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Revision of Ephydrini Zetterstedt (Diptera: Ephydridae) from the Americas south of the United States

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Abstract

The Neotropical genera and species of the tribe Ephydrini are revised and include nine genera and 33 species. Of the nine genera, *Setacera* Cresson, *Cirrula* Cresson, *Dimecoenia* Cresson, *Paracoenia* Cresson and *Ephydra* Fallén are mostly temperate in distribution, primarily in the Northern Hemisphere. The other four genera, which are exclusively Neotropical, include two, *Austrocoenia* and *Notiocoenia,* that were treated previously in the tribe Scatellini, and two recently described genera: *Paraephydra* (type species: *Paraephydra freitasi* (Oliveira)) and *Neoephydra* (type species: *Neoephydra araucaria* Mathis). New species described herein are: *Neoephydra neotropica* (Chile), *N. dasycephala* (Argentina and Peru), *N. mallonota* (Argentina, Bolivia, and Chile), *N. shewelli* (Argentina, Bolivia, and Chile), *N. inca* (Argentina, Bolivia, Peru), *N. penai* (Chile) and *N. trichina* (Argentina and Chile). New synonyms are (cited in their original combinations): *Ephydra densepilosa* Hendel = *E. ciligena* Rondani, *Dimecoenia grumanni* Oliveira = *E. ciligena* Rondani, *D. coltaensis* Cresson = *D. zurcheri* Hendel, *D. carrerai* Oliveira = *D. zurcheri* Hendel, *D. lopesi* = *E. ciligena* Rondani, *D. travassosi* Mello and Oliveira = *E. prionoptera* Thomson. A neotype is designated for *E. caesia* Wulp, and the following lectotype designations have also been made to better stabilize nomenclature (here cited in their original combination): *Ephydra chilensis* Macquart, *Ephydra densepilosa* Hendel, *Ephydra pravoneura* Hendel, *Ephydra prionoptera* Thomson, and *Dimecoenia zurcheri* Hendel. *Dimecoenia venteli* Oliveira is listed as a species *inquirenda*, as the type series includes only female specimens that we cannot presently recognize. Although the genera and subgenera are fairly easily distinguished, the included species are frequently difficult to separate, and we have generally relied on characters of the male terminalia to determine a species identity. Illustrations of male terminalia and distribution maps are included for each species and keys to all taxa have been provided.

Key words: Diptera, Ephydridae, Ephydrini, neotropics, new species, taxonomy

Introduction

Characterization of the tribe Ephydrini dates to Wirth and Stone (1956), but for purposes of nomenclature, the authorship and date of the tribe are attributed to Zetterstedt (1837) who first proposed the family-group name. Wirth and Stone's (1956) characterization of Ephydrini and Scatellini was in a key to North American genera and established the tribal precedent followed by most workers since then and largely without modification (Wirth 1965, 1968, Cogan and Wirth 1977, Cogan 1980, Wirth *et al.* 1987, Mathis 1989, Mathis and Zatwarnicki 1995, 1998). In a series of papers, however, Mathis and Shewell (1978) and Mathis (1979a, 1979b, 1980, 1982a), have suggested that Scatellini, as then characterized, was paraphyletic, including Ephydrini as a sublineage and as the hypothetical sister group of *Paracoenia* Cresson plus related genera. Even though the tribe Scatellini is paraphyletic, the tribe Ephydrini is undoubtedly monophyletic (see characterization of Mathis and Simpson 1981, Mathis 2008, and diagnosis below, p. 6–7), and the objectives of this study are to further characterize Ephydrini and all included subtaxa from the Neotropics without further modification of the classification. Substantive changes in the classification are temporarily being held in abeyance, awaiting the completion of a study, now in progress, in which the higher classification of the subfamily Ephydrinae will be elaborated and more thoroughly characterized.

The history of Neotropical taxa included in Ephydrini is relatively recent and uncomplicated, mostly occurring in the 20th Century. With the exception of Wirth (1968), previous studies dealing with taxa of the tribe were isolated species descriptions of at most a few related species of one genus. No comprehensive study of Neotropical Ephydrini is available. The literature for Neotropical taxa previously treated is given in the appropriate synonymical bibliographies, and we have attempted to make these complete.

Methods and materials

Generally we have followed the descriptive format and procedures established in previous papers (Mathis and Shewell 1978, Mathis 1979a, 1979b, 1980, 1982a, 1982b, Mathis and Simpson 1981). Five head and three venational ratios that are used in the descriptions are defined below (all ratios are based on three specimens—the largest, smallest, and one other). We use the term basal flagellomere for the large antennomere beyond the pedicel. We prefer this term over "first flagellomere" as there may be more than one flagellomere involved, and basal does not imply a number or numbers. We likewise do not use "postpedicel" (Stuckenberg 1999) for this antennomere because at least the multisegmented arista is beyond the pedicel in addition to the large antennomere, and postpedicel is thus ambiguous and lacking in precision.

Head Ratio: Head width/head height. Both measurements are maximum distances and are taken from the head in an anterior view.

Frontal Ratio: Frontal width/frontal length. The width measurement is taken at the level of the anterior ocellus. The length measurement is taken between the level of the posterior ocelli and the anterior margin. Both measurements are maximum distances.

Facial Ratio: Facial width/facial height. Facial width is the narrowest distance between the compound eyes. Facial height is the distance between the ptilinal suture and the oral margin, as measured in a straight line between the antennal bases. Both measurements are maximum distances and are measured from the head in an anterior view.

Eye Ratio: Eye width/eye height. Both measurements are taken from the eye in lateral view and represent maximum distances.

Gena-to-Eye ratio: genal height measured at the maximum eye height divided by the eye height.

Wing Ratio: Wing width (maximum straight-line width)/wing length (from base of cell bm to apex).

Costal vein ratio: the straight line distance between the apices of veins R_{2+3} and R_{4+5}/distance between the apices of veins R_1 and R_{2+3}.

M vein ratio: the straight line distance along vein M between crossveins (dm-cu and r-m)/distance apicad of dm-cu.

The descriptive terminology, with the exceptions noted in Mathis (1986), Mathis & Zatwarnicki (1990b), and Mathis *et al.* (2012), follows that published in the *Manual of Nearctic Diptera* (McAlpine 1981). Because specimens are small, usually less than 3.5 mm in length, study and illustration of the male terminalia required use of a compound microscope. We have followed the terminology for most structures of the male terminalia that other workers in Ephydridae have used (see references in Mathis 1986, and Mathis & Zatwarnicki 1990a, 1990b), such as surstylus. Zatwarnicki (1996) suggested that the pre- and postsurstylus correspond with the pre- and postgonostylus and that the subepandrial plate is the same as the medandrium. The species descriptions are composite and not based solely on the holotypes.

In the synonymical bibliographies, each entry, with the exception of the original description, is annotated within brackets, and these are self explanatory, i.e., [catalog], [revision], etc.

The geographic coverage used in this paper is that of the Neotropical catalog of Diptera or all of the New World below the United States-Mexican border and includes all of the Neotropical Region plus some portions of northern Mexico (Sabrosky 1966). This coverage is in accord with the two major regional catalogs for New World taxa of the family Ephydridae (Wirth 1965, 1968). Only localities within this coverage are included on the distribution maps. For the "Distribution" section provided for each species, however, we have attempted to be comprehensive, including data beyond the immediate coverage of this revision.

Acknowledgments

Numerous persons and institutions have cooperated to make this study possible. We express our appreciation for their consideration, especially to the curators, and their respective institutions, for loaning specimens (an asterisk indicates collections from which type specimens were borrowed).

ANSP Academy of Natural Sciences of Philadelphia, Pennsylvania (Jon K. Gelhaus, Jason D. Weintraub)

BMNH The Natural History Museum, London, England (Brian Pitkin, John E. Chainey, Nigel Wyatt)
CAS California Academy of Sciences, San Francisco, California (Paul H. Arnaud, Jr.)
CNC Canadian National Collection, Ottawa, Ontario, Canada (J. R. Vockeroth, deceased)
DEI Deutsches Entomologisches Institut, Müncheberg, Germany (Frank Menzel)
DZUP Coleção Entomológica Pe. Jesus Santiago Moure, Department of Zoology, Federal University of Paraná, Curitiba, Brazil (Claudio José Barros de Carvalho)
FML Fundación Miguel Lillo, Tucumán, Argentina (Mercedes Lizarralde de Grosso)
IOC Instituto Oswaldo Cruz, Rio de Janeiro, Brazil (Jane Costa)
MCZ Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Margaret Thayer, Norman E. Woodley, Philip D. Perkins)
MNHN Museum National d'Histoire Naturelle, Paris, France (Loïc Matile, deceased)
MZUF Museo Zoologica Università Firenze ("La Specola"), Florence, Italy (Sarah Mascherini)
MZUSP Museu de Zoologia da Universidade de São Paulo, Brazil (Francisca C. do Val, Nelson Papavero, Carlos Lamas)
NMW Naturhistorisches Museum, Wien, Austria (Ruth Contreras-Lichtenberg, Peter Sehnal)
NRS Naturhistoriska Riskmuseet, Stockholm, Sweden (Thomas Pape, Per Inge Persson)
SMNS Staatliches Museum für Naturkunde in Stuttgart, Ludwigsburg, Germany (Hans-Peter Tschorsnig)
USNM former United States National Museum, collections in the National Museum of Natural History, Smithsonian Institution, Washington, D. C.

Erin Kolski prepared the distribution maps. The plate of *Cirrula hians* (Say) (head and thorax) were assembled by Karolyn (Karie) Darrow, who also expertly produced these amazing photographs. Karie also helped with assembling all Figs. and plates. L. Michael Druckenbrod rendered the frontispiece of *Neoephydra araucaria* Mathis. Their expertise and contributions are greatly appreciated.

The manuscript was critically reviewed by Mercedes Lizarralde de Grosso and Oliver S. Flint, Jr. We also thank S. Dillon Ripley, deceased and former Secretary Emeritus of the Smithsonian Institution, for financial support to conduct field work through a Fluid Research Grant.

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Taxonomy

Tribe Ephydrini Zetterstedt

Ephydrini Zetterstedt 1837: 48 [as Ephydrinae].—Wirth and Stone 1956: 45 [first formal use and diagnosis as a tribe].—Mathis and Zatwarnicki 1995: 235–254 [world catalog].

Diagnosis. Specimens of Ephydrini may be distinguished from other Ephydridae by the following combination of character states.

Adult: Head: Mesofrons subquadrate, slightly wider posteriorly, with shiny, metallic luster; frequently with convergent, interfrontal setae inserted near anterior margin of mesofrons; dorsum of interfoveal hump usually shiny, with metallic luster, concolorous with mesofrons; fronto-orbital setae lateroclinate, 2 or more; face

protruding, setulose to densely pilose, marginal setae larger; dorsum of interfoveal hump sometimes shiny; eye bare, usually as long as high, oval, and generally oriented obliquely to plane of epistoma; gena high, bearing a large genal seta and evenly covered with smaller setae; facial setae along oral margin usually dense and long; oral opening large, gaping, usually concealing clypeus. *Thorax:* Dorsocentral setae 4–5 (1+3, 2+3), some setae sometimes weakly developed, the posteriormost seta displaced laterally from alignment of others; intrapostalar seta well developed, at least equal to 1/2 length of postalar seta; postsutural supra-alar seta well developed, subequal to postalar seta; notopleuron sparsely setulose; proepisternum setulose; prosternum setose, usually more evident along posterior margin near forecoxae; anepisternum bearing 1 large seta near middle along posterior margin, several smaller setae or setulae may also be present; anepimeron, meron, and metapleuron bare of setae; hindcoxal strap setose; pulvilli rudimentary or lacking; tarsal claws shallowly curved and usually elongate; costal vein extended to vein M; vein R_{2+3} long, terminating at approximately same distance from vein R_{4+5} as tip of vein M is from vein R_{4+5}. *Abdomen:* Male with 5 visible abdominal tergites, tergite 5 distinctly trapezoidal or triangular; female with 6, sometimes 7, visible tergites, tergite 5 subtrapezoidal, not triangular.

Third-Instar Larva: Mouthhooks not joined together basally, each mouthhook spatulate and dentate marginally; anterior spiracles with 2–8 marginal papillae; posterior spiracles borne distally on bifid, retractile respiratory tube, tube 1/3–1/6 total body length; spiracular caps each bearing 4 spiracular openings (or series of openings), openings slitlike, oval, each bordered basally by hydrofuge interspiracular process; segments 5–12 with ventral prolegs bearing crochetlike spines in well-defined rows; dorsal patterns composed of flattened spines usually present; if prolegs and dorsal patterns absent, then spiracular openings subdivided and spiracular caps elongate.

Discussion. Larvae of most Ephydrini are easily recognized by their elongate respiratory tube, ventral prolegs, and dorsal pattern of spines. The larvae of *Dimecoenia* are exceptional in not having conspicuous prolegs but can be distinguished by the shape of their mouthparts, the unique structure of the posterior spiracles, and their habitat distribution (salt marshes).

The monophyly of the tribe Ephydrini is well established, being based on the following synapomorphies: 1. *Setal vestiture of prosternum:* In members of Ephydrini, the prosternum is setulose to setose, especially ventrally and posteriorly around the coxal cavities, but usually more extensively. The generalized condition in the family is for the prosternum to be bare of setae. 2. *Hindcoxal strap:* The hindcoxa has a strap that extends around the posterior side. This strap bears four or five setae in members of Ephydrini. Elsewhere in the family the strap is bare. 3. *Pulvilli:* With few exceptions in the family, the pulvilli are evident as conspicuous pads beneath the tarsal claws. In members of Ephydrini, however, the pulvilli are either rudimentary or are apparently lacking. 4. *Tarsal claws:* The tarsal claws are shallowly curved and are usually elongate in members of Ephydrini. The generalized condition is for claws to be conspicuously curved and short. 5. *Larval prolegs:* With the exception of a secondary loss in *Dimecoenia,* larvae of Ephydrini have prominent, ventral prolegs that bear crochets. These structures are an adaptation to the algal-mat habitat of the immatures of these flies and assist in grasping the substrate. The secondary loss of prolegs in larvae of *Dimecoenia* apparently occurred as the latter shifted back to a mud-shoreline habitat. Larvae of *Dimecoenia* have creeping welts, similar to those of other mud inhabiting Ephydridae (Mathis and Simpson 1981). 6. *Habitat of immatures:* The generalized habitat for the subfamily Ephydrinae is probably shoreline mud. This is the habitat of most species of Scatellini and Parydrini. However, members of Ephydrini have adapted to algal mats on the surface of both lentic and lotic water systems.

Although the tribe Ephydrini is undoubtedly monophyletic, its companion tribe, Scatellini, is not. Ephydrini are but one of several monophyletic lineages arising from the ancestral lineage that now comprises the concept of Scatellini (Mathis 1979c, 1980).

Key to Genera and Subgenera of Ephydrini Zetterstedt

1. Prosternum setulose on at least posterior portion. Pulvilli much reduced or absent; tarsal claws long and nearly straight 2
- Prosternum bare. Pulvilli well developed; tarsal claws short and distinctly curved 11
2. Basal flagellomere bearing a large lateral seta just below insertion of arista . . . . . *Setacera* Cresson
- Basal flagellomere without a lateral seta. 3
3. 3 or more well-developed fronto-orbital setae. Anterior presutural supra-alar seta usually well developed, subequal to notopleural setae 4

- 2 well-developed fronto-orbital setae present. Anterior presutural supra-alar seta absent or much reduced, much smaller than posterior notopleural seta 7
4. 5–6 well-developed fronto-orbital setae . . . . . *Neoephydra* Mathis
- 3–4 well-developed fronto-orbital setae 5
5. 2 presutural dorsocentral setae, anterior seta sometimes rather short. Face very thickly setulose; arista short, weakly haired, thicker on its basal half; usually 2 posteriorly directed rows of well-developed cruciate interfrontal setae present, with these rows closer to orbital setae than to each other. Male with basitarsomere of foreleg bearing ventral tuft of long setulae near tip . . . . . *Ephydra (Hydropyrus* Cresson)
- 1 presutural dorsocentral seta. Face with 1 well-developed row of facial setae and 1 of oral setae, otherwise thinly short-haired; arista without markedly swollen basal region; usually not more than 1 pair of interfrontal setae situated as close to each other as to orbital setae. Male with basitarsomere of foreleg without ventral tuft of setulae 6
6. 1 well-developed interfrontal seta present; palpus well developed. Crossvein dm-cu making nearly a right angle with vein CuA_1 . . . . . *Ephydra (Ephydra* Fallén)
- Interfrontal seta weak or absent; palpus small. Crossvein dm-cu forming an acute angle with vein CuA_1. . . . . *Ephydra (Halephydra* Wirth)
7. Cruciate interfrontal setae present. 8
- Cruciate interfrontal setae absent 10
8. Dorsocentral setae 4 (1+3). Arista bearing subpectinate dorsally-branching rays on basal 1/2 . . . . . *Paraephydra* Mathis
- Dorsocentral setae 5 (1+4). Arista at most minutely haired on basal 1/2 9
9. Aristal rays long, length subequal to width of pedicel. Hindfemur of male not differing markedly from fore- or midfemur, lacking stout setae as above; hindtibia of male lacking tuft of setulae; hindtarsi of male cylindrical, normal . . *Dimecoenia* Cresson
- Aristal rays short, length approximately 1/2 width of pedicel. Hindfemur of male conspicuously swollen, bearing short row of 4–5 stout setae along anteroventral surface toward base; hindtibia of male with ventroapical tuft of setulae; hindtarsi of male variously modified. . . . . *Cirrula* Cresson
10. A well-developed prescutellar acrostichal seta; 2 postpronotal setae, dorsal seta about 1/2 length of ventral seta; prosternal setulae few (Australasian) . . . . . *Ephydrella* Tonnoir and Malloch
- Lacking a well-developed prescutellar acrostichal seta; 1 postpronotal seta; prosternal setulae numerous (Neotropical) . . . . . *Neoephydra* Mathis
11. Dorsocentral setae 4 (1+3) present; postpronotal seta(e) either weak, at most 1/4 length of posterior notopleural seta, or lacking. Hindcoxa bare posteriorly 12
- Dorsocentral setae 5 (1+4) present (anterior setae reduced in *Austrocoenia*); postpronotal seta distinct, at least 1/2 as long as posterior notopleural seta. Hindcoxa bare or with a row of setae posteriorly. 13
12. Arista bearing long hairs dorsally, length of longest hairs subequal to height of basal flagellomere; frons only moderately to sparsely microtomentose, especially subshiny mesofrons (Holarctic) . . . . . *Coenia* Robineau-Desvoidy
- Arista either almost bare or bearing short hairs dorsally, length of longest hairs about 1/2 height of basal flagellomere; frons uniformly and densely microtomentose, dull, mesofrons little differentiated from parafrons . . . . . (Neotropical) . . . . . *Notiocoenia* Mathis
13. Paravertical seta large, at least 1/3 length of medial vertical seta. 14
- Paravertical seta small, generally subequal to setae of postocular row 16
14. R stem vein bearing 1–2 setulae dorsally, inserted beyond transverse septum. Scutellar disc convex. Hindcoxa with row of setae along posteroventral margin. . . . . *Paracoenia* Cresson
- R stem vein bare dorsally. Scutellar disc almost flat. Hindcoxa bare posteriorly along ventral margin (Genus *Calocoenia* Mathis) 15
15. Larger species, body length over 3.25 mm. Gena-to-eye ratio 0.25 or larger. Costal setulae well developed, projected anteriorly from ventral and dorsal surfaces . . . . . Subgenus *Calocoenia* Mathis
- Smaller species, body length under 2.75 mm. Gena-to-eye ratio 0.20 or smaller. Costal setulae weakly developed, only on dorsal surface . . . . . Subgenus *Leptocoenia* Mathis
16. Frons mostly lacking setulae and with coloration and vestiture generally uniform, microtomentose, dull; arista long, nearly double length of basal flagellomere. 1 interalar seta inserted just posterior of transverse suture. . . . . *Notiocoenia* Mathis
- Mesofrons tan to brown, generally distinct from grayer parafrons, microtomentum denser, conspicuously setulose, especially laterally; arista short, subequal to length of basal flagellomere. Interalar seta lacking . . . . . *Austrocoenia* Wirth

Genus *Austrocoenia* Wirth

Austrocoenia Wirth 1970: 3 [type species: *Austrocoenia aczeli* Wirth 1970, original designation].—Mathis 1980: 4–7 [revision].—Lizarralde de Grosso 1989: 59 [fauna of Argentina].—Mathis and Zatwarnicki 1995: 235 [world catalog].

Diagnosis. *Austrocoenia* is distinguished from other genera of Ephydrini by the following combination of characters: Medium-sized to large shore flies, body length 3.65–5.10 mm; coloration generally gray; wing mostly hyaline; setae generally reduced.

Head: Mesofrons conspicuously setulose, completely microtomentose, dull, lacking large setae, cruciate or

otherwise, parafrons more sparsely microtomentose; lateroclinate fronto-orbital setae 2; medial and lateral vertical setae both well developed; paravertical setae either reduced or lacking; antenna short; basal flagellomere lacking a lateral seta; basal flagellomere subequal in length to that of pedicel from dorsal view; arista short, only slightly longer than length of basal flagellomere, basal 2/3 thickened; antennal grooves deeply impressed; face long, distinctly protuberant anteriorly; facial setae small, setula-like; eye subspherical, slightly higher than wide; gena mostly bare, lacking a prominent seta, high, gena-to-eye ratio at least 0.60; maxillary palpus well developed.

Thorax: Acrostichal setae in 2 rows, these extended posteriorly to base of scutellum; well-developed, prescutellar, acrostichal seta 1, inserted slightly laterad of other acrostichal setulae; well-developed, dorsocentral seta 1, inserted near base of scutellum, with 3–4 larger setae along dorsocentral tract; postpronotal setae 1–2, these subequal in length to presutural supra-alar seta; postsutural supra-alar seta reduced or lacking; disc of scutellum bare; lateral scutellar setae 2; prosternum bare. Wing normally developed, mostly hyaline; costal margin with short spinelike setae; costal vein long, extended to vein M; R stem vein bare dorsally. Pulvilli well developed; tarsal claws short and distinctly curved; hindfemur of male not differing markedly from fore- or midfemur, lacking stout setae as above; hindtibia of male lacking tuft of setulae; hindtarsi of male cylindrical, normal.

Abdomen: Tergites generally setose, setae along margins larger. Males with 5 visible segments, with tergite 5 longest, trapezoidal, broadly truncate posteriorly; females with 7. Male terminalia: Cercus of male terminalia elongate, fused ventrolaterally with epandrium; surstylus evidently fused with ventral margin of epandrium; gonite plate-like; aedeagus greatly reduced; female ventral receptacle with operculum subtrapezoidal, asymmetrical, extended process more or less C-shaped.

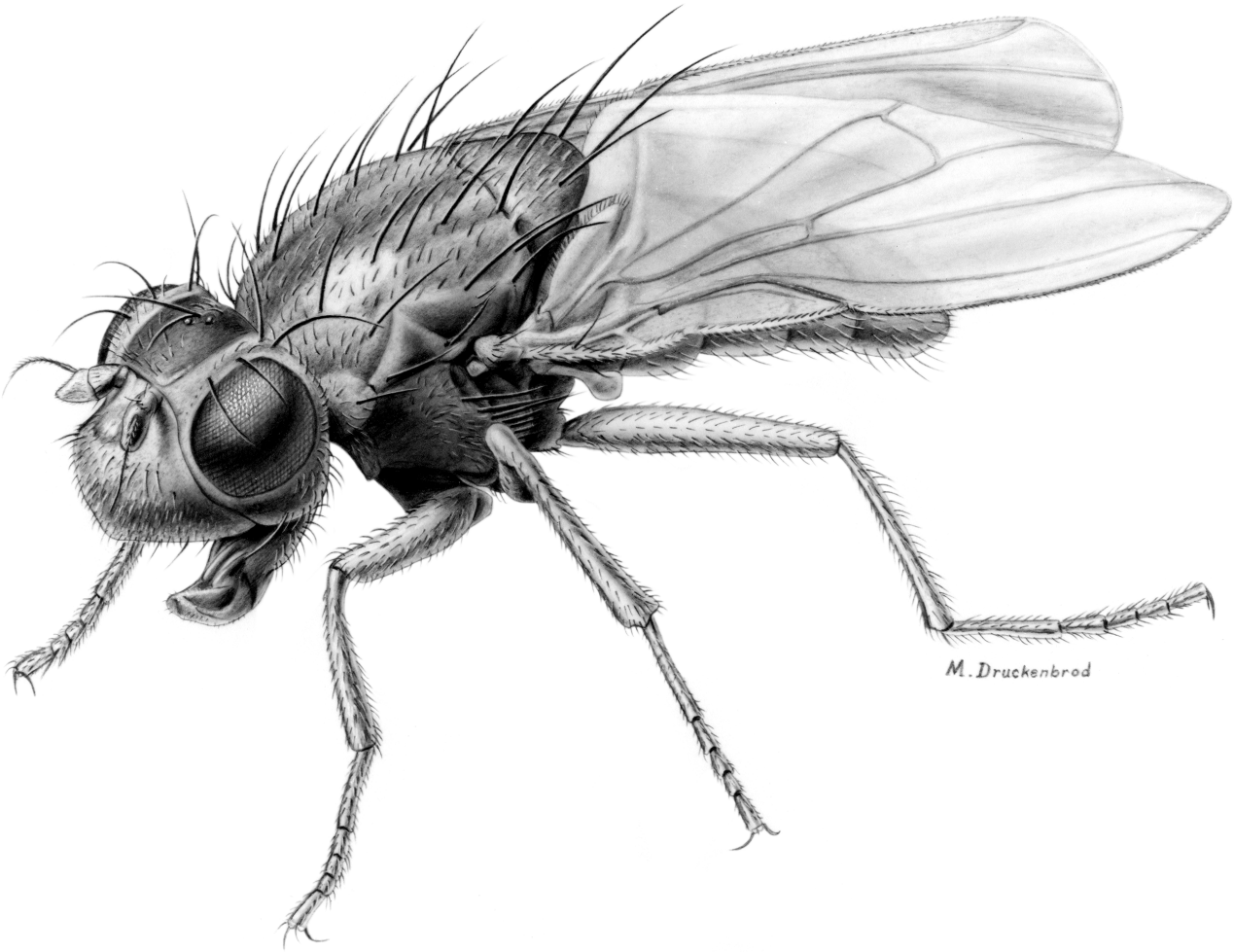


FIGURE 1. Frontispiece of Neoephydra araucaria Mathis (from Mathis and Wirth 1979).

Distribution. *Austrocoenia* is endemic to southern South America (Patagonia, between 49°–52°S).

Discussion. *Austrocoenia* is a monotypic genus and is somewhat of an anomaly. Due to the autapomorphic

condition of several of its characters, we have not succeeded in discovering evidence that would indicate a phylogenetic relationship with other generic level taxa of Ephydrinae. We have tentatively placed *Austrocoenia* near the *Paracoenia-Calocoenia* lineage because adults have five dorsocentral setae. But even this character state is autapomorphic, as the anterior pairs of setae are reduced and are only slightly larger than surrounding setae.

Wirth (1970: page) was also perplexed by his new genus, noting that although the *Austrocoenia* is clearly a member of the subfamily Ephydrinae, "...it is not closely allied with any known genus. It appears to be closest to *Coenia* Robineau-Desvoidy, a Holarctic genus, which it resembles to a slight extent in the presence of four pairs of dorsocentral setae and curved tarsal claws. Otherwise, its similarities are diverse and rather remote. *Austrocoenia* is doubtless an annectant form surviving and modified from a very early offshoot of the Ephydrinae."

1. *Austrocoenia aczeli* Wirth

Figs. 2–8, Map 1

Austrocoenia aczeli Wirth 1970: 8.—Mathis 1980: 5–7 [revision].—Lizarralde de Grosso 1989: 59 [list, Argentina].—Mathis and Zatwarnicki 1995: 235 [world catalog].

Diagnosis. Generally microtomentose, whitish gray to gray but with some brown coloration dorsally; ocelli arranged in equilateral triangle; tarsi with venter yellowish, hindbasitarsus mostly yellowish except for thin, linear, dorsal, gray stripe; wing mostly hyaline, veins brown except for yellowish costa, subcosta, and basal portions of other veins; structures of male terminalia as in Figs. 6–7. Medium-sized to large shore flies, body length 3.65–5.10 mm; generally gray.

Head (Figs. 3–4): Head width-to-height ratio 0.73. Frons mostly dull, microtomentose, mostly flat; mesofrons subtriangular, anterior angle produced anteriorly, rounded, and broadly reaching ptilinal suture, lateral margins bearing scattered but conspicuous setulae, approximately 8–10 on each side, but lacking large setae, cruciate or otherwise; mesofrons generally tan, but frequently with some bluish, greenish, or charcoalish coloration, especially around ocelli; parafrons generally darker in coloration than mesofrons, more grayish but with some bluish to charcoal color; ocellar triangle and fronto-orbits slightly raised in relief from parafrons; fronto-orbits nearly concolorous with mesofrons but more grayish; well-developed, lateroclinate, fronto-orbital setae 2, plus 8–11 setulae, frequently 1 proclinate to lateroclinate setula anterior of larger seta; ocellar seta 1, divergent, 3–4 smaller setulae posterior of larger seta; ocelli arranged in equilateral triangle; postocular setae becoming slightly larger toward vertex. Antenna mostly gray but with small patches blackish gray or whitish gray; arista shorter than combined length of 1st 3 segments, thickened along basal 3/4, apical 1/4 style-like; pedicel bearing small setae, generally inconspicuous, except for 1 larger, erect seta inserted dorsally. Facial unicolorous, whitish gray, becoming slightly darker dorsally. Eye nearly round, bare. Parafacials bearing 3–5 prominent setae. Gena high, gena-to-eye ratio 0.65, concolorous with face. Maxillary palpus blackish gray.

Thorax (Fig. 5): Relatively long and narrow; rather densely microtomentose, appearing dull. Mesonotum dark bluish gray to whitish gray but mostly grayish brown to brown; 2 darker stripes on either side of acrostichal setae extended posteriorly no further than level of transverse suture; acrostichal track mostly brownish, frequently with whitish stripe between; scutellum with disc mostly grayish brown to brown; pleural areas distinctly paler in color than mesonotum, becoming whitish gray to white ventrally. Chaetotaxy as follows: Acrostichal setae becoming larger and rows slightly more divergent posteriorly, 1 pair of larger prescutellar setae, these slightly displaced laterally from track of other acrostichal setae; well-developed dorsocentral setae 2–5, but only posterior 1–2 obviously larger, posteriormost seta distinctly larger and slightly displaced laterally from alignment of other setae; interalar setae in a row, posteriormost seta largest; postpronotal setae 2–4, usually 1 seta largest; presutural, supra-alar seta 1, this not much larger than surrounding setae; a row of supra-alar setae, 2 posterior setae larger but neither greater than 1/2 length of postalar seta, which is well developed; lateral scutellar setae 2, otherwise scutellum bare except for an apical pair of setae, these frequently cruciate; notopleural setae 2, each near ventral angle, remainder of notopleuron bare; anepisternal seta 1, inserted near middle along posterior margin, several scattered setulae, particularly toward dorsal and posterior margins; katepisternal seta 1, and a small row of setae just anterior of larger seta; prosternum bare. Wing (Fig. 2) veins yellowish brown to yellowish anterobasally, otherwise brownish; membrane mostly hyaline, occasionally palely infuscate, brownish, or slightly milky; costal vein ratio 0.18; M vein ratio 0.88. Halter yellowish. Femora and tibiae concolorous, whitish gray; basal 2 tarsomeres pale, rufous to yellowish orange; apical tarsomeres becoming darker, grayer.

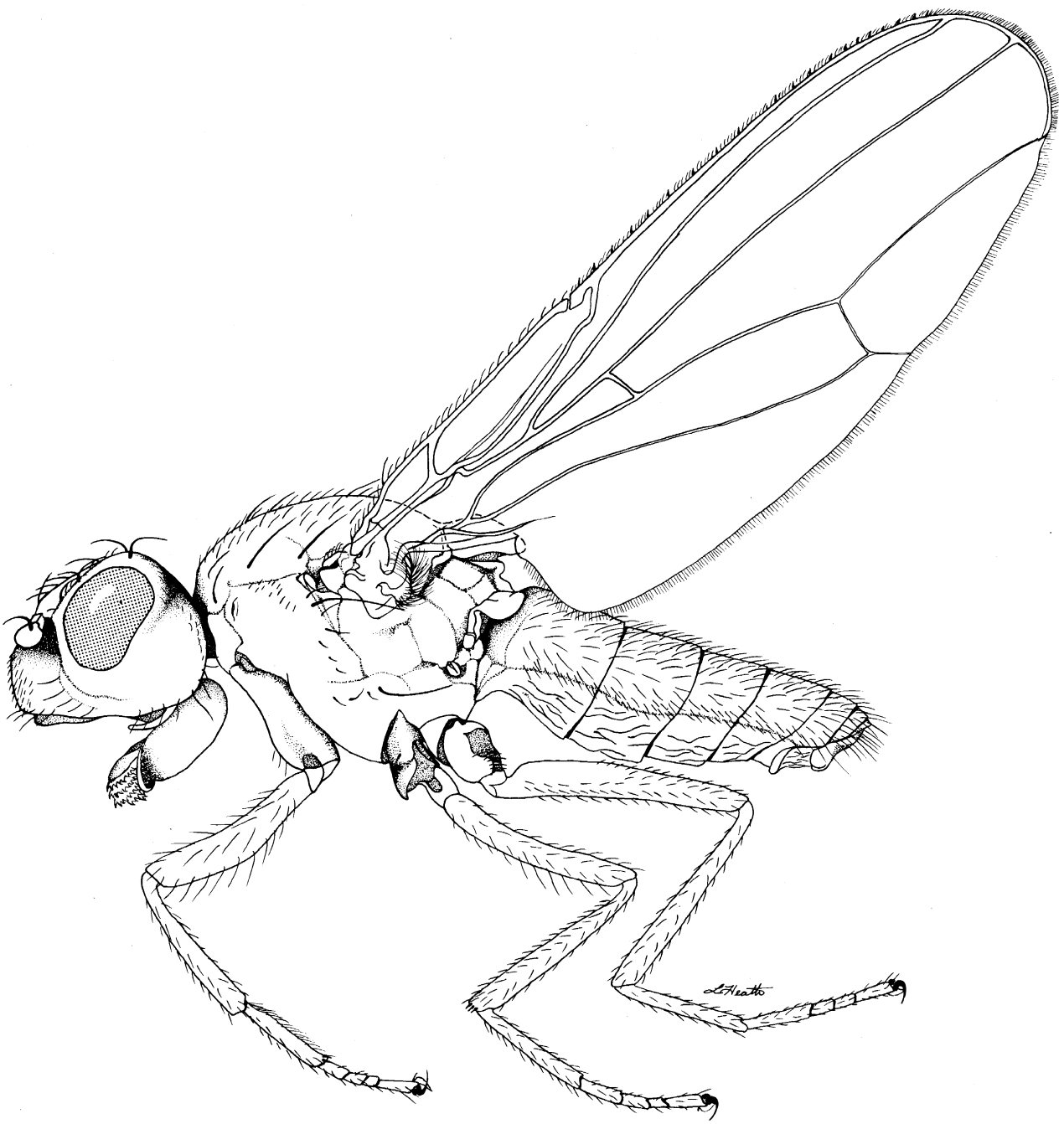
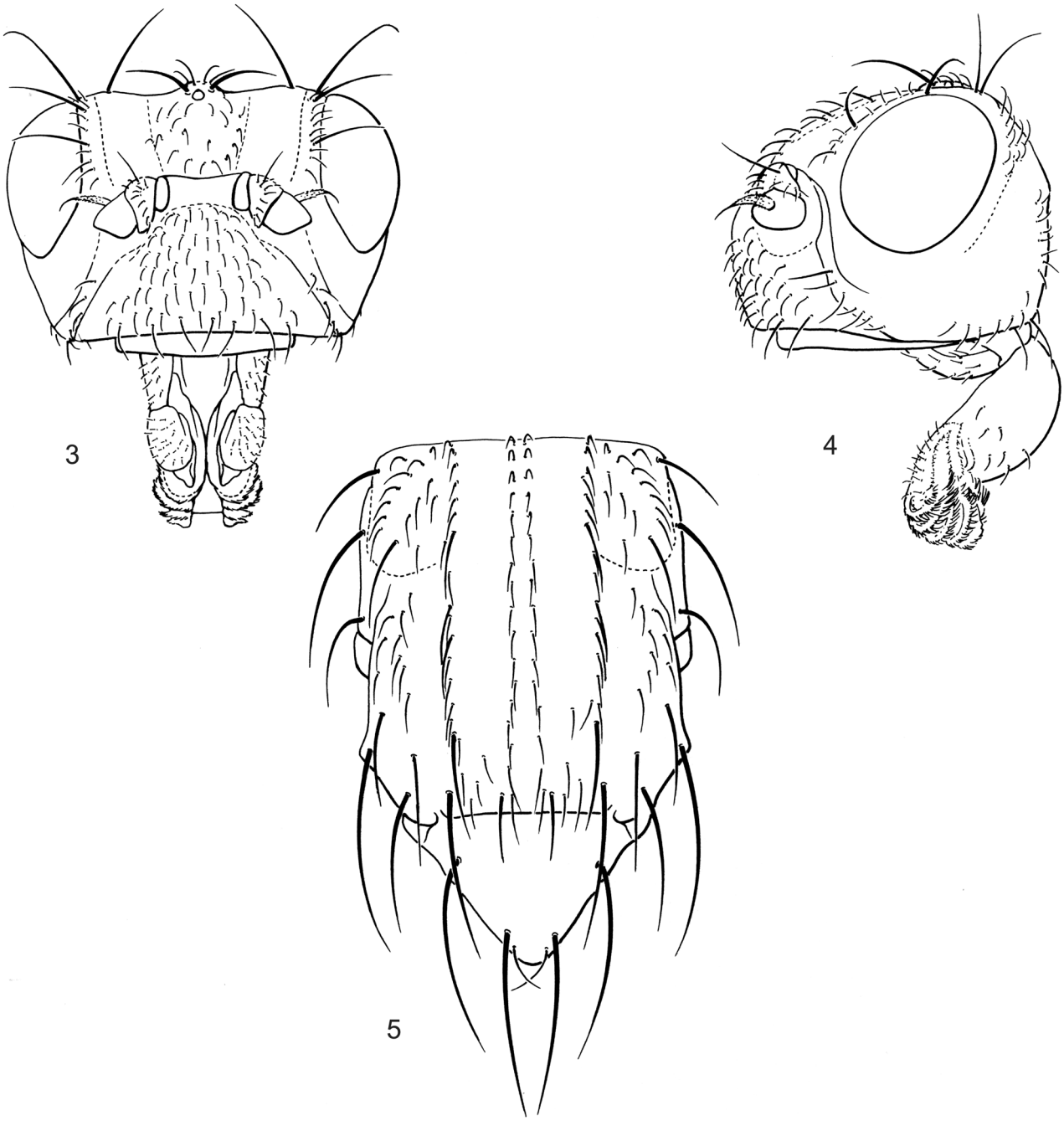
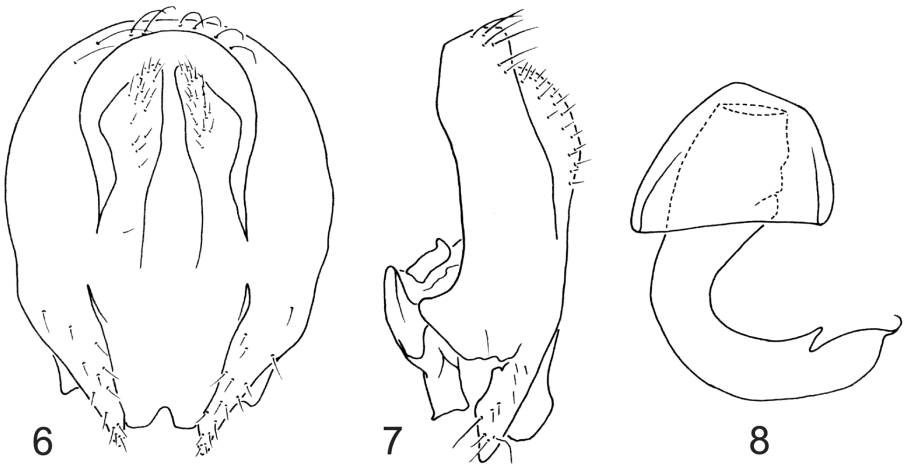


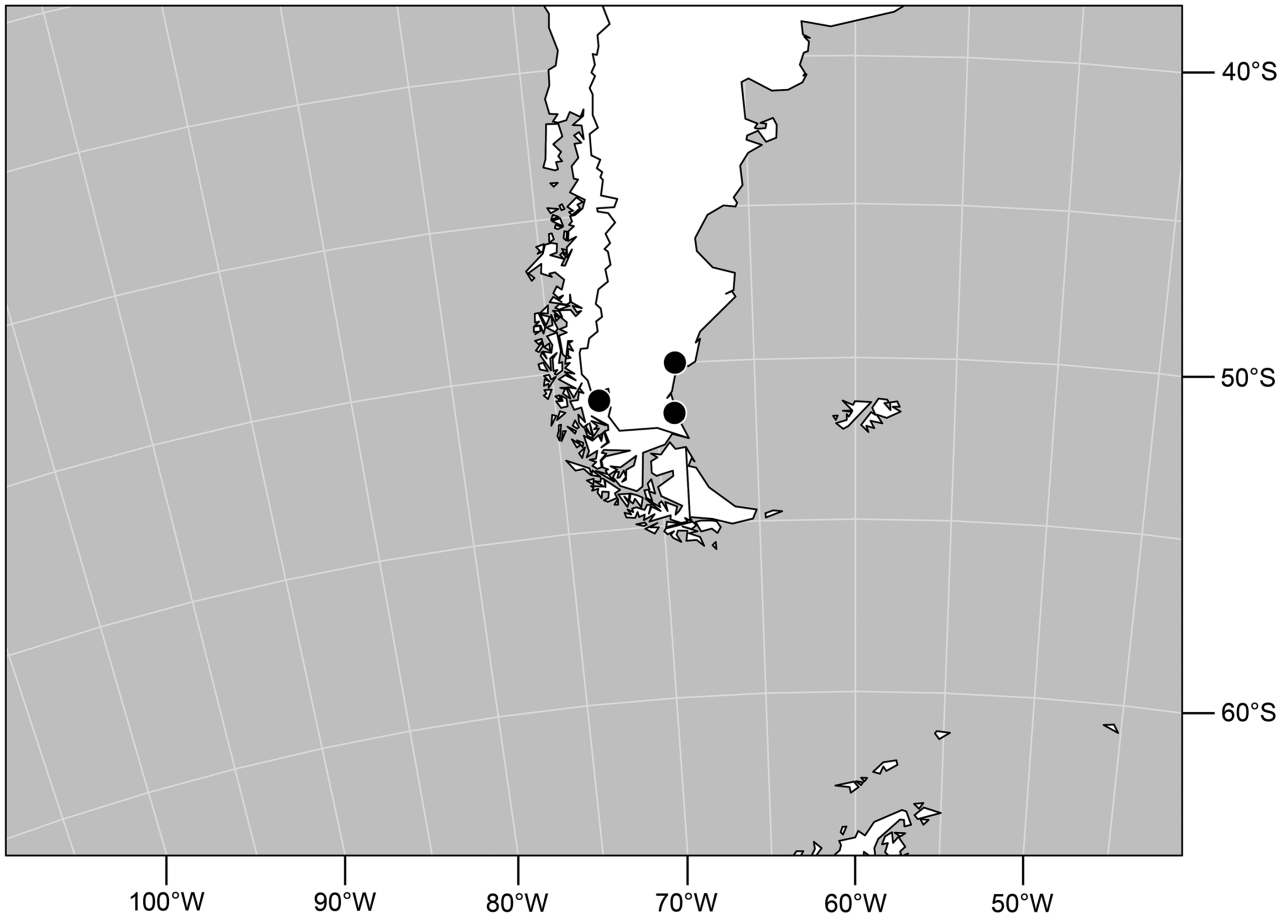
FIGURE 2. Habitus of *Austrocoenia aczeli* Wirth, lateral view (from Wirth 1970).



FIGURES 3–5. *Austrocoenia aczeli* Wirth. (3) head, anterior view; (4) same, lateral view; (5) mesonotum, dorsal view (from Wirth 1970).



FIGURES 6–8. Structures of male and female terminalia of *Austrocoenia aczeli* Wirth. (6) epandrium, cerci, and presurstyli, posterior view; (7) same, lateral view; (8) female ventral receptacle, lateral view. Scale bar = 0.1 mm (from Mathis 1980).



MAP 1. Distribution map for *Austrocoenia aczeli* Wirth.

Abdomen: Generally unicolorous, gray. Male terminalia (Figs. 6–7): Epandrium in posterior view (Fig. 6) as an inverted U, dorsal arch of U, less well developed, thinner, in lateral view (Fig. 7) dorsal 2/3 nearly parallel sided although dorsal portion thinner, ventral 1/3 becoming wider, with anteriorly oriented, short projection; cercus elongate, in posterior view with dorsal hald triangular, fused ventrolaterally with epandrium; surstylus evidently fused with ventral margin of epandrium, in posterior view (Fig. 6) oriented ventromedially, somewhat pointed apically; gonite plate-like; aedeagus greatly reduced. Female ventral receptacle (Fig. 8) with operculum subtrapezoidal, asymmetrical, extended process more or less C-shaped.

Type material. The holotype male is labeled "R[epublica] A[rgentina]. SANTA CRUZ Cabo Buen Tiempo Gallegos 29-II-[1]953 Coll: Biraben [handwritten; black border]." The holotype specimen is double mounted (minute nadel in cork base), is in good condition, and is deposited in FML. Allotype female and 31 paratypes (7♂, 24♀; BMNH, FML, USNM) bear the same locality label data as the holotype.

Type locality. Argentina. Santa Cruz: Cabo Buen Tiempo Gallegos (51°34'S, 69°05'W).

Other specimens examined. *ARGENTINA: Santa Cruz:* Piedrabuena (5 km NW; 49°59'S, 68°54'W; 130 m), 25 Nov 1966, M. E. Irwin, E. I. Schlinger (11♂, 4♀; USNM).

CHILE: Magallanes: Laguna Amarga (4 km W; 51°S, 72°48'W; 300 m), 7 Dec 1966, M. E. Irwin, E. I. Schlinger (1♀; USNM).

Distribution (Map 1): *Neotropical:* Argentina (Santa Cruz), Chile (Magallanes).

Genus *Notiocoenia* Mathis

Notiocoenia Mathis 1980: 12 [type species: *Notiocoenia paniculata* Mathis 1980, original designation].—Lizarralde de Grosso 1989: 59 [fauna of Argentina].—Mathis and Zatwarnicki 1995: 249–250 [world catalog].

Diagnosis. Specimens of *Notiocoenia* are similar to those of *Coenia* Robineau-Desvoidy but are distinguished from the latter and other genera of Ephydrini by the following combination of characters: Small to moderately large shore flies, body length 1.90–4.20 mm; mostly grayish brown to brown, generally appearing dull but subshiny to shiny over much of dorsum.

Head: Wider than high from anterior view; frons mostly flat, wider than long, vestiture more or less uniform, dull, microtomentose, mostly unicolorous brown, margins of mesofrons indicated by shallowly impressed furrow, otherwise undifferentiated from parafrons, lacking large setae, cruciate or otherwise; well-developed, lateroclinate, fronto-orbital setae 2, plus 1 much smaller proclinate seta anterior of larger setae; paravertical seta small, inconspicuous, none 1/2 length of vertical seta; well-developed, ocellar setae 1, slightly divergent; small postocellar setae 2–3 setulae; medial vertical setae well developed, lateral vertical seta either well developed or lacking. Antenna normally developed, dark colored, basal flagellomere considerably longer than high, rounded apically; pedicel bearing several setae, especially on medial and ventral surfaces, bearing 1 large, dorsally erect seta on dorsum; arista longer than combined length of other antennal segments, macropubescent or bearing short hairs dorsally. Face protuberant, broadly transversely arched, setulose to setose; interfoveal hump evident but variously developed; vestiture densely microtomentose. Eye subspherical, slightly higher than wide. Gena short, gena-to-eye ratio 0.20 or less; well-developed, genal seta 1. Mouthparts generally retracted into oral opening, clypeus not exposed; maxillary palpus dark; prementum longer than wide; microtomentose to microtomentose, setose.

Thorax: Vestiture variable, dull to shiny, generally becoming shinier posteriorly; coloration grayish brown to blackish brown. Pleural areas generally becoming paler colored ventrally; humeral callus, part of anepisternum, and katepisternum grayish tan to whitish tan, otherwise pleural areas darker brown; forecoxa gray to silvery gray, contrasting with remainder of pleural areas. Chaetotaxy as follows: Acrostichal setae when present arranged in 2 rows, larger setae mostly anterior of transverse suture; lacking well-developed, prescutellar seta; well-developed, dorsocentral setae 4 (1+3), rarely 5 (2+3), anterior 1–2 setae smaller, several smaller setae anterior of larger setae; interalar setae 2, anterior seta inserted just posterior of transverse suture, posterior seta posterior of level of posteriormost dorsocentral seta; postpronotum either bare or bearing 2–3 setulae, none more than 1/4 length of posterior, notopleural seta; presutural interalar seta 1; interalar setae 2, rarely 3, anterior seta inserted just posterior of transverse suture, posterior seta smaller, inserted just posterior of posteriormost dorsocentral seta; postsutural, supra-alar seta variable; postalar seta well developed; disc of scutellum mostly bare, bearing 2–3 setulae, or bare; lateral scutellar setae 2; notopleural setae 2, inserted near each ventral angle; anepisternal seta 1, inserted near middle of posterior edge, numerous smaller setae, particularly toward dorsal and posterior margins; prosternum bare; katepisternal seta 1, with 1–2 smaller setae around larger seta; midcoxa with 1 larger seta. Wing hyaline to palely infuscate; R stem vein bare dorsally. Halter yellowish to pale brown. Legs variable, femora swollen to slender; coloration rufous to black; pulvilli well developed; tarsal claws short and distinctly curved; pulvilli well developed; tarsal claws short and distinctly curved; hindfemur of male not differing markedly from fore- or midfemur, lacking stout setae as above; hindtibia of male lacking tuft of setulae; hindtarsi of male cylindrical, normal.

Abdomen: Male terminalia as in species-group diagnoses.

Distribution. The composite distribution of this genus extends from 24°–53°S along the east and west slopes of the Andes Mountains.

Discussion. Although the monophyly of *Notiocoenia* appears to be well established, its relationship within Ephydrini is not as evident. Although we suggest a sister group relationship with *Coenia,* which we think is correct, the evidence to support this alliance is not altogether convincing.

Key to species groups and species of *Notiocoenia*

1. Lateral vertical seta present, length subequal to medial vertical seta; postsutural, supra-alar seta either lacking or much reduced; arista at most macropubescent; postpronotum bearing 2–3 setulae; wing appearing dull, palely infuscate, 2 white spots on either side of crossvein dm-cu (the *pollinosa* group) . . . . . *N. pollinosa* Mathis
- Lateral vertical seta lacking; postsutural, supra-alar seta present, length subequal to postalar seta; arista micropectinate, hair length about 1/2 height of basal flagellomere; postpronotum bare; wing appearing shiny, mostly hyaline, lacking white spots as above (the *paniculata* group) 2
2. Male 4th abdominal sternite subrectangular, posterior margin truncate, setae at posterior margin slightly larger but not clumped; ventral margin of epandrium with conspicuous U-shaped medial emargination in posterior view; aedeagus more slender and with more distinct taper toward apex: gonite with acutely pointed process posteriorly . . . . . *N. acutella* Mathis
- Male 4th abdominal sternite pentagonal, posterior margin shallowly pointed, with distinct clump of 15 or more larger setae near apex; ventral margin of epandrium lacking U-shaped medial emargination in posterior view; aedeagus with gradual taper throughout its length; gonite lacking pointed process along posterior margin . . . . . *N. paniculata* Mathis

The *paniculata* Group

Diagnosis. Although similar to the *pollinosa* group, specimens of this species-group may be distinguished by the following combination of characters: *Head:* Frons wider, width at level of medial ocellus about 3 times distance between ptilinal suture and medial ocellus; arrangement of ocelli in nearly equilateral triangle, distance between posterior pair only slightly longer than between either posterior ocellus and anterior ocellus; lateral vertical seta lacking; 1 pair of smaller proclinate fronto-orbital setae inserted anterior of larger lateroclinate setae, size about 1/3 larger setae; arista pectinate with dorsal branches along basal 2/3, longest rays subequal to 1/2 width of basal flagellomere; interfoveal hump with distinct dorsal crease; face from oral margin to dorsum of interfoveal hump higher, length much longer than longest facial seta along oral margin; coloration of face grayish brown to brown, not contrasted distinctly with coloration of frons. *Thorax:* Vestiture of mesonotum appearing duller, more densely microtomentose, disc of scutellum much shinier; row of larger acrostichal setae extended posteriorly beyond level of transverse suture; postpronotum bare; scutellum slightly convex, bare dorsally; dorsocentral setae 4 (1+3), anterior seta weaker; postsutural, supra-alar seta subequal to postalar seta; coloration of pleural areas with contrasting brown and slightly brownish gray areas, especially evident on anepisternum; wing appearing shiny, mostly hyaline but with slight brownish infuscation, crossvein dm-cu with darker brown infuscation; coloration of legs mostly rufous but variable; femora mostly subequal in size, slender. *Abdomen:* Darker brown, with some bluish coloration, subshiny to shiny, abdominal tergite 5 short, approximately 1/3 length of tergite 4. Male terminalia: Surstylus either lost or more likely fused indistinguishably with ventral margin of epandrium; ventral margin of epandrium (= surstylus) truncate; aedeagus a long, slender, tapered process, apex slightly corniform. Female ventral receptacle with small operculum and large roughly C-shaped extended process in lateral view.

Natural history. We have collected specimens of both described species of this species group from the Lake District of southern Chile (Osorno Province). Although an occasional specimen was encountered in other habitats, most were collected at one site near Termas de Aguas Calientes, Parque National Puyehue. This site was a densely shaded seepage area, approximately 2 by 10 m, alongside a narrow path used by grazing stock. A densely vegetated, steep bank paralleled its length to the south; the path marked its northern limit. The seepage area was muddy, highly organic, and relatively undisturbed. A dense overhang of brush from the adjacent bank shaded the area at all times and probably provided most of the organic debris. The brush also protected the area, acting as a barrier to stock animals. Most specimens were collected by sweeping under the overhang and just over the muddy seepage area. The surrounding vegetation was typical of a Southern Beech (*Nothofagus*) forest. Both species occur sympatrically at this locality.

2. *Notiocoenia acutella* Mathis
Figs. 9–11, Map 2

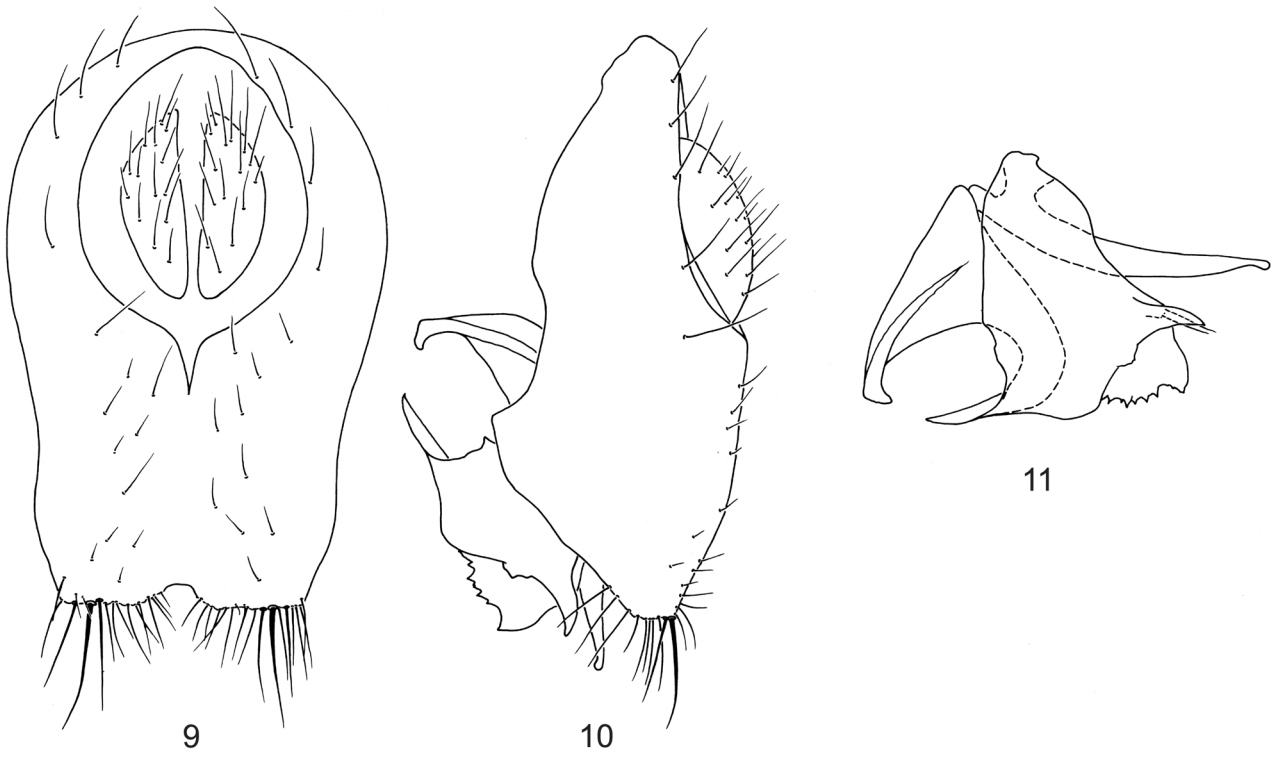
Notiocoenia acutella Mathis 1980: 14.—Mathis and Zatwarnicki 1995: 249–250 [world catalog].

Diagnosis. Although very similar to specimens of *P. paniculata,* specimens of this species may be distinguished by the following character states of the male preabdomen and terminalia: 4th abdominal sternite subrectangular, posterior margin truncate, setae at posterior margin slightly larger but not clumped; ventral margin of epandrium with conspicuous U-shaped medial emargination in posterior view; aedeagus more slender and with more distinct taper toward apex; gonite with acutely pointed process posteriorly. As in description of *N. paniculata* except as follows: Moderately small to medium-sized shore flies, body length 2.78–3.93 mm.

Head: Gena-to-eye ratio 0.16–0.18; eye height-to-width ratio 0.86–0.89.

Thorax: Legs tending to consistently be more yellowish orange, with little or no blackish coloration.

Abdomen: Male sternite 4 subrectangular, posterior margin truncate, setae at posterior margin slightly larger but not clumped or clustered. Male terminalia (Figs. 9–11): Epandrium in posterior view (Fig. 9) as an inverted U, more thinly developed dorsally, in lateral view (Fig. 10) conspicuously thinner dorsally, thereafter ventrally gradually becoming wider, widest at ventral 1/3, ventral 1/3 tapered to a rather bluntly rounded point; ventral margin, which is probably the fused surstylus, truncate with a conspicuous U-shaped medial emargination (best seen in posterior view); cerci free in cercal cavity, not fused with epandrium, semihemispherical; aedeagus in lateral view (Fig. 11) elongate, slender, narrowly tubular, very gradually tapered to apical point; gonite well developed, with acutely pointed process posteriorly.



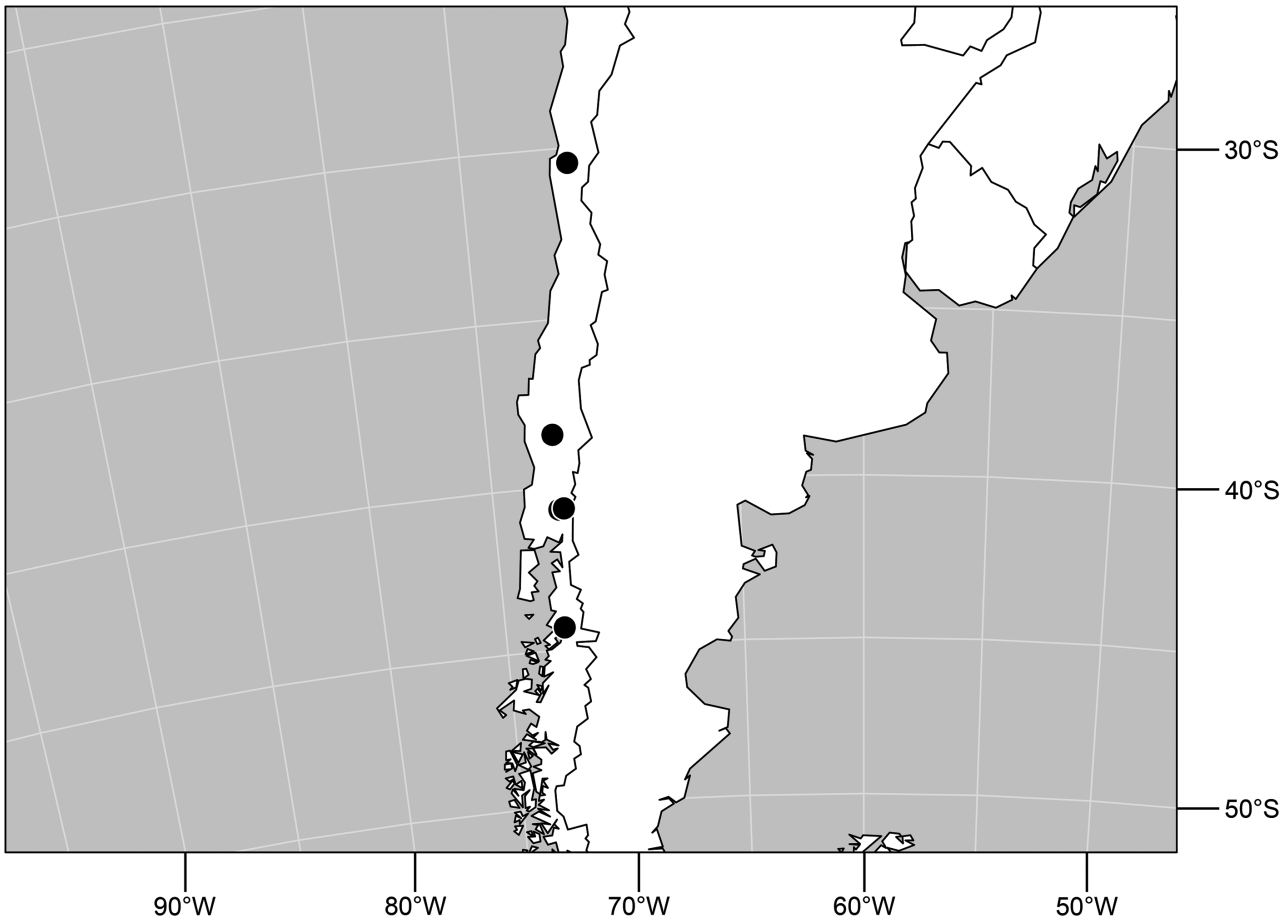
FIGURES 9–11. Structures of male terminalia of *Notiocoenia acutella* Mathis. (9) epandrium and cerci, posterior view; (10) same, lateral view; (11) internal structures of male terminalia, lateral view (from Mathis 1980).

Type material. The holotype male is labeled "CHILE: Osorno Prov. [Termas de] Aguas Calientes (1 km SE) 530 m. elev. 7–8 Feb. 1978 WNMathis/HOLOTYPE Notiocoenia acutella Mathis [handwritten, red]." The holotype is double mounted (minute nadel), is in good condition, and is deposited in the USNM (76067). The allotype female and 10 paratypes (6♂, 4♀; DEI) are labeled "Sud. Chile [Aisen] 14. 4. 40. (14 Apr 1940) Puerto Puyuguapi [44°18'S, 72°32'W] leg. G. H. Schwabe 201." Other paratypes are as follows: *CHILE: Coquimbo:* El Pangue (30°26'S, 71°01'W), 1 Nov 1954, P. G. Kuschel (1♂; USNM). *Malleco:* Perquenco (16.1 km N; 38°25'S,

72°23'W), 1 Jun 1951, A. E. Michelbacher, E. S. Ross (1♂; CAS). *Osorno:* Anticura (1 km W; 40°39'S, 72°10'W; 430 m), 1–3 Feb 1978, W. N. Mathis (1♂; USNM).

Type locality. Chile. Osorno: Termas de Aguas Calientes (1 km SE; 40°41'S, 72°21'W; 530 m).

Distribution (Map 2). *Neotropical:* Chile (Coquimbo, Malleco, Osorno), between 38°–44°S.



MAP 2. Distribution map for *Notiocoenia acutella* Mathis.

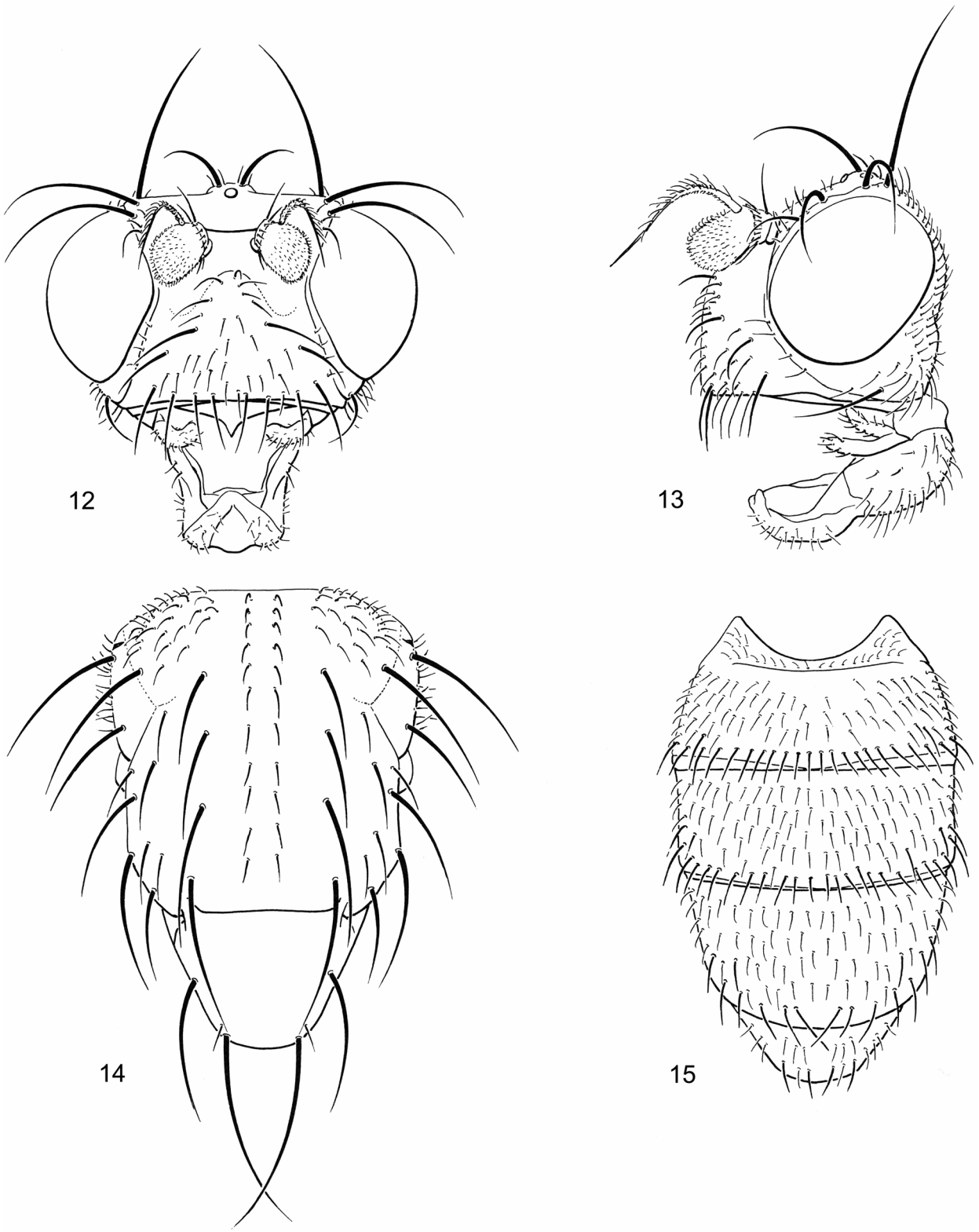
3. *Notiocoenia paniculata* Mathis

Figs. 12–20, Map 3

Notiocoenia paniculata Mathis 1980: 15.—Mathis and Zatwarnicki 1995: 50 [world catalog].

