

A Revision of the New World Species  
of the Shore-Fly Genus *Nostima*  
Coquillett (Diptera: Ephydriidae)

JAMES F. EDMISTON  
and  
WAYNE N. MATHIS

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A Revision of the New World Species  
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*James F. Edmiston and Wayne N. Mathis*

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## ABSTRACT

James F. Edmiston and Wayne N. Mathis. A Revision of the New World Species of the Shore-Fly Genus *Nostima* Coquillett (Diptera: Ephydriidae). *Smithsonian Contributions to Zoology*, number 623, 108 pages, 255 figures, 3 tables, 2005. Thirty-eight New World species are revised, including 21 new species that are described (type locality in parentheses): *Nostima atriscuta* (Jamaica. Portland: Crystal Springs (18°12.5'N, 76°37.9'W)), *N. cinnamea* (Grand Bahamas Island. Freeport), *N. duaguttata* (Costa Rica. Puntarenas: Rincón (5 km S; 8°42.1'N, 83°30.8'W; 95 m)), *N. footei* (Panama. Canal Zone: Balboa), *N. franciscana* (Jamaica. St. Anns: Runaway Bay), *N. lineata* (Dominica: Layou (5 km E)), *N. lucida* (Bolivia. La Paz: Apa (8 km S Chulumani; 16°22'S, 67°30.4'W; 1960 m)), *N. lutea* (St. Vincent: Kingstown Botanical Garden), *N. maculata* (Argentina. Tucumán: La Cavera), *N. magnifica* (Ecuador. Chimborazo: Naranjapata Chilicay), *N. melina* (Panama. Canal Zone: Kobbe Beach), *N. negruzca* (Grenada. St. John: Concord Falls (12°07.1'N, 61°43'W)), *N. simuliflavida* (Dominica. Cabrit Swamp), *N. spinosa* (Bermuda. Paget Parish: Botanical Gardens), *N. stellata* (Ecuador. Orellana: Río Tiputini (0°38.2'S, 76°8.9'W)), *N. tresguttata* (Ecuador. Napo: Baeza (17 km S; 1815 m)), *N. velutina* (Mexico. Chiapas: San Cristobal de Las Casas (2160 m)), *N. williamsi* (Costa Rica. Alajuela: San Mateo, Higuito), *N. xenohypopia* (Dominican Republic. Pedernales: Sierra de Baoruco, Las Abejas (1300 m)), *N. xenoptera* (Costa Rica. Puntarenas: Rincón (3 km SW, 9°55'N, 84°13'W, 10 m)), *N. ypsilon* (Costa Rica. Puntarenas: Rincón (3 km SW, 9°55'N, 84°13'W, 10 m)). This study revealed the species-group *Nostima niveofasciata* Cresson (1947) is synonymous with *Nostima canens* Cresson (1941).

The cladistic analysis was based upon 10 morphological characters. An analysis using "implicit enumeration" (ie-) of Hennig86 resulted in a cladogram of minimal length. This cladogram has a length of 16 steps, a consistency index of 1.0, and a retention index of 1.0. From the cladogram (Figure 255) and supporting synapomorphies, the following hypotheses can be made: (1) *Nostima* is monophyletic; (2) *Nostima* and *Garifuna* form a monophyletic lineage (supported by three synapomorphies); (3) *Garifuna* is the immediate sister group of *Nostima*, and *Philygria* forms a clade immediately basal to the common lineage of *Nostima* and *Garifuna*; and (4) New World species of *Nostima* are provisionally arrayed into five lineages. Some of these lineages apparently demonstrate a speciation pattern in which peripheral or isolated species diverged from more widely distributed species.

Keys to the tribes and genera of Ilytheinae, as well as to the New World species of *Nostima*, are provided. Distribution maps are also produced for the New World species.

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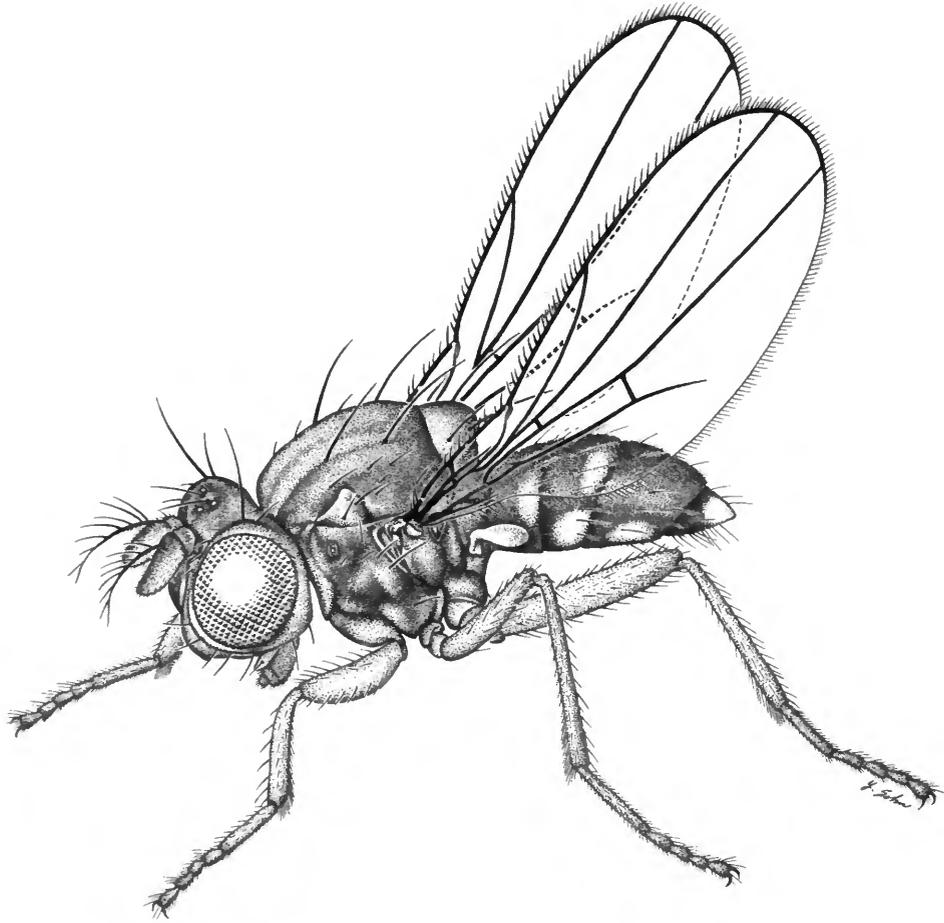


FIGURE 1.—Frontispiece of *Nostima franciscana* Edmiston and Mathis (West Indies, ♂). Scale = 0.5 mm.

# A Revision of the New World Species of the Shore-Fly Genus *Nostima* Coquillett (Diptera: Ephydriidae)

*James F. Edmiston and Wayne N. Mathis*

## Introduction

Shore flies of the genus *Nostima* Coquillett have semiaquatic larval stages that feed on blue-green algae (Foote, 1995), and adults are often collected in grassy habitats (Bährmann, 1978; Steinly, 1984). The natural history, ecology, and immature stages of only one species have been described (Foote, 1983). Species of *Nostima* are very small, obscure, and seldom collected. The purpose of this paper is to revise the New World species, including an analysis of their phylogenetic relationships.

*Nostima* is derived from the Greek *nostimos*, meaning desirable. The generic name confirms Dahl's (1959:143) reference to *Nostima* as "our most beautiful ephydrid." Indeed, most species of *Nostima* have distinctive wing patterns, and many areas of the body are often richly invested with complex patterns of silvery, golden, and velvety patches of microtomentum.

Coquillett (1900a) described the genus *Nostima*, with *N. slossonae* Coquillett as its type species. Subsequently, Hendel (1917) described *Philygriola*, with *Notiphila picta* Fallén (1813) as its type species. The type species of *Philygriola* and *Nostima* are considered to be congeneric, and thus the two genus-group names are treated as synonyms, with *Nostima* hav-

ing priority (Cresson 1941, 1943). Cresson (1941, 1944, 1947) and Sturtevant and Wheeler (1954) significantly revised the classification and described additional species.

Except for polar regions, *Nostima* is essentially distributed worldwide and is especially rich in tropical regions. More species of the genus are known from the New World than from elsewhere (Mathis and Zatwarnicki, 1995). Cogan (1980, 1984) cataloged three species from the Afrotropical Region and three species from the Palearctic Region. Canzoneri (1986), Canzoneri and Raffone (1987), and Canzoneri and Rampini (1995) each described a new Afrotropical species. Miyagi (1977) reported two species from Japan, and three species are known from the South Pacific and New Zealand (Malloch, 1933; Cresson, 1943; Mathis, 1989). Wirth (1965, 1968) cataloged eight previously described Nearctic species and 15 Neotropical species, for a total of 19 species in the New World (four species occur in both the Nearctic and Neotropical Regions).

The higher-level classification and placement of *Nostima* has been confused and unstable, starting at the category of subfamily. Wirth (1965, 1968), following Cresson's precedent (1942, 1944, 1946, 1949), divided the Ephydriidae into four subfamilies: Discomyzinae (as Psilopinae), Ephydrinae, Hydrelliinae (as Notiphilinae), and Ilytheinae (mostly as Parydrinae or Napaeinae). As indicated by the parenthetical inclusions, the nomenclature for family-group names had been unstable, which contributed to the confusion of where to place *Nostima*. The family-group nomenclature has now been resolved (Mathis and Zatwarnicki, 1995; Sabrosky, 1999), and only zoological issues remain. For this revision, we consider *Nostima* to belong to the subfamily Ilytheinae Cresson, tribe Hyadinini Phillips et al. (including genera that had been placed in the tribe Philygriini Lizarralde de Grosso, 1989; Zatwarnicki, 1992; Mathis and Zatwarnicki, 1995; Hollmann-Schirmacher, 1998). Further comments on the tribes of Ilytheinae are provided in the discussion section of the subfamily.

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**METHODS AND MATERIAL.**—The descriptive terminology, with the exceptions noted in Mathis (1986) and Mathis and Zatwarnicki (1990a) and below, follows that published in the *Manual of Nearctic Diptera* (McAlpine, 1981). Many specimens of Hyadinini are among the smallest in the Ephydriidae, so study and illustration of the male genitalia required use of a compound microscope. We have followed the terminology for most structures of the male genitalia that other workers in Ephydriidae have used (see references in Mathis, 1986; Mathis and Zatwarnicki, 1990a, 1990b), such as surstylus. Zatwarnicki (1996) has suggested that the pre- and postsurstylus correspond with the pre- and postgonostylus and that the subepandrial plate is the same as the medandrium. The terminology for structures of the male genitalia is provided directly on Figures 2–4 and is not repeated for comparable illustrations of other species. The species descriptions are composite and are not based solely on the holotypes.

Label data from each specimen were recorded and listed alphabetically according to country, state or province, county, and specific locality, such as city. As available, date of collection, collector, sex, and specimen location were listed. Label data from holotype specimens were recorded exactly, and clarifying information, such as script style and label color, is enclosed within brackets. Alternative spellings for some geographic localities are cited in parenthesis, especially for locality names that were transliterated into English.

Distribution maps were made using ESRI ArcView® GIS 3.2. Longitude and latitude coordinates were obtained for the locality where each specimen was collected, and this data was entered into a Microsoft Excel® spreadsheet. If available, the longitude and latitude were obtained directly from the specimen labels. For specimen labels that did not have longitude and latitude, gazetteers and maps were used to determine the geographical coordinates. The geographic coordinate spreadsheet was converted to a tab delimited text file and then imported into ESRI ArcView. The specimen locales were plotted on a world land projection, presented within ESRI ArcView layouts, and exported as encapsulated postscript (EPS) files.

**Specimen Characteristics:** External morphological structures were observed and recorded using a dissecting microscope. Continuous characters were measured using a calibrated ocular micrometer attached to either a compound or a dissecting microscope.

Dissections of male and female genitalia were performed using the method of Clausen and Cook (1971) and Grimaldi (1987). Microforceps were used to remove abdomens, which were macerated in a potassium hydroxide solution. Cleared genitalia were rinsed in distilled water and 70% ethanol and then transferred to glycerin for examination. If necessary for proper orientation, the specimen was transferred from glycerin to glycerine jelly. The glycerin jelly was heated so the specimen could be embedded and appropriately oriented. After cooling, the embedded specimen became immobilized. The abdomen from each dissected specimen was placed in a plastic

microvial filled with glycerin, which was then attached to the pin supporting the remainder of the insect.

Wing patterns were observed with a compound microscope on wings that were flattened under a coverslip on a slide. Wings were placed in a plastic microvial and attached to the pin containing the remainder of the insect from which they were removed. Wing photographs were taken with a digital camera through a WILD M-400 stereomicroscope. Photographic irregularities and missing structures were modified using Adobe Photoshop® (version 7) to produce composite illustrations representing the wings.

External morphologic characters were drawn using an ocular grid attached to a stereoscopic dissecting microscope. Internal genitalic features were drawn using a camera lucida with a Wild M-400 compound microscope and corroborated with views from a Nikon SMZ-1500 dissecting microscope.

The following quantitative characters used commonly in the descriptions are defined for the convenience of the user.

1. Body length is the maximum distance in lateral view from the anterior margin of the head to the posterior abdominal apex.
2. Scutal length is the maximum straight line distance in dorsal view from the anterior margin of the scutum to the scutellar suture.
3. Scutellar length is the maximum straight line distance in dorsal view from the scutellar suture to the posterior scutellum.
4. Costal-vein ratio is the straight line distance between the apices of veins  $R_{2+3}$  and  $R_{4+5}$  divided by the distance between the apices of veins  $R_1$  and  $R_{2+3}$ .
5. M-vein ratio is the straight line distance along vein M between crossvein dm-cu and r-m divided by the distance apicad of crossvein dm-cu.

**Cladistic Methods:** The phylogenetic analysis was performed with the assistance of Hennig86© (Farris, 1988), a computerized algorithm that produces cladograms on the basis of parsimony. Character data were polarized using the closely related genus *Philygria* as the outgroup. To provide a broader phylogenetic perspective to our analysis, the matrix also included the closely related genus *Garifuna*. Classifications constructed as a result of this revision were based on the evolutionary species concept, considering individual specimens as representatives of species.

**ACKNOWLEDGMENTS.**—Although most specimens for this study, including many of the primary types, are in the Smithsonian's National Museum of Natural History (NMNH), numerous others were borrowed, particularly type specimens of the species previously described. To our colleagues and their institutions who loaned specimens, we express our sincere thanks. Without their cooperation this study could not have been completed.

AMNH	American Museum of Natural History, New York, New York (David A. Grimaldi)
ANSP	Academy of Natural Sciences of Philadelphia, Pennsylvania (Jon K. Gelhaus, Jason Weintraub, Donald F. Azuma)
BMNH	The Natural History Museum (formerly the British Museum (Natural History)), London, England (Brian Pitkin and John E. Chainey)
CARN	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (Chen W. Young)
CAS	California Academy of Sciences, San Francisco, California (Paul H. Arnaud, Jr.)
CNC	Canadian National Collection, Ottawa, Canada (James E. O'Hara and Bruce Cooper)
CU	Cornell University, Ithaca, New York (James K. Liebherr)
DEI	Deutsches Entomologisches Institut, Eberswalde, Germany (Frank Menzel and Joachim Ziegler)
GUEL	University of Guelph, Ontario, Canada (Stephen A. Marshall)
HNHM	Hungarian Natural History Museum, Budapest, Hungary (László Papp)
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo, Heredia, Costa Rica (Manuel Zumbado)
INHS	Illinois Natural History Survey, Champaign, Illinois (Donald W. Webb)
IOWA	Iowa State University, Ames, Iowa (Robert E. Lewis and Gregory W. Courtney)
KANS	Kansas State University, Manhattan, Kansas (H. Derrick Blocker)
KENT	Kent State University, Kent, Ohio (Benjamin A. Foote)
KU	Snow Entomological Museum, University of Kansas, Lawrence, Kansas (J. Stephen Ashe and George W. Byers)
LUND	Zoological Institute, Museum of Zoology and Entomology, Lund University, Lund, Sweden (Roy Danielsson)
MART	personal collection of Michel Martinez, Montpellier, France
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Philip D. Perkins)
MICH	University of Michigan, Ann Arbor, Michigan (Thomas E. Moore)
MNBL	Museo Nacional de Historia Natural, La Paz, Bolivia (Alvaro Gari-tano-Zavala)
NRS	Naturhistoriska Riskmuseet, Stockholm, Sweden (Thomas Pape)
STUT	Staatliches Museum für Naturkunde in Stuttgart, Ludwigsburg, Germany (Hans-Peter Tschorsnig)
UBZI	Universität Bielefeld, Zoologisches Institut, Bielefeld, Germany
UMIN	University of Minnesota, St. Paul, Minnesota (Philip J. Clausen)
USNM	collections of the former United States National Museum, now in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.
WALES	National Museum of Wales, Cardiff, Wales (John C. Deeming)
WSU	Washington State University, Pullman, Washington (Richard S. Zack)
ZMAM	Instituut voor Taxonomische Zoologie, Zoologisch Museum, Universiteit van Amsterdam, Amsterdam, Netherlands (Ben Brugge)
ZMHU	Zoologisches Museum, Humboldt Universität, Berlin, Germany (Marion Kotrba and Hella Wendt)

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search Opportunity Fund. László Papp examined the holotype of *Philygria basilis* Cresson and provided information on its identity, condition, and labels. We are grateful for his efforts. The Franciscan Friars of the Sacred Heart Province (St. Louis, Missouri), of the Franciscan Foundation for Russia and Kazakhstan, and of the Custody of the Holy Land (Washington, D.C.) fraternally provided release time and accommodations during the research and manuscript-preparation phases of the project. Kent State University provided a graduate research grant and support for travel to the Natural History Museum, London, the Zoologisch Museum in Amsterdam, and the Museo Civico di Storia Naturale di Venezia.

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## Systematics

### Subfamily Ilytheinae Cresson

Ilytheinae Cresson, 1943:2 (as the tribe Ilytheini) [type genus: *Ilythea* Haliday in Curtis, 1837].—Zatwarnicki, 1992:89 [diagnosis, classification, phylogeny].—Mathis and Zatwarnicki, 1995:186–214 [world catalog].—Hollmann-Schirmacher, 1998:17–44 [classification, phylogeny].

DIAGNOSIS.—The monophyly of Ilytheinae is corroborated by the following synapomorphies (Zatwarnicki, 1992:76; Hollmann-Schirmacher, 1998:46): (1) anterior spiracle of larva divided into 2 basal, elongate branches; (2) insertion of posterior notopleural seta moderately to conspicuously elevated, especially compared with anterior seta; (3) operculum of female ventral receptacle reduced; and (4) extending process of female ventral receptacle sinuous.

DESCRIPTION OF ADULT.—*Head*: Fronto-orbital setae proclinate and reclinate if present, frequently one or both setae absent. Face either protruding with large oral opening (Ilytheini) or moderately protruding, often carinate (Hyadinini). Spine-like seta on pedicel inconspicuous.

*Thorax*: Insertion of posterior notopleural seta moderately to conspicuously elevated, especially compared with anterior seta; presutural (sometimes sutural) dorsocentral setae present or absent.

*Abdomen*: Male genitalia: surstyli usually fused with ventral margin of epandrium, often indistinguishably; subepandrial plate usually fused with hypandrium and/or gonites, some-

times reduced to a remnant or forming a gonal arch; aedeagal apodeme triangular in lateral view; ejaculatory apodeme present or secondarily absent; pre- and postgonite fused into a single gonite. Female genitalia: extending process of female ventral receptacle sinuous, operculum reduced.

DESCRIPTION OF LARVA.—Anterior spiracle of larva divided into 2 basal, elongate branches.

DISCUSSION.—Although recent classifications of the Ephydridae have recognized the monophyly of Ilytheinae and there is agreement on the included species (Mathis and Zatwarnicki, 1995), the categories between species and subfamily have been, and to some degree remain, unresolved and somewhat controversial. Arguments vary, depending upon concepts of genera (the lumping versus splitting argument), selection of characters, and the weight of these characters.

Zatwarnicki (1992), in a relatively brief paper that covered the entire family, proposed the first phylogenetic classification for Ilytheinae and provided evidence that supported recognition of three tribes: Ilytheini, Hyadinini, and Philygriini. Although these three tribes had been recognized earlier, primarily in catalogs (Cresson, 1942, 1949; Wirth, 1965, 1968; Cogan and Wirth, 1977; Cogan, 1980, 1984; Mathis, 1989), they had not been recognized collectively as tribes of a single subfamily. Zatwarnicki (1992) not only resolved the issue concerning which tribes ought to be included in Ilytheinae but he also maintained the three tribes as monophyletic lineages and supported that decision with evidence that he interpreted. Hollmann-Schirmmayer (1998) confirmed the monophyly of Ilytheinae by essentially using the same characters that Zatwarnicki had proposed, but in addition, Hollmann-Schirmmayer suggested that Ilytheinae should be divided into just two, rather than three, tribes. The tribe Ilytheini remained essentially unmodified, but Philygriini was made a junior synonym of Hyadinini. The synonymization of Philygriini was

based primarily on conferring greater weight to some characters from the male genitalia. Hollmann-Schirmmayer's preferred classification was presented in a cladogram that had the genera *Nostima* and *Philygria* as the most derived, monophyletic lineage within Hyadinini as well as the sister group of *Axysta* Haliday. Although resolving the phylogenetic relationships among tribes of the subfamily Ilytheinae is beyond the scope of this species revision, we concur and adhere to the precedent of both Zatwarnicki and Hollmann-Schirmmayer in recognizing the genera *Nostima* and *Philygria*, formerly in the tribe Philygriini, as being in the subfamily Ilytheinae and the tribe Hyadinini.

Although there is now considerable evidence that corroborates the monophyly of the "Philygriini" and the placement of this lineage in Ilytheinae, the genera comprising this lineage were historically most often associated with *Lemnaphila* Cresson in the subfamily Hydrelliinae (Wirth, 1965, 1968, as Notiphilinae). Using feeding behavior in addition to larval and adult morphology, Lizarralde de Grosso (1978) demonstrated that *Lemnaphila* is closely related to the tribe Hydrelliini within the subfamily Hydrelliinae rather than to the tribe Philygriini. Moreover, Mathis (1985) suggested that the genera *Nostima* and *Philygria* are more closely related to the tribe Hyadinini, which was then placed in the subfamily Parydrinae. Mathis based his conclusions on his study of adult morphology and on Foote's studies (1977, 1981a, 1981b, 1983) of larval morphology and behavior. Mathis and Edmiston (2000) further confirmed the placement of *Lemnaphila* within the subfamily Hydrelliinae, tribe Hydrelliini. Recent publications also have confirmed the placement of *Lemnaphila* in the subfamily Hydrelliinae (Zatwarnicki, 1992; Mathis and Zatwarnicki, 1995; Hollmann-Schirmmayer, 1998) and of *Nostima* in the subfamily Ilytheinae (Mathis and Edmiston, 2000).

#### Key to Tribes and Genera of Ilytheinae Cresson

1. Posterior notopleural seta inserted near ventral margin and at about same level as anterior seta . . . . . 2  
 Posterior notopleural seta inserted at conspicuously higher level than anterior seta . . . . . 11
2. Vein  $R_{2+3}$  short, II costal section about  $\frac{1}{3}$  length of III, and with a stump vein. A single, proclinate, fronto-orbital seta . . . . . *Parydroptera* Collin  
 Vein  $R_{2+3}$  long, II costal section at least  $\frac{1}{2}$  length of section III, lacking a stump vein. Usually a reclinate and a proclinate fronto-orbital seta . . . . . 3
3. Costa extending at most to slightly beyond vein  $R_{4+5}$ . Tergite 4 at least 3 times length of tergite 5 . . . . . *Axysta* Haliday  
 Costa extending to vein M. Tergite 4 at most 2 times length of tergite 5 . . . . . 4
4. Wing with vein  $R_{2+3}$  long; II costal section almost 3 times length of III. Face flat or weakly carinate, not medially prominent. Flagellomere 1 rounded at apex above . . . . . 5  
 Wing with vein  $R_{2+3}$  short; II costal section less than 2 times length of III. Face with low conical median prominence. Flagellomere 1 usually angulate at apex above . . . . . 8

5. Both an inner and outer vertical seta present and well developed; fronto-orbital setae usually moderately well to well developed, lateroclinate [Holarctic] . . . . . *Pelina* Haliday  
Only an inner vertical seta present, outer seta lacking; lacking well-developed fronto-orbital setae [Neotropical] [genus *Pelinoidea* Cresson] . . . . . 6
6. Femora and palpus yellow to yellowish red; arista with dorsal branches, length of branches subequal to basal aristal width; eye height about 2 times genal height . . . . . *pallipes* group  
Femora and palpus black or dark colored; arista mostly bare, if short hairs present, these shorter than basal aristal width; eye height only slightly longer than genal height, sometimes smaller . . . . . 7
7. Tergite 4 bare, shiny, enlarged, length subequal to combined length of tergites 2 and 3 . . . . . *cyclocerus* group  
Tergite 4 microtomentose, appearing dull, at most subshiny, length only slightly longer than tergite 3 . . . . . *sulcatus* group
8. Wing brown with about 14 distinct white spots . . . . . *Pseudohyadina* Clausen  
Wing unmarked or with at most faint spots or clouds at apex of vein R<sub>1</sub> and on cross-veins . . . . . 9
9. Tergite 4 from 1.3 to 2 times length of tergite 5, both conspicuously punctate. Inner vertical seta present, outer vertical seta absent. Lateral margins of scutellum not densely microtomentose, not appearing velvety . . . . . *Lytogaster* Becker  
Tergite 4 subequal in length to tergite 5, neither conspicuously punctate. Usually both vertical setae present, if outer absent then lateral margins of scutellum densely microtomentose, appearing velvety . . . . . 10
10. Dorsocentral seta 1. Lacking well-developed, fronto-orbital setae . . . . . *Hyadina* Haliday  
Dorsocentral setae 2. Well-developed, lateroclinate, fronto-orbital seta 1 . . . . . *Parahyadina* Tonnoir and Malloch
11. Fronto-orbital setae either lateroclinate and inconspicuous or lacking; prescutellar acrostichal setae lacking . . . . . 12  
Fronto-orbital setae conspicuous, well developed, mostly reclinate or proclinate or both; prescutellar acrostichal setae present, well developed [Ilytheini Cresson] . . . . . 14
12. Outer vertical seta lacking; fronto-orbital setae lacking . . . . . *Garifuna* Mathis  
Both inner and outer vertical setae usually present; fronto-orbital setae present, sometimes reduced . . . . . 13
13. Arista bare or minutely branched; 2 rows of facial setae. Presutural or sutural dorsocentral seta present . . . . . *Philygria* Stenhammar  
Arista with short to long branches; 1 row of facial setae. Presutural or sutural dorsocentral seta lacking . . . . . *Nostima* Coquillett
14. Dorsocentral setae 3 (1+2) . . . . . *Donaceus* Cresson  
Dorsocentral setae 2 (1+1) . . . . . 15
15. Vein R<sub>2+3</sub> long, subparallel to C; costal section II more than 2 times length of section III . . . . . *Ilythea* Haliday  
Vein R<sub>2+3</sub> short, running almost straight to C; costal section II subequal in length to section III . . . . . *Zeros* Cresson

#### Tribe HYADININI Phillips et al.

Hydrinini Cresson, 1944:175 [type genus: *Hydrina* of authors, not Robineau-Desvoidy, 1830 (= *Philygria* Stenhammar, 1844), unavailable, based on a junior homonym].  
Hyadinini Phillips et al. in Cresson, 1949:251 [type genus: *Hyadina* Haliday in Curtis, 1837].—Hollmann-Schirmacher, 1998:29, 45–56 [discussion].

Philygriini [nomen nudum].—Wirth and Stone, 1956:469.—Wirth, 1965:745 [Nearctic catalog]; 1968:16 [Neotropical catalog].—Cogan and Wirth, 1977:335 [Oriental catalog].—Cogan, 1980:666 [Afrotropical catalog]; 1984:149 [Palearctic catalog].  
Philygriini Lizarralde de Grosso, 1989:51 [type genus: *Philygria* Stenhammar, 1844].—Mathis and Zatwarnicki, 1995:190–200 [world catalog].—Hollmann-Schirmacher, 1998:50 [synonymy with Hyadinini].

**DIAGNOSIS.**—This tribe is similar to Ilytheini but is distinguished by the following combination of characters: number of arisal branches usually reduced; number of acrostichal setae reduced, prescutellar pair lacking; dorsocentral setae frequently reduced in size and/or number (1+2, 0+2, or sutural+1); subepandrial plate fused with gonite dorsally, forming a rounded projection, sometimes joined medially over aedeagus to form a gonial arch; gonites and hypandrium usually fused; gonite produced posteriorly as a long triangular to almost parallel-sided projection, with apex variously modified.

**DISCUSSION.**—The monophyly of the tribe Hyadinini is established by the following synapomorphies (Zatwarnicki, 1992:76; Hollmann-Schirmacher, 1998:50): (1) reduction of scutellar/prescutellar acrostichal setae; (2) fusion of gonite with hypandrium; (3) reduction of dorsocentral setae; (4) lack of long branches on the arista; and (5) ventral elongation of the epandrium.

