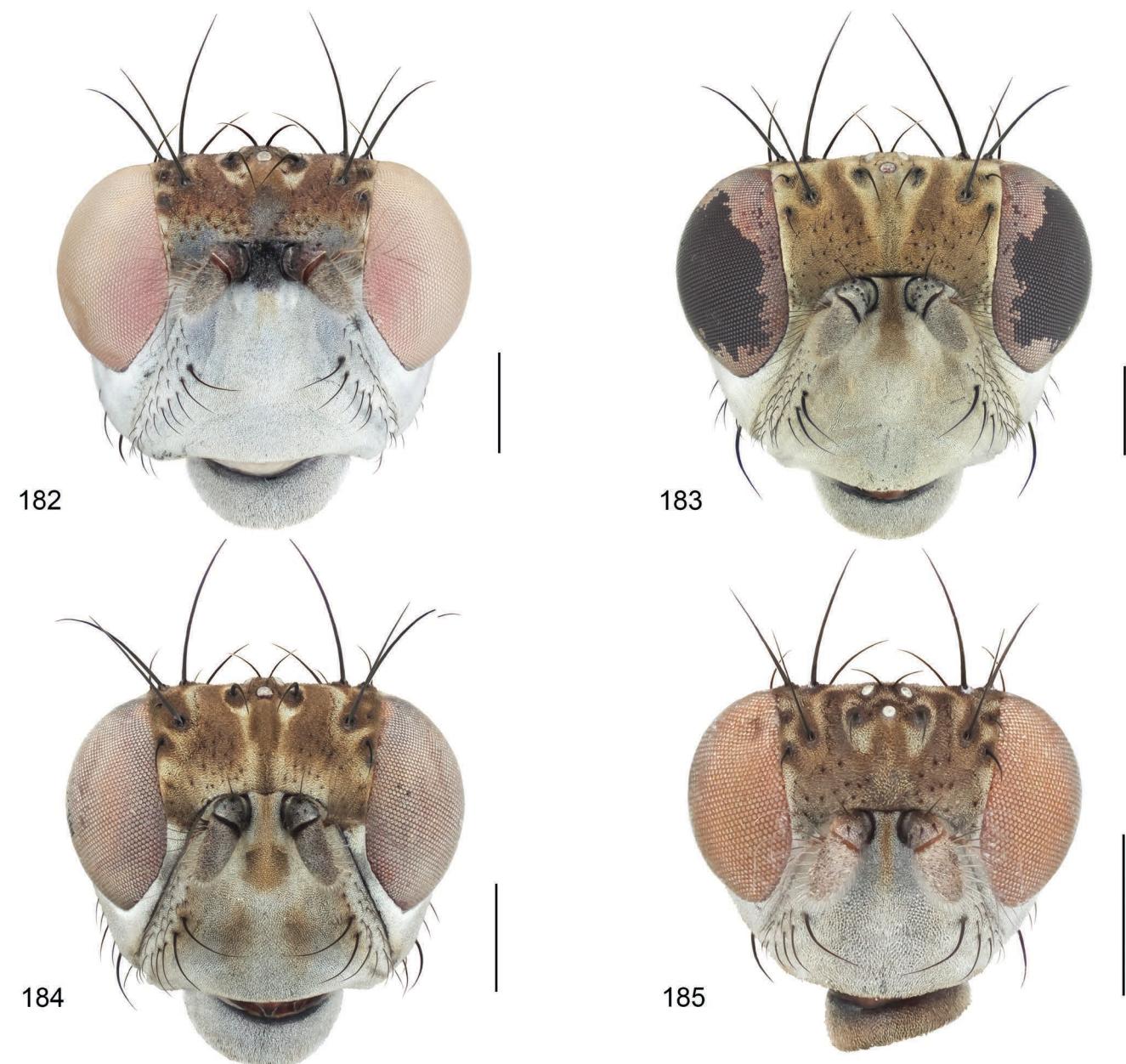
FIGURES 170–173. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (170) *Paralimna fellerae* Mathis (Belize. Stann Creek); (171) *Paralimna flexineuris* Cresson (Ecuador. El Oro); (172) *Paralimna fulgifrons*, sp. nov. (Peru. Loreto); (173) *Paralimna guttata*, sp. nov. (Brazil. Amazonas).