Diagnosis. Specimens of this species very closely resemble those of *N. acutella,* and we can distinguish them confidently only by comparing structures of the male terminalia. The latter differ as follows: 4th abdominal sternum pentagonal, posterior margin shallowly pointed and with distinct clump of 15 or more larger setae near apex; ventral margin of epandrium lacking U-shaped medial emargination in posterior view; aedeagus with gradual taper throughout its length; gonite lacking pointed process along posterior margin. Moderately small to moderately large shore flies, body length 2.91–4.17 mm; appearing dull, microtomentose; coloration mostly pale brown to brown; wing hyaline.

Head (Figs. 12–13): Frons width-to-length ratio 0.31–0.34; coloration of frons uniform, slightly charcoalish brown. Antenna mostly brownish black to black, basal flagellomere of some specimens with rufous coloration posteroventrally along medial surface. Coloration of face nearly concolorous with mesonotum, slightly paler brown than frons; antennal fovea more grayish and with some greenish tinges. Eye height-to-width ratio 0.92–0.96; gena-to-eye ratio 0.18–0.20. Gena unicolorous, whitish gray.

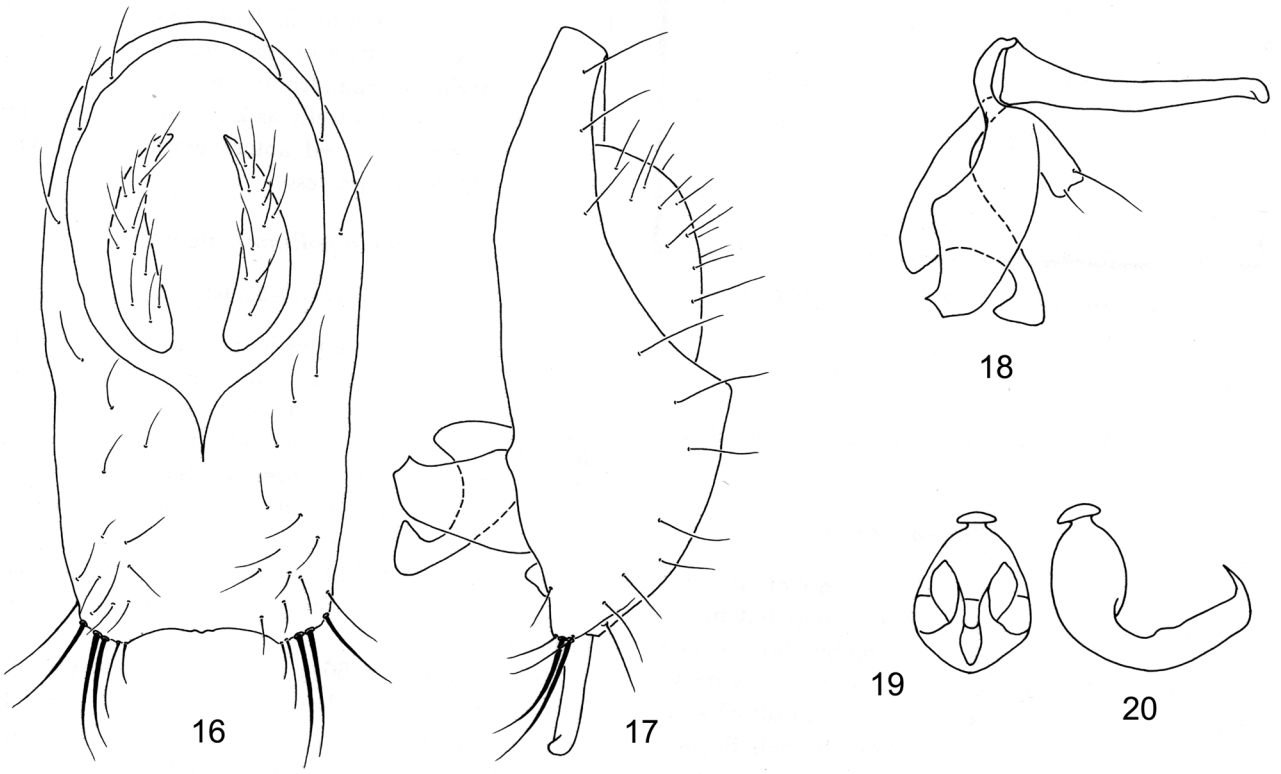


FIGURES 12–15. *Notiocoenia paniculata* Mathis. (12) head, anterior view; (13) same, lateral view; (14) mesonotum, dorsal view; (15) abdomen, dorsal view (from Mathis 1980).

Thorax (Fig. 14): Mesonotum dull, rather densely microtomentose, pale brown anteriorly, becoming darker and shinier posteriorly, with a pair of whitish brown vittae laterad of acrostichal setae, extended posteriorly no farther than transverse suture, distinctiveness of vittae variable. Scutellum subshiny to shiny, darker colored than mesonotum, more blackish. Pleural areas paler brown than mesonotum, becoming generally paler ventrally; postpronotum, proepisternum, part of anepisternum, forecoxa, and katepisternum distinctly paler colored, brownish

gray to whitish gray, otherwise pleural areas mostly unicolorous, brown to pale brown. Wing mostly hyaline, shiny; slight infuscation anteriorly and around crossvein dm-cu; costal vein ratio 0.13–0.15; M vein ratio 0.65–0.68. Legs rufous to orange, frequently with some infuscation; tarsi becoming blackish, toward apical tarsomere. Halter yellowish to yellowish orange, unicolorous.

Abdomen (Fig. 15): Coloration nearly unicolorous, brownish black with some bluish hues, subshiny to shiny. Male sternite 4 pentagonal, posterior margin shallowly pointed and with distinct clump of 15 or more larger setae near apex. Male terminalia (Figs. 16–18): Epandrium in posterior view (Fig. 16) as an inverted U, more thinly developed dorsally, in lateral view (Fig. 17) dorsal arch of inverted U more thinly developed, thereafter ventrally in lateral view gradually becoming wider, widest at ventral 1/3, ventral 1/3 tapered to a rather bluntly rounded point, posterior margin shallowly arched, anterior margin nearly straight; ventral epandrial margin, which is probably the fused surstylus, truncate with a very shallow, wide emargination ventrally; cerci free in cercal cavity, not fused with epandrium, semihemispherical, wider ventrally; aedeagus in lateral view (Fig. 18) with gradual taper throughout length, very shallowly curved; gonite lacking pointed process along posterior margin. Female ventral receptacle as in Figs. 19–20.

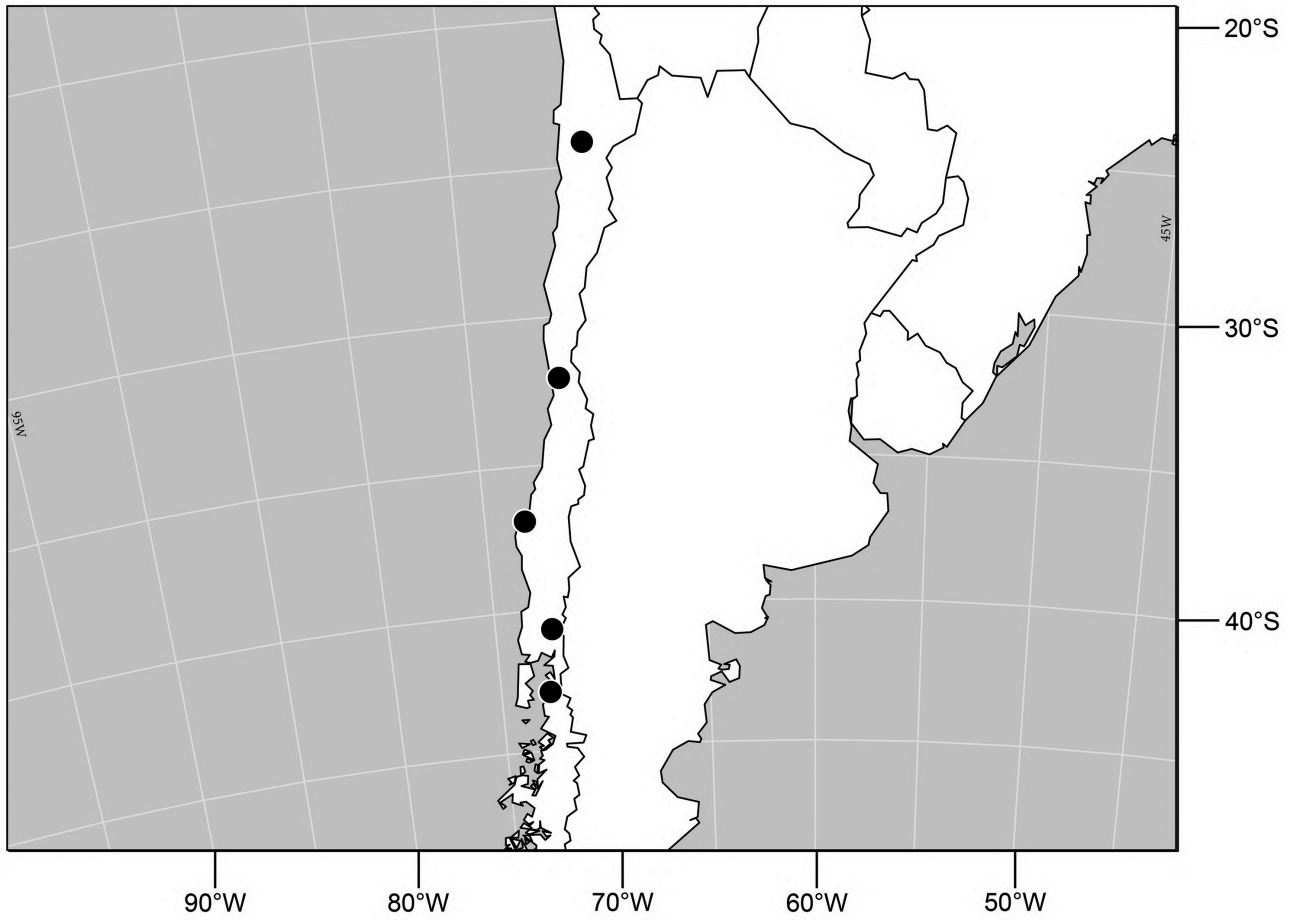


FIGURES 16–20. Structures of male and female terminalia of *Notiocoenia paniculata* Mathis. (16) epandrium and cerci, posterior view; (17) same, lateral view; (18) internal structures of male terminalia, lateral view; (19) female ventral receptacle, anterior view; (20) same, lateral view (from Mathis 1980).

Type material. The holotype male is labeled "CHILE: Osorno Prov. [Termas de] Aguas Calientes (1 km SE) 530 m. elev. 7–8 Feb. 1978 WNMathis/HOLOTYPE Notiocoenia paniculata Mathis [handwritten, red]." The holotype specimen is double mounted (minute nadel), is in good condition, and the holotype, allotype, and paratypes from the type locality are in the USNM (76068). The allotype female and 16 paratypes (4♂, 12♀; USNM) bear the same locality label data as the holotype. Other paratypes as follows: *CHILE: Antofagasta:* Rincón El Arbol (24°11.3'S, 69°31.3'W), Oct. 1969, L. E. Peña (1♀; MZUSP). *Concepción:* Concepción (Parque Botánico Hualpen; 36°48.9'S, 73°11'W), Jan 1970, L. E. Peña (1♀; MZUSP). *Coquimbo:* Tilama, El Naranjo (32°05'S, 71°10'W), Oct 1967, L. E. Peña (16♂, 22♀; MZUSP). *Palena:* Camping Arrayanes (5 km NW Chaitén; 42°53.8'S, 72°40.1'W; Malaise trap), 21 Jan 1987, C. M. and O. S. Flint (1♂; USNM).

Type locality. Chile. Osorno: Termas de Aguas Calientes (1 km SE; 40°41'S, 72°21'W; 530 m).

Distribution (Map 3). *Neotropical:* Chile (Antofagasta, Concepción, Coquimbo, Osorno, Palena), foothills, between 24°–42°S.



MAP 3. Distribution map for *Notiocoenia paniculata* Mathis.

The *pollinosa* Group

Diagnosis. Specimens of this species-group are similar to those of the *paniculata* group but may be distinguished by the following combination of character states:

Head: Frons narrower, width at level of medial ocellus about 2× distance between ptilinal suture and medial ocellus; arrangement of ocelli distinctly forming isosceles triangle, distance between posterior pair much larger than between either posterior ocellus and medial one; lateral vertical seta well developed, subequal to medial vertical seta; smaller fronto-orbital setae much less than 1/4 larger lateroclinate setae, lacking a larger anterior pair of setae; arista macropubescent along most of length; interfoveal hump poorly developed, lacking a distinct dorsal crease; face between oral margin and dorsum of interfoveal hump shorter, length about equal to larger setae along oral margin; coloration of face whitish gray, contrasting distinctly with brownish coloration of frons.

Thorax: Mesonotum subshiny to shiny, microtomentose vestiture sparse, not contrasting distinctly with appearance of scutellum; larger acrostichal setae not extended posteriorly much past level of transverse suture; postpronotum bearing 2–3 setae; scutellum flat and very sparsely setulose; dorsocentral setae 4–5 (1+3; 2+3); postsutural, supra-alar seta either lacking or much reduced; coloration of pleural areas becoming gradually grayer toward venter, but lacking patches of contrasted coloration; wing appearing dull, infuscate; 2 white spots on either side of crossvein dm-cu; legs black; fore- and hindfemur swollen.

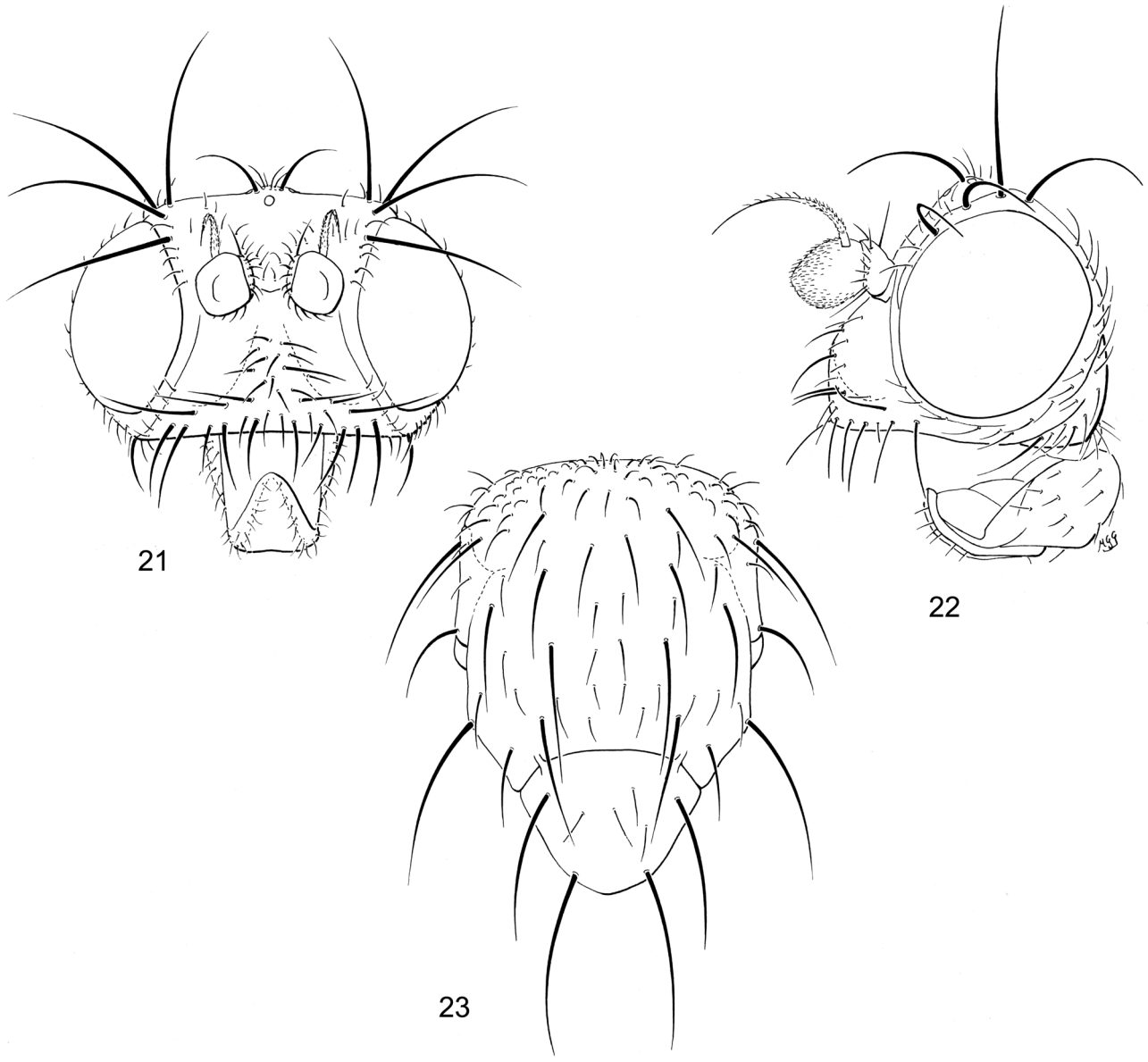
Abdomen: Color blackish, shiny; tergite 5 as long or longer than tergite 4; male tergite 4 subequal to combined length of tergites 2 and 3; surstylus of male terminalia fused to ventral margin of epandrium but distinct, setose; aedeagus produced ventrally as 2 symmetrical narrow processes; gonite produced anteroventrally as curved parallel-sided slender process.

4. *Notiocoenia pollinosa* Mathis
Figs. 21–26, Map 4

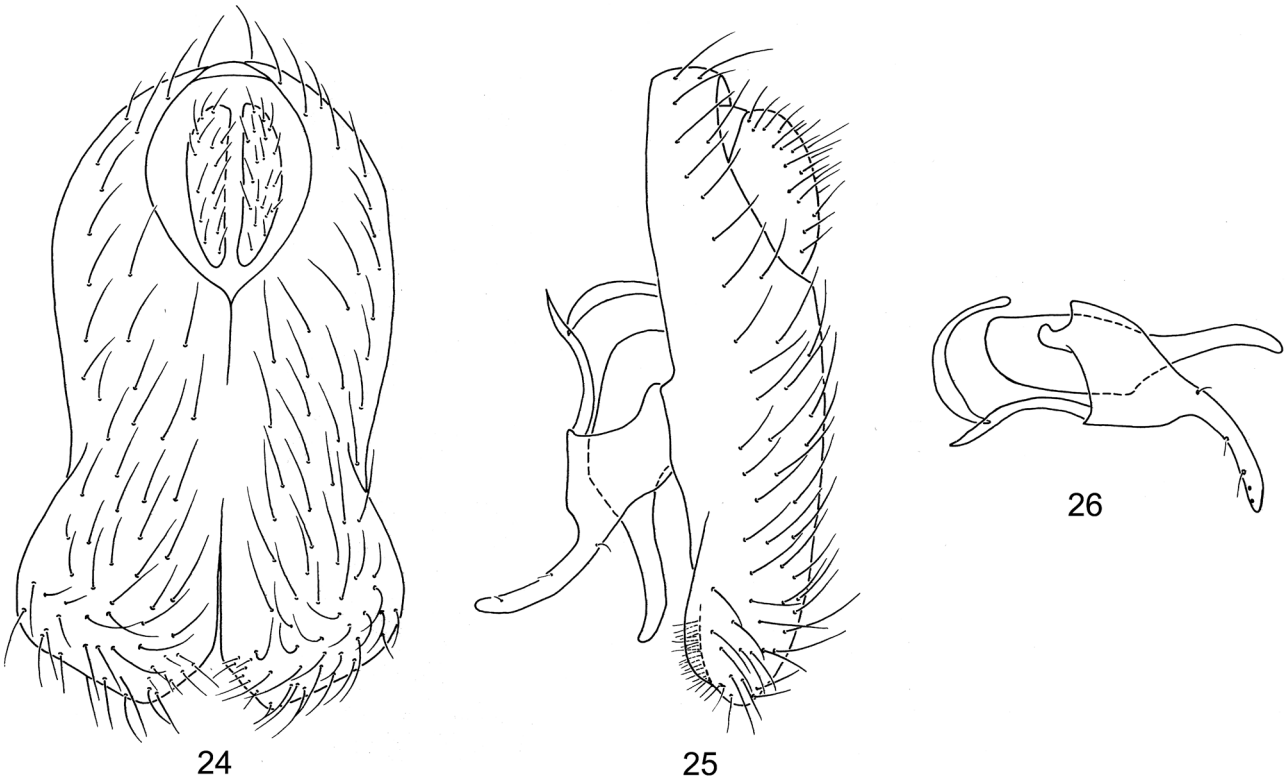
Notiocoenia pollinosa Mathis 1980: 18.—Lizarralde de Grosso 1989: 59–60 [list, Argentina].—Mathis and Zatwarnicki 1995: 250 [world catalog].

Diagnosis. Because this is the only known species of the *pollinosa* group, the diagnosis of the latter, as cited previously, will adequately serve to distinguish specimens of this species. Should additional species of this species-group be discovered, character states of the male terminalia will undoubtedly distinguish them from the present species. Small to moderately small shore flies, body length 1.98–2.56 mm; generally shiny, dark brown dorsally.

Head (Figs. 21–22): Frons width-to-length ratio 0.36–0.38; coloration of frons mostly pale brown with some faintly olivaceous to greenish tinges. Antenna unicolorous, black. Coloration of face unicolorous, whitish gray to silvery gray; antennal groove shallowly impressed. Eye height-to-width ratio 0.86–0.88; gena-to-eye ratio 0.11–0.13; gena pale brown; well-developed genal seta 1.



FIGURES 21–23. *Notiocoenia pollinosa* Mathis. (21) head, anterior view; (22) same, lateral view; (23) mesonotum, dorsal view (from Mathis 1980).



FIGURES 24–26. Structures of male terminalia of *Notiocoenia pollinosa* Mathis. (24) epandrium and cerci, posterior view; (25) same, lateral view; (26) internal structures of male terminalia, lateral view (from Mathis 1980).

Thorax (Fig. 23): Mesonotum and scutellum concolorous, shiny, bronzish brown, except extreme anterior margin of mesonotum dull, grayish. Pleural areas gradually becoming paler brown ventrally, grayer, particularly forecoxa and katepisternum. Wing palely infuscate, pale brown, appearing dull; with 2 white spots on either side of crossvein dm-cu; costal vein ratio 0.14–0.16; M vein ratio 0.58–0.61. Legs unicolorous, black; fore- and hindfemora appearing swollen. Halter brownish yellow, unicolorous.

Abdomen: Subshiny anteriorly, becoming distinctly shiny posteriorly; coloration grayish black anteriorly, becoming very dark greenish black posteriorly; female tergites becoming progressively longer posteriorly, also narrowing with gradual taper toward posterior end; male tergite 4 subequal to combined length of tergites 2 and 3; male tergite 5 subtrapezoidal, bluntly rounded apically, length about equal to length of tergite 4; male tergite 4 produced ventrally to acutely pointed apex; male sternite 4 subquadrate, becoming densely setose medioposteriorly. Male terminalia (Figs. 24–26): Epandrium generally setulose, in posterior view (Fig. 24) with dorsal 2/3 as an inverted U, more thinly developed dorsally, in lateral view (Fig. 25) dorsal arch of inverted U more thinly developed, thereafter ventrally in lateral view gradually becoming wider to level of ventral margin of cercal cavity, ventral 1/3 in posterior view (Fig. 24) flared laterally as bluntly rounded, lateral projections, posterior and anterior margins nearly parallel, posterior margin straight; ventral epandrial margin, which is probably the fused surstylus, obtusely angulate with a V-shaped medial notch and partial medial suture; cerci free in cercal cavity, not fused with epandrium, semihemispherical, short, subequal to ¼ length of epandrium and fused surstyli; aedeagus in lateral view (Fig. 26) elongate, conspicuously wider on basal half, apical portion narrowed, slender, pointed apically; gonite produced anteroventrally as curved parallel-sided slender process.

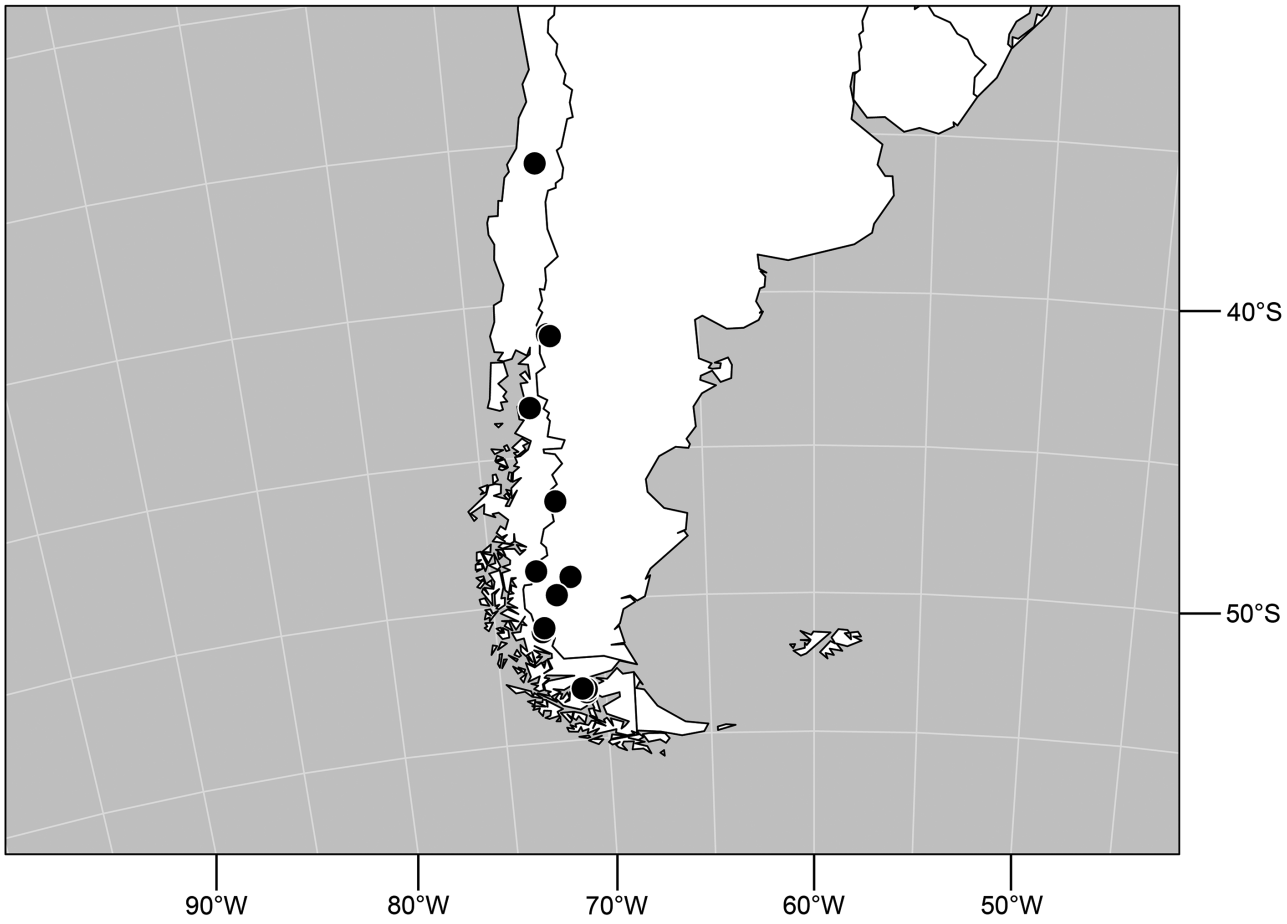
Type material. The holotype male is labeled "CHILE: Prov. Magallanes Rio Verde 12 Jan. 1966 Flint & Cekalovic/HOLOTYPE Notiocoenia pollinosa Mathis [handwritten, red]." The holotype specimen is double mounted (glued to a paper point), is in good condition (although both basal flagellomeres are missing), and is deposited in the USNM (76069). The allotype female and four paratypes (2♂, 2♀; USNM) are labeled "CHILE Chanillo Esperanza 25-II-1962 T. Cekalovic." Other paratypes as follows: *ARGENTINA: Rio Negro:* Llao Llao (11.4 km E; 41°03'S, 71°32'W; 760 m), 16 Nov 1966, M. E. Irwin and E. I. Schlinger (2♂, 3♀; CAS); Puerto Moreno (3.7 km S; 41°07'S, 71°25'W; 800 m), 17 Nov 1966, M. E. Irwin, E. I. Schlinger (1♀; CAS); San Carlos de

Bariloche (49°09'S, 71°18'W), Nov 1926, R. C. and E. Shannon (1♀; USNM). *Santa Cruz:* Lago Argentino (49°45'S, 72°W), 26 Feb 1953, A. Willink (1♂, 1♀; FML).

Type locality. Chile. Magallanes: Río Verde (43°23.8'S, 72°31.5'W).

Other specimens examined. *CHILE. Aisen:* Chile Chico (4.8 km W; 46°33'S, 71°44'W; 400 m; meadow), 22 Nov 1966, M. E. Irvin, E. I. Schlinger (1♂, 1♀; CAS). *Magallanes:* Río Verde (43°23.8'S, 72°31.5'W), 12 Jan 1966, O. S. Flint, Jr., T. Cekalovic (1♂, 2ex; USNM); Río Tres Brazos (53°16'S, 70°56'W), 9–13 Jan 1966, O. S. Flint, Jr., T. Cekalovic (4♀; USNM); Punta Arenas (53°09'S, 70°55'W), 9–15 Jan 1966, O. S. Flint, Jr., T. Cekalovic, 22 Feb 1962, T. Cekalovic (3♀; USNM); Laguna Amarga (4 km W; 5059'S, 72°45'W), 7 Dec 1966, M. E. Irwin, E. I. Schlinger (4♂, 4♀; CAS); Laguna Amarga (4 km W; 51°S, 72°48'W; 300 m), 7 Dec 1966, M. E. Irwin, E. I. Schlinger (3♂; CAS); Laguna Azul (50°52'S, 72°42'W), 1 Feb 1952, (2♂, 1♀; FML); Cerro Mina Rica (53°07'S, 71°07'W), 13 Jan 1952 (1♀; FML); Dos Lagunas (48°52'S, 72°52'W), 27 Jan 1957, T. Cekalovic (1♂; USNM).

Distribution (Map 4). *Neotropical:* Argentina (Rio Negro, Santa Cruz), Chile (Aisen, Magallanes), between 41°–55°S.



MAP 4. Distribution map for *Notiocoenia pollinosa* Mathis.

Genus *Paracoenia* Cresson

Paracoenia Cresson 1935: 356. Type species: *Coenia bisetosa* Coquillett 1902, original designation.—Wirth 1965: 755–756 [Nearctic catalog].—Mathis 1975: 65–85 [revision of Nearctic species].—Mathis and Zatwarnicki 1995: 250–252 [world catalog].

Diagnosis. *Paracoenia* is distinguished from other genera of the tribe Ephydrini by the following combination of characters: Small to large shore flies, body length 2.10–4.40 mm; dark colored and often with subshiny, metallic reflections.

Head: Face projected, transversely arched; paravertical setae large, subequal to vertical setae.

Thorax: Postpronotal seta distinct, at least 1/2 as long as posterior notopleural seta; dorsocentral setae 5 (1+4); scutellum with dorsum convex; prosternite bare. R stem vein bearing 1–2 setulae above, inserted beyond transverse septum. Pulvilli well developed; hindcoxa with row of setae posteriorly along ventral margin; tarsal claws short and distinctly curved.

Abdomen: Male terminalia: Surstyli distinct as elongate, narrow, arm-like projections, projections oriented ventrally; a medial, triangular process between surstylar arms; gonite (sometimes called hypandrial process) well developed, sheathing aedeagus.

Discussion. The lineage comprising *Paracoenia* and related genera is probably the sister group to the remaining taxa of Ephydrini. This lineage plus the remaining taxa of Ephydrini, as here delimited, is characterized by the following character states (some have become modified secondarily): 1. *Number of dorsocentral setae:* Although other genera of the subfamily Ephydrinae sometimes have five pairs of dorsocentral setae (e.g. *Notiocoenia* Mathis and *Austrocoenia* Wirth), the anterior pair (or pairs) is weakly developed. There are five well-developed pairs only in members of Ephydrini (the anterior pair is presutural; specimens of *Cirrula gigantea* have the anterior four pairs of dorsocentral setae weakly developed, a condition we interpret to be secondary). 2. *Development of intrapostalar seta:* In most species of the family, the intrapostalar seta is either lacking or is very much reduced, less than one-half the length of the postalar seta. In members of this lineage, the intrapostalar seta is frequently as long. 3. *Setal vestiture of proepisternum:* Throughout most of the family the proepisternum is bare of setae (although frequently it is thinly to densely microtomentose). In members of this lineage, there are numerous setulae that are generally conspicuously evident.

Subgenus *Paracoenia* Cresson

Paracoenia Cresson 1935: 356 (as a genus). Type species: *Coenia bisetosa* Coquillett 1902, original designation.

Diagnosis. This subgenus is similar to the subgenus *Thiomyia* Wirth but is distinguished by the following combination of characters: Generally olivaceous gray to dark greenish or bluish brown; setation generally well developed.

Head: Frons short. Antenna slender, basal flagellomere longer than wide; arista with dorsal rays about equal in length to length of basal flagellomere. Face high, height more than twice length of largest setae along oral margin; face generally conspicuously setose; antennal grooves evident but not as concave as *Thiomyia.*

Thorax: Dorsocentral setae 5; postsutural supra-alar seta well developed, subequal to length of anterolateral, postalar seta; katepisternal seta well developed. Wing generally hyaline to faintly infuscate. Femora more swollen than in *Thiomyia,* nearly twice width of tibiae; midfemur of male with comb-like row of setae along posteroventral margin; tarsomeres normally developed, cylindrical, not explanate, pulvilli evident, well developed. Halter whitish yellow to yellow.

Abdomen: Tergites wide, particularly tergite 2 and tergite 3, each 3X wider than long; tergite 5 of male generally with a ventrolateral process oriented along plane of body.

5. *Paracoenia (Paracoenia) wirthi* Mathis

Figs. 27–34, Map 5

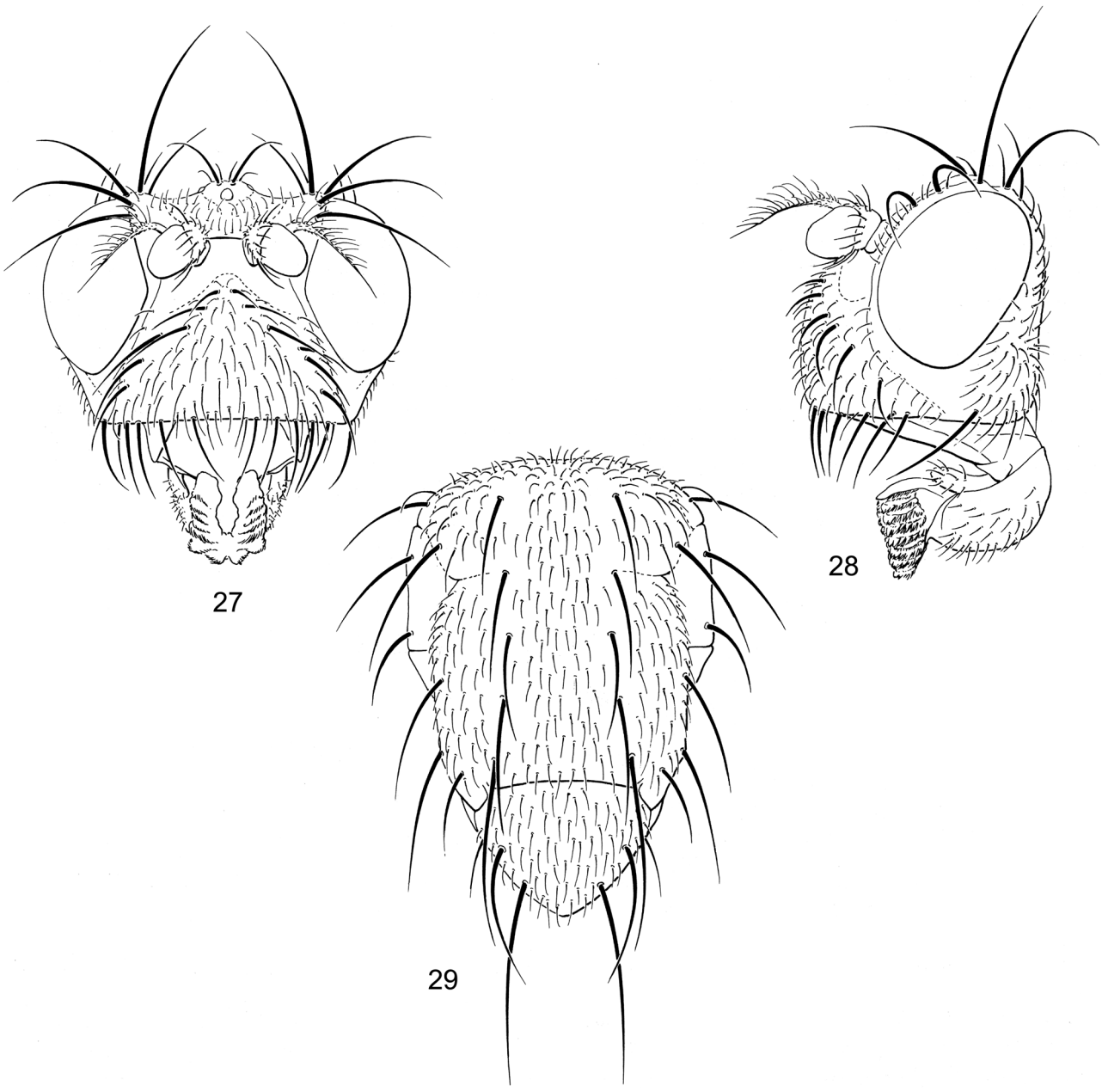
Paracoenia (Paracoenia) wirthi Mathis 1975: 78 [United States. California. Inyo: Tecopa Hot Springs (1.6 km N); HT ♂, CAS (12033)].—Mathis 1980: 9–11 [revision].—Mathis and Zatwarnicki 1995: 251 [world catalog].

Diagnosis. This species is distinguished from congeners, especially *P. bisetosa,* by the following combination of characters: Medium-sized shore flies, body length 3.12–3.65 mm; subshiny dorsally, bluish green to green metallic luster.

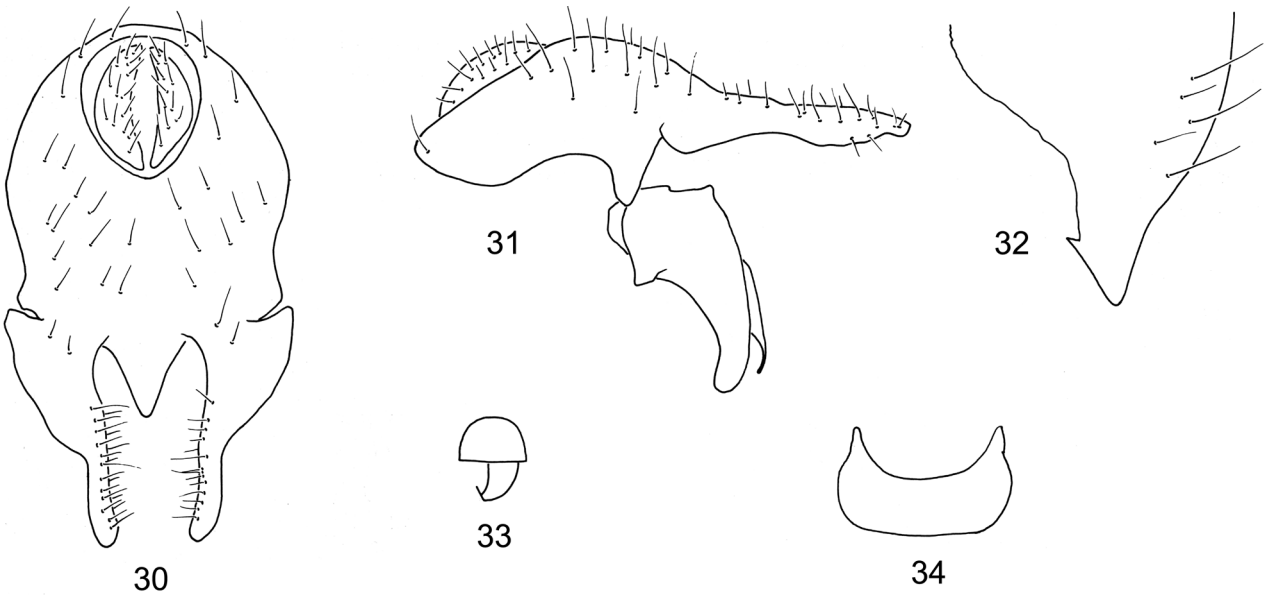
Head (Figs. 27–28): Mesofrons greenish blue, shiny; fronto-orbital areas dark brown, microtomentose to subshiny. Face densely microtomentose, grayish tank, dorsum of facial hump slightly darker than face, grayer; paravertical setae shorter than their distance apart; gena-to-eye ratio 0.30; eye ratio 0.64, height-to-length ratio 0.91; eye-width-to-face-length ratio 0.44.

Thorax: Mesonotum (Fig. 29) with anterior area slightly microtomentose, becoming subshiny to shiny posteriorly; acrostichal setulae in 3–4 rows anteriorly, becoming irregular, 5–6 rows posteriorly. Mesopleuron with more subdued coloration than mesonotum, mostly olivaceous gray. Wing nearly transparent to faintly brown.

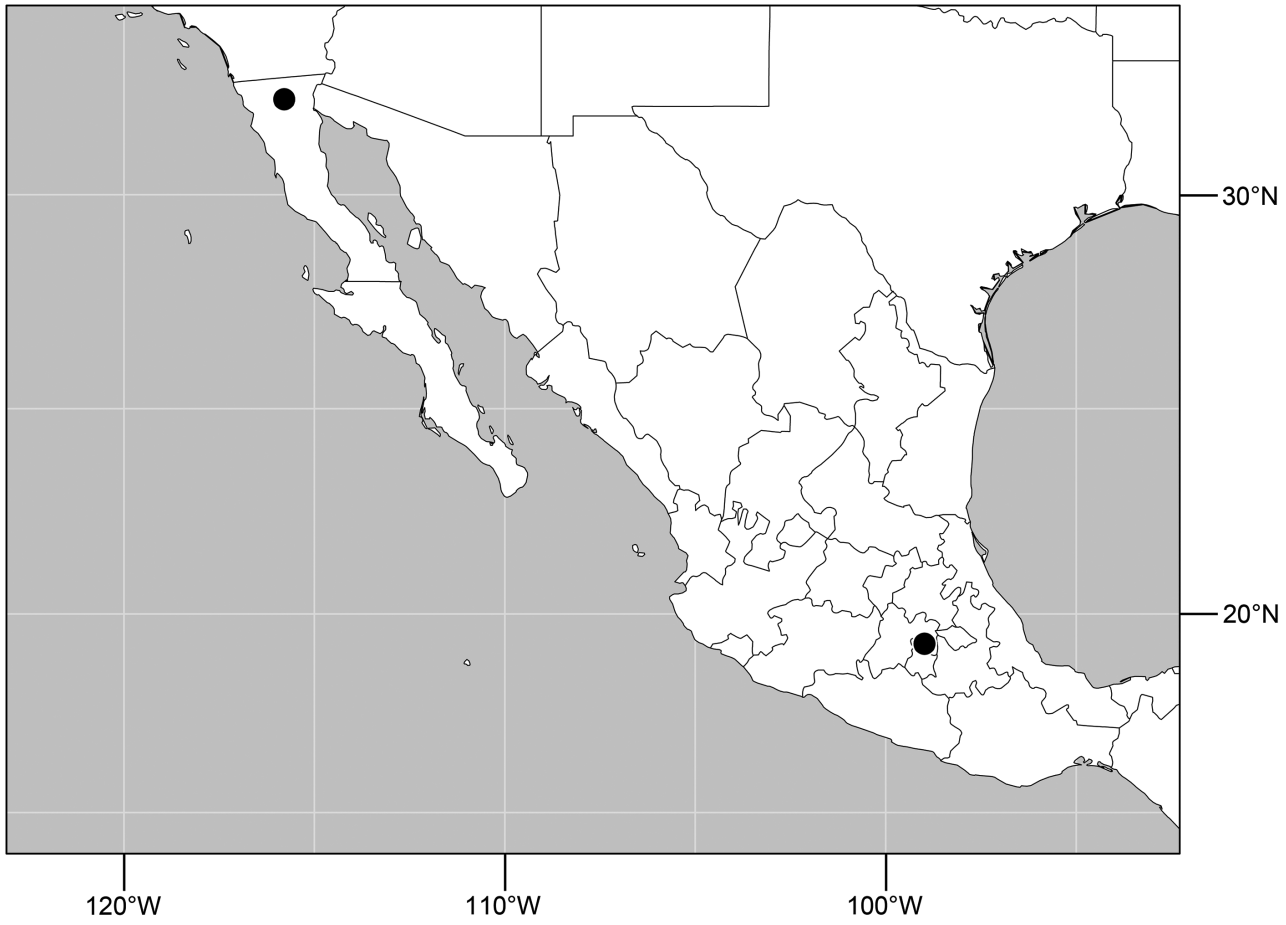
Abdomen: Concolorous with mesonotum; digitiform lateral process of male tergite 5 elongate, acutely pointed apically; male sternite 5 (Fig. 34) broadly U-shaped with posteriorly extended arms oriented posteriorly, acutely pointed, anterior margin somewhat truncate, posterior margin moderately deeply emarginate. Male terminalia (Figs. 30–32): Surstylus in posterior view with base robustly developed, width 3X apical width, thereafter abruptly narrowed with apical extension narrowly digitiform; medial triangular process less than half length of surstylar arm, not cleft apicomedially; gonite more or less triangular, sider basally, apical half tapered, apex digitiform, apex rounded. Female ventral receptacle as in Fig. 33 with large, mushroom-like operculum.



FIGURES 27–29. *Paracoenia wirthi* Mathis. (27) head, anterior view; (28) same, lateral view; (29) mesonotum, dorsal view (from Mathis 1980).



FIGURES 30–34. Structures of male and female terminalia of *Paracoenia wirthi* Mathis. (30) epandrium, cerci and surstyli, posterior view; (31) epandrium, cerci, surstyli and gonite, lateral view; (32) ventral apex of male tergite 5, ventral view; (33) female ventral receptacle, lateral view; (34) male sternite 5, ventral view (from Mathis 1980).



MAP 5. Distribution map for *Paracoenia wirthi* Mathis.

Type material. The holotype male is labeled "USA. CALIF. Inyo Co 1 mi N Tecopa Hot Spg 24 June 1974[,] Wayne N. Mathis/HOLOTYPE *Paracoenia wirthi* Mathis [red; 12033]." Allotype and 21 paratypes (7♂, 14♀;

CAS, USNM) bear the same label data as the holotype. Other paratypes as listed in Mathis (1975:78). The holotype male is double mounted (minute nadel), is in excellent condition, and is deposited in the CAS (12033).

Type locality. United States. California. Inyo: Tecopa Hot Springs (1.6 km N; 35°52.7'N, 116°13.9'W); HT ♂, CAS (12033).

Other specimens examined. *MEXICO. Baja California:* Guadalupe Canyon (32°09.3'N, 115°47.4'W), 19 May 1957, F. X. Williams (1♂, 3♀; CAS). *Distrito Federal:* Mixquic, Chalco Lake (9 km NW; 19°15.5'N, 98°58.6'W), 1 Aug 1965, K. R. Valley (4♂, 16♀; CAS, USNM).

Distribution (Map 5). Nearctic: United States (California). Neotropical: Mexico (Baja California, Distrito Federal).

Remarks. This species is similar to *P. bispinosa* but is slightly smaller in body length and less setulose. The ventral margin of the male sternite five is broadly U-shaped, and the connecting bridge is wide; the male tergite five is produced into an acutely pointed process; and the surstylus is more robustly developed basally, and the distal surstylar extensions are narrowly digitiform; the gonite is narrowed toward the apex, and the apex is digitiform, apically rounded.

Genus *Paraephydra* Mathis

Paraephydra Mathis 2008: 4 [type species: *Ephydrella freitasi* Oliveira 1954, original designation].

Diagnosis. *Paraephydra* is distinguished from other genera of Ephydrini by the following combination of characters: Moderately small to medium-sized shore flies, body length 2.40–3.80 mm; setation normally developed, not generally appearing pilose.

Head: Mesofrons shiny, with metallic luster, differentiated from microtomentose parafrons; cruciate interfrontal setae l; lateroclinate, fronto-orbital setae 2; antennal groove distinct but not deeply impressed; basal flagellomere lacking large seta inserted on lateral surface; arista as long or slightly longer than combined length of 1st 3 antennal segments, gradually tapered from base to apex, with subpectinate, dorsally branching rays on basal 2/3; postocular setae normally developed, not conspicuous; larger facial setae extended from interfoveal hump with 1–2, distinctly porrect to anaclinate.

Thorax: Females with 1 prescutellar, acrostichal setae; dorsocentral setae 4 (1+3), all well developed; supra-alar seta present; presutural supra-alar seta lacking; intrapostalar seta either weakly developed or lacking; disc of scutellum concolorous with posterior portion of scutum; females lacking dense patch of setae between posterior 2 dorsocentral setae. Hindtibia with apical, anteroventral seta, length equal to or larger than width of tibia at widest point.

Abdomen: Female ventral receptacle with operculum flat, disc-like. Male terminalia: symmetrical; epandrium longer than wide, narrowed ventrally, fused almost imperceptibly with base of united surstyli; surstyli fused medially except at near apex; posterior surstylar process only slightly longer than lateral process; both processes apical; gonite, hypandrium, and apparently aedeagus fused to form 1 compact structure, curved anteriorly, wide basally, tapered to rounded apex.

Distribution. *Neotropical;* widespread but scarce, from Puerto Rico south through Brazil to Chile. None of the congeners is known to be sympatric.

Natural history. Like other ephydrines, *Paraephydra* occurs in wetlands. In southern Chile (Osorno Province), we collected specimens of *P. stauros* in a sedge meadow near the margins of small but apparently permanent ponds. Nothing is known about the immature stages or the microhabitat of the genus.

Discussion. *Paraephydra* is proposed to accommodate two closely related species, *P. freitasi* (Oliveira) and *P. stauros* Mathis. See "Remarks" section under *P. freitasi* for further comments on the classificatory history and placement of that species.

Sexual dimorphism is evident in the chaetotaxy of *Paraephydra.* Females, unlike males, have a prescutellar acrostichal seta that is larger than other acrostichal setulae. Based on this character, Oliveira (1954c) described *P. freitasi* in the genus *Ephydrella,* as that genus, unlike *Dimecoenia,* sensu Neotropical species, lacks these setae.

Key to species of *Paraephydra*

1. Femora of at least foreleg and usually hindleg bicolored, darker basally; gena high, gena-to-eye ratio larger than 0.55 . . . . . *P. stauros* Mathis
- Femora unicolorous, yellow to yellowish orange; gena shorter, gena-to-eye ratio less than 0.40 . . . . . *P. freitasi* (Oliveira)

6. *Paraephydra freitasi* (Oliveira)

Fig. 35–40, Map 6

Ephydrella freitasi Oliveira 1954c: 292.—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 247 [world catalog].
Paraephydra freitasi.—Mathis 2008: 5–7 [generic combination, revision].

Diagnosis. Specimens of *P. freitasi* may be distinguished from other congeners of *Paraephydra* by the following combination of characters: Mesofrons brown; face white to silvery white; gena short, gena-to-eye ratio 0.38; femora completely yellow; tarsi with basal tarsomeres mostly yellowish, becoming darker brown apically; and conformation of male terminalia. Moderately small shore flies, body length 2.73–2.76 mm (holotype); dorsum generally dark or bluish green to gray, subshiny to shiny, paler in color, gray to yellowish.

Head (Fig. 35): Head ratio 0.62–0.69; frontal ratio 0.56–0.57; mesofrons mostly shiny, with metallic luster, brown, becoming greenish blue laterally; ocelli in isosceles triangle, distance between medial ocellus and either posterior ocellus longer than distance between posterior ocelli; microtomentose, with small strip near vertex of parafrons along tract of vertical and fronto-orbital setae shinier, more or less concolorous with lateral margins of mesofrons. Antenna brown to black; basal flagellomere slightly grayer, appearing more microtomentose. Facial ratio 1.01–1.07; face mostly microtomentose, white to silvery white. Eye ratio 0.92–0.95; gena-to-eye ratio 0.31–0.38; gena moderately high, more or less unicolorous with face.

Thorax (Fig. 36): Scutum dull gray to shiny, dark, bluish green, shinier posteriorly, dull coloration restricted to anterior portion anterior of 1st dorsocentral seta; scutellum shiny, unicolorous, concolorous with posterior portion of scutum; pleural areas brownish or bluish gray to whitish gray, dull, microtomentose; coloration change between scutum and pleural areas rather marked. Wing length 2.61–2.85 mm; costal vein ratio 0.23–0.31; M vein ratio 0.72–0.74; wing mostly hyaline. Legs more or less concolorous; femora unicolorous, pale, yellow to yellowish orange; tibiae nearly concolorous with femora but slightly darker apically and ventrally; tarsi with basal tarsomeres mostly brown to dark brown apically, basitarsomere sometimes yellowish basally and ventrally.

Abdomen: Tergites generally unicolorous although metallic luster of anterior segments tends to be more concolorous with scutum, bluish green; posterior tergites becoming progressively more brownish in color; lateral margins duller, more microtomentose, grayer. Male terminalia (Figs. 37–40): epandrium in posterior view (Figs. 37) elliptical to obovate but more or less truncate ventrally, lateral margins shallowly curved to sinuous, especially toward venter; base of fused surstyli with partial suture to indicate fusion with venter of epandrium; posterior surstylar processes very slightly divergent; length of fused surstylar plate (Figs. 37–38, 39) more than twice width; internal terminalia much reduced and compact; phallapodeme apparently lacking or fused with base of aedeagus and hypandrium; aedeagus (Fig. 40) moderately wide throughout its length, elongate, shallowly curved; female ventral receptacle with a short, flattened cap and a robust, C-shaped extension.

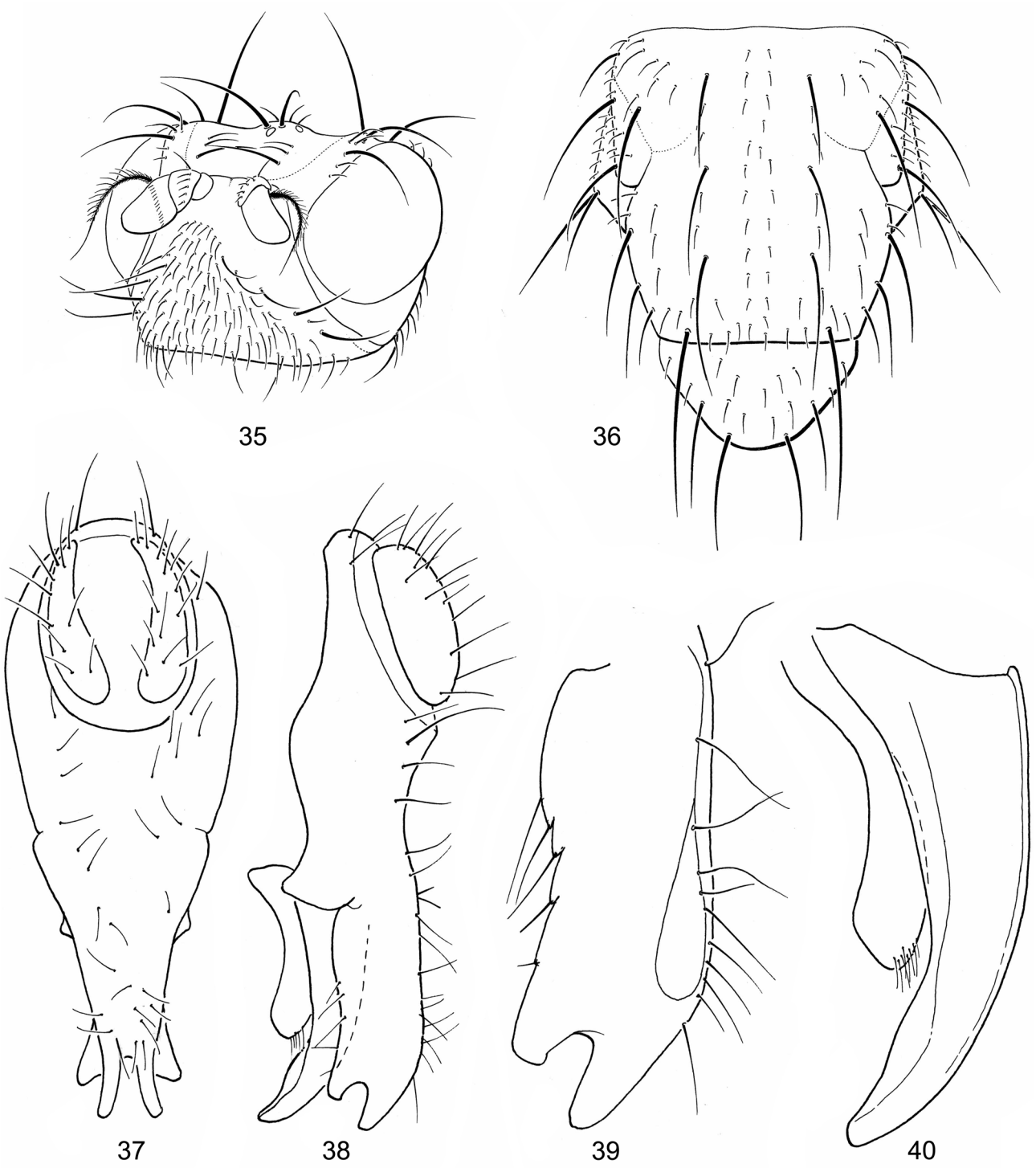
Type material. The holotype female is labeled "[Brazil] Bodoquena[,] Mato Grosso XI-1941 [Nov 1941] Com. I O C/COL. INST.O.CRUZ NO. 719/HOLOTYPE Ephydrella freitasi Oliveira [red]." Three female paratypes are labeled with the same label data as the holotype except for collection numbers, which are 718, 720, and 721. The type series is in the IOC. The holotype is glued to a paper point and is in good condition. Two of the paratypes lack abdomens but otherwise the specimens are in good condition. The third paratype is missing its head, and the left wing has been removed and is glued apart from the remainder of the specimen.

Type locality. Brazil. Mato Grosso do Sul: Bodoquena (20°31.1'S, 56°43.3'W).

Other specimens examined. *ARGENTINA. Entre Ríos:* Rio Paraná, Ibicuy, Puerto Ibicuy (33°44'S, 59°11'W), 10 Dec 1979, C. M. and O. S. Flint (1♂; USNM).

PARAGUAY. Nueva: Asunción (20°48'S, 61°55'W), 21–25 Mar 1986, M. Pogue, A. Solis (1♂; USNM).

PERU. Lima: Lima, Lagunas de Villa (12°03.3'S, 77°03'W), 14 Feb 1984, W. N. Mathis (20♂, 20♀; USNM).



FIGURES 35–40. *Paraephydra freitasi* (Oliveira). (35) head, lateroblique view; (36) mesonotum, dorsal view; (37) epandrium, cerci, surstyli, posterior view; (38) same, lateral view; (39) surstylus, lateral view; (40) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view (from Mathis 2008).

WEST INDIES. Puerto Rico. Laguna Cartagena (S Mayaguez; 18°0.1'N, 67°06.1'W), 8 Apr 1972, L. V. Knutson (2♂, 1♀; USNM).

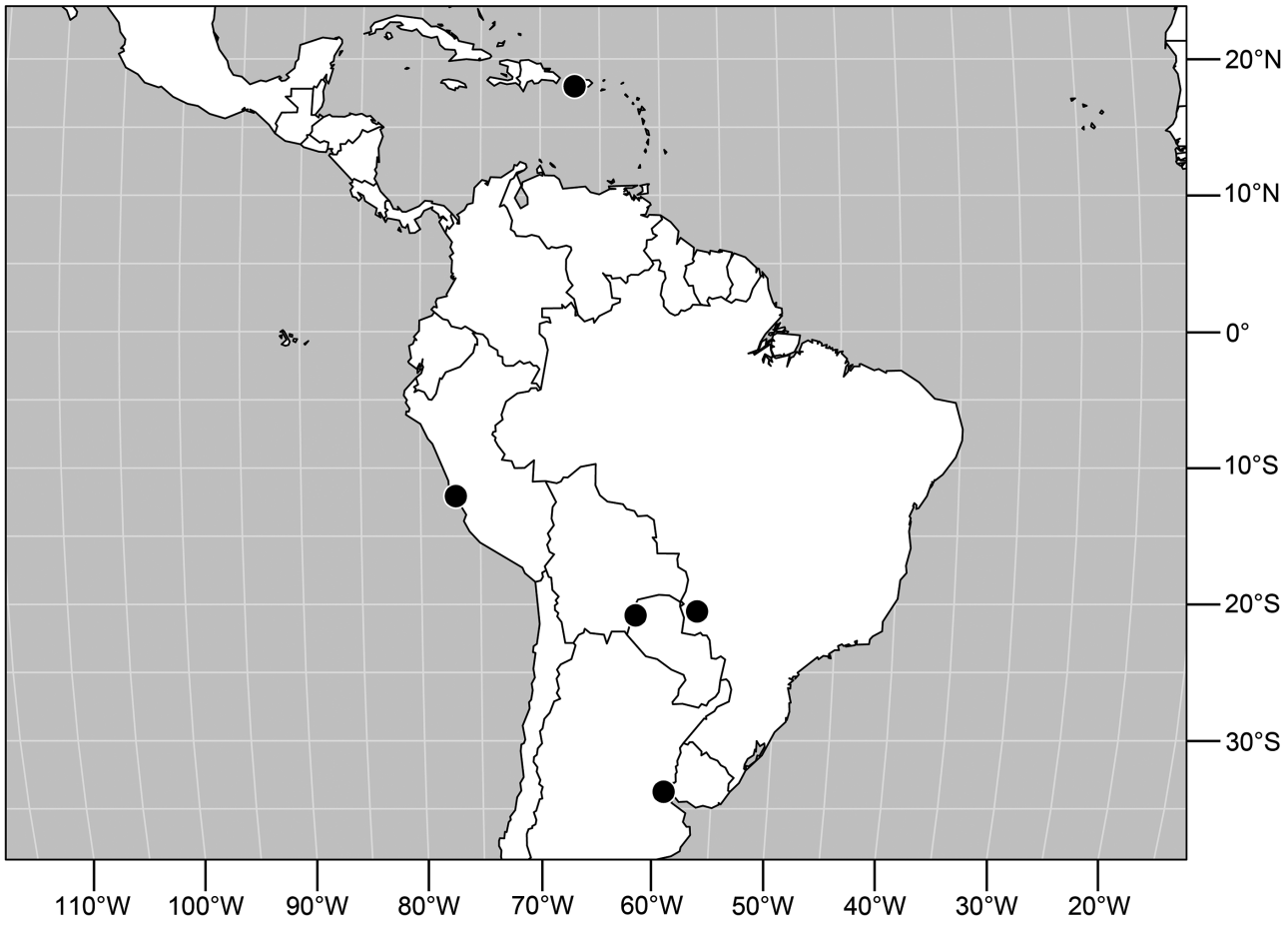
Distribution (Map 6). *Neotropical:* Argentina (Entre Ríos), Brazil (Mato Grosso do Sul), Chile (Osorno, Valdivia), Paraguay (Nueva), Peru (Lima), West Indies (Puerto Rico).

Remarks. Oliveira (1954c) tentatively placed this species in the genus *Ephydrella* Tonnoir and Malloch, awaiting males to further clarify its generic status. Using the brief descriptions of *Ephydrella* species for comparison, Oliveira noted that *P. freitasi,* like species of *Ephydrella,* has a well-developed, prescutellar,

acrostichal seta. But Oliveira lacked males for critical study of postabdominal structures and was unable to satisfactorily resolve the generic affinity of this species. As an added complication, it has now been discovered that not all members of *Ephydrella* have prescutellar, acrostichal setae and that their occurrence in species related to *P. freitasi* is limited to females.

Identification of this species remains somewhat suspect, as males from the type locality or from a site nearby are still lacking and structures of the male terminalia provide important characters for species recognition in this tribe, including *Paraephydra.* In part, we are basing the identification of this species on the distributional information, with this species apparently being the more widespread Neotropical species, especially east of the Andes.

Discovery of *P. freitasi* in Puerto Rico was unexpected, as its congeners are mostly from southern South America. This finding leads us to suspect that the distribution of *Paraephydra* will be discovered to be more widespread than is presently known and that it would not be surprising to discover representatives of the genus in northern South America and Central America, perhaps even Mexico.



MAP 6. Distribution map for *Paraephydra freitasi* (Oliveira).