Within the tribe Hyadinini, the genera *Nostima* and *Philygria* form a monophyletic lineage. Hollmann-Schirmacher (1998) identified the following synapomorphies that corroborate the monophyly of the *Nostima/Philygria* lineage within the tribe Hyadinini: (1) face carinate; (2) eye with numerous, short, interfacetal setulae; (3) secondary restoration of a second dorsocentral seta (presutural or sutural); (4) cerci and epandrium fused (although in this study, fusion not found in all *Nostima* species or in *Garifuna*); (5) reduction of the anterior elongation (fused surstyli) of epandrium (this reduction and fusion not found in all *Nostima* species or in *Garifuna*); (6) gonite with reduced setae; (7) long seta inserted at connection of gonite with hypandrium; and (8) second basal seta of gonite translocated to apex of gonite (although in this study, a second basal seta not found in all *Nostima* species). Whereas we recognize *Nostima* and *Philygria* as closely related genera, we do not accept Hollmann-Schirmacher's (1998) proposal to synonymize *Nostima* with *Philygria*. Further analysis of these and other characters are presented in the discussion of the genus *Nostima* and in the "Phylogenetic Considerations" section.

Mathis (1997) described a new genus from Belize, *Garifuna*, that he placed in the tribe Philygriini. His placement was based on the reduction of the dorsocentral setae (0+2), with the anterior dorsocentral setae inserted just anterior of the transverse suture, and on the long branched arista. The cerci in males of *Garifuna* are not fused to the epandrium (as in some other Hyadinini), and the acrostichal setae are in two rows (a character found in the tribe Ilytheini). *Garifuna* is a monotypic genus, and the exact tribal placement of this genus within the subfamily Ilytheinae requires further attention. For the present, we consider *Garifuna* to be a genus within the tribe Hyadinini. Regardless of the tribal placement for *Garifuna*, the genus is certainly in the subfamily Ilytheinae. As a possible outgroup, *Garifuna* provides information about the possible character-development patterns within the lineage containing *Nostima*. Although resolving the phylogenetic relationships among the species and genera within the tribe Hyadinini is beyond the scope

of this revision, we concur with the precedent of placing all *Nostima* in the tribe Hyadinini (Zatwarnicki, 1992; Hollmann-Schirmacher, 1998).

### Genus *Nostima* Coquillett

*Nostima* Coquillett, 1900a:35 [type species: *Nostima slossonae*, by original designation; as a genus].—Cresson, 1930a:101 [*Nostima* compared with *Philygriola*]; 1931:89 [key to genera]; 1941:1–2 [compared with *Hydrina* and key to species]; 1944:176–177 [key to Nearctic species]; 1947:39–42 [key to subgenera and species]; 1948:3 [list].—Sturtevant and Wheeler, 1954:239–242 [review of Nearctic species].—Lizarralde de Grosso, 1989:52–54 [Argentine species].—Foote, 1995:425 [biology].—Hollmann-Schirmacher, 1998:44 [synonymy of *Nostima* with *Philygria*].  
*Philygriola* Hendel, 1917:42 [type species: *Notiphila picta* Fallén 1813:254, by original designation]; 1930:141 [compared with *Hydrellia*].—Cresson 1930a:101 [synonymy]; 1944:176–177 [subgeneric status]; 1947:42–43 [subgeneric status].—Frey, 1936:114 [Canary Islands].

**DIAGNOSIS.**—The genus *Nostima* can be distinguished from other genera of Hyadinini by the following combination of characters: face, thorax, and abdomen with distinct microtomentose patterns; fronto-orbital setae reduced in size; both inner and outer vertical setulae usually present; arista with short to long branches; face distinctly carinate; eyes sparsely setulose; a single row of facial setae adjacent to parafacial; 2 dorsocentral setae, anterior seta postsutural (0+2); acrostichal setae lacking; 2 notopleural setae, anterior seta  $\frac{1}{3}$ – $\frac{2}{3}$  length of posterior seta, posterior seta inserted dorsad of anterior seta; anterior scutellar setae shorter than apical setae; structures of male genitalia usually forming 2 fused complexes: (1) epandrium, cerci, and surstyli; and (2) gonites, subepandrial plate, and hypandrium.

**DESCRIPTION.**—Minute to very small flies, body length 0.72–1.72 mm.

**Head:** Mesofrons and vertex often with circular microtomentose area around ocelli; anterolateral frons with microtomentose triangle, usually darker in coloration than ocellar circle; fronto-orbital plate dark colored, bare or with dense pale microtomentum; frons bare or with sparse to dense microtomentum. Face generally paler than frons, yellow to dark yellowish brown with golden, yellowish silver, or silvery gray microtomentum extending to gena; medially along parafacial, a band with sparse or no microtomentum extending lateroventrally below gena. Gena concolorous with ventral parafacial plate, sometimes ventral gena bare or with sparse microtomentum; postgena and occiput concolorous with gena, sometimes with sparse microtomentum, sometimes shiny stripes with sparse microtomentum across postgena and occiput, contiguous with lateral thoracic stripe pattern. Chaetotaxy as follows: ocellar seta well developed, divergent, proclinate; postocellar seta minute, divergent, proclinate; orbital setae minute, 3–5 pairs, proclinate; inner vertical seta prominent, mesocline; outer vertical seta prominent, smaller than inner vertical seta, laterocline, rarely absent; paraverticilar seta, if present, minute; postocular setae minute, in row along dorsolateral eye margin; facial setae minute, in a single row on shiny strip along parafa-

cial plate; dorsal facial seta longest with setae decreasing in length ventrally; genal setae minute, numerous, posterior. Antenna yellow, yellowish brown, or brown; scape, pedicel, and flagellomere 1 often darker in color dorsally; scape with row of setulae along distal ventral margin; flagellomere 1 microtomentose with numerous setulae; arista pectinate, dorsally branched. Maxillary palpus prominent, yellow to dark yellowish brown; prementum yellow to dark yellowish brown; mouthparts often withdrawn in preserved specimens.

**Thorax:** Mesonotum bare or with sparse to dense microtomentum, often marked with distinct vittae, background pale brown to dark brown, microtomentum golden, silver, velvety black, or brown. Scutal length 0.29–0.62 mm; scutellar length 0.09–0.24 mm; scutellum trapezoidal with posterior margin slightly rounded, dorsally concolorous with posterior margin of mesonotum, lateral margin sometimes with dense, silvery gray microtomentum contiguous with mesonotal vittae; pleura often paler than mesonotum, with striped pattern of silvery gray microtomentum contiguous with microtomentum pattern of gena and occiput; anepisternum bare or with sparse to dense microtomentum, often striped; katapisternum bare or with sparse to dense microtomentum; subscutellum brown to dark brown, bare or covered with sparse to dense microtomentum; anatergite brown to dark brown, bare or covered with sparse to dense microtomentum. Chaetotaxy as follows: acrostichal setae lacking; 2 postsutural dorsocentral setae, anterior seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; 3–5 presutural dorsocentral setulae; 1 prominent supra-alar seta; interalar setae minute; 2 notopleural setae, anterior seta  $\frac{1}{3}$ – $\frac{2}{3}$  length of posterior seta, posterior seta inserted dorsad of anterior seta; 1 anepisternal seta, small to minute, inserted along posteromedial margin; 1 katapisternal seta, small to minute, inserted along dorsomedial margin; 1 scutellar seta inserted laterally and 1 inserted posteroapically, lateral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posteroapical seta, lateral seta rarely absent. Wing length 0.83–1.92 mm; width 0.36–0.85 mm; costal-vein ratio 0.56–2.16; M-vein ratio 0.11–1.03. Legs yellow, yellowish brown, to dark brown; covered with rows of minute setulae; femora and tibiae often with patterned pale and dark areas; tarsomeres 4 and/or 5 often darker than proximal tarsomeres. Halter knob white, yellow, or yellowish brown.

**Abdomen:** Five abdominal tergites normally exposed in males, cercus well developed; 6–8 abdominal tergites normally exposed in females, cercus well developed; abdominal background color yellowish brown, brown, to dark brown; abdominal tergites partially bare, and usually with distinct areas of sparse to dense microtomentum; tergites setulose, with setal rows along margins. Male genitalia: abdominal tergite 5 dorsal to aedeagus and to associated internal structures; epandrium-cerci-surstyli complex with components separate or often variously fused; cerci usually densely setulose; sometimes with a 10th sternite; aedeagus associated with an aedeagal apodeme; subepandrial plate-gonite-hypandrium separate or often variously fused; ventral margin of surstylus sometimes with dis-

tinctive setal patterns; lateroventral margin of gonite with a distinct seta projecting posteroventrally.

**DISTRIBUTION.**—Species of *Nostima* occur in all zoogeographical regions. In the New World, *Nostima* occurs from southern Canada, south through the United States, Mexico, Bermuda, the West Indies, and throughout South America.

**DISCUSSION.**—For most of the twentieth century, the species included in this revision of *Nostima* have been classified in the genus *Philygriola* (Hendel, 1917), which is closely related to *Philygria* (Zatwarnicki, 1992; Mathis and Zatwarnicki, 1995). Cresson (1930a) synonymized *Philygriola* with *Nostima*; however, Cresson later (1944) suggested that *Philygriola* had “certain characters which are here considered of subgeneric value,” and he accorded subgeneric status to *Philygriola*. Cresson (1944) did not note any distinguishing characters, although he later (1947) mentioned some color characters to differentiate *Philygriola* from *Nostima*. Sturtevant and Wheeler (1954) surveyed these differences and suggested that *Philygriola* and *Nostima* were not “sufficiently distinct” and could not be maintained as separate genera.

More recently, Hollmann-Schirmacher (1998) treated the genus *Nostima* as a junior synonym of *Philygria*, which he divided into four species groups. Two of Hollmann-Schirmacher’s species groups, the “*picta*” and “*flavitarsis*” groups, together comprise our concept of the genus *Nostima*. In his cladogram, these two species groups collectively form a well-supported lineage that is undoubtedly monophyletic; however, the broader concept of *Philygria* and its species groups, as advocated by Hollmann-Schirmacher (1998), were distinguished almost exclusively through characters of the male genitalia. Hollmann-Schirmacher proposed the synonymy of *Nostima* with *Philygria* according to a hypothetical development of setae and projections on the gonite-hypandrium complex. Emphasis on genital characters, however, is problematic because divergence of external characters in extant species does not always correlate well with the divergence of genitalic characters. His phylogenetic consideration of *Nostima* was limited to two exemplars, *Nostima picta* and *N. flavitarsis*. Most of his revision was based upon his doctoral dissertation, which was completed in 1993, and his paper did not consider more recent discoveries, such as the description of the closely related genus *Garifuna* (Mathis, 1997).

Since 1993, much more material has become available to us from the New World and Australia. To understand the relationships between these closely related genera (*Nostima*, *Philygria*, *Garifuna*), to obtain a broader view of character development within Hyadinini, and to establish the monophyly of *Nostima*, we herein describe 38 species of New World *Nostima*, and we make observations of an African species (*Nostima flavitarsis* Canzoneri and Meneghini), an Australian species (*Nostima duoseta* Cresson), *Philygria*, and *Garifuna*. Three general tendencies are evident in the characters and character states of *Nostima*, especially compared with the other genera in the tribe Hyadinini. These are (1) a reduction in body size, (2) a reduc-

tion in the number of setulae and setae, and (3) the fusion of genitalic structures.

In his 1998 revision, Hollmann-Schirmmacher defined three synapomorphic characters to support his opinion that *Philygria* is a monophyletic lineage: a single row of acrostichal setulae (except his "*picta*" and "*flavitaris*" groups); a fused epandrium-cerci-surstylar process; and a fused hypandrium-gonal process. Further analysis during this study, however, indicates none of these characters is found consistently among all the species he considered to be *Philygria*.

*Garifuna* has two rows of acrostichal setae, whereas these have been reduced to a single row in *Philygria*, and acrostichal setae are absent in *Nostima*. The presutural dorsocentral setae are absent in *Nostima* and *Garifuna*. All species of *Philygria*, but only some species of *Nostima*, have the epandrium-surstylis fused with the cerci and have completely fused hypandrium-gonites. Patterns among the gonial setae that form the basis for Hollmann-Schirmmacher's phylogenetic hypotheses are quite variable among *Nostima*, and the gonial setae have been uniquely modified and positioned in some *Nostima* lineages. The arisal branches have been reduced to many very small branches in *Philygria*, whereas the arista branches are long in *Nostima* and *Garifuna*; however, *Nostima duoseta* from Australia has only very small arisal branches. Our studies indicate variation in many characters within the genus *Nostima*, and after Mathis (1997) described the new genus *Garifuna*, the lack

of acrostichal setae is the only synapomorphic character for the genus *Nostima*. Two characters, the lack of presutural dorsocentral setae and the single row of facial setae, distinguish all *Nostima* and *Garifuna* (a monotypic genus) from *Philygria*.

The phylogenetic relationship between *Philygria*, *Garifuna*, and *Nostima* remains unclear. An argument could be developed regarding the progressive reduction of acrostichal setae from two rows (all subfamily species except *Nostima* and *Philygria*) to a single row (as in *Philygria*) to being absent (as in *Nostima*), but the variability among genitalic patterns and the absence of other characters at this time would make this a weak hypothesis. Phylogenetic relationships among these genera are not completely understood on a worldwide basis, but at least one distinct external character supports *Nostima* as a monophyletic group. Furthermore, *Garifuna* and all *Nostima* have a single row of facial setae and no presutural dorsocentral bristles. Based upon our analysis of characters from a wider sample of species within these genera, we partially adhere to Hollmann-Schirmmacher's concept of *Philygria* (we exclude his "*picta*" and "*flavitaris*" groups), but we recognize *Nostima* as a separate genus based upon the comparison of characters among the three closely related genera *Nostima*, *Garifuna*, and *Philygria*. Other considerations about the relationships among these genera can be found in the "Phylogenetic Considerations" section.

#### Key to New World Species of *Nostima*

1. Arista appearing bare, length of dorsal branches less than basal arisal width; dorsocentral setae 2, anterior seta presutural or sutural (1+1) . . . *Philygria* Stenhammar . . . . . (other species groups and subgenera)  
Arista bearing conspicuous dorsal branches, length of branches much longer than basal arisal width; dorsocentral setae 2, both postsutural (0+2) (genus *Nostima* Coquillett) . . . . . 2
2. Crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish other veins . . . . . 3  
Veins and crossveins generally unicolorous, yellowish brown to dark brown, crossveins r-m and dm-cu at most slightly paler than other veins . . . . . 17
3. Wing with dark, slightly arched, transverse band at about basal 1/3; femora mostly black; hindtibia banded . . . . . 24. *N. pulchra* (Williston)  
Wing lacking transverse band as above . . . . . 4
4. Wing spotted, generally with white spots on a dark background . . . . . 5  
Wing generally infumate and more or less unicolorous except for white crossveins . . . . . 8
5. Vein R<sub>2+3</sub> lacking spurious veins; abdomen, especially tergites 4 and 5, sparsely microtomentose, subshiny, with gray spots and bands . . . . . 13. *N. ilytheoides* (Cresson)  
Vein R<sub>2+3</sub> with spurious veins within some white spots; abdomen generally densely microtomentose, brown with gray spots or bands . . . . . 6
6. Tergites 4 and 5 with only lateral microtomentose spots . . . . . 38. *N. ypsilon*, new species  
Tergites 4 and 5 with lateral and dorsal microtomentose spots . . . . . 7

- 7. Tergites 4 and 5 densely microtomentose, mostly gray with some brown . . . . . 17. *N. maculata*, new species  
     Tergites 4 and 5 densely microtomentose, mostly brown with gray spots . . . . . 28. *N. slossonae* Coquillett
- 8. Scutellum densely black microtomentose, appearing velvety, contrasted with dark gray coloration of posterior portion of scutum . . . . . 9  
     Scutellum not densely black microtomentose or not appearing velvety . . . . . 10
- 9. Velvety microtomentum on scutum limited to area just before scutellum, thereafter anteriorad, area between dorsocentral setae dark, blackish brown to black, subshiny, moderately sparsely microtomentose; tergite 5 of male without silvery white microtomentum apically . . . . . 23. *N. picta* (Fallén)  
     Velvety microtomentum on scutum extending anteriorly, darkened area between dorsocentral setae only slightly less microtomentose; tergite 5 posterior margin with silvery white microtomentum . . . . . 33. *N. velutina*, new species
- 10. Scutum except anterior margin blackish brown, subshiny, sparsely microtomentose, contrasted with densely gray to golden gray microtomentose scutellum . . . . . 3. *N. atriscuta*, new species  
     Scutum and scutellum usually densely microtomentose, yellowish gray to brown . . . . . 11
- 11. Apical section of CuA<sub>1</sub> very short, length equal to or less than that of crossvein dm-cu . . . . . 12  
     Apical section of CuA<sub>1</sub> long, length about 2 times that of crossvein dm-cu . . . . . 14
- 12. Thoracic pleura yellow, similar to coloration of leg . . . . . 16. *N. lutea*, new species  
     Thoracic pleura gray to grayish brown or black, contrasted with yellowish legs . . . . . 13
- 13. Tergites 2–4 densely microtomentose along posterolateral margin, microtomentum extending dorsally; tergite 4 only with microtomentum from lateral extensions, dorsal spots lacking . . . . . 30. *N. spinosa*, new species  
     Tergites 2–4 with small triangular patches of dense microtomentum on posterolateral margin only; tergite 4 with 2 round, microtomentose dorsal spots . . . . . 22. *N. niveivenosa* Cresson
- 14. Mesonotum distinctly bicolored, medial area between dorsocentral rows brown, areas lateral whitish gray; dorsum of 5th tergite of male with silvery white microtomentum toward margin W-shaped with middle arm longest . . . . . 12. *N. giovannolii* Wirth  
     Mesonotum either unicolorous or vittate along setal rows, not distinctly bicolored as above . . . . . 15
- 15. Tergites 3–5 densely microtomentose, tan to brown with some white to silvery white maculation; hindfemur of male enlarged and excavated ventrally on apical half, hindfemur and especially tibia of male bowed . . . . . 29. *N. spilogaster* Cresson  
     At least some tergites, especially 3–5, partially to mostly shiny black, very sparsely microtomentose to bare; hindfemur of male normally developed, dorsal and ventral surfaces similar . . . . . 16
- 16. Tergites lacking densely microtomentose bands . . . . . 15. *N. lucida*, new species  
     Tergites 2 and 3 with densely microtomentose, silvery gray bands along or near posterior margins . . . . . 7. *N. elegantula* (Hendel)
- 17. Crossveins r-m and dm-cu dark brown surrounded by dark brown band, veins R<sub>4+5</sub> and M sinuous . . . . . 18  
     Crossveins r-m and dm-cu white, yellowish, or yellowish brown (sometimes surrounded by white spot), veins R<sub>4+5</sub> and M not sinuous . . . . . 19
- 18. Tergite 3 with large microtomentose anterodorsal spots . . . . . 36. *N. xenohypopia*, new species  
     Tergite 3 without large microtomentose anterodorsal spots . . . . . 37. *N. xenoptera*, new species
- 19. Scutellum densely microtomentose, appearing velvety . . . . . 20  
     Scutellum not appearing velvety . . . . . 22

20. Dense scutellar microtomentum appearing velvety cinnamon brown; setae on tergites dorsally erect, long, especially on compressed tergites 2 and 3; tergite 4 greatly elongate . . . . . 21. *N. nitidigaster* (Cresson)  
 Dense scutellar microtomentum appearing velvety black; setae on tergites not especially dorsally erect or long; tergite 4 not greatly elongate . . . . . 21
21. Tergites 3 and 4 with round silvery gray microtomentose lateral spots . . . . . 6. *N. duaguttata*, new species  
 Only tergite 4 with round silvery gray microtomentose lateral spots . . . . .  
 . . . . . 20. *N. negruzca*, new species
22. Mesonotum distinctly bicolored, with medial portion between dorsocentral setae unicolorous, chestnut brown to blackish brown, and area immediately laterad silvery white to gray . . . . . 23  
 Mesonotum either unicolorous or vittate pattern not as above . . . . . 31
23. Wing conspicuously spotted . . . . . 24  
 Wing unspotted . . . . . 25
24. Cell  $r_1$  with 3 spots; vein  $R_{2+3}$  with subapical, spurious vein . . . . .  
 . . . . . 31. *N. stellata*, new species  
 Cell  $r_1$  with 2 spots; vein  $R_{2+3}$  lacking spurious vein . . . . .  
 . . . . . 25. *N. quinquenotata* Cresson
25. Gray, mesonotal stripe laterad of dorsocentral setae conspicuously wider than fronto-orbital strip . . . . . 26  
 Gray mesonotal stripe not much wider than fronto-orbital strip . . . . . 27
26. Cercus of male with rounded, hook-like projection lateroventrally; female ventral receptacle with rounded point dorsally . . . . . 8. *N. flavida* (Cresson)  
 Cercus of male lacking hook-like projection lateroventrally, rounded; female ventral receptacle rounded dorsally, not pointed . . . . . 27. *N. simuliflavida*, new species
27. Flagellomere 1 blackish brown dorsally, yellowish ventrally . . . . . 28  
 Flagellomere 1 entirely blackish brown to black . . . . . 29
28. Scutal band between dorsocentral setae uniformly colored . . . . .  
 . . . . . 2. *N. approximata* Sturtevant and Wheeler  
 Scutal band between dorsocentral setae darker laterally than medially . . . . .  
 . . . . . 14. *N. lineata*, new species
29. Anepisternum unicolorous, blackish brown with silvery white microtomentum . . . . .  
 . . . . . 34. *N. williamsi*, new species  
 Postpronotum and dorsal  $\frac{1}{3}$  of anepisternum as yellow band in female, ventral  $\frac{2}{3}$  of anepisternum blackish brown . . . . . 30
30. Microtomentose spots on tergites 4 and 5 large and touching posterior margins [Figures 241, 242] . . . . . 32. *N. tresguttata*, new species  
 Microtomentose spots on tergites 4 and 5 small and not touching posterior margins [Figures 213, 214] . . . . . 18. *N. magnifica*, new species
31. Scutum conspicuously vittate . . . . . 32  
 Scutum unicolorous or mostly so, not vittate . . . . . 33
32. Abdomen mostly brown, appearing dull, densely microtomentose, lacking lateral spots but tergites 4 and 5 with posterior margin silvery white; scutal vittae narrow . . . . . 26. *N. schildi* Cresson  
 Abdomen subshiny to shiny black, sparsely microtomentose, with conspicuous silvery white spots laterally on tergites 3 and 4 and faintly so on tergite 2; scutal vittae wide, merging posteriorly . . . . . 10. *N. franciscana*, new species
33. Mesonotum yellow to yellowish brown . . . . . 5. *N. cinnamea*, new species  
 Mesonotum gray to dark brown . . . . . 34
34. Mesonotum brown, subshiny, sparsely microtomentose . . . . . 35. *N. willistoni* (Wirth)  
 Mesonotum gray, densely microtomentose . . . . . 35
35. Abdomen with at least tergites 4 and 5 mostly subshiny to shiny black, sparsely microtomentose . . . . . 36  
 Abdomen lacking subshiny to shiny tergites . . . . . 37

36. Costal section II subequal or slightly longer than section III (costal-vein ratio 0.89–1.13) ..... 11. *N. gilvipes* (Coquillett)  
 Costal section II conspicuously shorter than section III (costal-vein ratio 1.48–1.82) ..... 1. *N. abbreviata* (Cresson)
37. Abdominal tergites 3–5 conspicuously fasciate along posterior margin (tergite 2 partially so) ..... 4. *N. canens* Cresson  
 Abdominal tergites not fasciate ..... 38
38. Forefemur yellow ..... 19. *N. melina*, new species  
 Forefemur brown ..... 9. *N. footei*, new species

### 1. *Nostima abbreviata* Cresson

FIGURES 2–5, 139, 177, 178

*Nostima abbreviata* Cresson, 1941:3; 1947:40 [compared with *N. gilvipes* and *N. niveofasciata*].—Sturtevant and Wheeler, 1954:240 [list].—Wirth, 1968:16 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:190 [world catalog].

*Nostima (Nostima) abbreviata*.—Cresson, 1947:40 [review].

**DIAGNOSIS.**—*Nostima abbreviata* is distinguished from congeners by the following combination of external characters: gena with ventral surface shiny; thorax lacking vittae; crossveins and veins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler in color than other veins; costal-vein ratio greater than 1.4; tergite 2 with silvery gray microtomentum along posterior margin; tergite 3 with band of dense, silvery gray microtomentum along posterior margin; tergite 4 with dense, silvery gray microtomentose spots posterolaterally; and tergite 5 with dense, silvery gray microtomentose band along posteromedial margin.

**DESCRIPTION.**—Minute to small shore flies, body length 0.84–1.19 mm; yellow, yellowish brown, to brown with silvery gray microtomentum.

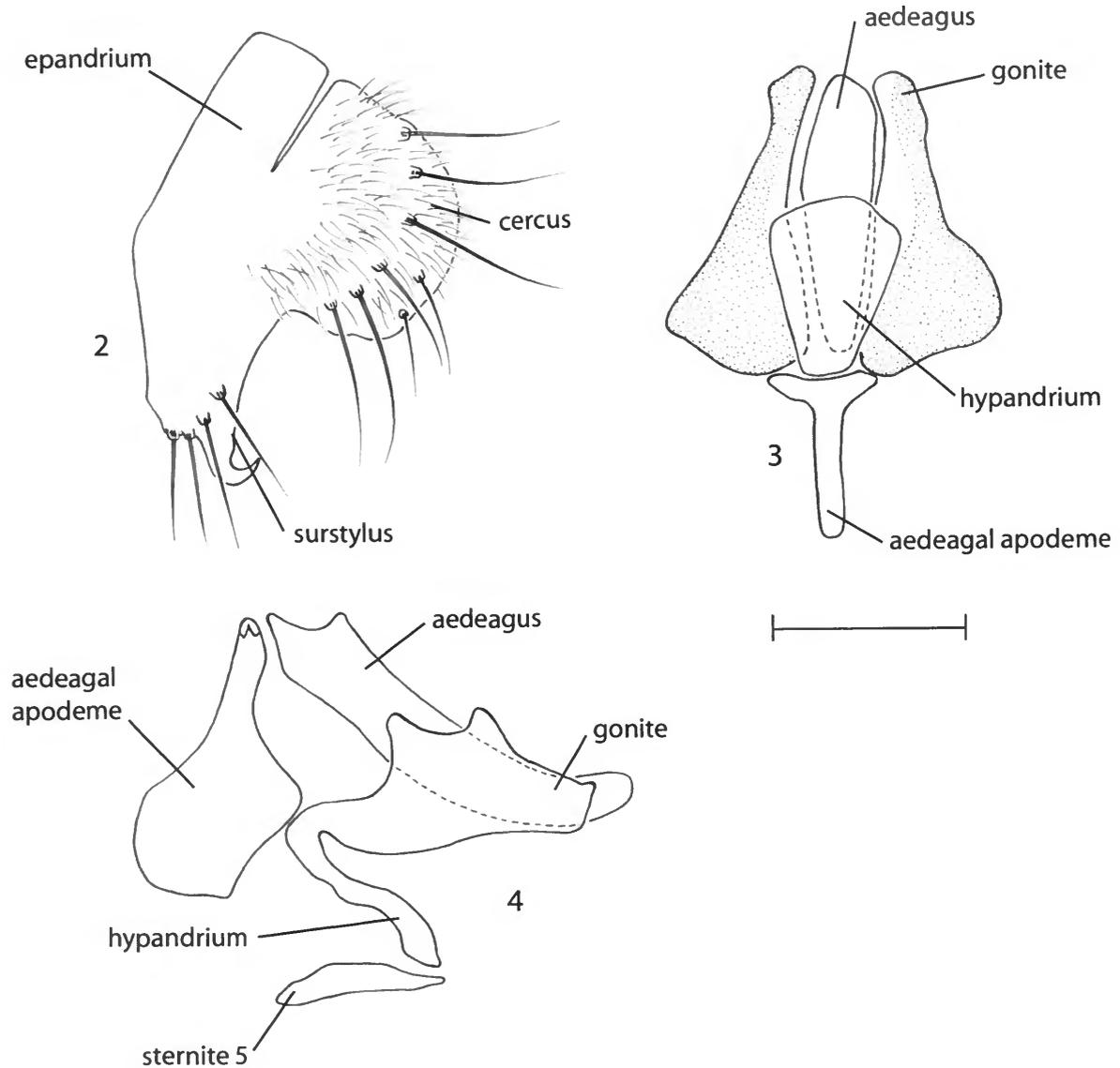
**Head:** Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with silvery gray microtomentum. Occiput with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paravertical seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally; arista dorsally branched. Facial background yellowish brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face yellowish brown to dark brown and covered with yellowish silver microtomentum. Gena covered with silvery gray microtomentum; postgena covered with sparse, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum brown.

**Thorax** (Figure 139): Scutal length 0.32–0.44 mm; scutellar length 0.12–0.17 mm. Mesonotum brown with sparse, silvery gray microtomentum; scutellum brown with sparse, silvery gray microtomentum; anepisternum shiny brown with sparse, silvery gray microtomentum; katapisternum shiny

brown with sparse, silvery gray microtomentum; subscutellum brown with sparse, silvery gray microtomentum; anatergite shiny brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 139): length 1.06–1.26 mm; width 0.46–0.56 mm; costal-vein ratio 1.48–1.82; M-vein ratio 0.22–0.31; amber background with pale brown veins and crossveins, slightly darker posteriorly. Halter yellow. Legs yellowish brown to brown; tarsi yellowish brown with tarsomere 5 brown.