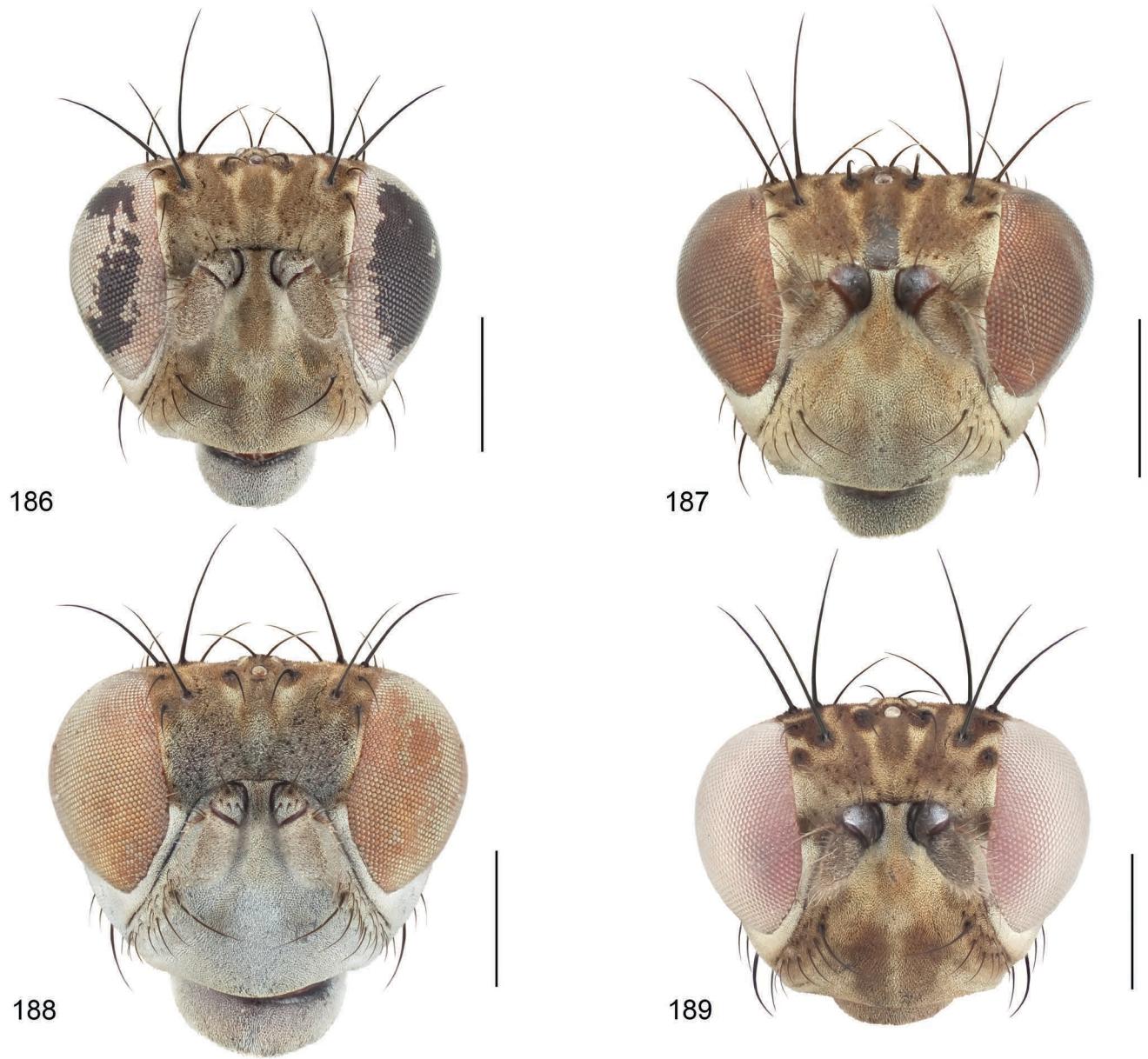
FIGURES 174–177. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (174) *Paralimna guttata*, sp. nov. (Brazil. Amazonas); (175) *Paralimna maculata*, sp. nov. (Dominican Republic. Monseñor-Nouel); (176) *Paralimna malleata*, sp. nov. (Dominica. Layou Valley, Clarke Hall Estate); (177) *Paralimna meridionalis* Cresson (Costa Rica. San José).