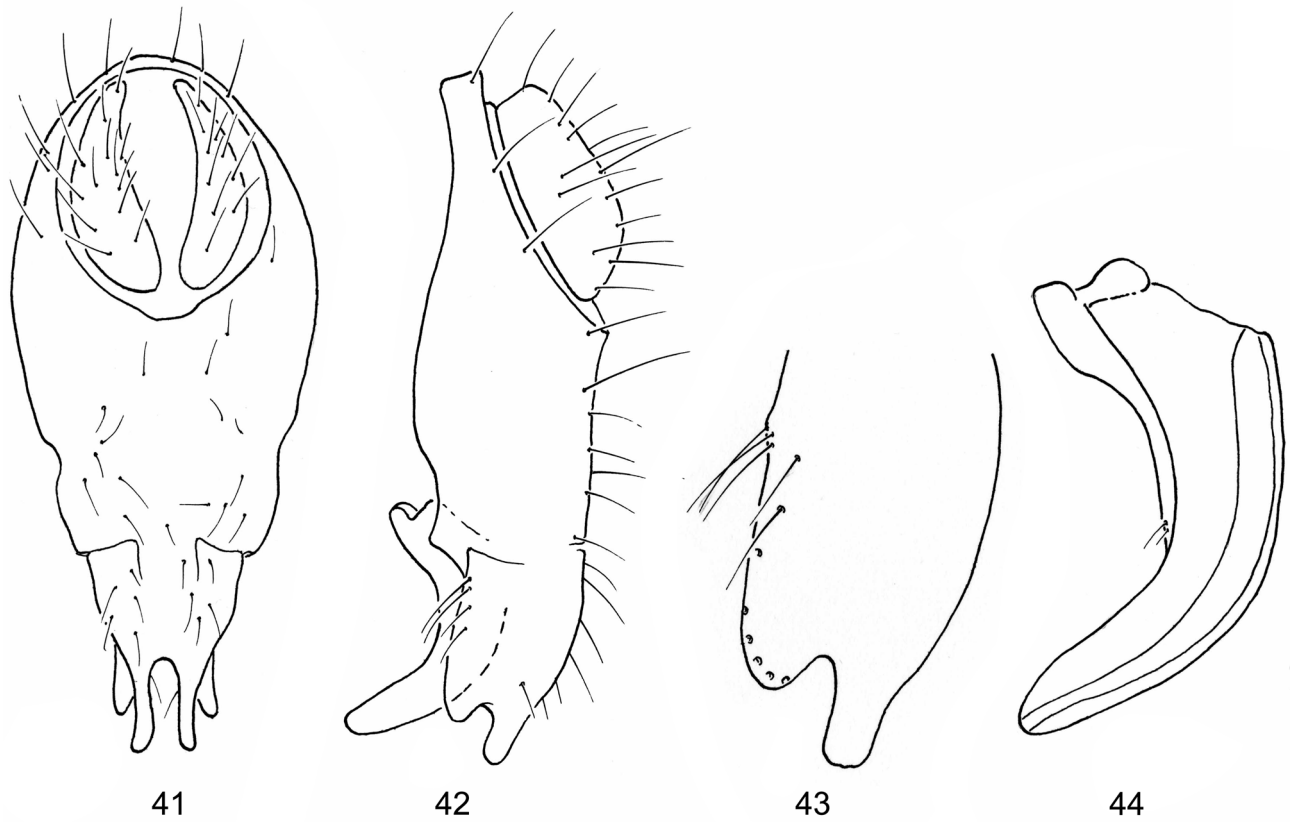
7. *Paraephydra stauros* Mathis

Figs. 41–44, Map 7

Paraephydra stauros Mathis 2008: 8.

Diagnosis. This species is similar to *P. freitasi* but is distinguished from it by the following combination of characters: Mesofrons metallic green; face mostly unicolorous, grayish white to silvery white; gena comparatively high, gena-to-eye ratio 0.57–0.58; forefemur two toned, bluish gray basally, dull, microtomentose, becoming paler, less microtomentose and yellowish orange apically; tarsi brown to brownish black; shape of structures of male

terminalia distinctive. Moderately small to medium-sized shore flies, body length 2.40–3.60 mm (averaging 3.02 mm); generally dark dorsally, dull, olivaceous brown to shiny, metallic green becoming paler in color ventrally, mostly gray.



FIGURES 41–44. Structures of male terminalia of *Paraephydra stauros* Mathis. (41) epandrium, cerci, surstyli, posterior view; (42) same, lateral view; (43) surstylus, lateral view; (44) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view (from Mathis 2008).

Head: Head ratio 0.65–0.66; frontal ratio 0.49–0.50; subquadrate mesofrons narrowed slightly anteriorly, shiny with metallic green luster, anterior portion with some smaller, generally inconspicuous setae in addition to larger, cruciate, interfrontal setae; ocelli in isosceles triangle, distance between medial ocellus and either posterior ocellus longer than distance between posterior ocelli; fronto-orbits slightly shinier with faintly evident metallic green luster. Antenna mostly unicolorous, basal flagellomere slightly browner and less gray; arista long, longer than combined length of segments 1–3, with dorsal, subpectinate branching on basal 2/3. Facial ratio 1.05–1.70; area immediately between antennal bases brown, otherwise face mostly unicolorous, grayish white to silvery white. Eye ratio 0.91–0.93; gena-to-eye ratio 0.57–0.58; gena high, concolorous with face.

Thorax: Scutum gray to olivaceous brown anteriorly, microtomentose, dull, becoming shinier, less microtomentose and more greenish to dark greenish blue in coloration; scutellum shiny with metallic dark greenish blue luster. Pleural areas grayish brown to brown dorsally, becoming paler, bluish gray to gray ventrally. Wing hyaline or slightly infumate; costal vein ratio 0.41–0.43; M vein ratio 0.76–0.79. Legs mostly concolorous; forefemora and usually hindfemora two-toned, bluish gray basally, dull, microtomentose, becoming paler, less microtomentose and yellowish orange apically; tibiae concolorous with apices of femora basally, becoming browner apically; tarsi mostly brown to brownish black.

Abdomen: Dorsum of tergites microtomentose to subshiny; basal tergites subshiny medially, mostly greenish blue, lateral margins becoming duller, grayer; apical tergites subshiny medially although less so than basal ones, with more brownish coloration, lateral margins also becoming grayer and more microtomentose. Male terminalia (Figs. 41–44): epandrium in posterior view (Figs. 41) obovate but more or less truncate ventrally, lateral margins slightly sinuate, especially toward venter; base of fused surstyli with partial suture to indicate fusion with venter of epandrium; length of surstylar plate (Figs. 41–43) only slightly greater than width; apical surstylar prongs mostly

parallel, deeply emarginate; phallapodeme, aedeagus and hypandrium greatly reduced and compacted; aedeagus (Fig. 44) mostly wide throughout its length; aedeagus conspicuously curved.

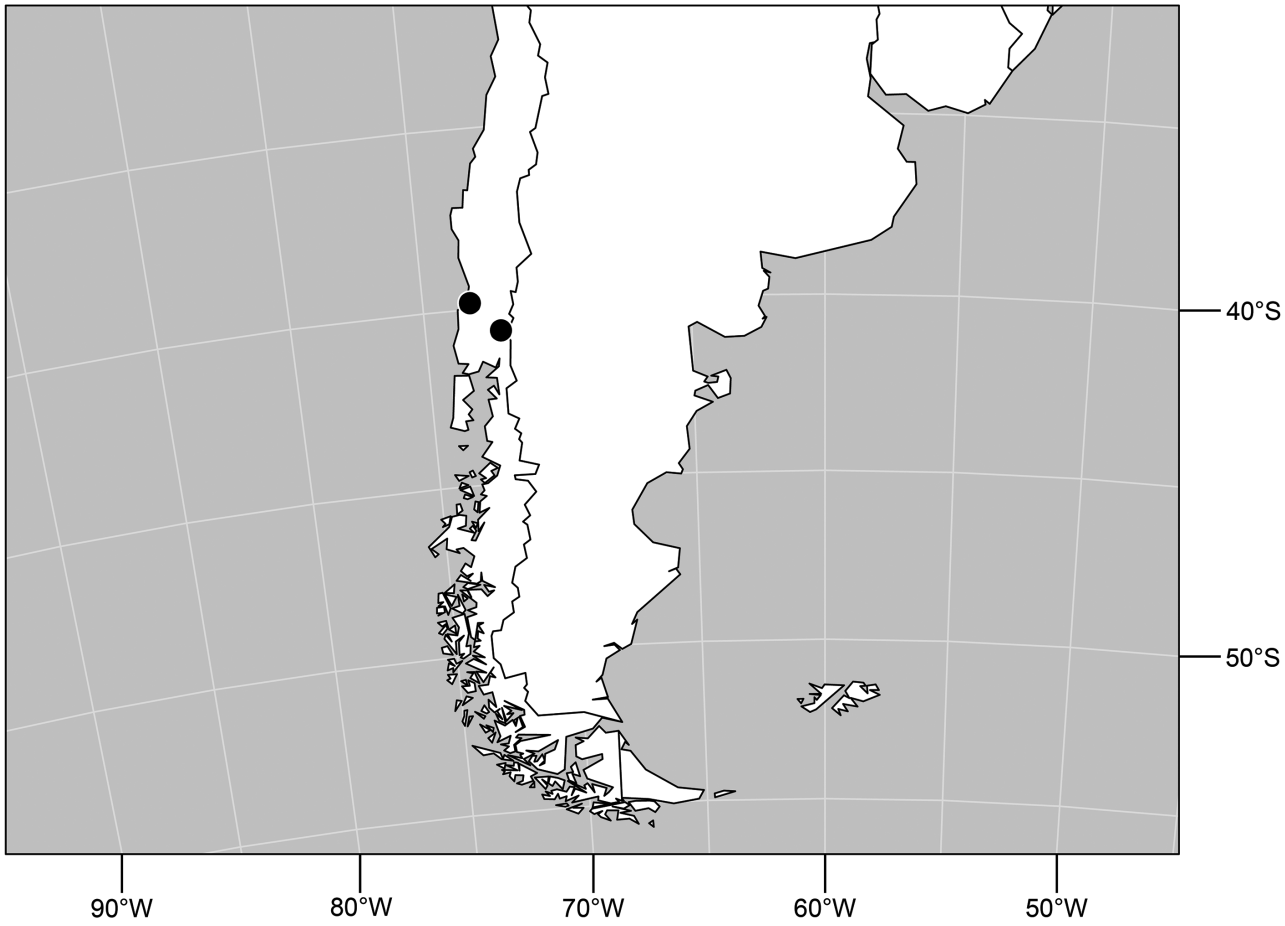
Type material. The holotype male is labeled "CHILE: Osorno Pr. Anticura (1 km. W) 432 m. elev.[,] 1–3 Feb. 1978[,] WNMathis/HOLOTYPE ♂ Paraephydra stauros Mathis USNM [red]." The holotype is double mounted (minuten in a block of plastic elastomer), is in excellent condition (abdomen has been removed, dissected; parts are in an attached microvial), and is deposited in the USNM. The allotype female bears the same locality label data as the holotype. Other paratypes are as follows: CHILE. Valdivia: Valdivia (7 Km S; 39°49'S, 73°14'W), 4 Jun 1969, P. and P. Spangler (2♂, 4♀; USNM).

Type locality. Chile. Osorno: Anticura (1 km W; 40°39'S, 72°10'W; 432 m).

Distribution (Map 7). *Neotropical:* Chile (Osorno, Valdivia).

Etymology. The specific epithet, *stauros,* is a masculine Greek noun meaning cross and refers to the prominent pair of cruciate interfrontal setae of this species. The name is a noun in apposition to the generic name.

Remarks. Although some intraspecific variation in color is evident, the color of the legs, as noted in the key and description, seems to hold. The sampling of this species, however, is based on the few specimens listed previously.



MAP 7. Distribution map for *Paraephydra stauros* Mathis.

Genus *Neoephydra* Mathis

Dimecoenia in part of authors [misidentification], not Cresson 1916: 152.—Wirth 1968: 23 [catalog of South American species, distribution].—Lizarralde de Grosso 1989: 57–58 [fauna of Argentina].—Mathis and Zatwarnicki 1995: 238–240 [world catalog].

Neoephydra Mathis 2008: 9 [type species: *Neoephydra araucaria* Mathis 2008, original designation].

Diagnosis. *Neoephydra* is distinguished from other genera of Ephydrini by the following characters: medium-sized to large shore flies, body length 3.00–5.30 mm.

Head: Mesofrons with vestiture variable; lacking cruciate, interfrontal setae; lateroclinate, fronto-orbital setae either 2 or 5–6, not 3; basal flagellomere lacking large seta inserted on lateral surface; arista moderately short, thickened basally, with macropubescent vestiture dorsally, apical half style-like, bare; postocular setae variable; large facial setae declinate; gena moderately high to high, gena-to-eye ratio 0.30 or larger.

Thorax: Acrostichal setae no well-developed; dorsocentral setae 5 (1+4), development variable; supra-alar seta variable; presutural supra-alar seta lacking; intrapostalar seta present, although sometimes weak; hindtibia lacking apical seta.

Abdomen: Male terminalia symmetrical, epandrium longer than wide; surstyli fused medially except near apices and with 1–2 lateral projecting processes or prongs in addition to apical prominences; aedeagus shallowly crescent-shaped and generally quite slender, at least apically; female ventral receptacle with small papilla-like operculum.

Distribution. Members of *Neoephydra* are known only from the Neotropics, where they are widespread and occur in habitats similar to those of the Holarctic genera *Ephydra* Fallén and *Setacera* Cresson.

Natural history. Like many taxa of the subfamily Ephydrinae, specimens of *Neoephydra* inhabit diverse and what would appear to be environments inimical to life. Oliveira (1954a) noted that Dr. Herman Lent found larvae, pupae, and adults of a Chilean species in the hot effluent of a high altitude, hot water geyser located at El Tatio (5200 m), near San Pedro de Atacama. Although the temperature of the water was not taken, Dr. Lent stated that it was sufficiently hot to cook an egg. Dr. Lent also observed a small, predatory toad, *Telmatobius peruvianus* Wiegmann (Anura: Leptodactylidae), whose diet consisted solely of freshly emerged, adult flies.

Numerous larvae and pupae of a second species, collected in southern Brazil, were found to inhabit warm, algae-covered, and often saline water that had accumulated in depressions of large rocks near the sea shore (Oliveira 1954b, 1958). Water evaporation from the shallow depressions is rapid, accounting for the concentration of salts.

Hennig (1943) and Oliveira (1954b, 1958) described and figured the larvae of four species belonging to this genus. Based on these Figs., larvae of *Neoephydra* are typical of the tribe, with eight pairs of claw-bearing prolegs on the ventral surface, the terminal pair being larger and with crochets opposable to those of the other prolegs. The posterior spiracles are borne on a long respiratory tube which bifurcates posteriorly.

Discussion. *Neoephydra* is the generic name for most South American species that had been placed in the genus "*Dimecoenia.*" As noted by Steyskal (1970) and Wirth (1971), the Neotropical species, which were treated as members of *Dimecoenia* (Wirth 1968), are structurally dissimilar from the Nearctic species. We came to the same conclusion as Steyskal and Wirth after studying structures of the male terminalia. A more complete diagnosis is given in the generic and species group's descriptions. Particular attention should be paid to structures of the male terminalia and female ventral receptacle.

Species groups are also being recognized (the *araucaria, dasycephala,* and *neotropica* groups). These groups are proposed for specimens that are dissimilar superficially from the typical *Neoephydra* (the *araucaria* group) but which have structures of the male and/or female terminalia that closely resemble those of other similar aggregates. We chose the informal category of "species group" for these subtaxa because of its flexibility, without encumbering additional, fixed nomenclature, such as would be required for the subgeneric category.

The monophyly of *Neoephydra* is established by the following characters: *Conformation of the male terminalia:* The surstyli are fused medially except near their apices and each surstylus bears one or two additional, anterolateral prongs. This conformation is unique within the subfamily. *Conformation of female ventral receptacle:* All species groups have a small, papilla-like operculum, which is also unique to females of *Neoephydra*.

It is also probable that the species groups of *Neoephydra* are monophyletic, although the *araucaria* group lacks characterization by derived character states. The monophyly of the remaining groups is well founded as evidenced by the appropriate characterization heading each group treatment.

Key to species groups of *Neoephydra*

1. Lateroclinate, fronto-orbital setae 5–6; postocular setae well developed, prominent, particularly along ventral margin of eye . . . . . The *dasycephala* Group
- Lateroclinate, fronto-orbital setae 2; postocular setae variable but not prominent along ventral margin of eye 2

2. Setation generally weak, fronto-orbital setae much shorter than width of frons; mesofrons mostly microtomentose; antennal groove deeply impressed; disc of scutellum gray, contrasted distinctly with brown scutum . . . . . The *neotropica* Group
- Setation strongly developed, length of fronto-orbital setae nearly equal to width of frons; mesofrons shiny with metallic reflections; antennal groove not deeply impressed; disc of scutellum concolorous with posterior portion of scutum . . . . . .The *araucaria* Group

The *neotropica* Group

Species included: *Neoephydra neotropica* **sp. nov.**

Diagnosis. Members of the *neotropica* group may be distinguished from those of related species groups by the following characters: overall size large; setation generally reduced, lacking pilose appearance.

Head: Mesofrons and parafrons with vestiture undifferentiated; postocular setae normally developed, not unusually conspicuous; lateroclinate, fronto-orbital setae 2; antennal groove deeply impressed.

Thorax: Anterior dorsocentral setae weak, not conspicuous; female with dense patch of setae between posterior 2 pairs of dorsocentral setae; disc of scutellum pale grayish blue, contrasted distinctly with darker, posterior portion of the scutum; and supra-alar seta lacking.

Distribution. *Neotropical:* Chile (Santiago: El Tabo).

8. *Neoephydra neotropica* sp. nov.

Figs. 45–49, Map 8

Diagnosis. As the only known species of this species groups, *N. neotropica* is characterized by the diagnosis of the species group; should other species be discovered, structures of the male genitalia will undoubtedly be diagnostic. Moderately large shore flies, body length 4.61–4.75 mm (averaging 4.66 mm); generally brown or pale greenish brown to gray in color, mostly dull, microtomentose.

Head (Fig. 45): Head ratio 0.61–0.63; frontal ratio 0.42–0.44; mesofrons mostly microtomentose, dull, brownish olive to brownish green, contrasted little with parafrons in luster and vestiture; ocellar triangle and parafrons slightly browner than mesofrons, anteriorly charcoal colored; anterior portion of mesofrons with sparsely scattered, small, generally inconspicuous setae; ocellar setae small, from dorsal view not extended to anterior margin of mesofrons; postocellar setae minute, inconspicuous; fronto-orbital setae small, inserted on posterior half of fronto-orbits, occasionally with a 3rd fronto-orbital setae, if present, length about 3/4 that of larger setae; medial and lateral vertical setae on posterior surface of head just below vertex. Antenna dark brown, mostly unicolorous, basal flagellomere almost as long as combined length of scape and pedicel; aristal length approximately equal to combined length of basal 3 segments. Facial ratio 0.71–0.73; interfoveal hump narrow, dorsum dull, microtomentose, dark brown, contrasted distinctly with lower portion of face which is bluish gray to whitish gray; setation of face reduced, totally prominent setae; existing setae uniformly scattered. Eye ratio 0.89–0.93; gena-to-eye ratio 0.43–0.47; gena moderately high, coloration slightly darker than lower portion of face, frequently with more bluish tinges. Palpus dark brown.

Thorax (Fig. 46): Generally brown dorsally and gray ventrally, dull, totally microtomentose; scutum generally brown, lacking shiny vittae; humeral callosity, anteromedial vitta, and small area surrounding apex of dorsal notopleural angle grayish blue; disc of scutellum grayish blue, contrasted distinctly with brown, lateral margins; female specimens with rather dense patch of long setae on scutum just anterior of scutellum, setae on disc of scutellum also denser and longer but not as long as those of mesonotal patch; pleural areas except notopleuron, unicolorous, bluish gray; vestiture of katepisternum more pronounced, almost microtomentose. Wing mostly hyaline or but slightly infumate; wing ratio 0.40; wing length from 4.27–4.56 mm (averaging 4.39 mm); costal vein ratio 0.39–0.43; M vein ratio 0.59–0.62. Femora concolorous, grayish blue apically, gradually browner toward apices; tibiae concolorous, mostly unicolorous, olivaceous brown with some faint bluish tinges; tarsi generally dark brown.

Abdomen: Generally less microtomentose than thorax, almost subshiny toward lateral margins; medial portion of tergites 1 and 2 bluish gray with lateral margins pale greenish brown, gray area attenuated posteriorly; remaining

tergites unicolorous, olivaceous brown; tergite 5 of male truncate posteriorly, forming a trapezoid. Male terminalia (Figs. 47–49): epandrium in posterior view (Fig. 47) with pedunculate sides; lateral margins of fused surstyli very slightly divergent from posterior view; posterior surstylar process wide, projecting parallel to each other; lateral surstylar process (Fig. 48) broadly based, visible from posterior view in addition to lateral view; aedeagus in lateral view (Fig. 49) narrow throughout most of its length except for basal 1/4, where it broadens gradually; phallapodeme in lateral view (Fig. 49) slender, longer than wide.

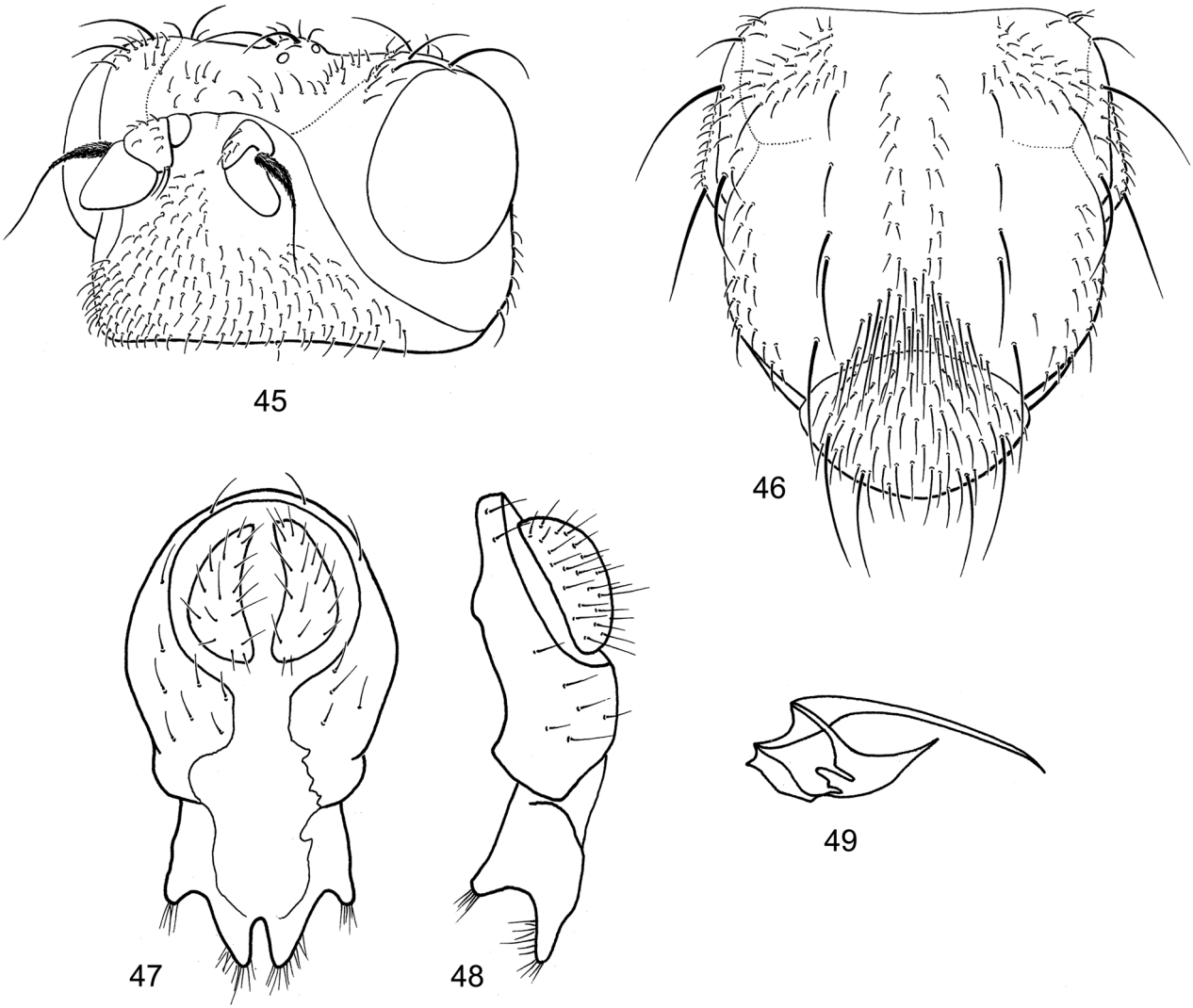
Type material. The holotype male is labeled "CHILE - Stgo [Santiago], El Tabo, 24.7.61 [24 Jul 1961], Kuschel leg. [handwritten]/♂/HOLOTYPE ♂ Neoephydra neotropica Mathis USNM [red]." The holotype is double mounted (glued to a paper triangle), is in excellent condition, and is deposited in the USNM. The allotype female and 14 additional paratypes (8♂, 6♀; USNM) bear the same locality label data as the holotype.

Type locality. Chile. Santiago: El Tabo (33°27'S, 71°40'W).

Distribution (Map 8). *Neotropical:* Chile (Santiago). *Neoephydra neotropica* is known thus far only from the type locality.

Etymology. The specific epithet, *neotropica,* is a Latinized adjective in reference to the Neotropical distribution of this species.

Remarks. This species demonstrates considerable sexual dimorphism, particularly with respect to setation. Females have a rather dense, prescutellar patch of setae between the posterior dorsocentral setae that is not found in males.



FIGURES 45–49. Head, thorax, and structures of male terminalia of *Neoephydra neotropica* **sp. nov.** (45) head, lateroblique view; (46) mesonotum, dorsal view; (47) epandrium, cerci, surstyli, posterior view; (48) same, lateral view; (49) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view.

MAP 8. Distribution map for *Neoephydra neotropica* **sp. nov.**

The *dasycephala* Group

Species Included: *Neoephydra dasycephala* **sp. nov.**; *N. mallonota* **sp. nov.**; and *N. shewelli* **sp. nov.**.

Diagnosis. Members of the *dasycephala* group are characterized by the following characters: medium-sized to moderately large shore flies, body length 3.50–5.00 mm; body with pronounced hairiness, appearing pilose.

Head: Mesofrons shiny, with metallic luster, contrasted with microtomentose parafrons; postocular setae well developed, particularly along the posteroventral margin of the eye; lateroclinate, fronto-orbital setae at least 5; antennal groove distinct but not deeply impressed.

Thorax: Anterior dorsocentral setae well developed, conspicuous; female lacking dense patch of setae between posterior 2 dorsocentral setae; disc of scutellum concolorous with posterior portion of scutum; supra-alar seta present.

Distribution. Species of the *dasycephala* group occur at higher elevations throughout the southern range of the Andes Mountains. Most specimens were collected at elevations between 3700 and 4100 m, along the Argentine-Chilean border and northward into Peru.

Remarks. The distributions for the three known species are broadly sympatric, with all three species occurring at a specific locality. As nothing is known concerning the natural history of any of the included species, how they partition the habitat is unknown.

Key to species of the *dasycephala* Group

1. Tibiae and tarsi of at least mid- and hindlegs mostly rufous. . . . . *N. shewelli* **sp. nov.**

Tibiae and tarsi of all legs mostly grayish green to charcoal gray 2

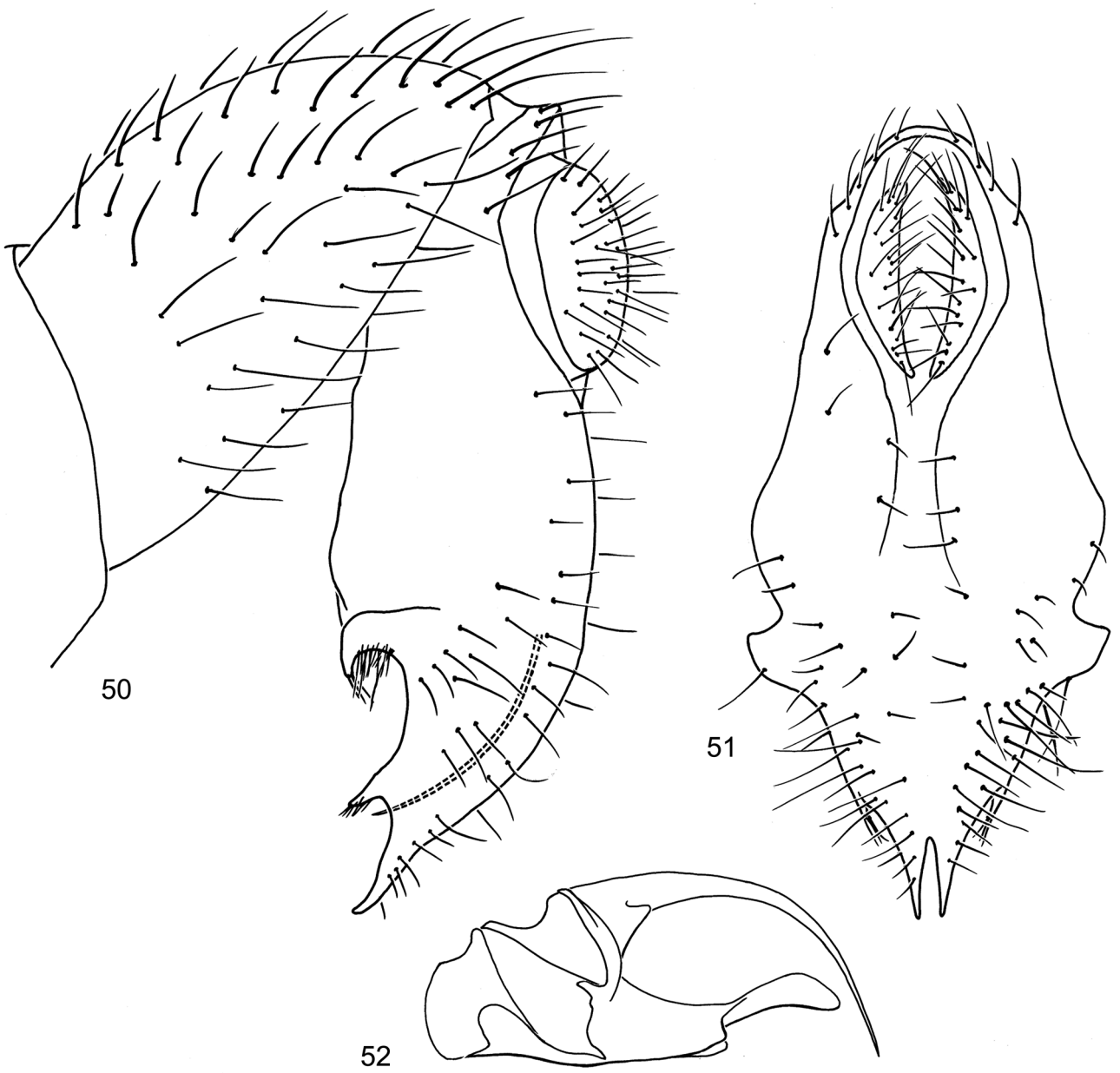
2. Dorsal portion of face and scutum distinctly rusty brown; scutum mostly microtomentose . . . . . *N. dasycephala* **sp. nov.**

- Dorsal portion of face and scutum mostly grayish green, at most slightly olivaceous; scutum mostly subshiny, appearing darker . . . . . *N. mallonota* **sp. nov.**

9. *Neoephydra dasycephala* sp. nov.

Figs. 50–52, Map 9

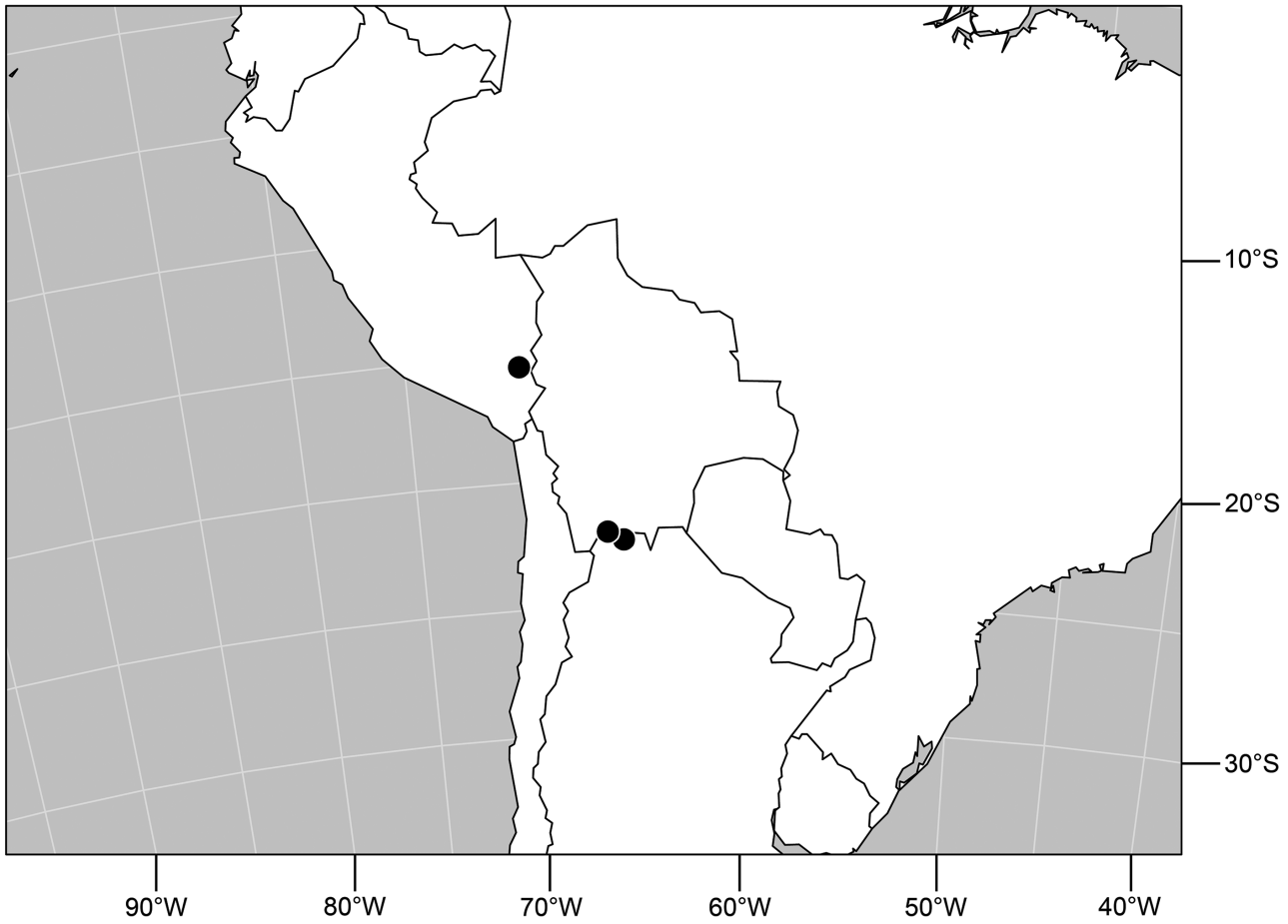
Diagnosis. Specimens of this species could easily be confused with those of either congener of this species group but may be distinguished by the following characters: larger, body length up to 5.00 mm; legs mostly grayish green, densely microtomentose, but with ventral surface of at least hindtibia somewhat rufous; medial portion of scutum brown, mostly microtomentose, subshiny vittae less distinct, as in specimens of *N. mallonota;* and male terminalia with distinctive conformation. Moderately large shore flies, body length 4.30–5.00 mm (averaging 4.63 mm); grayish blue or grayish green to brown dorsally, progressively paler, grayer toward ventral surface.



FIGURES 50–52. Structures of male terminalia of *Neoephydra dasycephala* **sp. nov.** (50) tergite 5, epandrium, cerci, surstyli, lateral view; (51) same, posterior view; (52) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view.

Head: Head ratio 0.57–0.60; frontal ratio 0.47–0.52; mesofrons with dark greenish blue, metallic luster, more or less densely pilose; ocellar triangle and lateral margins of frons mostly concolorous, microtomentose, brownish gray to charcoal gray, more charcoal colored toward anterior margins; area between fronto-orbital seta insertions and eye less microtomentose, grayish green, slightly subshiny, bare. Antenna unicolorous, microtomentose, blackish brown to black; aristal length equal to combined length of pedicel and basal flagellomere. Facial ratio 0.76-0.81; face densely microtomentose, dark brown dorsally, gradually paler ventrally, grayish tan to nearly white. Eye ratio 0.96–0.99; gena-to-eye ratio 0.62–0.66; gena very high, coloration pale tannish white anteriorly, darker posteriorly with some faint grayish green or grayish blue tinges.

Thorax: Mostly microtomentose; scutum brown medially with paler, grayish blue margins, but with some faint, subshiny vittae. Anterior margin with 2 distinct, subshiny brown vittae which become grayer and duller from transverse suture backward; area laterad and mediad of subshiny anterior vittae darker brown, subshiny, and fused posteriorly; gray microtomentose lateral margins particularly evident from humeral callus posteriorly through notopleural region, more bluish and slightly subshiny posteriorly; dorsum of scutellum concolorous with posteriormost portion of scutum, subshiny with metallic brownish blue luster; lateral and apical margins grayish blue, duller; anepisternum brown along dorsal margin, gradually grayer toward ventral margin; other pleural areas mostly grayish tan, unicolorous. Wing mostly hyaline or with faint, grayish brown coloration; costal vein ratio 0.39–0.41; M vein ratio 0.89–0.92. Coxae grayish white to silvery; femora generally grayish green, densely microtomentose, concolorous; tibiae concolorous with femora but some specimens with rufous coloration on ventral surface, especially on hindleg; tarsi grayish black in freshly emerged specimens, paler, rufous in older specimens.



MAP 9. Distribution map for *Neoephydra dasycephala* **sp. nov.**

Abdomen: Unicolorous, microtomentose to subshiny, grayish green or grayish blue, often with some faint golden, metallic luster when viewed from posteroblique angle. Tergite 5 (Fig. 50) of male forming equilateral triangle. Male terminalia (Figs. 50–51): margins of epandrium from posterior view enlarged toward middle, with

lateral prominences at juncture of surstyli with ventral margin of epandrium; posterior surstylar processes closely opposed basally, divergent apically; 2 other pairs of lateral, surstylar processes, basal pair with convergent orientation; aedeagus long, slender, crescent-shaped, tapered gradually to apex; phallapodeme well developed, almost as wide as long.

Type material. The holotype male is labeled "18 X 1965 [18 Oct 1965] Pusi [15°26'S, 69°56'W], PUNO PERU 250 Coll. J. C. Hitchcock, Jr./♂/HOLOTYPE ♂ Neoephydra dasycephala Mathis USNM [red]." The holotype is directly pinned, is in excellent condition, and is deposited in the USNM. The allotype female and 10 paratypes (7♂, 3♀; USNM) bear the same locality label data as the holotype. Other paratypes are as follows: *ARGENTINA. Jujuy:* Cangrejillos (S La Quiaca; 22°25'S, 65°34'W; 3500 m), 28 Oct 1968, L. E. Peña (1♂; CNC); Santa Catalina (22°05'S, 66°18'W; 3700 m), 25 Oct 1968, L. E. Peña (1♂; CNC).

Type locality. Peru. Puno: Pusi (15°26'S, 69°56'W).

Distribution (Map 9). *Neotropical:* Argentina (Jujuy), Peru (Puno), between 15°–23°S and 65°–70°W.

Etymology. The specific epithet, *dasycephala,* is of Greek derivation and is the combination of the adjective *dasy,* meaning hairy or shaggy, and the noun *cephala,* meaning head, in allusion to the dense pilosity over much of the body, particularly the head.

Remarks. Although we used colorational characters in the key to distinguish this species from *N. mallonota,* they may be difficult to interpret without reference to accurately determined material. As a further complication, facial coloration often varies considerably intraspecifically, although trends are evident for each species, as indicated in the key and descriptions. When identification of a specimen is doubtful, structures of the male terminalia should be examined. Unassociated female specimens will perhaps not be identifiable in some cases.

10. *Neoephydra mallonota* sp. nov.

Figs. 53–57, Map 10

Diagnosis. Specimens of *N. mallonota* may be distinguished from those of similar congeners of this species group by their generally darker appearance, especially the darker scutum and legs, and by the distinctive conformation of the male terminalia. Moderately large shore flies, body length 4.00–4.30 mm (averaging 4.16 mm); with brown to dull greenish blue coloration dorsally, becoming paler and grayer ventrally.

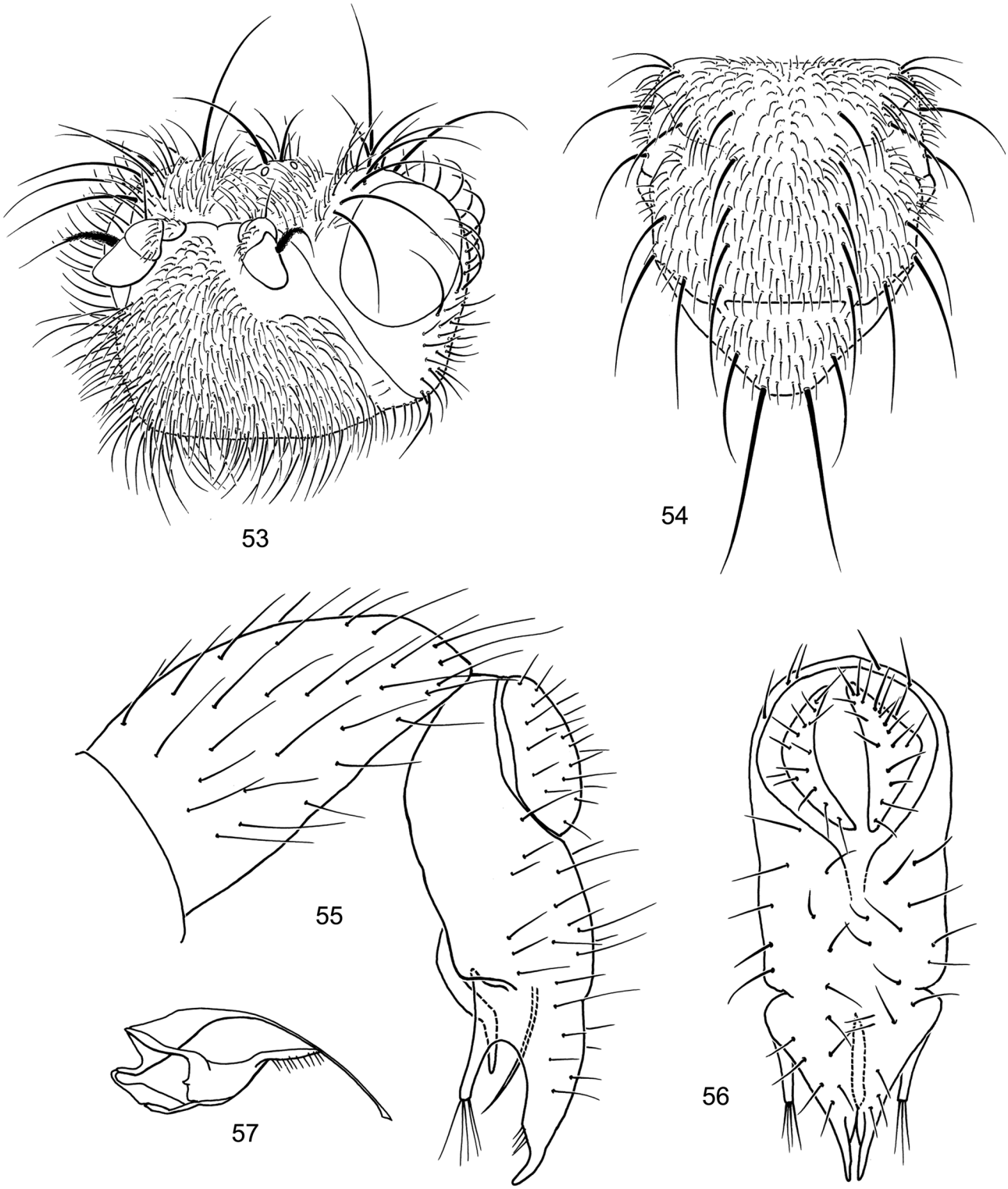
Head (Fig. 53): Head ratio 0.59–0.61; frontal ratio 0.43–0.46; mesofrons with dark greenish blue to blackish blue metallic luster, densely pilose (best seen in profile); ocellar triangle and parafrons mostly concolorous, microtomentose; parafrons generally duller and more charcoal colored toward anterior margin but with a slightly subshiny, greenish blue vitta just mesad of larger fronto-orbital setae. Antenna microtomentose, mostly unicolorous, dark brown to black or with basal segments grayer. Facial ratio 0.81–0.83; face mostly dull, microtomentose, unicolorous, yellowish gray to grayish brown, frequently slightly paler in color ventrally. Eye ratio 0.98–1.02; gena-to-eye ratio 0.61–0.67; gena very wide, grayish white to silvery anteriorly, darker, more olivaceous to brown posteriorly, with some metallic although faint bluish green tinges.

Thorax (Fig. 54): Microtomentose to subshiny; scutum mostly brownish to brownish blue but with faint, subshiny, darker vittae, 1 medial and 2 lateral pairs; anterior portion of scutum and lateral margins more microtomentose, becoming distinctly shiny posteriorly; lateral margins from postpronotum posteriorly through notopleural area duller, grayish blue to blue, darker, shinier posteriorly; dorsum of scutellum shiny, nearly concolorous with shiny mesofrons. Pleural areas mostly olivaceous gray, paler and grayer ventrally; anepisternum more brownish. Wing hyaline to very slightly infumate, pale brown; costal vein ratio 0.35–0.39; M vein ratio 0.85–0.88. Legs mostly unicolorous, densely microtomentose, greenish gray, gradually more charcoal colored apically; tibiae and tarsi unicolorous, charcoal gray.

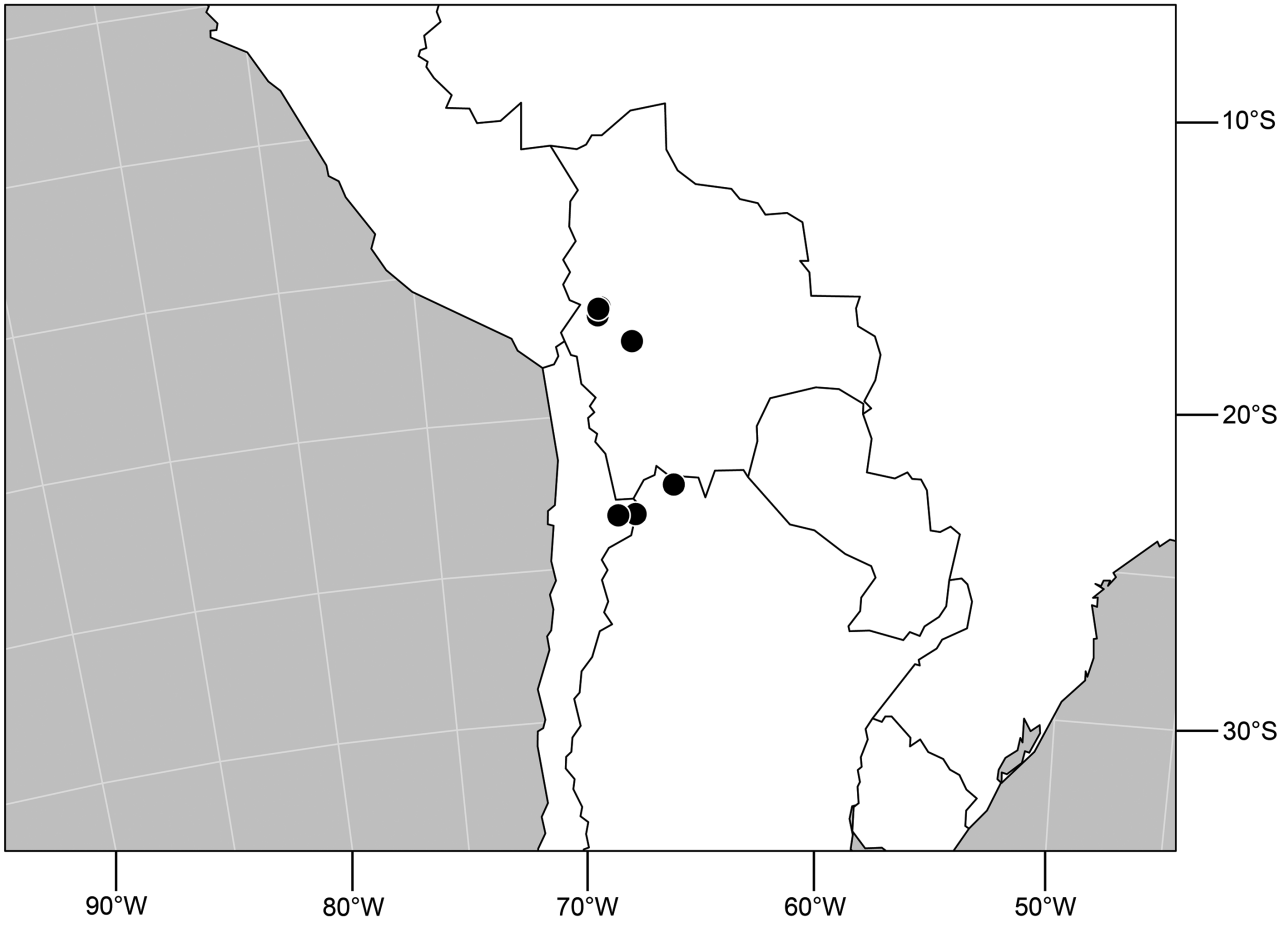
Abdomen: Dorsal surface mostly unicolorous, grayish blue to bluish brown, subshiny to shiny with some metallic, bluish green to greenish blue luster; anteromedial portion of each segment tinged with some brownish coloration, duller; tergite 5 of male wider basally than long. Male terminalia (Figs. 55–57): lateral margins of epandrium more or less parallel, lacking any widening where surstyli attach; posterior surstylar processes closely opposed basally, continued parallel to each other to apex; 1 additional pair of lateral processes, each with apical setae; internal genitalic structures generally reduced in size; aedeagus very slender, much longer than wide.

Type material. The holotype male is labeled "Bolivia, La Paz, 2 May 1969, P & P Spangler [handwritten]/

HOLOTYPE ♂ Neoephydra mallonota Mathis USNM [red].” The holotype is double mounted (minuten in a block of polyporus), is in excellent condition, and is deposited in the USNM (100212). Four paratypes (2♂, 2♀; USNM) bear the same label data as the holotype. Other paratypes are as follows: *ARGENTINA. Jujuy:* Cangrejillos (S La Quiaca; 22°25'S, 65°34'W; 3500 m), 28 Oct 1968, L. E. Peña (1♂, CNC).



FIGURES 53–57. Head, thorax, and structures of male terminalia of *Neoephydra mallonota* **sp. nov.** (53) head, lateroblique view; (54) mesonotum, dorsal view; (55) tergite 5, epandrium, cerci, surstyli, lateral view; (56) same, posterior view; (57) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view.



MAP 10. Distribution map for *Neoephydra mallonota* **sp. nov.**

BOLIVIA. Cochabamba: Japo (18 km W; 17°35'S, 66°56.2'W; 4060 m), 23 Mar 2001, W. N. Mathis (15♂, 6♀; USNM); Lequepalca (1 km E; 1737.7'S, 66°57'W; 3970 m), 26 Mar 2001, A. Freidberg, W. N. Mathis (22♂, 15♀; USNM). *La Paz:* El Alto (de La Paz; 16°27.'S, 68°05.8'W; 45–4600 m), 28 Oct 1968, L. E. Peña (3♂, 2♀; CNC, USNM); El Alto (23 km S; 16°42.7'S, 68°11.2'W; 3860 m), 21 Mar 2001, W. N. Mathis (1♀; USNM).

CHILE. Antofagasta: Mucar (23°20'S on Argentine border; 4000–4100 m), 12–16 Dec 1965, L. E. Peña (30♂, 37♀; CNC); Tumbre (E of Atacama Salt Lake; 23°21'S, 67°48'W; 3600–3800 m), 6–9 Dec 1965, L. E. Peña (1♀; CNC).

Type locality. Argentina. Jujuy: Cangrejillos (S La Quiaca; 22°25'S, 65°34'W).

Distribution (Map 10). *Neotropical:* Argentina (Jujuy), Bolivia (Cochabamba, La Paz), and Chile (Antofagasta), between 17°–27°S and 65°–68°W.

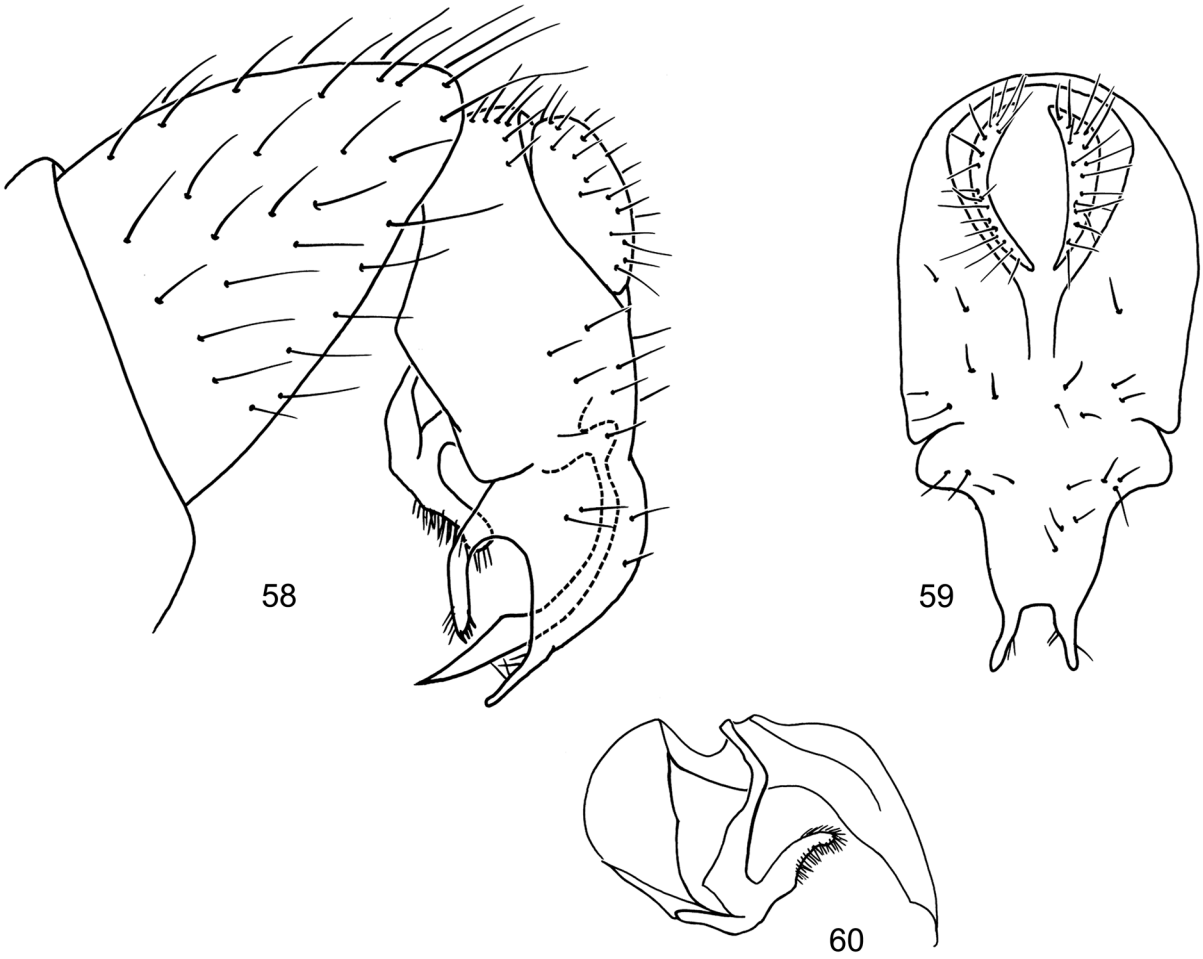
Etymology. The specific epithet, *mallonota,* is of Greek derivation and is a combination of *mallo,* meaning wool, and *nota,* meaning the back, in allusion to the abundant pilosity on the scutum.

Remarks. Our comments concerning the identification of *N. dasycephala* apply here also.

11. *Neoephydra shewelli* sp. nov.

Figs. 58–60, Map 11

Diagnosis. This is the most distinctive species of the *dasycephala* group and specimens are easily distinguished from those of related congeners by the following characters: general coloration paler, especially the tibiae and tarsi; size smaller; structures of the male terminalia very distinctive. Medium-sized shore flies, body length 3.50–3.80 mm (averaging 3.66 mm); generally microtomentose, dull, pale greenish gray to slightly orange tan, abdomen less microtomentose, subshiny.



FIGURES 58–60. Structures of male terminalia of *Neoephydra shewelli* **sp. nov.** (58) tergite 5, epandrium, cerci, surstyli, lateral view; (59) same, posterior view; (60) internal male terminalia (fused hypandrium gonite, aedeagus), lateral view.

Head: Head ratio 0.56–0.58; frontal ratio 0.49–0.53, mesofrons with metallic bronzish green luster; ocellar triangle and posterior portion of a parafrons microtomentose, concolorous, orangish tan, becoming gray to charcoal gray anteriorly; thin strip of parafrons adjacent to dorsal margin of eye tannish gray to white. Antenna microtomentose, mostly unicolorous, grayish brown to grayish black, sometimes becoming paler, grayer basally. Facial ratio 0.83–0.87; face, including antennal groove mostly dull, microtomentose, unicolorous, brown to pale yellowish tan but frequently becoming paler in color ventrally. Eye ratio 0.89–0.93; gena-to-eye ratio 0.57–0.60; gena very high, mostly grayish white to silvery anteriorly, becoming darker, tinged with pale greenish gray to tan coloration posteriorly.

Thorax: Generally microtomentose, brown to brownish gray; scutum mostly pale bronzish tan, more microtomentose and grayer anteriorly and laterally, subshiny and darker posteriorly, with very faint metallic vittae, 1 medial and 2 lateral pairs, vittae more evident posteriorly; dorsum of scutellum shiny anteromedially, with metallic bronze luster nearly concolorous with shiny mesofrons. Pleural areas more or less unicolorous but with dorsal portion, especially anepisternum nearly concolorous with scutum, ventrally paler and grayer. Wing mostly infumate, pale brown; length 3.14–3.49 mm (averaging 3.31 mm); costal vein ratio 0.61–0.64; M vein ratio 0.85–0.88. Forecoxa pale brownish white to grayish white; femora microtomentose, very palely tinged with some green color but mostly gray; tibiae mostly concolorous, mostly pale orange but with some grayer and darker areas toward apices; tarsi with basal tarsomeres concolorous with apex of tibiae, other tarsomeres apically dark brown.

Abdomen: Visible segments mostly concolorous, subshiny to shiny dorsally with metallic green to bronzish green luster, more microtomentose, grayer toward lateral and posterior margins. Male terminalia (Figs. 58–60): epandrium parallel sided; basal portion of fused surstyli wide, narrowed more or less abruptly; posterior surstylar processes more widely separated basally, becoming slightly divergent apically; 1 pair of lateral processes, each

bearing rather stout setae apically; phallapodeme evenly rounded along outer margin, wide; aedeagus thick over most of length, medial margin sinuate.

Type material. The holotype male is labeled "PERU. Cuzco: Quispicamchis [sic, Quispicanchi], Huarcapay, 2900m, 1 Sep 1988, WNMathis/HOLOTYPE ♂ Neoephydra shewelli Mathis USNM [red]." The holotype is double mounted (minuten in a plastic elastomer block), is in excellent condition, and is deposited in the USNM. A male paratype (USNM) bears the same locality label data as the holotype. Other paratypes are as follows: *ARGENTINA. Jujuy:* Cangrejillos (S La Quiaca; 22°25'S, 65°34'W; 3500 m), 28 Oct 1968, L. E. Peña (1♂, 1♀; CNC, USNM); Cerrillos (22°19'S, 65°49'W; 3600 m), 31 Oct 1968, L. E. Peña (1♀; CNC); Coyaguayma (7 km S Mina Periquitas; 22°46.7'S, 66°33.5'W; 4100 m), 4 Nov 1968, L. E. Peña (6♂; CNC); Santa Catalina (22°05'S, 66°18'W; 3700 m), 25 Oct 1968, L. E. Peña (2♂, 1♀; CNC).

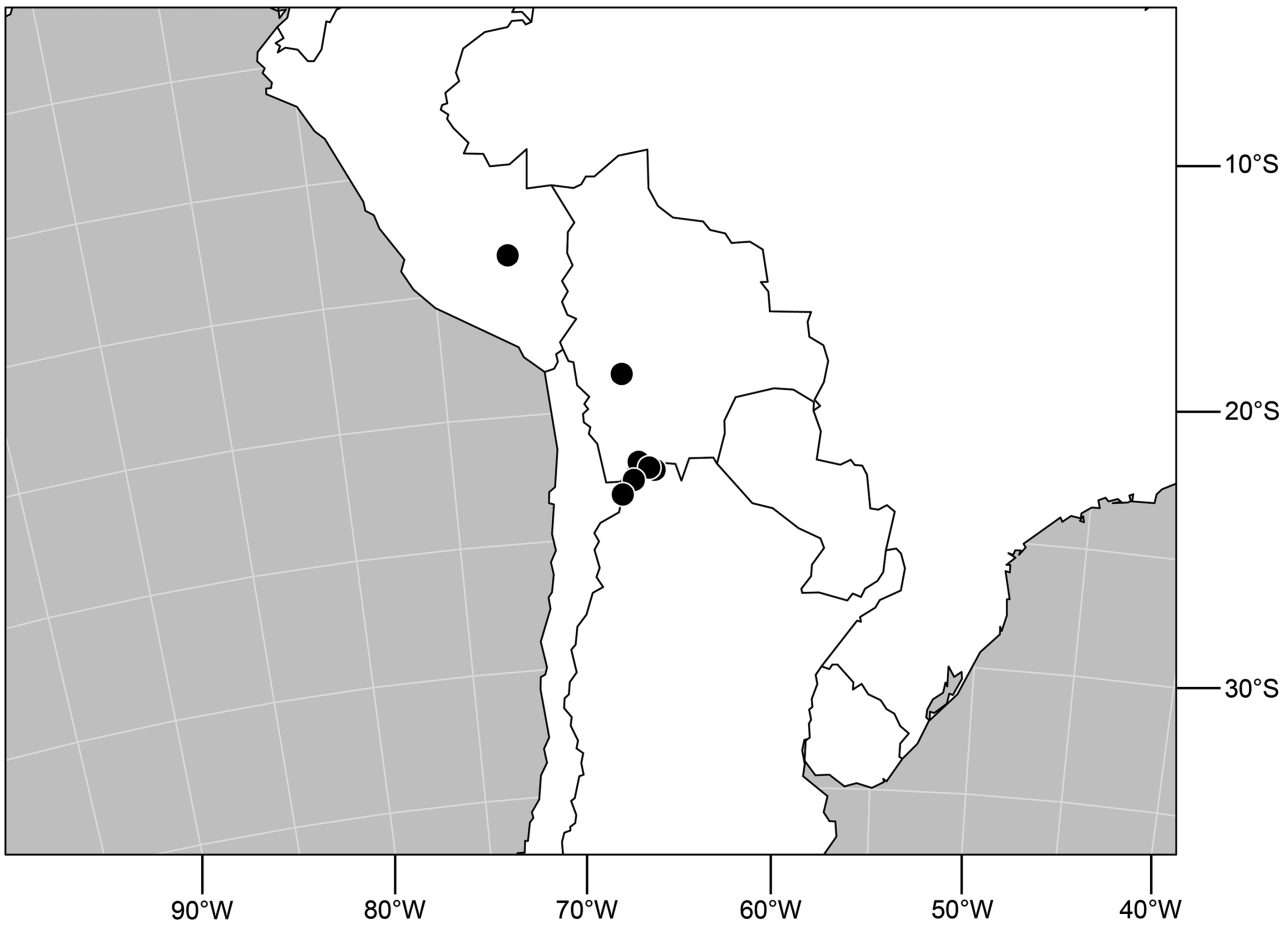
BOLIVIA. Oruro: Pazña (S of town; 18°36.2'S, 66°54.7'W; 3750 m), 22 Mar 2001, W. N. Mathis (2♂, 1♀; USNM).

CHILE. Antofagasta: Mucar (on Argentina border; 23°22'S, 67°07'W; 4000–4100 m), 12–16 Dec 1965, L. E. Peña (2♂, 1♀; CNC).

Type locality. Peru. Cuzco: Quispicanchi, Huarcapay (13°38'S, 71°40'W; 2900 m).

Distribution (Map 11). *Neotropical:* Argentina (Jujuy), Bolivia (Oruro), Chile (Antofagasta), and Peru (Cuzco), between 13°–24°S and 65°–72°W.

Etymology. The specific epithet, *shewelli,* is a Latin genitive patronym, honoring Guy E. Shewell (deceased), who graciously loaned the specimens of the type series and who has contributed so much to our knowledge of the Diptera of the New World.



MAP 11. Distribution map for *Neoephydra shewelli* **sp. nov.**

The *araucaria* Group

Species Included: *Neoephydra abrupta* (Cresson); *N. araucaria* Mathis; *N. caesia* (Wulp); *N. chilensis* (Macquart); *N. ciligena* (Rondani); *N. inca* **sp. nov.**; *N. lenti* (Oliveira); *N. penai* **sp. nov.**; *N. pravoneura* (Hendel); *N. prionoptera* (Thomson); *N. trichina* **sp. nov.**; *N. zurcheri* (Hendel).

Diagnosis. Members of the *araucaria* group are distinguished from those of other species groups by the following characters: Overall body size large, 3.04–5.50 mm; setation normally developed, not with pilose appearance

Head: Mesofrons shiny with metallic luster; mesofrons bearing several uniformly scattered small setae; lateroclinate, fronto-orbital setae 2; pedicel bearing a long slender seta, inserted dorsally and directed dorsally; arista enlarged basally, macropubescent, apical half style-like.

Thorax: Anterior dorsocentral setae well developed; disc of scutellum concolorous with posterior portion of scutum; female lacking prescutellar patch of setae between posterior 2 dorsocentral setae; supra-alar seta present; hindtibia with a patch of short black setae near apex of anteroventral surface, but lacking apical, large seta.

Distribution. Neotropics; from the equator (Galapagos Islands) south throughout most of temperate South America, apparently not occurring in tropical areas.

Remarks. This is the largest species group of the genus and comprises the Neotropical species listed in recent catalog under *Dimecoenia* (Wirth 1968, Mathis and Zatwarnicki 1995).

Many species are quite variable, especially color polymorphism. In the key to follow, we have endeavored to account for color variation wherever possible, but for many species, we have had to resort to other characters, particularly to features of the male terminalia, to determine a species. The key, consequently, is adequate only for males, and frequently dissection and study of the male terminalia are necessary. For many species, however, females are also separable.