**Abdomen** (Figures 2–4, 177, 178): Background brown; tergites 1–3 with sparse, silvery gray microtomentum; tergite 2 with silvery gray microtomentum slightly more dense along posterior margin; tergite 3 with band of dense, silvery gray microtomentum along posterior margin; tergite 4 shiny, bare with dense, silvery gray microtomentose spots posterolaterally; tergite 5 shiny, bare with dense, silvery gray microtomentose band along posteromedial margin. Male genitalia (Figures 2–4): epandrium-cerci-surstyli complex fused; epandrium an inverted U-shaped band; cercus crescent-shaped with numerous setulae and separated dorsally from epandrium by V-shaped groove; surstylus posteromedial margin with 4 posteriorly projected setae and 1 hook-shaped ventromedial projection; aedeagal apodeme triangular in lateral view, anterior projection broadly rounded, posterior projection elongate with rounded apex; aedeagus elongate crescent-shaped; subepandrial plate-gonite-hypandrium fused; gonite base broadly encircling aedeagus, posterior projection broadly rounded with small indentation and broadly fused to subepandrial plate, dorsal projection rounded; subepandrial plate narrow, articulated with anteroventral margin of epandrium; hypandrium fused posteriorly with subepandrial plate, spatulate, and folded posteriorly beneath genital complex in preserved specimens.

**TYPE MATERIAL.**—The holotype male of *Nostima abbreviata* Cresson is labeled “GRAJAHU RIO DE JANEIRO S. LOPES 30-8-39 [white with black-line border]/TYPE *Nostima ABBREVIATA* E.T. Cresson, Jr. 6603 [species name and number handwritten, number along label right edge] [red]/ANSP [yellow].” The holotype is double mounted (glued by right legs to a minuten in a long, rectangular block of paper-covered cork), is in excellent condition, and is deposited in the ANSP (6603).



FIGURES 2-4.—Male genitalia of *Nostima abbreviata* Cresson: 2, epandrium, cercus, fused surstylus, lateral aspect; 3, internal male genitalia, ventral aspect; 4, same, lateral aspect. Scale = 0.05 mm.

OTHER SPECIMENS EXAMINED (23 ♂, 12 ♀).—BRAZIL. *Rio de Janeiro*: Grajahu, 20 Aug 1939, S. Lopes (1 ♀; ANSP).

COLOMBIA. *Antioquia*: Medellin (30 km NW; 2440 m), Feb 1958, M.R. Wheeler (1 ♂; USNM). *Cundinamarca*: Villetta (16 km W; 1660 m), 15 Mar 1955, E.I. Schlinger, E.S. Ross (2 ♂, 1 ♀; CAS).

COSTA RICA. *Alajuela*: Peñas Blancas (10°18'N, 84°46'W), 18 Aug 1986, L. Masner (1 ♂; CNC). *Cartago*: La Suiza, 3 May–20 Jun 1921, 1923, 1924, P. Schild (2 ♂, 3 ♀; ANSP, HHNM, USNM).

ECUADOR. *Chimborazo*: Bugna, Jul 1955, R. Levi Castillo (1 ♂; USNM); Chilicay, Jul 1955, R. Levi Castillo (1 ♂; USNM); Chilicay Naranjapata, 16 Jun 1955, R. Levi Castillo (7 ♂, 3 ♀; USNM); Huigra, Jul 1955, R. Levi Castillo (1 ♂, 2 ♀; USNM); Linje, Jul 1955, R. Levi Castillo (1 ♀; USNM). *Pichincha*: Santo Domingo de los Colorados, Mar 1958, M.R. Wheeler (4 ♂; USNM); Santo Domingo de los Colorados (100 km W), Mar 1958, M.R. Wheeler (2 ♂, 1 ♀; USNM).

MEXICO. *Veracruz*: Tlapacoyan (24 km W), 28 Feb 1972, F. Parker, D. Miller (1 ♂; USNM).

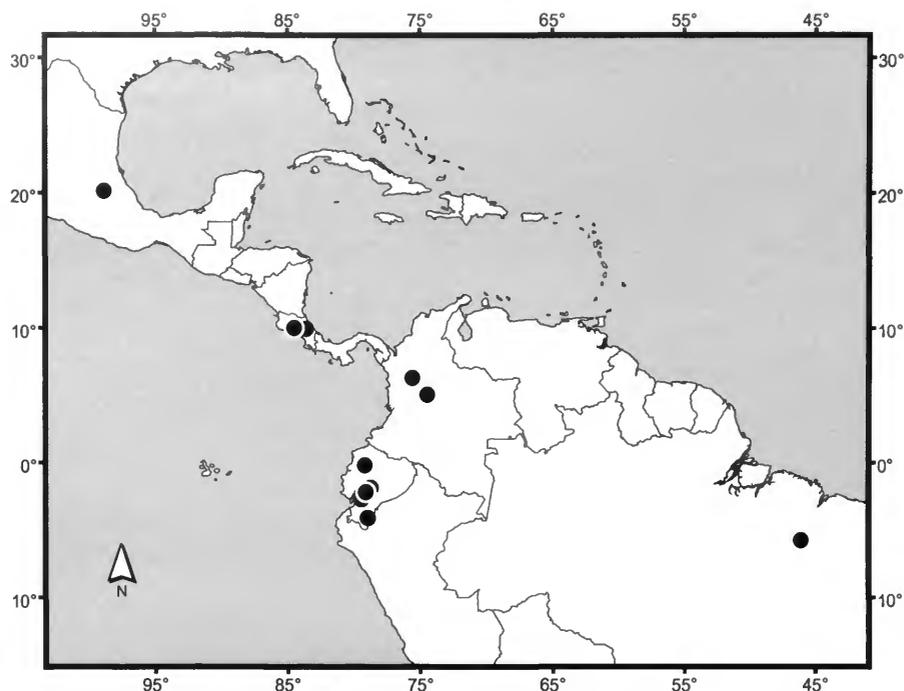


FIGURE 5.—Distribution map for *Nostima abbreviata* Cresson.

**DISTRIBUTION** (Figure 5).—*Neotropical*: Brazil (Rio de Janeiro), Colombia (Antioquia, Cundinamarca), Costa Rica (Alajuela, Cartago), Ecuador (Chimborazo, Pichincha), Mexico (Veracruz).

**ETYMOLOGY**.—Cresson (1941) appropriately named *N. abbreviata* for its short costal section II.

**REMARKS**.—*Nostima abbreviata* is closely related to *N. gilvipes* but can be distinguished by the dense, silvery gray microtomentose spot laterally on tergite 4 and by the distinctive hook-shaped ventromedial projection of the surstylus.

Apparently this species is common throughout its primarily northern Neotropical distribution and has been found essentially wherever intensive collecting of small Diptera has occurred.

## 2. *Nostima approximata* Sturtevant and Wheeler

FIGURES 6–9, 140, 179–182

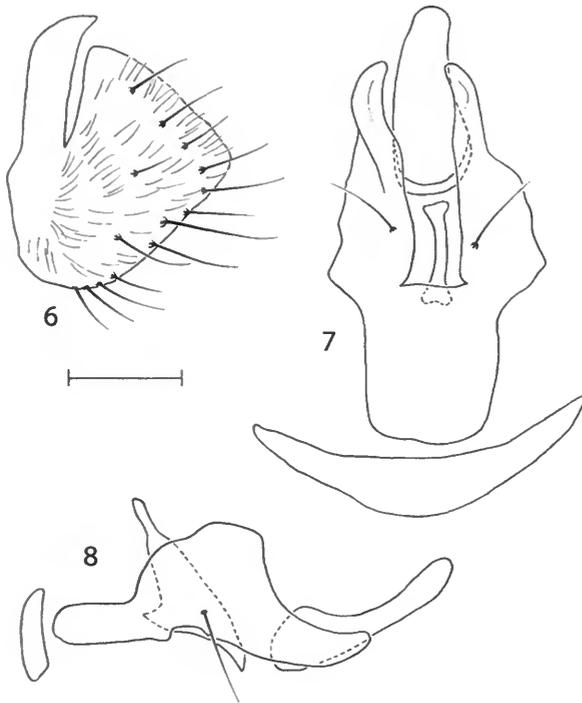
*Nostima approximata* Sturtevant and Wheeler, 1954:240.—Wirth, 1965:745 [Nearctic catalog].—Foote, 1983:472–484 [biology and immature stages].—Mathis and Zatwarnicki, 1995:190–191 [world catalog].

**DIAGNOSIS**.—*Nostima approximata* is distinguished from congeners by the following combination of external characters: paraverticlar seta present; flagellomere 1 blackish brown dorsally, yellowish ventrally; mesonotum with sharply defined stripe laterad of dorsocentral setae, stripe not much wider than fronto-orbital stripe; scutellum velvety brown; wing unspotted;

crossveins r-m and dm-cu paler than veins but not white; and tergites 3 and 4 with dense, silvery gray microtomentose oval-shaped posterolateral spot.

**DESCRIPTION**.—Small shore flies, body length 1.03–1.27 mm; brown with silver, silvery gray, yellowish silver, and golden microtomentum.

**Head**: Frons with velvety black ventrolateral triangles, anterior semicircle brown with yellowish microtomentum, slightly darker medioventrally. Occiput with dense, silvery gray microtomentum, medially shiny dark brown band with sparse microtomentum. Outer vertical seta  $\frac{1}{2}$  length of inner vertical seta; paraverticlar seta minute. Scape yellow, pedicel ventrally yellow, dorsally dark brown; flagellomere 1 with dorsal  $\frac{1}{3}$  brown and ventral  $\frac{2}{3}$  yellow; arista dorsally branched. Facial background brown with silvery gray and yellowish brown microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae and extending along parafacial and gena. Medially along silvery gray parafacial, a brown band extending lateroventrally below gena; medially along brown band, a silvery gray microtomentose band extending lateroventrally below gena. Face with striped appearance from lateromedial bands; face medially yellowish brown with sparse, silvery gray microtomentum. Gena covered with dense, silvery gray microtomentum; postgena ventrally with dense, silvery gray microtomentum, slightly less dense dorsally. Maxillary palpus yellow; prementum yellowish brown.



FIGURES 6-8.—Male genitalia of *Nostima approximata* Sturtevant and Wheeler: 6, epandrium, cercus, fused surstylus, lateral aspect; 7, internal male genitalia, ventral aspect; 8, same, lateral aspect. Scale = 0.05 mm.

**Thorax** (Figure 140): Scutal length 0.34–0.41 mm; scutellar length 0.14–0.19 mm. Mesonotum medially brown with yellowish silver microtomentum; sharply defined silvery gray stripe between dorsocentral line and interalar setae; anteriorly silvery gray microtomentum covering postpronotum, widening posteriorly to cover lateroposterior margin; scutellum dorsally covered with velvety brown microtomentum, laterally with dense, silvery gray microtomentum contiguous with mesonotal stripe; anepisternum dorsal  $\frac{1}{4}$  with silvery gray microtomentum, ventral  $\frac{3}{4}$  shiny dark brown with sparse, yellowish silver microtomentum; katapisternum dark brown, dorsal  $\frac{1}{3}$  with silvery gray microtomentum, ventral  $\frac{1}{3}$  shiny with sparse, yellowish silver microtomentum; subscutellum dark brown, ventral  $\frac{1}{4}$  with sparse, silvery gray microtomentum; anatergite dark brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 140): length 0.83–1.19 mm; width 0.36–0.47 mm; costal-vein ratio 1.13–1.76; M-vein ratio 0.11–0.20; amber background color with slightly darkened areas in  $r_1$  cell, in medial cell, and in anterior cubital cell; veins and crossveins brown, r-m ventrally yellowish brown, dm-cu dorsally yellowish brown. Halter yellowish white. Legs yellow to yellowish brown; mid- and hind-

femora with distal  $\frac{1}{3}$  slightly darker; hindtibia faintly banded; tarsomere 5 yellowish brown.

**Abdomen** (Figures 6–8, 179–182): Background brown; tergites 1–5 covered with sparse, yellowish silver microtomentum; tergite 3 with dense, silvery gray microtomentose oval-shaped posterolateral spot; tergite 4 with dense, silvery gray microtomentose oval-shaped posterolateral spot. Male tergite 5 sometimes with dense, silvery gray microtomentose posteromedial spot; female tergite 5 with dense, silvery gray microtomentose oval-shaped posterolateral spot. Male genitalia (Figures 6–8): epandrium-cerci-surstyli complex fused; epandrium a thin, inverted, U-shaped sclerite fused ventrolaterally with cercus; cercus crescent-shaped with many long setulae, a curved indentation on lateral margin, and fused laterally with epandrium, separated from epandrium by V-shaped dorsal space; surstylus rounded with rounded anterior projection, ventrally with 4 setae; aedeagal apodeme triangular in lateral view, posterior projection narrowly spatulate, anterior projection rounded with minute projections, lateral projections spike-shaped; aedeagus crescent-shaped with rounded posterior projection; subepandrial plate-gonite-hypandrium fused; gonite with broad base, a prominent medial setula, rounded posterior projection, and a rounded dorsal projection; subepandrial plate forming narrow band; hypandrium quadrate with rounded corners, fused anteriorly with subepandrial plate.

**TYPE MATERIAL.**—The holotype female of *Nostima approximata* Sturtevant and Wheeler is labeled “Burbank Okla. [Osage:] 9.13.52 [13 Sep 1952] [handwritten]/HOLOTYPE *Nostima approximata* Stvt & Whlr [red]/TYPE 6701 [red; number handwritten]/ANSP [yellow].” The holotype is double mounted (glued by the left thorax to a paper point), is in excellent condition, and is deposited in the ANSP (6701).

**OTHER SPECIMENS EXAMINED** (44♂, 32♀).—BERMUDA. *Paget*: Paget Marsh (32°17'N, 64°47'W), 31 May–3 Jun 1991, W.N. Mathis (23♂, 19♀, 1ex; USNM).

**CAYMAN ISLANDS.** *Grand Cayman*: Georgetown (19°18'N, 81°22.9'W; Malaise trap), 15–30 Mar 1965, J.R. McLintock (1♂, 2♀; CNC).

**UNITED STATES.** *Florida*: Palm Beach County: Lake Worth, A.T. Slosson (1♀; AMNH); Monroe County: Big Pine Key (Malaise trap), 13 Feb 1978, W.W. Wirth (2♂; USNM). *Kansas*: Leavenworth County: Tonganoxie State Lake, 12 May 1934, M.W. Sanderson (1♀; ANSP). *Maryland*: Calvert County: Chesapeake Beach, 2 Aug, J.M. Aldrich (1♂; USNM). *Ohio*: Portage County: Kent (1.6 km E), 1 Sep–10 Nov 1981, 1985, B.A. Foote (17♂, 8♀; KENT). *Virginia*: Richmond County: Warsaw, 26 Jul 1952, W.W. Wirth (1♀; USNM).

**DISTRIBUTION** (Figure 9).—*Nearctic*: Bermuda, United States (Florida, Kansas, Maryland, Ohio, Oklahoma, Virginia). *Neotropical*: West Indies (Cayman Islands).

**ETYMOLOGY.**—*Nostima approximata* was possibly named for its close resemblance to the ubiquitous and Holarctic species *N. picta*. *Nostima approximata* is indeed closely related to

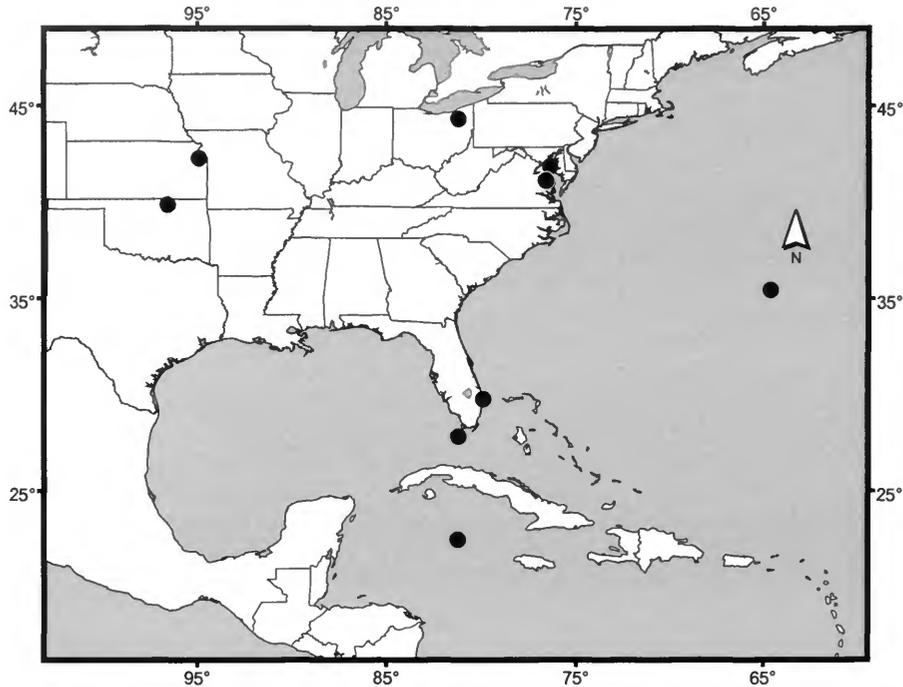


FIGURE 9.—Distribution map for *Nostima approximata* Sturtevant and Wheeler.

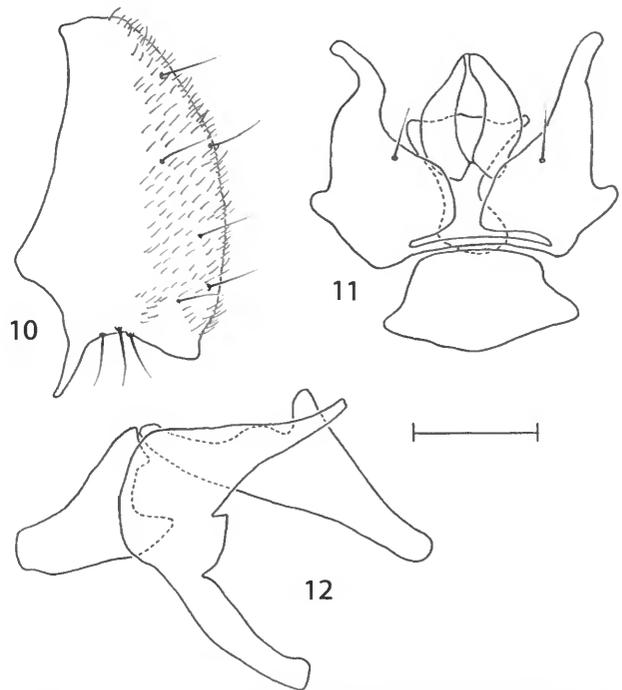
*N. picta* but is distinguished by the scutellar coloration and the shape of the gonite.

REMARKS.—*Nostima approximata* is the only species of *Nostima* for which the larval stages are known. Foote (1983) discovered larvae of *N. approximata* feeding on blue-green algae near Kent, Ohio. He subsequently conducted larval feeding tests and described the immature stages. The larvae of *N. approximata* may feed in nature exclusively on blue-green algae of the genus *Oscillatoria*. Mature larvae are morphologically more similar to other members of the tribe Hyadinini, such as *Hyadina* and *Lytogaster*, than to Hydrellinae (Foote, 1983).

**3. *Nostima atriscuta*, new species**

FIGURES 10–13, 141, 183, 184

DIAGNOSIS.—*Nostima atriscuta* is distinguished from congeners by the following combination of external characters: face evenly microtomentose, mostly unicolorous, yellowish, lacking bare, shiny areas; scutum except for anterior margin blackish brown, unicolorous, subshiny, sparsely microtomentose, contrasted with dark brown scutellum; wing hyaline; veins generally unicolorous, mostly brown; vein  $R_{2+3}$  relatively short, costal sections II and III about equal in length; crossveins r-m and dm-cu white; apical section of vein  $CuA_1$  long, about two times length of vein M between crossveins; tergites 4 and 5 of male mostly shiny brown; tergite 4 with sil-



FIGURES 10–12.—Male genitalia of *Nostima atriscuta*, new species: 10, epanthrium, cercus, fused surstylus, lateral aspect; 11, internal male genitalia, ventral aspect; 12, same, lateral aspect. Scale = 0.05 mm.

very gray posterolateral spot; tergite 5 with silvery gray microtomentose posteromedial band

**DESCRIPTION.**—Minute to small shore flies, body length 0.99–1.16 mm; generally dark brown to shiny black dorsally, gray laterally, legs generally yellowish brown.

**Head:** Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum. Occiput with yellowish silver microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally; arista dorsally branched. Facial background coloration brown with golden microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face brown with yellowish gray microtomentum. Gena covered with silvery gray microtomentum; postgena covered with sparse, silvery gray microtomentum. Maxillary palpus yellow; prementum yellowish brown.

**Thorax (Figure 141):** Scutal length 0.41–0.52 mm; scutellar length 0.14–0.18 mm. Mesonotum dark brown with sparse, silvery yellow microtomentum; scutellum dark brown with dense, silvery yellow microtomentum; anepisternum brown with yellowish silver microtomentum; katepisternum brown with silvery yellow microtomentum; subscutellum brown with

silvery yellow microtomentum; anatergite brown with silvery yellow microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 141): length 1.26–1.38 mm; width 0.56–0.59 mm; costal-vein ratio 0.84–1.00; M-vein ratio 0.24–0.26; amber background with white veins and crossveins; crossveins r-m and dm-cu yellowish brown. Halter yellowish white. Legs yellowish brown; tarsi yellowish brown with tarsomere 5 slightly darker.

**Abdomen (Figures 10–12, 183, 184):** Background coloration brown; tergites 1–3 with sparse, yellowish silver microtomentum; tergite 4 shiny, bare with dense, silvery gray microtomentose spots posterolaterally; tergite 5 shiny, bare with dense, silvery gray microtomentose band along posteromedial margin. Male genitalia (Figures 10–12): epandrium-cerci-surstyli complex fused; epandrium a broad U-shaped dorsal band with rounded anteroventral projection; cercus completely fused to epandrium and with many long setae; surstylus fused dorsally to epandrium, broadly rectangular, and with pointed ventral projection and 3 long ventral setae; aedeagal apodeme triangular in lateral view with spatulate posterior projection, pointed lateromedial projections, and rounded anterior projection; aedeagus heavily sclerotized, triangular in lateral view with rounded posterior projection, and in posterior view with medial groove; gonite broadly fused to subepandrial plate and with rounded posterior projection, lateroventral setulae, and

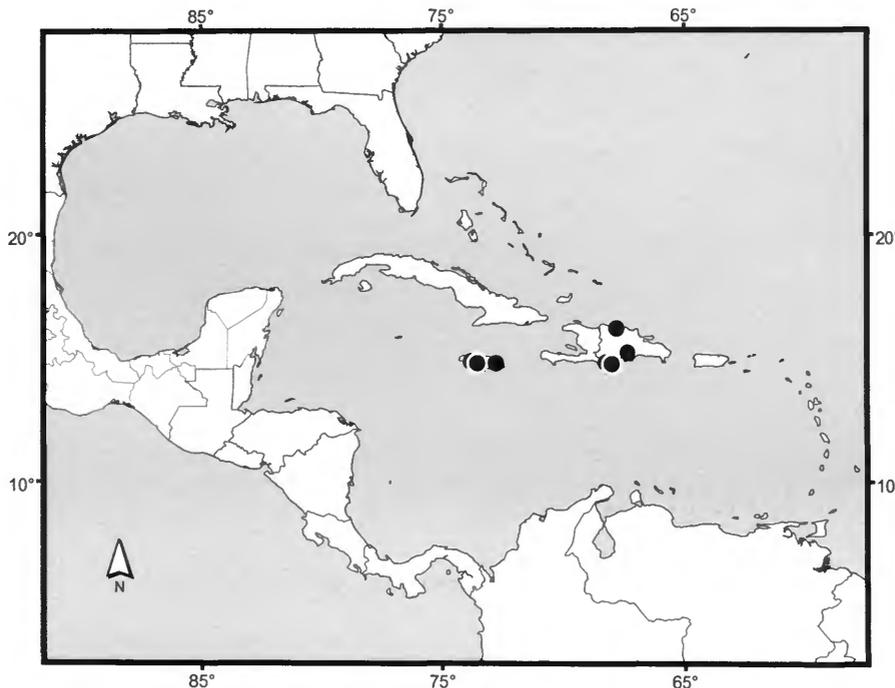


FIGURE 13.—Distribution map for *Nostima atriscuta*, new species.

rounded dorsal projection; subepandrial plate a narrow band; hypandrium trapezoidal with broadly rounded anterolateral projections.

**TYPE SPECIMENS.**—The holotype male is labeled “JAMAICA. Portland: Crystal Springs, 18°12.5'N, 76°37.9'W[,] 18 May 1996, D. & W. Mathis, H. Williams/USNM ENT 00141438 [bar code label]/HOLOTYPE ♂ *Nostima atriscuta* Edmiston & Mathis USNM [red].” The holotype is double mounted (minuten in a block of plastic), is in excellent condition, and is deposited in the USNM. Six paratypes (5♂, 1♀; USNM) bear the same locality data as the holotype. Other paratypes are as follows: JAMAICA. *Manchester*: near Mandeville (18°03.5'N, 77°31.9'W), 15–18 Apr 2000, W.N. Mathis (2♂; USNM). *St. Andrew*: Cinchona (18°04.4'N, 76°39.3'W; 1400 m), 29 Apr 2000, W.N. Mathis (1♂; USNM); Hardwar Gap (18°04.2'N, 76°44'W), 17 May 1996, D. and W.N. Mathis, H.B. Williams (4♂, 4♀; USNM). *St. Elizabeth*: Ys Falls (18°09.3'N, 77°49.5'W), 17–18 Apr 2000, W.N. Mathis (7♂, 4♀; USNM).

**OTHER SPECIMENS EXAMINED** (4♂, 4♀).—DOMINICAN REPUBLIC. *Barahona*: Paraíso (5 km N; 18°01.5'N, 71°11.6'W; 150 m), 21 Mar 1999, W.N. Mathis (3♂, 2♀; USNM). *Pedernales*: Cabo Rojo (26 km NE; 18°06'N, 71°38'W; mesic deciduous forest with scattered pines), 16 Jul 1992, C. Young, R. Davidson, S. Thompson, J. Rawlins (1♀; CARN). *Peravia*: San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W.N. Mathis (1♀; USNM). *Puerto Plata*: Pico El Murazo (north slope near summit; 19°41'N, 70°57'W; 910 m; mesic deciduous forest), 28 Nov 1992, J. Rawlins, R. Davidson, M. Klingler, S. Thompson (1♂; CARN).

**DISTRIBUTION** (Figure 13).—*Neotropical*: West Indies (Dominican Republic, Jamaica).

**ETYMOLOGY.**—The species epithet, *atriscuta*, is of Latin derivation and is a combination of *ater*, meaning black, and *scuta*, meaning plate. The name refers to the mostly black scutum.

**REMARKS.**—With better sampling, we suspect that this species will be found on other islands of the Greater Antilles and perhaps elsewhere.

#### 4. *Nostima canens* Cresson

FIGURES 14–17, 142, 185, 186

*Nostima canens* Cresson, 1941:5; 1947:41 [review, compared with *N. schil-di*].—Wirth, 1968:16 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:191 [world catalog].

*Nostima niveofasciata* Cresson, 1947:40.—Wirth, 1968:16 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:192 [world catalog]. [New synonymy.]

**DIAGNOSIS.**—*Nostima canens* is distinguished from congeners by the following combination of external characters: scutum unicolorous or mostly so, gray, densely microtomentose; scutellum microtomentose but not appearing velvety; crossveins and veins generally unicolorous, yellowish brown to

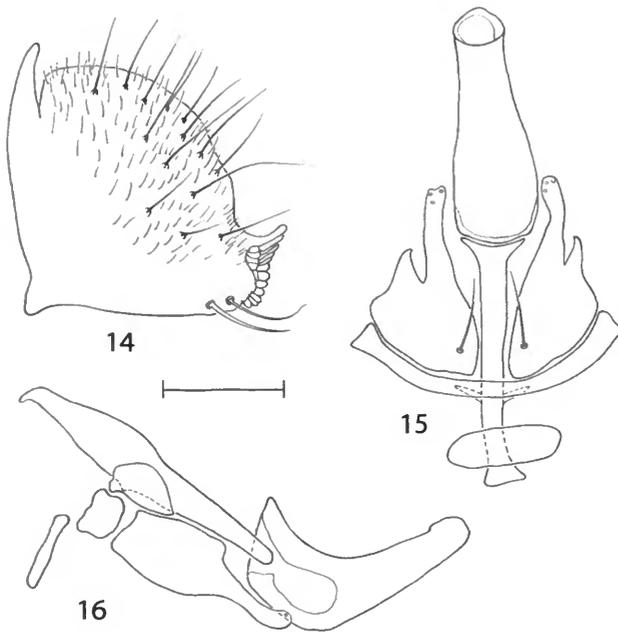
brown, at most crossveins r-m and dm-cu slightly paler in color than other veins; tergites 3–5 with pattern of dense microtomentum, none shiny; and tergites 3–5 conspicuously fasciate along posterior margin (tergite 2 partially so).

**DESCRIPTION.**—Minute to small shore flies, body length 0.89–1.11 mm; yellowish brown, brown, to dark brown with silvery gray and yellowish silver microtomentum.

**Head:** Frons with dark brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum slightly paler than ventrolateral triangles. Occiput dark brown with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown dorsally, yellow ventrally; arista dorsally branched. Facial background brown to dark brown with silvery gray and yellowish silver microtomentum; narrow band of silvery golden microtomentum along eye margin beginning at antenna, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a dark brown band extending lateroventrally below gena. Gena covered with dense, silvery gray microtomentum; postgena covered with silvery gray microtomentum, less dense than on gena. Maxillary palpus yellow; prementum yellowish brown.