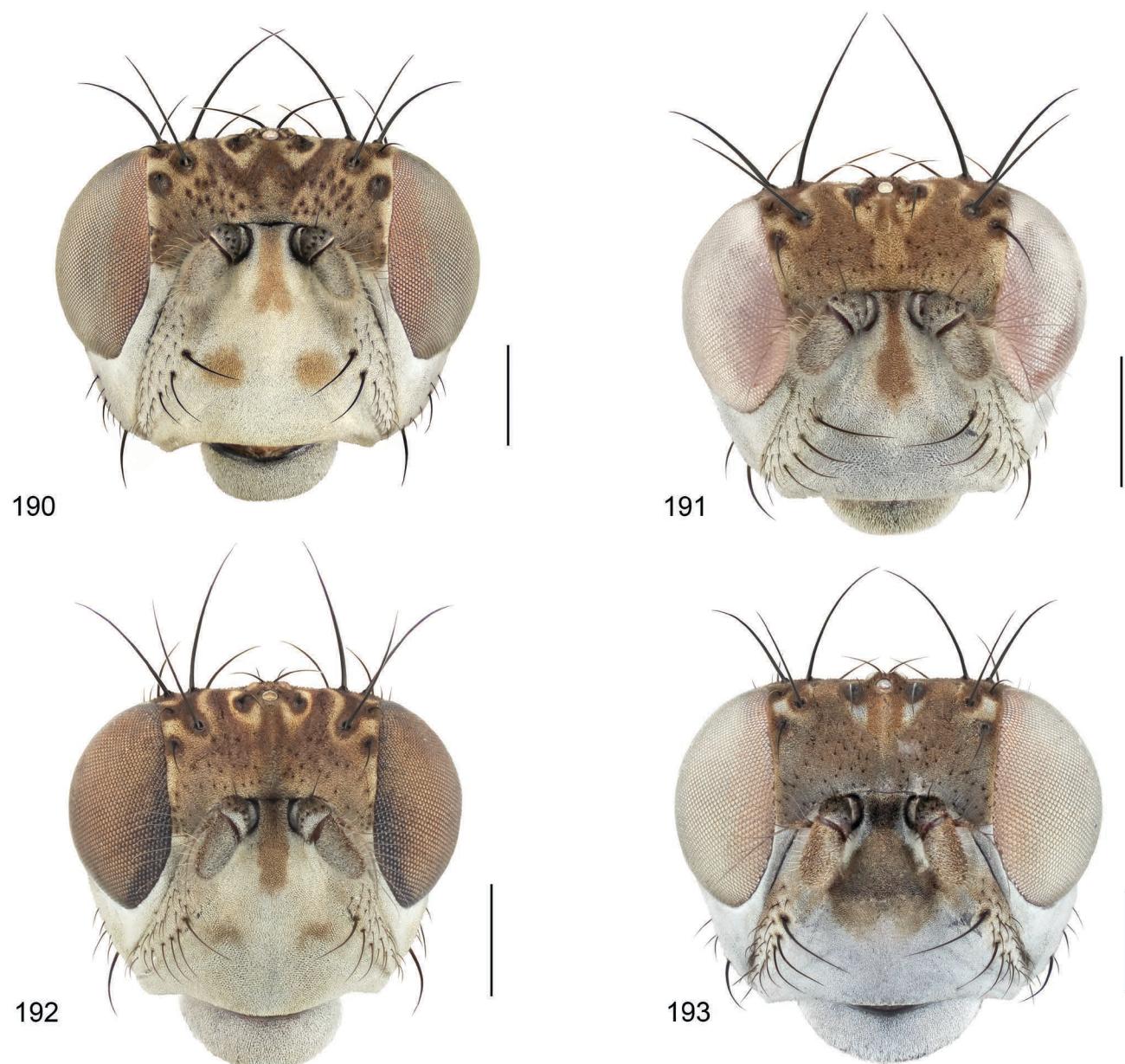
FIGURES 178–181. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (178) *Paralimna meridionalis* Cresson; (179) *Paralimna molossus* Schiner (Venezuela. Valle Seco); (180) *Paralimna molossus* Schiner (Bolivia. La Paz); (181) *Paralimna thomae* (Wiedemann).



FIGURES 182–185. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (182) *Paralimna nigropicta* Cresson (Costa Rica. Puntarenas); (183) *Paralimna pallida*, sp. nov. (Brazil. Amazonas); (184) *Paralimna pauca*, sp. nov. (Dominican Republic. Independencia); (185) *Paralimna pectinata* Hendel (Guyana. Karanambo).