Key to species of The *araucaria* group of South America

1.	Mid- and hindfemora densely microtomentose, mostly pale greenish to gray	6
-	Mid- and hindfemora thinly microtomentose to bare, coloration yellowish; if thinly microtomentose, generally appearing whitish	2
2.	Abdominal tergites 3–5 fasciate, anterior 1/2–2/3 of tergites brown to brassy, frequently subshiny, contrasted distinctly with dull colored bluish gray or greenish gray posterior margins	3
–	Abdominal tergites 3–5 not fasciate with brown anterior bands which contrast with bluish gray to greenish gray posterior margins; if slightly fasciate, anterior band concolorous with posterior margin although coloration frequently more intense or shinier	5
3.	Surstylus with lateral process extremely short, indicated as angulate bump and by medioapical patch of long setulae	*N. abrupta* (Cresson) in part
-	Surstylus with lateral process as a distinct, long, narrow process	4
4.	Surstylus in lateral view tapered gradually to apex (Fig. 73); surstylus in posterior view long, gradually widened at base, lacking distinct lateral protrusions basally; epandrium in posterior view wider, with lateral margins more or less straight, not distinctly sinuate	*N. chilensis* (Macquart)
-	Surstylus in lateral view distinctly curved at nearly a right angle subapically; surstylus in posterior view short and with broadly produced lateral protrusions basally; lateral margins of epandrium narrow, sinuate, pedunculate in posterior view	*N. zurcheri* (Hendel)
5.	Dorsum of thorax and abdomen brassy to metallic greenish blue; abdomen more bluish posteriorly; surstylus in lateral view with subapical enlargement before recurved apex	*N. ciligena* (Rondani) in part
-	Dorsum of thorax and abdomen greenish brown to brassy, abdomen more greenish brown posteriorly; surstylus in lateral view more or less gradually and evenly tapered to apex, posterior margin gently arched	*N. caesia* (Wulp)
6.	Gena high, about 1/2 eye height; setae generally larger and more abundant	7
-	Gena shorter, generally 1/3–1/4 eye height; setae weaker and less abundant	8
7.	Legs entirely dark colored, more or less concolorous	*N. lenti* (Oliveira)
-	Tibiae and basitarsi reddish orange, contrasted with darker-colored femora and terminal tarsomeres	*N. trichina* **sp. nov.**
8.	Dorsum of abdominal tergites not fasciate, more or less unicolorous, mostly subshiny metallic blue	*N. zurcheri* (Cresson)
-	Dorsum of abdominal tergites fasciate, posterior margin distinctly contrasted with anterior darker fascia	9
9.	Tibiae and femora concolorous, both dark colored	*N. ciligena* (Rondani) in part
-	Tibiae generally paler in color than femora, more reddish orange	10
10.	Lateral surstylar process long, length from base about 1/2 length of surstylus in lateral view	11
-	Lateral surstylar process shorter, length from base 1/3 or less length of surstylus in lateral view	15

11. Coloration of anepisternum, especially toward posterodorsal corner, distinctly darker than whitish gray katepisternum 12
- Coloration of anepisternum and katepisternum more or less concolorous, if anepisternum much darker than color changes very gradual 13
12. Surstylus in lateral view over twice as long as wide (width not including lateral prong); posteroventral margin of surstylus evenly curved subapically (Argentina, Brazil, Chile) . . . . . *N. pravoneura* (Hendel) in part
- Surstylus in lateral view less than twice as long as wide (width not including lateral prong); posteroventral margin of surstylus shallowly recurved subapically, appearing slightly sinuate . . . . . *N. inca* **sp. nov.**
13. Anepisternum and katepisternum mostly olivaceous brown. 14
- Anepisternum and katepisternum mostly gray to grayish brown (Bolivia) . . . . . *N. pravoneura* (Hendel) in part
14. Surstylus in lateral view tapered evenly and gradually to apex; lateral surstylar prongs in posterior view distinctly protrudent . . . . . *N. prionoptera* (Thomson)
- Surstylus in lateral view with subapical swelling before abruptly rounded apex; lateral surstylar prongs curving inward, not protrudent in posterior view . . . . . *N. ciligena* (Rondani) in part
15. Anepisternum and katepisternum mostly concolorous, gray; surstyli in posterior view broadly produced to bluntly-rounded apex . . . . . *N. penai* **sp. nov.**
- Anepisternum generally darker than grayish katepisternum, if more or less concolorous, both brown; surstyli in posterior view narrowed distinctly to acutely-pointed apex 16
16. Epandrium not much wider than greatest width of surstyli in posterior view; lateral surstylar prong distinct; surstylus in lateral view tapered abruptly subapically*N. araucaria* Mathis
- Epandrium much wider than greatest width of surstyli in posterior view; lateral surstylar prong barely evident; surstylus in lateral view tapered gradually to apex. . . . . *N. abrupta* (Cresson) in part

12. *Neoephydra abrupta* (Cresson)

Figs. 61–63, Map 12

Dimecoenia abrupta Cresson 1935: 352.—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Lizarralde de Grosso 1989: 58 [list, Argentina].—Mathis and Zatwarnicki 1995: 238 [world catalog].
Neoephydra abrupta.—Mathis 2008: 10 [generic combination].

Diagnosis. Specimens of *N. abrupta* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance dimorphic, either dark, particularly the legs, or pale, with orangish yellow legs; face moderately setose; gena moderately short; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.62–4.23 mm; generally dull, grayish brown to gray, somewhat subshiny dorsally.

Head: Head ratio 0.63–0.66; frontal ratio 0.51–0.53; mesofrons with dark, greenish blue, metallic luster, pilose laterally; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with faint metallic reflections, concolorous with mesofrons; number of fronto-orbital setae usually 2, sometimes with a larger seta posterior of others. Antenna mostly concolorous, blackish brown. Facial ratio 0.96–0.99; moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish yellow, paler along oral margin. Eye ratio 0.87–0.90; gena-to-eye ratio 0.35–0.38; gena moderately short, coloration gray to whitish gray but with faint tinges of olivaceous green posteriorly.

Thorax: Mostly microtomentose; scutum mostly brown, subshiny to shiny, with brassy brown metallic luster, more uniformly dark and subshiny posteriorly, anterior margin more microtomentose, especially postpronotum, grayish brown; pleural areas paler, more gray colored ventrally; anepisternum with central area and dorsal margin brownish, otherwise paler, olivaceous gray to brown; other pleural areas including coxae palely olivaceous white to more whitish gray ventrally. Wing length averaging 3.90–3.95 mm; mostly very palely infuscate, faintly brownish; costal vein ratio 0.19–0.22; M vein ratio 0.74–0.76. Leg coloration variable, either dark generally, femora greenish to bluish gray, microtomentose, or mostly paler, yellowish red, particularly tibiae and tarsi.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 61–63): margins of epandrium in posterior view parallel, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle, apices of processes forming ventral angle with narrow gap between; surstylus in lateral view with posterior process tapered gradually to bluntly rounded apex, anterior margin irregularly shaped, posterior margin more regular; lateral process extremely short, as angulate bump indicated by patch of long medioapical setulae.

Type material. The holotype male is labeled "Argentin[a] MENDOZA 17. XII. 04 [17 Dec 1904] [light green, date handwritten]/coll. Lichtwardt/♂/TYPE Dimecoenia ABRUPTA ♂ T. Cresson, Jr. [red, name and sex handwritten]." The holotype is double mounted (minute nadel in foam block), is in fairly good condition (some setae of the head are missing, and the wings are tattered along the posterior margin), and is deposited in the ANSP. Allotype female and one male paratype (head missing) are labeled with the same label data as the holotype except for the type label and sex symbol as appropriate. Cresson's original description lists the depository of the holotype as "Deut. Ent. Inst." The cited depository of DEI for the holotype is either an error or the specimen was not returned.

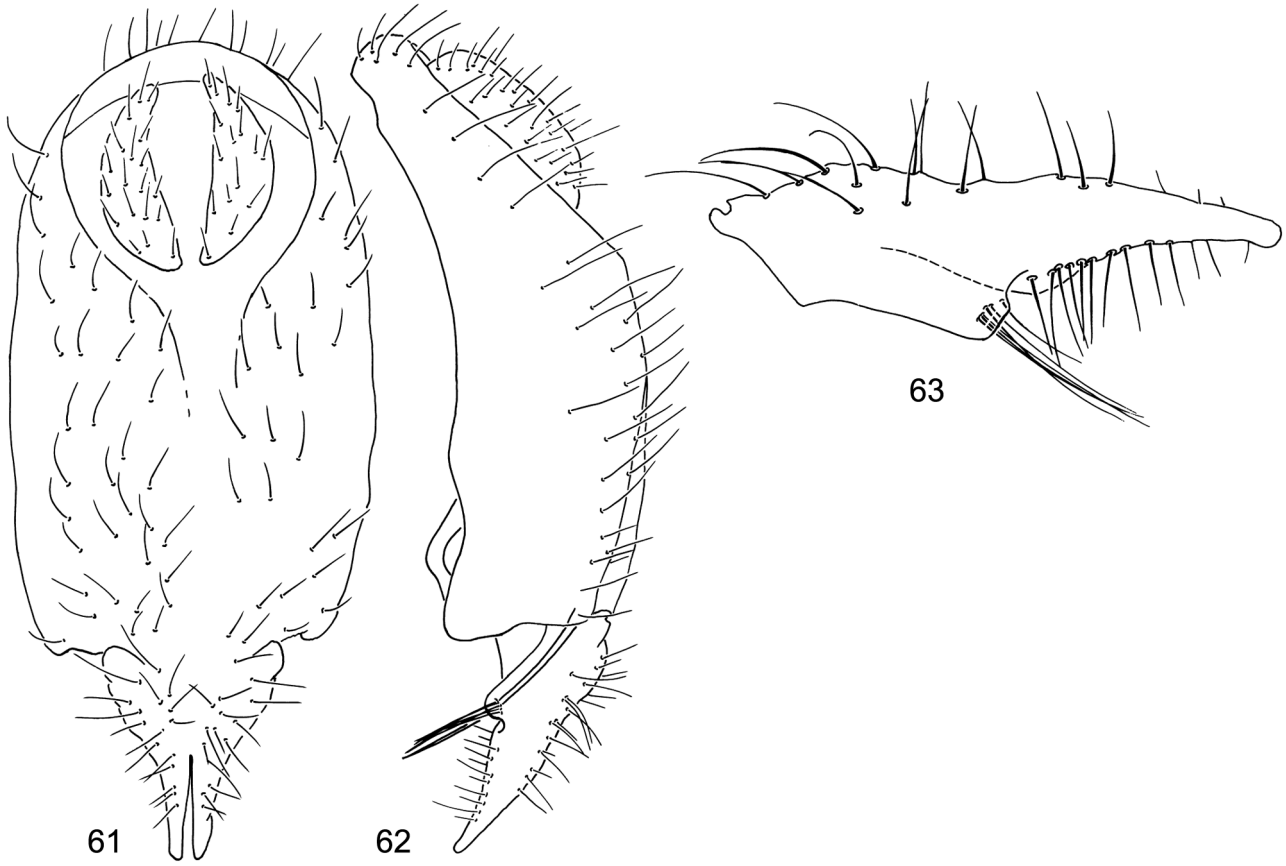
Type locality. Argentina. Mendoza: Mendoza (32°53'S, 68°49'W).

Additional specimens examined. *ARGENTINA. La Rioja:* Carrizal Bajo (28°53'S, 67°33'W), Oct 1958, L. E. Peña (3♂; MZUSP). *Mendoza:* Uspallata (32°40'S, 69°21.9'W), 1977, M. L. de Grosso (15♂, 13♀; FML).

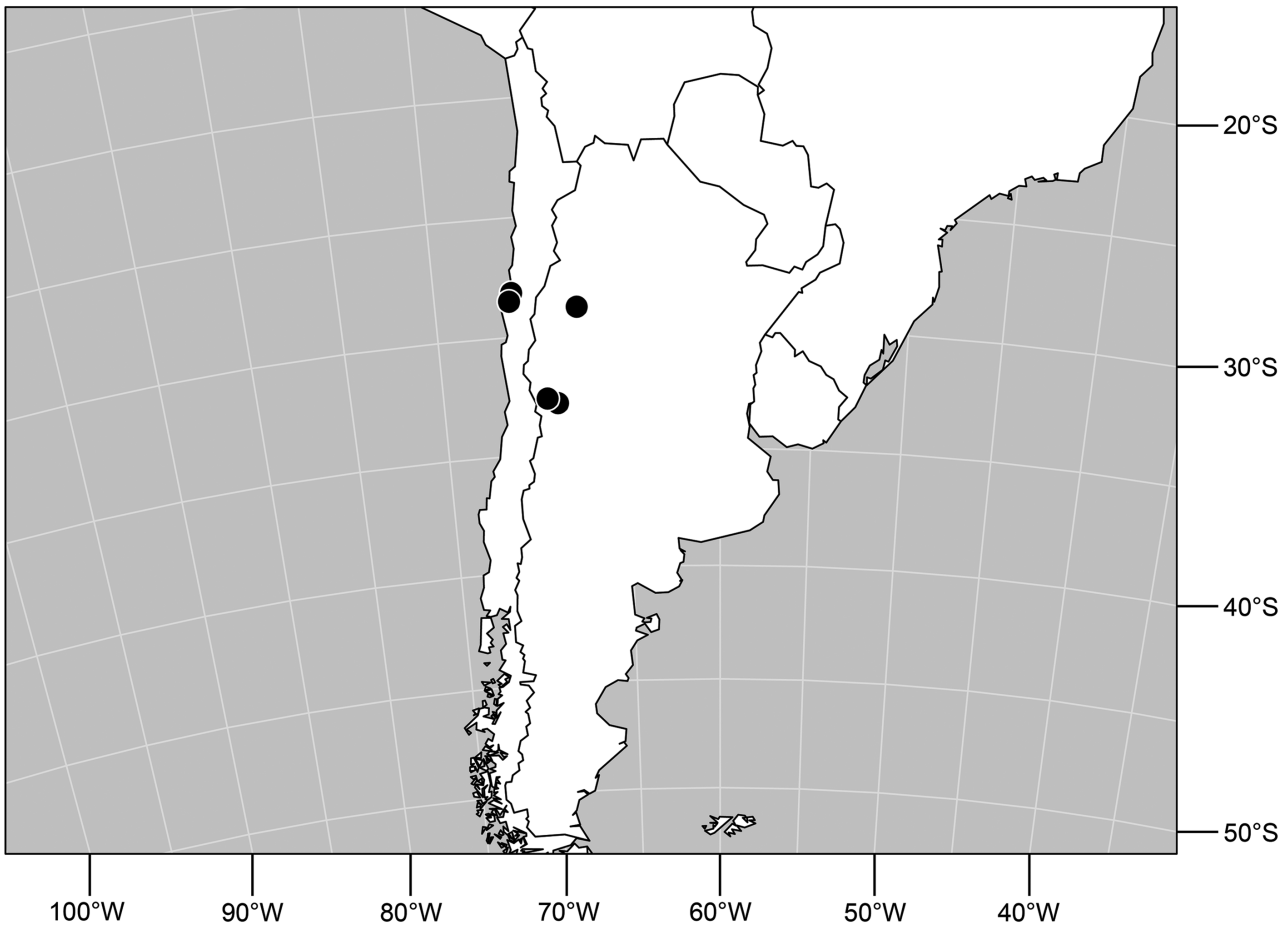
CHILE. Atacama: Canto del Agua (28°09'S, 70°56'W), 6 Oct 1966, M. E. Irwin (2♂, 2♀; USNM). *Coquimbo:* Freirina (28°30.3'S, 71°04.6'W), Oct 1969, L. E. Peña (3♂, 1♀; USNM).

Distribution (Map 12): *Neotropical:* Argentina (La Rioja, Mendoza) and Chile (Atacama, Coquimbo).

Remarks. This species, like *N. ciligena,* has two basic color forms. The holotype is a representative of the dark form, i.e., legs mostly microtomentose, grayish green to grayish blue. The second form is pale colored, i.e., legs at most thinly microtomentose, mostly yellowish to orangish. The conformation of the male terminalia of both forms is virtually identical.



FIGURES 61–63. Structures of male terminalia of *Neoephydra abrupta* (Cresson). (61) epandrium, cerci, surstyli, posterior view; (62) same, lateral view; (63) surstylus, lateral view.



MAP 12. Distribution map for *Neoephydra abrupta* (Cresson).

13. *Neoephydra araucaria* Mathis

Figs. 1, 64–68, Map 13

Neoephydra araucaria Mathis 2008: 10 [revision].

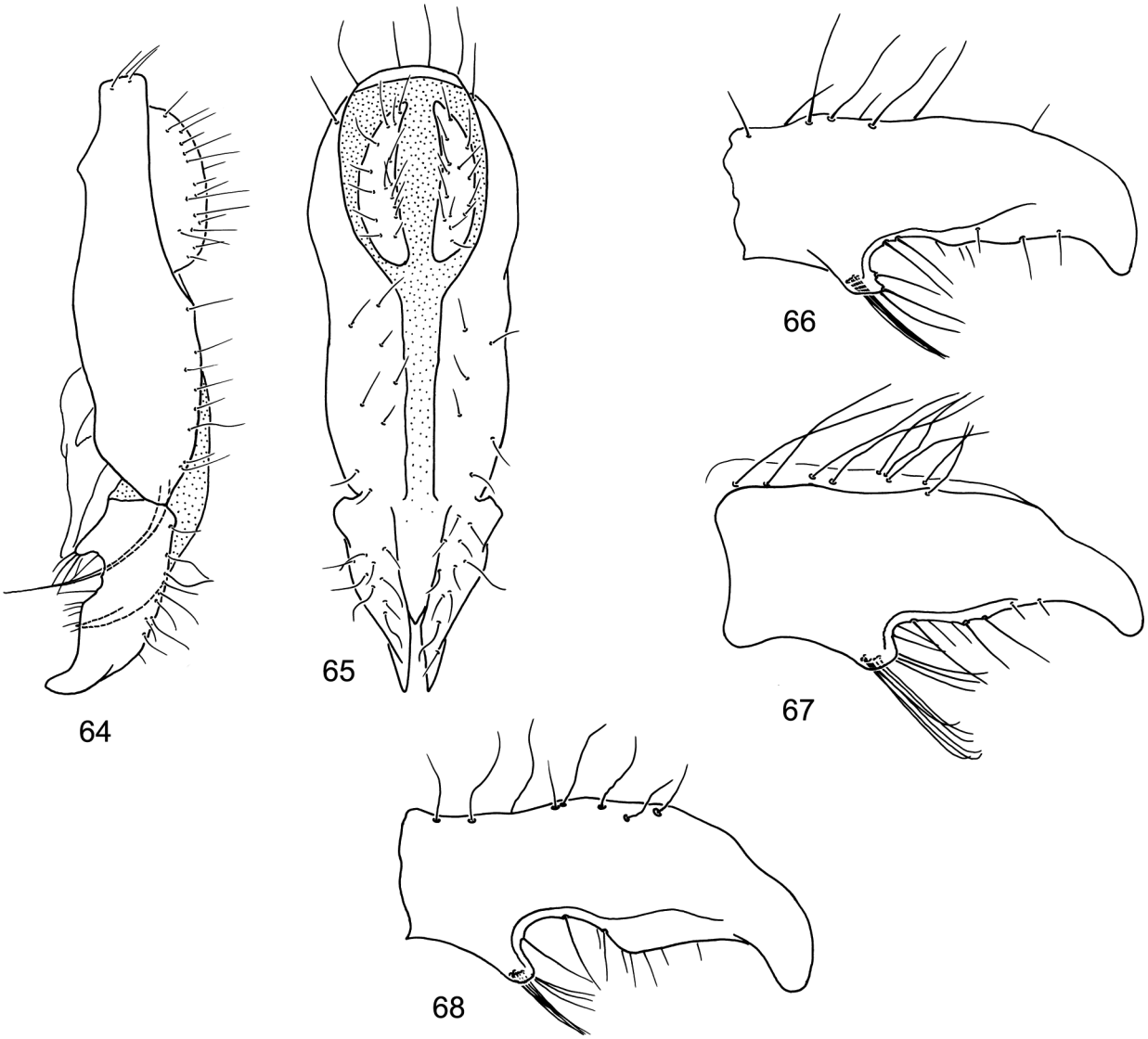
Diagnosis. Specimens of *N. araucaria* are distinguished from similar congeners by the following characters: generally appearing moderately dark; face moderately setose; gena moderately short; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.04–4.38 mm; generally dull, grayish with some subshiny areas dorsally.

Head: Head ratio 0.69–0.72; frontal ratio 0.54–0.55; mesofrons with dark, greenish blue to brassy luster, inconspicuously pilose; ocellar triangle differing little from mesofrons in color or vestiture; fronto-orbital setae 2. Antenna mostly concolorous, dark, blackish brown. Facial ratio 0.90–0.93; mostly densely setulose, particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish brown to golden brown, gradually paler ventrally. Eye ratio 1.07–1.10; gena-to-eye ratio 0.32–0.35; gena moderately short, coloration immediately below eye whitish gray, slightly more tannish posteriorly.

Thorax: Scutum thinly microtomentose, subshiny, mostly dark brown, darker and shinier posteriorly; anterior margin slightly more microtomentose, grayer, especially postpronotum and 2 partial, microtomentose stripes laterad of acrostichal track; lateral margins of scutum slightly more microtomentose, more grayish brown; scutellum concolorous with posterior portion of scutum; pleural areas paler, grayer ventrally; anepisternum with dorsal and posterior margins more brownish, otherwise mostly gray; anepimeron mostly concolorous with posterior margin of anepisternum; other pleural areas including coxae whitish gray, concolorous. Wing length

averaging 3.55–3.80 mm; faintly infuscate; costal vein ratio 0.20–0.22; M vein ratio 0.69–0.71. Legs generally dark; femora microtomentose, grayish blue to green, only slightly darker than ventral pleural areas; tibiae and tarsi orangish yellow, with blackish tinges apically.

Abdomen: Generally thinly microtomentose to microtomentose; tergites fasciate, anterior margin brownish to brassy, more thinly microtomentose, posterior margin grayish olivaceous green to gray, paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male triangular, nearly equilateral. Male terminalia (Figs. 64–68): margins of epandrium in posterior view (Fig. 65) parallel below cerci, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle, apices of posterior processes forming ventral angle with narrow gap between; surstylus in lateral view (Figs. 66–67) with posterior process wide on basal 2/3, thereafter tapered to anteriorly curved, rounded apex, anterior margin irregularly shaped, posterior margin more regular; lateral process short, bluntly rounded, with patch of long, medioapical setulae.



FIGURES 64–68. Structures of male terminalia of *Neoephydra araucaria* Mathis. (64) epandrium, cerci, surstyli, lateral view; (65) same, posterior view; (66) surstylus, lateral view (Chile. Palo Colorado); (67) surstylus, lateral view (Chile. Rio Bueno, N of Orsono); (68) surstylus, lateral view (Chile. Termas de Puyehue) (from Mathis 2008).

Type material. The holotype male is labeled "CHILE: Osorno Pr. Anticura (1 km. W) 430 m 1–3 Feb. 1978 W N Mathis/♂/HOLOTYPE ♂ Neoephydra araucaria Mathis USNM [red]." The holotype is double mounted (minuten in a plastic elastomer block), is in excellent condition, and is deposited in the USNM. The allotype female and 123 paratypes (71♂, 52♀; USNM) bear the same locality label data as the holotype. Other paratypes are as

follows (all in USNM): *CHILE. Bio Bio:* Santa Barbara (25 km E; 37°40'S, 72°01'W; 350 m), 24 Jan 1978, W. N. Mathis (21♂, 11♀; USNM). *Curico:* Estero Potrero Grande (3 km E Potrero Grande; 35°11'S, 71°07'W; 400 m), 8 Feb 1987, C. M. and O. S. Flint (5♂, 5♀; USNM). *Malleco:* Victoria (11 km N; 38°13'S, 72°20'W; 300 m), 25 Jan 1978, W. N. Mathis (15♂, 8♀; USNM). *Maule:* Constitución (35°20'S, 72°30'W), 16 Dec 1976, A. Gurney, Barria (1♂; USNM). *Nuble:* Río Perquilauquen, Parral (12 km S; 36°10'S, 71°50'W; 160 m), 24 Jan 1978, W. N. Mathis (5♂, 3♀; USNM). *O'Higgins:* Río Claro (5 km N Rengo; 34°24'S, 70°52'W; 300 m), 23 Jan 1978, W. N. Mathis (9♂; USNM). *Osorno:* Termas de Aguas Calientes (1 km SE; 40°41'S, 72°21'W; 530 m), 7–8 Feb 1978, W. N. Mathis (12♂, 3♀; USNM); Anticura (4 km W; 37°40'S, 72°01'W; 400 m), 3 Feb 1978, W. N. Mathis (2♂, 3♀; USNM); Anticura (1 km W; 40°39'S, 72°10'W; 430 m), 5–6, 11–12 Feb 1978, W. N. Mathis (6♂, 1♀; USNM); Lago Puyehue (SE shore; 40°45'S, 72°25.2'W), 6–10 Feb 1978, W. N. Mathis (23♂, 20♀; USNM); Lago Puyehue, Entre Lagos (40°45.2'S, 72°34.8'W), 14 Feb 1978, W. N. Mathis (40♂, 24♀; USNM); Lago Rupanco, El Encanto (40°49'S, 72°28'W), 6 Feb 1978, W. N. Mathis (2♂, 3♀; USNM); Laguna El Pato (41°10'S, 73°40'W; 1100 m), 13 Feb 1978, W. N. Mathis (5♂, 12♀; USNM); Laguna El Toro (41°09'S, 73°28'W; 780 m), 8 Feb 1978, W. N. Mathis (1♂, 2♀; USNM); Salto del Río Pilmaiquen (40°08'S, 71°59'W), 14 Feb 1978, W. N. Mathis (15♂, 14♀; USNM). *Palena:* Termas El Amarillo, (30 km SE Chaitén; 42°52.9'S, 72°21.4'W; 250 m), 22 Jan 1987, C. M. and O. S. Flint (3♂, 7♀; USNM). *Santiago:* El Alfalfal (33°30'S, 70°11'W; 1320 m), 22 Jan 1978, W. N. Mathis (20♂, 5♀; USNM); Lampa (22 km NW Santiago; 33°17'S, 70°54'W), 21 Jan 1978, W. N. Mathis (5♂, 9♀; USNM). *Talca:* Río Lircay (11 km N Talca; 35°23'S, 71°39'W; 85 m), 23 Jan 1978, W. N. Mathis (3♂, 1♀; USNM).

Type locality. Chile. Osorno. Anticura (1 km W; 40°39'S, 72°10'W).

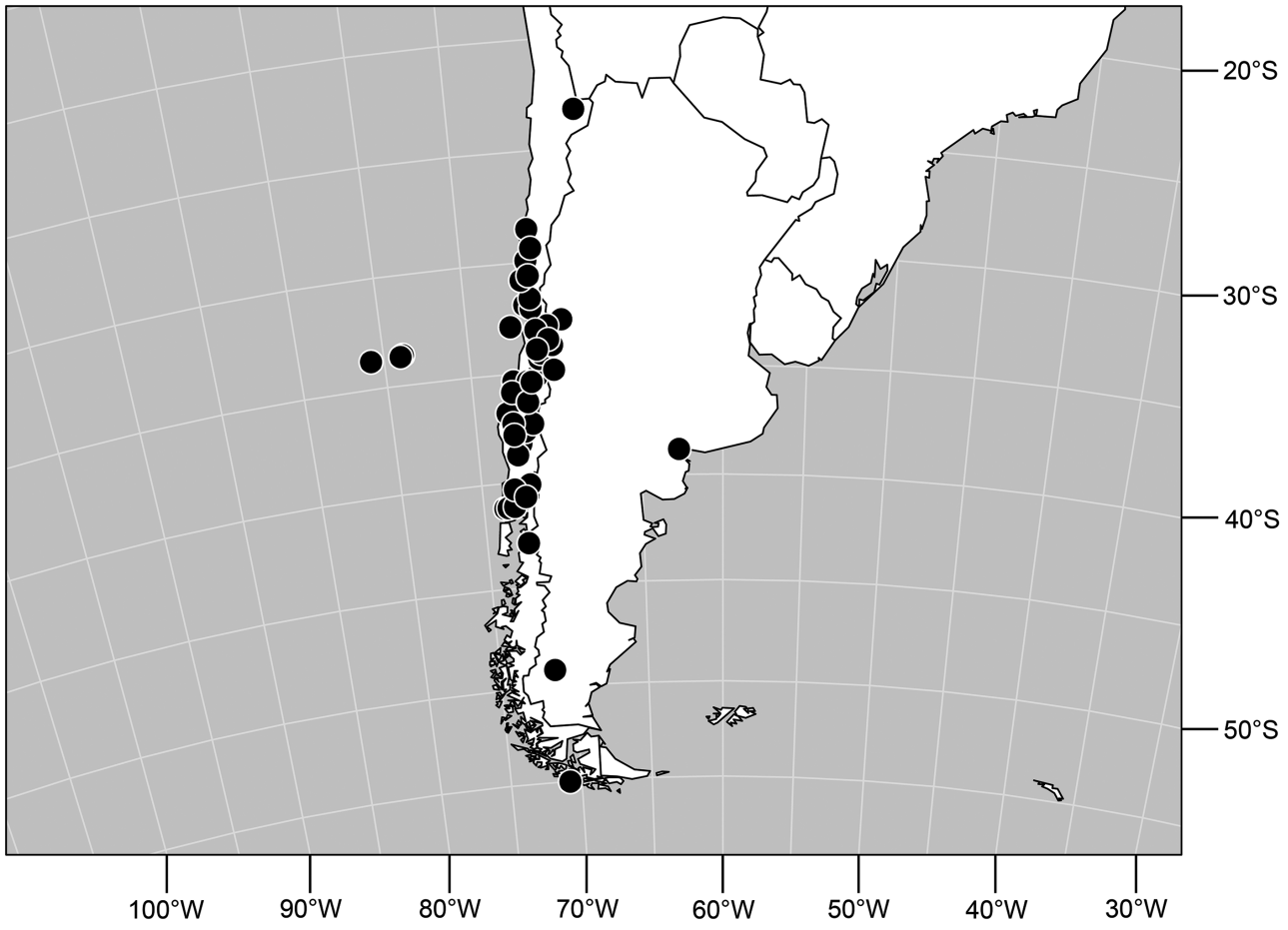
Additional specimens examined. *ARGENTINA. Buenos Aires:* Médanos (38°49'S, 62°41'W), 11 Nov 1946, K. Hayward (1♂; USNM). *Mendoza:* Uspallata (9 mi W; 32°40'S, 69°25'W), 6 Feb 1951, E. S. Ross, A. E. Michelbacher (1♂; CAS). *Rio Negro:* San Carlos de Bariloche (49°09'S, 71°18'W), Nov 1926, R. C. and E. Shannon (5♂, 2♀; USNM).

CHILE. Aconcagua: Guardia Vieja (E; 32°54'S, 70°17'W), 3 Dec 1976, A. Gurney, G. Barria (1♂; USNM). *Antofagasta:* Pocos (23°15'S, 68°04'W; 2800 m), Des Atacama, Apr 1954, L. E. Peña (l♂; USNM). *Bio Bio:* El Abanico (37°20'S, 71°31'W), 31 Dec 1950, E. S. Ross, A. E. Michelbacher (l♂; USNM). *Cautin:* Temuco (20 km E; 38°44'S, 72°35'W), 7 Jan 1951, E. S. Ross, A. E. Michelbacher (39♂, 46♀; USNM). *Concepción:* Cosmito (36°46'S, 73°01'W), 31 Dec 1966, O. S. Flint, Jr., T. Cekalovic (l♂, 1♀; USNM); San Rosendo (37°16'S, 72°43'W), Dec 1926, R. C. and E. Shannon (l♂; USNM). *Coquimbo:* Bosque de Nague-Los Vilos (31°54.7'S, 71°30.8'W), Nov 1969, L. E. Peña (27♂, 24♀; MZUSP, USNM); Freirina (28°30.3'S, 71°04.6'W), Oct 1969, L. E. Peña (4♂, 13♀; USNM); Hda Illapel (31°37.8'S, 71°09.9'W; 600–1200 m), 24–30 Oct–19 Dec 1954–1966, M. E. Irwin, L. E. Peña, E. Schlinger (4♂, 2♀; USNM); La Serena (50 km S; 29°55'S, 71°15.2'W), 1 Dec 1950, E. S. Ross, A. E. Michelbacher (2♂; CAS); Los Loros (Boca Rio Limari; 30°47.5'S, 71°37.3'W), Sep 1969, L. E. Peña (93♂, 126♀; MZUSP); Ovalle (32 km SE; 30°36'S, 71°11'W), 12 Dec 1950, E. S. Ross, A. E. Michelbacher (4♂, 11♀; USNM); Río Colorado-Pichidarqui (32°52'S, 72°25'W), 7–11 Aug 1960, L. E. Peña (2♂, 1♀; CNC); Port Tres Cruces (Portuzuelo; 29°22.3'S, 70°56'W), 30 Oct 1957, L. E. Peña (2♂, 2♀; CNC); Tilama, El Naranjo (32°05'S, 71°10'W), Oct 1967, L. E. Peña (2♂, 2♀; USNM). *Curico:* Cajon de Río Claro-SE Los Queñes (35°0.1'S, 70°49.1'W; 1100 m), 8 Dec 1966, E. I. Schlinger (1♂, 1♀; USNM). *Llanquihue:* Frutillar (41°07'S, 73°03'W), 22 Jan 1953, P. G. Kuschel (4♂; USNM). *Malleco:* Angol (37°48'S, 72°43'W), 28 Nov–1 Jan 1926–1932, D. S. Bullock (3♂; USNM). *Maule:* Curanipe (35°50'S, 72°38'W), 4 Dec 1953, L. E. Peña (1♂; USNM). *Nuble:* San Carlos (18 km E; 36°20'S, 71°44'W), 24 Dec 1950, E. S. Ross, A. E. Michelbacher (1♀; CAS); San Carlos (40 km E; 36°20'S, 71°43'W), 23 Dec 1950, E. S. Ross, A. E. Michelbacher (l♂, 1♀; USNM). *O'Higgins:* Rancagua (23 km N; 34°09'S, 70°45'W), 21 Dec 1950, E. S. Ross, A. E. Michelbacher (30♂, 26♀; USNM). *Osorno:* Río Bueno-N Osorno (40°19'S, 72°58'W), 14 Jan 1951, E. S. Ross, A. E. Michelbacher (30♂, 38♀; USNM); Termas de Puyehue (40°42'S, 72°18'W), 7 Jun 1940, G. H. Schwabe (2♂, 1♀; USNM). *Santiago:* Baños de Morales (33°50'S, 70°03'W), 12 Jul 1940, G. H. Schwabe (1♂; USNM); Chacabuco, Tiltil (33°04.3'S, 70°58.3'W; 950 m), 18–19 Jan 1999, P. and M. Kerr (1♂, 1♀; USNM); Refugio Lo Valdés (33°48'S, 70°03'W), Jun 1954, L. E. Peña (2♂, 4♀; USNM); Los Maitenes (33°32'S, 70°16'W; 1200–1300 m), 19 Oct 1954, L. E. Peña (1♂; USNM); Cantillana (33°58'S, 70°58'W; 2000 m), Dec 1969, L. E. Peña (2♂, 1♀; USNM). *Talca:* Talca (29.5 km N; 35°25'S, 71°25'W), 22 Dec 1950, E. S. Ross, A. E. Michelbacher (1♀; CAS); Vegas del Flaco (34°56'S, 70°02'W; 1350 m), Nov 1969, L. E. Peña (1♂; USNM). *Valparaiso:* Islas Juan Fernandez: Mas-a-Tierra (33°38'S, 78°52'W), 15 Jan–24 Mar 1951–1973, G. Barria, L. Cartagena, P. G. Kuschel, L. E. Peña (47♂, 53♀; CNC, USNM); Isla Más

Afuera (33°45'S, 80°46'W), 31 Jan 1973, L. E. Peña (51♂, 68♀; CNC); Isla Santa Clara (33°42'S, 79°W), 1 Jun–30 Dec 1952–1954, P. J. Kusch, P. G. Kuschel (7♂, 3♀; USNM).

Distribution (Map 13). *Neotropical:* Argentina (Buenos Aires, Mendoza, Rio Negro) and Chile (Antofagasta, Bio Bio, Cautin, Concepción, Coquimbo, Curico, Llanquihue, Malleco, Maule, Nuble, O'Higgins, Osorno, Santiago, Talca, Valparaiso), between 28°–42°S and 62°–79W.

Remarks. This is a common and widespread species in southern South America. Specimens are frequently abundant, and large numbers can often be collected in marshy habitats.



MAP 13. Distribution map for *Neoephydra araucaria* Mathis.

14. *Neoephydra caesia* (Wulp)

Figs. 69–71, Map 14

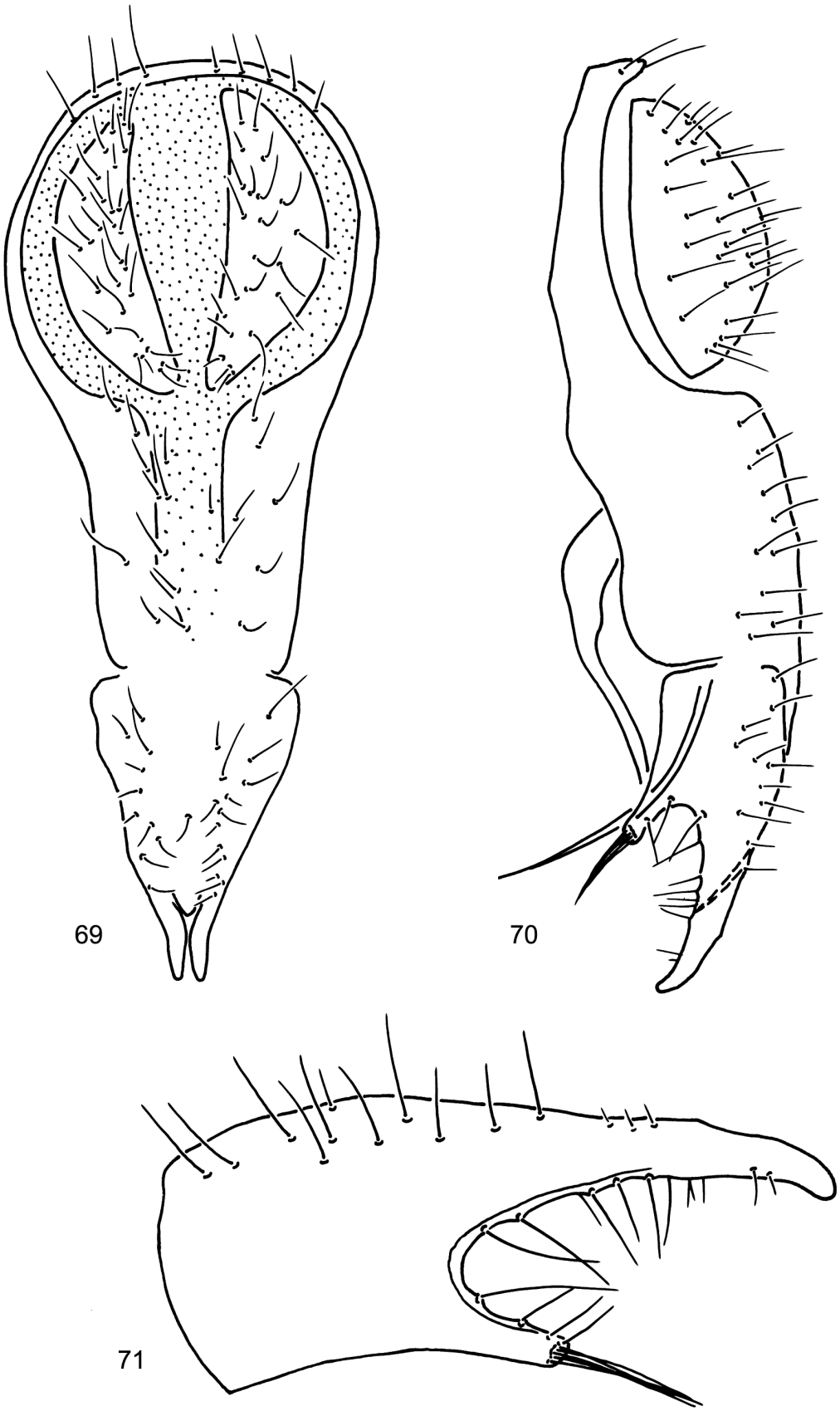
Ephydra caesia Wulp 1883: 58.

Dimecoenia caesia.—Cresson 1931: 104 [generic combination; review]; 1935: 352 [review].—Wirth 1968: 23 [Neotropical catalog].—Lizarralde de Grosso 1989: 58 [list, Argentina].—Mathis and Zatwarnicki 1995: 238–239 [world catalog].

Neoephydra caesia.—Mathis 2008: 10 [generic combination].

Diagnosis. Specimens of *N. caesia* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally pale, particularly the legs; face moderately setose; gena moderately high; and structures of male terminalia with distinctive conformation. Moderately large to large shore flies, body length 4.20–5.50 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.65–0.68; frontal ratio 0.52–0.55; mesofrons with dark, blackish blue, metallic luster; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some faint metallic luster; number of fronto-orbital setae 2. Antenna mostly concolorous,



FIGURES 69–71. Structures of male terminalia of *Neoephydra caesia* (Wulp). (69) epandrium, cerci, surstyli, posterior view; (70) same, lateral view; (71) surstylus, lateral view.

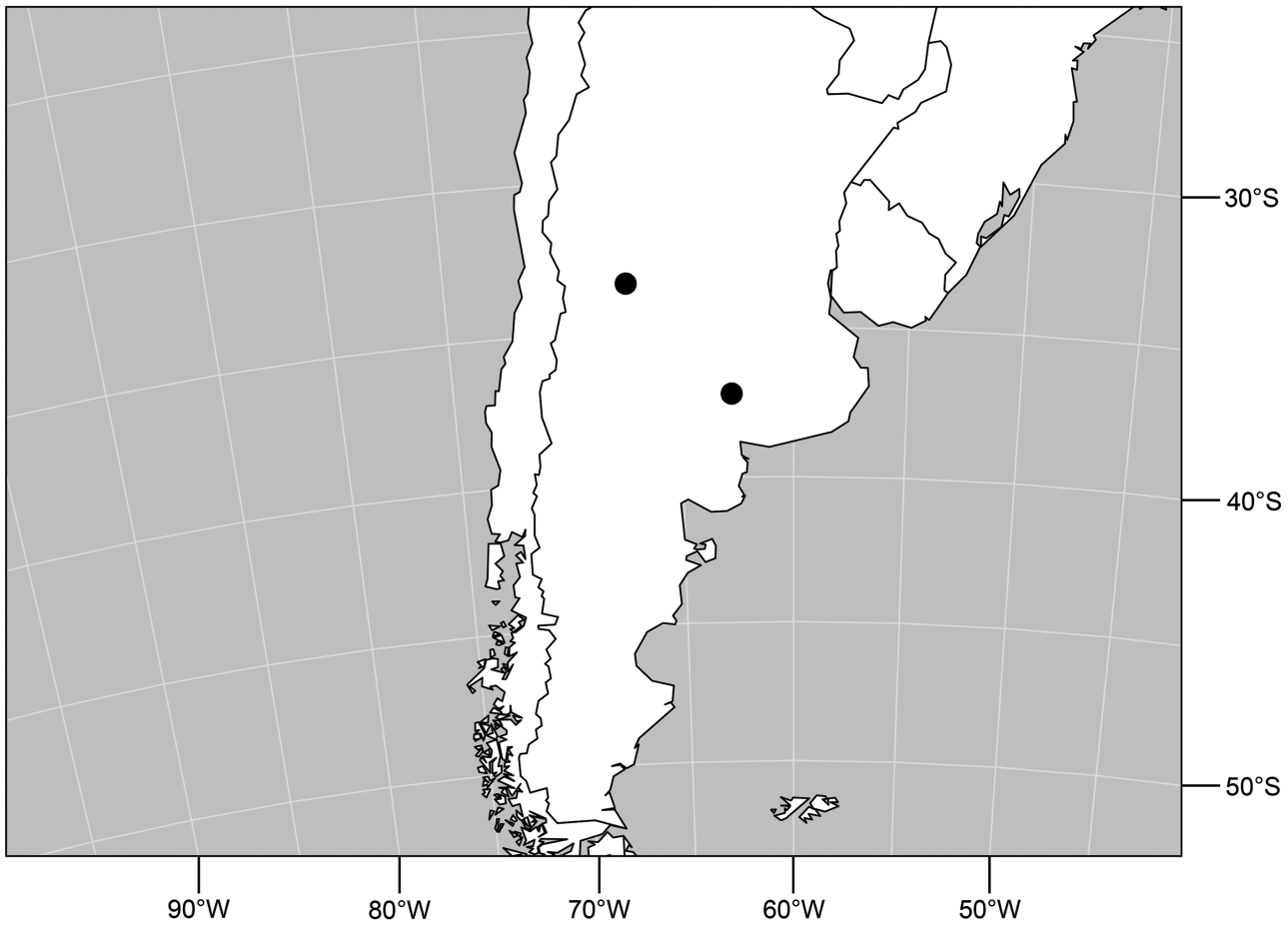
blackish brown. Facial ratio 0.86; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, yellowish to palely brownish gray, gradually paler ventrally. Eye ratio 0.89–0.92; gena-to-eye ratio 0.39–0.41; gena moderately high, coloration gray to whitish gray but with faint tinges of olivaceous green posteriorly.

Thorax: Mostly microtomentose; mesonotum mostly blackish blue, darker and subshinier posteriorly; anterior margin more microtomentose, especially postpronotum, gray to bluish gray; pleural areas paler, more gray to grayish white ventrally; anepisternum with dorsal and posterior margins faintly brownish, otherwise faintly bluish gray; other pleural areas including coxae mostly whitish gray, concolorous. Wing length averaging 3.95–4.30 mm; mostly very faintly infuscate, palely grayish brown; costal vein ratio 0.25–0.29; M vein ratio 0.75–0.79. Legs generally pale colored; femora mostly bare, reddish yellow, hindfemur thinly microtomentose, faintly bluish to olivaceous gray; tibiae and tarsi mostly concolorous, reddish yellow.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 69–71): margins of epandrium in posterior view narrowed below level of cerci, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle, longer than wide; surstylus in lateral view with posterior process tapered gradually to narrowly rounded apex; lateral process less than 1/2 length of posterior process, more or less parallel sided, narrow, with medioapical patch of long setulae.

Type material. The neotype male of *Ephydra caesia* Wulp here designated is labeled "Carhue, Buenos Aires/ Argentina Dec 16 1920/A Wetmore Collector/♂/NEOTYPE ♂ Ephydra caesia van der Wulp by W. N. Mathis USNM [red]." The neotype is double mounted (glued to a paper point), is in good condition, and is deposited in the USNM. Nineteen paraneotypes (10♂, 9♀; USNM) bear the same locality label data as the neotype.

Type locality. Argentina. Buenos Aires: Carhué (37°11'S, 62°44'W).



MAP 14. Distribution map for *Neoephydra caesia* (Wulp).

Additional specimens examined. *ARGENTINA. Mendoza:* Río Desaguadero (33°25'S, 67°11'W), Nov 1972, M. L. de Grosso (4♂, 9♀; FML).

Distribution (Map 14). *Neotropical:* Argentina (Buenos Aires, Mendoza).

Remarks. Van der Wulp described this species from a single female specimen, which is automatically the holotype, but he also studied a topotypical male. That male, according to van der Wulp, was a paler *variety* of the species, being smaller, more metallic green, and with legs that are entirely brownish yellow. Because van der Wulp accorded this specimen varietal status, it cannot be considered as part of the type series.

In the original description, van der Wulp stated that the holotype was collected in Argentina by Professor H. Weyenbergh, Jr. The unique specimen was apparently returned to Professor Weyenbergh in Argentina, and according to Horn and Kahle (1937: 301) all of Weyenbergh's collection was destroyed. Other holotypes apparently suffered a similar fate (Thompson 1974: 28). Thus, it seems likely that the holotype of *Ephydra caesia* was destroyed.

When we began this study, we requested the holotype from the Instituut voor Taxonomische Zoologie, Amsterdam, through Dr. Theowald van Leeuwen. We were sent a "syntype" which was missing its abdomen. This specimen cannot be a syntype, as already noted, and although we cannot determine the sex of the specimen, it does match the brief description of the male "variety," especially in the coloration of the legs, which are entirely brownish yellow rather than red to dark brown, the leg color of the female holotype. The specimen does bear a handwritten label, which reads "Argenta Weyenb[ergh] [handwritten, pale yellow]/Ephydra caesia [handwritten]/ SYNTYPE [red with black border near margin]." Based on this evidence, we believe this specimen is the topotypical male variety that van der Wulp mentioned in the original description. It has no nomenclatural status, however.

As no holotype is apparently extant and as the so-called male variety is neither identifiable nor has any nomenclatural status, we have designated a neotype (see "Type Material").

15. *Neoephydra chilensis* (Macquart)

Figs. 72–74, Map 15

Ephydra chilensis Macquart 1851: 276.—Blanchard 1852: 464 [reference].—Cresson 1931: 85 [diagnosis and discussion].—Hendel 1930: 150 [list].

Dimecoenia chilensis.—Cresson 1935: 350 [generic combination].—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 239 [world catalog].

Neoephydra chilensis.—Mathis 2008: 10 [generic combination].

Ephydra gilvipes Coquillett 1901: 377.—Hendel 1930: 150 [list].—Mathis 1995: 636 [synonymy].

Dimecoenia gilvipes.—Cresson 1935: 353 [generic combination; review].—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog]; 1969: 593 [distribution and diagnosis].

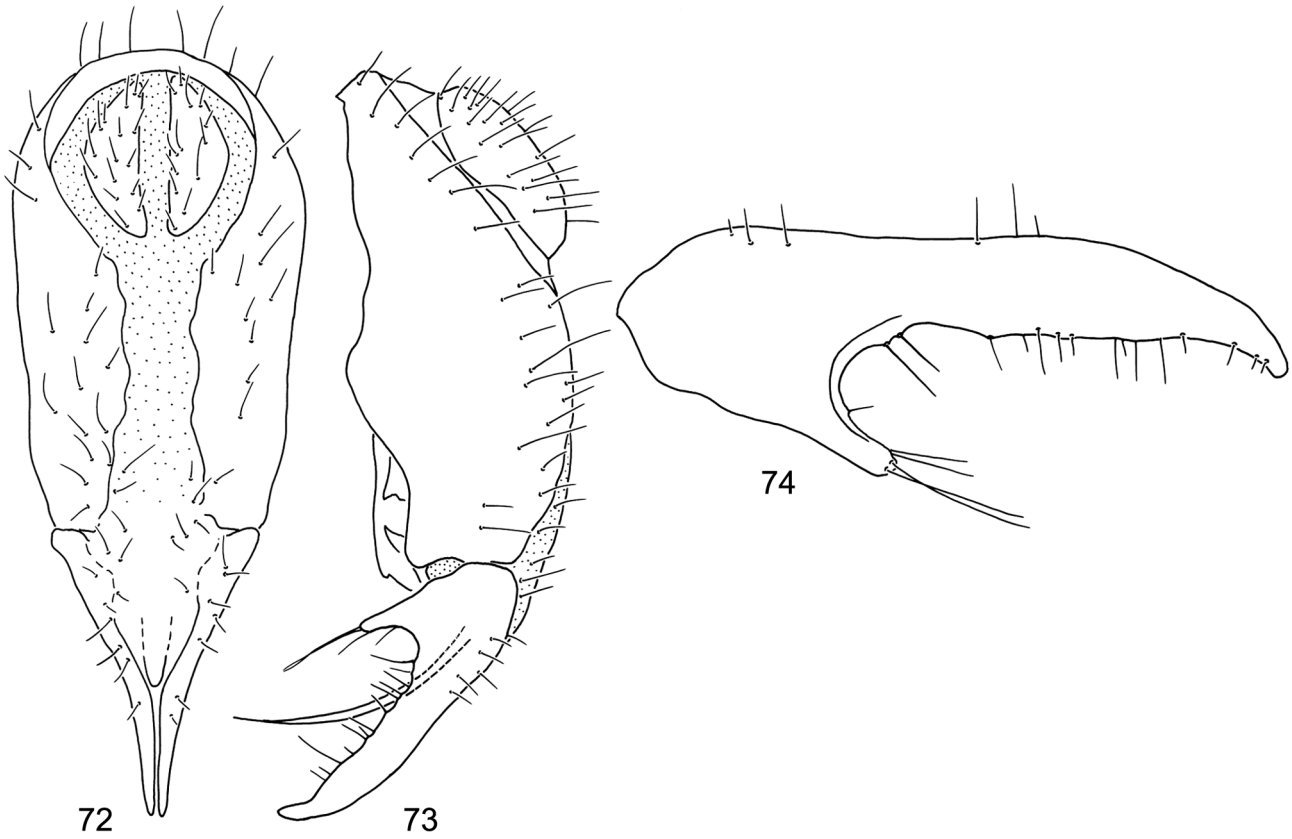
Diagnosis. Specimens of *N. chilensis* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally gray, microtomentose; face moderately setose; gena moderately short; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.40–5.00 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.68–0.70; frontal ratio 0.53–0.56; mesofrons with dark greenish to greenish blue, metallic luster, pilose laterally; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some metallic luster; number of fronto-orbital setae usually 2, sometimes with a large seta posterior to others. Antenna mostly concolorous, blackish brown. Facial ratio 0.95–0.98; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, mostly whitish gray, faintly brownish dorsally, paler ventrally. Eye ratio 0.87–0.90; gena-to-eye ratio 0.34–0.38; gena high, coloration gray to whitish gray but with faint tinges of olivaceous green posteriorly.

Thorax: Mostly microtomentose; scutum mostly brown, somewhat subshiny, darker posteriorly; anterior margin microtomentose, gray to bluish gray, subshiny luster concolorous with mesofrons; pleural areas paler, more gray colored ventrally; anepisternum with central area and dorsal margin brownish, otherwise becoming gray;

other pleural areas including coxae mostly whitish gray, faintly olivaceous dorsally, paler ventrally. Wing length averaging 3.19–3.34 mm; mostly very faintly infuscate, very pale grayish brown; costal vein ratio 0.21–0.24; M vein ratio 0.80–0.83. Legs mostly pale colored, yellowish to reddish yellow; femora of some specimens thinly microtomentose, grayish to faintly greenish gray; tibiae and tarsi yellowish to reddish yellow.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 72–74): margins of epandrium in posterior view tapered very gradually, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle, lateral margins long; surstylus in lateral view with posterior process moderately wide on basal 3/4, thereafter tapered to rounded, anteriorly curved apex; lateral process moderately long, bluntly rounded, with 2–3 long, medioapical setulae.



FIGURES 72–74. Structures of male terminalia of *Neoephydra chilensis* (Macquart). (72) epandrium, cerci, surstyli, posterior view; (73) same, lateral view; (74) surstylus, lateral view (from Mathis 1995).

Type material. The lectotype male of *Ephydra chilensis* Macquart, here designated to stabilize and make more universal the use of this name, is labeled "8 [handwritten on white disk]/[a green disk, white on underside] 124 38 [1838][handwritten on underside]/Ephydra Chilensis ♀ [sic] Macq. n. sp. [handwritten on folded, white rectangle]/ LECTOTYPE Ephydra chilensis Macquart by W. N. Mathis [red, handwritten]." Two paralectotypes (1♂, 1ex) are labeled with the same label data as the lectotype except for the determination label. The lectotype and paralectotypes are in the MNHN (number 1996). All specimens of the type series are pinned directly and are moldy; the head and abdomen of one of the paralectotypes is missing; the abdomen of the lectotype has been removed and dissected, and the structures are in an attached microvial.

The lectotype male *Ephydra gilvipes* (designated by Wirth 1969: 593) is labeled "Galapagos Is[lands] Albemarle [Isabela; 0°49.8'S, 91°08.1'W] 2-13-1899 [13 Feb 1899]/Type No. 4429 U.S.N.M. [red]/Ephydra gilvipes Coq./LECTOTYPE Ephydra gilvipes Coquillett by W. N. Mathis [red, handwritten]." In the original description, Coquillett listed one male and five female syntypes. We have studies three of these species and only one was a female. The best male specimen of the type series was selected as the lectotype and is deposited in the USNM (4429). The lectotype is pinned directly; the abdomen has been removed and dissected, and the structures are stored in an attached microvial.

Type locality. "Chile." (ca. 30°S, 71°W).

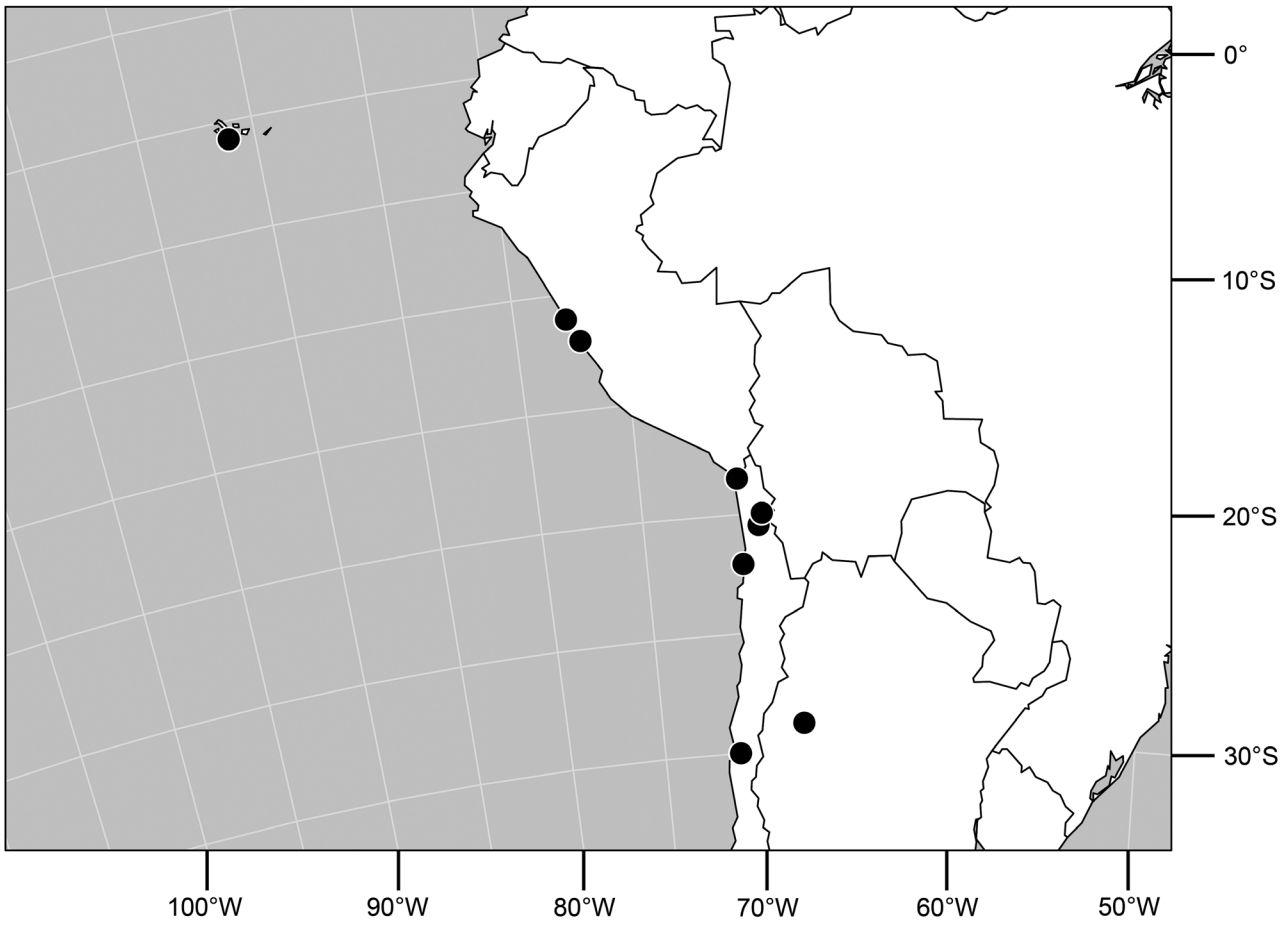
Additional specimens examined. *ARGENTINA. La Rioja:* Carrizal Bajo (28°53'S, 67°33'W), Oct 1958, L. E. Peña (6♂, 2♀; MZUSP).

CHILE. Antofagasta: Tocopilla (22°05'S, 70°12'W), 10 Apr 1931, D. S. Bullock (4♂, 5♀; USNM). *Tarapaca:* Azapa Valley (18°29'S, 70°14'W), Jun 1912, D. E. Porter (1♂, 1♀; USNM); Noasa (19°59'S, 69°08'W), 28 Sep 1951, L. E. Peña (13♂, 6♀; USNM); Pica (20°30'S, 69°21'W), 23 Sep–20 Nov 1966, M. E. Irwin, E. Medina (2♂, 5♀; USNM).

PERU. Lima: Huaura (16 mi N; 11°04.1'S, 77°36'W), 15 Jan 1955, E. S. Ross, E. I. Schlinger (1♂, 1♀; CAS, USNM); Lima, Laguna de Villa (12°03.3'S, 77°03'W), 30 Aug 1988, W. N. Mathis (11♂, 1♀; USNM).

Distribution (Map 15). *Neotropical:* Argentina (La Rioja), Chile (Antofagasta, Tarapaca), Ecuador (Galápagos Islands), and Peru (Lima), between the equator and 23°S and 70°–91°W.

Remarks. This species is widespread, mostly west of the Andes Mountains, and throughout its known range color polymorphism is evident. The legs of most specimens are pale colored, mostly yellowish to reddish yellow, but occurring sympatrically are occasional specimens with dark colored femora. The femora of these specimens are actually pale colored, but their microtomentose vestiture is denser and darker, covering their pale coloration.



MAP 15. Distribution map for *Neoephydra chilensis* (Macquart).

16. *Neoephydra ciligena* (Rondani)

Figs. 75–78, Map 16

Ephydra ciligena Rondani 1868: 32.
Parydra ciligena.—Wirth 1968: 22 [generic combination, Neotropical catalog].
Dimecoenia ciligena.—Clausen 1985: 382 [generic combination].—Mathis and Zatwarnicki 1995: 239 [world catalog].
Neoephydra ciligena.—Mathis 2008: 10 [generic combination].
Ephydra densepilosa Hendel 1930: 152. **New synonym**

Dimecoenia densepilosa.—Hendel 1933: 223 [generic combination].—Wirth 1968: 23 [Neotropical catalog].—Lizarralde de Grosso 1989: 58 [list, Argentina].—Mathis and Zatwarnicki 1995: 239 [world catalog].
Neoephydra densepilosa.—Mathis 2008: 10 [generic combination].
Dimecoenia prionoptera, in part [misidentification].—Cresson 1935: 350 [listed questionably in synonymy].
Dimecoenia lopesi Oliveira 1954b: 269.—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 239 [world catalog]. **New synonym**
Neoephydra lopesi.—Mathis 2008: 10 [generic combination].
Dimecoenia grumanni Oliveira 1954b: 272; 1958: 167 [description and illustration of immature stages].—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 239 [world catalog]. **New synonym**
Neoephydra grumanni.—Mathis 2008: 10 [generic combination].

Diagnosis. Specimens of *N. ciligena* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance variable, either generally dark, particularly the legs, or pale colored, with legs mostly reddish yellow; face moderately setose; gena high; and structures of male terminalia with distinctive conformation. Moderately large to large shore flies, body length 4.10–5.60 mm; generally dark colored, grayish brown to brown with some subshiny to shiny, golden brown or brown areas dorsally.

Head: Head ratio 0.67–0.70; frontal ratio 0.47–0.50; subquadrate mesofrons shiny with golden brown to greenish brown metallic luster, moderately pilose anteriorly, lateral margins becoming slightly narrower anteriorly; ocellar triangle and parafrons dull, microtomentose, brown to blackish brown; ocelli in isosceles triangle, distance between posterior ocelli less than between medial ocellus and either posterior ocellus; parafrons mostly blackish brown, lacking any subshiny area through insertions of fronto-orbital setae. Antenna mostly unicolorous blackish brown, densely microtomentose; arista thickened on basal 1/3, gradually tapered to style-like, bare tip, basal portion with macropubescent vestiture; aristal length equal to combined length of 1st 3 segments. Facial ratio of females 0.80–0.82, of males 0.93–0.96, densely microtomentose, mostly unicolorous, brown to golden brown; dorsum of interfoveal hump with small anterior area subshiny, golden brown; facial setae moderately well developed, particularly along dorsal slope and oral margin, larger setae along dorsal slope slightly anaclinate. Eye ratio 1.0; gena-to-eye ratio 0.46; gena moderately high, anterior portion concolorous with face becoming slightly more yellowish posteriorly.

Thorax: Generally brown; scutum mostly subshiny to shiny, microtomentose only along anterior and lateral margins; becoming shinier and darker posteriorly; scutellum concolorous with posterior portion of scutum. Pleural areas generally concolorous, dull, microtomentose, blackish brown to grayish brown, becoming only slightly paler toward venter. Wing very palely infuscate, pale grayish brown; wing length averaging 3.38–3.47 mm; costal vein ratio 0.25–0.28; M vein ratio 0.71–0.72. Legs mostly concolorous; femora variable, either concolorous with pleural areas, with tibiae blackish brown dorsally, ventral surface somewhat rufous to brownish orange, and tarsi blackish brown except at articulations which are brownish orange, or with legs mostly pale, reddish yellow.