**Thorax** (Figure 142): Scutellar length 0.35–0.46 mm; scutellar length 0.14–0.19 mm. Mesonotum anteriorly with faint vittae, posteriorly brown with sparse, yellowish silver microtomentum; medially brown with yellowish silver microtomentum, lateral from medial line with sparse, silvery gray microtomentum; dorsocentral line brown with yellowish silver microtomentum, laterally along dorsocentral line with sparse, silvery gray microtomentum; scutellum medially brown with sparse, yellowish silver microtomentum, laterally with silvery gray microtomentum; anepisternum shiny dark brown with silvery gray microtomentum, ventrally sparse; katepisternum shiny dark brown with silvery gray microtomentum; subscutellum shiny dark brown with sparse, yellowish silver microtomentum; anatergite shiny dark brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorso-central seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{2}$  length of apical seta. Wing (Figure 142): length 1.03–1.23 mm; width 0.46–0.56 mm; costal-vein ratio 1.27–1.77; M-vein ratio 0.18–0.33; background, veins, and crossveins amber, posterior  $\frac{1}{10}$  slightly darker. Halter yellow to brown. Legs yellowish brown; femora yellowish brown; forefemur dark yellowish brown; tibia yellowish brown; tarsi yellowish brown with tarsomere 5 dark yellowish brown.

**Abdomen** (Figures 14–16, 185, 186): Background dark brown; tergites 1 and 2 dark brown with sparse, silvery gray microtomentum; tergite 3 dark brown with silvery gray microtomentose band along entire posterior margin covering  $\frac{1}{2}$ – $\frac{2}{3}$  of the tergite; tergite 4 dark brown with silvery gray microtomentose V-shaped band from dorsomedial surface to lateral



FIGURES 14–16.—Male genitalia of *Nostima canens* Cresson: 14, epandrium, cercus, fused surstylus, lateral aspect; 15, internal male genitalia, ventral aspect; 16, same, lateral aspect. Scale = 0.05 mm.

margins, posteromedial margin with sparse, silvery gray microtomentum; tergite 5 dark brown with silvery gray microtomentose band along entire posterior margin covering  $\frac{1}{2}$  of the tergite. Male genitalia (Figures 14–16): epandrium-cerci-surstyli complex fused; epandrium a U-shaped band; cercus ventrolaterally fused with epandrium, separated dorsally from epandrium by a narrow V-shaped groove; cercus covered with many long setae; surstylus fused dorsally with epandrium, with rounded anterior projection, and with rounded posterior projection bearing long setae and approximately 10 papillae; aedeagal apodeme elongate, triangular in lateral view, posterior projection spatulate with pointed lateral projections, anterior projection square with rounded edges, lateral projection sharply pointed; aedeagus arc-shaped with basal sclerotized ring; gonite broad-based with medial setulae, posterior projection broadly rounded, mediodorsal projection triangular with medially projecting apex; subepandrial plate collar-shaped, laterally articulated with epandrium-cerci-surstyli complex; hypandrium oval-shaped.

**TYPE MATERIAL.**—The holotype female of *Nostima canens* Cresson is labeled "GRAJAHU RIO DE JANEIRO S. LOPES 20-8-39 [20 Aug 1939][white with black-line border]/TYPE Nostima CANENS E.T. Cresson, Jr. 6605 [red; species name and number handwritten, number written along right border]/ANSP [yellow]." The holotype is double mounted (glued by

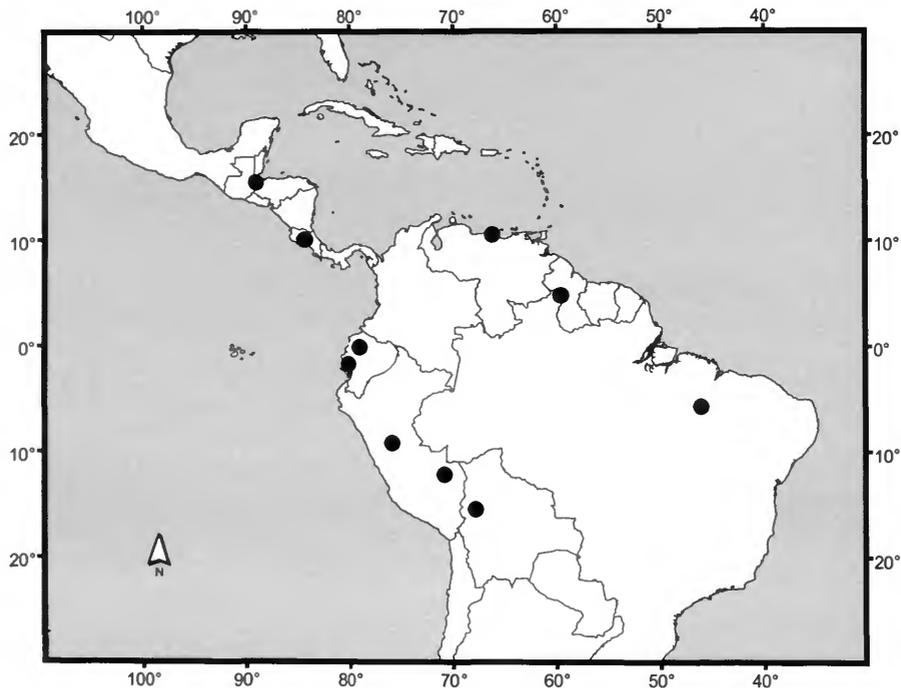


FIGURE 17.—Distribution map for *Nostima canens* Cresson.

left thorax to a minuten pin in a long, rectangular, paper-covered cork), is in excellent condition, and is deposited in the ANSP (6605).

The holotype male of *Nostima niveofasciata* Cresson is labeled "San Jose Costa Rica/HSchmidt v:15vii [handwritten] coll/TYPE No. Nostima niveofasciata E.T.Cresson, Jr. [red; species name handwritten]/Type No 70630 USNM [red; number handwritten]." The holotype is double mounted (minuten in a long, rectangular block of pith), is in fair condition (left wing removed and in an attached microvial; some setae on head and thorax missing), and is deposited in the USNM (70630).

OTHER SPECIMENS EXAMINED (17♂, 39♀, 1 not determinable).—BOLIVIA. *La Paz*: Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W.N. Mathis (1♂, 6♀; USNM).

BRAZIL. *Rio de Janeiro*: Grajahu, 20 Aug 1939, S. Lopes (1♀, 1ex; ANSP).

COSTA RICA. *Alajuela*: Higuato, San Mateo, P. Schild (2♂, 1♀; ANSP). *Puntarenas*: Coto Brus, Pittier (9°1'N, 82°57'W), 1 Jul 1995, F. Alvarado (2♀; INBIO); Monteverde (10°19'N, 84°44'W; 1500 m; cloud forest), 15–20 Aug 1986, L. Masner (1♂; CNC). *San José*: Pérez Zeledón, San Pedro (9°23'N, 83°35'W), 13 Jan 1996, A. Mora Maroto (1♂; INBIO); San José La Caja (8 km W), 1930, H. Schmidt (4♂, 3♀; DEI, USNM).

ECUADOR. *Manabi*: Pedro Carbo (45 km NW), 11 Jan 1978, W.N. Mathis (1♂, 18♀; USNM). *Pichincha*: Santo Domingo de los Colorados (81 km W), Mar 1958, M.R. Wheeler (3♂; USNM); Santo Domingo de los Colorados (100 km W), Mar 1958, M.R. Wheeler (1♀; USNM).

GUATEMALA. *Izabal*: Matias de Galvez, 14–15 Aug 1965, P.J. Spangler (1♂; USNM).

GUYANA. Paramakatoi (4°42'N, 59°42.8'W), 24–25 Aug 1997, W.N. Mathis (1♂; USNM).

PERU. *Huánuco*: Tingo Maria, 11 Nov 1954, E.I. Schlinger, E.S. Ross (1♀; CAS); Tingo Maria, 9 Dec 1954, E.I. Schlinger, E.S. Ross (1♀; CAS); Tingo Maria (24 km NE; 700 m), 11 Nov 1954, E.I. Schlinger, E.S. Ross (1♂; CAS). *Madre de Dios*: Manu, Río Manu, 9–23 Sep 1988, W.N. Mathis (2♀; USNM); Manu, Río Manu, Cocha Salvador (240 m), 14 Sep 1988, W.N. Mathis (1♂; USNM).

VENEZUELA. *Aragua*: Caife [Café?], Jan 1943, P. Anduze (3♀; USNM).

DISTRIBUTION (Figure 17).—*Neotropical*: Bolivia (La Paz), Brazil (Rio de Janeiro), Costa Rica (Alajuela, Puntarenas, San José), Ecuador (Pichincha, Manabi), Guatemala (Izabal), Guyana, Peru (Huánuco, Madre de Dios), Venezuela (Aragua).

ETYMOLOGY.—The species epithet, *canens*, is derived from the Latin root *can*, meaning gray or ash-colored. Cresson appropriately named *N. canens* for the very large patches of dense, silvery gray microtomentum on the abdominal tergites.

REMARKS.—*Nostima canens* has been found where intensive collecting of small Diptera has occurred. *Nostima canens* is ap-

parently a common Neotropical species. The cercal papillae of *N. canens* and *N. gilvipes* may be homologous structures.

Cresson (1947:40) described *Nostima niveofasciata* with the complete description as follows, "Similar to *abbreviata* in its short costal section, but differs from both *gilvipes* and *abbreviata* in having a distinct white apical fascia on tergite IV which curves basad at middle." In the same paper, Cresson described *N. canens* as having abdominal tergites with white fasciae only, and costal section II distinctly shorter than costal section III. Based solely on the abdominal tergite microtomentum and costal ratio, *N. canens* and *N. niveofasciata* are not distinguishable as separate species.

We have studied the holotype and three paratypes of *N. niveofasciata* and have placed a white determination label on the holotype, indicating its synonymy with *Nostima canens*.

Three female specimens from Venezuela have a slightly different microtomentose pattern on the dorsum of the fourth tergite. Rather than completely covering the fourth tergite, the microtomentum is absent medially along the posterodorsal margin. This variation may indicate another species, but without the availability of male specimens, assessment of this variant as a distinct and probably new species is not prudent at this time.

## 5. *Nostima cinnamea*, new species

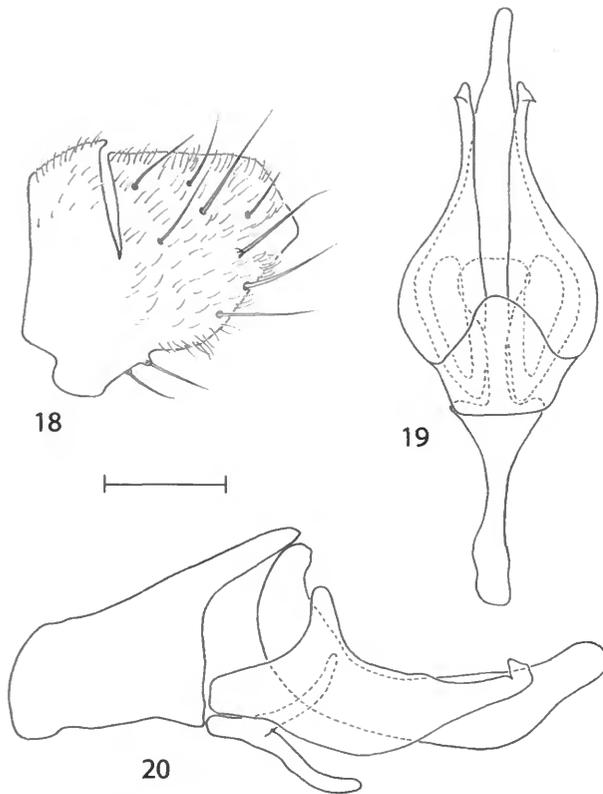
FIGURES 18–21, 143, 187, 188

DIAGNOSIS.—*Nostima cinnamea* is distinguished from congeners by the following combination of external characters: mesonotum yellow to yellowish brown with sparse, yellowish silver microtomentum, slightly darker along dorsocentral rows but not vittate; anepisternum and katepisternum pale yellow to tan; wing mostly hyaline, unspotted, but with pale, whitish, oval-shaped spot in basomedial area of cell  $cua_1$ ; crossveins  $r_m$  and  $dm-cu$  concolorous with adjacent veins, not white; and no discernible microtomentose pattern evident on tergites.

DESCRIPTION.—Small shore flies, body length 1.15–1.25 mm; generally tan to brown dorsally and laterally and with some whitish to pale gray microtomentum, legs yellowish.

*Head*: Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum. Occiput with yellowish silver microtomentum. Outer vertical seta  $1/3$ – $1/2$  length of inner vertical seta; paravertical seta minute. Scape and pedicel pale yellowish brown ventrally, darker yellowish brown dorsally; flagellomere 1 pale yellowish brown ventrally, darker yellowish brown dorsally; arista dorsally branched. Facial background coloration pale yellowish brown with golden microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at vertical setae, extending and gradually blending with yellowish silver microtomentum on gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face yellowish brown with golden

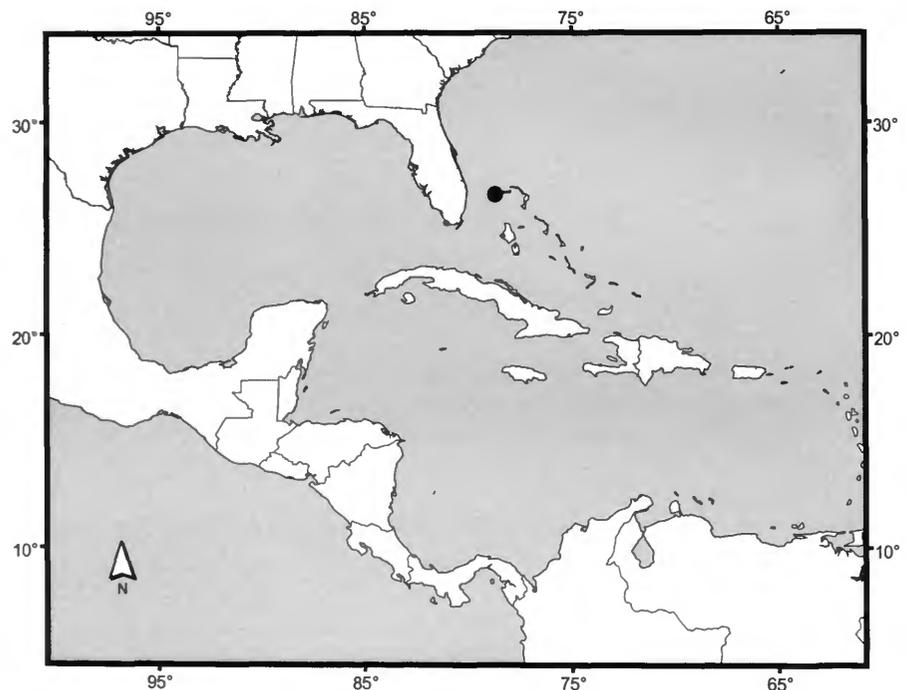
FIGURES 18–20 (left).—Male genitalia of *Nostima cinnamea*, new species: 18, epandrium, cercus, fused surstylus, lateral aspect; 19, internal male genitalia, ventral aspect; 20, same, lateral aspect. Scale = 0.05 mm.



microtomentum. Gena covered with yellowish silver microtomentum; postgena covered with sparse, yellowish silver microtomentum. Maxillary palpus yellow; prementum yellow.

*Thorax* (Figure 143): Scutal length 0.37–0.42 mm; scutellar length 0.11–0.11 mm. Mesonotum yellowish to brown with sparse, yellowish silver microtomentum, slightly darker along dorsocentral rows; scutellum pale brown with sparse, yellowish silver microtomentum; anepisternum yellow to tan with sparse, yellowish silver microtomentum; katepisternum yellow to tan with sparse, yellowish silver microtomentum; subscutellum pale brown with sparse, yellowish silver microtomentum; anatergite pale brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 143): length 1.01–1.10 mm; width 0.38–0.46 mm; costal-vein ratio 1.47–1.77; M-vein ratio 0.16–0.18; amber background with brown veins and crossveins; crossveins r-m and dm-cu slightly thickened and darker; basomedial area of cell  $cua_1$  with pale, whitish, oval-shaped spot. Halter pale yellowish brown. Legs yellowish brown; hindtarsus yellowish brown with tarsomere 5 slightly darker; mid- and hindtibiae with slightly darker bands.

FIGURE 21 (right).—Distribution map for *Nostima cinnamea*, new species.



**Abdomen** (Figures 18–20, 187, 188): All specimens collected with a pan trap; all specimens bloated with a whitish discoloration typical of acalyprate Diptera collected with such techniques. No discernible microtomentose pattern evident on tergites. Male genitalia (Figures 18–20): epandrium-cerci-surstyli complex fused; epandrium a U-shaped dorsal band; cercus crescent-shaped with dorsad angulate and bearing many long setulae, laterally fused with epandrium, and dorsally separated from epandrium via narrow V-shaped space; surstylus fused dorsally with epandrium, rounded with anterior projection, and with 2 long posteroventral setae; aedeagal apodeme broadly rectangular with large rounded anterior projection, spatulate posterior projection, and rounded mediolateral projections; aedeagus crescent-shaped with rounded posterior projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate a U-shaped band, broadly fused posteriorly with hypandrium, fused medially with gonites, and articulated posteriorly with epandrium; gonite with triangular-tipped posterior projection and with broadly rounded dorsal projection; hypandrium trapezoidal in ventral view.

**TYPE MATERIAL.**—The holotype male of *Nostima cinnamea* is labeled "GRAND BAHAMA ISLAND[,] Freeport[,] 20–27 June 1987[,] W. E. Steiner, M.J. & R. Molineaux/Yellow pan trap in Caribbean pine and palmetto scrub/HOLOTYPE ♂ *Nostima cinnamea* Edmiston & Mathis USNM [red]." The holotype is double mounted (glued to a paper triangle), is in good condition (abdomen removed and dissected, parts in an attached microvial; left wing in an attached microvial), and is deposited in the USNM. Two paratypes (2 ♀; USNM) bear the same locality label as the holotype.

**DISTRIBUTION** (Figure 21).—*Neotropical*: Bahamas.

**ETYMOLOGY.**—The species epithet, *cinnamea*, is of Latin derivation and refers to the cinnamon-colored mesonotum.

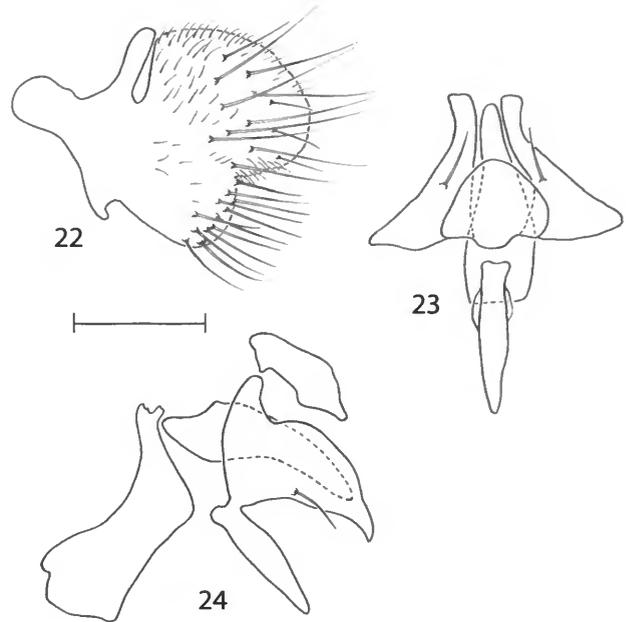
**REMARKS.**—*Nostima cinnamea* may be endemic to the Bahamas, but only with more intensive collection will the further distribution of this species become known.

## 6. *Nostima duaguttata*, new species

FIGURES 22–25, 144, 189, 190

**DIAGNOSIS.**—*Nostima duaguttata* is distinguished from congeners by the following combination of external characters: frons densely microtomentose, mesofrons velvety black, fronto-orbits silvery gray; gena with sparse, yellowish silver microtomentum, shiny ventrally; mesonotum unicolorous, black; scutellum with dense microtomentum, appearing velvety black; veins and crossveins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler in color than other veins but not white; and tergites 3 and 4 each with silver-colored microtomentose spot.

**DESCRIPTION.**—Minute shore flies, body length 0.86–0.95 mm; except for yellow legs and flagellomere 1, mostly blackish brown to black with gray to velvety black microtomentum.



FIGURES 22–24.—Male genitalia of *Nostima duaguttata*, new species: 22, epandrium, cercus, fused surstylus, lateral aspect; 23, internal male genitalia, ventral aspect; 24, same, lateral aspect. Scale = 0.05 mm.

**Head:** Frons and ventrolateral triangles black, densely microtomentose, appearing velvety black, only fronto-orbits gray. Occiput black with yellowish silver microtomentum. Outer vertical seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel dark yellowish brown; flagellomere 1 yellowish brown. Facial background coloration black with sparse, yellowish silver microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with sparse, yellowish silver microtomentum on gena; medially along parafacial, a black band extending lateroventrally below gena; face black with mediovertical stripe of silvery gray microtomentum extending ventrally to cover ventral facial margin. Gena covered with sparse, yellowish silver microtomentum; postgena covered with sparse, yellowish silver microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax** (Figure 144): Scutal length 0.25–0.34 mm; scutellar length 0.14–0.15 mm. Mesonotum black with yellowish silver microtomentum, denser laterad of dorsocentral line; scutellum black, velvety; anepisternum black with sparse, yellowish silver microtomentum; katepisternum black with silvery gray microtomentum; subscutellum black with sparse, yellowish silver microtomentum; anatergite black with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{4}$ – $\frac{1}{3}$  length of

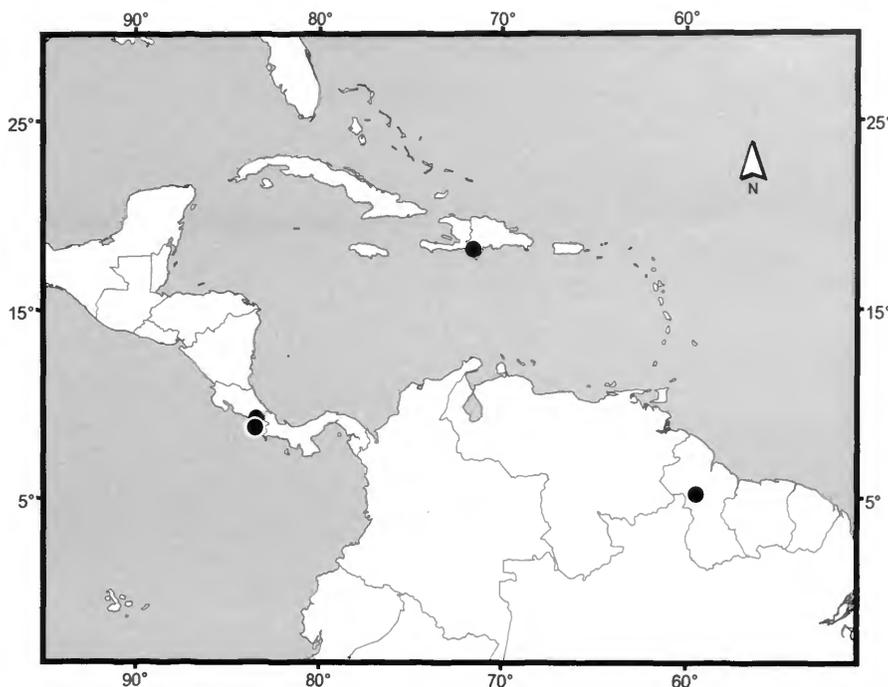


FIGURE 25.—Distribution map for *Nostima duaguttata*, new species.

apical seta. Wing (Figure 144): length 0.94 mm; width 0.37–0.41 mm; costal-vein ratio 1.45–1.59; M-vein ratio 0.18–0.33; amber background with yellowish brown to brown veins and crossveins;  $R_{4+5}$  and  $CuA_1$  paler yellowish brown. Halter yellowish white. Legs pale yellowish brown; tarsi pale yellowish brown with tarsomere 5 of mid- and hindlegs slightly darker.

**Abdomen** (Figures 22–24, 189, 190): Background shiny dark brown with sparse, golden microtomentum; tergite 3 with silver-colored microtomentose circular-shaped posterolateral spot; tergite 4 with silver-colored microtomentose circular-shaped posterolateral spot. **Male genitalia** (Figures 22–24): epandrium-cerci-surstyli complex fused; epandrium a narrow dorsal band with broadly rounded anterior projection and small rounded ventral projection; cercus crescent-shaped, ventromedially fused with epandrium, separated dorsally from epandrium by V-shaped space, and bearing many long setae; surstylus fused dorsally with epandrium, with rounded anterior and anteroventral projections, and posteroventrally bearing many long setae; aedeagal apodeme rectangular in lateral view, with broad anterior projection with uneven margin and with rounded posterior projection with uneven margin; aedeagus with rectangular anterior base and rounded posterior projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate separated into dorsal and ventral plates, ventral plate a broad band

with rounded dorsal projection, dorsal plate rectangular with rounded medial projections dorsad of aedeagus; gonite with broad base and pointed posterior projections bearing a prominent anteroventral setulae; hypandrium fused posteriorly with subepandrial plate and folded to project posteroventrally to gonite, appearing triangular in ventral view.

**TYPE MATERIAL**.—The holotype male of *Nostima duaguttata* is labeled “COSTA RICA. Punta[renas]: Rincón (5 km S;  $8^{\circ}42.1'N$ ,  $83^{\circ}30.8'W$ ; 95 m), 10–11 August 2001, D.&W.N.Mathis/ USNM ENT 00094665 [bar code label]/HOLOTYPE ♂ *Nostima duaguttata* Edmiston & Mathis INBio [red].” The holotype is double mounted (minuten in a block of plastic), is in fair condition (head and abdomen removed and stored in an attached microvial; most legs and left wing missing), and is deposited in INBio. Paratypes are as follows: COSTA RICA. *Guanacaste*: Santa Cecilia (9 km S; 800 m), Estación Pitilla, 13 Feb 1995, L. Masner (1 ♂, 1 ♀; CNC). *Heredia*: Punto Viejo, Selva Verde, 3–5 Mar 1981, B.J. Sinclair (1 ♂; CNC). *Puntarenas*: Estación Altmira (1 km S Cerro Biolley; 1300–1450 m), 20 Nov–9 Dec 1995, R. Villalobos (1 ♀; INBio). DOMINICAN REPUBLIC. *Pedernales*: Sierra de Baoruco (Las Abejas;  $18^{\circ}09'N$ ,  $71^{\circ}38'W$ ; 1300 m; cloud forest), 17 Jan 1989, L. Masner (1 ♂; CNC). GUYANA: Kaieteur Falls ( $5^{\circ}10.5'N$ ,  $59^{\circ}28.9'W$ ), 21–24 Aug 1997, W.N. Mathis (1 ♀; USNM).

DISTRIBUTION (Figure 25).—*Neotropical*: Costa Rica (Guanacaste, Heredia, Puntarenas), Guyana, West Indies (Dominican Republic).

ETYMOLOGY.—The species epithet, *duaguttata*, is of Latin derivation and is a combination of *duo*, meaning two, and *gut-tata*, meaning small spot. The name refers to the two spots on the abdominal tergites.

REMARKS.—The microtomentose spots on the lateral abdominal tergites indicates a close resemblance of this new species with *N. approximata*, *N. franciscana*, *N. lineata*, *N. picta*, and *N. williamsi*.

### 7. *Nostima elegantula* Hendel

FIGURES 26–29, 145, 191, 192

*Nostima elegantula* Hendel, 1930:141.—Cresson, 1941:3–4 [revision]; 1947:40 [notes].—Wirth, 1968:16 [Neotropical catalog].—Lizarralde de Grosso, 1989:53 [review, Argentina].—Mathis and Zatwarnicki, 1995:191 [world catalog].

*Nostima (Nostima) elegantula*.—Cresson, 1947:40 [review].

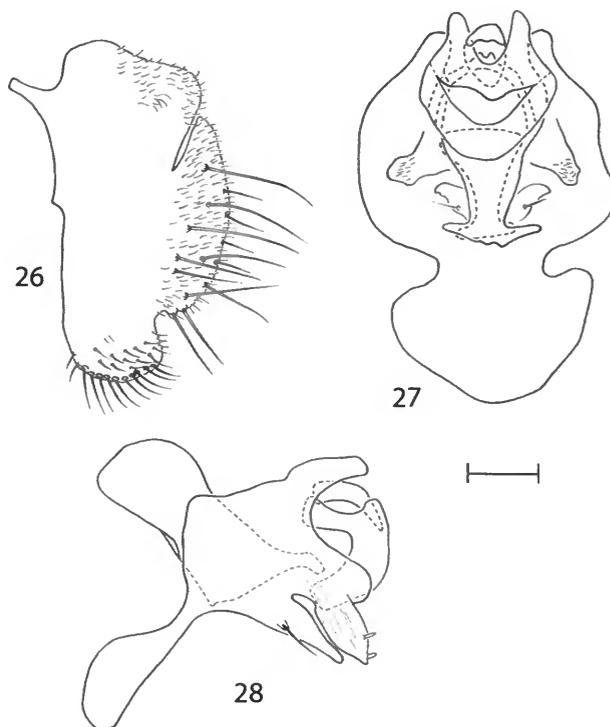
DIAGNOSIS.—*Nostima elegantula* is distinguished from congeners by the following combination of external characters: crossveins r-m and dm-cu lighter in color than veins; hindtibia banded; tergite 2 with silvery gray microtomentose spots on posterolateral margins and with dense, silvery gray microtomentose band mediodorsally on posterior margin; tergite 3 with dense, silvery gray microtomentose V-shaped band posterodorsally and dense, silvery gray microtomentose spots posterolaterally; tergite 4 with dense, silvery gray microtomentose spots posteromedially and posterolaterally; and tergite 5 with dense, silvery gray microtomentose band along posteromedial margin. The epandrium has a distinctive dense row of setae, which is an autapomorphic character for *N. elegantula*.