FIGURES 186–189. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (186) *Paralimna piger* Cresson (Ecuador. Guayas); (187) *Paralimna pleurivittata* Cresson (Peru. Madre de Dios); (188) *Paralimna plumbiceps* Cresson (Puerto Rico. Adjuntas); (189) *Paralimna puncticornis* Cresson (Costa Rica. Heredia).



FIGURES 190–193. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (190) *Paralimna punctipennis* (Wiedemann) (USA. Virginia, Stafford); (191) *Paralimna sana* Cresson (Bolivia. Santa Cruz); (192) *Paralimna secunda* Schiner (Territorio Federal Amazonas); (193) *Paralimna sera* Cresson (Jamaica. St. Andrew).



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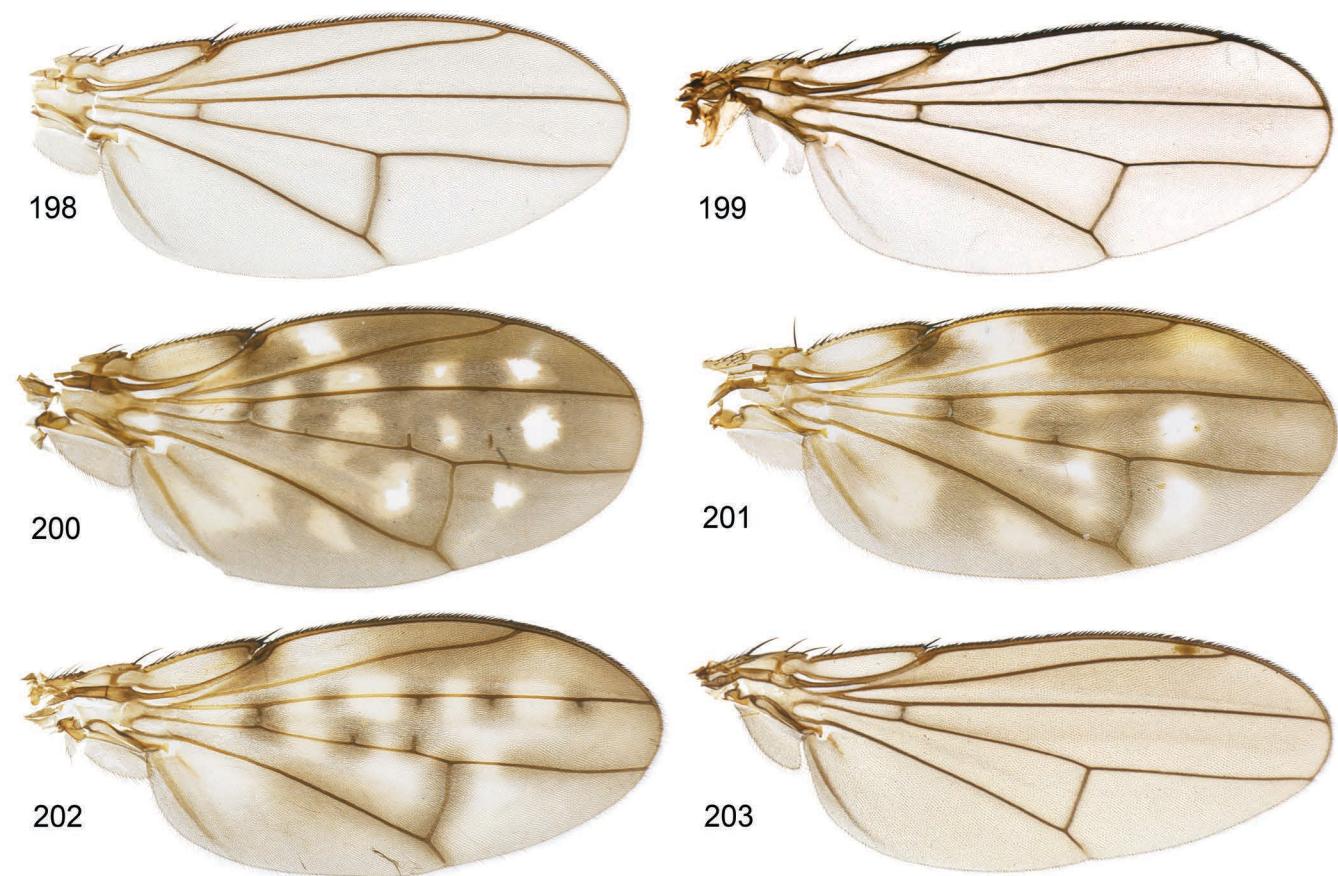