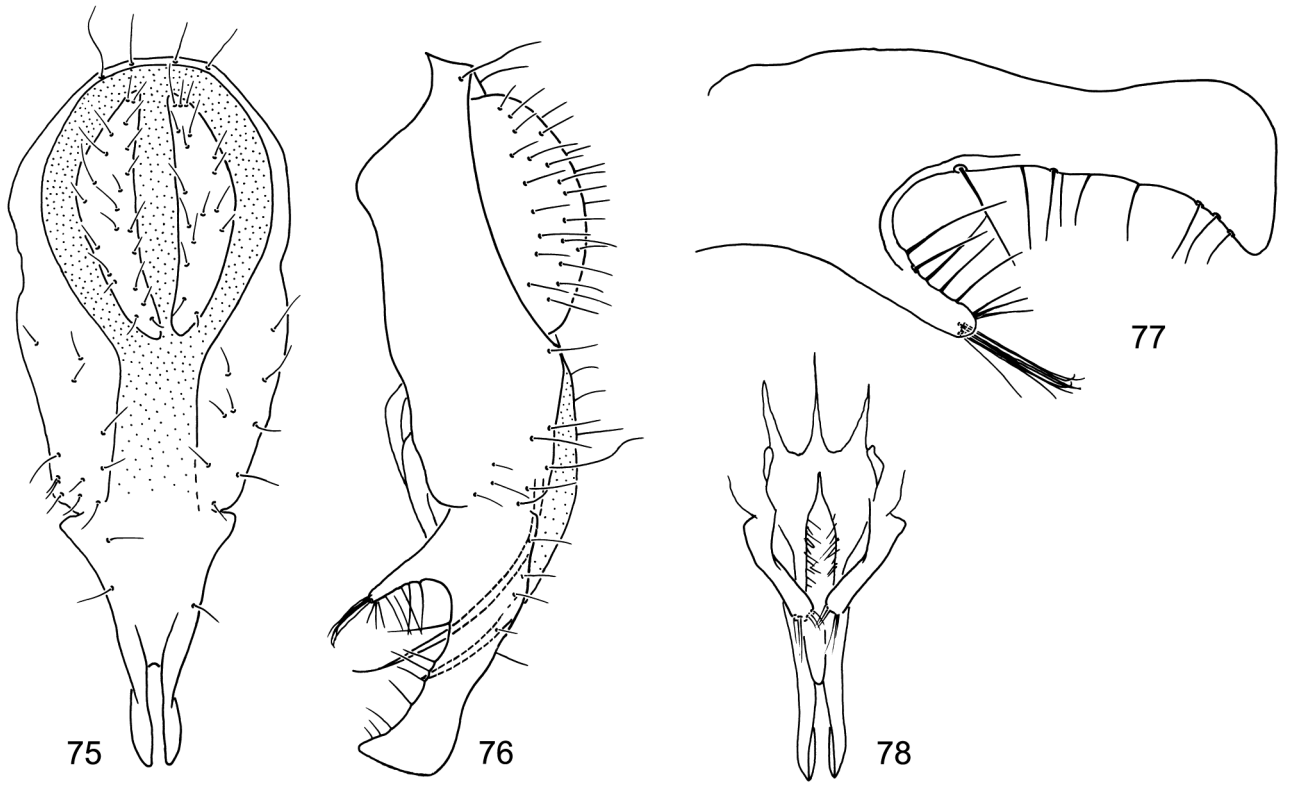
Abdomen: Generally subshiny dorsally, becoming duller, more microtomentose toward lateral margins; first 4 tergites with large subshiny area toward anterior margin with dark, greenish brown, metallic luster, lateral margins becoming gradually duller and grayer; 5th tergite of male mostly brown, at most subshiny, sides tapered gradually to bluntly rounded apex. Male terminalia (Figs. 75–78): epandrium in posterior view becoming narrower and parallel sided below level of cerci; surstyli in posterior view with broadly rounded basal enlargement, becoming abruptly narrower along ventral projections; surstylus in lateral view with ventral projection curved at tip and slightly enlarged, lateral projection over 1/2 length of ventral projection, claviform.

Type material. The lectotype female of *Ephydra ciligena* Rondani (designated by Clausen 1985: 382) is labeled "HOLOTYPE Ephydra ciligena Rondani P.J.Clausen, 1984 HOLOTYPE [red]/Correct genus now Dimecoenia P.J. Clausen, 1984 [handwritten, white with a black sub-border]." Although Clausen (1985) labeled this specimen as the "HOLOTYPE," Rondani's original paper is not specific about whether the type series is a single specimen or a series. Thus the primary type is better considered a lectotype rather than a holotype. The lectotype is directly pinned, is in poor condition (covered by fungal hyphae), and is deposited in the MZUF.

The lectotype male of *Ephydra densepilosa* Hendel, here designated to stabilize and make more universal the use of this name, labeled "Tapikiole-Arg[entina]. XII. 25–I.26 [Dec 1925–Jan 1926] Lind O. Chaco-Exped/ Ephydra densepilosa ♂ Hendel F. Hendel det. [species name, sex symbol, and author's name handwritten]/Type Hendel 1930 [handwritten in red, black border]/LECTOTYPE ♂ Ephydra densepilosa Hendel By W. N. Mathis [handwritten, black sub-border]." The lectotype is double mounted (minute nadel in paper rectangle), is in good condition (the abdomen has been removed and dissected; the structures are in an attached microvial), and is deposited in the SMNS. A female paralectotype is also designated herein.

The holotype male of *Dimecoenia lopesi* Oliveira is labeled "[Brazil] Recr. dos Band[eirantes]. 24-IV-940 [24 Apr 1940] Lopes/COL. INST. O. CRUZ NO. 714/HOLOTYPE Dimecoenia lopesi Oliveira [red]." Allotype female and one male paratype are labeled with the same label data as the holotype except for the collection numbers, which in these specimens are 715 and 716 respectively. The type series is in the IOC. The holotype is directly pinned and is in excellent condition. The abdomens of the allotype and paratypes have been removed, presumably for purposes of illustration, and were not included with the pinned specimens that we examined.

The holotype male of *Dimecoenia grumanni* Oliveira is labeled "TORRES, 1. XI. 950 [1 Nov 1950] RIO GRANDE do SUL E. Gruman/COL. INST. O. CRUZ NO. 723/HOLOTYPE Dimecoenia grumanni Oliveira [red]." Allotype female (No. 739) and five paratypes (3♂, 2♀) are labeled with the same label data as the holotype except for the collection numbers which are 722, 724, and 738 for the males, and 740 and 748 for the females. The type series is in the IOC. All specimens of the type series are double mounted on paper points and appear to have been collected in alcohol or a moist killing jar before being mounted. Consequently they are not in the best of condition. The holotype is the best preserved specimen.



FIGURES 75–78. Structures of male terminalia of *Neoephydra ciligena* (Rondani). (75) epandrium, cerci, surstyli, posterior view; (76) same, lateral view; (77) surstylus, lateral view; (78) internal male terminalia (fused hypandrium gonite, aedeagus), ventral view.

Type locality. Argentina. Capital Federal: Buenos Aires (34°40'S, 58°24'W).

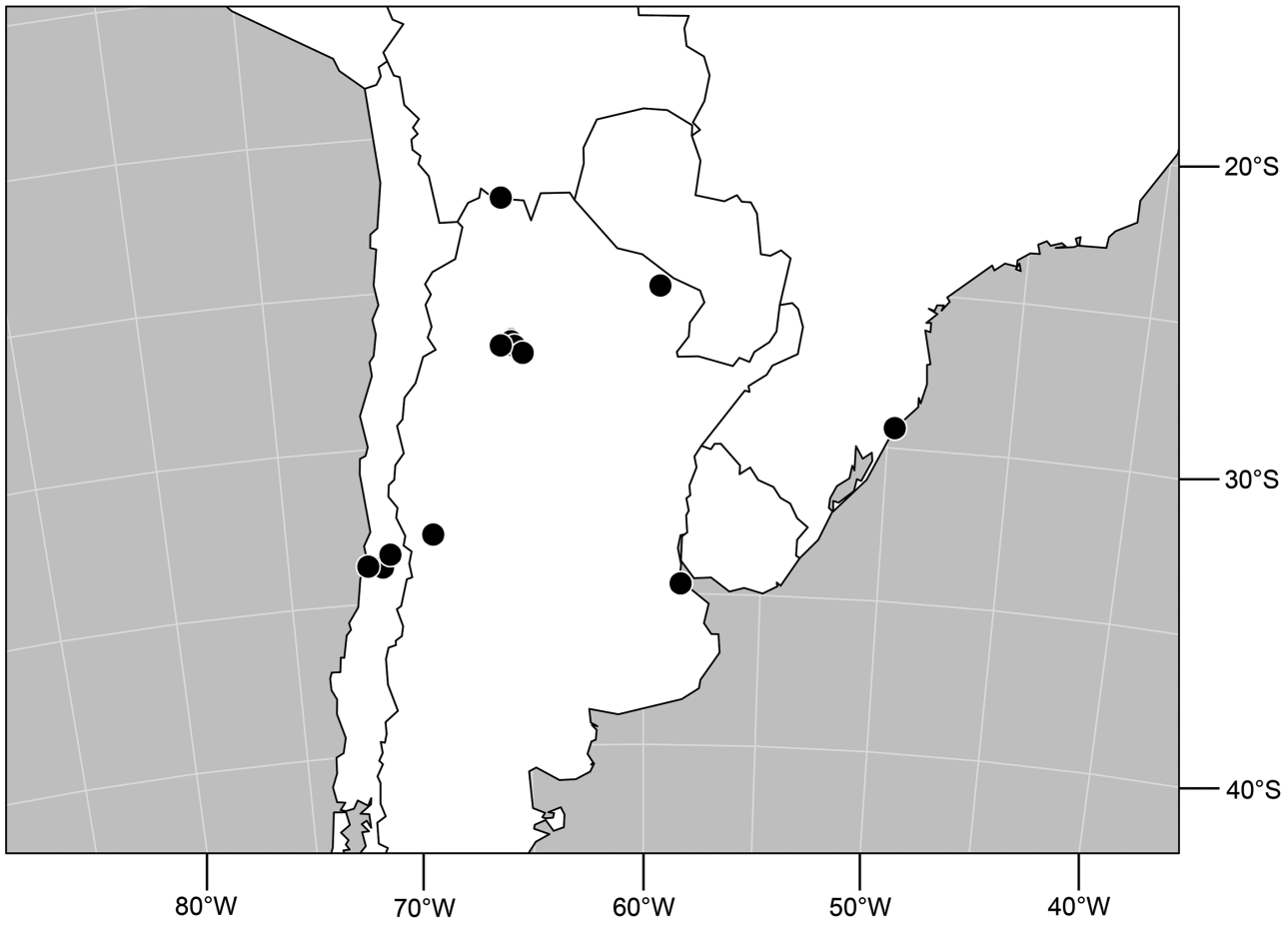
Additional specimens examined. *ARGENTINA. Formosa:* Estancia Tapikiolé (25°01'S, 59°19'W), E. Lindner (1♂, 1♀; SMNS). *Jujuy:* Yavi Chico (22°06'S, 65°28'W), Oct 1968, L. E. Peña (2♀; USNM). *Mendoza:* Mendoza (32°53'S, 68°49'W), Jan 1970, L. E. Peña (1♀; USNM). *Tucumán:* Dique de Cadillal (26°41'S, 65°16'W), 16–29 Jan 1951, R. Golbach (3♀; FML); Finca La Cavera (Tafí Viejo; 26°45'S, 65°16'W), 23–28 Nov 1951, M. L. Aczel, R. Golbach (7♂, 9♀; FML); Pacará (26°54'S, 65°08'W), 20–28 Nov 1947, R. Golbach (1♂; FML); Tacanas (27°08'S, 64°49'W), 20–28 Nov 1957, R. Golbach (1♂, 3♀; FML); Tafi del Valle (26°52'S, 65°41'W), Nov-6-12 Dec 1947–1970, M. L. de Grosso, R. Golbach (9♂, 6♀; FML).

BRAZIL. Rio Grande do Sul: Torres (29°21'S, 49°44'W), Jun 1965, N. Papavero (4♂, 2♀; USNM).

CHILE. Santiago: El Arbol-Aculeo (33°51'S, 71°01'W), Oct 1969, L. E. Peña (1♀; USNM); El Convento (coast of Santiago Province, south of Santo Domingo village, south of San Antonio, Luis E. Peña G., personal communication; 33°47'S, 71°38'W), 12 Oct 1963, L. E. Peña (77♂, 65♀; MZUSP, USNM); Santiago (33°27'S, 70°40'W), 10 Oct 1963, L. E. Peña (2♀; USNM).

Distribution (Map 16). *Neotropical:* Argentina (Jujuy, Mendoza, Tucumán), Brazil (Rio de Janeiro, Rio Grande do Sul), and Chile (Santiago), between 22°–34°S and 44°–71°W.

Remarks. The known distribution of *N. ciligena* is widespread, and there is considerable color polymorphism throughout. This is especially evident in the color of the legs, which vary from being mostly blackish gray to mostly reddish yellow. The structures of the male terminalia, however, are very similar, and based on them , we have determined that the various color morphs are conspecific.



MAP 16. Distribution map for *Neoephydra ciligena* (Rondani).

17. *Neoephydra inca* sp. nov.

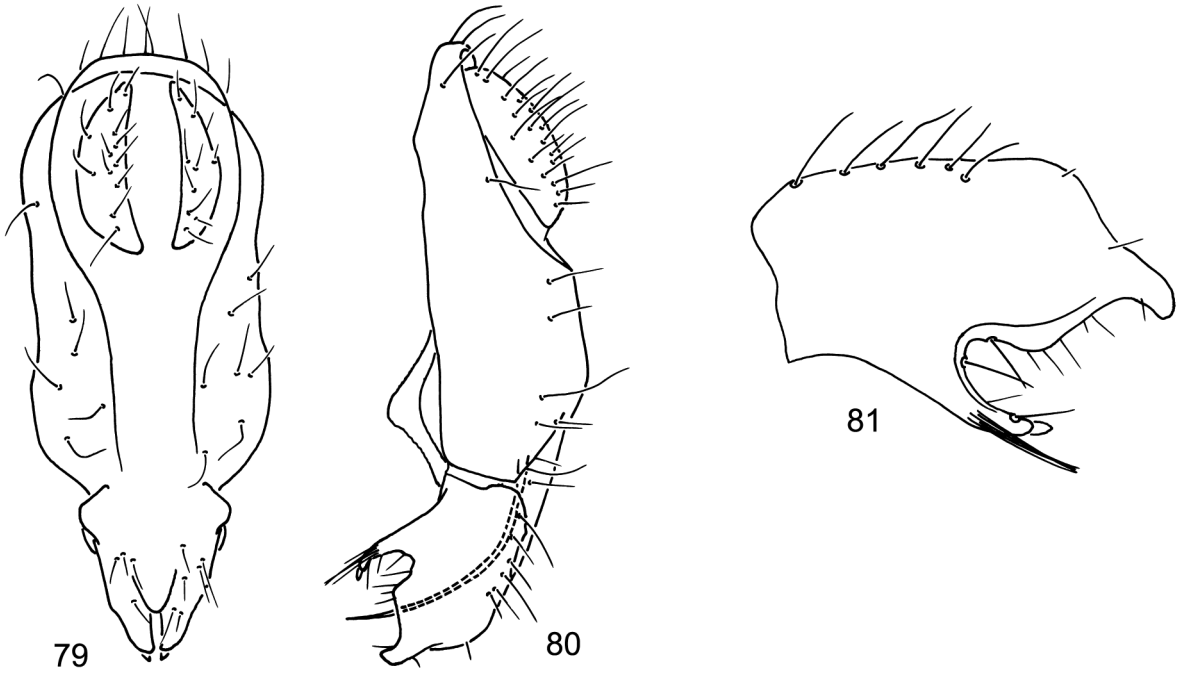
Figs. 79–81, Map 17

Diagnosis. Specimens of *N. inca* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark, particularly the legs; face moderately setose; gena high; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.30–4.60 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.72–0.74; frontal ratio 0.49–0.53; mesofrons with dark bluish green to greenish metallic luster, generally pilose laterally; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some faint metallic luster, number of fronto-orbital setae usually 2. Antenna mostly concolorous, blackish brown. Facial ratio 0.97–1.03; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish brown to gray, paler along oral margin. Eye ratio 0.97–0.98; gena-to-eye ratio 0.51–0.53; gena high, coloration gray to whitish gray but with faint tinges of olivaceous green to brown posteriorly.

Thorax: Mostly microtomentose; scutum mostly brown, darker and subshinier posteriorly; anterior margin microtomentose, especially postpronotum, gray to brownish gray; pleural areas paler, more gray colored especially ventrally; anepisternum with central area, dorsal and sometimes posterior margins brownish, otherwise mostly gray; other pleural areas including coxae whitish gray, although lighter, whitish ventrally. Wing length averaging 3.83–3.96 mm; mostly palely infuscate, faintly brown; costal vein ratio 0.26–0.29; M vein ratio 0.76–0.80. Legs dark generally; femora gray, microtomentose, only slightly darker than ventral pleural areas; tibiae and tarsi mostly concolorous, reddish yellow.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 79–81): margins of epandrium in posterior view parallel, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle with an apical process; surstylus in lateral view basically rectangular with an apical, digitiform, short process and a longer lateral prong, length of lateral prong about equal to width of surstylus at base, lateral prong with sub-basal tuft of setulae, anterior margin between apical process and lateral prong shallowly produced, shallowly triangular.



FIGURES 79–81. Structures of male terminalia of *Neoephydra inca* **sp. nov.** (79) epandrium, cerci, surstyli, posterior view; (80) same, lateral view; (81) surstylus, lateral view.

Type material. The holotype male is labeled "PERU. Cuzco: Quispicamchis [sic, Quispicanchi], Huarcapay, 2900m, 1 Sep 1988, WNMathis/HOLOTYPE ♂ Neoephydra inca Mathis USNM [red]." The holotype is double mounted (minuten in a plastic elastomer block), is in excellent condition, and is deposited in the USNM. The allotype female and 36 paratypes (36♂, 3♀) bear the same locality label as the holotype. Other paratypes are as follows: *ARGENTINA. Jujuy:* Abra Laite (85 km S Abra Pampa; 23°12'S, 65°47'W), 29 Oct 1968, L. E. Peña (13♂, 5♀; CNC); Barrios (S La Quiaca; 22°15'S, 65°32'W; 3500 m), 31 Oct 1968, L. E. Peña (1♀; CNC); Cajas (35 Km E La Quiaca; 22°15'S, 65°18'W; 3800 m), 24 Oct 1968, L. E. Peña (10♂, 19♀; CNC, USNM); Cangrejillos (S La Quiaca; 22°25'S, 65°34'W; 3500 m), 28–29 Oct 1968, L. E. Peña (44♂, 77♀; CNC, USNM); Cerrillos (22°19'S, 65°49'W; 3600 m), 31 Oct 1968, L. E. Peña (34♂, 40♀; CNC, USNM); Cienagas (2 km SW; road to Pirquitas; 22°41'S, 66°31'W), 3 Nov 1968, L. E. Peña (1♀; CNC); Cienaguillas (22°05'S, 65°53'W; 3650 m), 28 Oct 1968, L. E. Peña (16♂, 13♀; CNC); La Quiaca (22°06'S, 65°37'W; 3500 m), 23 Oct 1968, L. E. Peña (1♂, 2♀; CNC); Lecho (32 km E La Quiaca; 22°13'S, 65°27'W), 4 Oct 1968, L. E. Peña (11♂, 19♀; CNC, USNM); Río Cincel, S. L. Pozuelos (22°22'S, 66°01'W; 3800 m), 3 Nov 1968, L. E. Peña (1♀; CNC); Río Seco (5 km S Santa Catalina; 22°06'S, 66°18'W; 3500 m), 25 Oct 1968, L. E. Peña (6♂, 5♀; CNC); Santa Catalina (22°05'S, 66°18'W; 3700 m),

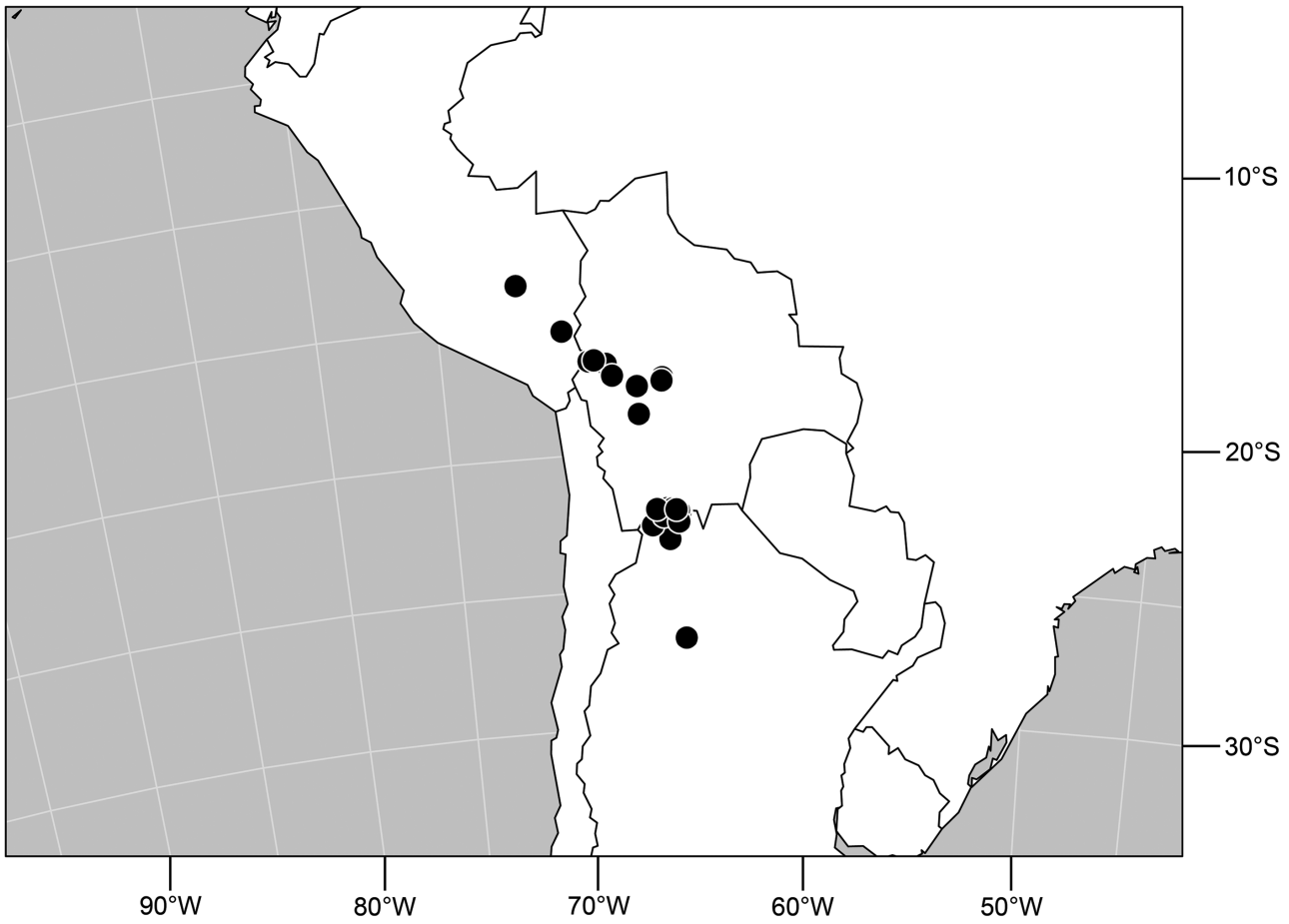
25 Oct 1968, L. E. Peña (1♂, 1♀; CNC); Suripugio (22°10'S, 65°22'W), Oct 1968, L. E. Peña (4♂; CNC); Tilcara (12 km S; 22°35'S, 65°22'W; 2000 m), 23 Oct 1968, L. E. Peña (8♂, 5♀; CNC); Yavi (2 km W; 22°08'S, 65°28'W; 3400 m), 31 Oct 1968, L. E. Peña (1♂, 2♀; CNC); Yavi Chico (22 km E La Quiaca; 22°06'S, 65°28'W; 3500 m), 24 Oct 1968, L. E. Peña (9♂, 19♀; CNC). *Tucumán:* San Miguel de Tucumán (30 km N; 26°50'S, 65°13'W; 700 m), 15 Oct 1968, L. E. Peña (1♀; CNC).

BOLIVIA. Cochabamba: Colomi (5 km E; 17°17.9'S, 65°52.2'W; 3370 m), 24 Mar 2001, W. N. Mathis (2♂; USNM); Japo (18 km W; 17°35'S, 66°56.2'W; 4060 m), 23 Mar 2001, W. N. Mathis (6♂, 1♀; USNM); Lequepalca (1 km E; 17°37.7'S, 66°57'W; 3970 m), 26 Mar 2001, A. Freidberg, W. N. Mathis (14♂, 3♀; USNM); Lequepalca (2 km W; 17°37.7'S, 66°57'W; 3970 m), 23 Mar 2001, W. N. Mathis (17♂, 5♀; USNM); Sacaba (20 km E; 17°25.1'S, 65°53.9'W; 3450 m), 24 Mar 2001, W. N. Mathis (1♂, 1♀; USNM). *La Paz:* El Alto (14 km S; 16°40.1'S, 68°11'W; 3900 m), 20 Mar 2001, W. N. Mathis (1♂; USNM); El Alto (23 km S; 16°42.7'S, 68°11.2'W; 3860 m), 21 Mar 2001, W. N. Mathis (1♀; USNM); Guaqui (Lake Titicaca; 16°35.6'S, 68°51.2'W; 3840 m), 28 Mar 2001, A. Freidberg, S. D. Gaimari, W. N. Mathis (17♂, 4♀; USNM); Guaqui (Lake Titicaca; 16°35.6'S, 68°53.5'W), 19 Apr 2001, A. L. Norrbom (2♀; USNM); Patacamaya (17 km NE; 17°09.5'S, 67°56.7'W; 3800 m), 21 Mar 2001, W. N. Mathis (3♀; USNM); Tiahuanaco Ruins (16°33.7'S, 68°40.7'W; 3870 m), 28 Mar 2001, W. N. Mathis (4♂, 5♀; USNM). *Oruro:* Pazña (S of town; 18°36.2'S, 66°54.7'W; 3750 m), 22 Mar 2001, W. N. Mathis (17♂, 8♀; USNM).

PERU. Puno: Pusi (15°26'S, 69°56'W), 18 Oct 1965, J. C. Hitchcock (2♂, 1♀; USNM).

Type locality. Peru. Cuzco: Quispicanchi, Huarcapay (13°38'S, 71°40'W; 2900 m).

Distribution (Map 17). *Neotropical:* Argentina (Jujuy), Bolivia (Cochabama, La Paz, Oruro), and Peru (Cuzco, Puno), between 13°–26°S and 65°–71°W.



MAP 17. Distribution map for *Neoephydra inca* **sp. nov.**

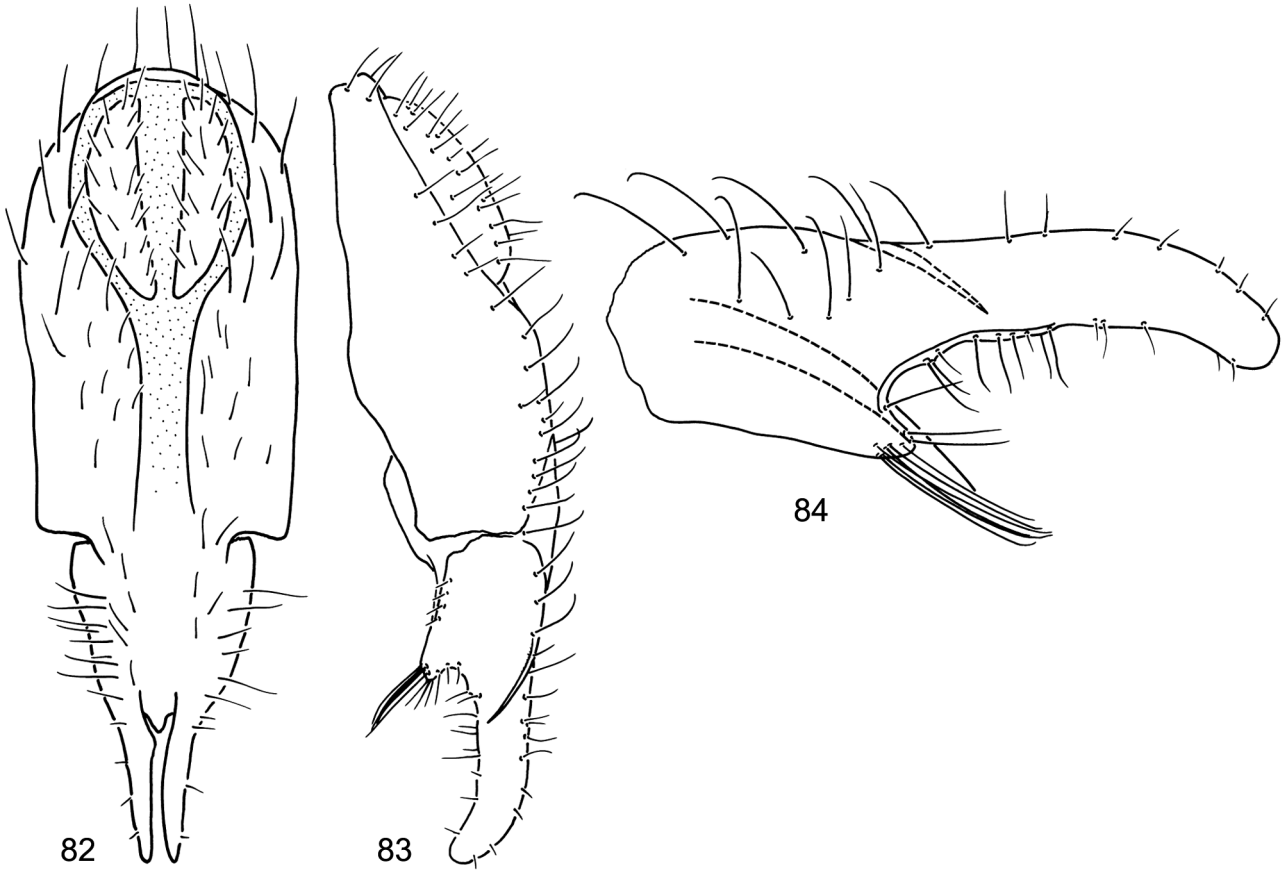
Etymology. The specific epithet, *inca,* is taken from the general name of the Native Americans who frequent the area where this species is found and is a noun in apposition to the generic name.

18. *Neoephydra lenti* (Oliveira)
Figs. 82–84, Map 18

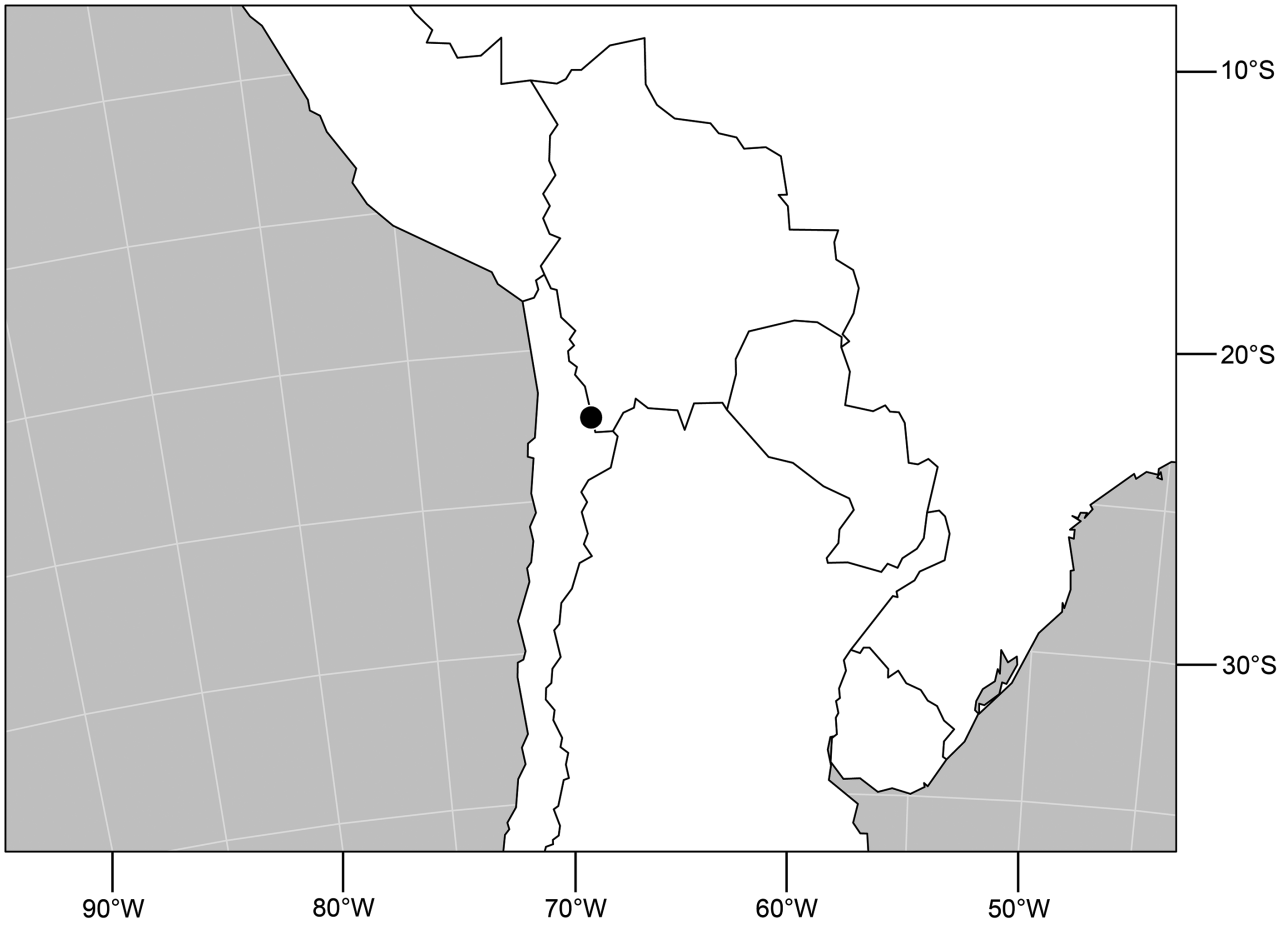
Dimecoenia lenti Oliveira 1954a: 188.—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 239 [world catalog].
Neoephydra lenti.—Mathis 2008: 10 [generic combination].

Diagnosis. Specimens of *N. lenti* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark; face moderately setose; gena high; and structures of male terminalia with distinctive conformation. Moderately large shore flies, body length 4.10–4.40 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.70–0.73; frontal ratio 0.49–0.53; mesofrons with dark blackish blue, metallic luster, generally pilose; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some metallic reflections, concolorous with mesofrons; number of fronto-orbital setae usually 2, sometimes with a 3rd large seta posterior to other. Antenna mostly concolorous, blackish brown. Facial ratio 0.80–0.83; mostly densely setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish brown to gray, gradually paler ventrally. Eye ratio 1.18–1.23; gena-to-eye ratio 0.57–0.61; gena high, coloration gray to whitish gray but with faint tinges of olivaceous green.



FIGURES 82–84. Structures of male terminalia of *Neoephydra lenti* (Oliveira). (82) epandrium, cerci, surstyli, posterior view; (83) same, lateral view; (84) surstylus, lateral view.



MAP 18. Distribution map for *Neoephydra lenti* (Oliveira).

Thorax: Mostly microtomentose; scutum mostly brown, darker and subshiny posteriorly; anterior margin microtomentose, gray to bluish gray, subshiny luster concolorous with mesofrons; lateral margins of scutum microtomentose, grayish brown; scutellum concolorous with posterior portion of scutum; pleural areas paler, more gray colored ventrally; anepisternum with anterior and posterior margins brownish, otherwise becoming gray; other pleural areas including coxae whitish gray, concolorous. Wing length averaging 3.30–3.39 mm; mostly infuscate, brown; costal vein ratio 0.31–0.36; M vein ratio 0.64–0.68. Legs dark generally; femora gray, microtomentose, only slightly darker than ventral pleural areas; tibiae darker than femora, more blackish; tarsi (based on basitarsi of holotype) also dark, concolorous with tibiae.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 82–84): margins of epandrium in posterior view parallel, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle with narrowly bifurcate apical half; surstylus in lateral view elongate with a blunt lateral process and an elongate, slightly apically curved, parallel-sided, digitiform process, blunt lateral process bearing a long tuft of setulae.

Type material. The holotype male is labeled "COL. INST. O. CRUZ NO. 749/El Tatio-Geyser-5200 m. Prox. S. Pedro de Atacama Prov. Antofagasta - Chile IV-1952. HERMAN LENT./HOLOTYPE Dimecoenia lenti Oliveira [red]." The holotype is pinned directly, most tarsi are missing, and setae are frequently missing or are not oriented normally. The allotype female and 14 adult paratypes (10♂, 4♀; IOC) are labeled with the same label data as the holotype except for collection numbers, which are from 750–759 and 761–764. Twelve larvae and 36 puparia were also included in the type series. We have not examined the immature stages but they are presumably in the IOC. None of the adult specimens of the type series is in good condition. They appear matted and were probably collected in alcohol and were later dried and glued to points.

Type locality. Chile. Antofagasta: El Tatio Geyser (22°19.9'S, 68°0.8'W).

Distribution (Map 18): *Neotropical:* Chile (Antofagasta). *Neoephydra lenti* is known only from the type locality.

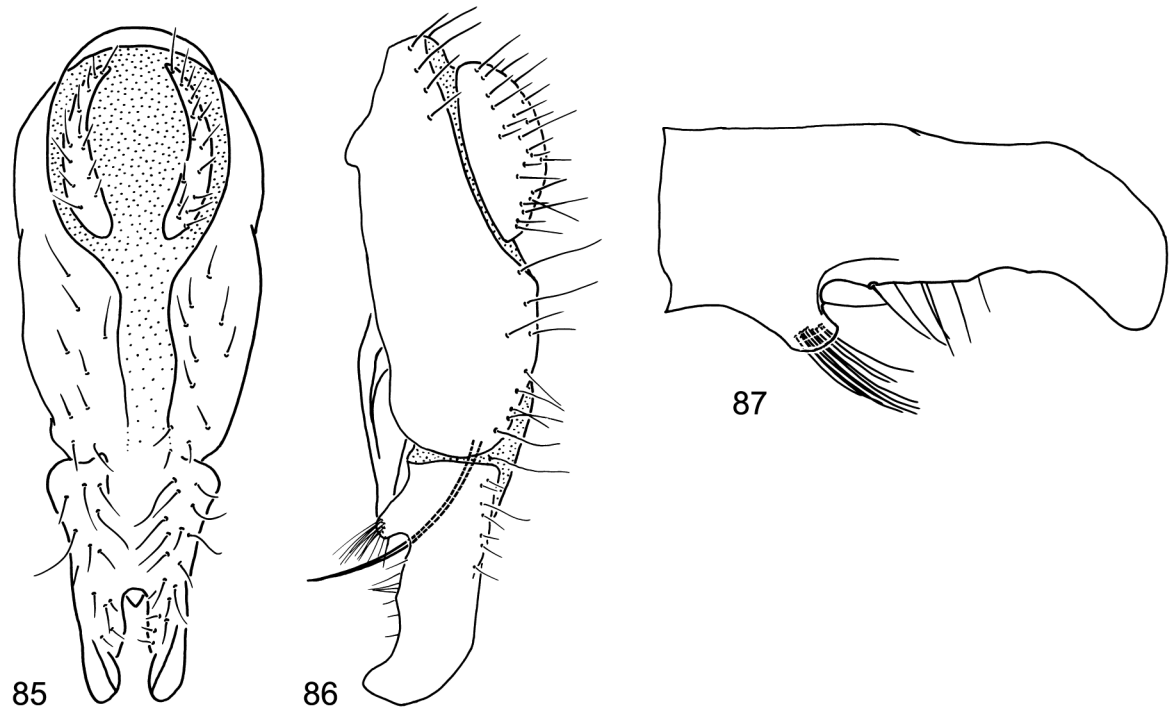
Remarks. Among taxa of Ephydrini, this species occurs at the highest elevation (5200 m).

19. *Neoephydra penai* sp. nov.
Figs. 85–87, Map 19

Diagnosis. Specimens of *N. penai* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark, particularly the legs; face moderately setose; gena moderately short; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.90–4.10 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.65–0.71; frontal ratio 0.52–0.55; mesofrons with dark brownish green, metallic luster, generally pilose; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some faint metallic reflections; number of fronto-orbital setae 2. Antenna mostly concolorous, blackish brown. Facial ratio 1.0; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, yellowish gray, gradually paler ventrally. Eye ratio 0.95–0.97; gena-to-eye ratio 0.31–0.35; gena moderately short, coloration gray to whitish gray but with faint tinges of olivaceous green posteriorly.

Thorax: Mostly microtomentose; mesonotum mostly brownish green, darker and subshiny posteriorly; anterior margin microtomentose, gray to bluish gray; pleural areas paler, more gray to faintly bluish or greenish gray ventrally; anepisternum with dorsal margin faintly brownish, otherwise faintly bluish gray; other pleural areas including coxae mostly whitish to bluish gray, concolorous. Wing length averaging 3.10–3.21 mm; mostly faintly infuscate, palely grayish brown; costal vein ratio 0.27–0.29; M vein ratio 0.74–0.77. Legs dark generally; femora gray, microtomentose, only slightly darker than ventral pleural areas; tibiae and tarsi, mostly reddish yellow, thinly microtomentose.



FIGURES 85–87. Structures of male terminalia of *Neoephydra penai* **sp. nov.** (85) epandrium, cerci, surstyli, posterior view; (86) same, lateral view; (87) surstylus, lateral view.

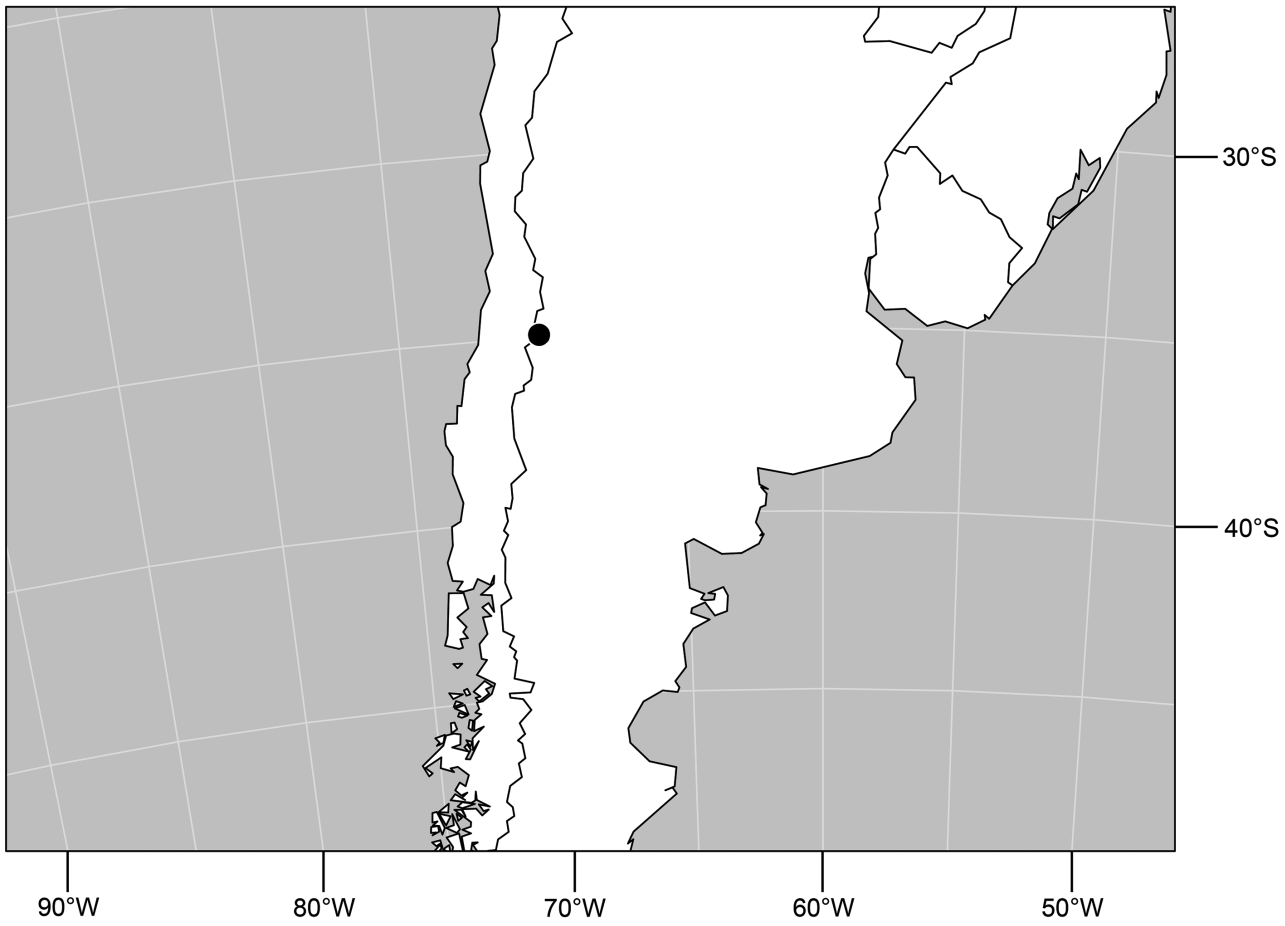
Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Fifth tergite of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 85–87): margins of epandrium in posterior view very gradually narrowed posteriorly, rounded dorsally; surstyli in posterior view as 2 moderately robust, digitiform processes, with narrow but distinct gap between, lateral margins slightly concave; surstylus in lateral view with short, blunt, lateral prong at basal 1/3, lateral prong bearing robust tuft of long setulae, extended surstylar process robustly elongate, curved subapically, generally digitiform process.

Type material. The holotype male is labeled "Vegas del Flaco Talca, CHILE. 29. XI. 1957 [29 Nov 1957] L. E. Peña./HOLOTYPE Neoephydra penai Mathis [red, handwritten]." The holotype is glued to the side of a pin, is in good condition (several setae are missing or are partially displaced), and is deposited in the CNC. The allotype female and one paratype (♂) are labeled with the same label data as the holotype.

Type locality. Chile. Talca: Vegas del Flaco (34°56'S, 70°02'W).

Distribution (Map 19): *Neotropical:* Chile (Talca), *Neoephydra penai* is known only from the type locality.

Etymology. The specific epithet, *penai,* is a genitive patronym to honor Mr. Luis E. Peña G., collector par excellence, facilitator and enthusiast of Chilean entomology, and friend.



MAP 19. Distribution map for *Neoephydra penai* **sp. nov.**

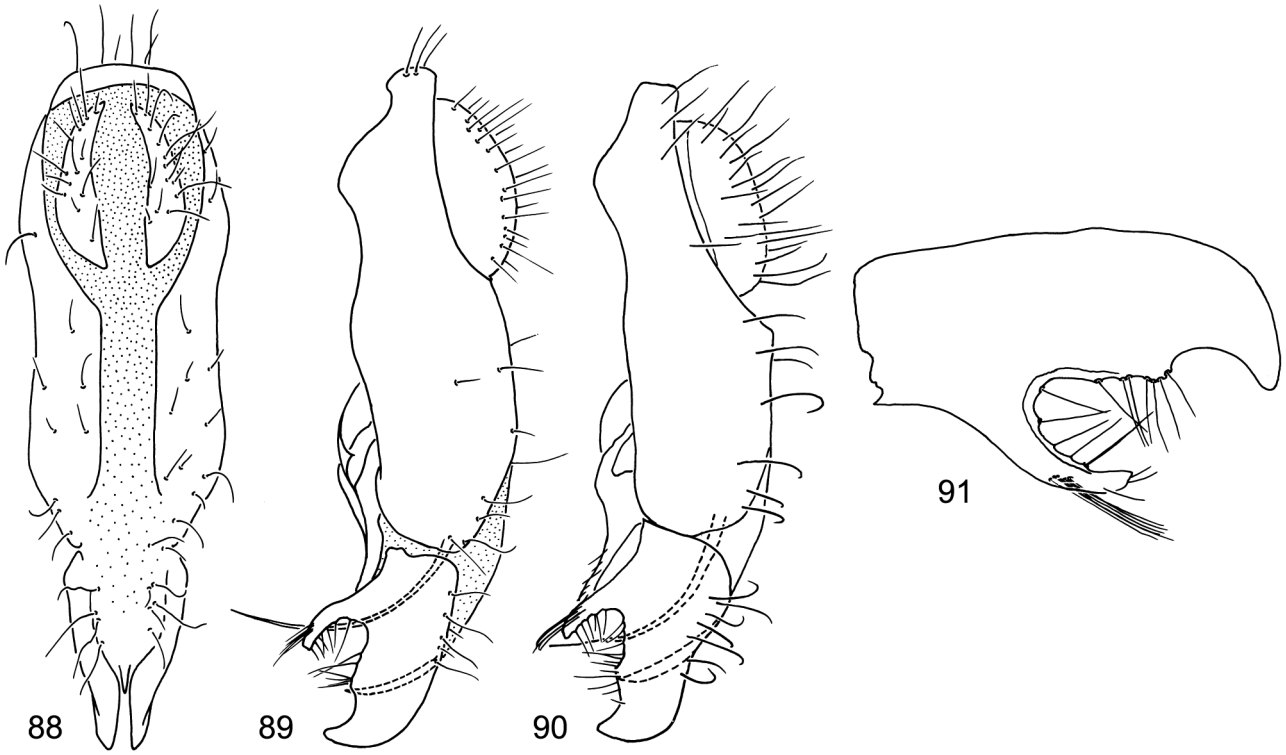
20. *Neoephydra pravoneura* (Hendel), New Combination

Figs. 88–91, Map 20

Ephydra pravoneura Hendel 1930: 150.

Dimecoenia pravoneura.—Hendel 1933: 223 [generic combination].—Mathis and Zatwarnicki 1995: 138–239 [world catalog, as a synonym of *D. caesia*].

Dimecoenia caesia in part of authors [misidentification], not van der Wulp 1883: 58.—Cresson 1935: 352 [review].—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 238–239 [world catalog].



FIGURES 88–91. Structures of male terminalia of *Neoephydra pravoneura* (Hendel). (88) epandrium, cerci, surstyli, posterior view; (89) same, lateral view; (90) epandrium, cerci, surstyli, lateral view; (91) surstylus, lateral view.

Diagnosis. Specimens of *N. pravoneura* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark, particularly the legs; face moderately setose; gena moderately short; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.50–4.30 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

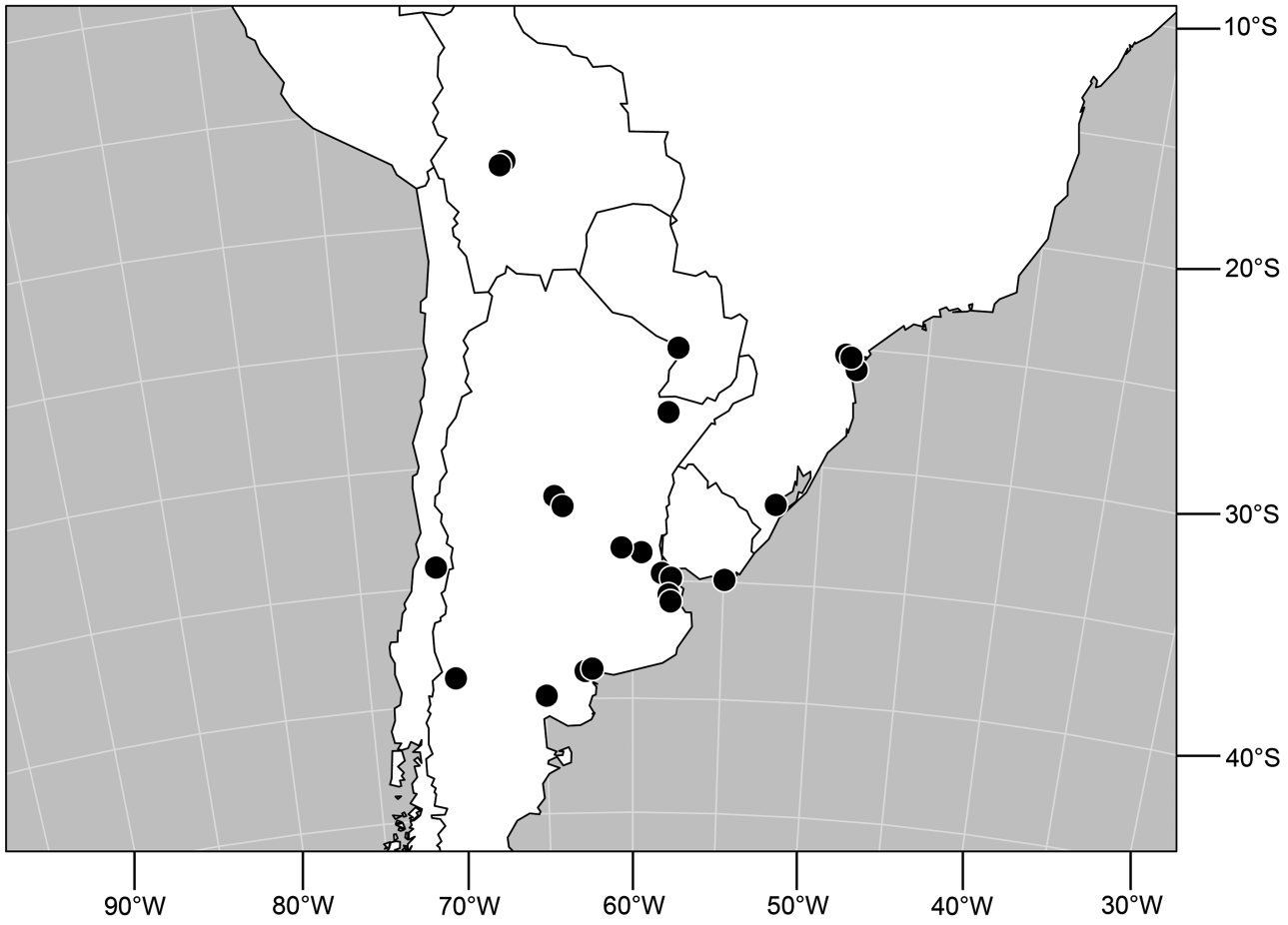
Head: Head ratio 0.71–0.75; frontal ratio 0.52–0.55; mesofrons with dark, brassy, blackish blue to green, metallic luster; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some faint metallic luster; number of fronto-orbital setae 2. Antenna mostly concolorous, blackish brown. Facial ratio 0.89–0.92; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, brownish gray to gray, gradually paler ventrally. Eye ratio 0.89–0.93; gena-to-eye ratio 0.28–0.32; gena moderately short, coloration gray to whitish gray but with faint tinges of olivaceous green.

Thorax: Mostly microtomentose; mesonotum darker, mostly brassy brown, darker and subshinier posteriorly; anterior margin microtomentose, gray to bluish gray, subshiny luster concolorous with mesofrons; pleural areas paler, more gray colored ventrally; anepisternum either with central area and dorsal margin brownish and otherwise olivaceous to faintly bluish gray or mostly olivaceous to bluish gray; other pleural areas including coxae mostly whitish gray, concolorous. Wing length averaging 3.85–3.93 mm; mostly very palely infuscate, faintly grayish brown; costal vein ratio 0.20–0.25; M vein ratio 0.73–0.77. Legs dark generally; femora mostly gray, microtomentose, only slightly darker than ventral pleural areas; tibiae and tarsi reddish yellow, sometimes thinly microtomentose.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 88–91): margins of epandrium in posterior view roughly parallel, tapered medially just before merger with surstyli, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle, longer than wide, with apical half as 2, narrow, elongate processes with a narrow gap between; surstylus in lateral view twice as long as wide, robustly

elongate, curved apically, tapered to a point, lateral prong elongate, length equal to width of base of surstylus, curved, bearing an apical, long tuft of setulae, wide gap from by lateral prong with setulae; lateral margin between lateral prong and apex of surstylus with shallowly produced and bearing short setulae.

Type material. The lectotype male of *Ephydra pravoneura* Hendel, here designated to stabilize and make more universal the use of this name, is labeled "Sierra Cordoba Arg[entina]. VII 25. Lind. D[eutschen]. Chaco-Exped [black border white label]/Ephydra pravoneura Hend. ♂ [handwritten]/Coll. Hendel/LECTOTYPE Ephydra pravoneura Hendel ♂ [red, handwritten]." Both the lectotype and paralectotype are deposited in the NMW and are in excellent condition. One female paralectotype, here designated, bears the same label data as the lectotype except for the ♀ sex symbol and the paralectotype label. Both specimens are double mounted (minute nadel); the abdomen of the lectotype has been removed and dissected (total length before dissection 3.48 mm), the structures are in an attached microvial.



MAP 20. Distribution map for *Neoephydra pravoneura* (Hendel).

Type locality. Argentina. Córdoba: Córdoba (31°24'S, 64°11'W).

Additional specimens examined. *ARGENTINA. Buenos Aires:* Bahia Blanca (38°43'S, 62°17'W), 12 Nov 1970, M. L. de Grosso (4♂, 3♀; FML); Baradero, Balneario Municipal (33°47.8'S, 59°31.2'W), 15 Dec 1979, C. M. and O. S. Flint, Jr. (1♀; USNM); Berisso (34°52'S, 57°53'W), 3 Feb 1970, M. L. de Grosso (9♂, 8♀; FML); Buenos Aires (34°40'S, 58°24'W), 11 Nov 1946, K. Hayward (3♂, 3♀; USNM); Chascomús (1 km S; Cabeza de Vaca; 35°35'S, 58°01'W), 28 Nov 1979, C. M. and O. S. Flint, Jr. (6♂, 8♀; USNM); Chascomús (N Arroyo Vitel; 35°34'S, 58°01'W), 27–28 Nov 1979, C. M. and O. S. Flint, Jr. (3♂, 1♀; USNM); General Gelly (3 km S Arroyo del Medio; 33°36'S, 60°36'W), 14 Dec 1979, C. M. and O. S. Flint, Jr. (1♀; USNM); Manuel J. Cobo (17 km NW Arroyo Las Encadenadas; 35°51.9'S, 57°54'W), 29 Nov 1979, C. M. and O. S. Flint, Jr. (3♀; USNM); Médanos (38°50'S, 62°41'W), 11 Nov 1946, K. Hayward (3♂, 11♀; USNM). *Cordoba:* INTA Experimental Station near Manfredi (31°50'S, 63°45'W), 7 Dec 1967, C. R. Ward (4♂, 4♀; USNM). *Corrientes:* Manantiales (27°57'S, 58°08'W), 7 Nov 1949, M. L. Aczel (1♂; USNM). *Neuquen:* Zapala (38°54'S, 70°04'W), 19–22 Dec 1946 (3♂,

1♀; USNM). *Rio Negro:* Pichi Mahiuda, Río Colorado (39°50'S, 22°08'W), 14 Dec 1946, K. Hayward (3♂, 6♀; USNM).

BRAZIL. Paraná: Bocaiúva do Sul (ca. 10 km NW; 25°14.9'S, 49°08.9'W; 890 m), 2–4 Nov 2010, D. and W. N. Mathis (1♀; USNM); Prainha (5 km S Matinhos; 25°51.2'S, 48°33.6'W; beach), 15 Nov 2010, D. and W. N. Mathis (2♂, 2♀; DZUP, USNM); Rio Mae Catira, Serra do Mar (25°21.8'S, 48°52.6'W), 29 Aug 2000, D. and W. N. Mathis (1♂; USNM). *Rio Grande do Sul:* Pelotas (31°40'S, 52°20'W), C. Biezanko (1♂, AMNH).

BOLIVIA. Cochabamba: Cochabamba (16°23.3'S, 66°07'W), Apr 1965, T. Steinbach (11♂, 16♀; USNM); Cochabamba (17°23.3'S, 66°07'W; 2610 m), 25 Mar 2001, W. N. Mathis (1♂, 1♀; USNM); Parotani (17°34'S, 66°21'W), 25 May 1990, A. Visinoni (1♂, 2♀; ROSSI).

CHILE. O'Higgins: Rancaqua (23 km N; 33°50'S, 70°44.5'W), 21 Dec 1950, E. S. Ross, A. E. Michelbacher (6♂, 2♀; USNM).

PARAGUAY. Distrito Federal: Asunción (25°15.9'S, 57°40'W), 23–25 Mar 1986, M. Pogue, A. Solis (2♂, 2♀; USNM).

URUGUAY. Maldonado: Maldonado (34°54'S, 54°57'W; on sandy beach), 11 Oct 1941, H. L. Parker (2♂, 3♀; USNM).

Distribution (Map 20): *Neotropical:* Argentina (Buenos Aires, Córdoba, Corrientes, Rio Negro), Brazil (Paraná, Rio Grande do Sul), Bolivia (Cochabamba), Chile (O'Higgins), Paraguay (Distrito Federal), Uruguay (Maldonado). Widespread in southern South America between 17–39°S and 52°–72°W.

Remarks. Considerable color variation is evident for this species, which is widespread, and we have generally had to rely on characters of the male terminalia for specific determinations.

Hendel (1930) first described this species in the genus *Ephydra* then transferred it to *Dimecoenia* (Hendel 1933), and here we transfer it to *Neoephydra*.

21. *Neoephydra prionoptera* (Thomson)

Figs. 92–94, Map 21

Ephydra prionoptera Thomson 1868: 590.—Hendel 1930: 150 [review].—Cresson 1931: 85 [review].
Dimecoenia prionoptera.—Hendel 1933: 223 [generic combination].—Edwards 1933: 119.—Cresson 1935: 350 [review].—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Lizarralde de Grosso 1989: 58 [list, Argentina].—Mathis and Zatwarnicki 1995: 239–240 [world catalog].
Neoephydra prionoptera.—Mathis 2008: 10 [generic combination].
Dimecoenia densa Cresson 1931: 105.—Edwards 1933: 119 [synonymy].
Dimecoenia travassosi Mello and Oliveira 1992: 137 [Brazil. Rio de Janeiro, Santa Cruz; HT ♂, IOC (50016)]. **New synonym**
Neoephydra travassosi.—Mathis 2008: 10 [generic combination].

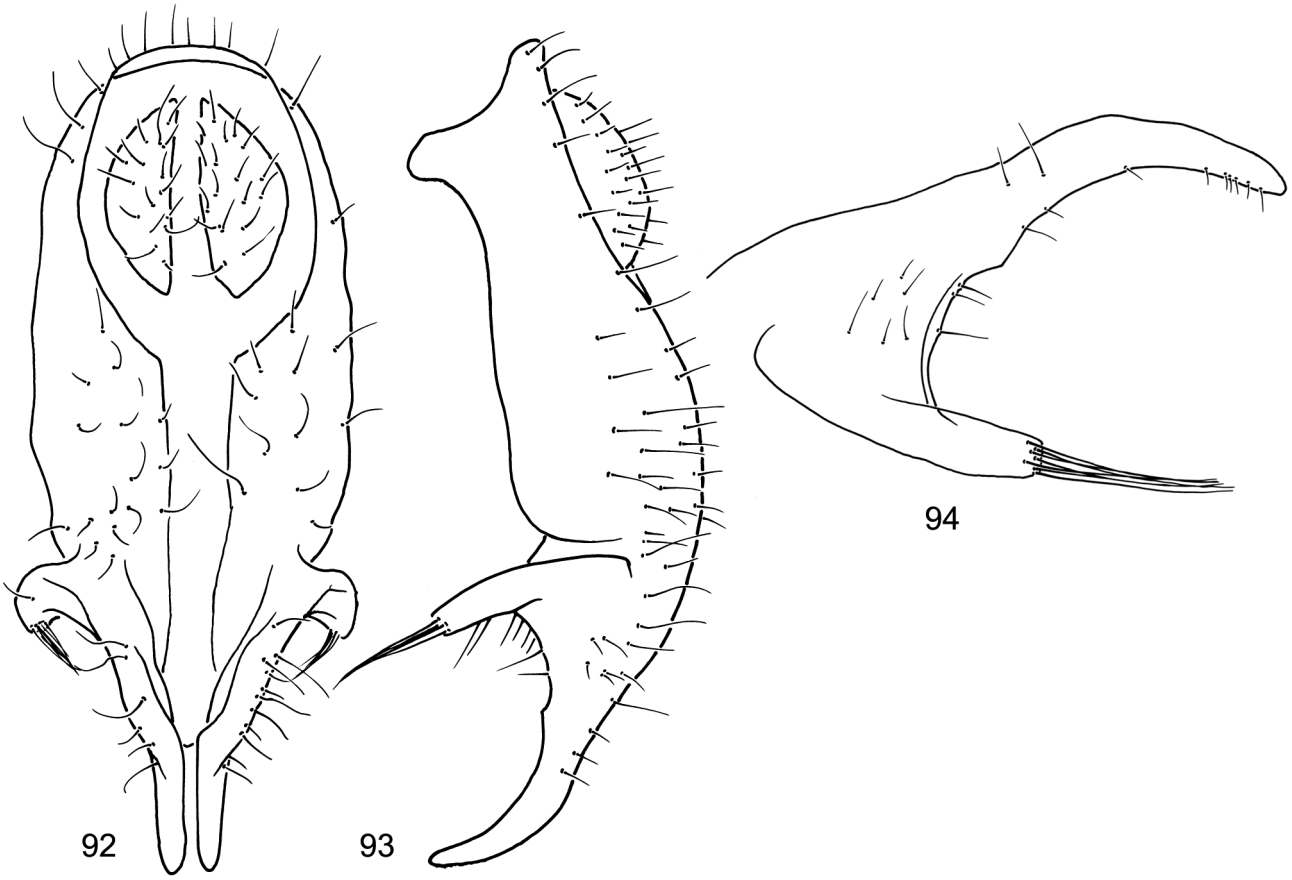
Diagnosis. Specimens of *N. prionoptera* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark, particularly the legs; face moderately setose; gena moderately high; and structures of male terminalia with distinctive conformation. Medium-sized to moderately large shore flies, body length 3.80–4.95 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

Head: Head ratio 0.57–0.60; frontal ratio 0.47–0.51; mesofrons with dark, blackish blue, metallic luster; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with some faint metallic luster; number of fronto-orbital setae 2. Antenna mostly concolorous, blackish brown. Facial ratio 0.82; mostly moderately setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish brown to gray, becoming gradually paler ventrally. Eye ratio 0.89–0.93; gena-to-eye ratio 0.40–0.43; gena high, coloration gray to whitish gray but with faint tinges of olivaceous green.

Thorax: Mostly microtomentose; mesonotum mostly brown, darker and subshinier posteriorly; anterior margin microtomentose, gray to bluish gray, subshiny luster concolorous with mesofrons; pleural areas paler, grayer ventrally; anepisternum mostly gray to olivaceous, often with some faint bluish or greenish metallic coloration and usually with diffuse, brown area toward posterior margin; other pleural areas including coxae whitish gray,

concolorous. Wing length averaging 3.34 mm; mostly very palely infuscate, faintly grayish brown; costal vein ratio 0.34; M vein ratio 0.67. Legs dark generally; femora gray, microtomentose, only slightly darker than ventral pleural areas; tibiae and tarsi reddish yellow.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Fifth tergite of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 92–94): margins of epandrium in posterior view parallel, rounded dorsally; surstyli in posterior view roughly forming equilateral triangle, produced at base with short curved process that bears setae, apically as 2 narrow, elongate processes oriented medially with a narrow gap between, lateral prong very elongate, robust, bearing an apical tuft of setulae, the main surstylar process narrow, elongate, length about twice length of lateral prong, process gradually tapered, generally arched.



FIGURES 92–94. Structures of male terminalia of *Neoephydra prionoptera* (Thomson). (92) epandrium, cerci, surstyli, posterior view; (93) same, lateral view; (94) surstylus, lateral view.

Type material. The lectotype male of *Ephydra prionoptera* Thomson, here designated to stabilize and make more universal the use of this name, is labeled "Pata-gonia/Kinb./Typus/299 77 [pink]/Riksmuseum Stockholm [green]/LECTOTYPE Ephydra prionoptera Thomson by W. N. Mathis [red, handwritten]." The lectotype (body length 4.0 mm) and two paralectotype males (here designated, same locality data as lectotype) are deposited in the NRS. All specimens of the type series are pinned directly and are slightly moldy. The abdomen of one of the male paralectotypes has been removed and dissected; the structures are in an attached microvial.