DESCRIPTION.—Small shore flies, body length 1.23–1.72 mm; yellowish brown, brown, to dark brown with silvery gray and yellowish silver microtomentum.

*Head*: Frons with yellowish brown ventrolateral triangles, anterior semicircle yellowish brown with yellowish silver microtomentum slightly paler than ventrolateral triangles, paler medioventrally. Occiput ventrally with silvery gray microtomentum, dorsally brown band with sparse, silvery gray microtomentum contiguous with striped thoracic pattern. Outer vertical seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel yellowish brown; flagellomere 1 brown dorsally, yellowish brown ventrally; arista dorsally branched. Facial background yellowish brown to brown with yellowish silver and silvery gray microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face covered medially with dense, yellowish silver microtomentum. Gena covered with dense, silvery gray microtomentum; postgena covered with silvery gray microtomentum,

sparse posterolaterally. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 145): Scutal length 0.51–0.62 mm; scutellar length 0.21–0.24 mm. Mesonotum yellowish brown, vittate with silvery gray microtomentum; mesonotum medially brown with yellowish brown band laterally bounded with silvery gray bands; dorsocentral line yellowish brown; silvery gray band between dorsocentral line and interalar setae; scutellum dorsally yellowish brown with yellowish silver microtomentum, laterally with dense, silvery gray microtomentum; anepisternum shiny dark brown with sparse, silvery gray microtomentum on ventral  $\frac{1}{4}$ , spots of silvery gray microtomentum on dorsal  $\frac{3}{4}$ ; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{1}{3}$ , dark brown and bare on ventral  $\frac{2}{3}$ ; subscutellum shiny dark brown with sparse, yellowish silver microtomentum; anatergite shiny dark brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. *Wing* (Figure 145): length 1.60–1.92 mm; width 0.68–0.81 mm; costal-vein ratio 0.57–0.73; M-vein ratio 0.16–0.26; generally amber background with pale brown veins and crossveins, base of sc cell slightly darker; crossvein r-m white dorsally, crossvein dm-cu white ventrally. Halter yellowish white. Legs



FIGURES 26–28.—Male genitalia of *Nostima elegantula* Hendel: 26, epandrium, cercus, fused surstylus, lateral aspect; 27, internal male genitalia, ventral aspect; 28, same, lateral aspect. Scale = 0.05 mm.

yellowish brown to brown; femora yellowish brown proximally, paler distally; hindtibia yellowish brown with slightly darker medioproximal and mediodistal bands; tarsi yellowish brown, with tarsomere 4 slightly darker and tarsomere 5 brown.

**Abdomen** (Figures 26–28, 191, 192): Background brown; tergites 1 and 2 covered with sparse, yellowish silver microtomentum; tergite 2 with silvery gray microtomentose spots on posterolateral margins, posterior margin mediodorsally with dense, silvery microtomentose band; tergite 3 shiny with a dense, silvery gray microtomentose V-shaped band posterodorsally and with dense, silvery gray microtomentose spots posterolaterally; tergite 4 shiny with dense, silvery gray microtomentose spots posteromedially and posterolaterally; tergite 5 with dense, silvery gray microtomentose band along posteromedial margin. **Male genitalia** (Figures 26–28): epandrium-cerci-surstyli complex fused; epandrium a broad band with short setulae on posterodorsal surface, with rounded anterodorsal projection and with pointed anteroventral projection; cercus crescent-shaped and ventrally fused with epandrium, dorsally separated from epandrium by narrow V-shaped space, surface with many long setae; surstylus fused to epandrium and with numerous long setae on ventral surface; 10<sup>th</sup> sternite triangulate in ventral view with undulate posteroventral margin; aedeagal apodeme rectangular, elongate, almost reaching tergite, with posterior projection spatulate, anterior projection rectangular, and lateral projections rounded; aedeagus triangular in lateral view with heavily sclerotized collar-shaped base, large rounded poster-

oventral projections, and small rounded posterodorsal projections; subepandrial plate-gonite-hypandrium fused; gonite with broad base, posteriorly separated from subepandrial plate by V-shaped space, posteroventral projection with rounded apex and lateroventral setula, posterodorsal projection striate and with 2 distinct dorsal cone-shaped setulae, dorsomedial projections rounded; hypandrium crescent-shaped and broadly fused posteriorly with subepandrial plate.

**TYPE MATERIAL.**—The holotype male *Nostima elegantula* Hendel is labeled “Aguarai arg. VI,26 [26 Jun], Lind. D. Chaco-Exped [white with black-line border]/Nostima [handwritten] elegantula [handwritten] F. Hendel det. H. [handwritten]/Type Hendel 1930 [white label with black border, red ink].” The holotype is double mounted (minuten ventrally through thorax into white cardboard), is in good condition, and is deposited in the STUT.

**OTHER SPECIMENS EXAMINED** (37 ♂, 34 ♀).—**ARGENTINA.** *Catamarca*: El Pintado, S. La Viña (650 m), 27–29 Sep 1968, L.E. Peña (1 ♀; CNC). *Tucumán*: El Caleo, W Alpachiri (1000 m), 1 Oct 1968, L.E. Peña (1 ♂, 1 ♀; CNC); La Cavera, 23–28 Nov 1951, M.L. Aczel, R.M. Golbach (6 ♂, 7 ♀; USNM); V. Padre Monti, Burruyacu, 17 Jan–7 Feb 1948, R.M. Golbach (1 ♂; USNM).

**BOLIVIA.** *La Paz*: Apa (8 km S Chulumani; 16°22'S, 67°30.4'W; 1960 m), 9–10 Mar 2001, W.N. Mathis (2 ♂, 1 ♀; USNM); Chulumani (2 km S; 16°23.5'S, 67°31.8'W; 1750 m), 9–10 Mar 2001, W.N. Mathis (2 ♂, 1 ♀; USNM).

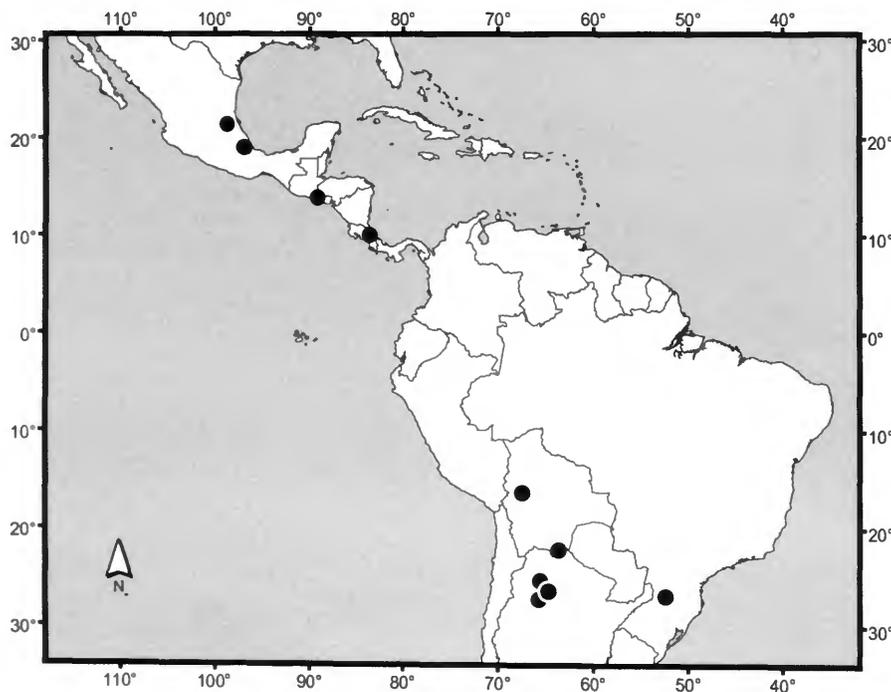


FIGURE 29.—Distribution map for *Nostima elegantula* Hendel.

BRAZIL. *Santa Catarina*: Nova Teutônia, 15 Nov 1936, F. Plaumann (1 ♀; BMNH).

COSTA RICA. *Cartago*: La Suiza, 1 Apr–Aug 1921, 1926, P. Schild (17 ♂, 9 ♀; ANSP, HNHM). *San José*: La Caja (8 km W San José), Vava Blanca, Apr 1930, H. Schmidt (1 ♀; USNM); San José, Jul–Aug 1956, W.B. Heed, H.L. Carson, M. Wasserman (1 ♂; USNM).

DOMINICAN REPUBLIC. *Independencia*: Angel Feliz (5.5 km NNW; Sierra de Neiba near crest; 18°41'N, 71°47'W; 1750 m; dense cloud forest), 21–22 Jul 1992, J. Rawlins, S. Thompson, C. Young, R. Davidson (4 ♂, 6 ♀; CARN); El Aguacate (3 km ESE; north slope Sierra de Baoruco; 18°18'N, 71°42'W; 1980 m; pine woodland), 28–29 Sep 1991, J. Rawlins, R. Davidson, C. Young, S. Thompson (1 ♀; CARN). *Pedernales*: Los Arroyos (5 km NE; 18°15'N, 71°45'W; 1680 m; cloud forest), 30 Sep 1991, R. Davidson, C. Young, S. Thompson, J. Rawlins (1 ♀; CARN). *Puerto Plata*: Puerto Plata (Pico El Murazo; north slope near summit; 19°41'N, 70°57'W; 910 m; mesic deciduous forest), 28 Nov 1991, J. Rawlins, R. Davidson, M. Klinger, S. Thompson (1 ♀; CARN).

EL SALVADOR. *La Libertad*: Volcan Boqueron (1372 m), Feb 1954, W.B. Heed (2 ♂, 2 ♀; USNM).

MEXICO. *San Luis Potosí*: Tamazunchale, 23 Nov 1946, E.S. Ross (1 ♂; USNM). *Veracruz*: Cordoba, 22 Nov 1963, N.L.H. Krauss (1 ♀; USNM).

DISTRIBUTION (Figure 29).—*Neotropical*: Argentina (Catarina, Tucumán), Bolivia (La Paz), Brazil (Santa Catarina), Costa Rica (Cartago, San José), El Salvador (La Libertad), Mexico (San Luis Potosí, Veracruz), West Indies (Dominican Republic).

ETYMOLOGY.—*Nostima elegantula* is one of the largest species of *Nostima*. The dark brown, shiny abdomen with large speckles of silvery gray microtomentum truly justifies the rather flamboyant name Hendel used for *N. elegantula*.

REMARKS.—The prominent epandrium with a ventral row of setae may be homologous with similar setae found on *N. ilytheoides*, *N. maculata*, and *N. magnifica*.

Neotropical in distribution, *N. elegantula* is apparently a common species, essentially occurring wherever small Diptera have been intensively collected.

### 8. *Nostima flavida* Cresson

FIGURES 30–33, 146, 193, 194

*Nostima (Philygriola) flavida* Cresson, 1947:43.

*Nostima flavida*.—Wirth, 1968:17 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:191 [world catalog].

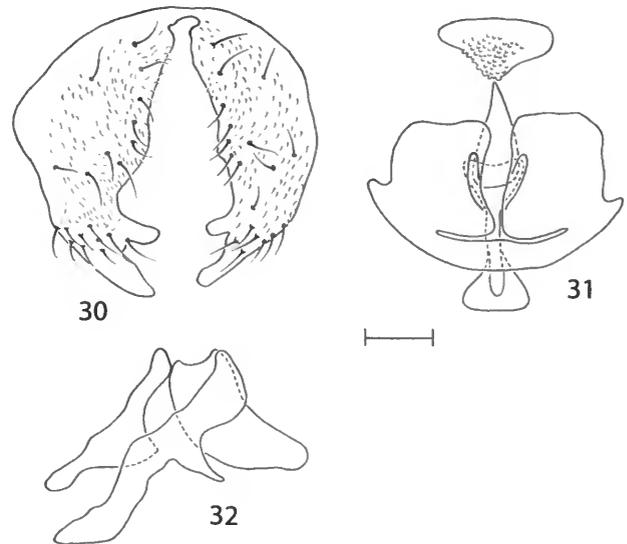
DIAGNOSIS.—*Nostima flavida* is distinguished from congeners by the following combination of external and genitalia characters: mesonotum distinctively bicolored, with pale to chestnut brown wide stripe between dorsocentral setae and with gray stripe laterad of dorsocentral line and conspicuously wider than fronto-orbital stripe; crossveins and veins uniformly colored; tergites yellowish brown and lacking dense micro-

mentose spots; and epandrium and cercus fused, with rounded, hook-like, lateroventral projection. *Nostima flavida* can be distinguished from *N. simuliflavida* only by the genitalia structures.

DESCRIPTION.—Minute to small shore flies, body length 0.86–1.09 mm; pale to dark yellowish brown with silvery gray microtomentum.

*Head*: Frons with brown ventrolateral triangles, anterior semicircle brown with golden microtomentum, darker medioventrally. Occiput brown with silvery gray microtomentum. Outer vertical seta  $\frac{3}{4}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel dorsally yellowish brown, ventrally yellow; flagellomere 1 with ventral  $\frac{2}{3}$  yellowish brown and dorsal  $\frac{1}{3}$  brown; arista dorsally branched. Facial background yellowish brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at inner vertical seta, extending along parafacial, and continuing to gena. Medially along silvery parafacial, a narrow yellowish brown band extending lateroventrally below gena. Face medially yellowish brown with sparse, silvery gray microtomentum, center of face slightly paler. Gena dorsally covered with dense, silvery gray microtomentum, ventrally shiny yellowish brown; postgena brown, covered with silvery gray microtomentum extending to occiput. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 146): Scutal length 0.32–0.38; scutellar length 0.12–0.14 mm. Mesonotum yellowish brown with golden microtomentum, mediolaterally slightly paler; dorso-central line yellowish brown with golden microtomentum; band of silvery gray microtomentum between dorsocentral line



FIGURES 30–32.—Male genitalia of *Nostima flavida* Cresson: 30, epandrium, cercus, fused surstylus, lateral aspect; 31, internal male genitalia, ventral aspect; 32, same, lateral aspect. Scale = 0.05 mm.

and interalar setae; postpronotum lateral  $\frac{1}{3}$  yellowish brown, medial  $\frac{2}{3}$  with silvery gray microtomentum; scutellum dorsally yellowish brown with golden microtomentum, laterally with dense, silvery gray microtomentum contiguous with mesonotal band; anepisternum yellow; katapisternum yellow; subscutellum yellowish brown; anatergite yellowish brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{3}{4}$  length of posterior seta; anterior notopleural seta  $\frac{3}{4}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta. Wing (Figure 146): length 1.05–1.28 mm; width in males 0.39–0.50 mm; costal-vein ratio 1.13–1.57; M-vein ratio 0.14–0.18; pale amber background with yellowish brown veins and crossveins. Halter yellow. Legs yellowish to yellowish brown; tarsal segment 5 yellowish brown on all legs.

**Abdomen** (Figures 30–32, 193, 194): Background yellowish brown to brown, shiny, no microtomentum; tergites without dense microtomentum. Male genitalia (Figures 30–32): epandrium-cerci-surstyli complex fused; epandrium thin, U-shaped with rounded anteromedial projection; cercus laterally fused with epandrium and bearing long setae, cercus rounded; surstylus rectangular with rounded anterior projection and rounded posterior projection; 10<sup>th</sup> sternite triangular with many rounded surface projections; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection spatulate with anteromedial indentation, lateral projections rounded; aedeagus arc-shaped with heavily sclerotized base forming ring-like anterior opening; subepandrial plate forming a shelf-

like structure on the ventral surface of the epandrium-cerci-surstyli complex; gonite base broad with rectangular posterior projections; hypandrium a broad rectangular plate completely fused posteriorly with subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima flavida* Cresson is labeled "Higuito San Mateo CR/Pablo Schild Coll/TYPE No. Nostima [handwritten] flavida [handwritten] [male symbol, handwritten] E.T. Cresson, Jr. [red]/Type No 70454 [handwritten] USNM [red]." During dissection the holotype split into four parts, which we placed in three microvials attached to the pin with the original labels. Microvial 1 includes the left thorax with mid- and hindlegs, left wing, and anterior abdomen; microvial 2 includes the right thorax and right wing; and microvial 3 includes the head and forelegs with flagellomere 1 missing from both antennae. A fourth microvial includes the posterior abdomen and genitalia in glycerin. The holotype is deposited in the USNM (70454).

**OTHER SPECIMENS EXAMINED** (5 ♂, 6 ♀, 1 not determinable).—**ARGENTINA.** *Tucumán*: Ao. El Coleo (W Alpachiri; 1000 m), 1 Oct 1968, L.E. Peña (1 ♂; CNC); Lacavera, 21–28 [month illegible] 1951, M.L. Aczel, R.M. Golbach (1 ♀; USNM).

**COSTA RICA.** *Alajuela*: Higuito, San Mateo, P. Schild (2 ♀; ANSP). *San José*: La Caja (8 km W), 1930, H. Schmidt (1 ♂, 1 ♀, 1 ex; USNM).

**DOMINICAN REPUBLIC.** *Puerto Plata*: Pico El Murazo (north slope near summit; 19°41'N, 70°57'W; 910 m; mesic de-

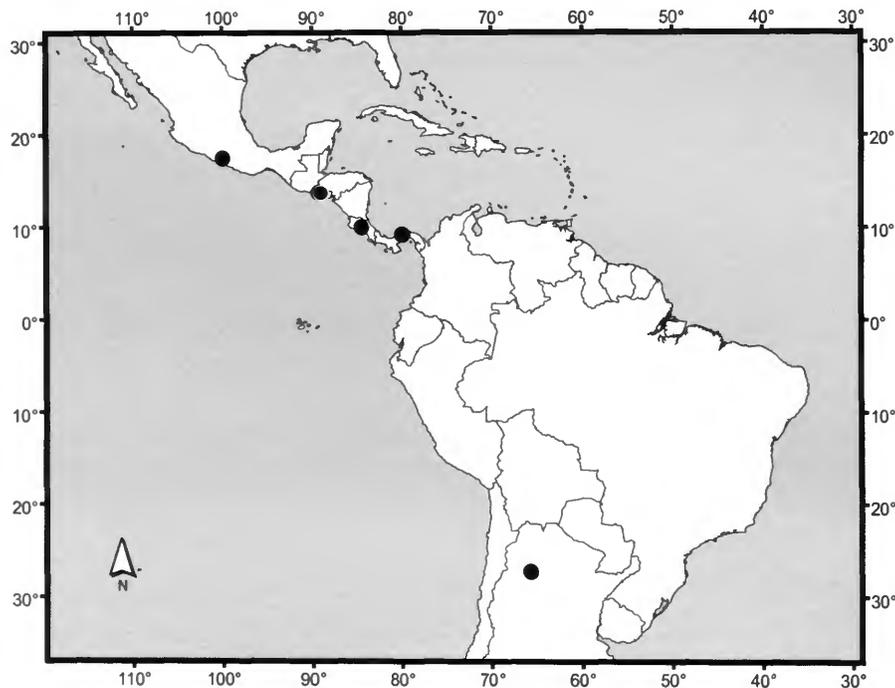


FIGURE 33.—Distribution map for *Nostima flavida* Cresson.

ciduous forest), 28 Nov 1992, J. Rawlins, R. Davidson, M. Klingler, S. Thompson (1 ♂; CARN).

EL SALVADOR. *San Salvador*: San Salvador, 14 Jun 1958, L.J. Bottimer (1 ♀; USNM).

MEXICO. *Guerrero*: Guerrero (8 km S; 4 km E Chilpancingo), 6 Aug 1962, N. Marston (1 ♂; KANS).

PANAMA. *Canal Zone*: Barro Colorado Island (at light), 28 Jun 1963, M.E. Irwin (1 ♀; USNM); Summit, Dec 1946, N.L.H. Krauss (1 ♂; USNM).

DISTRIBUTION (Figure 33).—*Neotropical*: Argentina (Tucumán), Costa Rica (Alajuela, San José), El Salvador (San Salvador), Mexico (Guerrero), Panama (Canal Zone), West Indies (Dominican Republic).

ETYMOLOGY.—The yellowish color of this species indicates Cresson's choice of the Latin root *flav*, meaning yellow, as the epithet for this species.

REMARKS.—*Nostima flavida* is distinguishable from *N. simuliflavida* only by the shape of the male genitalia, specifically the rounded medial and ventral projections of the surstylus.

The distribution of *N. flavida* is disjunct; Argentina, Central America, and one locale from the West Indies are the only known locations. The difficulty in collecting very small flies such as *N. flavida* may be a reason for its limited collection records.

### 9. *Nostima footei*, new species

FIGURES 34–37, 147, 195, 196

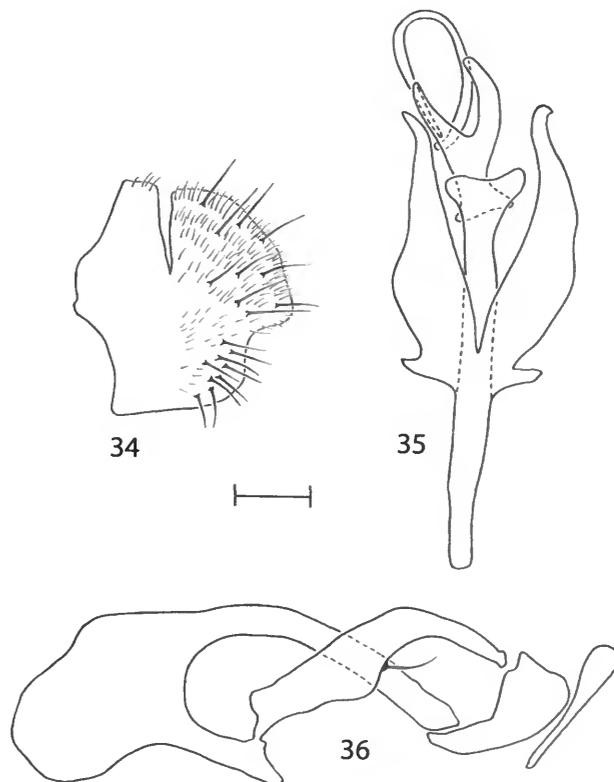
DIAGNOSIS.—*Nostima footei* is distinguished from congeners by the following combination of external characters: paraverticral seta present; ventral gena bare and shiny; mesonotum shiny brown with sparse, yellowish silver microtomentum, lacking vittae; crossveins and veins unicolorous, not white; hindtibia banded; tergites microtomentose, none shiny nor fasciate along posterior margin; and tergites 3 and 4 with dense, silvery gray microtomentose posterolateral spot.

DESCRIPTION.—Minute to small shore flies, body length 0.93–1.20 mm; yellowish brown, brown, to dark brown with yellowish silver, silvery gray, and silvery white microtomentum.

*Head*: Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with silvery gray microtomentum, darker medioventrally. Occiput dark brown with sparse, silvery white microtomentum. Outer vertical seta  $\frac{2}{3}$ – $\frac{3}{4}$  length of inner vertical seta; paraverticral seta minute. Scape and pedicel yellowish brown; flagellomere 1 brown dorsally, yellowish brown ventrally; arista dorsally branched. Facial background brown to dark brown with yellowish silver, silvery gray, and silvery white microtomentum; narrow band of silvery white microtomentum along eye margin beginning at vertical setae and extending to gena. Medially along parafacial, a shiny dark brown band extending lateroventrally below gena. Face medially with dense, silvery white microtomentum. Gena anteriorly with silvery white microtomen-

tum, posteriorly dark brown with sparse, silvery white microtomentum; postgena dark brown with sparse, silvery white microtomentum. Maxillary palpus yellowish brown; prementum brown.

*Thorax* (Figure 147): Scutal length 0.33–0.40 mm; scutellar length 0.13–0.16. Mesonotum shiny brown with sparse, yellowish silver microtomentum; scutellum shiny brown with sparse, yellowish silver microtomentum; anepisternum shiny brown with sparse, yellowish silver microtomentum; katepisternum shiny brown with sparse, yellowish silver microtomentum; subscutellum shiny brown with sparse, yellowish silver microtomentum; anatergite shiny brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$ – $\frac{3}{4}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 147): length 0.93–1.16 mm; width 0.39–0.51 mm; costal-vein ratio 1.25–1.50; M-vein ratio 0.14–0.19; amber background with yellowish brown veins and crossveins. Halter yellowish white. Legs yellow to yellowish brown; femora yellowish brown, slightly darker distally; tibia yellowish brown; hindtibia faintly banded; tarsi yellowish brown.



FIGURES 34–36.—Male genitalia of *Nostima footei*, new species: 34, epanthrium, cercus, fused surstylus, lateral aspect; 35, internal male genitalia, ventral aspect; 36, same, lateral aspect. Scale = 0.05 mm.

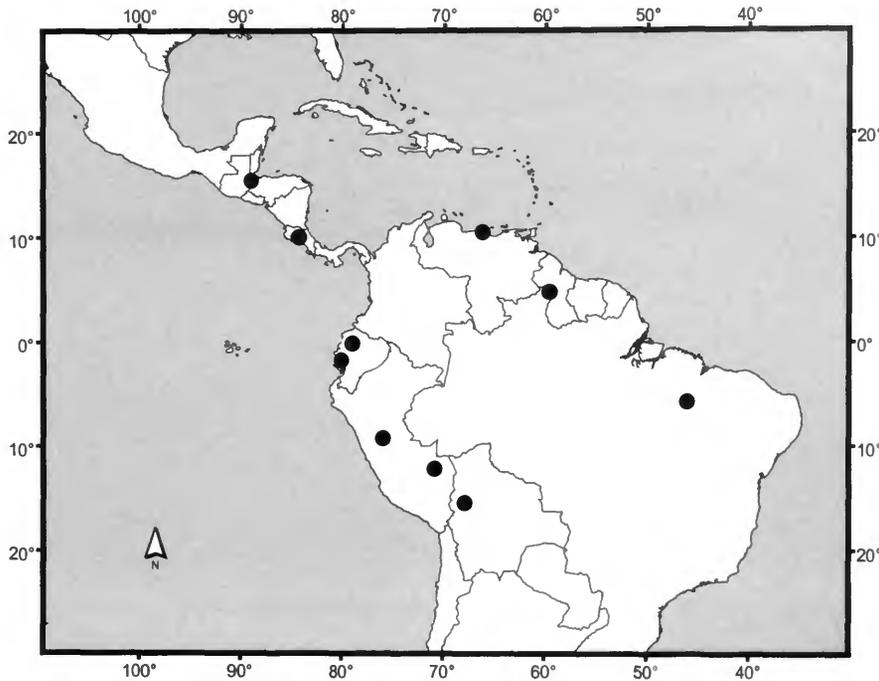


FIGURE 37.—Distribution map for *Nostima footei*, new species.

*Abdomen* (Figures 34–36, 195, 196): Background shiny brown with sparse, yellowish silver microtomentum; tergite 3 with dense, silvery gray microtomentose posterolateral spot; tergite 4 with dense, silvery gray microtomentose posterolateral spot. Male genitalia (Figures 34–36): epandrium-cerci-surstyli complex fused; epandrium a broad dorsal band with rounded anteroventral projection; cercus crescent-shaped, bearing many long setulae, fused anteroventrally with epandrium, and separated ventrally from epandrium by V-shaped space; surstylus fused anterodorsally with epandrium, rounded with anterior projection, and posteroventrally bearing many long setae; 10<sup>th</sup> sternite formed into narrow U-shaped band; aedeagal apodeme-hypandrium-subepandrial plate-gonite fused; aedeagal apodeme broadly rectangular with U-shaped posterior projection, posterior projection spatulate in lateral view, posteroventral projection broad with pointed lateral projections, posteroventral projection fused with hypandrium; aedeagus Y-shaped in ventral view with rounded posterior projections and spatulate anterior base; subepandrial plate narrowed at connection between hypandrium and gonite, subepandrial plate with small rounded dorsal projection; gonite broader medially with rectangular posterior projection and prominent ventromedial setulae; hypandrium fused anterodorsally with aedeagal apodeme and fused posterodorsally with subepandrial plate, hypandrium with rounded ventral projection.

**TYPE MATERIAL.**—The holotype male of *Nostima footei* is labeled “Balboa C.Z. 17 [handwritten] IX [handwritten] 1942

[42 handwritten]/P. A. Woke Collector/tidalmarsh em. trap/ HOLOTYPE ♂ *Nostima footei* Edmiston & Mathis USNM [red].” The holotype is glued by the left thorax to a paper point, is in fair condition (setae of the head and thorax broken, and right arista missing; right wing in an attached microvial), and is deposited in the USNM. One paratype (1 ♂; USNM) bears the same label data as the holotype. Other paratypes are as follows: PANAMA. Canal Zone: Balboa (tidal marsh in trap), Sep 1942, P.A. Woke (1 ♂, 3 ♀; USNM); Balboa, Feb 1958, M.R. Wheeler (1 ♀; USNM).