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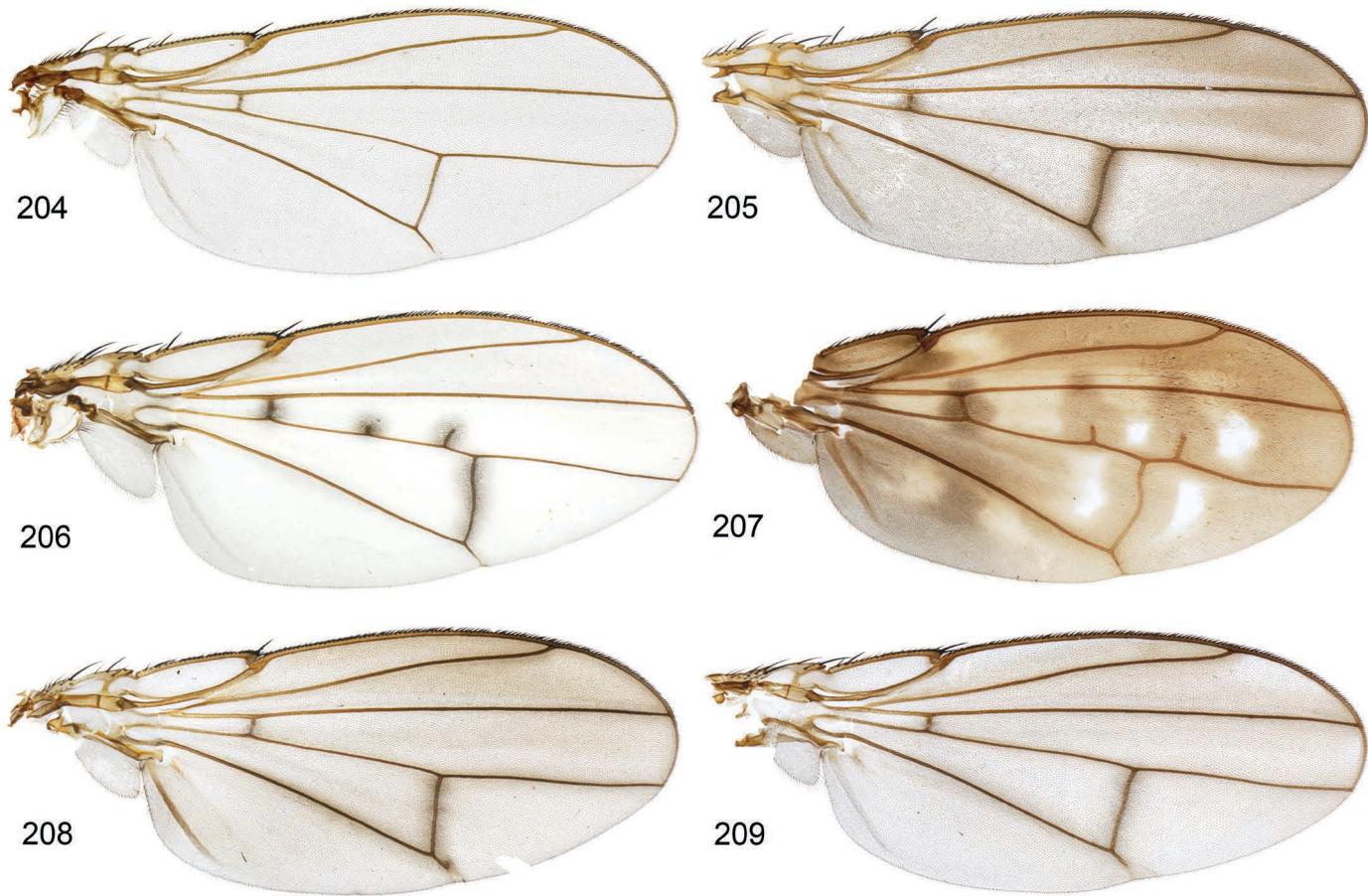