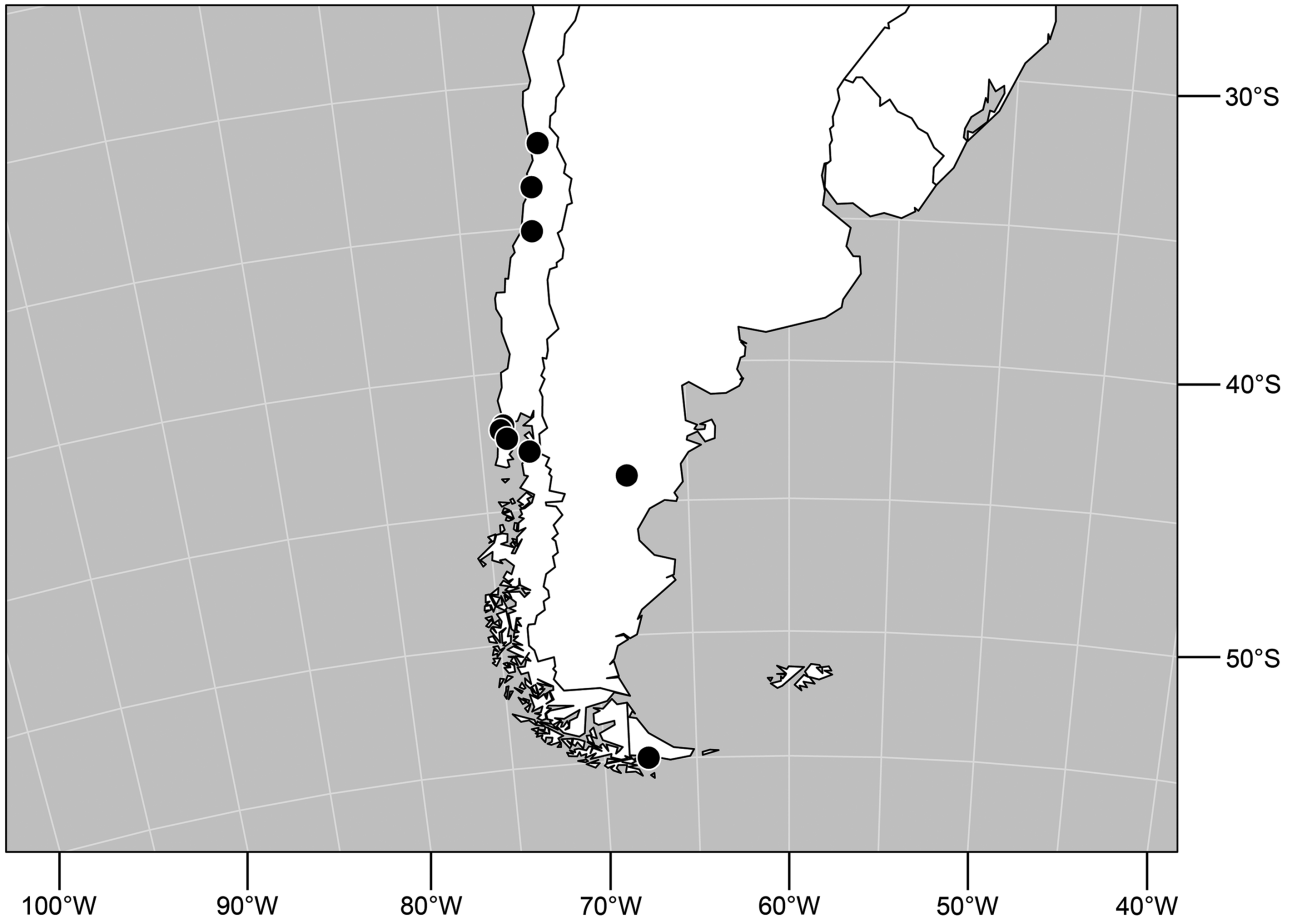
The holotype male of *Dimecoenia densa* Cresson is labeled "Castro. 20–22. xi. 1926. [20–22 Nov 1926]/S. Chile: Chiloe I. F. & M. Edwards. B. M. 1927–63./♂/Holo-TYPE Dimecoenia DENSA E. T. Cresson Jr [dark maroon]." This specimen is in excellent condition (right wing slightly torn), is double-mounted (minute nadel) on a celluloid rectangle, and its abdomen has been removed and dissected; the structures are in an attached microvial (total length before dissection 4.08 mm). Cresson's original description also listed three female paratypes, all presumably in the BMNH with the holotype.

The holotype male of *Dimecoenia travassosi* Mello and Oliveira is labeled "Santa Cruz, Rio de Janeiro[,] BRASIL[,] Paschoal Robbs VI. [19]90/50.016 IOC." The holotype is pinned directly, is in good condition, and is deposited in IOC.

Type locality. Argentina. Patagonia (44°S, 68°W).

Additional specimens examined. *CHILE. Chiloe:* Ancud (41°52.2'S, 73°49.2'W), 20 Jan 1952, L. E. Peña (9♂, 8♀; USNM); Chepu (42°02.2'S, 73°57.9'W), Apr 1968, L. E. Peña (6♂, 3♀; USNM); Dalcahue (42°21.8'S, 73°42.1'W), Feb 1961, L. E. Peña (1♂, 1♀; CNC). *Coquimbo:* Tilama, El Naranjo (32°05'S, 71°10'W), Oct 1967, L. E. Peña (1♀; USNM); Huaquen (35°07'S, 71°43'W), 26 Jul 1960, L. E. Peña (1♂; CNC). *Magellanes:* Isla Navarino-Puerto Williams (54°56'S, 67°37'W), 1 Jan 1959, P. G. Kuschel (1♂, 2♀; USNM). *Palena:* Camping Arrayanes (5 km NW Chaitén; 42°53.8'S, 72°40.1'W; Malaise trap), 21 Jan 1987, C. M. and O. S. Flint (1♂; USNM). *Santiago:* Llolleo (33°35'S, 71°35'W), M. E. Irwin, E. I. Schlinger (6♂, 7♀; CAS, USNM).

Distribution (Map 21). *Neotropical:* Argentina (Patagonia), Chile (Chiloe, Coquimbo, Magellanes, Palena, Santiago).



MAP 21. Distribution map for *Neoephydra prionoptera* (Thomson).

Remarks. The lectotype male (length 4.0 mm) of *Ephydra prionoptera* differs from other specimens of this species in that the metallic luster or sheen over much of the dorsum is blackish blue to bluish green. The mesofrons and dorsum of the interfoveal hump are purplish blue; the scutum is blackish blue; and the abdomen is dark blue medially, becoming more greenish laterally. The holotype male of *D. densa* is a large specimen (4.08 mm) and is considerably more brownish in appearance. The mesofrons is bronzish blue-green; the scutum is mostly brown to blackish brown with some metallic luster; and the abdomen is only slightly metallic, medially, becoming more microtomentose and grayer toward the posterior margin of each tergite.

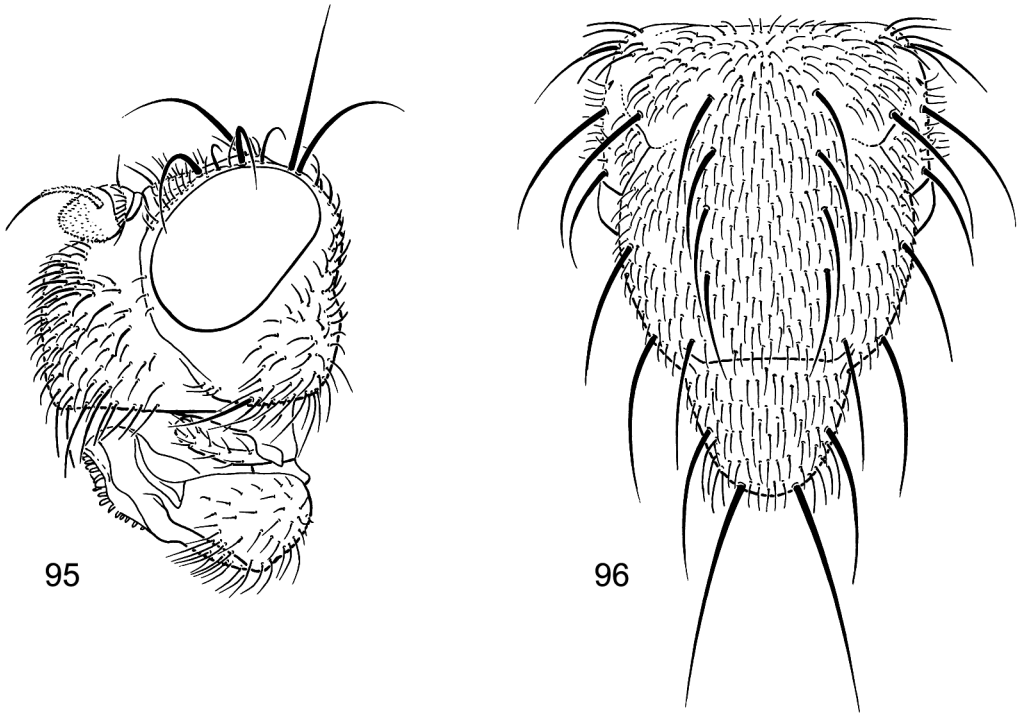
22. *Neoephydra trichina* sp. nov.
Figs. 95–99, Map 22

Diagnosis. Specimens of *N. trichina* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark; legs bicolored; face densely setose; gena high; and structures of male terminalia with distinctive conformation. Medium-sized to large shore flies, body length 3.50–5.30 mm; generally dull, grayish brown to gray with some subshiny areas dorsally.

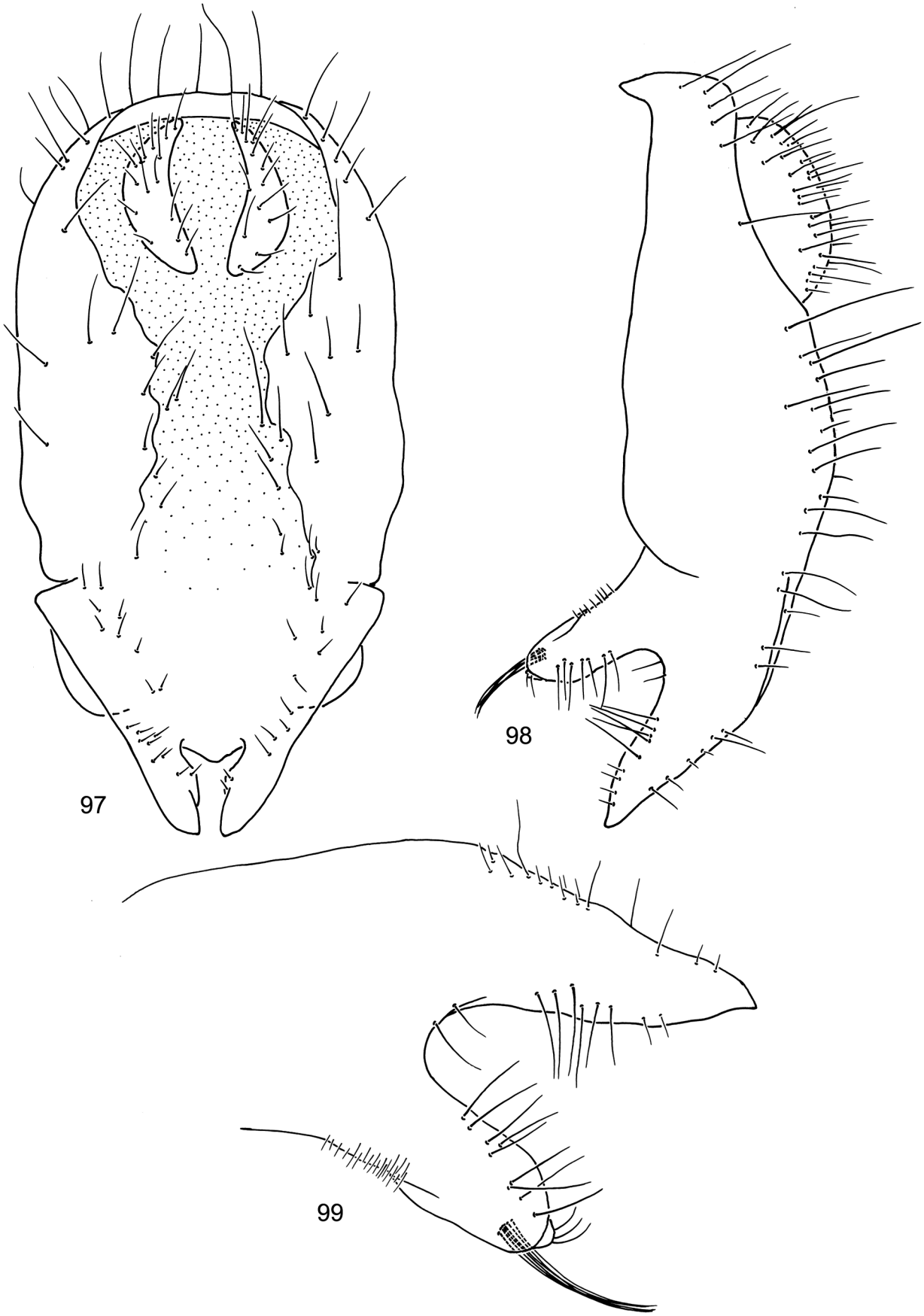
Head (Fig. 95): Head ratio 0.65–69; frontal ratio 0.50–56; mesofrons with dark, blackish blue, metallic luster, generally pilose; ocellar triangle and parafrons nearly concolorous, microtomentose, brown; parafrons more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae slightly subshiny, with some metallic luster, concolorous with mesofrons; fronto-orbital setae 2. Antenna mostly concolorous, blackish brown. Facial ratio 0.94–0.98; mostly densely setulose particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish tan, gradually paler ventrally. Eye ratio 1.0; gena-to-eye ratio 0.47–0.52; gena high, whitish gray, olivaceous tan posteriorly.

Thorax (Fig. 96): Mesonotum subshiny, mostly brown to bluish brown, darker and subshinier posteriorly, some specimens with 2 stripes anteriorly, gray to bluish gray; pleural areas paler, more gray colored ventrally; anepisternum olivaceous brown or with anterior and posterior margins brownish; other pleural areas including coxae mostly olivaceous gray. Wing length averaging 4.10 mm; mostly infuscate, brown; costal vein ratio 0.22–0.24; M vein ratio 0.81–0.86. Legs bicolored; mid- and hindfemora bluish to greenish gray, microtomentose, only slightly darker than ventral pleural areas; tibiae and tarsi generally concolorous, mostly reddish orange with some sparse blackish coloration.

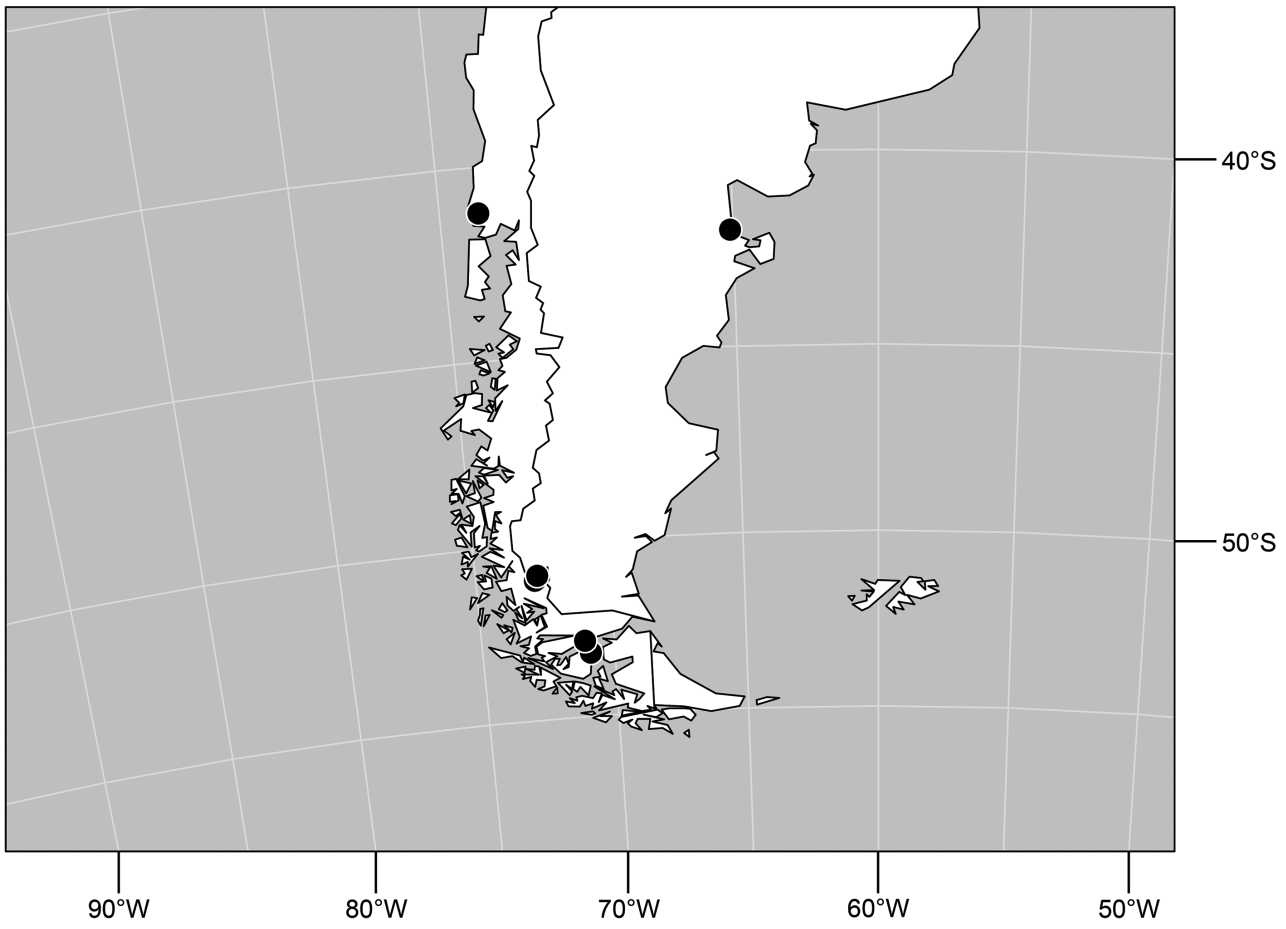
Abdomen: Generally subshiny, thinly microtomentose; anterior margin of tergites 1–4 slightly fasciate, shinier, more bluish anteriorly, more microtomentose, grayer posteriorly, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically, brassy. Male terminalia (Figs. 97–99): margins of epandrium in posterior view parallel, rounded dorsally; surstyli in posterior view roughly forming equilateral triangle with short apical gap; surstylus in lateral view robustly bifurcate, lateral prong subequal to main surstylar process, lateral prong robust, digitiform, main process tapered to apical point.



FIGURES 95–96. Head and thorax of *Neoephydra trichina* **sp. nov.** (95) head, lateral view; (96) mesonotum, dorsal view.



FIGURES 97–99. Structures of male terminalia of *Neoephydra trichina* **sp. nov.** (97) epandrium, cerci, surstyli, posterior view; (98) same, lateral view; (99) surstylus, lateral view.



MAP 22. Distribution map for *Neoephydra trichina* **sp. nov.**

Type material. The holotype male is labeled "CHILE: Osorno Pr. Laguna El Pato 1100 m. elev. 13 Feb. 1973 W Mathis/HOLOTYPE Neoephydra trichina Mathis [red, handwritten]." The holotype is double mounted (minute nadel), is in excellent condition, and is deposited in USNM. Allotype female with same label data as the holotype. Other paratypes are as follows: *ARGENTINA. Chubut:* Arroyo Verde (12 km S Río Senquer; 41°59'S, 65°06'W; 710 m), 20 Nov 1966, M. E. Irwin, E. I. Schlinger (1♂; USNM).

CHILE. Magallanes: Estancia Otway (52°48'S, 71°06'W), 12 Jan 1966, O. S. Flint, Jr., T. Cekalovic (1♂, 5♀; USNM); Laguna Amarga (51°S, 72°48'W), 7 Jul 1966, M. E. Irwin, E. I. Schlinger (15♂, 6♀; USNM); Punta Arenas, Rio de las Minas (53°09'S, 70°55'W), 18 Apr 1971, O. S. Flint, Jr., G. F. Hevel (24♂, 20♀; USNM); Seno Ultima Esperanza-Laguna Azul (50°52'S, 72°42'W), 1 Feb 1952, T. Cekalovic (1♂, 1♀; USNM); South Patagonia, B. Brown (1♂; USNM).

Type locality. Chile. Osorno: Laguna El Pato (41°10'S, 73°40'W; 1100 m).

Distribution (Map 22). *Neotropical:* Argentina (Chubut) and Chile (Magallanes), between 40°–53°S and 65°–74°W.

Etymology. The specific epithet, *trichina,* is of Greek derivation and means hair in allusion to the hairiness of the face of this species.

23. *Neoephydra zurcheri* (Hendel)

Figs. 100–103, Map 23

Dimecoenia zurcheri Hendel 1933: 233.—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Lizarralde de Grosso 1989: 58 [list, Argentina].—Mathis and Zatwarnicki 1995: 240 [world catalog].

Neoephydra zurcheri.—Mathis 2008: 10 [generic combination].

Dimecoenia coltaensis Cresson 1935: 353.—Oliveira 1954a: 188 [list].—Wirth 1968: 23 [Neotropical catalog].—Mathis and

Zatwarnicki 1995: 239 [world catalog]. **New synonym**

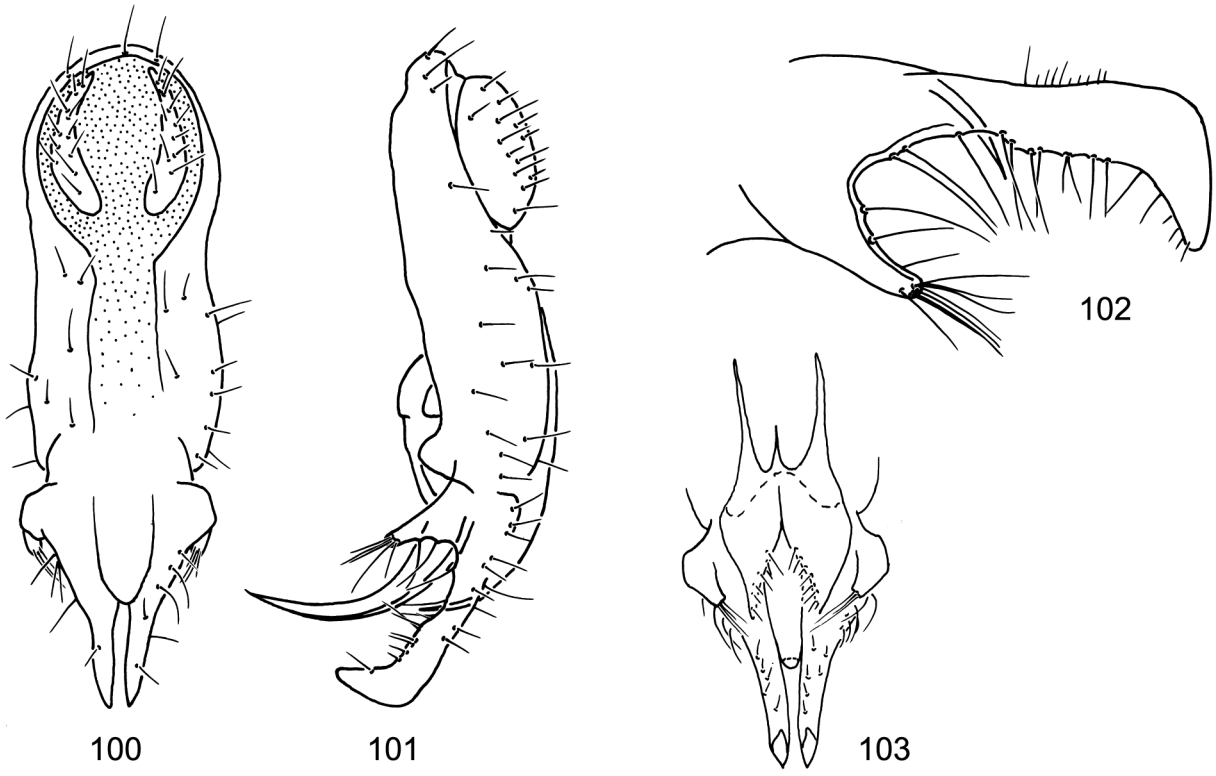
Neoephydra coltaensis.—Mathis 2008: 10 [generic combination].

Dimecoenia carrerai Oliveira 1957: 305.—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 239 [world catalog]. **New synonym**

Neoephydra carrerai.—Mathis 2008: 10 [generic combination].

Diagnosis. Specimens of *N. zurcheri* are distinguished from similar congeners of the *araucaria* group by the following characters: appearance generally dark, particularly the legs; face moderately setose; gena moderately high to high; and structures of male terminalia with distinctive conformation. Moderately large shore flies, body length 4.30–4.60 mm; generally dull, grayish blue brown to gray, somewhat subshiny dorsally.

Head: Head ratio 0.66–0.70; frontal ratio 0.42–0.47; mesofrons with dark, blackish blue, metallic luster, pilose laterally; ocellar triangle and parafrons nearly concolorous, microtomentose, brownish gray to charcoal gray; parafrons becoming more charcoal colored anteriorly; fronto-orbits with narrow strip through insertions of fronto-orbital setae subshiny, with slight metallic luster, concolorous with mesofrons; number of fronto-orbital setae usually 2, sometimes with a 3rd pair of large setae posterior to other setae. Antenna mostly concolorous, dark, blackish brown. Facial ratio 1.00–1.05; mostly moderately to densely setulose, particularly along oral margin and toward posteroventral portions of face; dorsum of interfoveal hump with subshiny area more or less concolorous with mesofrons, otherwise face densely microtomentose, grayish yellow to grayish brown, slightly brownish dorsally, becoming gradually paler ventrally. Eye ratio 0.91–0.96; gena-to-eye ratio 0.50–0.53; gena high, coloration gray to whitish gray, but with faint tinges of olivaceous green.



FIGURES 100–103. Structures of male terminalia of *Neoephydra zurcheri* (Hendel). (100) epandrium, cerci, surstyli, posterior view; (101) same, lateral view; (102) surstylus, lateral view; (103) internal male terminalia (fused hypandrium gonite, aedeagus), ventral view.

Thorax: Mostly microtomentose; scutum mostly brown, darker, subshiny to shiny posteriorly, anterior margin microtomentose, gray to bluish gray, subshiny luster, lateral margins of scutum microtomentose, grayish brown; pleural areas paler, more gray colored ventrally; anepisternum with central area and dorsal margin brownish; otherwise mostly gray; other pleural areas including coxae whitish gray, mostly concolorous. Wing length averaging 4.32–4.40 mm; mostly infuscate, brown; costal vein ratio 0.27–0.29; M vein ratio 0.76–0.78. Legs dark generally; femora dark bluish gray to gray, microtomentose, only slightly darker than ventral pleural areas; tibiae

and tarsi darker than femora, more blackish, tarsi also dark, reddish yellow to blackish, nearly concolorous with tibiae.

Abdomen: Generally microtomentose and unicolorous, grayish olivaceous green to gray, becoming paler toward lateral margins, some specimens with faint bluish tinges of metallic luster; ventral surface of tergites frequently whitish gray. Tergite 5 of male somewhat trapezoidal, truncate apically. Male terminalia (Figs. 100–103): margins of epandrium in posterior view shallowly pedunculate, slightly emarginate at ventral margin of cerci, rounded dorsally; surstyli in posterior view roughly forming isosceles triangle although posterior processes forming ventral angle narrowly separated, apices tapered to point; surstylus in lateral view with posterior process long, anterior margin irregular, posterior margin nearly straight, apex abruptly curved anteriorly at nearly a right angle, bluntly rounded apically, lateral process or prong short, about 1/3 length of posterior process, tapered, rounded apically, with several moderately long setulae at apex.

Type material. The lectotype male of *Dimecoenia zurcheri* Hendel, here designated to stabilize and make more universal the use of this name, is labeled "Paraguay Sa[nta]. Trinidad X. 1914 [Oct 1914]/124 [red on white, handwritten]/Hendel det./Typus [red]/Dimecoenia zurcheri Hendel/LECTOTYPE Dimecoenia zurcheri Hendel ♂ [red, handwritten]." Two male and three female paralectotypes (here designated) are labeled with the same locality and date data as the lectotype. The lectotype male and three paralectotypes (1♂, 2♀) are deposited in the DEI; a male and female paralectotype are in the NMW. Hendel's original description does not state how many specimens were in the syntype series. We have examined the six specimens listed above, each of which was reared. Four have their puparium pinned below the adult, and all of the adults are teneral. The abdomen of one of the paralectotypes was removed and dissected; the structures are in an attached microvial.

The holotype male of *Dimecoenia coltaensis* is labeled "Colta Ecua[dor. Chimborazo: Colta (1°43.6'S, 78°46'W)] 3280 ft./F Campos Collector/♂/Type No. 51100 U.S.N.M. [red]/TYPE No. Dimecoenia coltaensis E. T. Cresson, Jr, [red]." The holotype, allotype, and one female paratype are deposited in the USNM (51100). The holotype is directly pinned and appears to have a pale coating of precipitate, which probably resulted from being collected or stored in alcohol before being mounted on the pin. Cresson's original description also lists two male and three female paratopotypes. Cresson labeled one of the latter females with a pink allotype label.

The presumed holotype male of *Dimecoenia carrerai* is labeled "SAO PAULO, (de) Guaruja, M. Carrera I-942/60.294." We are assuming that the specimen indicated here is the holotype despite a discrepancy in the collection number. Oliveira (1957) cited the collection number to be "60 293" and the female to be "60 295." Either the original citation is in error or the specimen sent for study is not the holotype. We have inquired regarding the latter possibility and have been assured that the specimen sent to us is the only one in their collection. The holotype is in the IOC.

Type locality. Paraguay. Itapúa: Trinidad (27°07'S, 55°47'W).

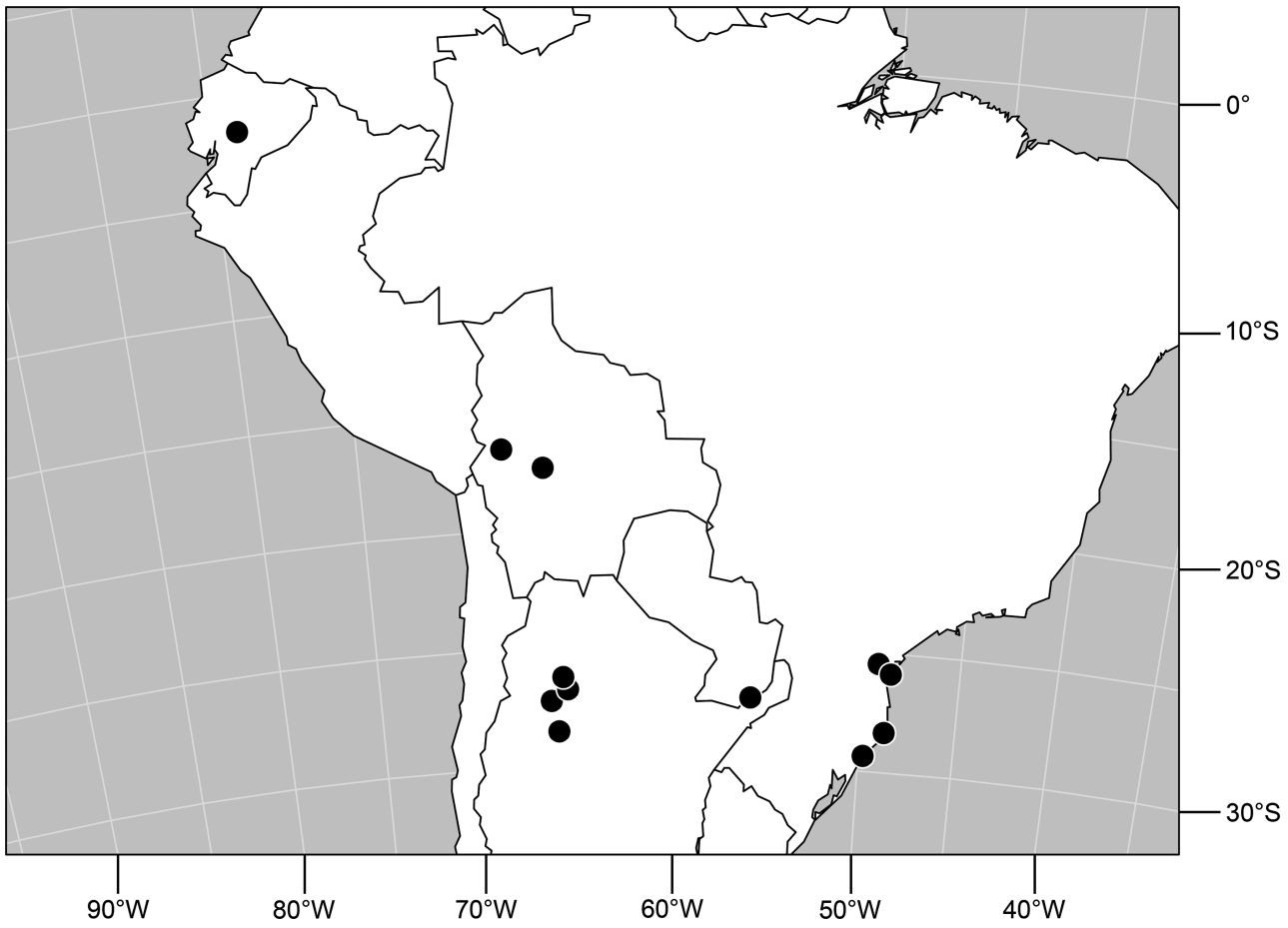
Additional specimens examined. *ARGENTINA. Catamarca:* Yunka Suma (5 km N Aconquija; 27°13'S, 66°08'W), 2 Oct 1968, L. E. Peña (7♂, 20♀; CNC). *Tucumán:* El Tala (14 km S; 28°30'S, 65°48'W; 700 m), 13–14 Oct 1968, L. E. Peña (1♀; CNC); Finca La Cavera (Tafí Viejo; 26°45'S, 65°16'W), 23–28 Nov 1951, M. L. Aczel, R. Golbach (17♂, 29♀; USNM); San Pedro de Colalao (26°14'S, 65°29'W), 14 Oct 1968, L. E. Peña (1♂, 2♀; CNC).

BOLIVIA. Cochabamba: Cochabamba (16°23.3'S, 66°07'W; 2610 m), 25 Mar 2001, W. N. Mathis (13♂, 1♀; USNM). *La Paz:* La Paz (near museum; 16°32.5'S, 68°04.3'W; 3360 m), 20 Mar 2001, W. N. Mathis (30♂, 11♀; USNM).

BRAZIL. Paraná: Curitiba, Universidade Federal do Paraná, Reserva Biológica (25°26.9'S, 49°14'W; 915 m), 4 Jan 2010, D. and W. N. Mathis (1♂, 4♀; UFPR, USNM); Prainha (5 km S Matinhos; 25°51.2'S, 48°33.6'W; beach), 15 Nov 2010, D. and W. N. Mathis (2♂, 3♀; DZUP, USNM). *Rio Grande do Sul:* Torres (29°21'S, 49°44'W), Jun 1965, N. Papavero (35♂, 24♀; MZUSP, USNM). *Santa Catarina:* Imbituba, praia de Itapirubá (), Feb 2010, J. C. Almeida (16♂, 2♀; MZUSP).

Distribution (Map 23). *Neotropical:* Argentina (Catamarca, Tucumán), Bolivia (Cochabamba, La Paz), Brazil (Paraná, Rio Grande do Sul, Santa Catarina, São Paulo), Ecuador (Chimborazo), Paraguay (Itapúa).

Remarks. This species is closely related to *N. ciligena* but is distinguished from the latter by the external characters and features of the male terminalia as noted in the description.



MAP 23. Distribution map for *Neoephydra zurcheri* (Hendel).

Species Inquirinda

Neoephydra venteli (Oliveira)

Dimecoenia venteli Oliveira 1954b: 276.—Wirth 1968: 23 [Neotropical catalog].—Mathis and Zatwarnicki 1995: 240 [world catalog].
Neoephydra venteli.—Mathis 2008: 10 [generic combination].

Type material. The holotype female is labeled "Bodoquena Mato Grosso [do Sul] XI-1941 Com I O C/COL. INST. O. CRUZ NO. 717/HOLOTYPE Dimecoenia venteli Oliveira [red]." The holotype is in the IOC. The specimen is in poor condition, the left wing, hindlegs, and abdomen are missing, and several setae of the head are broken.

Type locality. Brazil. Mato Grosso do Sul: Bodoquena (20°31.1'S, 56°43.3'W).

Remarks. We are unable to place this specimen. Specimens of species most closely resembling it are not within the range of distribution of the latter as presently known. Consequently, we are treating Oliveira's name as a *species inquirinda* until more information can be obtained.

Genus *Cirrula* Cresson

Cirrula Cresson 1915: 70 [type species: *Cirrula gigantea* Cresson, by monotypy].—Sturtevant and Wheeler 1954: 162–163 [review].—Wirth 1965: 753 [Neotropical catalog].—Mathis and Simpson 1981: 8–29 [revision of North American species, natural history].—Mathis and Zatwarnicki 1995: 236–237 [world catalog].

Pogonephydra Hendel 1917: 42 [type species: *Pogonephydra chalybea* Hendel (= *C. gigantea*), by monotypy] [Synonymy by Hendel 1931: 10].

Hydropyrus Cresson 1934: 216 [type species: *Ephydra hians* Say, by original designation and monotypy].—Sturtevant and Wheeler 1954: 171 [review; as subgenus of *Ephydra*].—Wirth 1965: 753 [Neotropical catalog]; 1971: 374–376 [review, Figs. of male terminalia; as subgenus of *Ephydra*].—Mathis and Zatwarnicki 1995: 236 [synonymy].

Diagnosis. *Cirrula* is distinguished from other genera of Ephydrini by the following characters: Moderately large to large shore flies, body length 4.83–8.52 mm.

Head: Cruciate, interfrontal setae 1–2 pairs, size generally subequal to fronto-orbital setae (weakly developed in *C. gigantea,* especially females); lateroclinate, fronto-orbital setae either 2 or 3–4 pairs, slightly divergent, if 2, then dorsocentral setae (1+4), if 3–4, then dorsocentral setae (2+4); antenna simple, lacking secondary seta inserted on lateral surface just below arista; arista bare to macropubescent; face uniformly setose with marginal setae larger, declinate, one species with patches of long setae above middle height of face on anterior surface of interfoveal hump.

Thorax: Prescutellar, acrostichal setae variable; dorsocentral setae 5–6 pairs (5 (1+4) in specimens with 2 fronto-orbital setae, 6 (2+4) in specimens with 3–4 fronto-orbital setae), well developed in Neotropical species; supra-alar seta present; presutural supra-alar seta variable; intrapostalar seta well developed. Legs sexually dimorphic; hindtibia lacking apical, long seta.

Abdomen: Male terminalia symmetrical; surstyli complex, situated at ventral apex of epandrium, covering other internal structures in repose, fused medially; phallapodeme more or less C-shaped with a dorsal lobe extended far into epandrial cavity; aedeagus generally simple except in males of *C. austrina,* where trilobate process arises at anterior base of aedeagus. Female ventral receptacle with large operculum, generally as long as wide; extended process J-shaped, length about as long as operculum; conformation of receptacle in females of *D. spinosa* exceptional, operculum trapezoidal and much smaller, extended process three times as long as operculum length.

Larva: Prolegs distinct; segment 3 of third-instar larvae with distinctive transverse band on venter.

Distribution. New World. Primarily temperate Nearctic Region but extending south into the northern Neotropical Region (Belize (Stann Creek District)).

Key to Neotropical species of *Cirrula*

1. Dorsocentral setae 6 (2+4); cruciate interfrontal setae 2 pairs; arista short, subequal to combined length of antennal segments 1–3; prescutellar setae 1 pair; forebasitarsus of male with ventral tuft of long hairs near apex . . . . . 24. *C. hians* (Say)
- Dorsocentral setae 5 (1+4); cruciate interfrontal setae 1 pair; arista long, much longer than combined length of antennal segments 1–3; lacking prescutellar setae; hindtarsomeres of male bearing tufts of long hairs . . . . . 23. *C. austrina* (Coquillett)

24. *Cirrula austrina* (Coquillett)

Figs. 104–110, Map 24

Ephydra austrina Coquillett 1900: 36.—Aldrich 1905: 629 [Nearctic catalog].

Caenia [sic] *virida* Hine 1904: 65 [description].—Cresson 1916: 152 [synonymy].

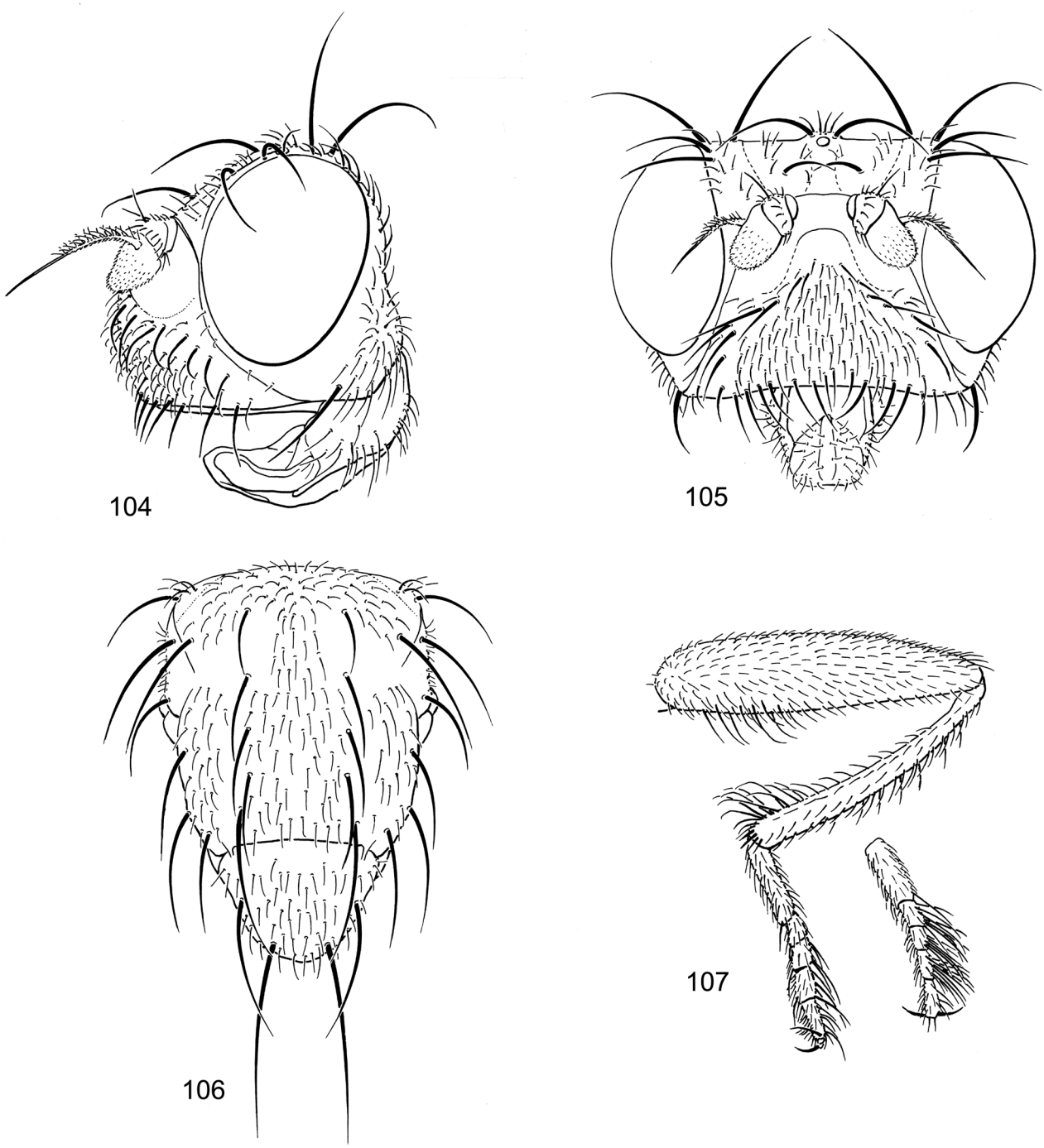
Ephydra viridis.—Aldrich 1912: 101.

Dimecoenia austrina.—Cresson 1916: 152.—Sturtevant and Wheeler 1954: 166 [review].—Wirth and Stone 1956: 472 [review].—Wirth 1965: 755 [Nearctic catalog].—Steyskal 1970: 463 [review, Figs. of male and female terminalia].

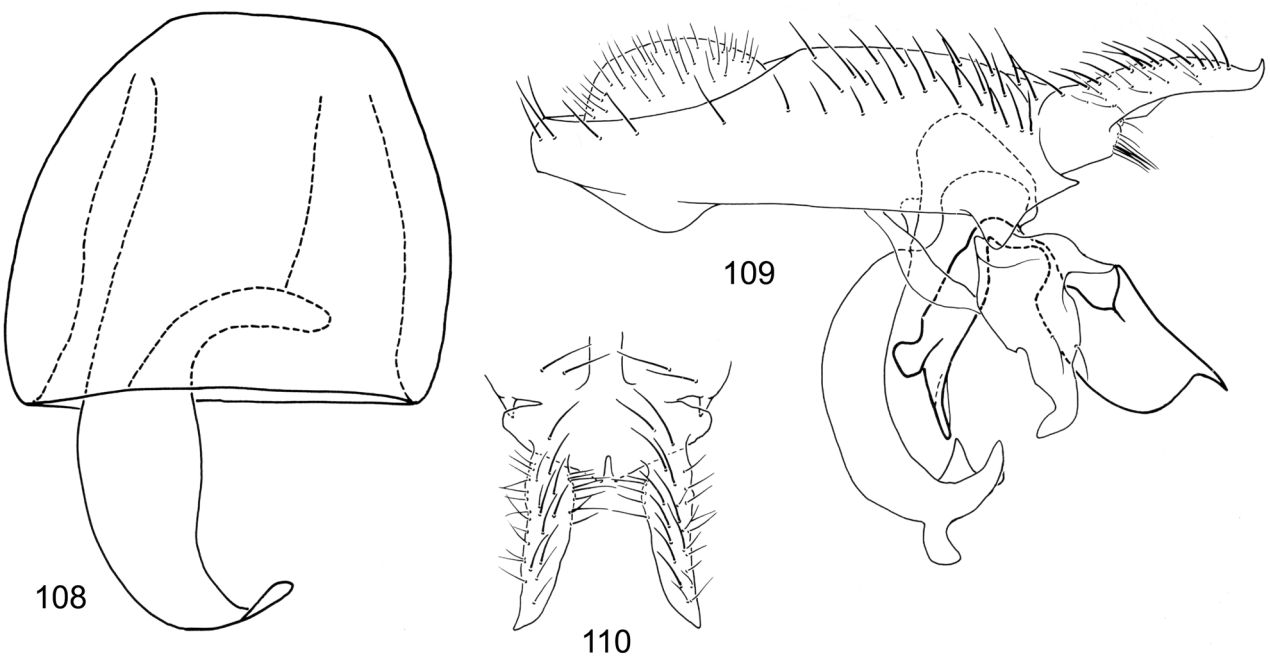
Cirrula austrina.—Mathis and Simpson 1981: 9–21 [revision, generic combination, Figs. of adult and immatures, natural history].—Mathis and Zatwarnicki 1995: 236 [world catalog].—Mathis 1997: 64–65 [review, Belize].

Diagnosis. This species is related and similar to *C. gigantea* Cresson but is distinguished by the following combination of characters: Moderately large to large shore flies, body length 4.80–6.80 mm; mostly dull, olivaceous to grayish brown, with subshiny to shiny areas on dorsum. *Head:* Lateroclinate fronto-orbital setae 2, well developed; cruciate interfrontal setae 1, long, over 2/3 length of arista, overlapping apically; parafrons brownish to brownish gray, microtomentose but not velvety; aristal rays slightly longer than aristal width at base;

interfoveal hump distinctly projecting anteriorly; dorsum of face lacking patche(s) of long setae. *Thorax:* Dorsocentral setae 5 (1+4) well developed, subequal; presutural seta well developed, equal to or longer than anterior notopleural seta; lacking distinct prescutellar, acrostichal setae and presutural supra-alar setae. Hindfemur of male enlarged, swollen; hindtarsi of male shortened and bearing tufts of long hairs; legs generally dark; tarsi of foreleg normal, cylindrical, similar to those of midleg. *Abdomen:* Hypandrium evident as a well-sclerotized process; setae of epandrium around cercal cavity similar to other epandrial setae.



FIGURES 104–107. *Cirrula austrina* (Coquillett). (104) head, lateral view; (105) same, anterior view; (106) mesonotum, dorsal view; (107) hindleg of male, lateral view and dorsal view of tarsi (from Mathis and Simpson 1981).



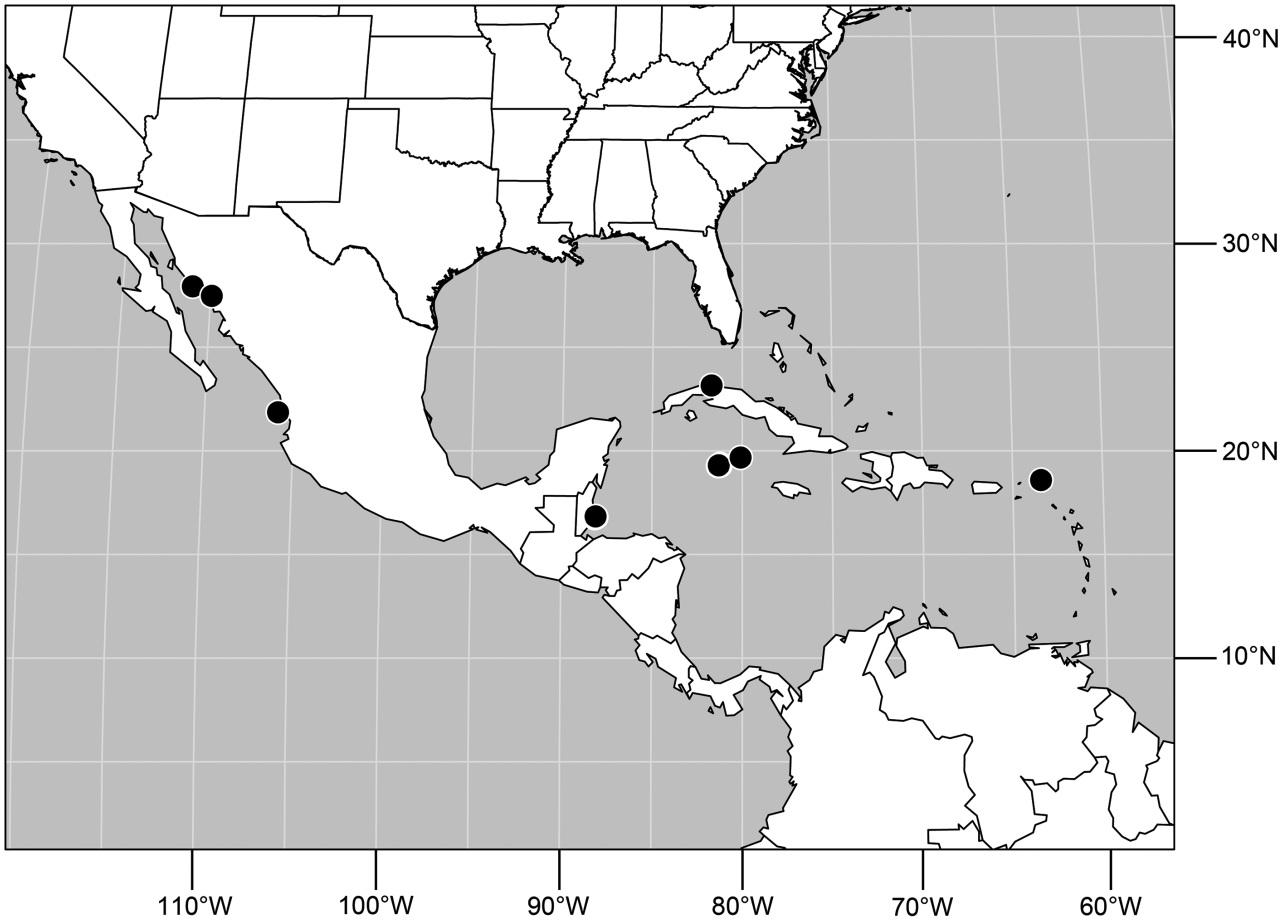
FIGURES 108–110. Structures of male and female terminalia of *Cirrula austrina* (Coquillett). (108) female ventral receptacle, lateral view; (109) male terminalia, lateral view; (110) ventral margin of epandrium and surstyli, posterior view (from Mathis and Simpson 1981).

Head (Figs. 104–105): Head ratio 0.58; frontal ratio 0.51; subquadrate mesofrons shiny with metallic olivaceous to greenish blue luster; cruciate interfrontal setae 1 pair, remainder of mesofrons with small inconspicuous setae; ocellar triangle and parafrons mostly concolorous, brownish gray, the latter becoming slightly darker anteriorly; ocelli in isosceles triangle, distance between posterior pair much less than between either posterior ocellus and medial ocellus; medial ocellus marking posterior extension of shallow depression; lateroclinate fronto-orbital setae 2 pairs; postocellar setae only moderately well developed; postocular setae more or the uniform in size. Antenna more or less unicolorous, brownish gray to charcoal gray; arista longer than combined length of 1st 3 antennal segments gradually tapered to style-like apex; subpectinate dorsally just apicad of midpoint to near base. Facial ratio 0.73; interfoveal hump prominent, dorsum shiny, nearly concolorous with shiny mesofrons; antennal groove deeply impressed, more or less concolorous with remainder of face but less microtomentose and tending to be somewhat subshiny with very pale greenish blue luster; face olivaceous to argentous, darker dorsally; marginal facial setae larger, extended from interfoveal hump to posteroventral corner of face more or less uniformly, gently curved posteriorly; oral margin weakly emarginate toward midpoint. Eye ratio 1.2; gena-to-eye ratio 0.29; gena only moderately wide, mostly bare except for small setae paralleling parafacial suture, mostly concolorous with face, becoming darker and setulose posteriorly.

Thorax (Fig. 106): Mesonotum generally subshiny, slightly darker and shinier posteriorly, with linear, microtomentose vittae between shiny ones, particularly evident anteriorly, color varying from grayish blue to metallic olivaceous green; acrostichal setae unseriated; dorsocentral setae 5. Pleural areas paler, more microtomentose than mesonotum, becoming paler, grayer toward venter. Legs generally dark colored, dull, microtomentose, mostly unicolorous, apices generally tawny; legs of males differing as follows (Fig. 107): hindfemur enlarged, swollen, particularly basal half; hindtibia with several long hairs on ventral surface near apex; hindtarsomeres generally shorter, slightly more swollen, bearing tufts if long on ventral surfaces, more pronounced on basal segments. Wing length averaging 4.76 mm; generally hyaline or very slightly infumate, grayish brown; costal vein ratio 0.19; M vein ratio 1.1; wing length-to-width ratio 0.40.

Abdomen: Generally microtomentose, grayish blue to grayish brown, tergites darker anteriorly and along median, becoming more grayish blue toward posterior and lateral margins. Tergite 5 of male slightly longer than tergite 4, as wide as long. Male terminalia as follows (Figs. 109–110): epandrium more or less parallel sided in posterior view, somewhat flattened in profile, with anteroventral margin distinctly angulate; surstylus simple, long, slender process with apex slightly recurved; gonite almost as wide as long, narrowed apically to curved point; phallapodeme long, pointed ventrally, dorsal portion broad, curved posteriorly; aedeagus short, posteroventral

corner acutely pointed; hypandrium with long anterior process, anterior portion broadly bifurcate and folded back on itself. Female ventral receptacle (Fig. 108) with operculum very large, as high as wide; extended process with small curved process on medial margin.



MAP 24. Distribution map for *Cirrula austrina* (Coquillett).

Type material. The lectotype male of *Ephydra austrina* (designated by Mathis and Simpson 1981: 9) is labeled "Fl[orid]a./Collection, C. V. Riley/Type No 4299 USNM [red]." The lectotype is pinned directly, is in good condition (some setae of the head and thorax are missing, mesonotum cracked where pinned), and is deposited in the USNM (4299).

Type locality. United States. Florida. Brevard: Georgiana (28°17'N, 80°40.5'W).

The lectotype female of *Caenia* [sic] *virida* (designated by Mathis and Simpson 1981: 9) is labeled "Brownsville, Texas, apr 12 may 20/TYPE [red]." The lectotype is deposited in the Ohio State University (Columbus); apparently it is the only extant specimen of the original syntype series. Hine's original description also indicated that Charles Dury collected the syntype series in 1903.

Additional specimens examined. *ANGUILLA.* Sombrero Island (18°35.2'N, 63°25.6'W; freshwater pool), 9–13 Nov 1999, M. A. Ivie, J. B. Runyon (1♂, 1♀; USNM).

BELIZE. Stann Creek District: Carrie Bow Cay (16°47'S, 88°04'W), Mar 1988, W. N. Mathis (1♂, 2♀; USNM); Stewart Cay (16°46'S, 88°09'W), Mar 1988, W. N. Mathis (1♀; USNM); Twin Cays (16°49.8'S, 88°06.1'W; Aanderaa Flats, West Pond), Mar 1988, W. N. Mathis (2♂, 19♀; USNM).

CUBA. Hanana: Puerto Escondido (22°57'S, 82°24'W), 26 Apr 1983, W. N. Mathis (1♂; USNM).

CAYMAN ISLANDS. Grand Cayman. Bodden Town (1.6 km E; 19°17.5'N, 81°13.3'W; Meagre Bay Pond), 29 Apr 1993, W. N. Mathis (11♂, 9♀; USNM); Hutland (1 km W; 19°21'N, 81°13.3'W), 29 Apr 1994, W. N. Mathis (1♀; USNM); Spotts (19°16.5'N, 81°19.1'W), 25 Apr 1994, W. N. Mathis (4♂, 8♀; USNM); North Sound, Bobby Cay (19°18'N, 81°18'W; light trap), 6 May 1938, C. B. Lewis, G. H. Thompson (2♂, 1♀; BMNH). *Little Cayman.* South Town (S coast; 19°40'N, 80°05.1'W), 30 May 1938, C. B. Lewis, G. H. Thompson (3♂, 7♀; BMNH).

MEXICO. Nayarit: Isabel Island (21°51'N, 105°53'W), 24 May 1925, H. H. Keifer (7♂; USNM). *Sonora:* San Carlos Bay (27°56'N, 111°03'W), 8 Jul 1921, E. P. Van Duzee (1♀; USNM); San Jose Beach (40 mi SE Obregon; 27°28'N, 109°56'W), 18 May 1961, H. Howden, J. Martin (3♀; CNC).

Distribution (Map 24): *Nearctic:* Bermuda, United States (California, Florida, Maryland, Texas Virginia). *Neotropical:* Belize, Mexico (Nayarit, Sonora), West Indies (Cuba, Cayman Islands, Sombrero).

Natural history. Mathis and Simpson (1981) published a detailed report on the natural history of this species, and their study should be consulted for more complete details. They successfully reared specimens from several localities along the coast of Virginia and noted that immatures and adults reached their highest densities where the habitat was partially dried, leaving algal mats on firm ground. Adults were collected commonly by sweeping over these mats.

Unlike the larvae of *Dimecoenia spinosa,* those of *C. austrina* have eight pairs of well-developed prolegs and the third-instar larva also has a dark transverse strap at the anteroventral margin of segment three.

25. *Cirrula hians* (Say)

Figs. 111–114, Map 25

Ephydra hians Say 1830: 188 (1859: 371).—Osten Sacken 1858: 54 [Nearctic catalog]; 1878: 203 [Nearctic catalog].—Aldrich 1905: 630 [Nearctic catalog]; 1912: 85 [photos of egg, larva, pupa and adult; biology].

Hydropyrus hians.—Cresson 1934: 216.—Wirth and Stone 1956: 171 [review].—Wirth 1965: 754 [Nearctic catalog].

Ephydra (Hydropyrus) hians.—Sturtevant and Wheeler 1954: 171 [review].—Wirth 1971: 374 [review, Figs. of male terminalia].—Simpson 1976: 268 [redescription and Figs. of larva and puparium].

Cirrula hians.—Mathis and Zatwarnicki 1995: 237 [generic combination; world catalog].

Ephydra crassimana Loew 1866: 182.—Osten Sacken 1878: 203 [Nearctic catalog].—Aldrich 1905: 629 [Nearctic catalog]; 1912: 85 [synonymy].

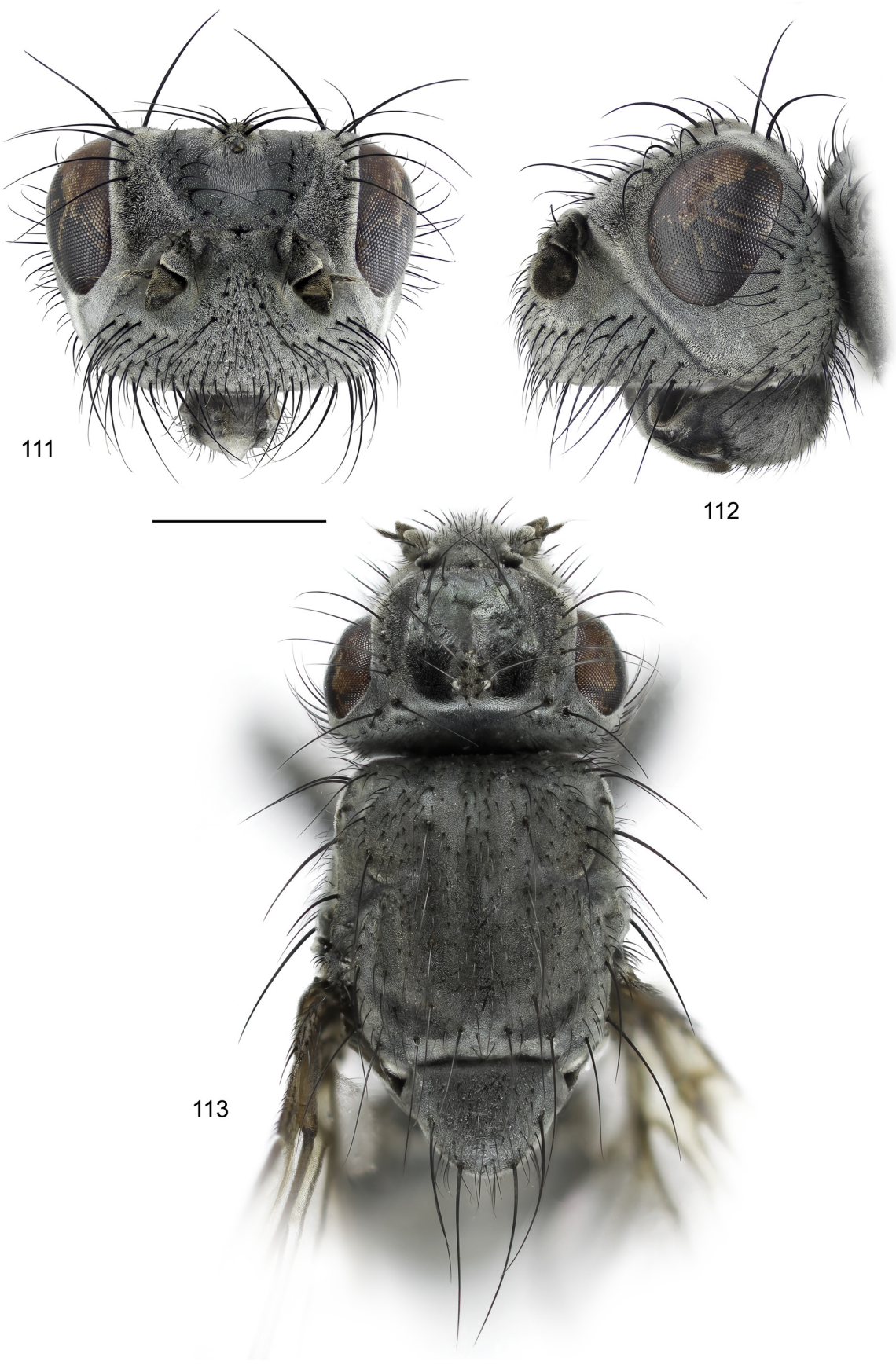
Ephydra californica Packard 1871: 103 [larva and pupa only].—Osten Sacken 1878: 203 [catalog, notes].—Aldrich 1905: 629 [Nearctic catalog]; 1912: 85 [synonymy].

Ephydra tarsata Williston 1893: 257.—Aldrich 1905: 630 [Nearctic catalog]; 1912: 85 [synonymy].

Ephydra salina of authors, not Curran 1931: 7.—Sturtevant and Wheeler 1954: 171.—Wirth 1965: 754 [Nearctic catalog].

Diagnosis. *Cirrula hians* is distinguished from other congeners by the following characters: cruciate interfrontal setae 2 pairs; postocellar setae well developed, 2–3 pairs; lateroclinate, fronto-orbital setae 3–4 pairs; gena-to-eye large; dorsocentral setae 6 (2+4); prescutellar setae 1, well developed; forebasitarsus of male with ventral tuft of hairs near apex; and conformation of male terminalia distinctive. Moderately large to large shore flies, body length 4.50–6.70 mm; generally dull, microtomentose, mostly gray, with some subshiny to shiny areas dorsally and faint indication of vittae.

Head (Figs. 111–112): Head ratio 0.68; frontal ratio 0.61; mesofrons with lateral margins slightly rounded, narrowed slightly toward anterior margin, shiny with metallic blackish to dark silvery blue luster; ocellar triangle and parafrons mostly concolorous, dull, roughly microtomentose, charcoal gray to brownish gray, gradually becoming darker anteriorly; ocelli in isosceles triangle with distance between posterior ocelli much less than either of latter and anterior ocellus; cruciate, interfrontal setae 2, occasionally 3 pairs, large, anterior pair larger, adjoining areas of mesofrons and parafrons with smaller incurved setae; ocellar setae well developed, proclinate, divergent, inserted midway between anterior ocellus and posterior ocelli; postocellar setae 2–3 pairs well developed, anterior pair inserted between posterior ocelli, with several smaller setae in addition; lateroclinate, fronto-orbital setae 3–4 pairs, very slightly divergent, a few smaller setae scattered in between; postocular setae well developed, especially those along posteroventral margin of eye, frequently with 1 larger dorsalmost pair of postocular setae. Scape and pedicel mostly unicolorous, concolorous with general coloration of face; basal flagellomere duller with some brownish color; arista about as long as combined length of 1st 3 antennal segments, thickened along basal 1/3, apex of thickened portion with a few branching rays about equal in length to thickness of arista at widest point, apical 2/3 style-like. Facial ratio 0.61; facial hump broad but distinct, dorsum only partially subshiny; antennal groove deeply impressed, less microtomentose than face, with greenish blue color; face microtomentose, more or less unicolorous, gray; marginal setae of face larger along margins, particularly along lateral margins of oral opening; face in lateral view decidedly projecting anteriorly. Eye ratio 1.21, oriented at slight oblique angle to epistoma; gena-to-eye ratio 0.60; gena high, bare anteriorly, concolorous with face, becoming setose and darker, more charcoal colored posteriorly.