**DISTRIBUTION** (Figure 37).—*Neotropical*: Panama (Canal Zone).

**ETYMOLOGY.**—The species epithet, *footei*, is a genitive patronym to honor Dr. Benjamin A. Foote for his many contributions to the biology of Ephydriidae. He is the only person who has studied the immature stages of any species of *Nostima*.

**REMARKS.**—*Nostima footei* is the only species of *Nostima* recorded from a salt-marsh environment. Because Dr. Foote greatly enjoys investigating salt-marsh Diptera, we hope that the patronymic nomenclature of this species will encourage him to discover its immature stages.

The genitalia of *N. footei* are unlike any others found within the genus. The fusion of the hypandrium with the aedeagal apodeme is unique within this genus. Even with these genitalic peculiarities, *N. footei*, according to external characters, should still be classified in *Nostima*.

10. *Nostima franciscana*, new species

FIGURES 1, 38–41, 148, 197, 198

**DIAGNOSIS.**—*Nostima franciscana* is distinguished from congeners by the following combination of external characters: mesonotum vittate; scutellum with dense, silvery gray microtomentum laterally; crossveins and veins unicolorous; hindtibia not banded; tergite 3 with silvery gray microtomentose band medioventrally along posterior margin and with dense, silvery gray microtomentose lateromedial spot; tergite 4 with dense, silvery gray microtomentose lateromedial spot; and tergite 5 with band of dense, silvery gray microtomentum along postero-medial margin.

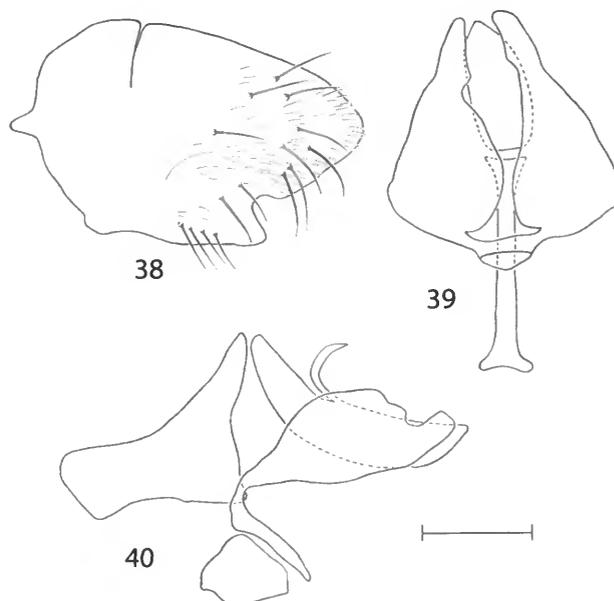
**DESCRIPTION.**—Minute to small shore flies, body length 0.90–1.15 mm; yellowish brown, brown, to dark brown with silvery gray and yellowish silver microtomentum.

**Head:** Frons with dark brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum. Occiput with dense, silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellow ventrally, yellowish brown dorsally; flagellomere 1 yellowish brown dorsally, yellow ventrally; arista dorsally branched. Facial background dark brown with yellowish silver and silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae and extending to gena. Medially along parafacial, a brown band with yellowish silver microtomentum extending lateroventrally below gena, dorsomedially band covering narrowest point between eyes. Face lateroventrally yellowish brown with yellowish silver microtomentum in triangular pattern on ventral face, microtomentum paler near ventral antennal bases than on medial face. Gena covered with dense, silvery gray microtomentum; postgena covered with dense, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax (Figure 148):** Scutal length 0.30–0.42 mm; scutellar length 0.12–0.18 mm. Mesonotum medially with brown band with yellowish silver microtomentum laterally bounded with silvery gray microtomentose bands; dorsocentral line brown with yellowish silver microtomentum extending posteriorly to between dorsocentral setae; silvery gray microtomentose stripe between dorsocentral line and interalar setae, sparse laterad of anterior dorsocentral seta; scutellum medially brown with yellowish silver microtomentum, laterally with dense, silvery gray microtomentum; anepisternum with sparse, silvery gray microtomentum on dorsal  $\frac{1}{2}$ , dense, silvery gray microtomentum on medioventral  $\frac{1}{4}$ , bare, shiny dark brown on ventral  $\frac{1}{4}$ ; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{2}{3}$ , bare, shiny dark brown on ventral  $\frac{1}{3}$ ; subscutellum shiny dark brown with sparse, yellowish silver microtomentum; anatergite shiny dark brown with sparse, yellowish silver microtomentum on dorsal  $\frac{3}{4}$ . Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$

length of posterior seta; lateral scutellar seta  $\frac{1}{2}$  length of apical seta. Wing (Figure 148): length 1.00–1.30 mm; width 0.40–0.54 mm; costal-vein ratio 1.00–1.86; M-vein ratio 0.19–0.27; amber background with yellowish brown veins and crossveins. Halter yellowish white. Legs generally yellowish brown to brown; femora and tibia yellowish brown, midtibia distally darker; tarsi yellowish brown with tarsomere 5 brown.

**Abdomen (Figures 38–40, 197, 198):** Background brown; tergite 1 with sparse, yellowish silver microtomentum; tergite 2 with sparse, yellowish silver microtomentum slightly more dense medially; tergite 3 shiny with sparse, yellowish silver microtomentum, with silvery gray microtomentose band mediolaterally along posterior margin, and with dense, silvery gray microtomentose lateromedial spot; tergite 4 bare shiny brown with dense, silvery gray microtomentose lateromedial spot; tergite 5 bare, shiny brown, postero-medial margin with band of dense, silvery gray microtomentum. Male genitalia (Figures 38–40): epandrium-cerci-surstyli complex fused; epandrium a U-shaped dorsal band with rounded anteromedial projection; cercus crescent-shaped with long setulae, laterally fused with epandrium, separated dorsally from epandrium by V-shaped space; surstylus fused dorsally with epandrium, rounded with anterior and posterior projections, and bearing 4 long ventral setae; aedeagal apodeme triangular in lateral view, anterior projection rounded and laterally spatulate, posterior projection spatulate, lateral projections rounded; aedeagus crescent-shaped in lateral view with crescent-shaped anterodorsal projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate forming ventral band articulated laterally



FIGURES 38–40.—Male genitalia of *Nostima franciscana*, new species: 38, epandrium, cercus, fused surstylus, lateral aspect; 39, internal male genitalia, ventral aspect; 40, same, lateral aspect. Scale = 0.05 mm.

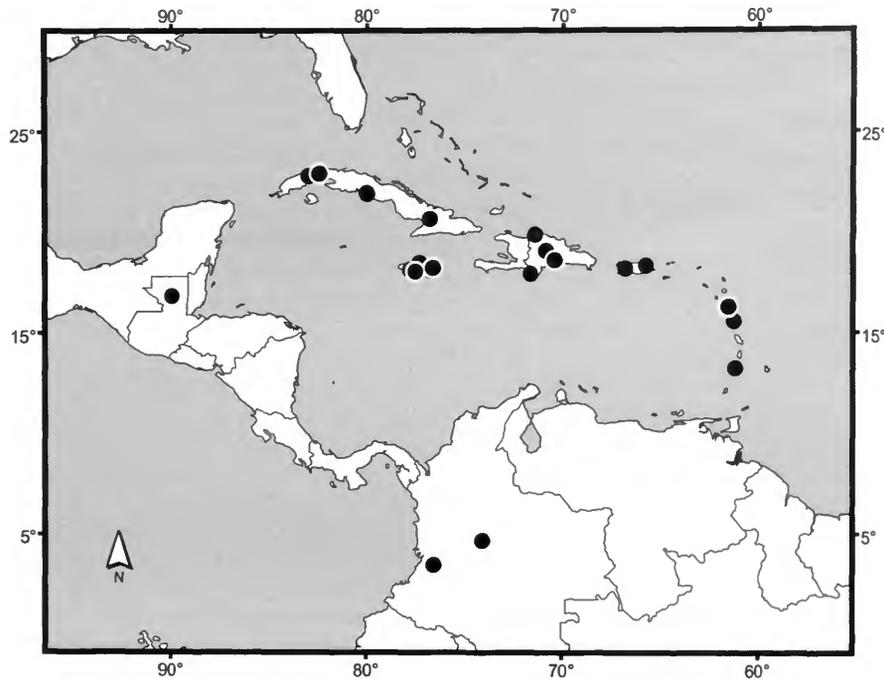


FIGURE 41.—Distribution map for *Nostima franciscana*, new species.

with epandrium; gonite fused with subepandrial plate, forming structure with broad base and with posterior projections rounded with truncate apices; hypandrium triangular, posteriorly fused with subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima franciscana* is labeled “JAMAICA Runaway Bay[,] Feb. 1969[,] W. W. Wirth stream bed/HOLOTYPE ♂ *Nostima franciscana* Edmiston & Mathis USNM [red].” The holotype is glued by the right thorax to a paper point, is in excellent condition, and is deposited in the USNM. Seven paratypes (2♂, 5♀; USNM) bear the same label data as the holotype. Other paratypes are as follows: **JAMAICA.** *Clarendon:* Grantham (18°09.3′N, 77°23.8′W; 340 m), 16 Apr 2000, W.N. Mathis (1♀; USNM). *Manchester:* near Mandeville (18°03.5′N, 77°31.9′W), 15–18 Apr 2000, W.N. Mathis (1♂, 2♀; USNM). *Portland:* Crystal Springs (18°12.5′N, 76°37.9′W), 18 May 1996, D. and W.N. Mathis, H.B. Williams (1♂; USNM); Hollywell (18°05.5′N, 76°43.6′W; 1170 m), 27 Apr 2000, W.N. Mathis (1♀; USNM); Section (0.5 km E; 18°05.2′N, 76°43.9′W; 1020 m), 28 Apr 2000, W.N. Mathis (1♀; USNM). *St. Andrew:* Cinchona (18°04.4′N, 76°39.3′W; 1400 m), 29 Apr 2000, W.N. Mathis (1♂, 2♀; USNM); Hardwar Gap (18°04.2′N, 76°44′W; 1220 m), 10 Mar–10 Jul 1966, 1970, 1996, E.C. Becker, H. Howden, T. Farr, D. and W.N. Mathis, H.B. Williams, W.W. Wirth (6♂, 2♀; CNC, USNM); Silver Hill Gap (18°05.1′N, 76°41.2′W; 980 m), 26 Apr 2000, W.N. Mathis (1♀; USNM). *St. Ann:* Runaway Bay (stream bed; Malaise trap), 16 Feb–8 Mar 1969,

W.W. Wirth (2♂, 3♀; USNM). *St. Elizabeth:* Ys Falls (18°09.3′N, 77°49.5′W), 17–18 Apr 2000, W.N. Mathis (3♂, 3♀; USNM). *St. Thomas:* Bath River, Bath (17°56.8′N, 76°21.6′W), 16 May 1996, D. and W. Mathis, H.B. Williams (1♂; USNM).

**OTHER SPECIMENS EXAMINED (36♂, 59♀).**—**COLOMBIA.** *Cundinamarca:* Bogota (below Montserrat), 15 Aug 1982 (1♂; WALES). *Valle:* Plendamo (S of Cali), 18 Aug 1982, K.A. Spencer (1♀; WALES).

**CUBA.** *Cienfuegos:* Topes de Collantes (5 km WNW; 21°56.5′N, 80°2.3′W; 600 m), 11 Dec 1994, W.N. Mathis (3♂; USNM). *Havana:* San Antonio de los Baños (22°54.9′N, 82°29.3′W), 8 Dec 1994, W.N. Mathis (5♂; USNM). *Orientes:* Herradura, C.W. Metz (1♀; USNM). *Pinar del Río:* Soroa (22°47.7′N, 83°W), 4–6 Dec 1994, W.N. Mathis (4♂, 2♀; USNM). *Sancti Spiritus:* Topes de Collantes (21°54.4′N, 80°01.4′W; 670 m), 9–11 Dec 1994, W.N. Mathis (2♂; USNM). *Province Not Determinable:* St. Vicente, Jan–Feb 1956, M. Breuer (1♀; USNM).

**DOMINICA.** Melville Hall Airport, 28 May 1966, G.C. Steyskal (1♂; USNM). Springfield Plantation, 23–29 Jul 1978, G.C. Steyskal (1♀; USNM).

**DOMINICAN REPUBLIC.** *Barahona:* Ojeda (17°58.2′N, 71°10.6′W), 22 Mar 1999, W.N. Mathis (1♀; USNM). *Distrito Nacional:* Santo Domingo (Jardín Botánico; 18°29.9′N, 69°56.9′W), 26 Mar 1999, W.N. Mathis (1♂, 3♀; USNM). *La Vega:* La Cienega de Manabao (19°03.9′N,

70°51.8'W; 1050 m), 28 Mar 1999, W.N. Mathis (1 ♀; USNM). *Monseñor Nouel*: near Jima (19°01.6'N, 70°28.9'W; 670 m), 29 Mar 1999, W.N. Mathis (1 ♀; USNM). *Pedernales*: Cabo Rojo, Alcoa Road, km 26, 17–20 Jan 1989, S.A. Marshall, J. Swann (5 ♂, 13 ♀; GUEL); Pedernales (13 km N; along Río Mulito; 18°09'N, 71°46'W; 230 m; riparian woodland), 17 Jul 1992, J. Rawlins, S. Thompson, C. Young, R. Davidson (4 ♀; CARN); Sierra de Baoruco (Las Abejas; 18°09'N, 71°38'W; 1300 m; cloud forest), 17 Jan 1989, L. Masner (8 ♂, 16 ♀; CNC). *Peravia*: San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W.N. Mathis (6 ♀; USNM).

GUADELOUPE. Lamentin, Ravine Chaude, 25–30 Nov 2001, M. Martinez (4 ♀; MART).

GUATEMALA. *Peten*: Tikal ruins, 2 Sep 1972, G.R. and S. Hevel (1 ♂; USNM).

PUERTO RICO. El Yunque, 20 Mar 1954, J. Maldonado, S. Medina (3 ♂, 2 ♀; USNM); Yauco-Lares Road (km 22), 18 Jul 1953, J.A. Ramos, J. Maldonado (1 ♂; USNM).

ST. VINCENT. *St. George*: Kingstown, Botanical Garden, 25–27 Mar 1989, W.N. Mathis (2 ♀; USNM). No locale, Jul–Aug 1957, W.B. Heed (1 ♂; USNM).

Distribution (Figure 41).—*Neotropical*: Colombia (Cundinamarca, Valle), Guatemala (Peten), West Indies (Cuba, Dominica, Dominican Republic, Guadeloupe, Jamaica, Puerto Rico, St. Vincent).

ETYMOLOGY.—The species epithet, *franciscana*, is named for the Franciscan Friars of the Sacred Heart Province, St. Louis, Missouri, and of the Holy Land Custody in Washington, D.C. The friars permitted the first author the time and resources to conduct the research for this revision. Moreover, the three white spots along the brown abdominal tergites resemble the three knots in the cord of a Franciscan friar's habit, which represent the vows of poverty, chastity, and obedience.

REMARKS.—The presence of microtomentose spots on the lateral abdominal tergites indicates a close resemblance of this new species with *N. approximata*, *N. duaguttata*, *N. lineata*, *N. picta*, and *N. williamsi*. The distribution of *N. franciscana* includes Cuba and both the Greater and Lesser Antilles, as well as Guatemala and Colombia. The label data indicates that most specimens of the species were collected in the 1990s by Wayne Mathis. Even though Diptera sampling has been continuous throughout the last century, the importance of thorough collecting is the key for determining the complete distribution of these small flies.

## 11. *Nostima gilvipes* (Coquillett)

FIGURES 42–45, 149, 199, 200

*Hydrellia gilvipes* Coquillett, 1900b:261.—Jones, 1906:185 [catalog].

*Nostima gilvipes*.—Cresson, 1941:2–3 [revision].—Sturtevant and Wheeler, 1954:241 [review].—Wirth, 1965:745 [Nearctic catalog]; 1968:17 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:191 [world catalog].

*Nostima (Nostima) gilvipes*.—Cresson, 1947:40 [review].

*Nostima immaculata* Cresson, 1918:49; 1930b:80 [compared with *N. niveivenosa*]; 1941:2 [synonymy].

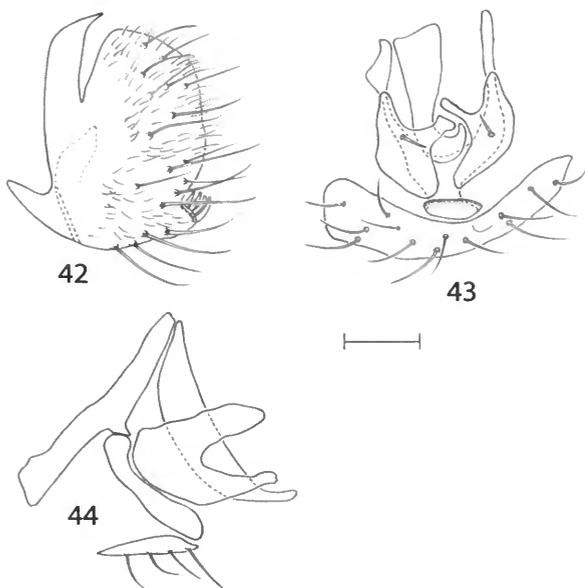
DIAGNOSIS.—*Nostima gilvipes* is distinguished from congeners by the following combination of external characters: gena with ventral portion densely microtomentose; mesonotum not vittate; scutellum unicolorous; crossveins and veins unicolorous; tergite 2 posteromedially with dense, silvery gray microtomentum in a triangular pattern; tergite 3 with dense band of silvery gray microtomentum along posterior margin; and tergite 5 posteromedially with dense, silvery gray microtomentum.

DESCRIPTION.—Minute to small shore flies, body length 0.89–1.24 mm; yellowish brown to brown with silvery gray, yellowish silver, and golden microtomentum.

*Head*: Frons with dark brown ventrolateral triangles with golden yellow microtomentum, ocellar circle brown with golden yellow microtomentum. Occiput brown with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellow; flagellomere 1 ventrally yellow, dorsally yellowish brown; arista dorsally branched. Facial background yellowish brown; narrow band of silvery gray microtomentum along eye margin beginning at antennae, extending along parafacial, and continuing to gena. Parafacial silvery gray, with a narrow brown band along medial parafacial and extending lateroventrally below gena. Face medially covered with yellowish silver microtomentum. Gena covered with dense, silvery gray microtomentum; postgena covered with dense, silvery gray microtomentum. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 149): Scutal length 0.34–0.43 mm; scutellar length 0.14–0.19 mm. Mesonotum brown with sparse, yellowish silver microtomentum, anterior margin paler; scutellum brown with sparse, yellowish silver microtomentum; anepisternum dorsal  $\frac{3}{4}$  brown with silvery gray microtomentum, ventral  $\frac{1}{4}$  shiny brown with sparse, silvery gray microtomentum; katepisternum shiny brown with silvery gray microtomentum; subscutellum shiny dark brown with sparse, silvery gray microtomentum; anatergite dorsal  $\frac{3}{4}$  brown with yellowish silver microtomentum, ventral  $\frac{1}{4}$  shiny brown. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of apical seta. Wing (Figure 149): length 1.17–1.41 mm; width 0.48–0.62 mm; costal-vein ratio 0.89–1.13; M-vein ratio 0.21–0.29; amber background with pale brown veins and crossveins. Halter yellow. Legs yellow to yellow brown; tarsomere 5 yellowish brown on all legs.

*Abdomen* (Figures 42–44, 199, 200): Background brown; tergite 1 with sparse, silvery gray microtomentum; tergite 2 anteriorly with sparse, silvery gray microtomentum, posteromedially with dense microtomentum in triangular pattern; tergite 3 with silvery gray microtomentum, anteriorly sparse, posterior  $\frac{1}{3}$  a dense band; tergite 4 bare, shiny; tergite 5 anterior  $\frac{1}{3}$  shiny, posteromedially with dense, silvery gray microtomentum. Male genitalia (Figures 42–44): epandrium-cerci-surstyli complex completely fused; epandrium U-shaped with rounded posteroventral projection; cercus triangular in lateral view with many setulae, separated from epandrium by V-shaped space;



FIGURES 42–44.—Male genitalia of *Nostima gilvipes* (Coquillett): 42, epanandrium, cercus, fused surstylus, lateral aspect; 43, internal male genitalia, ventral aspect; 44, same, lateral aspect. Scale = 0.05 mm.

surstylus rounded with pointed anterior projection and with posterior projection bearing 4 setae; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection broad with anterior point in ventral view, lateral projections spike shaped; aedeagus crescent-shaped in lateral view; gonite with broad base, medial setula, narrow rounded posteroverventral projection, and broad rounded posterodorsal projection; subepandrial plate and hypandrium fused; subepandrial plate a broad band with broad, bluntly pointed posterior projections; hypandrium rectangular in ventral view.

**TYPE MATERIAL.**—The holotype of *Hydrellia gilvipes* Coquillett has been destroyed, and nothing remains on the paper point that held the holotype. The pin includes a label by W.W. Wirth, indicating “Type lost Apr. 1969 W<sup>3</sup>.” Data on the label that accompanies the pin is as follows: “Bayamon Jan 1899/Porto Rico Aug Busck/Type No 4378 [handwritten] U.S.N.M. [red]/*Hydrellia gilvipes* Coq. [handwritten, white with black-line border]/Type lost Apr. 1969 W<sup>3</sup>. [handwritten, red ink].”

In the interest of stabilizing the use of this species name, a neotype should be designated. Paratypes do not exist, and specimens from the same locality apparently do not exist either; however, the type specimen for *Nostima immaculata*, a junior synonym as determined by Cresson (1941), is deposited in the ANSP. Cresson is the only person known to have compared the types of *N. gilvipes* and *N. immaculata*. Based upon his descriptions of these specimens, we concur that the synonymy is

valid; therefore, the holotype of *Nostima immaculata* is herein designated as the neotype for *N. gilvipes*.

The holotype male of *Nostima immaculata* Cresson and neotype of *Hydrellia gilvipes* Coquillett is labeled “Rio Surubres 20 X '09 [20 Oct 1909] C[osta]R[ica] P P Calvert/Bonnefil F'm 800 ft alt Sweepings/TYPER No. *Nostima immaculata* E T Cresson, Jr. 6122 [red; species name and number handwritten, number written along right margin] [red]/ANSP [yellow]/NEOTYPE *Nostima gilvipes* (Coquillett) J. Edmiston (1989) [red].” The holotype (and neotype) is double mounted (minuten through posterior thorax; pinned to a thin rectangular piece of cardboard), is in good condition, and is deposited in the ANSP (6122).

**OTHER SPECIMENS EXAMINED** (85♂, 119♀).—BELIZE. *Cayo*: San Ignacio (0.8 km N, W bank river; open grassland and scrub), 20–21 Jul 1978 (1♂; BMNH). *Stann Creek*: Cockscomb Basin Wildlife Sanctuary (16°47'S, 88°30'W), 5–6 Apr 1993, W.N. Mathis (1♂, 1♀; USNM).

BOLIVIA. *La Paz*: Apa (8 km S Chulumani; 16°35.6'S, 68°51.2'W; 1960 m), 10 Mar 2001, W.N. Mathis (2♂; USNM); Caranavi (15°50.2'S, 67°33.4'W; 670 m), 12 Mar 2001, W.N. Mathis (1♂; USNM); Chulumani (2 km S; 16°23.5'S, 67°31.8'W; 1750 m), 9–10 Mar 2001, W.N. Mathis (1♂; USNM); Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W.N. Mathis (14♂, 18♀; USNM); Mapiri (15°18.6'S, 68°13'W; 720 m), 15 Mar 2001, W.N. Mathis (3♂, 2♀; USNM).

BRAZIL. *Rio de Janeiro*: Ilha de Marambaia (23°03.6'S, 43°59.1'W), 4 Sep 2000, D. and W.N. Mathis (1♂; USNM).

COLOMBIA. *Antioquia*: Medellin (30 km NW; 2440 m), Feb 1958, M.R. Wheeler (1♂, 2♀; USNM). *Magdalena*: Villa Concha (near Santa Marta; 11°15'N, 74°09'W), Dec 1955, W.B. Heed (1♀; USNM). *Valle*: Palmira (near Cali; 1005 m), Nov 1955, W.B. Heed (2♂; USNM).

COSTA RICA. *Cartago*: La Suiza, 25 Apr–Aug 1921, P. Schild (8♂, 9♀; ANSP, HNHM, USNM). *Puntarenas*: Dominical (9°14.8'N, 83°51.4'W), 12 Jun 2003, J. Edmiston, D. and W.N. Mathis (1♀; USNM); Río Bonito (2.3 km W Cerro la Gamba; 110 m), 25 Jun–17 Jul 1996, E. Fletes (1♂; INBIO).

CUBA. *Cienfuegos*: Soledad, Jardín Botánico (22°7.5'N, 80°19.2'W), 13 Dec 1994, W.N. Mathis (1♀; USNM); Topes de Collantes (5 km WNW; 21°56.5'N, 80°2.3'W; 600 m), 11 Dec 1994, W.N. Mathis (2♂, 1♀; USNM). *Havana*: Ojo de Aqua (22°54.6'N, 82°29.1'W), 8 Dec 1994, W.N. Mathis (5♂, 19♀; USNM); San Antonio de los Baños (22°54.9'N, 82°29.3'W), 8 Dec 1994, W.N. Mathis (4♂, 8♀; USNM). *Orientes*: Herradura, C.W. Metz (1♀; MCZ). *Pinar del Río*: Soroa (22°47.7'N, 83°W), 4–6 Dec 1994, W.N. Mathis (4♀; USNM).

DOMINICAN REPUBLIC. *Distrito Nacional*: Santo Domingo (Jardín Botánico; 18°29.9'N, 69°56.9'W), 26 Mar 1999, W.N. Mathis (2♂, 1♀; USNM). *El Seibo*: Rincón (near Rincón; 18°45.3'N, 68°55.7'W), 12 May 1995, W.N. Mathis (1♂, 6♀; USNM). *Pedernales*: Pedernales (13 km N; along Río Mu-

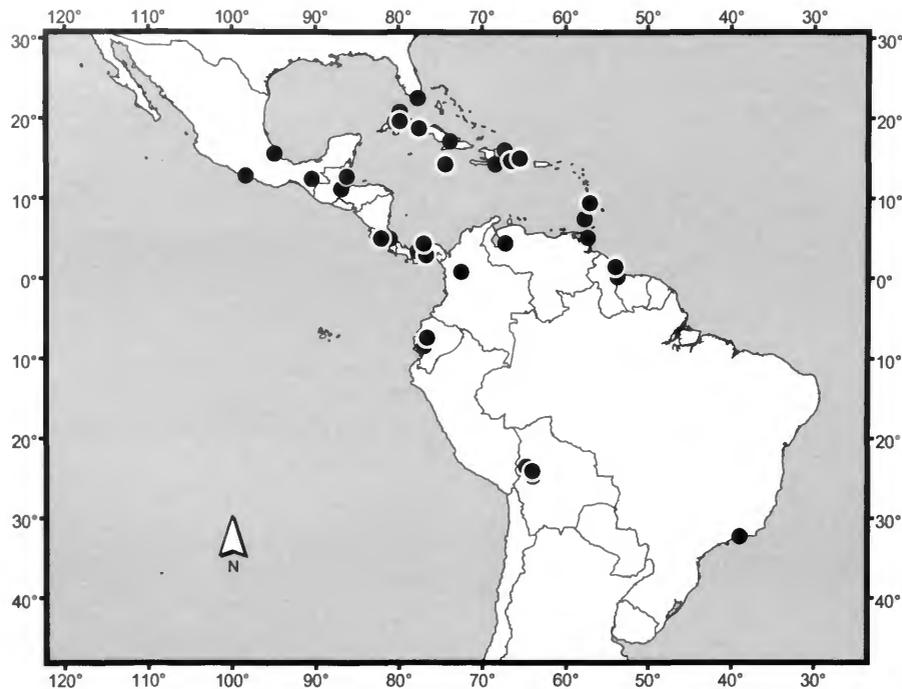


FIGURE 45.—Distribution map for *Nostima gilvipes* (Coquillett).

lito; 18°09'N, 71°46'W; 230 m; riparian woodland), 17 Jul 1992, J. Rawlins, S. Thompson, C. Young, R. Davidson (2♀; CARN); Pedernales (18°01.8'N, 71°44.7'W), 19–20 Mar 1999, W.N. Mathis (4♂, 4♀; USNM); Pedernales (19 km N; 18°09.2'N, 71°44.8'W; 230 m), 20 Mar 1999, W.N. Mathis (2♂, 1♀; USNM). *Peravia*: San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W.N. Mathis (1♂; USNM). *Puerto Plata*: Río Camu (14 km E Puerto Plata; 19°41.9'N, 70°37.5'W), 23 May 1998, D. and W.N. Mathis (1♂; USNM).

ECUADOR. *Los Ríos*: Guare, Aug 1955, R. Levi Castillo (1♀; USNM). *Manabí*: Bandurria, Aug 1955, R. Levi Castillo (3♂, 1♀; USNM); Camarones, 9 Sep 1955, R. Levi Castillo (1♂, 1♀; USNM); Estero Balsa, 9 Sep 1955, R. Levi Castillo (3♂, 2♀; USNM); Pichilingue, Mar 1958, M.R. Wheeler (1♂; USNM); Pichincha, Aug 1955, R. Levi Castillo (1♂; USNM).

EL SALVADOR. *La Libertad*: Lago de Zapotitán, Dec 1953, W.B. Heed (1♂; USNM).

GRENADA. *St. Andrew*: Grand Étang Lake (12°5.6'N, 61°41.7'W), 14 Sep 1997, W.N. Mathis (1♀; USNM).