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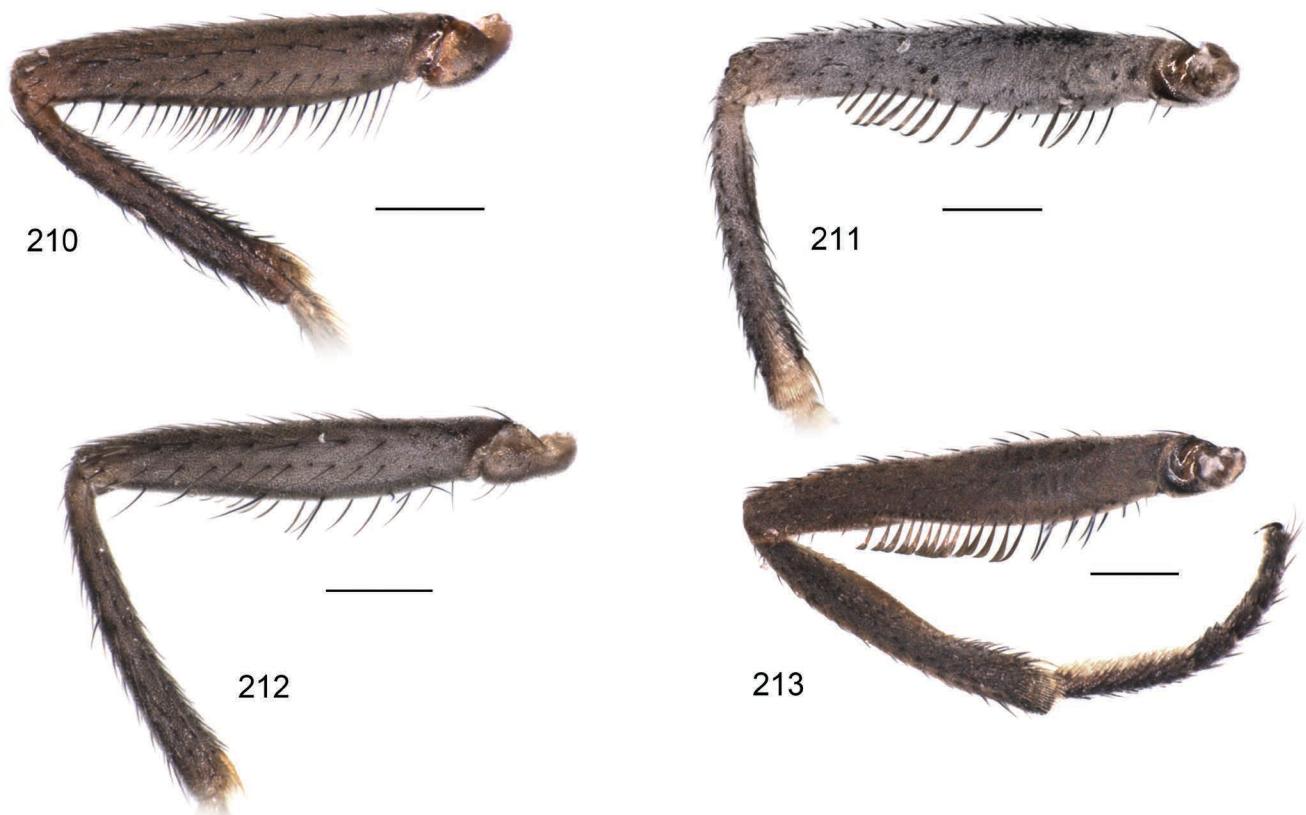
FIGURES 194–197. Photographs of heads, anterior aspect (scale bars = 0.5 mm): (194) *Paralimna stellata*, sp. nov. (Ecuador. Pastaza); (195) *Paralimna stigmata*, sp. nov. (Brazil. Amazonas); (196) *Paralimna texana* Cresson (USA. Texas); (197) *Paralimna velutina*, sp. nov. (Guyana. Paramakatoi).



FIGURES 198–203. Photographs of wings, dorsal aspect: (198) *Paralimna castanea*, sp. nov. (Trinidad and Tobago. Tobago: St. John); (199) *Paralimna crinita*, sp. nov. (Costa Rica. Puntarenas); (200) *Paralimna fulgifrons*, sp. nov. (Brazil. Amazonas); (201) *Paralimna guttata*, sp. nov. (Brazil. Amazonas); (202) *Paralimna guttata*, sp. nov. (Brazil. Amazonas); (203) *Paralimna malleata*, sp. nov. (Dominica. Clarke Hall).



FIGURES 204–209. Photographs of wings, dorsal aspect: (204) *Paralimna pauca*, sp. nov. (Dominican Republic. Independéncia); (205) *Paralimna pleurivittata* Cresson (Peru. Madre de Dios); (206) *Paralimna punctipennis* (Wiedemann) (USA. Virginia); (207) *Paralimna stellata*, sp. nov. (Ecuador. Pastaza); (208) *Paralimna stigmata*, sp. nov. (Brazil. Amazonas); (209) *Paralimna velutina*, sp. nov. (Brazil. Pará).