FIGURES 111–113. *Cirrula hians* (Say). (111) head, anterior view; (112) same, lateral view; (113) mesonotum, dorsal view; scale bar = 1.0 mm.

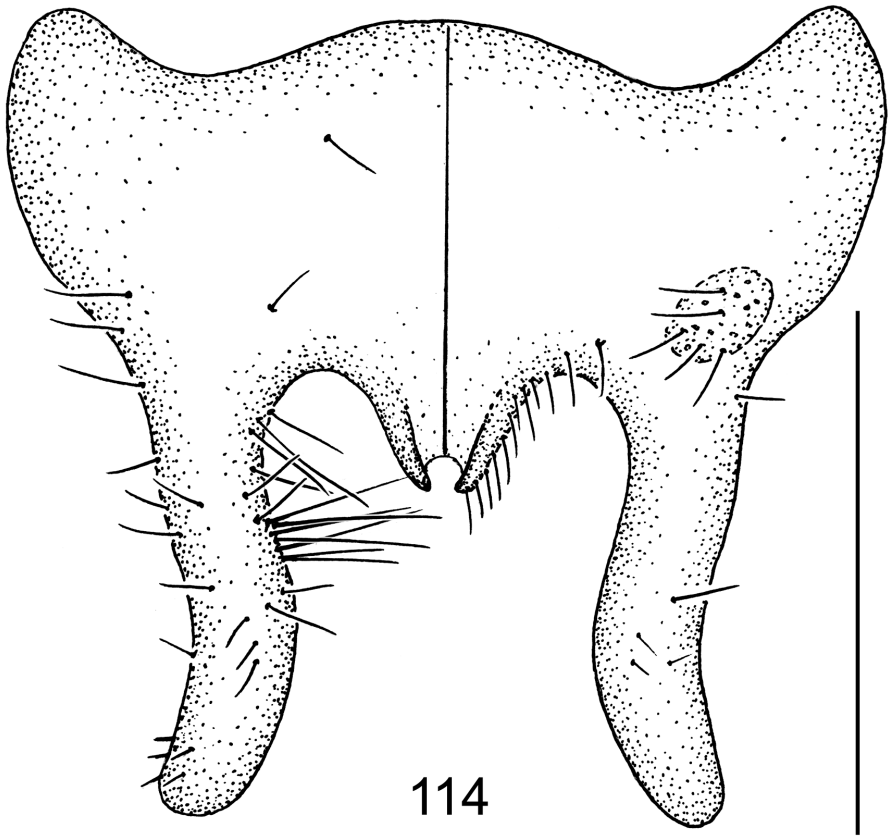


FIGURE 114. Structures of male terminalia of *Cirrula hians* (Say). (114) ventral margin of epandrium and surstyli.

Thorax (Fig. 113): Generally dull, microtomentose, gray. Mesonotum darker, more charcoal colored than pleural areas; 1 anteromedial vitta, shiny, dark silvery blue; area laterad of vitta brownish gray; dorsum of scutellum subshiny to shiny, concolorous with mesonotal vitta; dorsocentral setae 6 pairs (2+4); prescutellar acrostichal setae 1 pair, large; presutural supra-alar setae 1 pair, smaller than presutural setae; pleural areas mostly unicolorous, gray to very pale greenish gray. Wing hyaline to palely infumate, pale grayish brown; costal vein ratio 0.24; M vein ratio 1.15; wing ratio 0.47. Legs mostly unicolorous, gray, gradually becoming darker apically, apical tarsomeres grayish black; forebasitarsus of male swollen, with a tuft of hairs on venter near apex.

Abdomen: Generally gray to brownish gray, each tergite slightly darker anteriorly; tergite 5 of male mostly brownish gray, apex slightly emarginate; structures of male terminalia as follows (Fig. 114): epandrium parallel sided, anteroventral margin curved inward; surstyli simple, apical 1/3 narrowed in profile; gonite 4 times longer than wide, with short anterior process just apicad of midpoint, apex gently curved anteriorly; phallapodeme slender, sinuous, folded on itself at middle; aedeagus a simple tube, a membranous sack at apex; female ventral receptacle with large operculum, longer than high, more or less evenly rounded; extended process with slight extension on medial surface within operculum.

Type material. The primary types of *Ephydra hians* Say from Mexico were destroyed, and it is appropriate that we designate a neotype to promote accurate identification of this species and to stabilize the species' nomenclature. The neotype is labeled "CHAPINGO MEX. MEXICO. X-7-57 [7 Oct 1957; date handwritten]/En patio [handwritten]/Wm. W. Gibson Collector/USNM ENT 00118304 [plastic bar code label]/NEOTYPE ♂ *Ephydra hians* Say, designated by Mathis & Marinoni USNM [red]." The neotype is pinned directly, is in very good condition, and is deposited in the USNM.

The holotype male of *Ephydra crassimana* Loew (HT ♂, MCZ) is from "Mexico."

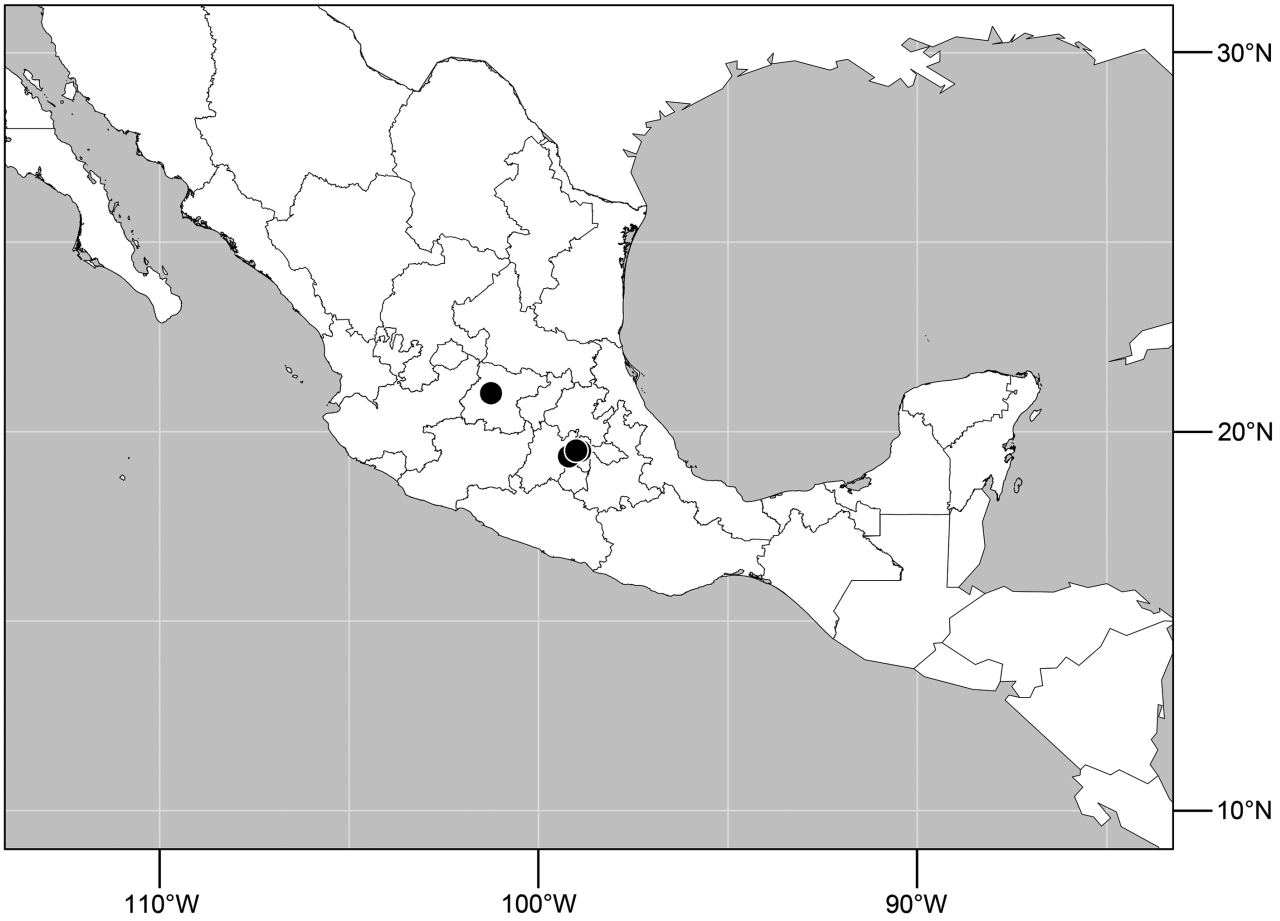
The primary types, syntype larvae and puparia, of *Ephydra californica* Packard have probably been destroyed or of unknown depository.

The syntypes males of *Ephydra tarsata* Williston (ST ♂, KU (684)) are from the United States. California. Inyo: Owens Valley (39°48'N, 116°48'W).

Type locality. Mexico. México: Chapingo (19°29.3'N, 98°54'W).

Other specimens examined. *MEXICO. Distrito Federal:* I. Conradt (2♀; USNM); San Ángel (19°20.9'N, 99°11.6'W), Aug 1923, E. Smyth (1♀; USNM). *Guanajuato:* Guanajuato (21°01'N, 101°15'W), A. Dugés (1♂, 5♀; USNM). *México:* Chapingo (19°29.3'N, 98°54'W), 7 May 1957, W. W. Gibson (5♂, 2♀; USNM); Lago de Texcoco (19°30'N, 99°W), 13 Oct 1963, B. Krogstad (2♂; USNM).

Distribution (Map 25). *Nearctic:* Canada (British Columbia, Manitoba), United States (California, Colorado, Minnesota, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington, Wyoming). *Neotropical:* Mexico (Distrito Federal, Guanajuato, México).



MAP 25. Distribution map for *Cirrula hians* (Say).

Genus *Dimecoenia* Cresson

Dimecoenia Cresson 1916: 152 [type species: *Coenia spinosa* Loew, by original designation].—Sturtevant and Wheeler 1954: 166 [review, in part].—Wirth and Stone 1956: 472 [review in part, species of California].—Wirth 1965: 755 [Nearctic catalog].—Steyskal 1970: 462-465 [review in part, Figs. of male and female terminalia].—Mathis and Simpson 1981: 29 [revision of North American species, natural history].—Mathis and Zatwarnicki 1995: 238-240 [world catalog].

Diagnosis. *Dimecoenia* is distinguished from other genera of the tribe Ephydrini by the following combination of characters: Moderately large to large shore flies, body length 4.25–6.25 mm; mostly dull, olivaceous brown to grayish brown, dorsum with some subshiny to shiny areas dorsally.

Head: Cruciate interfrontal setae 1 pair, well developed; lateroclinate fronto-orbital setae 2, slightly divergent. Basal flagellomere simple, lacking secondary seta inserted laterally just below arista; arista tapered gradually from thickened base to style-like apex, approximately basal 2/3 with dorsal rays, thereafter bare, aristal rays nearly as long as width of pedicel. Facial hump poorly developed, little evident; ventral margin of antennal grooves nearly horizontal, not sloping ventrally at conspicuous angle.

Thorax: Postpronotum bare of setae; dorsocentral setae 5 (1+4). Dorsal costagial seta subequal in length to anteroventral costagial seta; costa with numerous, conspicuous, spine-like setulae; legs of both sexes similar.

Abdomen: Male terminalia: Aedeagus a simple tube or bifurcate. Female ventral receptacle variously shaped.

Larva: larvae lacking well-developed prolegs on segments other than 12.

Distribution. As characterized here, Dimecoenia now includes just two species, *D. fuscifemur* Steyskal and *D. spinosa* (Loew). The monophyly of the genus is established by the following apotypic characters: 1. The anterior margin bears conspicuous, spine-like setae; 2. Margin of ventral margin of antennal groves rounded, nearly horizontal and not steeply angled.

Larvae of Dimecoenia represent an apparent reversal in the generalized adaptive scheme of Ephydrini by inhabiting mud substrates of salt marshes. This has apparently resulted in the atrophy of the prominent, ventral prolegs, including the crochets, which are functionally adapted to movement within algal mats.

26. *Dimecoenia spinosa* (Loew)

Figs. 115–121, Map 26

Coenia spinosa Loew 1864: 99.

Caenia spinosa [unjustified emendation].—Osten Sacken 1878: 204 [Nearctic catalog].—Aldrich 1905: 631 [Nearctic catalog].

Dimecoenia spinosa.—Cresson 1916: 152.—Sturtevant and Wheeler 1954: 166 [review].—Wirth and Stone 1956: 472 [review].—Wirth 1965: 755 [Nearctic catalog].—Steyskal 1970: 465 [review, Figs. of ♂ and ♀ terminalia].—Mathis and Simpson 1981: 30-42 [revision, Figs. of adult and immatures, natural history].—Mathis and Zatwarnicki 1995: 240 [world catalog].—Mathis 1997: 65–66 [review, Belize].

Diagnosis. This species is very similar to *D. fuscifemur* (Steyskal), both having a less well developed interfoveal hump, but may be distinguished by the following combination of characters: legs stramineous to yellow, at most with dorsum of femora grayish; fronto-orbital setae nearly parallel with each other, both oriented obliquely posterolaterad; posteroventral portion of basal flagellomere and palpus also pale, mostly concolorous with legs; crossvein dm-cu distinctly arched, concave basally; face between antennal bases with broad, bronzish band; conformation of male and female terminalia distinctive. Moderately large to large shore flies, body length 4.40–6.10 mm; mostly dull, olivaceous brown to grayish brown, dorsum with some subshiny to shiny areas.

Head (Figs. 115–116): Head ratio 0.56–0.58; frontal ratio 0.44–0.47; mesofrons with metallic blue to greenish blue luster; parafrons not distinctly contrasted with mesofrons, subshiny; ocellar triangle more or less concolorous with parafrons; ocelli in equilateral triangle; medial ocellus marking posterior margin of slight depression, not as well developed as in specimens of *C. austrina;* antenna mostly dark but with pale, yellowish orange areas, particularly toward posteroventral surface of basal flagellomere; arista longer than combined length of 1st 3 antennal segments, subpectinate above toward base, apical 1/3 style-like. Facial ratio 0.82–0.87; dorsal slope of interfoveal hump little evident, gradually projected; dorsum and antennal groove subshiny to shiny, mostly unicolorous and concolorous with shiny mesofrons; lower portion of face gradually becoming paler, nearly silvery in color; facial setae except along margins uniformly sized and space, marginal setae slightly larger, those extended from interfoveal hump widely separated in middle, numbering only 3–4 on each side; genal seta large, prominent, much larger than any facial seta. Eye ratio 1.23–1.26; gena-to-eye ratio 0.19–0.23. Gena moderately short; mostly bare and concolorous with face anteriorly, becoming darker and setose posteriorly; palpus noticeably pale yellow, sometimes slightly microtomentose, grayish.

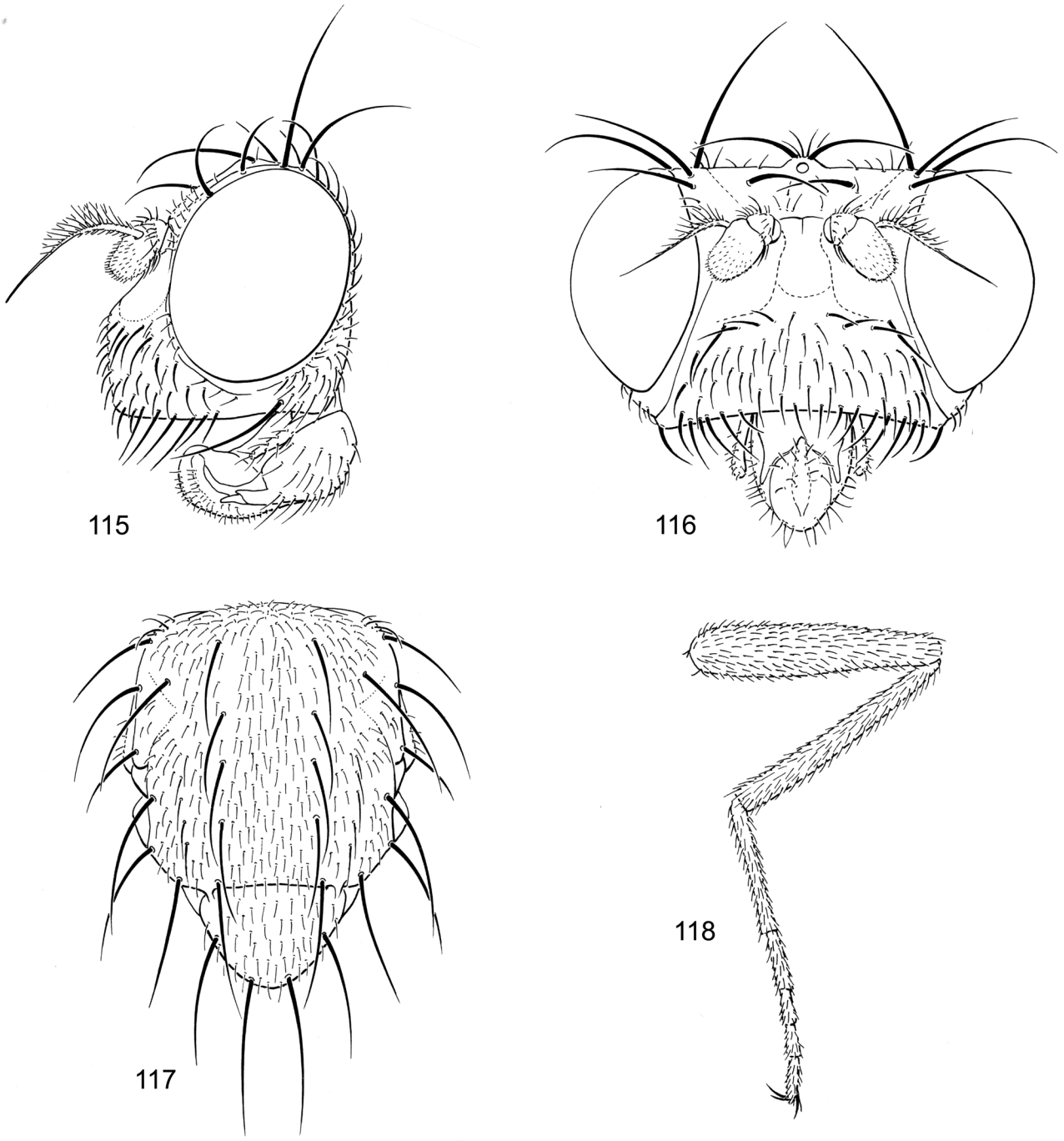
Thorax (Fig. 117): Generally dull, microtomentose, mostly olivaceous brown to grayish brown; mesonotum at most subshiny and slightly darker than pleural areas, with vittate pattern of dark and pale vittae, although difference between dark and pale areas slight; posterior portion of mesonotum and scutellum darker, frequently subshiny, dark brown; acrostichal setae mostly unseriated; dorsocentral setae 5 pairs. Legs wholly tawny, legs of male and female similar (Fig. 118) lacking enlarged hindfemur and explanate tarsomeres bearing tufts of long hairs. Wing length averaging 3.95–4.14 mm; wing length-to-width ratio 0.42–0.47; costal vein ratio 0.23–0.26; M vein ratio 0.75–0.81; costal margin spinose; sometimes with slight infuscation along crossveins and veins.

Abdomen: Generally subshiny; anterior portion of each tergite darker, browner, posterior portion paler, grayish green; male tergite 5 as long as wide, longer than tergite 4; structures of male terminalia as follows (Figs. 119–120): epandrium more or less oval in posterior view, anteroventral margin evenly rounded; surstyli with large

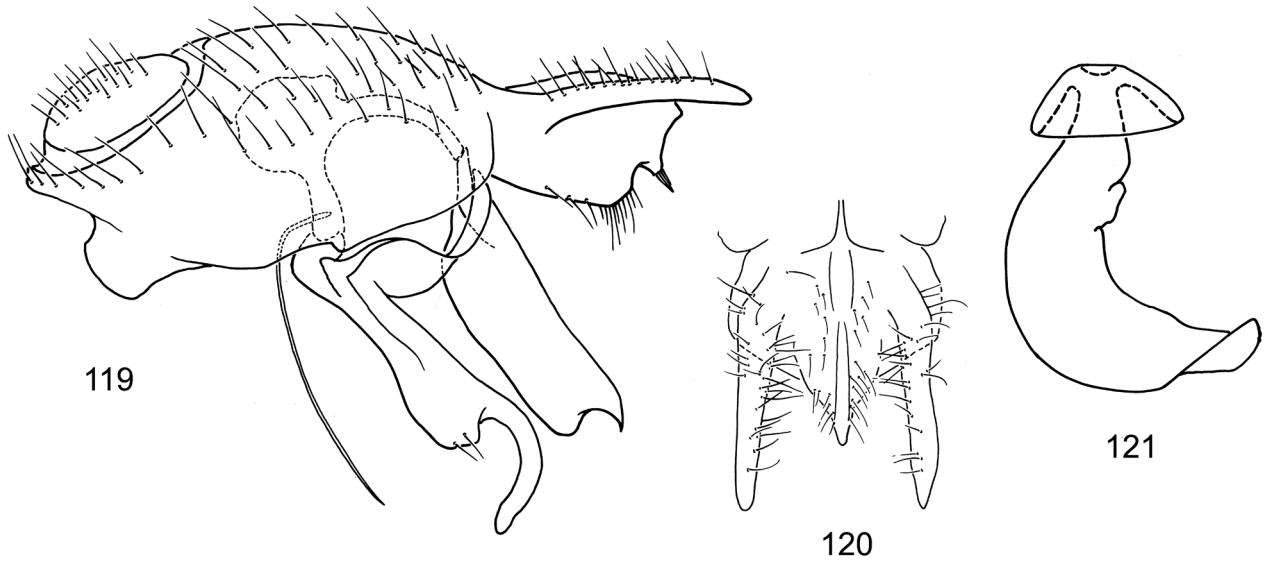
medial flange and posterolateral, slender process; gonite much longer than wide, 4 times, anteroventral margin broadly and shallowly U-shaped; phallapodeme with posteromedial, broad flange; aedeagus a simple tube, mostly parallel sided; female ventral receptacle (Fig. 121) with operculum much smaller than extended process, trapezoidal in conformation, extended process broadly C-shaped.

Type material. Lectotype female of *Coenia spinosa* (designated by Mathis and Simpson 1981) is labeled "Mass[achusetts]./123/Loew Coll./spinosa, m./Type 11182 [red]." The lectotype and one female paralectotype are mounted on the same pin; the bottom specimen is the lectotype. Both specimens are deposited in the MCZ (11182).

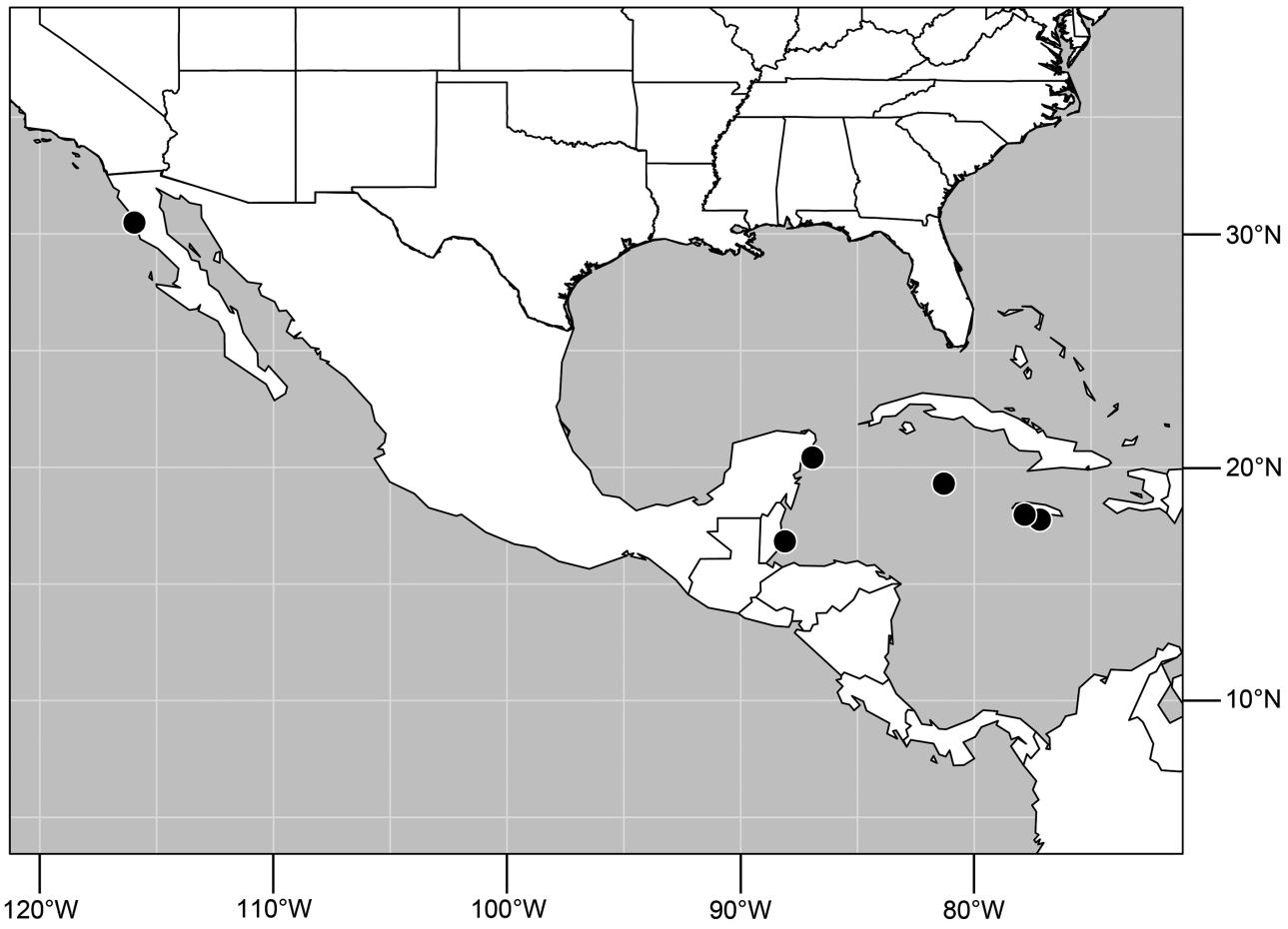
Type locality. United States. Massachusetts. (42°'N, 70°W).



FIGURES 115–118. *Dimecoenia spinosa* (Loew). (115) head, lateral view; (116) same, anterior view; (117) mesonotum, dorsal view; (118) hindleg of male, lateral view (from Mathis and Simpson 1981).



FIGURES 119–121. Structures of male and female terminalia of *Dimecoenia spinosa* (Loew). (119) male terminalia, lateral view; (120) ventral margin of epandrium and surstyli, posterior view; (121) female ventral receptacle, lateral view (from Mathis and Simpson 1981).



MAP 26. Distribution map for *Dimecoenia spinosa* Loew.

Additional specimens examined. *BELIZE. Stann Creek District:* Twin Cays (West Pond; 16°49'S, 88°06'W), Nov 1987, Mar 1988, W. N. and D. Mathis (4♂; USNM).

MEXICO. Baja California: San Quintin (30°29'S, 115°57'W), 18 Jul 1922, G. D. Hanna (1♂; USNM). *Quintana Roo:* Espiritu Santo Bay, Cozumel (20°25'S, 86°55'W), 5 Apr 1960, J. F. G. Clarke (1♀; USNM).

WEST INDIES. *CAYMAN ISLANDS.* Grand Cayman, North Sound, Booby Cay (19°20'S, 81°18'W; light trap), 6 May 1938, C. B. Lewis, G. H. Thompson (1♂, 2♀; BMNH).

JAMAICA. Clarendon: Portland Cottage (1 km S; 17°45.8'N, 77°12.6'W), 13 May 1996, D. and W. N. Mathis, H. Williams (1♀; USNM). *St. Elizabeth:* Salt Pond, Parottee Beach (1758.1'N, 77°50.2'W), 19 Apr 2000, W. N. Mathis (3♀; USNM).

Distribution (Map 26): *Nearctic:* Canada (New Brunswick, Nova Scotia), United States (California, Connecticut, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Texas, Virginia). *Neotropical:* Belize, Mexico (Baja California, Quintana Roo), West Indies (Grand Cayman, Jamaica).

Natural history. Adults are encountered commonly in salt marshes where they sometimes "skate" on the water's surface. Mathis and Simpson (1981) described the immature stages that were collected and reared from submerged detritus and mud. They discovered that larvae of *D. spinosa* are unlike most of the tribe Ephydrini, lacking well-developed, paired prolegs except for a large, subcylindrical proleg on segment 12. They also suggested that the third-instar larva, which has sharply pointed posterior spiracles, may tap air stored in the stems and roots of aquatic plants for respiratory purposes when they are in submerged mud at some distance from the air/water interface. See Mathis and Simpson (1981) for further details concerning the natural history and description of immature stages.

Genus *Ephydra* Fallén

Ephydra Fallén 1810: 22 [type species: *Ephydra riparia* Fallén, by subsequent designation (Curtis 1832: plate 413)].—Wirth 1968: 22 [catalog of South American species]; 1971: 357-377 [review of New World species, Figs. of male terminalia].—Mathis and Zatwarnicki 1995: 240–247 [world catalog].

Diagnosis. *Ephydra* is distinguished from other genera of Ephydrini by the following characters:

Head: Lateroclinate, fronto-orbital setae 3, well developed, subequal; development of cruciate, interfrontal setae variable, either with 1 well-developed pair or weak to lacking; basal flagellomere simple, lacking secondary seta inserted below arista on lateral surface; arista variable, subpectinate to macropubescent, if subpectinate, basal thickening extended about 1/3 of aristal length, if macropubescent, basal thickening extended over 1/2 of aristal length; antennal groove distinct but not deeply impressed.

Thorax: Presutural supra-alar seta present, well developed; dorsocentral setae 5 (1+4); intrapostalar seta present; supra-alar seta present; disc of scutellum generally concolorous with posterior portion of scutum.

Abdomen: Structures of male terminalia considerably modified depending on subgenus and species group (see appropriate diagnosis of subtaxon for further details). Female ventral receptacle with operculum small, trapezoidal in shape; extended process relatively large, C-shaped, length 2–3X width of operculum.

Distribution. Occurring primarily in temperate regions of the world as follows. New World. Widespread mostly in the Nearctic Region but extended into the northern Neotropical Region (12°–65°N): Canada (just south of the Great Bear Lake), southward into Mexico (Oaxaca) and the West Indies (Dutch West Indies). Old World. Widespread, mostly in the Palearctic and Afrotropical (temperate) regions but extended into the northern Oriental Region: Norway to Japan, southward to the Canary Islands, South Africa, across southern Asia (Afghanistan, Iran, and Tibet) to Japan and China.

Discussion. Wirth (1971, 1975) has provided an excellent revision of *Ephydra* on a worldwide basis, and his papers should be consulted for a more detailed discussion of the natural history and for identification of extralimital species. Our treatment is essentially a synopsis of Wirth's valuable study, although with some modification. Because Wirth borrowed and examined specimens from most major museums, we have not deemed it necessary to repeat that process. Consequently the "Specimens Examined" sections are omitted, and the reader is referred to Wirth's treatment for these data.

Key to Subgenera, species groups, and species of Neotropical *Ephydra*

1. Cruciate interfrontal setae weak or lacking; crossvein dm-cu forming acute angle with vein CuA_1; palpus small; coloration of mesonotum strongly whitish gray (subgenus *Halephydra* Wirth) . . . . . *E. gracilis* Packard
- One pair of well-developed, cruciate, interfrontal setae; crossvein dm-cu forming nearly right angle with vein CuA_1; palpus well developed; coloration of mesonotum shiny to moderately grayish (subgenus *Ephydra* Fallén) 2
2. Anterior acrostichal setae in 2 distinct rows; coloration generally grayish, microtomentose; tarsal claws generally nearly as long as tarsomere 5; male aedeagus nearly straight, lacking recurved, basal process (The *glauca* Group) . . . . . *E. mexicana* Cresson
- Anterior acrostichal setae unseriated or in 4–5 irregular rows; coloration generally olive green, microtomentose; tarsal claws generally not more than half as long as tarsomere 5; male aedeagus with strongly recurved basal process (The *riparia* Group) 3
3. Aedeagal apex distinctly pointed, curved, hook-like, becoming much stouter toward base; sternal plate with strong transverse ridges on strongly convex midportion; surstylus stout, thumb-like, rounded distally . . . . . *E. millbrae* Jones
Aedeagal apex rounded, not hook-like, tapered to apex; sternal plate not strongly convex; surstylus moderately expanded apicolaterally, yellowish. . . . . *E. packardi* Wirth

Subgenus *Ephydra* Fallén

See generic synonymy.

Diagnosis. The subgenus *Ephydra* is distinguished from other subcongeners by the following combination of characters:

Head: Cruciate, interfrontal setae 1 pair, well developed.

Thorax: Coloration of mesonotum generally shiny, at least partially; crossvein dm-cu merged with vein CuA_1 at nearly right angle.

Abdomen: Male terminalia with surstyli relatively stout and distally blunt; gonite bearing 2 very characteristically placed, subapical setae; aedeagus swollen at base or with strongly recurved basal process.

Distribution. See generic treatment.

Remarks. This subgenus comprises all species of *Ephydra* except *E. gracilis,* the only species of the subgenus *Halephydra.* All species of the Western Hemisphere belong to either of two species groups: the *glauca* and *riparia* groups. Both groups are represented by a single species in the geographic area being treated.

The *glauca* group

Species Included: *Ephydra mexicana* Cresson.

Diagnosis. This species group is distinguished from others of the genus *Ephydra* by the following characters: General coloration grayish, microtomentose.

Thorax: Acrostichal setae in 2 distinct rows; tarsal claws nearly as long as 5th tarsomere.

Abdomen: Aedeagus somewhat straight, basal portion swollen, apex tapered to distal point similar to tips of slender, distal process of gonite; surstyli variable but generally with setose lobe on anterior side.

Distribution. Old World. Europe and Asia from Sweden to Russia (Karelian Islands) in the north, southward to Italy and eastward across Asia to Tibet and Mongolia. New World. Throughout North America from Alaska (Savonoski Naknek Lake) to Labrador (Hebron), southward to southern California (Thousands Psalma), Mexico City, and Massachusetts (Eastham).

27. *Ephydra (Ephydra) mexicana* Cresson

Figs. 122–123, Map 27

Ephydra mexicana Cresson 1934: 214.—Wirth 1968: 22 [Neotropical catalog]; 1971: 369 [revision].—Mathis and Zatwarnicki 1995: 242 [world catalog].

Diagnosis. This species is similar to other subcongeners but may be distinguished by the elongate scutellum and setulose posterior margin of the anepisternum of the female and by characters of the male terminalia. Large shore flies, body length about 5.30 mm. General coloration.

Head: Mesofrons bluish with metallic luster. Head ratio 0.69; facial ratio 0.43. Eye ratio 0.88; gena-to-eye ratio 0.48; gena slightly darker than face, with some faint bluish and/or greenish coloration in addition to being gray.

Thorax: Scutum (vestiture and coloration); scutellum of female elongate, transversely rugose and distally pilose; prescutellar swelling of female not conspicuous but with some longer setae; acrostichal setae strongly developed, some seta-like; both males and females with well-developed pair of prescutellar acrostichal setae; anepisternum of female with posterior margin setose. Wing ratio 3.85–4.20 mm; costal vein ratio 0.25; M vein ratio 82. Legs greenish brown; tarsi and extreme bases of tibiae yellowish; tarsal claws about equal to length of 4th tarsomere.

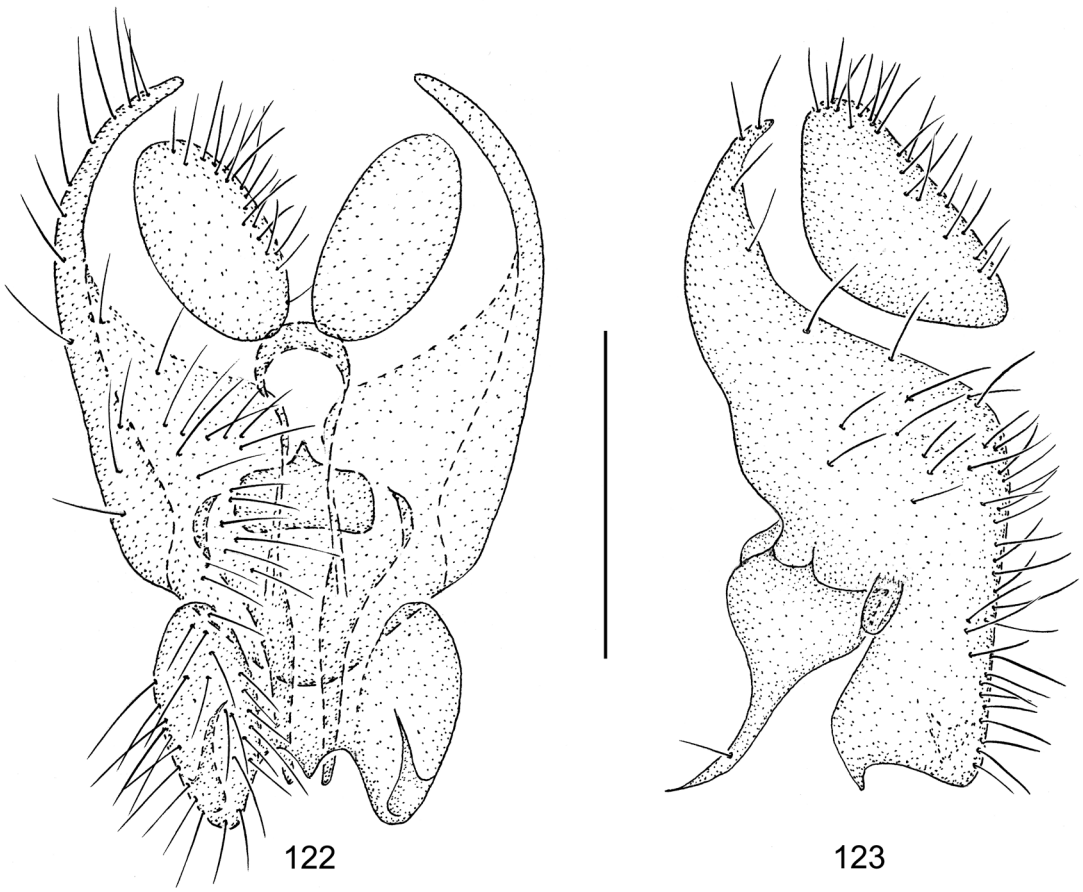
Abdomen: Tergite 5 of male about equal in length to tergite 4. Male terminalia (Figs. 122–123): surstyli very short, blunt apically, markedly expanded dorsoventrally and flattened laterally in a broad, distally truncate lobe, posteroventral corner bluntly rounded, bearing a small setose lobe near base at medial margin of dorsal side; gonite with moderately broad base, tapered distally to sharply pointed, slightly curved blade; aedeagus slender, slightly sinuous in lateral view, with stout base, and slightly bent, blunt pointed apex.

Type material. The holotype male is labeled "♂/Mexico [handwritten]/TYPE No. 6505 Ephydra MEXICANA E T Cresson, Jr. [red]." The holotype is double mounted, is in good condition (left basal flagellomere is missing), and is deposited in the ANSP (6505).

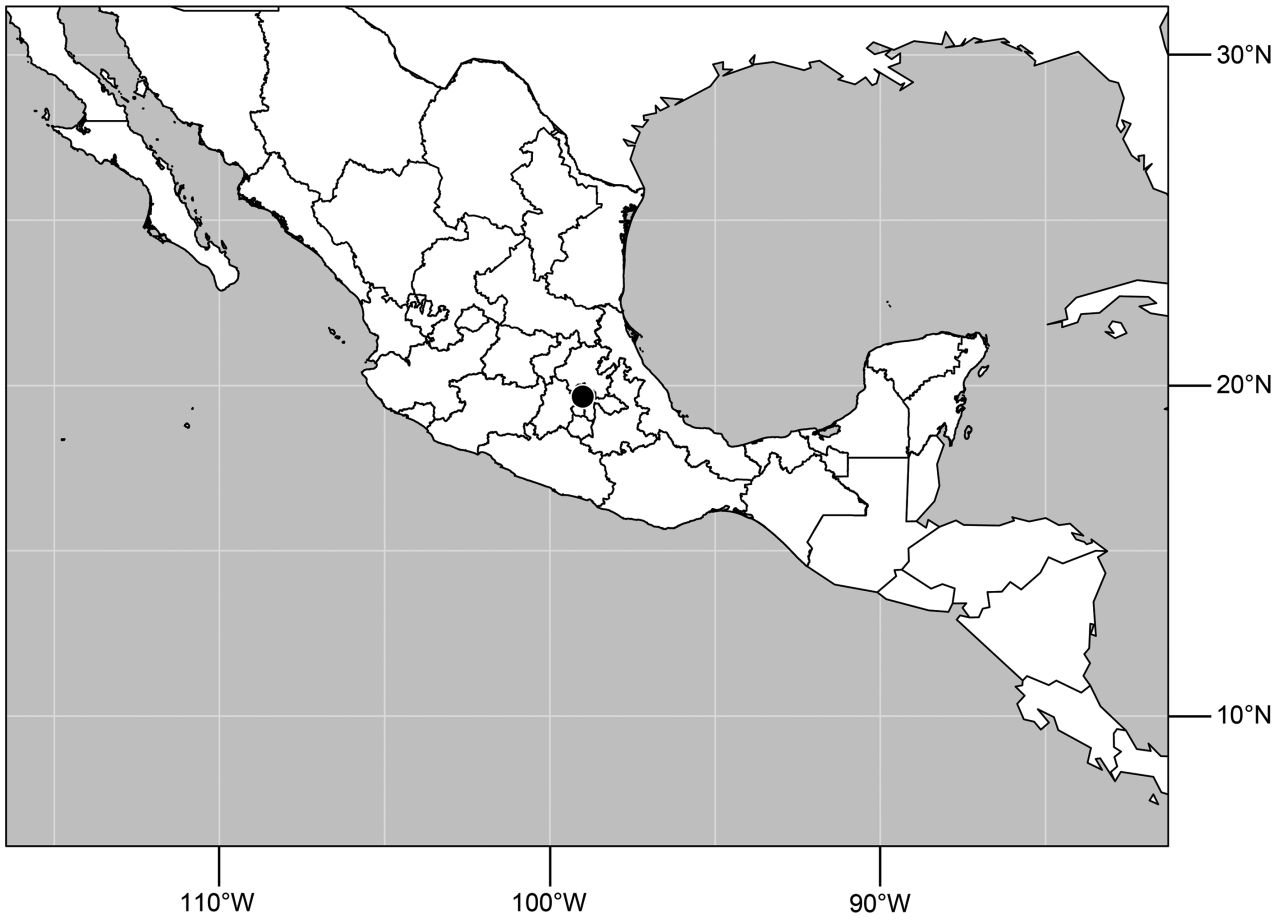
Type locality. Mexico. Distrito Federal: Valle de Mexico (19°40'N, 99°W).

Distribution (Map 27): This species is known only from the type locality, "Mexico."

Remarks. This species and *E. pectinulata* Cresson are sister species, as evidenced by the very similar structures of the male terminalia of both species. Nothing is known about the natural history of this species.



FIGURES 122–123. Structures of male terminalia of *Ephydra mexicana* Cresson. (122) epandrium, cerci, and surstyli, posterior view; (123) same plus gonite, lateral view.



MAP 27. Distribution map for *Ephydra mexicana* Cresson.

The *riparia* group

Species Included: *Ephydra packardi* Wirth.

Diagnosis. This species group is distinguished from others of the genus *Ephydra* by the following characters: General coloration more or less shiny, greenish to olive brown.

Thorax: Acrostichal setae in 4–5 irregular rows; tarsal claws generally not much over half length of tarsomere 5.

Abdomen: Aedeagus with a well developed, recurved basal process and with a wrinkled, membranous gland attached to anterior side of straight distal portion; gonite short, broad, and with a distinctive distal hook or pointed process; surstyli generally with a distinctive longitudinal carina.

Distribution. Old World. Northern Europe (Sweden) to northern Africa (Canary Islands, Algeria) eastward through Russia and southern Asia (Turkey, Iran) to Japan and China. New World. North America from Alaska (Fairbanks) to Nova Scotia (Baddeck), south to Baja California, northern Mexico, Louisiana, and North Carolina.

Remarks. In North America this species group comprises six species (Wirth 1971), with only *E. packardi* being represented below the Mexican-United States border.

28. *Ephydra (Ephydra) millbrae* Jones

Figs. 124–126, Map 28

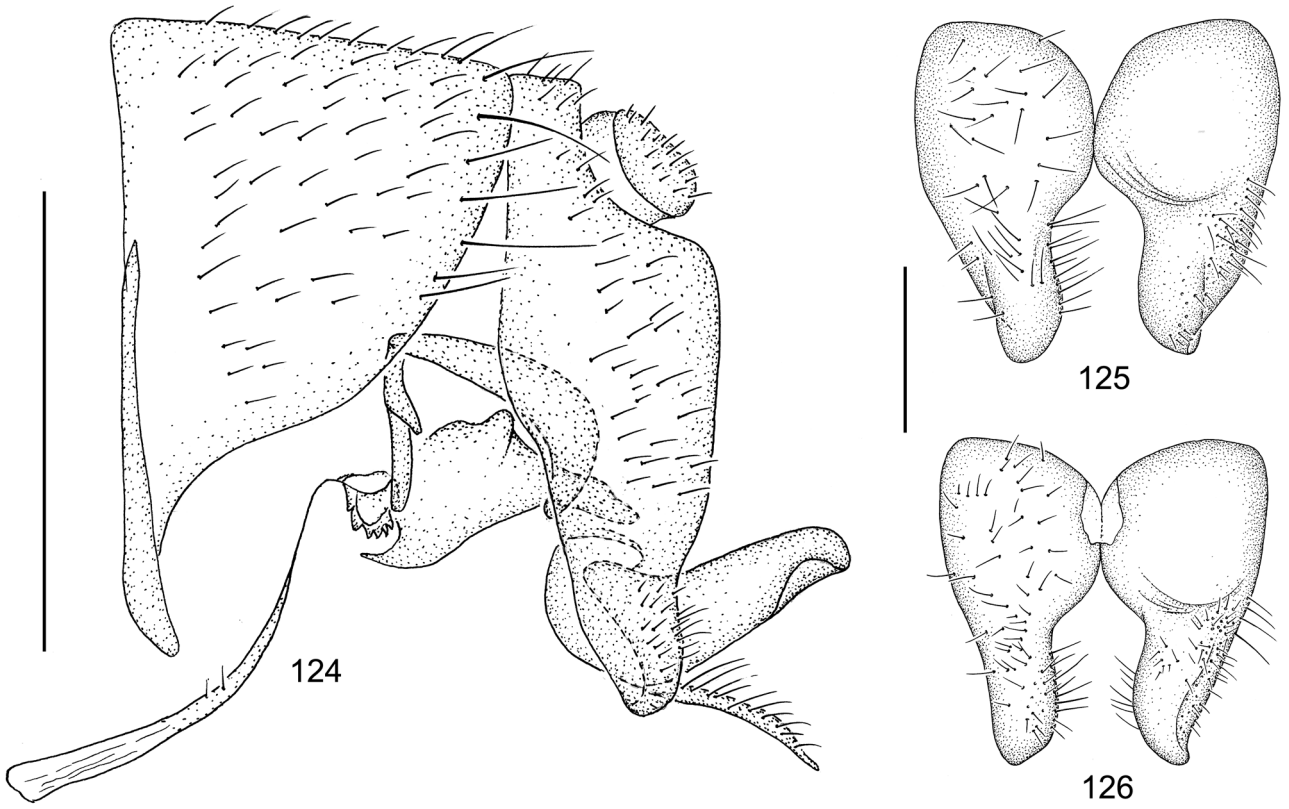
Ephydra millbrae Jones 1906: 155 [United States. California. San Mateo: Millbrae; LT ♂ (designated by Arnaud 1979: 349), CAS (4483)].—Aldrich 1912: 96–98 [biology].—Wirth 1971: 364–365 [revision].—Arnaud 1979: 349 [lectotype designation].—Mathis and Zatwarnicki 1995: 243 [world catalog].

Ephydra riparia of authors, not Fallén (misidentification).—Hardy 1952: 467 (list, Hawaii).—Sturtevant and Wheeler 1954: 170 [review].

Diagnosis. This species closely resembles other subcongeners but may be distinguished by the short, fairly blunt scutellum and sparsely setose anepisternum of females and by characters of the male terminalia. Moderately large shore flies, body length 4.25–4.90 mm; generally microtomentose, olivaceous to brownish with coppery and bluish vittae.

Head: Mesofrons shiny with bluish green metallic luster. Facial coloration variable, usually whitish but sometimes golden brown dorsally, paler ventrally. Eye nearly round, eye ratio 1.06; gena-to-eye ratio 0.43–0.49.

Thorax: Scutum microtomentose, subshiny, especially posteriorly, grayish green with some metallic bronzish tinges; scutellum of female moderately long, bluntly rounded. Acrostichal setae generally fine; both males and females with distinct, large pair of prescutellar acrostichal setae, prescutellar area of female shallowly swollen, generally inconspicuous, but with several setae; anepisternum, especially of female, with sparse setae along posterior margin. Pleural region olivaceous to dark brown. Wing length 3.80–4.25 mm; costal vein ratio 0.25–0.31; M vein ratio 0.84–0.86. Legs mostly yellowish to reddish, some specimens with femora slightly microtomentose, grayish green; tarsal claws about equal to length of tarsomere 4.



FIGURES 124–126. Structures of male terminalia of *Ephydra millbrae* Jones. (124) tergite 5, epandrium, cercus, surstylus, internal structures of male terminalia, lateral view; (125) surstyli, posterior view; (126) surstyli, posterior view.

Abdomen: Tergite 5 of male about 1.5X length of tergite 4. Male terminalia (Figs. 124–126): Surstyli expanded and rounded apically in posterior view, pale colored, usually yellowish, generally setose except at apex and is distal concavity on posterior surface; gonite generally broad, apex with well-developed pointed hook; sternal plate transverse with narrow anterior process forming bifurcate sclerite, transversely ridged midportion not strongly convex ventrally; aedeagus with apex rounded in lateral view, with a sharp medial flange on posterior side distally, membranous anterodistal lobe with very well-developed apical spicules and proximal ridges, recurved basal process short, about 1/3 length of straight portion.

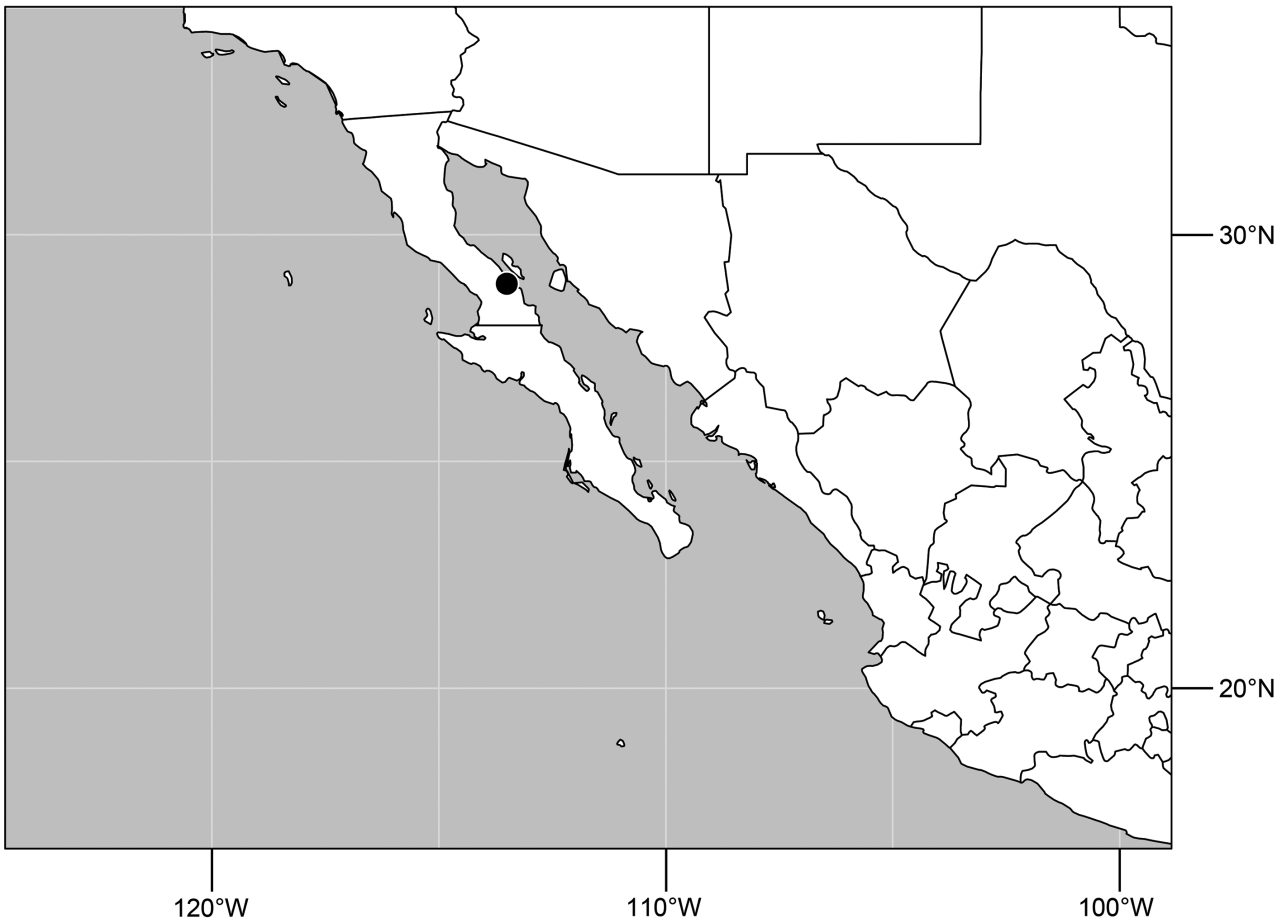
Type material. The lectotype male of *Ephydra millbrae* Jones, designated by Arnaud (1979: 349), is labeled "♂/Millbrae, San Mateo Co., Cal./Holo- [scratched off] TYPE Ephydra MILLBRAE Jones/7 Ephydra milbrae n. sp./LECTOTYPE ♂ Ephydra Millbrae Jones det 1974 PHArnaud & VFLee." The lectotype is pinned directly

mounted, is in good condition and is deposited in the CAS (4483). When Arnaud (1979: 349) designated this lectotype, he commented as follows: "Jones described *Ephydra millbrae* from an unspecified number of males and females, and the type-locality was given as "very abundant along the southwest shore of San Francisco Bay between the small towns of San Mateo and San Bruno, the center of the colony seeming to be about Millbrae, where the floating puparia and adults often cover the entire surface of the small salt-water ponds." Three paralectotypes were also designated.

Type locality. United States. California. San Mateo: Millbrae (37°35.9'N, 122°23.6'W).

Additional specimens examined. MEXICO. *Baja California:* Gulf of California, Bahía de Los Ángeles (Gulf of California; 28°55'N, 113°30'W), M. C. Van Duzee (ex; CAS).

Distribution (Map 28): *Australasian/Oceanian:* Hawaiian Islands (Maui, Oahu). *Nearctic:* Canada (British Columbia), United States (California, Oregon, Washington). *Neotropical:* Mexico (Baja California).



MAP 28. Distribution map for *Ephydra millbrae* Jones.

29. *Ephydra (Ephydra) packardi* Wirth

Figs. 127–129, Map 29

Ephydra packardi Wirth 1971: 365 [new name for *E. halophila* Packard].—Mathis and Zatwarnicki 1995: 243 [world catalog].
Ephydra halophila Packard 1869: 49 [preoccupied by *Coenia halophila* von Heyden 1844: 203, a synonym of *E. riparia* Fallén].
Ephydra subopaca, in part of authors [misidentification], not Loew 1864: 98.—Aldrich 1912: 93 [review].—Ping 1921: 557 [natural history, description of immature stages].
Ephydra riparia, in part of American authors [misidentification], not Fallén 1813: 246.
Ephydra macellaria, in part of American authors [misidentification], not Egger 1862: 779.

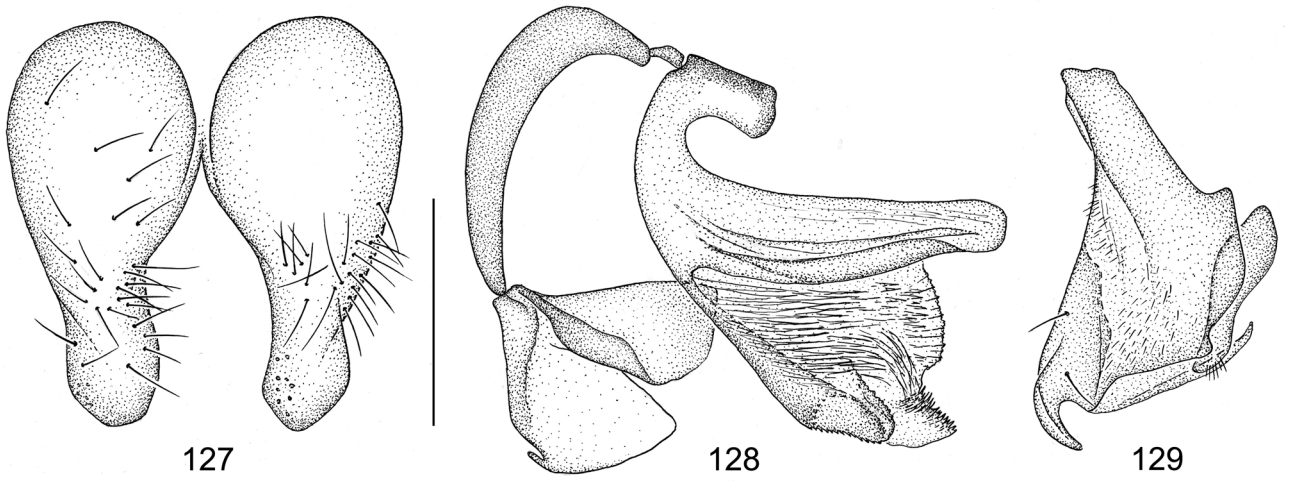
Diagnosis. This species closely resembles other subcongeners but may be distinguished by the short, fairly blunt

scutellum and sparsely setose anepisternum of females and by characters of the male terminalia. Medium-sized to moderately large shore flies, body length 3.30–4.70 mm; generally microtomentose, olivaceous green to gray.

Head: Mesofrons shiny with bluish green metallic luster. Facial coloration variable, usually whitish but sometimes golden brown dorsally, paler ventrally. Eye ratio 1.06; gena-to-eye ratio 0.47.

Thorax: Scutum microtomentose, subshiny, especially posteriorly, grayish green with some metallic bronzish tinges; scutellum of female moderately long, bluntly rounded. Acrostichal setae generally fine; both males and females with distinct, large pair of prescutellar acrostichal setae, prescutellar area of female shallowly swollen, generally inconspicuous, but with several setae; anepisternum, especially of female, with sparse setae along posterior margin. Wing length averaging 3.39–3.80 mm; costal vein ratio 0.27; M vein ratio 0.78. Legs mostly yellowish to reddish, some specimens with femora slightly microtomentose, grayish green; tarsal claws about equal to length of 4th tarsomere.

Abdomen: Tergite 5 of male about 1.5X length of tergite 4. Male terminalia (Figs. 127–129): surstyli expanded and rounded apically in posterior view, pale colored, usually yellowish, generally setose except at apex and is distal concavity on posterior surface; gonite generally broad, apex with well-developed pointed hook; sternal plate transverse with narrow anterior process forming bifurcate sclerite, transversely ridged midportion not strongly convex ventrally; aedeagus with apex rounded in lateral view, with a sharp medial flange on posterior side distally, membranous anterodistal lobe with very well-developed apical spicules and proximal ridges, recurved basal process short, about 1/3 length of straight portion.



FIGURES 127–129. Structures of male terminalia of *Ephydra packardi* Wirth. (127) surstyli, posterior view; (128) aedeagus, aedeagal apodeme, hypandrium, lateral view; (129) gonite, lateral view.

Type material. The lectotype male of *Ephydra halophila* Packard (designated by Wirth 1971: 365) is labeled "E. halophila Pack. Equality Salt works [Gallatin Co.,] Ill[inois]. United States. Packard Coll. [species name, author, and specific locality handwritten, folded label]/M. C. Z holoTYPE 28563 ["holo" and type number handwritten, red]/halophila Pack. [handwritten, black submargin]/halophila Pack=subopaca Loew (Sturtevant) [handwritten]/HOLOTYPE Ephydra packardi Wirth. n[ew]. n[ame]. [species name and author handwritten, red submargin]." Packard (1869) did not designate a holotype, hence the holotype labels are incorrect. Wirth's designation of "type in MCZ," however, does qualify as a lectotype designation, and the specimen he labeled as "HOLOTYPE" is the lectotype male of this species. The lectotype is double mounted (pin in cork block), is in fair condition (several setae are missing or misdirected, the basal flagellomeres are missing), and is in the Museum of Comparative Zoology, Harvard University, MCZ 28543. There is also a male paralectotype and a vial of puparia in the MCZ.

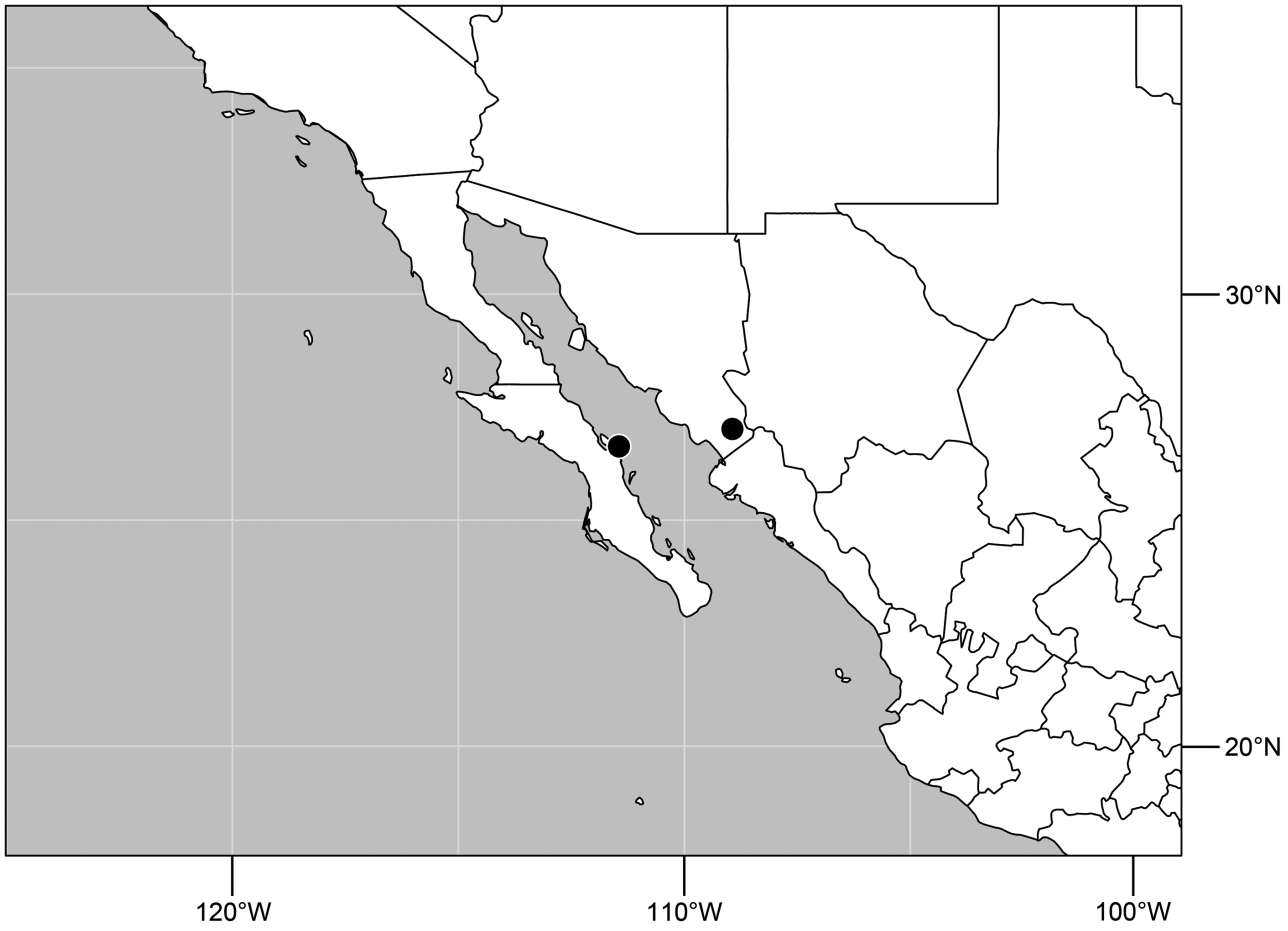
Type locality. United States. Illinois. Gallatin: Salt works (37°43.3'N, 88°17.7'W).

Additional specimens examined. MEXICO. *Baja California Sur:* Isla Ildefonso (26°38'N, 111°26.5'W), 30 Mar 1953, P. H. Arnaud, Jr. (4♂, 3♀; USNM). *Sonora:* Alamos (27°01'N, 108°55.9'W), 26 Feb 1963, P. H. Arnaud, Jr. (1♂; USNM).

Distribution (Map 29): *Nearctic:* Canada (British Columbia), United States (Arizona, California, Colorado, Idaho, Illinois, Indiana, Kansas, Louisiana, Maryland, Massachusetts, Missouri, Nebraska, Nevada, New York,

North Dakota, Oklahoma, Oregon, Texas, Utah, Virginia, Washington). *Neotropical:* Mexico (Baja California Sur, Sonora), between 26°–52°N and 72°–123°W.

Remarks. This is one of the commonest species of the subgenus *Ephydra,* and aside from *E. millbrae* Jones, it is the only species of the *riparia* group known to occur below the Mexican-United States border.



MAP 29. Distribution map for *Ephydra packardi* Wirth.

Subgenus *Halephydra* Wirth

Halephydra Wirth 1971: 371 [type species: *Ephydra cinerea* Jones (= *E. gracilis* Packard), by original designation].

Diagnosis. The subgenus *Halephydra* is distinguished from other subgenera of *Ephydra* by the following characters: General coloration dull, grayish, only mesofrons shiny and dark

Head: Cruciate interfrontal setae weak or lacking.