GUATEMALA. *Izabal*: Matias de Galvez, 14–15 Aug 1965, P.J. Spangler (1♀; USNM).

GUYANA. Dubulay Ranch, Berbice River (5°40.9'N, 57°51.5'W), 9–11 Apr 1994, W.N. Mathis (6♂, 7♀; USNM); Georgetown (6°48.6'N, 58°8.6'W; 340 m), 20–29 Aug 1997, W.N. Mathis (1♂, 3♀; USNM).

HONDURAS. *Cortés*: San Pedro Sula (8 km S; 15°25.7'N, 88°1.4'W), 25–26 Sep 1995, D. and W.N. Mathis (1♀; USNM).

JAMAICA. *Clarendon*: Grantham (18°09.3'N, 77°23.8'W; 340 m), 16 Apr 2000, W.N. Mathis (1♂; USNM). *Manchester*: near Warwick (17°54.1'N, 77°25.5'W), 7 May 1996, D. and W.N. Mathis, H.B. Williams (1♂, 5♀; USNM). *Portland*: Reach (4 km N; 18°03.6'N, 76°20.4'W), 15 May 1996, D. and W.N. Mathis, H.B. Williams (1♂; USNM). *St. Andrew*: Clydesdale (black light), 4–9 Dec 1975, G.F. Hevel (1♀; USNM).

MEXICO. *Chiapas*: Puente Macalapa, 22 May 1964, F.S. Blanton, “light trap” (3♀; USNM). *Guerrero*: Acapulco, 16–30 Aug 1938, L.J. Lipovsky (1♂; KU). *Puebla*: Huachinango, Dec 1958, A. Faberge (1♂; USNM). *Veracruz*: Veracruz, Oct 1962, N.L.H. Krauss (1♂, 1♀; BMNH).

PANAMA. *Canal Zone*: Kobbé Beach (mangrove), Jul 1967, W.W. Wirth (1♂; USNM). *Cocle*: El Valle, Feb 1958, M.R. Wheeler (1♂; USNM); Playa Santa Clara, 2 Jul 1967, W.W. Wirth (1♀; USNM). *Colon*: Cativa, 27 Aug 1952, F.S. Blanton (1♀; USNM). *Darien*: Garachine, Feb 1953, F.S. Blanton (1♀; USNM).

ST. LUCIA. Fond St. Jacques (13°50'N, 61°02'W), 13–14 Jun 1991, D. and W.N. Mathis (2♀; USNM). Soufriere Botanical Garden (13°51'N, 61°4'W), 12 Jun 1991, D. and W.N. Mathis (1♀; USNM).

TRINIDAD AND TOBAGO. *Trinidad*: St. George, Arima 8 km N (10°1'N, 61°18'W) (Verdant Vale), 19 Jun 1993, W.N. Mathis (1♂; USNM).

UNITED STATES. *Florida*: Dade County, Homestead, IFAS Exp. Station (Malaise trap), 9 Nov 1973, W.H. Pierce (1♀; USNM); Monroe County, Key West (24°32.9'N, 81°47.9'W), 11 Feb 2000, D. and W.N. Mathis (1♀; USNM).

VENEZUELA. *Barinas*: Santa Rosa, Feb 1943, P. Anduze (1♂, 1♀; USNM).

DISTRIBUTION (Figure 45).—*Nearctic*: United States (Florida). *Neotropical*: Belize (Cayo, Stann Creek), Bolivia (La Paz), Brazil (Rio de Janeiro), Colombia (Antioquia, Magdalena, Valle), Costa Rica (Cartago, Puntarenas), Ecuador (Los Ríos, Manabí), El Salvador (La Libertad), Guatemala (Izabal), Guyana, Honduras (Cortés), Mexico (Chiapas, Guerrero, Puebla, Veracruz), Panama (Canal Zone, Cocle, Colon, Darien), Trinidad, Venezuela (Barinas), and West Indies (Cuba, Dominican Republic, Grenada, Jamaica, St. Lucia).

ETYMOLOGY.—The yellow to yellowish brown color of *N. gilvipes* confirms Cresson's choice of the Latin root *gilv* meaning pale yellow.

REMARKS.—*Nostima gilvipes* is apparently a common species, occurring throughout the New World tropics and subtropics.

## 12. *Nostima giovannolii* Wirth

FIGURES 46–49, 150, 201, 202

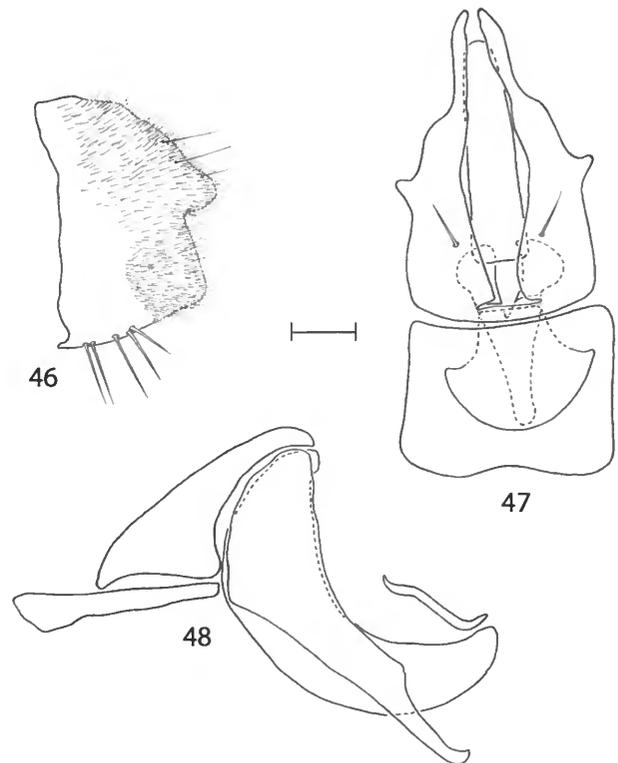
*Nostima giovannolii* Wirth, 1956:15; 1968:17 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:191–192 [world catalog].

DIAGNOSIS.—*Nostima giovannolii* is distinguished from congeners by the following combination of external characters: crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; apical section of CuA<sub>1</sub> long; hindtibia unicolorous; tergite 2 dorsomedially with dense, silvery gray microtomentose band from anterior to posterior margin, posterolateral margin with dense band of silvery gray microtomentum laterally expanded but not reaching margin; tergite 3 posterolateral margin with dense, silvery gray microtomentum laterally expanded but not reaching lateral margin; tergite 4 with silvery gray microtomentum in large dorsolateral spots along posterior margin covering more than ¾ of tergite, laterally with dense, silvery gray microtomentum not reaching margin; male tergite 5 posteromedial margin with dense, silvery gray microtomentum, with 3 silvery gray microtomentose projections extending from posteromedial margin, 2 oval-shaped lateral projections, 1 rod-shaped medial projection, and dense, silvery gray microtomentum covering lateral margin; and female tergite 5 dorsomedially completely covered with dense, silvery gray microtomentum except for brown anteromedial semicircle, posterolateral margin with dense, silvery gray microtomentum.

DESCRIPTION.—Small shore flies, body length 1.05–1.30 mm; yellowish brown to brown with silvery gray and yellowish silver microtomentum.

*Head*: Frons ventrolateral triangles brown with yellowish silver microtomentum, anterior semicircle paler brown than ventrolateral triangles and with yellowish silver microtomentum medioventrally darker. Occiput yellowish brown with silvery gray microtomentum. Outer vertical seta ½ length of inner vertical seta; paraverticilar seta present. Scape and pedicel dorsally yellowish brown, ventrally yellow; flagellomere 1 dorsally dark yellowish brown, ventrally pale yellowish brown; arista dorsally branched. Facial background yellowish brown with yellowish silver microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae and extending to gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face medially covered with yellowish silver microtomentum. Gena with dense, silvery gray microtomentum; postgena covered with dense, silvery gray microtomentum, extending to occiput. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 150): Scutal length 0.38–0.48 mm [n=4]; scutellar length 0.16–0.21 mm. Mesonotum brown with yellowish silver microtomentum, vittate, presutural vitae more



FIGURES 46–48.—Male genitalia of *Nostima giovannolii* Wirth: 46, epanthrium, cercus, fused surstylus, lateral aspect; 47, internal male genitalia, ventral aspect; 48, same, lateral aspect. Scale = 0.05 mm.

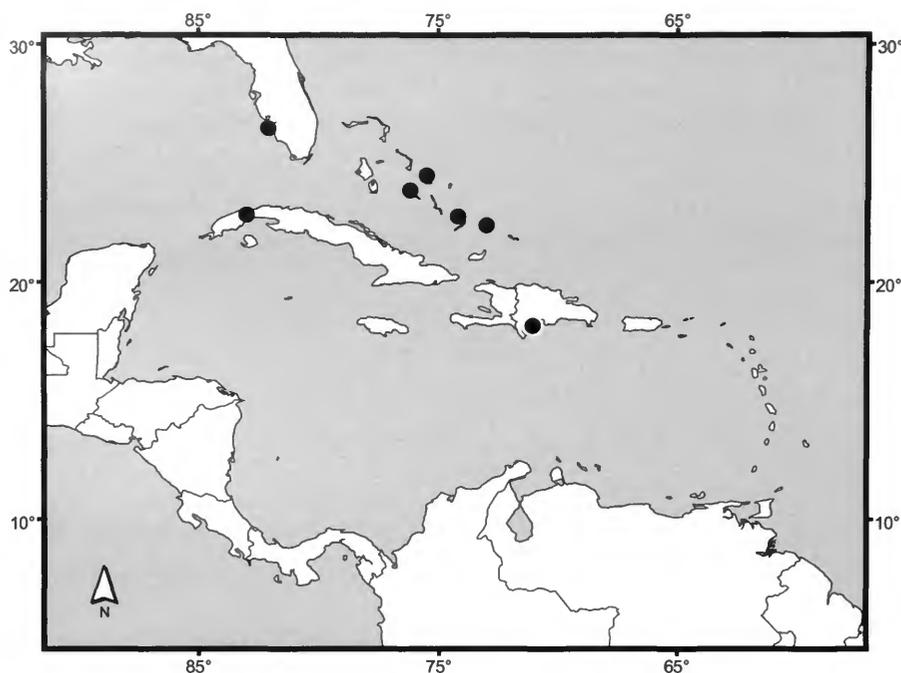


FIGURE 49.—Distribution map for *Nostima giovannolii* Wirth.

distinct than postsutural vitae; mesonotum medially with dark brown stripe laterally bounded with silvery stripes; dorsocentral line dark brown, darker around dorsocentral setal bases; silvery stripe between dorsocentral line and interalar setae; postpronotum dorsally silver, ventrally brown; scutellar disc brown with yellowish silver microtomentum, darker around scutellar setal bases, laterally with dense, silvery gray microtomentum; anepisternum and katapisternum dark yellowish brown with silvery gray microtomentum; subscutellum shiny dark yellowish brown with yellowish silver microtomentum; anatergite shiny dark yellowish brown with yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 150): length 1.10–1.31 mm; width 0.50–0.55 mm; costal-vein ratio 0.93–1.05; M-vein ratio 0.33–0.40; amber background; veins yellowish brown; crossveins r-m and dm-cu white. Halter yellowish white. Legs yellowish brown to brown; tibia 3 faintly banded; tarsomere 5 brown on all legs.

**Abdomen** (Figures 46–48, 201, 202): Background brown; tergites 1–5 with sparse, yellowish silver microtomentum; tergite 2 dorsomedially with dense, silvery gray microtomentose band from anterior to posterior margin, posterolateral margin with dense band of silvery gray microtomentum laterally expanded but not reaching margin; tergite 3 posterolateral margin with dense, silvery gray microtomentum laterally expanded but not reaching lateral margin; tergite 4 with silvery gray microto-

mentum in large dorsolateral spots along posterior margin covering more than  $\frac{3}{4}$  of tergite, laterally with dense, silvery gray microtomentum not reaching margin; male tergite 5 posteromedial margin with dense, silvery gray microtomentum, with 3 silvery gray microtomentose projections extending from posteromedial margin (2 oval-shaped lateral projections, 1 rod-shaped medial projection), and dense, silvery gray microtomentum covering lateral margin; female tergite 5 dorsomedially completely covered with dense, silvery gray microtomentum except for anteromedial brown semicircle, posterolateral margin with dense, silvery gray microtomentum. Male genitalia (Figures 46–48): epandrium-cerci-surstyli complex fused; epandrium a broad U-shaped band; cercus completely fused laterally with epandrium and with several long setulae; surstylus fused dorsally with epandrium, elongate, and ventrally bearing many small setae; 10<sup>th</sup> sternite triangulate in ventral view, undulate in lateral view; aedeagal apodeme triangular in lateral view with anterior projection broadly spatulate, posterior projection tripartite and rounded laterally and medially, lateral projections pointed; aedeagus crescent-shaped; subepandrial plate-gonite fused; gonite broadly fused anteriorly with subepandrial plate, posterior projection of gonite triangular in lateral view and with medioventral setula; subepandrial plate forming lateral shelf along gonite, articulated with epandrium via rounded lateral projections; hypandrium broadly rectangular with anterolateral margins rounded.

**TYPE MATERIAL.**—The holotype male of *Nostima giovannoli* Wirth is labeled "Cat Island McQueen Jan. 23, 1953/Van Voast—A M.N.H. Bahama Isls. Exped. Coll. E. B. Hayden/[male symbol]/HOLOTYPE ♂ *Nostima giovannoli* Wirth [red; handwritten]." The holotype is glued to a paper point on the left thorax, is in good condition (right wing in an attached microvial), and is deposited in the AMNH.

**OTHER SPECIMENS EXAMINED** (16♂, 13♀).—BAHAMAS. Cat Island, McQueen, 23 Jan 1953, E.B. Hayden, L. Giovannoli (1♂; AMNH); Crooked Island, Landrail Point, 5 Mar 1953, E.B. Hayden (1♂; USNM); Exuma Cays, Darby Island, 18 Jan 1953, E.B. Hayden, L. Giovannoli (2♀; AMNH, USNM); Mayaguana Island near Abraham Bay, 3 Mar 1953, E.B. Hayden (1♀; AMNH).

**CUBA.** *Pinar del Rio*: Soroa (22°47.7'N, 83°W), 4–6 Dec 1994, W.N. Mathis (1♀; USNM).

**DOMINICAN REPUBLIC.** *Barahona*: Barahona (11 km S; 18°07.7'N, 71°04'W), 15 May 1995, W.N. Mathis (12♂, 4♀; USNM); *Paraíso* (5 km N; 18°01.5'N, 71°11.6'W; 150 m), 21 Mar 1999, W.N. Mathis (2♀; USNM). *El Seibo*: Pedro Sánchez (18°51.4'N, 69°6.5'W), 26 May 1998, D. and W.N. Mathis (1♀; USNM). *Independencia*: Los Pinos (4 km S; 18°35'N, 71°46'W; 455 m; semiarid deciduous forest with pastures), 23 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1♂; CARN). *Peravia*: San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W.N. Mathis (1♀; USNM).

**UNITED STATES.** *Florida*: Lee County, Sanibel Island (Malaise trap), 2 May 1973, W.W. Wirth (1♀; USNM).

**DISTRIBUTION** (Figure 49).—*Nearctic*: United States (Florida). *Neotropical*: Bahamas, West Indies (Cuba, Dominican Republic).

**ETYMOLOGY.**—Wirth named this species for L. Giovannoli who was a collector on the Van Voast-American Museum of Natural History expeditions to the Bahamas in the early 1950s.

**REMARKS.**—*Nostima giovannoli* is one of the largest species of *Nostima*, and it is very similar and apparently closely related to *N. niveivenosa*, as indicated by the large white spots around the wing crossveins. The genitalia of *N. giovannoli*, however, are distinctive for this subtropical species, which has a northerly distribution.

### 13. *Nostima ilytheoides* Cresson

FIGURES 50–53, 151, 203, 204

*Nostima ilytheoides* Cresson, 1941:8.—Wirth, 1968:17 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:192 [world catalog].

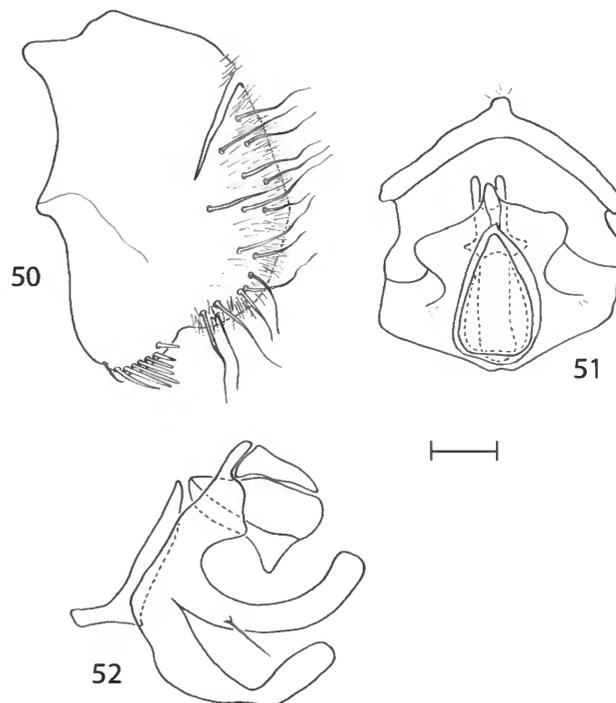
*Nostima (Nostima) ilytheoides*.—Cresson, 1947:42 [review].

**DIAGNOSIS.**—*Nostima ilytheoides* is distinguished from congeners by the following combination of external characters: wing maculation pattern distinctive, spotted; vein R<sub>2+3</sub> lacking spurious veins; veins generally unicolorous, pale brown to dark brown; crossveins r-m and dm-cu white; tergite 2 with silvery gray microtomentum along posteromedial and lateral margins

and with dense, silvery gray microtomentose posterolateral spots; tergite 3 with silvery gray microtomentum along posteromedial and lateral margins and with dense, silvery gray microtomentose posterolateral spots; tergite 4 with silvery gray microtomentum along lateral margin and with silvery gray microtomentose dorsomedial and posterolateral spots; and tergite 5 with dense, silvery gray microtomentose band along posteromedial margin.

**DESCRIPTION.**—Minute to small shore flies, body length 0.96–1.53 mm; yellowish brown, brown, to dark brown with yellowish silver and silvery gray microtomentum.

**Head:** Frons with ventrolateral triangles dark brown with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum, darker medioventrally. Occiput dorsally with silvery gray microtomentum, ventrally dark brown with sparse, silvery gray microtomentum contiguous with thoracic stripes. Outer vertical seta ½–⅔ length of inner vertical seta; paraverticilar seta minute. Scape yellowish brown, pedicel dark yellowish brown ventrally, yellowish brown dorsally; flagellomere 1 dark yellowish brown dorsally, yellowish brown ventrally; arista dorsally branched. Facial background brown with yellowish silver and silvery gray microtomentum; narrow band of silvery golden microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena.



FIGURES 50–52.—Male genitalia of *Nostima ilytheoides* Cresson: 50, epanthrium, cercus, fused surstylus, lateral aspect; 51, internal male genitalia, ventral aspect; 52, samc, lateral aspect. Scale = 0.05 mm.

Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face covered medially with yellowish silver microtomentum. Gena dorsal ½ covered with dense, silvery gray microtomentum, ventral ½ shiny dark brown; postgena dorsal ½ with dense, silvery gray microtomentum, ventral ½ shiny dark brown. Maxillary palpus yellow; prementum brown.

*Thorax* (Figure 151): Scutal length 0.45–0.52 mm; scutellar length 0.15–0.21 mm. Mesonotum brown, vittate with silvery gray microtomentum; mesonotum dorsomedially with pointed elliptic patch of silvery gray microtomentum surrounded by brown medial band, medial brown band laterally bounded with silvery gray microtomentum; dorsocentral line brown; silvery gray stripe between dorsocentral line and interalar setae; scutellum medially brown with sparse, silvery gray microtomentum, microtomentum posteromedially slightly more dense; scutellum laterally with dense, silvery gray microtomentum; anepisternum dorsal ⅓ brown, bearing sparse, silvery gray microtomentum, medial ⅓ with dense, silvery gray microtomentum, ventral ⅓ bare, shiny dark brown; katepisternum dorsal ½ with dense, silvery gray microtomentum, ventral ½ bare, shiny dark brown; subscutellum brown with yellowish silver microtomentum; anatergite shiny brown, dorsally with yellowish silver microtomentum, ventrally bare. Chaetotaxy: anterior dorsocentral seta ½ length of posterior seta; anterior notopleural seta ⅔ length of posterior seta; lateral scutellar seta ⅓–½ length of apical seta. Wing (Figure 151): length 1.24–

1.42 mm; width 0.62–0.70 mm; costal-vein ratio 0.71–0.90; M-vein ratio 0.61–0.76; background amber, maculate with brown spots, veins pale brown to dark brown; crossveins r-m and dm-cu white; spurious vein branching posteriorly from vein CuA<sub>1</sub> positioned basad of crossvein dm-cu; dark spots: distal and proximal to r<sub>1</sub> cell, posterior apex of r<sub>2+3</sub> cell, in band through cell r<sub>2+3</sub> from apex of vein R<sub>1</sub> to R<sub>2+3</sub>, anterior to r<sub>2+3</sub> cell, posterior to r<sub>4+5</sub> cell, medial to r<sub>4+5</sub> cell along vein R<sub>4+5</sub>, anterior to r<sub>4+5</sub> cell along crossvein r-m between veins R<sub>4+5</sub> and M, in br cell, along R<sub>4+5</sub> vein posterior to dm-cu in r<sub>4+5</sub> and dm cells, posteromedially in dm cell, posteriorly along CuA<sub>1</sub>, surrounding spurious vein dorsally, anteriorly, and posteriorly, and anterior to cua<sub>1</sub> cell. Halter yellow, knob yellowish brown. Legs yellow, yellowish brown, to brown; femora brown, distal ⅓ yellowish brown; fore- and hindtibia with medioproximal and mediolateral brown bands; midtibia yellowish brown, darker distally and proximally; tarsi yellowish brown with tarsomere 5 brown.

*Abdomen* (Figures 50–52, 203, 204): Background brown; tergites 1–3 covered with sparse, yellowish silver microtomentum; tergite 2 with silvery gray microtomentum along posteromedial and lateral margins and with dense, silvery gray microtomentose posterolateral spots; tergite 3 with silvery gray microtomentum along posteromedial and lateral margins and with dense, silvery gray microtomentose posterolateral spots; tergite 4 with silvery gray microtomentum along lateral margin and with silvery gray microtomentose dorsomedial and poster-

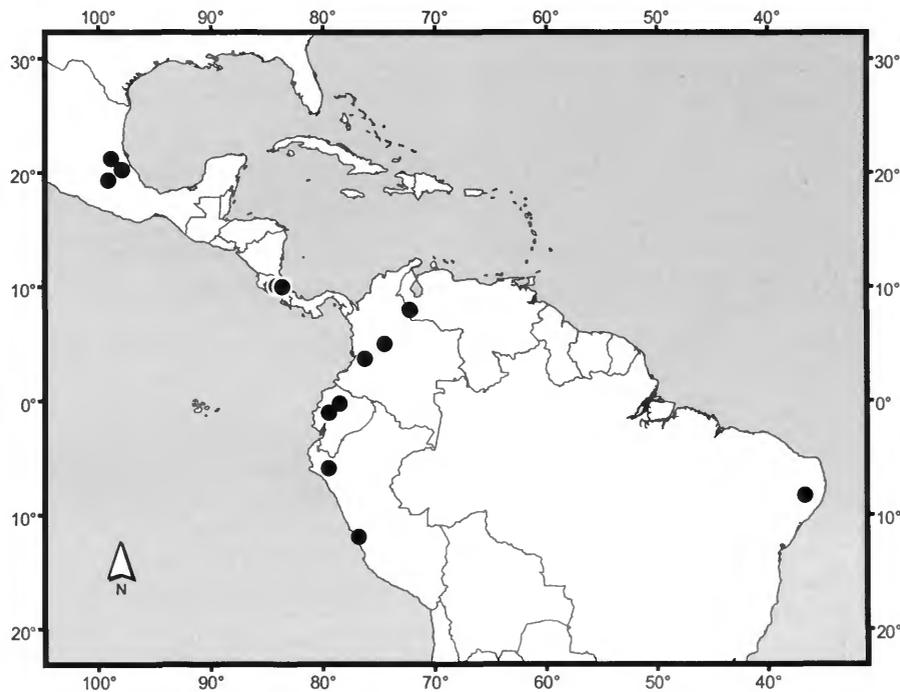


FIGURE 53.—Distribution map for *Nostima ilytheoides* Cresson.

olateral spots; tergite 5 with dense, silvery gray microtomentose band along posteromedial margin. Male genitalia (Figures 50–52): epandrium-cerci-surstyli complex fused; epandrium saddle-shaped with anterolateral rounded dorsal and medial projections; cercus oval-shaped, separated from epandrium by narrow V-shaped space, and ventral surface with numerous wavy setulae; surstylus ventrally with many small setae; 10<sup>th</sup> sternite triangulate ventrad to aedeagus; aedeagal apodeme triangular in lateral view with posterior projection bilobed and spatulate, anterior projection angulate, and lateral projections bifurcate pointed; aedeagus rectangular with heavily sclerotized anterior ring having rounded ventral projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate narrow, articulated laterally with epandrium; gonite broadly fused anteriorly with subepandrial plate, gonite with prominent anteromedial setulae, with posterodorsal projections fused dorsad of 10<sup>th</sup> sternite and aedeagus, and with rectangular posteroventral projections; hypandrium U-shaped in lateral view, with heavily sclerotized anteroventral band ventrad of subepandrial plate.

**TYPE MATERIAL.**—The male holotype of *Nostima ilytheoides* Cresson is labeled “La Suiza de Turrialba Jul COSTA RICA Pablo Schild/TYPE Nostima [handwritten] ILYTHEOIDES [handwritten] E. T. Cresson, Jr. 6602 [red; number handwritten along label’s right edge]/ANSP [yellow].” The holotype is double mounted (plant spine minuten through the thorax pinned to a narrow, rectangular white plastic block), is in good condition, and is deposited in the ANSP (6602).

**OTHER SPECIMENS EXAMINED** (16♂, 25♀).—BRAZIL. *Pernambuco*: Pesqueiro, 1922, C. Anheuser (1♀; USNM).

COLOMBIA. *Cundinamarca*: Alban (3 km N; Finca San Pablo; 1800 m), 1–12 Aug 1967, B. and P. Wygodzinsky (1♂; AMNH). *Valle*: Palmira (near Cali; 1000 m), Nov 1955, W.B. Heed (1♂; USNM); Palmira (near Cali; 1005 m), Mar 1958, M.R. Wheeler (2♀; USNM).

COSTA RICA. *Alajuela*: Higuito, San Mateo, P. Schild (1♀; USNM). *Cartago*: La Suiza, 23 May–Jul 1921, 1926, P. Schild (6♂, 6♀; ANSP, HNHM, USNM). *San José*: San José, Jul, H. Schmidt (1♂, 8♀; ANSP, USNM); San José, (8 km W), 1930, Schmidt (1♂; USNM); San José, Farm La Caja, 29 Jul 1919, H. Schmidt (1♂; USNM).

ECUADOR. *Manabi*: Pichilingue, Mar 1958, M.R. Wheeler (1♂; USNM). *Pichincha*: Tanguando River (NW Ibarra; 1650–1900 m), 9 Jun 1965, L.E. Peña (1♀; CNC).

MEXICO. *Hidalgo*: Chapulhuacan, 5 Aug 1962 (1♂; USNM); S. L. P. State Line (16 km S), Feb 1959, D. Hunsaker (1♀; USNM). *México*: Morelia Highway (24 km W Federal District), 5 Sep 1938, L.J. Lipovsky (1♀; KU). *Puebla*: Huachinango, Dec 1958, A. Faberge (1♂; USNM).

PERU. *Lambayeque*: Olmos (34 km E), 18 Jan 1955, E.I. Schlinger, E.S. Ross (1♂, 1♀; CAS). *Lima*: Lima, Cochacra (18 km E Chosica), 11 Feb 1984, W.N. Mathis (1♂, 1♀; USNM); Lima, Lima Lagunas de Villa, 14 Feb 1984, W.N. Mathis (1♀; USNM).

VENEZUELA. *Tachira*: Palo Grande, San Cristobal, 20 Jul 1930, H.J. MacGilavry (1♀; ZMAM).

**DISTRIBUTION** (Figure 53).—*Neotropical*: Brazil (Pernambuco), Colombia (Cundinamarca, Valle), Costa Rica (Alajuela, Cartago, San José), Ecuador (Manabi, Pichincha), Mexico (Hidalgo, México, Puebla), Peru (Lambayeque, Lima), Venezuela (Tachira).

**ETYMOLOGY.**—This species’ name may have been derived from the Greek root *ily*, meaning mud, in reference to the mud habitat where this species may have been collected.

**REMARKS.**—*Nostima ilytheoides* is a species that has been found where intensive collecting of small Diptera has occurred. A maculate wing with spurious veins may be homologous for *N. ilytheoides*, *N. maculata*, and *N. slossonae*.