FIGURES 210–213. Photographs of legs, anterior aspect (scale bars = 0.5 mm): (210) *Paralimna brunneiceps* Cresson (Costa Rica. San José); (211) *Paralimna flexineuris* Cresson (Ecuador. Manabí); (212) *Paralimna molossus* Schiner (Bolivia. La Paz); (213) *Paralimna pectinata* Hendel (Bolivia. Cochabamba).

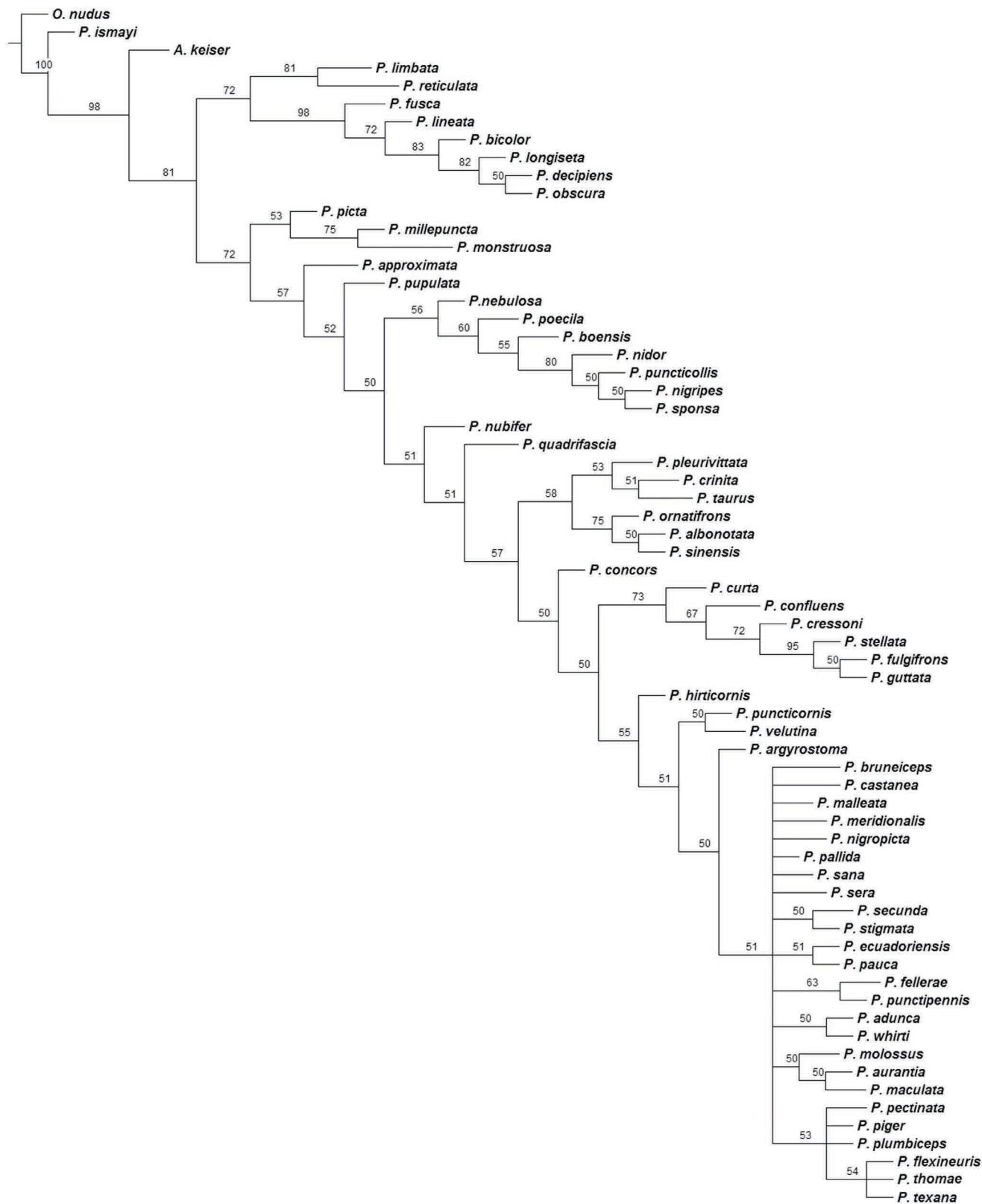


FIGURE 214. Consensus cladogram, with bootstrap values, of hypothetical relationships among species of *Paralimna*.