Thorax: Acrostichal setae in 2 rows; palpus relatively small; scutellum short and convex; crossvein dm-cu merging with vein CuA_1 at acute angle.

Abdomen: Structures of male terminalia as follows: epandrium moderately elongate with medial furrow and broad distal plate bearing surstyli; 2 clumps of long stout yellowish setae on each side near base of surstyli; surstyli long, digitiform, relatively close together, each bearing several long fine scattered setae on medial surface; aedeagus narrow, strongly sclerotized basally, expanded beyond slender distal arch of hypandrium forming a more or less cylindrical, large, funnel-like, palely sclerotized structure; gonites sickle-shaped, each bearing a well-developed proximal spine and smaller one near middle. Female ventral receptacle with extended process relatively broad, length about twice width of operculum.

Distribution. See species treatment.

Discussion. Wirth (1971: 371) noted that many structures of the male terminalia of this subgenus resemble those of *Ephydrella* Tonnoir and Malloch, a genus only known from Australia and New Zealand.

30. *Ephydra (Halephydra) gracilis* Packard
Figs. 130–132, Map 30

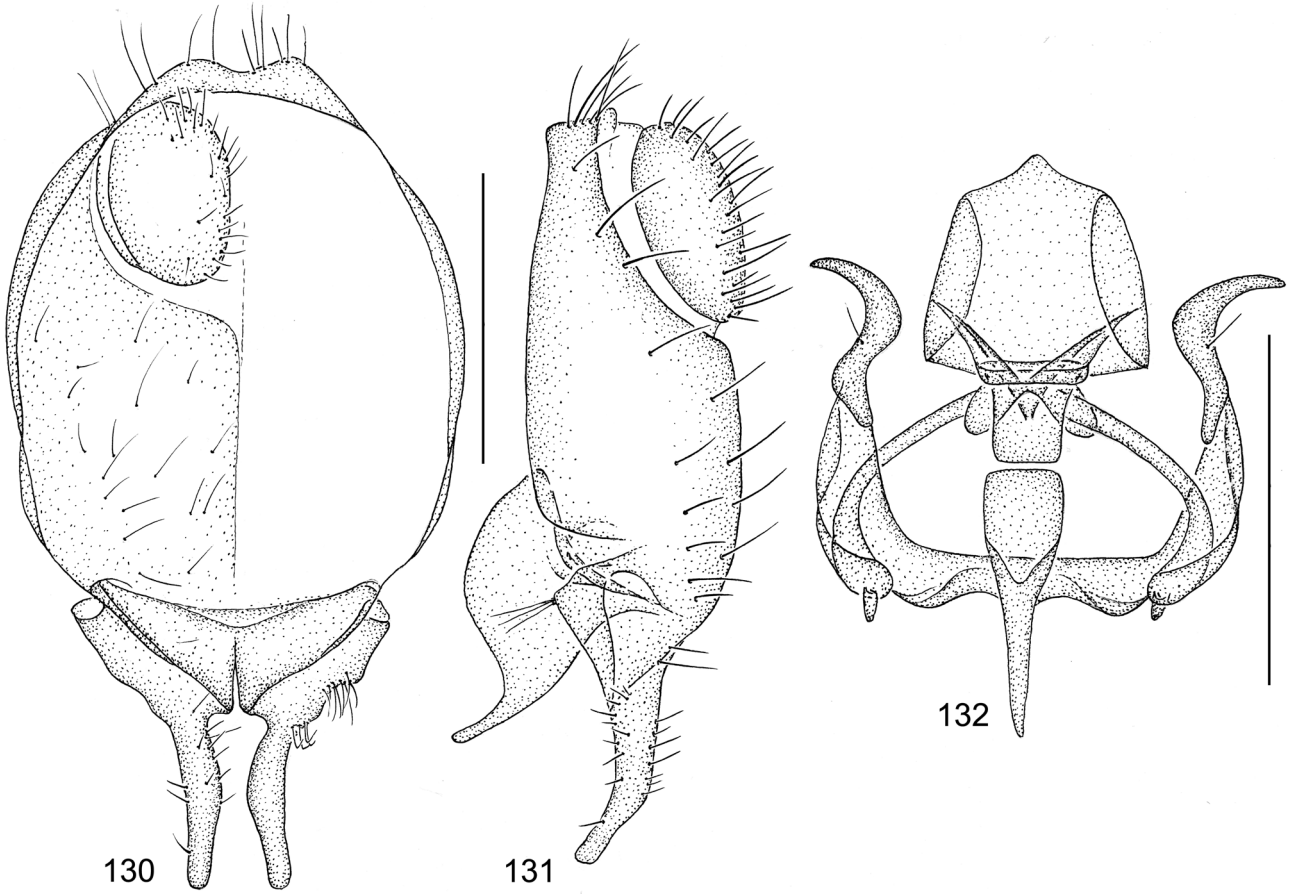
Ephydra gracilis Packard 1871: 105.—Aldrich 1912: 78 [biology, description].—Mathis and Zatwarnicki 1990b: 903 [revised status]; 1995: 243 [world catalog].
Ephydra cinerea Jones 1906: 159.—Sturtevant and Wheeler 1954: 168 [distribution, notes, synonymy].—Wirth 1956: 19 [distribution in Bahamas]; 1968: 22 [Neotropical catalog].
Ephydra (Halephydra) cinerea.—Wirth 1971: 371–374 [revision].—Simpson 1976: 264 [description and Figs. of larva and puparium].

Diagnosis. This is the only known species of the subgenus *Halephydra* that is known to occur in the Caribbean basin and is distinguished by the following combination of characters: cruciate interfrontal setae weak or lacking; crossvein dm-cu forming acute angle with vein CuA_1; palpus relatively small; mesonotum strongly microtomentose, whitish gray. Medium-sized to moderately large shore flies, body length 3.00–4.60 mm; general coloration gray, often with some faint greenish or bluish gray.

Head: Head ratio 0.71–0.75; frontal ratio 0.60–0.63; mesofrons with luster. Facial ratio 0.95–1.00. Eye ratio 0.93–0.96; gena-to-eye ratio 0.39–0.43; gena relatively high, concolorous with face.

Thorax: Scutum (vestiture and coloration); scutellum (shape). Acrostichal setae; prescutellar area of female; anepisternum (setae along posterior margin). Wing length 2.10–3.20 mm; costal vein ratio 0.34–0.36; M vein ratio 0.65–0.69.

Abdomen: Male terminalia (Figs. 130–132): As described under the subgenus.



FIGURES 130–132. Structures of male and female terminalia of *Ephydra gracilis* Packard. (130) epandrium, cerci, surstyli, posterior view; (131) same, lateral view; (132) aedeagus, aedeagal apodeme, gonites, hypandrium, dorsal view.

Type material. This species was originally described from puparia, and these have apparently been lost. Dr. Norman D. Woodley (personal communication) conducted a thorough search of the alcoholic collections at the Museum of Comparative Zoology and could not find the specimens of *E. gracilis* that Packard had studied.

Specimens of *E. gracilis* were found that were collected in 1871 by a J. A. Allen, and Packard could have studied these. But as Mr. Allen is not one of the collectors Packard mentioned in the original description, these specimens cannot be considered as part of the type series.

The lectotype male of *Ephydra cinerea* Jones (designated by Arnaud 1979: 349) is labeled "♂/Redondo Los Angeles Co V-23-98 [23 May 1898]/1169/LectoTYPE Ephydra CINEREA Jones/6 Ephydra [a manuscript name] n. sp./Ephydra var gracilis Pack. det. Cresson 1919/LECTOTYPE ♂ Ephydra cinerea Jones det 1974 PHArnaud & VFLee." The lectotype, allolectotype, and two paralectotypes are deposited in the CAS (4108).

Type locality. United States. Utah. Salt Lake: Great Salt Lake (40°45'N, 112°12.9'W).

Additional specimens examined. *ANGUILLA.* Prickly Pear Island (18°20.5'N, 63°74.8'W), 28 Mar 1958, J. F. G. Clarke (9♂, 15♀; USNM). Rendezvous Salt Pond (18°10.8'N, 63°06.7'W), 26 Mar 1992, W. E. Steiner, J. M. Swearingen (17♂, 23♀; USNM).

BAHAMAS. Exuma Cays: Staniel Cay (Staniard Cay; 24°14'N, 76°26'W), 13 Jan 1953, E. B. Hayden (50♂, 50♀; AMNH).

CURAÇAO. Koraal [Coral] Specht (3 km E Willemstad; 12°04.9'N, 68°52.9'W), 8–15 Feb 1987, W. E. Steiner, J. M. Swearingen (3♂, 13♀; USNM).

DOMINICAN REPUBLIC. Monte Cristi: Monte Cristi (19°51.5'N, 71°31.5'W; salt works), 18 May 1995, W. N. Mathis (3♂, 4♀; USNM).

JAMAICA. Clarendon: Rocky Point (2 km S; near Jackson Bay Cave; black pale; 17°44'N, 77°14'W), 10 Dec 1975, G. F. Hevel (1♂; USNM). *St. Thomas:* Yallahs salt ponds (17°51.8'N, 76°31'W), 14 May 1996, D. and W. N. Mathis, H. Williams (9♂, 6♀; USNM).

MEXICO. Baja California: Tijuana (72 km S; 30°24'N, 116°W), P. H. Arnaud, Jr. (ex; CAS). *Baja California Sur:* Isla del Carmen, Gulf of California (26°N, 111°08.6'W), 18–19 Jul 1984, S. E. Miller (1♂; USNM); Puerto Refugio (29°39.9'N, 11333.9'W), Isla Angel de la Guardia, M. C. Van Duzee (ex; CAS); San José del Cabo (23°03'N, 109°41'W), A. E. Michelbacher, E. S. Ross (ex; CAS); Todos Santos (29°30'N, 114°45'W), C. Ewart, R. C. Dickson (ex; UCR). *Guerrero:* Acapulco (16°50'N, 99°53'W), J. Chillcott (ex; CNC). *Nayarit:* San Blas (22°52'N, 105°06'W), 3 Jul 1964, P. J. Spangler (1♂; USNM). *Oaxaca:* Tehuantepec (16°20'N, 95°14'W; at light trap), 15–23 Jul 1964, P. J. Spangler (1♂; USNM). *Sinaloa:* Mazatlán (23°13'N, 106°25'W), 1–23 Jul 1963, 1964, P. J. Spangler (19♂, 27♀; USNM). *Sonora:* Álamos (27°01.6'N, 10856.4'W), P. H. Arnaud, Jr. (ex; CAS); Bahía Kino (28°47'N, 111°58'W), P. H. Arnaud, E. S. Ross, D. Rentz (ex; CAS); Ciudad Obregón (27°29'N, 110°W; San Jose beach), H. Howden, Martin (; CNC); El Desemboque (29°30'N, 112°23'W), B. Malkin (ex; CAS); Rocky Point (Puerto Peñasco; 31°19.1'N, 113°32.2'W), A. L. Melander (ex; CAS).

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♂, 2♀; USNM).

PUERTO RICO. Bahía Salinas (beach; 17°57.5'N, 67°12'W), 20 Sep 1995, D. and W. N. Mathis (2♂; USNM). Ensenada (17°58.2'N, 66°55.7'W), Nov 1936, Martoreli, G. Wollcott (43♂, 51♀; USNM). Guanica (17°59.3'N, 66°54.4'W), 22 Jul 1952, F. S. Blanton (1♂, 2♀; USNM). Río Grande (18°21.1'N, 65°48.4'W), 11–12 Mar 1964, S. M. Gaud, G. Rivera (2♂, 1♀; USNM).

TRINIDAD. St. George: Chacachacare Island (10°41'N, 61°46'W), 29 Jun 1993, W. N. Mathis (17♂, 9♀; USNM).

TURKS and CAICOS. Providenciales: Crystal Bay (near North West Point; 21°50'N, 72°19'W; sandy scrub forest), 31 Jan 1998, W. E. Steiner, J. M. Swearingen (1♀; USNM).

VIRGIN ISLANDS. St. John: Coral Bay (18°20.9'N, 64°43'W), 22 Jan 1963, P. J. Spangler, Muller (17♂, 20♀; USNM).

Distribution (Map 30): *Australasian/Oceanian:* Hawaiian Islands (Kauai, Oahu). *Nearctic:* United States (Arizona, California, Kansas, Nevada, New Mexico, Ohio, Texas, Utah). *Neotropical:* Bahamas, Curaçao, Mexico (Baja California, Baja California Sur, Guerrero, Nayarit, Oaxaca, Sinaloa, Sonora), Trinidad, Turks and Caicos, West Indies (Anguilla, Dominican Republic, Dutch West Indies, Jamaica, Navassa Island, Puerto Rico, Virgin Islands).

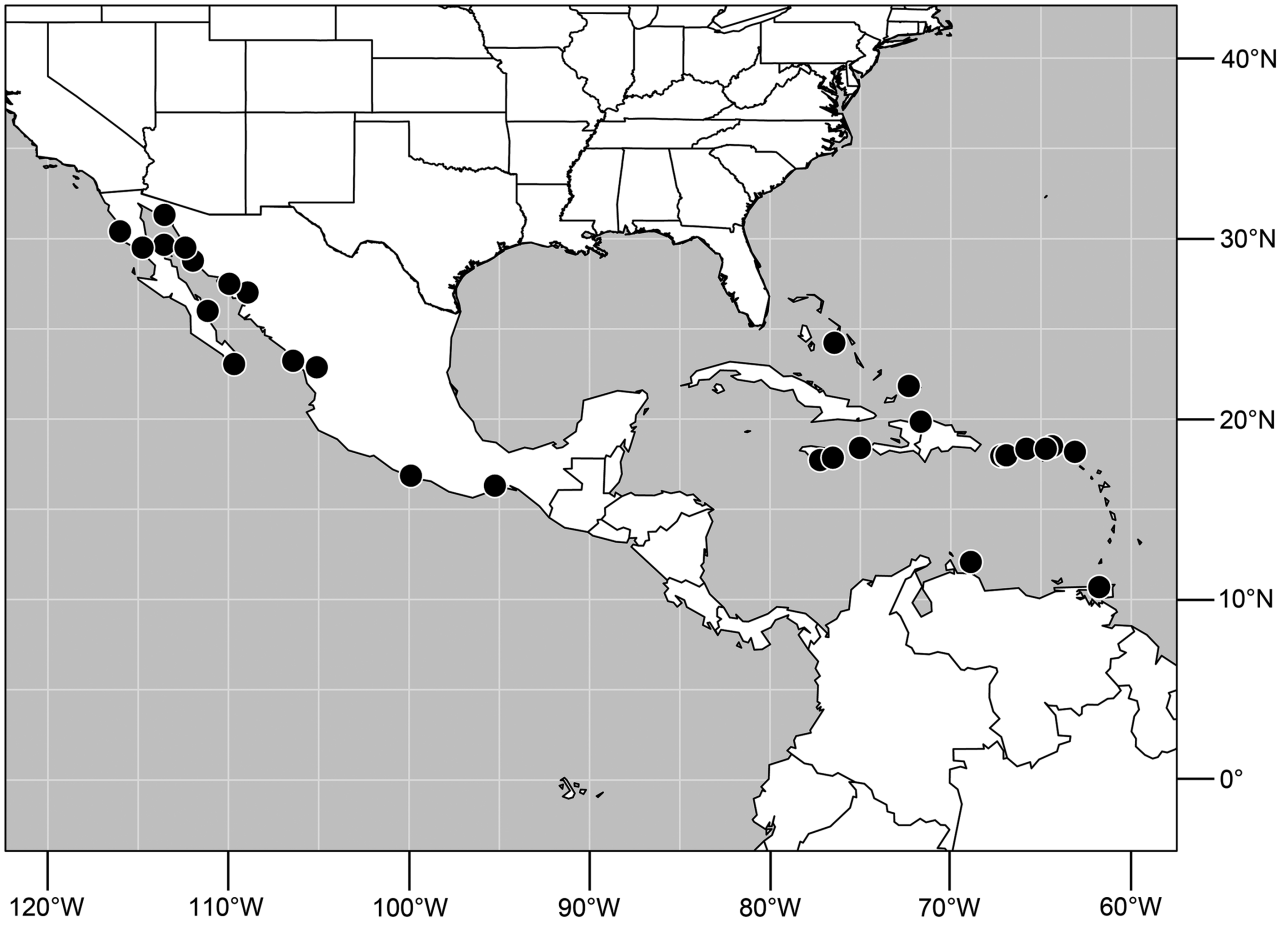
Remarks. Our usage of the name *E. gracilis,* as the senior synonym for this species, reverses a trend established by Sturtevant and Wheeler (1954) when they gave precedence to *E. cinerea* Jones and listed *E. gracilis* as a questionable synonym. Sturtevant and Wheeler argued, incorrectly paraphrasing Aldrich (1912), that Packard's description of the "larva [sic, Packard described the puparium] does not agree with the present species--a point that

we can confirm." we have reexamined the available data and have concluded that *E. gracilis* can indeed be recognized, and as this name has age priority we have recognized it as the senior synonym. Our argument is as follows.

Packard's description of the puparium, although brief, does mention a few salient characters that are unique to this species. The respiratory tube is much longer than that of any other species, "being as long as the body." The body is generally smaller and more slender, and the "feet" (prolegs) are more prominent. In addition, as Packard also noted, this species occurs abundantly around the Great Salt Lake. This combination of characters does describe this species adequately, and it is the most abundant species known to occur around the Great Salt Lake.

Aldrich (1912: 79), contrary to Sturtevant and Wheeler's incorrect paraphrasing of his work, did not say that Packard's description "does not agree with the present species." Instead, Aldrich noted the brevity of Packard's description and that the description was "scarcely" recognizable and unsatisfactory by the omission of a striking distinction (the basal filaments of the "anal" tube). Nevertheless, Aldrich concluded that "it is certain that Packard was describing a strikingly small *Ephydra* common in Great Salt Lake, and there is but one species [*E. gracilis*], whether he [Packard] described it well or not."

As we believe that the puparia Packard described can be recognized, and as *E. gracilis* has distinct age priority by over thirty years, we can only conclude that this species is recognized by the name its original describer gave, i.e., *E. gracilis.*



MAP 30. Distribution map for *Ephydra gracilis* Packard.

Genus *Setacera* Cresson

Setacera Cresson 1930: 116 [type species: *Ephydra pacifica* Cresson, by original designation].—Sturtevant and Wheeler 1954: 201–204 [key to North American species].—Wirth 1965: 754–755 [catalog of North American species]; 1968: 24 [catalog of South American species].—Mathis 1982b: 1–57 [revision].—Mathis and Zatwarnicki 1995: 252–254 [world catalog].

Diagnosis. *Setacera* is distinguished from other genera of Ephydrini by the following characters: Moderately small to large shore flies, body length 2.46–5.85 mm.

Head: Mesofrons shiny, with metallic luster; cruciate, interfrontal setae lacking or weakly developed; lateroclinate, fronto-orbital setae 2 pairs; fronto-orbits shiny with metallic luster concolorous with mesofrons; basal flagellomere with prominent seta on lateral surface below aristal insertion; arista with subpectinate branching along dorsal surface from between one-half to 2/3 of aristal length; dorsum of interfoveal facial ridge sloping very gradually; ridge projecting markedly forward in many species attaining broad apex from which arched face extends ventrally at nearly a right angle, face receding to oral margin in other species; antennal groove distinct but not deeply impressed; postocular setae normally developed, not conspicuous; larger facial setae declinate.

Thorax: Dorsocentral setae 5 (1+4); presutural supra-alar seta 1, generally subequal to posterior notopleural setae in species of Western Hemisphere.

Abdomen: Structures of male terminalia symmetrical but unusually complicated by addition of several secondary processes and prongs; epandrium elongate; well developed surstyli generally fused medially, projecting from ventral margin of epandrium; see Figs. of species for further detail. Female ventral receptacle with operculum as high as wide, broadly rounded dorsally; extended process more or less J-shaped.

Distribution. Among the genera of Ephydrini, *Setacera* is by far the most widely distributed, with species occurring in all major faunal realms. The neotropics, however, have a depauparate fauna, and the species considered herein are members of a single species group, known only from the Western Hemisphere. A single species, *S. trichoscelis,* is known from South America.

Natural history. The immature stages of *Setacera* and *Ephydra* closely resemble each other, and Johannsen (1935) considered them to be the most highly specialized of the family. Like larvae of *Ephydra,* those of *Setacera* are characterized by long, terminal respiratory tubes and by eight pairs of short, conical, abdominal prolegs, of which the last pair is the largest, with claws opposable to those of the other prolegs. Johannsen (1935) figured the cephalopharyngeal skeleton of *S. needhami,* a species described inadvertently from the immature stages (Cresson 1935), and Foote (1982) described and illustrated the immature stages of *S. atrovirens.*

Unlike *Ephydra,* members of *Setacera* occur primarily in freshwater habitats, although Johannsen (1935) reared a specimen of *S. atrovirens* from a puparium collected in a brine pool near Ithaca, New York. Where members of *Setacera* do occur, even within what appears to be their preferred habitat, specimens are not collected frequently, and collection of a good series usually requires diligent persistence.

Most species seem to prefer lentic aquatic systems, especially where a layer of floating algae has accumulated on the water's surface. This is the typical habitat of most species of Ephydrini, and their crochet-bearing prolegs are apparently an adaptation to this habitat, allowing movement through and attachment to the algae.

Discussion. Some members of *Setacera* have secondarily sexually dimorphic features. Males of these species bear prominent hair-tufts of varying lengths at tibial apices and often on the coxae. The extent and length of tufts, or their absence, are excellent species-level characters.

The species now included in *Setacera* were previously placed in the genus *Ephydra* Fallén, and some recent authors still prefer the precedent of *Setacera* as an included subgenus of *Ephydra* (Giordani Soika 1956, Dahl 1959). *Setacera* is indeed closely related to *Ephydra*, as evidenced by the similarity of adults and immatures of both genera. *Setacera*, however, can be consistently distinguished in both sexes from all other genera of Ephydrini and its monophyly corroborated by the following synapomorphies: (1) *Basal flagellomere seta:* Aside from the arista, there are usually no other large structures emanating from the basal flagellomere. Specimens of *Setacera*, however, have a large seta inserted just below the aristal insertion on the lateral surface. (2) *Vertico-orbits:* Within the tribe Ephydrini, the vertico-orbits are generally either shiny or densely microtomentose and grayish, appearing dull. This area, in specimens of *Setacera,* is uniquely invested with a dense patch of microtomentum that appears velvety. Velvety areas occur elsewhere in a few species of the tribe (parafrons in *Cirrula gigantea* Cresson; frons and orbits in *Ephydra auripes* Aldrich) but not in the specific area as described for *Setacera.* (3) *Genal seta:* This seta is usually very prominent, arising below the eye. Although this seta is still larger than surrounding ones in specimens of *Setacera,* its comparative size is smaller, and for convenience, we have compared it with the length of the arista. (4) *Cruciate interfrontal setae:* Although some species of the tribe Ephydrini do not have these setae, most genera have at least a few species in which they occur. Consequently, our interpretation of the general groundplan of the tribe is for their presence, and their lack in *Setacera* is apparently unique. (5) *Prescutellar acrostichal setae:* As with the preceding characters, these setae are generally present in Ephydrini. We know of no specimens of *Setacera*, however, where they are present, and we interpret this apparent loss to be synapomorphic.

As only the *pacifica* group occurs in the Neotropics, the comments to follow will deal primarily with that taxon. Earlier, Mathis (1982b) presented his hypotheses on the arrangement of other lineages.

The *aldrichi* group is the sister group of the *pacifica* group, and it is characterized and its monophyly established by: (1) *Configuration of aedeagus:* As before, the aedeagus is typically broadly rounded apically and almost as wide as long. Males of the *aldrichi* group have a somewhat pointed aedeagus that we interpret to be apomorphic. (2) *Configuration of epandrium:* Males of the *aldrichi* group have an anteroventral, digitiform process, apparently a unique condition, and one that we interpret to be apomorphic.

The monophyly of the *pacifica* group is established by: (1) *Configuration of vertico-orbits:* In *Setacera* this band is more or less broad and usually has a subanterior swelling. But in members of the *pacifica* group this band is very narrow and is sometimes difficult to detect. The narrowed aspect of this character is interpreted to apomorphic. (2) *Configuration of female ventral receptacle:* For most ephydrines, the operculum is typically wider than high. For females of the *pacifica* group, however, the height is subequal to its width, an apomorphic character.

Key to Neotropical species of *Setacera*

1. Presutural supra-alar seta weak, length about half that of presutural seta; overall body coloration more bluish gray; midtibia of males lacking apical tufts of long hairs; females with 6 visible abdominal segments from dorsal view . . . . . *S. pilicornis* (Coquillett)
- Presutural supra-alar seta well developed, subequal to presutural seta; overall body coloration more brownish; midtibia of males with apical tufts of long hairs; females with 7 visible abdominal segments from dorsal view 2
2. Midfemur of males with posteroventral row of numerous (>40) long setae near base subequal in length to greatest width of femur; sternites 3 and 4 of males lacking dense patch of well-developed setae posteromedially; anal plate of females prominent, length equal to width . . . . . .*S. trichoscelis* Mathis
- Midfemur of males lacking posteroventral row of setae as above; sternites 3 and 4 of males with dense patch of well-developed, conspicuous setae posteromedially; anal plate of females not as prominent, width greater than length . . . . . .*S. durani* Cresson

The *pacifica* Group

Species Included: *Setacera durani* Cresson; *S. pilicornis* (Coquillett); and *S. trichoscelis* Mathis.

Diagnosis. Specimens of the *pacifica* group may be distinguished by the following characters:

Head: Antennal grooves sparsely microtomentose, subshiny, nearly concolorous with dorsum of interfoveal hump and with similar metallic luster; vertico-orbits with velvety microtomentose band very narrow, inconspicuous.

Thorax: Presutural supra-alar seta well developed, subequal or slightly weaker than posterior notopleural seta, distance between it and presutural seta slightly less than that between notopleural setae; fore- and midtibiae mostly dark and concolorous with femora, at most with tibial-femoral articulation pale.

Abdomen: Tergite 5 of male longer than either tergites 3 or 4, narrowly to bluntly rounded, width at apex much less than length; male sternites 3 and 4 usually with dense patch of stout setae toward posterior margin, secondarily reduced in some species (*S. needhami* and *S. trichoscelis*). Male terminalia as follows: epandrium subtriangular in posterior view, much narrower dorsally than ventrally, dorsum narrowly rounded, becoming gradually broader, truncate ventrally, lacking medial sulcus (*S. pacifica* with superficially indication); cerci almost as wide as high in lateral view, with anteroposterior orientation; surstyli broadly fused basally (best seen in posterior view), usually with lateral and sometimes with medial projections (shape diagnostic at species level), apically curved anteriorly in lateral view; gonite with prong-like projections, conformation and arrangement differing with species; aedeagus bluntly rounded apically; hypandrium with 1–2 projections, at least partially and usually mostly well sclerotized. Female terminalia as follows: tergite 7 variable; tergite 8 comparatively short, almost as wide as high in some species, shape of dorsum in lateral view varying with species; 8th sternites elongate, 4 or more times longer than wide; sternite 9 vertically oriented, projected posteriorly, well sclerotized, forming 2 conical projections; sternite 9 with l setae borne at apex of sternite 9 projections, 2 large setae on each, these approximate, often difficult to distinguish; female ventral receptacle with operculum as high as wide, subtrapezoidal to dome-shaped in lateral view, extended process with cervix as long as corpus, more or less parallel sided, juncture of cervix and corpus

indicated on medial surface of curvature by small, lateral indentation, forming budlike projection in lateral view, curvature of corpus wide, open.

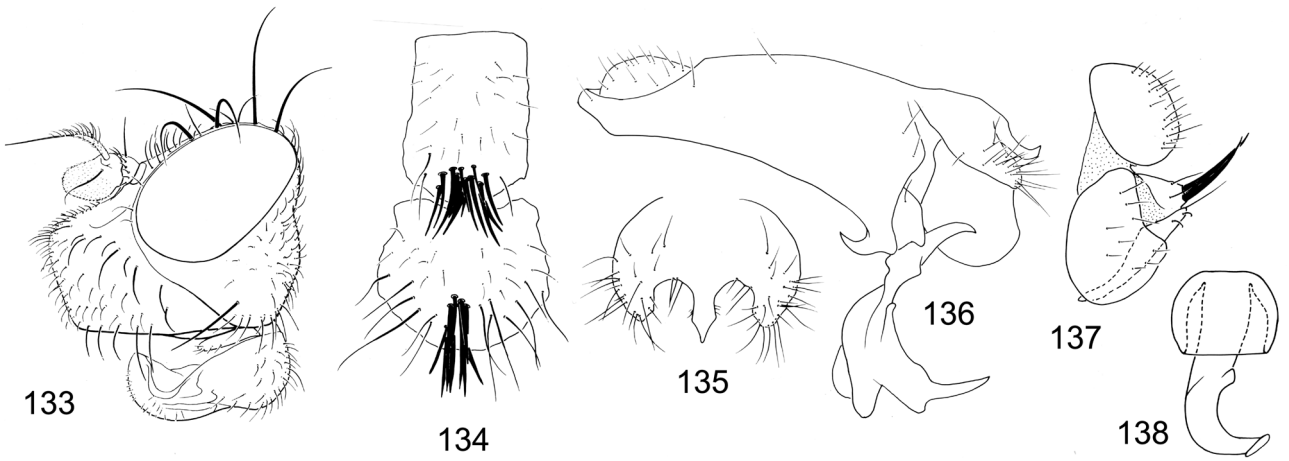
Distribution. New World. Except for *S. trichoscelis,* this species group is North American, mostly occurring west of the 100 meridian. An obvious exception is *S. pilicornis,* which occurs in southeastern United States and in Mexico.

31. *Setacera durani* Cresson

Figs. 133–138, Map 31

Setacera durani Cresson 1935: 348.—Sturtevant and Wheeler 1954: 202–203 [review].—Wirth 1965: 755 [Nearctic catalog].—Mathis 1982b: 38–40 [revision, Figs. of head, thorax, male terminalia].—Mathis and Zatwarnicki 1995: 253 [world catalog].

Diagnosis. *Setacera durani* is similar to *S. needhami* and *S. trichoscelis* but is distinguished by the following characters: interfoveal facial ridge more explanate; setation of male midfemur lacking conspicuous row of 4–7 larger setae along posteroventral surface; apical tufts of longer hairs of mid- and hindtibiae not as long; 3rd and 4th sternites of male with clump of stout setae at posteromedial edge; anal plate of female not as prominent, width greater than length; structures of male terminalia distinctive. Medium-sized to moderately large shore flies, body length 3.40–5.00 mm; coloration mostly gray to bluish green, generally microtomentose except dorsum which is subshiny to shiny with distinct metallic luster.



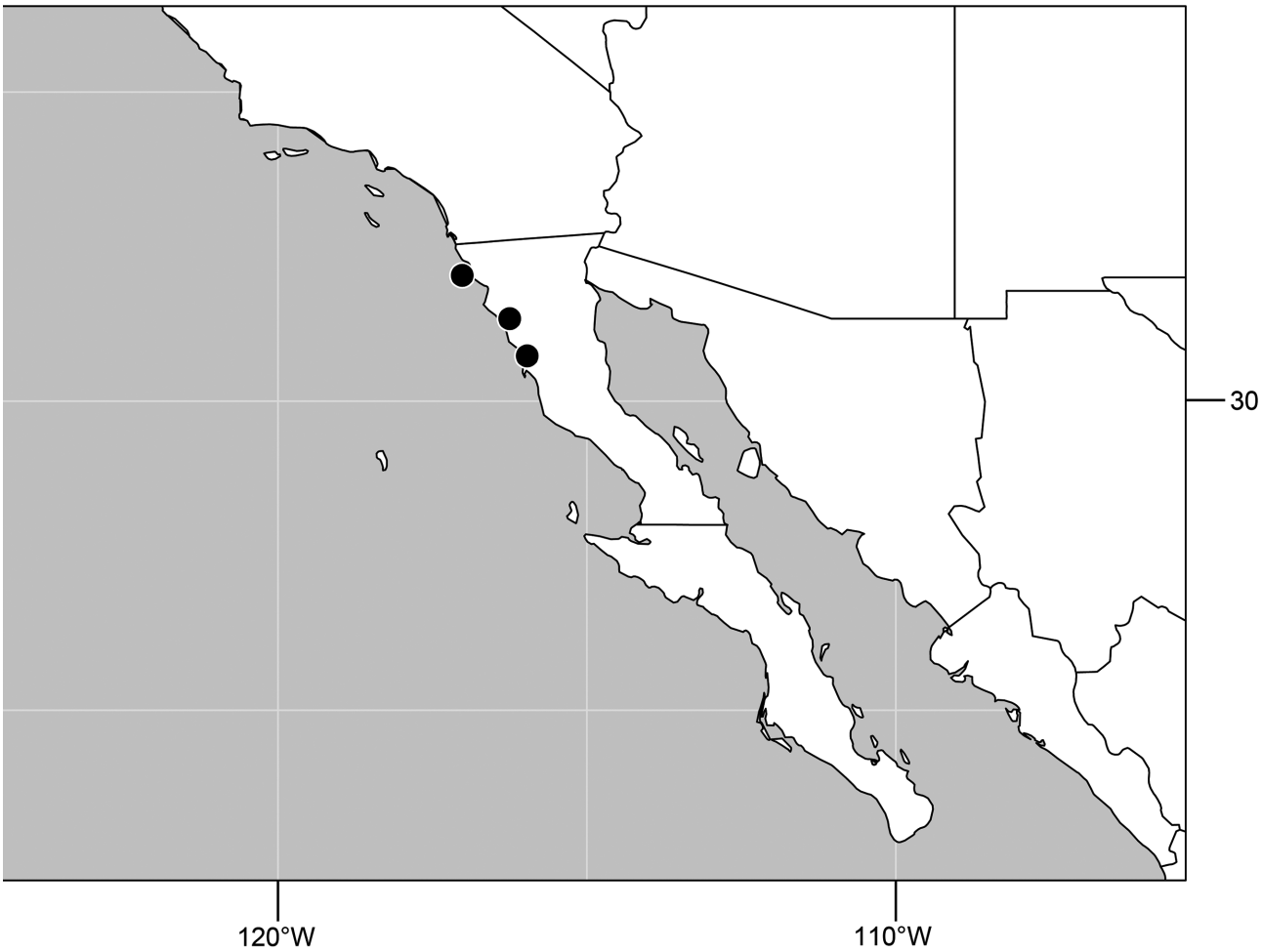
FIGURES 133–138. *Setacera durani* Cresson. (133) head, lateral view; (134) male sternites 3 and 4, ventral view; (135) surstyli, posterior view; (136) male terminalia, lateral view; (137) female terminalia, lateral view; (138) female ventral receptacle, lateral view (from Mathis 1982).

Head (Fig. 133): Head ratio 0.61; frontal ratio 0.48; coloration of frons, fronto-orbital plates, and dorsum of interfoveal ridge concolorous, greenish blue with shiny metallic luster; frons gradually becoming narrower anteriorly, sparsely setose, setae small, generally inconspicuous; ocellar triangle microtomentose, brownish, microtomentose; ocelli in equilateral triangle. Antenna mostly unicolorous, brownish black, microtomentose; scape and pedicel with some grayish green coloration ventrally; arista thickened on basal 1/3; basal 2/3 with dorsal subpectinate branching, length of longer rays about twice greatest width of arista. Face bicolored; dorsum of interfoveal ridge bluish green, mostly shiny, becoming duller and brownish toward edge of facial ridge; lower portion of face silvery white, from some angles with slight brownish to olivaceous coloration; setae along anterior edge of ridge larger, stout, otherwise facial setae relatively small, generally inconspicuous, uniformly scattered; anterior margin of lower portion of face in profile receding slightly to oral margin. Eye ratio 0.80, orientation of eye at oblique angle to plane of epistoma. Gena-to-eye ratio 0.52; gena mostly concolorous with lower portion of face, posterior portion becoming duller, grayer, with some faint olivaceous coloration.

Thorax: Mesonotum dull, microtomentose along anterior margin, becoming progressively shinier posteriorly, posterior portion distinctly shiny with metallic, slightly brownish green luster; scutellum concolorous with

posterior portion of mesonotum; setae other than larger setae reduced, generally inconspicuous. Pleural areas mostly dull, microtomentose to microtomentose; notopleuron with some subshiny to shiny areas like mesonotum above; coloration generally olivaceous to gray, becoming grayer ventrally and anteriorly. Femora mostly gray with some greenish or bluish coloration; tibiae mostly black; hindtarsi mostly concolorous with hindtibia; mid- and foretarsi more yellowish orange. Costal vein ratio of averaging 0.27; M vein ratio 0.79.

Abdomen: Dorsum generally subshiny, extreme anterior margin mostly dull gray, becoming subshiny posteriorly with metallic greenish luster; venter entirely dull, gray to olivaceous green. Tergite 5 of males almost as long as combined length of tergites 3 and 4, becoming narrower to subtruncate posterior edge. Epandrium of male terminalia (Figs. 135–136) rounded dorsally, lateral margins expanding laterally, broadly truncate ventrally where surstyli attach; surstyli in posterior view (Fig. 135) fused medially forming broadly U-shaped process with median, pointed process as long as either surstylar arm, each arm broadly rounded and densely setose; aedeagus (Fig. 136) rather bulbous, broadly produced, rounded apically. Sternites 3 and 4 of males (Fig. 134) with dense clusters of stout setae at posteromedial edge. Female terminalia, including female ventral receptacle, as in Figs. 137–138.



MAP 31. Distribution map for *Setacera durani* Cresson.

Type material. The holotype male is labeled "Los Angeles R[iver]. Cal[ifornia]., Aug. 15, 1916, V. Duran, Coll/♂/TYPE No. 6515 Setacera DURANI E T Cresson, Jr. [red]." The holotype is in good condition and is deposited in the ANSP (6516). Cresson's original description lists a female paratopotype, also in the Academy.

Type locality. United States. California. Los Angeles: Los Angeles River (33°45'S, 118°11.3'W).

Additional specimens examined. *MEXICO. Baja California:* San Vicente (31°20'S, 116°15'W), 20 Sep 1941, E. S. Ross, G. Bohart (1♂; CAS); Santo Domingo (5.7 m E; Hamilton Ranch; 30°44'S, 115°58'W), 22 Apr 1963, H. B. Leech, P. H. Arnaud, Jr. (4♂, 1♀; CAS, USNM); Tijuana (60 km S; 32°02'S, 117°01'W), 26 Jun 1950, A. L. Melander (1♂; USNM).

Distribution (Fig. 31). This species occurs in the Southwest of the United States (California, Arizona, Oregon,

Nevada, Colorado) and extends into northern Mexico. We have examined many specimens from the three sites in Baja California noted previously.

Natural history. Practically nothing is known about the ecology or immatures of this species. Foote (1982) collected adults from an algal mat that had formed in a small, sewage-polluted stream near Patagonia, Arizona.

Remarks. This species and *S. pacifica* are sister species, as evidenced by the joint possession of a median, triangular projection between the surstyli. This species is distinguished externally from *S. pacifica* by the evenly rounded, supraspiracular convexity and by the distinct tuft of setae at the apex of the midtibia.

32. *Setacera pilicornis* (Coquillett)

Figs. 139–145, Map 32

Ephydra pilicornis Coquillett 1902: 184.

Setacera pilicornis.—Sturtevant and Wheeler 1954: 204 [generic combination].—Wirth 1968: 24 [catalog, distribution].—Mathis 1982b: 49–53 [revision, Figs. of head, thorax, ♂ terminalia].—Mathis and Zatwarnicki 1995: 254 [world catalog].

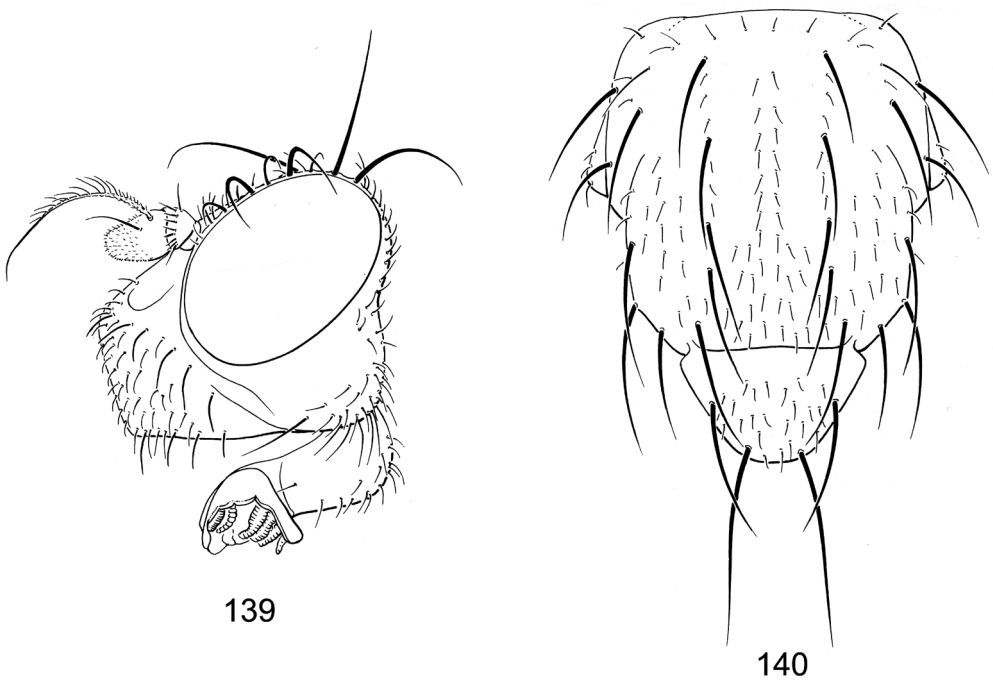
Setacera knabi Cresson 1935: 346.—Sturtevant and Wheeler 1954: 204 [synonymy].

Diagnosis. This species is similar to other species of the *pacifica* group, especially *S. trichoscelis* Mathis, but is distinguished by the following combination of characters: Overall body coloration more bluish gray; antennal grooves sparsely microtomentose, subshiny, nearly concolorous with dorsum of hump; vertico-orbits with velvety microtomentum very narrow, inconspicuous; postpronotal seta weak, length less than 1/2 presutural seta; distance between presutural seta and posterior notopleural seta slightly less than between notopleural setae; forecoxa lacking shaggy-appearing setulae; fore- and midtibiae mostly dark and concolorous with femora, at most with tibial-femoral articulation pale; midtibia of male lacking apical tufts of long hairs; tergite 5 of male longer than either tergites 3 or 4, narrowly to bluntly rounded, width at apex much less than length; sternites 3 and 4 of male usually with dense patch of stout setae toward posterior margin; conformation of male terminalia (Figs. ?) unique; females with 6 visible abdominal segments from dorsal view. Medium-sized to moderately large shore flies, body length 3.30–4.10 mm; subshiny to shiny dorsally, with faint to distinct, greenish blue to bluish green metallic luster.

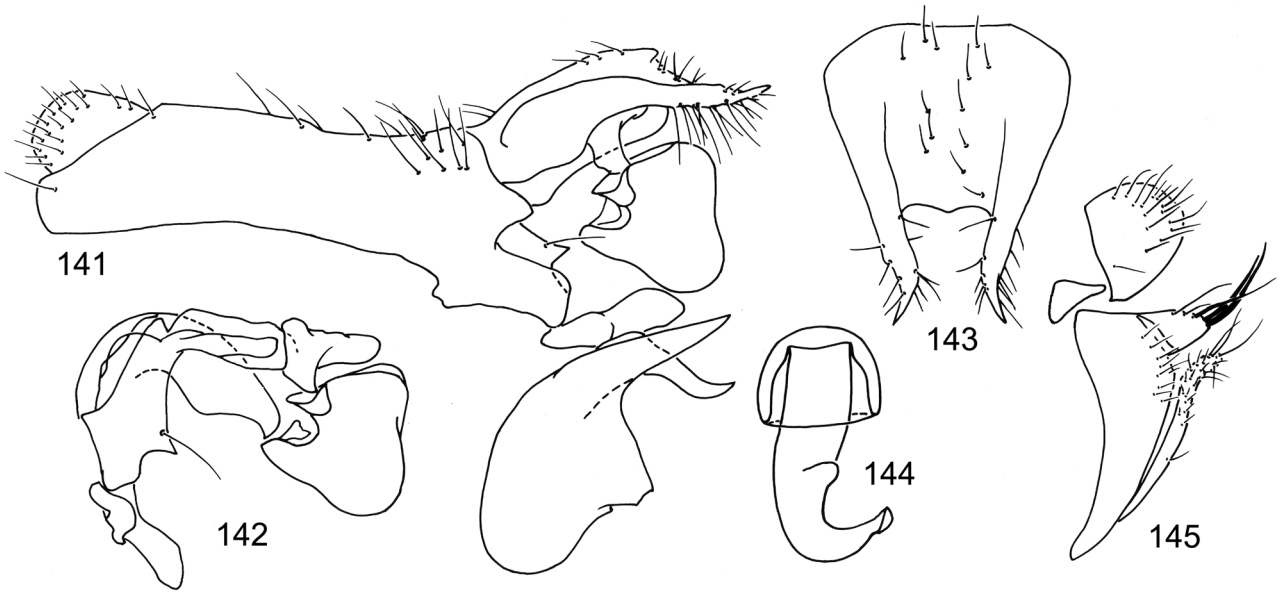
Head (Fig. 139): Head ratio 0.56–0.57; frontal ratio 0.52–0.55; mesofrons luster metallic blue to greenish blue, occasionally bluish green; a large patch of thinly scattered, pilose hairs on either side of frons midline; parafrons dull, charcoal gray in color; ocelli in isosceles triangle, distance between posterior pair shorter than between medial ocellus and either posterior ocellus; fronto-orbital plates concolorous with mesofrons, shiny. Antenna black, with considerable grayish vestiture; basal flagellomere slightly longer than combined length of scape and pedicel. Face mostly silvery white except for dorsal shelf; antennal groove and interfoveal space concolorous, with metallic luster similar to mesofrons coloration; area immediately surrounding base of antenna with some dull, grayish color; lower portion of face receding, facial angle in profile approximately 110°; length of lower portion longer than distance between base of antenna and facial angle. Eye ratio 0.78–0.83, oval, with oblique orientation to epistoma.

Thorax (Fig. 140): Mesonotum dull, microtomentose to subshiny, generally dark brown but with some shiny metallic luster; anterior portion duller, progressively darker and shinier posteriorly; pleural areas olivaceous brown to grayish brown; anepisternum and anepimeron generally concolorous, with some brownish coloration dorsally; katepisternum concolorous with ventral portion of anepisternum; forecoxa mostly gray, somewhat shiny. Femora concolorous, mostly dull, grayish blue, heavily microtomentose, apices pale; tibiae blackish blue, less microtomentose than femora; tarsomeres mostly black; legs of both sexes rather plain, lacking tufts of long hairs toward the apices of mid- and hindtibiae. Costal vein ratio 0.26–0.28; M vein ratio 0.80–0.83.

Abdomen: Mostly unicolorous, usually grayish blue but often with considerable brownish green coloration; posterior margins of segments often more subdued, paler. Tergite 5 of male almost as long as combined length of 3rd and 4th segments; lateral margins tapered gradually to truncate apex which is almost half the width of base. Male terminalia (Figs. 141–143): epandrium more or less parallel sided; surstyli attached basally to ventral margin of epandrium, fused medially but with acutely-angled apical processes; aedeagus rather bulbous, broadly produced, rounded apically; sternite 5 more or less U-shaped, each posteroventral arm produced into well-sclerotized, sharply-angled processes. Female terminalia, including female ventral receptacle, as in Figs. 144–145.



FIGURES 139–140. *Setacera pilicornis* (Coquillett). (139) head, lateral view; (140) mesonotum, dorsal view (from Mathis 1982).



FIGURES 141–145. *Setacera pilicornis* (Coquillett). (141) male terminalia, lateral view; (142) internal structures of male terminalia, lateral view; (143) surstyli, posterior view; (144) female ventral receptacle, lateral view; (145) female terminalia, lateral view (from Mathis 1982).

Type material. The holotype male of *Ephydra pilicornis* is labeled "BISC[ANYE]. BAY, FL[ORID]A.: Mrs [Annie T.] Slosson, Collector/Type No 6645, U.S.N.M. [red]." The holotype is in good condition and is deposited in the USNM (6645).

The holotype male of *Setacera knabi* is labeled "Miami, 23.11.12 [23 Feb 1912] Fl[orid]a/ Fredk Knab, Collector/♂/ TYPE No., Setacera KNABI ♂/E. T. Cresson, Jr. [pink], Type No, 51098, USNM [red]." The holotype is in good condition and is deposited in the USNM (51098).

Type locality. United States. Florida. Biscayne Bay (25°33.5'S, 80°12.6'W).

Additional specimens examined. *BAHAMAS.* New Providence: Carmichael area (25°01'S, 77°25'W; black

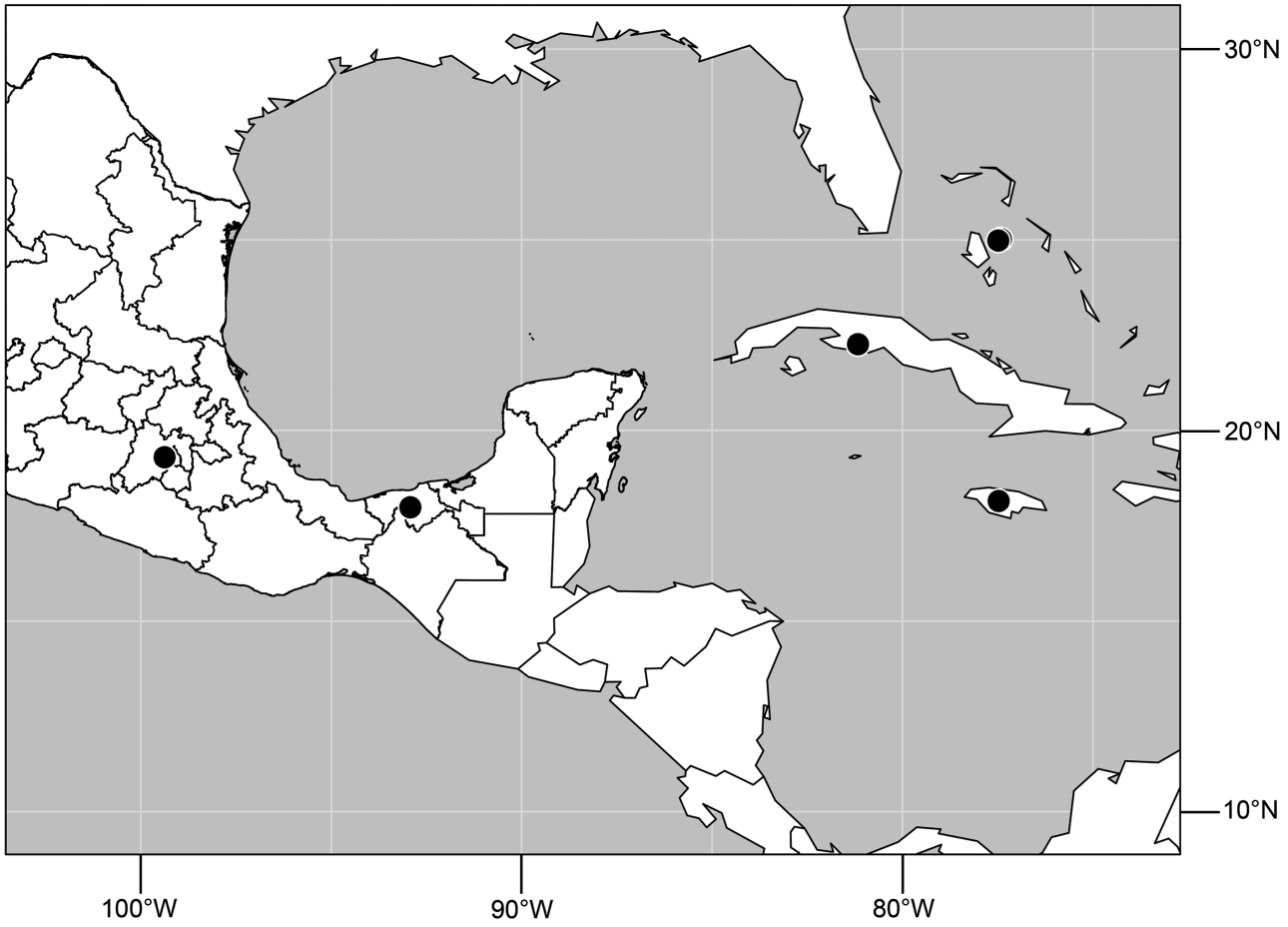
light in Caribbean pine forest and scrub), 17 Apr 2007, J. M. Swearingen, W. E. Steiner (1♀; USNM); Coral Harbour (24°59'S, 77°29'W; black light in gap of scrub forest near beach), 16 Apr 2007, W. E. Steiner, J. M. Swearingen (1♂; USNM).

CUBA. Matanzas: Playa Larga (1 km E; 22°15.9'N, 81°09.9'W), 2 May 1983, W. N. Mathis (7♂, 19♀; USNM).

JAMAICA. Manchester: near Clandon (18°09'N, 77°28.3'W), 8 May 1996, D. and W. N. Mathis, H. Williams (1♀; USNM).

MEXICO. México: La Marquesa, Las Cruces Park (19°17.8'N, 99°22.2'W), 5–9 Jul 1965, O. S. Flint, Ortiz (1♀; USNM). *Tabasco:* Villahermosa (17°59'N, 92°55'W), 6 Aug 1964, P. J. Spangler (3♂, 5♀; USNM).

Distribution (Map 32). *Nearctic:* USA (Florida, Georgia, Louisiana, Mississippi, South Carolina). *Neotropical:* Bahamas, Mexico (México, Tabasco), West Indies (Cuba, Jamaica).



MAP 32. Distribution map for *Setacera pilicornis* (Coquillett).

Natural history. Numerous specimens of this species were collected as prey of sphecid wasps on St. Catherines Island, Georgia (the wasps were being studied behaviorally and ecologically by Dr. R. W. Matthews and students, University of Georgia).

Remarks. When Sturtevant and Wheeler (1954) reviewed the Nearctic species of *Setacera,* they tentatively listed *S. knabi* Cresson as a junior synonym of *S. pilicornis.* Their uncertainty was because the type specimen of *S. knabi,* stated to be in the USNM, could not be located and studied. The type was subsequently located by Drs. Selwyn S. Roback and Willis W. Wirth among specimens at the Academy of Natural Sciences of Philadelphia that were not returned to the institution of deposition following the untimely death of E.T. Cresson, Jr. We examined the types of both synonyms and can confirm their conspecificity and thus, the status of *S. knabi* as a junior synonym. Only one species of *Setacera* is known to occur in Florida.

Although Coquillett's original description of this species indicates only a single male specimen, which automatically becomes the holotype, the Academy of Natural Sciences of Philadelphia collection contains four

additional specimens labeled as paratypes with Cresson's blue labels. These specimens cannot be paratypes since Coquillett's description specifically lists a single male specimen.

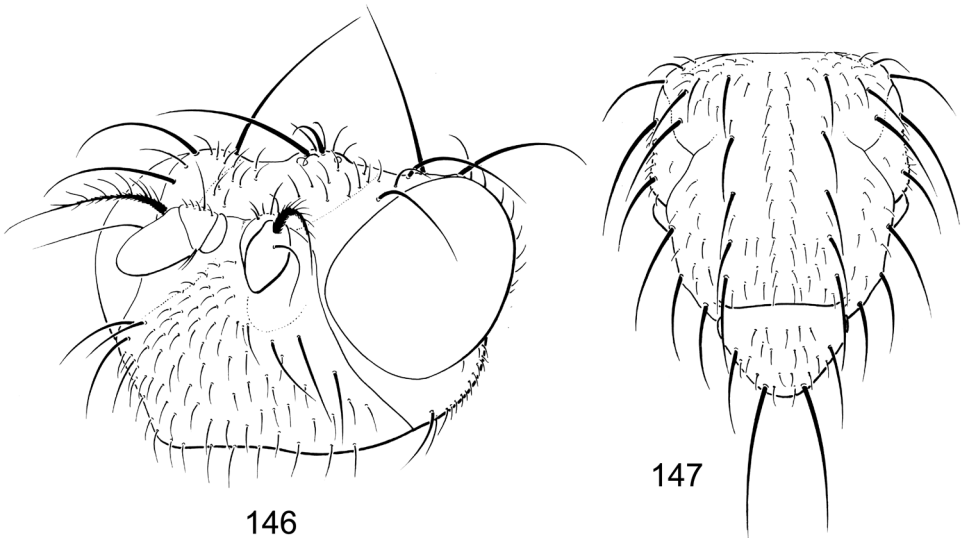
33. *Setacera trichoscelis* Mathis

Figs. 146–150, Map 33

Setacera trichoscelis Mathis 1982b: 53.—Mathis and Zatwarnicki 1995: 254 [world catalog].

Diagnosis. This species closely resembles *S. pacifica* (Cresson) and *S. needhami* Johannsen. The latter two, however, are known only from the Nearctic Region. Specimens of *S. trichoscelis* may be distinguished from those of either congener by the following characters: supraspiracular convexity shallowly rounded; tufts of hair near the apex of the mid- and hindtibiae well developed, as in members of *S. needhami;* and conformation of structures of male terminalia distinctive, particularly the shape of the fused surstyli. Medium-sized to moderately large shore flies, body length 3.20–4.20 mm; mostly subdued, microtomentose, pale brown to grayish green except for subshiny to shiny dorsum.

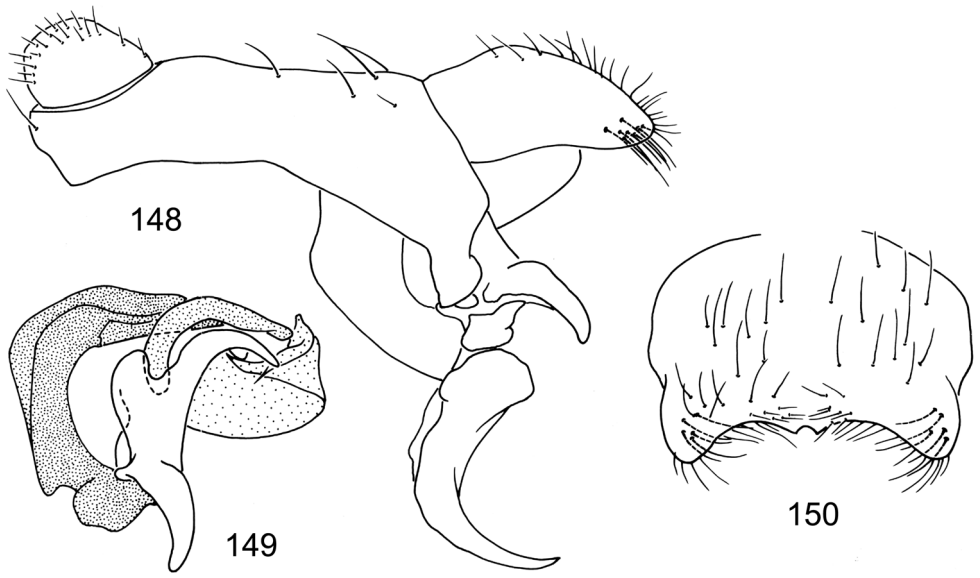
Head (Fig. 146): Head ratio 0.70; frontal ratio 0.49; frons and fronto-orbits distinctly shiny with metallic blue to greenish blue luster; frons with sparsely scattered, hairs, appearing pilose; ocelli in isosceles triangle, distance between posterior pair shorter than between medial ocellus and either posterior ocellus. Antenna unicolorous, blackish brown, dull, microtomentose with grayish vestiture; basal flagellomere slightly longer than combined length of scape and pedicel; pedicel with some greenish color ventrally. Face mostly silvery white except dorsal shelf; antennal groove and interfoveal space with metallic luster similar in color to mesofrons; area immediately surrounding base of antenna with golden brown microtomentum; lower portion of face receding; facial angle approximately 90° from profile view; length of lower portion longer than distance between base of antenna to facial angle. Eye width-to-height ratio 0.92, oval, orientated at oblique angle to plane of epistoma. Gena wide, gena-to-eye ratio 0.43; concolorous with face, becoming duller posteriorly and with some grayish green to olivaceous coloration.



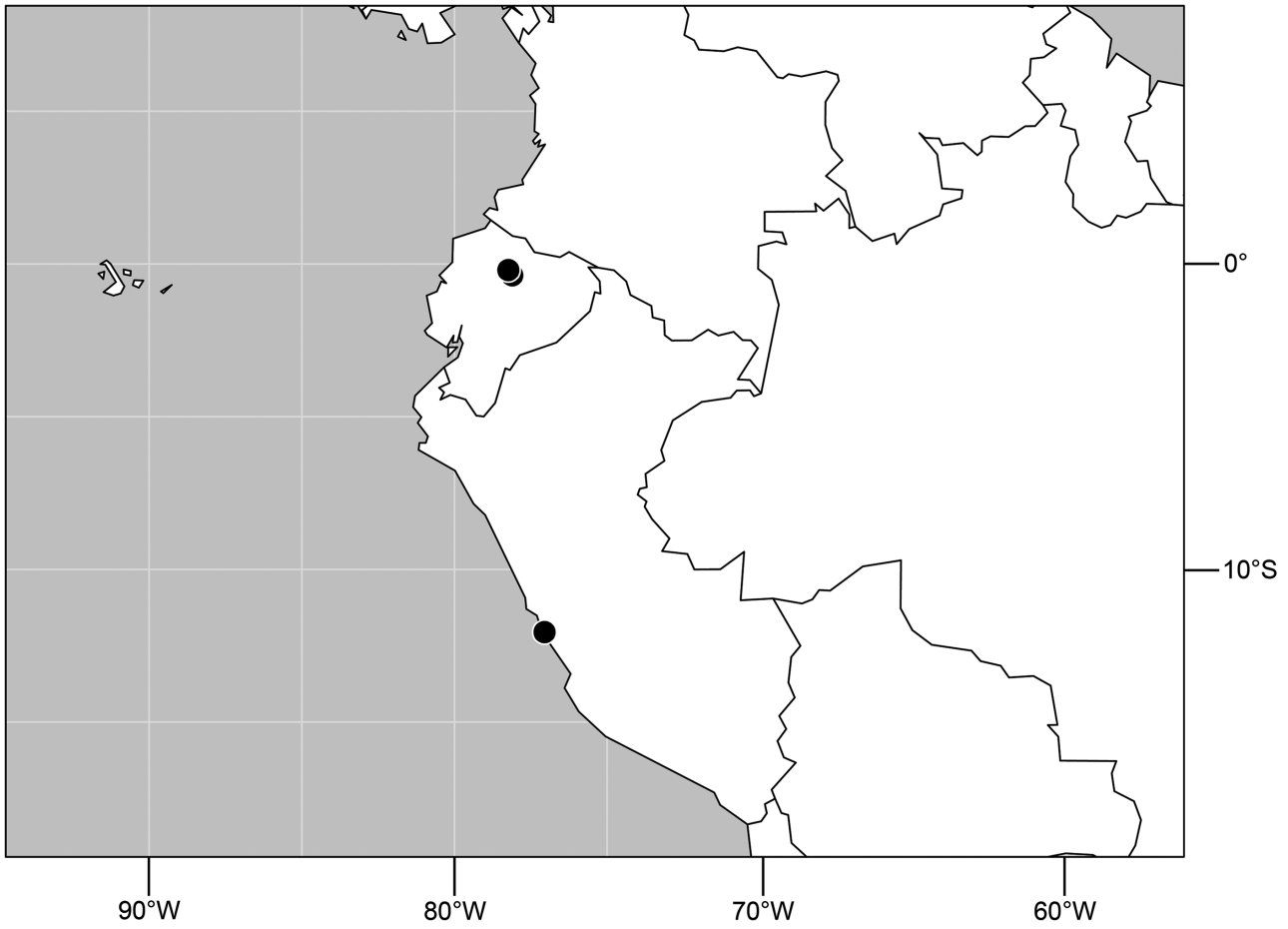
FIGURES 146–147. *Setacera trichoscelis* Mathis. (146) head, lateroblique view; (147) mesonotum, dorsal view (from Mathis 1982).

Thorax (Fig. 147): Mesonotum mostly brown to greenish brown; anterior portion more subdued, microtomentose, grayish brown, darker posteriorly, shinier, metallic green; scutellum with mostly greenish to bronzish blue metallic luster shiny through darker brown vestiture. Anepisternum, anepimeron, and katepisternum mostly concolorous, grayish golden brown to olivaceous; forecoxa shiny gray; meron mostly gray to palely olivaceous in color. Femora mostly gray but with some bluish or pale brown coloration, becoming darker apically; tibiae mostly concolorous with femora but with less grayish coloration; tarsi yellowish orange but with some

blackish coloration; legs of males with tufts of long hairs near apices of mid- and hindtibiae; posteroventral surface of midfemur with distinct row of setae which become larger toward base. Costal vein ratio 0.30; M vein ratio 0.83.



FIGURES 148–150. *Setacera trichoscelis* Mathis. (148) male terminalia, lateral view; (149) internal structures of male terminalia, lateral view; (150) surstyli, posterior view (from Mathis 1982).



MAP 33. Distribution map for *Setacera trichoscelis* Mathis.

Abdomen: Dorsum mostly unicolorous, brown with metallic bluish green to green luster; tergite 1 more microtomentose, grayish, other tergites becoming darker and shinier posteriorly but not as dark as dorsum of scutellum. Tergite 5 of male longer than wide, nearly as long as combined length of tergites 3 and 4; lateral margins tapered gradually to subtruncate apex. Epandrium of male terminalia triangular, becoming wider toward venter; surstyli attached to ventral margin of epandrium, broadly fused to form subrectangular plate with ventrolateral, rounded processes; sternite 5 loosely attached to posteroventral corners of epandrium, anterior ends produced into gently-curved, well-sclerotized, sickle-like processes; see Figs. of terminalia for further details (Figs. 148–150).

Type material. The holotype male is labeled "Yaguarcocha, 3 km N. Ibarra, 1950 m, Imbabura, Ecuad[or], 8–9. VI. 65 [8–9 Jun 1965], L. Pena/Holotype Setacera trichoscelis Mathis [red]." Female allotype and 36 paratypes (10♂, 26♀) are labeled with same label data as the holotype. The holotype, allotype, and most of the paratypes are in the CNC (15239). Two pairs of male and female paratypes are in the USNM.

Type locality. Ecuador. Imbabura. Yaguarcocha (3 km N Ibarra; 0°22'S, 78°06'W).

Additional specimens examined. *ECUADOR. Imbabura:* Laguna San Pablo (0°12.1'S, 78°14.1'W), 28 Aug 1999, W. N. Mathis (7♂, 2♀; USNM).

PERU. Lima: Lima, Laguna de Villa (12°00.2'S, 76°38.3'W), 14 Feb 1984, W. N. Mathis (9♂, 5♀; USNM).

Distribution (Map 33): *Neotropical:* Ecuador (Imbabura). Peru (Lima).

Remarks. This species is similar and apparently closely related to *S. pilicornis* and reference to structures of the male terminalia may be needed to distinguish between them.

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