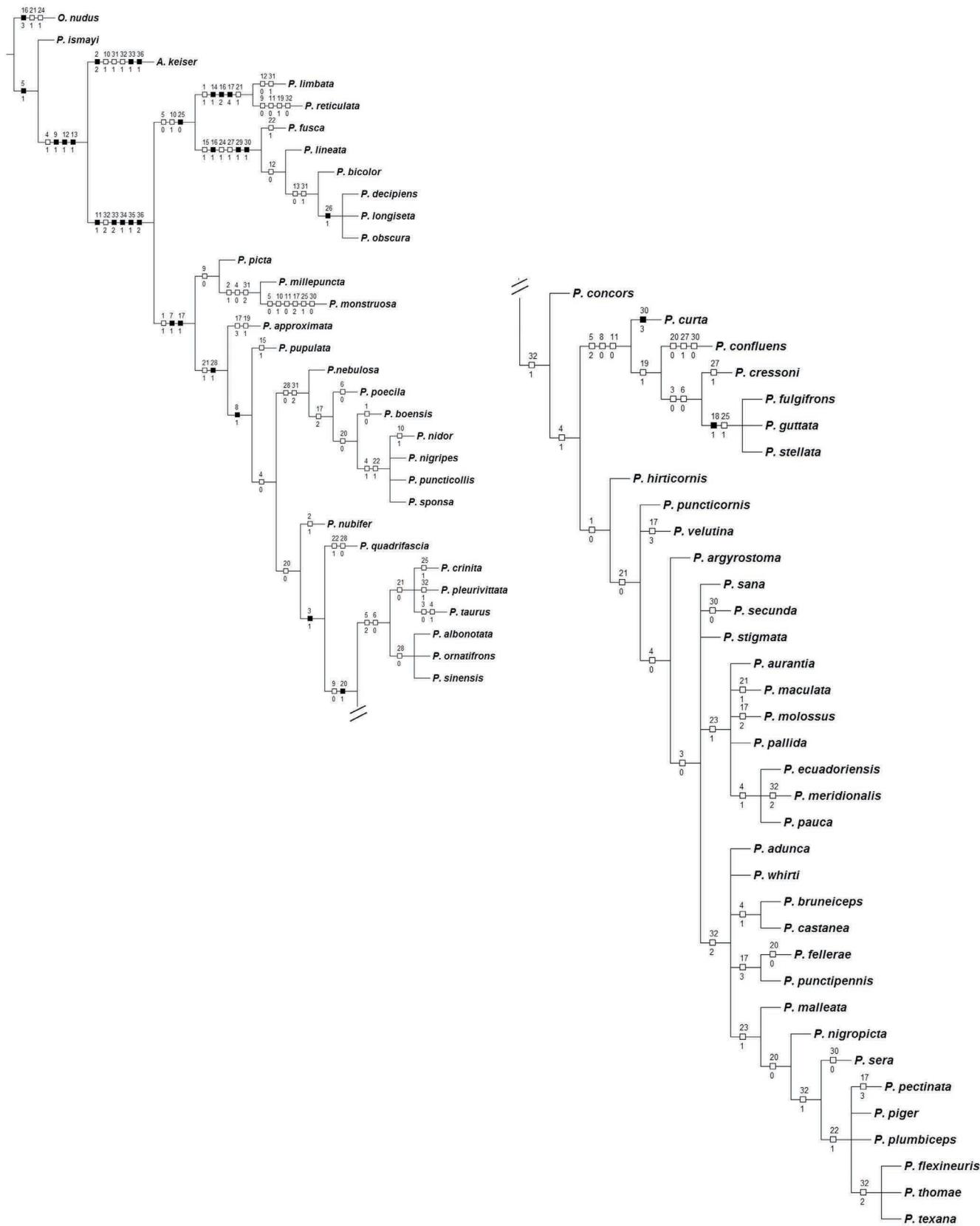


FIGURE 215. One of 100 trees, obtained from the analysis of the unordered 36 characters and 67 taxa, chosen to represent the hypothetical relationships among species of *Paralimna*. Consistency index = 0.40; retention index = 0.81; 127 steps; slow optimization used. Empty squares represent homoplasious synapomorphies; filled squares represent non-homoplasious synapomorphies.

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