#### 14. *Nostima lineata*, new species

FIGURES 54–57, 152, 205, 206

**DIAGNOSIS.**—*Nostima lineata* is distinguished from congeners by the following combination of external characters: flagellomere 1 brown dorsally, yellowish brown ventrally; mesonotum with sharply defined stripe laterad of dorsocentral setae, stripe not much wider than fronto-orbital stripe; scutellum velvety brown; wing unspotted; crossveins r-m and dm-cu paler than veins but not white; and tergites 3 and 4 with dense, silvery gray microtomentose oval-shaped posterolateral spots.

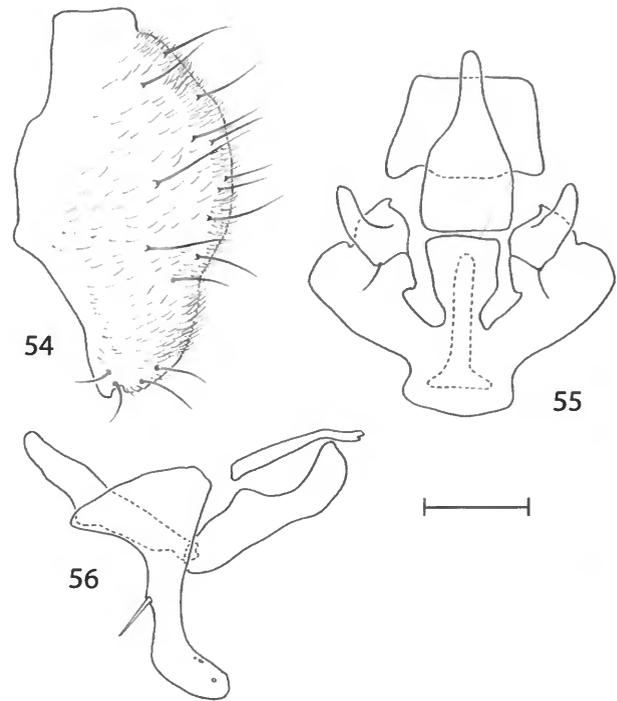
**DESCRIPTION.**—Minute shore flies, body length 0.90 mm; generally dark colored with area between dorsocentral setae brown and with silvery gray microtomentose lateral stripes.

*Head*: Frons with brown ventrolateral triangles, anterior semicircle brown with yellowish silver microtomentum. Occiput medially yellowish brown with yellowish silver microtomentum, laterally with silvery gray microtomentum forming stripe contiguous with thoracic stripe. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel brown; flagellomere 1 ventrally yellowish brown, dorsally brown. Facial background coloration yellowish brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face yellowish brown with silvery gray microtomentum. Gena covered with silvery gray microtomentum; postgena covered with silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 152): Scutal length 0.34 mm; scutellar length 0.10 mm. Mesonotum medially brown with yellowish silver microtomentum, darker along dorsocentral line, stripe of silvery gray microtomentum laterad of dorsocentral line, and a darker stripe laterad of silvery gray stripe; scutellum medially brown with yellowish silver microtomentum, laterally with darker stripes and with silvery gray microtomentous stripe contiguous with mesonotal stripes; anepisternum yellowish brown

with silvery gray microtomentum; katapisternum yellowish brown, dorsally with silvery gray microtomentum, ventrally shiny; subscutellum yellowish brown with sparse, yellowish silver microtomentum; anatergite yellowish brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorso-central seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta. Wing (Figure 152): length 1.04 mm; width 0.61 mm; costal-vein ratio 1.01; M-vein ratio 0.25; amber background coloration with yellowish brown veins and crossveins, crossveins r-m and dm-cu paler yellowish brown. Legs pale yellowish brown, with tarsomere 5 slightly darker.

**Abdomen** (Figures 54–56, 205, 206): Background dark yellowish brown; tergite 1 with sparse, yellowish silver microtomentum; tergite 2 with sparse, yellowish silver microtomentum and posterolateral silvery gray microtomentose spot; tergite 3 shiny dark yellowish brown with silvery gray microtomentose posterolateral spot; tergite 4 shiny dark yellowish brown with silvery gray microtomentose posterolateral spot; tergite 5 shiny dark yellowish brown. **Male genitalia** (Figures 54–56): epandrium-cerci-surstyli complex fused; epandrium a broad U-shaped band with rounded anteroventral projection; cercus completely fused laterally with epandrium and bearing many long setulae; surstylus dorsally fused with epandrium, rectangular with pointed ventral projection and bearing many long setae; 10<sup>th</sup> sternite dorsad of aedeagus, rectangular in ventral view, and with rounded posterior projection in lateral view; aedeagal apodeme triangular in lateral view, posterior projec-



FIGURES 54–56.—Male genitalia of *Nostima lineata*, new species: 54, epandrium, cercus, fused surstylus, lateral aspect; 55, internal male genitalia, ventral aspect; 56, same, lateral aspect. Scale = 0.05 mm.

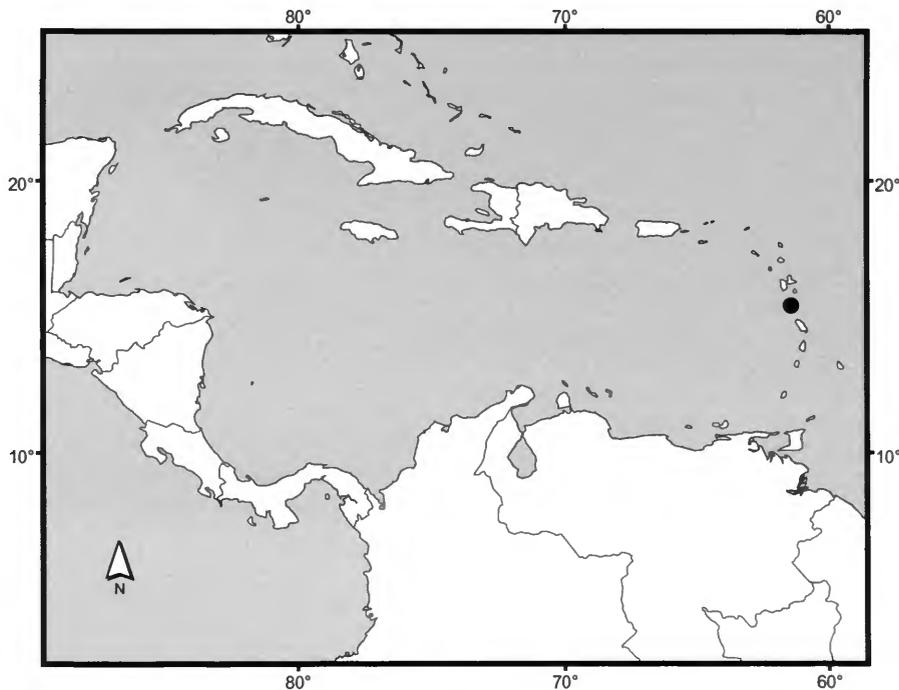


FIGURE 57.—Distribution map for *Nostima lineata*, new species.

tion spatulate, lateromedial projections pointed, anterior projection rounded; aedeagus crescent-shaped in lateral view, with rounded dorsomedial projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate reduced to region between gonites and hypandrium, with small rounded dorsal projection and spatulate medial projection; gonite with broad base, broadly rounded posterior projection, prominent ventromedial setula, and 3 minute rounded areas on posterior projection; hypandrium rectangular and broadly fused posteriorly with subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima lineata* is labeled "W.I. Dominica: Layou (5 km E)[,] 23 March 1989[,] W. N. Mathis/HOLOTYPE ♂ *Nostima lineata* Edmiston & Mathis USNM [red]." The holotype is double mounted (minute inserted ventrad of right wing), is in fair condition (thoracic setae missing or damaged; left hindleg missing; right hindleg, subscutellum, and abdomen in an attached microvial), and is deposited in the USNM.

**DISTRIBUTION** (Figure 57).—*Neotropical*: West Indies (Dominica).

**ETYMOLOGY.**—The species epithet, *lineata*, is derived from the Latin word *linea*, meaning line. The name refers to the striped pattern on the mesonotum.

**REMARKS.**—The very narrow and distinctive metathoracic stripes are common to *N. approximata* and *N. lineata*.

### 15. *Nostima lucida*, new species

FIGURES 58–61, 153, 207, 208

**DIAGNOSIS.**—*Nostima lucida* is distinguished from congeners by the following combination of characters: ventral portion of gena bare, shiny; crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; apical section of CuA<sub>1</sub> long, length about 2 times that of crossvein dm-cu; hindfemur of male normally developed, dorsal and ventral surfaces similar to each other; hindtibia of male not bowed; tergites 3 and 4 with silvery gray microtomentose posterolateral spots.

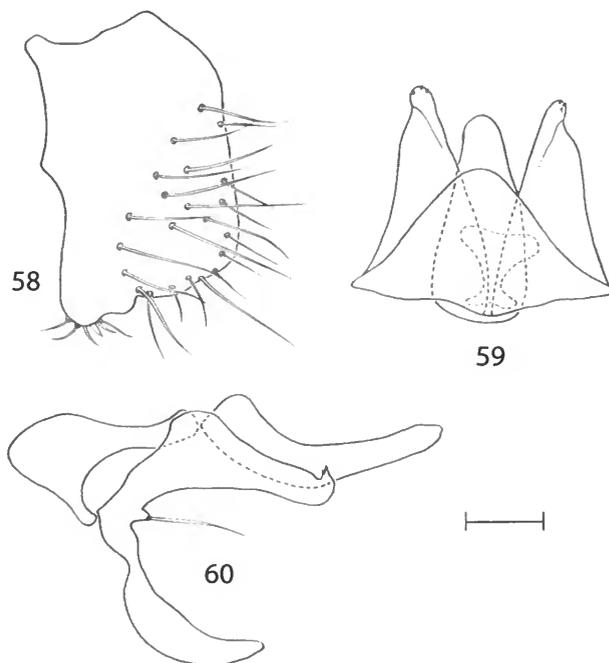
**DESCRIPTION.**—Small shore flies, body length 1.25–1.46 mm; mostly brown to blackish brown with silvery gray stripes.

**Head:** Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum. Occiput with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paravertical seta minute. Scape and pedicel brown; flagellomere 1 yellowish brown ventrally, brown dorsally; arista dorsally branched. Facial background coloration brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face brown with yellowish silver microtomentum. Gena covered with silvery

gray microtomentum; postgena bare and shiny. Maxillary palpus yellowish brown; prementum brown.

**Thorax** (Figure 153): Scutal length 0.54 mm; scutellar length 0.22 mm. Mesonotum medially with brown band laterally bounded with silvery gray bands; dorsocentral line brown; silvery gray band between dorsocentral line and interalar setae; scutellum dorsally brown with yellowish silver microtomentum, laterally with dense, yellowish silver microtomentum; anepisternum shiny dark brown with silvery gray microtomentum; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{1}{2}$ , dark brown bare on ventral  $\frac{1}{2}$ ; subscutellum shiny dark brown with sparse, silvery gray microtomentum; anatergite dark brown with yellowish microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{4}$ – $\frac{1}{3}$  length of apical seta. Wing (Figure 153): length 1.34–1.46 mm; width 0.73–0.85 mm; costal-vein ratio 0.89; M-vein ratio 0.34–0.54; amber background; veins brown; crossveins r-m and dm-cu white. Halter yellowish white. Legs dark yellowish brown; hind tibia faintly banded; tarsomere 5 brown.

**Abdomen** (Figures 58–60, 207, 208): Background shiny dark brown; tergites 1 and 2 covered with sparse, yellowish silver microtomentum; tergite 3 shiny with silvery gray microtomentose spots posterolaterally; tergite 4 shiny with dense, silvery gray microtomentose spots posterolaterally. Male genitalia (Figures 58–60): epandrium-cerci-surstyli complex



FIGURES 58–60.—Male genitalia of *Nostima lucida*, new species: 58, epandrium, cercus, fused surstylus, lateral aspect; 59, internal male genitalia, ventral aspect; 60, same, lateral aspect. Scale = 0.05 mm.

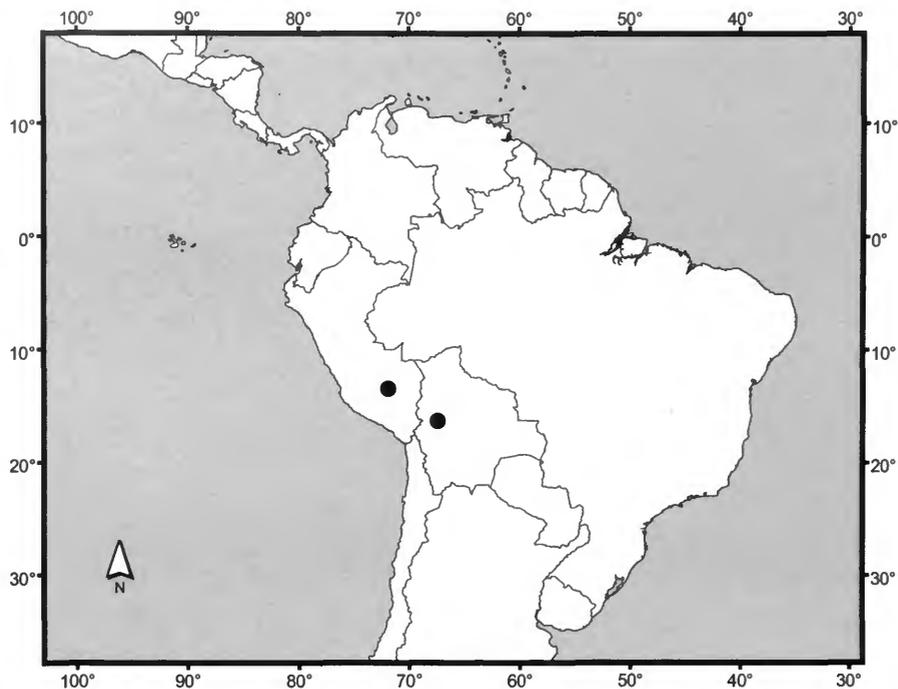


FIGURE 61.—Distribution map for *Nostima lucida*, new species.

fused; epandrium a broad U-shaped band with rounded anteroventral projection and with posteroventral projection articulated with subepandrial plate; cercus rectangular and fused anteroventrally with epandrium, covered with many setulae; surstylus ventrally fused with epandrium and densely covered anteroventrally with numerous long setulae; aedeagal apodeme triangular in lateral view with rounded anterior and posterior projections, anterolateral projections pointed, posterolateral projections spatulate; aedeagus hook-shaped with rounded posterior projection and heavily sclerotized anterior projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate narrow; gonite broadly fused anteriorly with subepandrial plate, with prominent ventromedial setulae, posterior projection irregular; hypandrium broadly rectangular, fused posteriorly with subepandrial plate and curved to form broad posterior projection ventrad of subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima lucida* is labeled “BOLIVIA. La Paz: Apa Apa (1960m; 8km S Chulumani; 16°22’S, 67°30.4’W)[,] 9–10 Mar 2001, W. N. Mathis/HOLOTYPE ♂ *Nostima lucida* Edmiston & Mathis [red].” The holotype is double mounted (minuten in a block of plastic), is in excellent condition, and will be deposited in the MNBL. Four paratypes (2♂, 2♀; MNBL, USNM) bear the same locality label data as the holotype.

**OTHER SPECIMEN EXAMINED** (1♀).—PERU. Cuzco: Paucartambo, Buenos Aires (km 132; 2400 m), 2 Sep 1988, W.N. Mathis (1♀; USNM).

**DISTRIBUTION** (Figure 61).—*Neotropical*: Bolivia (La Paz), Peru (Cuzco).

**ETYMOLOGY.**—The species epithet, *lucida*, is derived from the Latin word *lucidus*, meaning full of light, shining. The name refers to the shiny black abdomen of this species, especially tergites 4 and 5.

**REMARKS.**—*Nostima lucida* may be one of the less common species within the genus.

#### 16. *Nostima lutea*, new species

FIGURES 62–65, 154, 209, 210

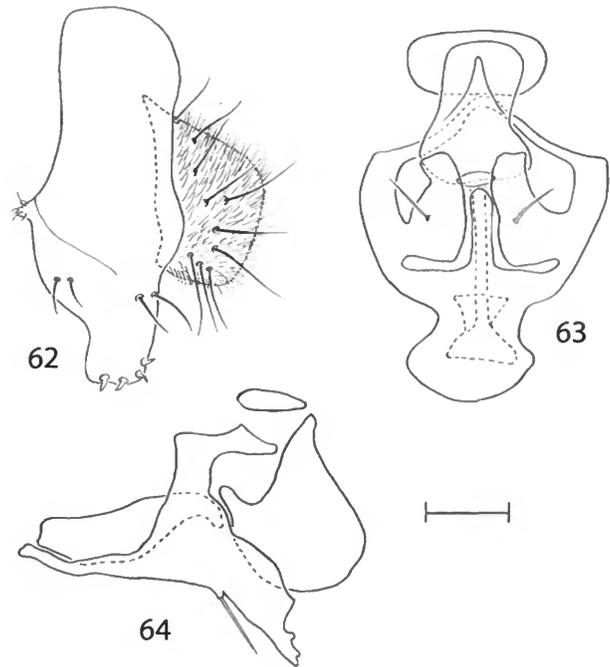
**DIAGNOSIS.**—*Nostima lutea* is distinguished from congeners by the following combination of characters: mesonotum vitate; scutellum brown with dense, golden microtomentum dorsally and with silvery gray microtomentum laterally; pleural area yellowish, concolorous with legs; crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; distance between crossveins r-m and dm-cu long, almost 2 times length of apical section of vein CuA<sub>1</sub>; apical section of CuA<sub>1</sub> very short, length equal to or less than that of crossvein dm-cu; femora yellow; hindtibia faintly banded; tergite 3 with microtomentose band laterally; tergite 4 with silvery gray dorsomedial spots, sometimes joined posterolaterally with silvery gray spots; ventral margin of tergite 4 with a large silvery white spot; and tergite 5 with dense, silvery gray microtomentous medial band, with band tapering to anteromedial point.

**DESCRIPTION.**—Small shore flies, body length 1.10–1.15 mm; generally mostly brown dorsally, pleural areas and especially legs yellowish.

**Head:** Frons with brown ventrolateral triangles with golden microtomentum, anterior semicircle brown with golden microtomentum. Occiput with silvery gray microtomentum. Outer vertical seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of inner vertical seta; paravertic seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally; arista dorsally branched. Facial background coloration brown with golden microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face brown with golden microtomentum. Gena covered with silvery gray microtomentum; postgena covered with silvery gray microtomentum. Maxillary palpus yellow; prementum yellowish brown.

**Thorax (Figure 154):** Scutal length 0.36–0.37 mm; scutellar length 0.14–0.15 mm. Mesonotum background brown and vittate with dense microtomentum, medially brown with paler golden brown band medially along dorsocentral line; dorsocentral line slightly darker; silvery gray stripe between dorsocentral line and interalar setae; scutellum brown, and dorsally with dense, golden microtomentum, laterally with dense, silvery gray microtomentum; anepisternum pale yellowish brown with sparse, yellowish silver microtomentum; katepisternum pale yellowish brown with sparse, silvery yellow microtomentum; subscutellum yellowish brown with sparse, silvery yellow microtomentum; anatergite yellowish brown with sparse, silvery yellow microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 154): length 0.94–0.96 mm; width 0.42–0.45 mm; costal-vein ratio 0.94–1.08; M-vein ratio 0.63–0.68; amber background except veins yellowish brown to brown, crossveins r-m and dm-cu white and centered within oval-shaped spots; slightly darker anteriorly. Halter yellowish white. Legs yellowish; hindtibia faintly banded; tarsomere 5 yellowish brown.

**Abdomen (Figures 62–64, 209, 210):** Background yellowish brown; tergites 1–5 shiny yellowish brown with sparse, yellowish silver microtomentum; tergite 2 with sparse, silvery gray microtomentose posteromedial band extending anterolaterally to anterior margin; tergite 3 with posterolateral microtomentose band extending anterolaterally to anterior margin; tergite 4 with dense, silvery gray microtomentose dorsomedial circular spots, with these spots sometimes broadly joined posterolaterally with dense, silvery gray microtomentose spots; tergite 5 mediadorsal half covered with dense, silvery gray microtomentose band tapering to an anteromedial point. Male genitalia (Figures 62–64): epandrium and surstylus fused, cerci separate from epandrium-surstylus, not forming a single, mostly to completely fused complex; epandrium a well-devel-



FIGURES 62–64.—Male genitalia of *Nostima lutea*, new species: 62, epandrium, cercus, fused surstylus, lateral aspect; 63, internal male genitalia, ventral aspect; 64, same, lateral aspect. Scale = 0.05 mm.

oped, inverted U-shaped band, evenly wide across dorsum, anteroventral margin (at merger with wide base of surstylus) with rounded projection to which apical arm of hypandrium and lateral portion of subepandrial plate meet; cercus broadly crescent-shaped, bearing long setulae; surstylus elongate with 4 ventral setae; 10<sup>th</sup> sternite well developed, triangular, situated ventrad of cercus; subepandrial plate an arch dorsad of aedeagus, widely and shallowly V-shaped in dorsal view, articulated laterally with epandrium and fused laterally with apex of lateral hypandrial arm; aedeagal apodeme elongate, triangular, posterior projection spatulate with pointed lateral projections, anterior projection narrowly pointed, lateral projections pointed; aedeagus in lateral view about as long as wide, with base more heavily sclerotized and sinuous, extending posterior portion broadly rounded, in posterior view higher than wide, somewhat saddle-shaped; gonite in lateral view with narrow base, thereafter apically broadened with rounded dorsal margin, apical portion with 2 pointed projections, the second projection longer, projections in lateral view forming a serrate or crenulate apical margin, also with ventrolateral projection bearing a seta; hypandrium in ventral view with rounded anterior projections, thereafter posteriorly narrowed then extending further posteriorly as 1 medial and 2 lateral arms, medial arm extending ventrally to aedeagal apodeme, lateral arms extending with apices fused to lateral extensions of subepandrial plate.

FIGURE 65.—Distribution map for *Nostima lutea*, new species.

**TYPE MATERIAL.**—The holotype male of *Nostima lutea* is labeled “W.I. St. Vincent: Kingstown Botanical Garden[,] 25–27 March 1989[,] Wayne N. Mathis/HOLOTYPE ♂ *Nostima lutea* Edmiston & Mathis USNM [red].” The holotype is double mounted (minuten in a block of plastic), is in excellent condition, and is deposited in the USNM. Eighteen paratypes (11 ♂, 7 ♀; USNM) bear the same locality data as the holotype. Other paratypes are as follows: ST. VINCENT. *Charlotte*: Montreal (13°12′N, 61°11′W), 26 Mar–9 Jun 1989, 1991, W.N. Mathis (2 ♀; USNM); Montreal (13°12.6′N, 61°11.3′W), 3 Sep 1997, W.N. Mathis (3 ♀; USNM). *St. Patrick*: Hermitage (13°15′N, 61°12.9′W), 9 Sep 1997, W.N. Mathis (2 ♂, 3 ♀; USNM).

**OTHER SPECIMENS EXAMINED** (1 ♂, 3 ♀).—DOMINICAN REPUBLIC. *Dajabon*: Loma de Cabrera (10 km S; 19°20′N, 71°37′W; 650 m; marshy habitat in disturbed woodland), 12 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1 ♀; CARN). *Independencia*: Los Pinos (4 km S; Loma de Vientos; 18°35′N, 71°46′W; 455 m; semiarid deciduous forest with pastures), 23 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1 ♀; CARN). *Puerto Plata*: Pico El Murazo (north slope near summit; 19°41′N, 70°57′W; 910 m; mesic deciduous forest), 28 Nov 1992, J. Rawlins, R. Davidson, M. Klingler, S. Thompson (1 ♀; CARN). *San Juan*: Arroyo Cano (7 km N; 1 km S Los Frios; 18°52′N, 71°01′W; 1120 m; pine forest, second growth), 1 Sep 1995, J. Rawlins, G. Onore, R. Davidson (1 ♂; CARN).

**DISTRIBUTION** (Figure 65).—*Neotropical*: West Indies (Dominican Republic, St. Vincent).

**ETYMOLOGY.**—The species epithet, *lutea*, is derived from the Latin adjective *luteus*, meaning yellow. The name refers to the yellowish pleural area.

**REMARKS.**—The genitalia of *N. lutea* and *N. niveivenosa* are very similar; however, the lighter overall coloration and distinct abdominal microtomentum patterns of *N. lutea* indicate the two are distinct species. Specimens of *N. lutea* have only been collected on St. Vincent and the Dominican Republic, so this species may have developed from the isolation of a *N. niveivenosa* population.

### 17. *Nostima maculata*, new species

FIGURES 66–69, 155, 211, 212

**DIAGNOSIS.**—*Nostima maculata* is distinguished from congeners by the following combination of external characters: wing spotted; crossveins r-m and dm-cu white; tergite 2 with medioventral spots of silvery gray microtomentum; tergite 3 posterior mediolateral margins with dense, silvery gray microtomentum; tergite 4 with irregular patches of dense, silvery gray microtomentum covering entire segment; and tergite 5 with irregular patches of dense, silvery gray microtomentum covering entire segment.

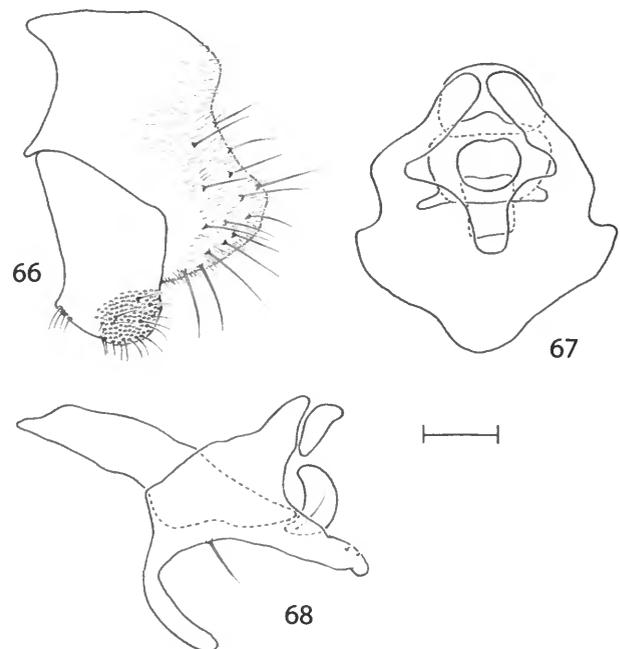
**DESCRIPTION.**—Small shore flies, body length 1.30–1.45 mm; yellowish brown, brown, to black with yellowish silver and silvery gray microtomentum.

**Head:** Frons with brown ventrolateral triangles covered with sparse, yellowish microtomentum, anterior semicircle hardly distinguishable from ventrolateral triangles, slightly paler medioventrally. Occiput ventrally with silvery gray microtomentum, medially black, dorsally with silvery gray microtomentum, appearing striped. Outer vertical seta  $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta minute. Scape dark yellowish brown; pedicel ventrally dark yellowish brown, dorsally with silvery gray microtomentum; flagellomere 1 ventrally yellowish brown, dorsally brown; arista dorsally branched. Facial background brown with yellowish and silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face covered medially with silvery gray microtomentum and yellowish microtomentum, appearing striped. Gena dorsally with dense, silvery gray microtomentum, ventrally shiny black; postgena dorsally with dense, silvery gray microtomentum, ventrally shiny black. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax** (Figure 155): Scutal length 0.45–0.54 mm; scutellar length 0.17–0.22 mm. Mesonotum brown maculate and vitate with silvery gray microtomentum; medial stripe brown, broken with silvery gray microtomentum; silvery gray microtomentose stripe between medial stripe and dorsocentral line; dorsocentral line with silvery gray microtomentum with brown spots around bases of dorsocentral setae and prescutellar setulae; silvery gray microtomentose stripe between dorsocentral line and interalar setae; postpronotum dorsally brown, ventrally with silvery gray microtomentum; scutellum brown with dense, silvery gray microtomentum, slightly more dense posteromedially, laterally with dense, silvery gray microtomentum; anepisternum striped, having dense, silvery gray microtomentum on dorsal  $\frac{1}{4}$ , sparse band of silvery gray microtomentum on medial  $\frac{1}{2}$ , shiny black on ventral  $\frac{1}{4}$ ; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{1}{3}$ , shiny black on ventral  $\frac{2}{3}$ ; subscutellum brown with sparse, yellowish silver microtomentum; anatergite brown with sparse, yellowish silver microtomentum on dorsal  $\frac{2}{3}$ , ventral  $\frac{1}{3}$  shiny, bare. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 155): length 1.41–1.56 mm; width 0.68–0.76 mm; costal-vein ratio 0.79–0.93; M-vein ratio 0.35–0.48; maculate with white spots on amber background; veins brown except in white spots; crossveins white; spurious veins in white spots: anteriorly and posteriorly in  $r_1$  cell from C to vein  $R_{2+3}$ , posteromedially from  $R_{2+3}$ , ventrally from  $R_{4+5}$   $\frac{3}{4}$  distance from crossvein r-m between r-m and wing margin, posterior  $r_{2+3}$  cell between C and  $R_{4+5}$ , ventrally from M2 distance from dm-cu between r-m and

wing margin, posterior dm between vein  $R_{4+5}$  and  $CuA_1$ , ventrally from  $CuA_1$   $\frac{3}{4}$  distance between  $CuA_1$  and dm-cu. Halter yellowish white, knob slightly darker. Legs yellowish brown to dark brown; femora dark brown, distal  $\frac{1}{8}$  yellowish brown; fore- and hindtibia yellowish brown with medioproximal and mediolateral dark brown bands, midtibia yellowish brown with apical and distal ends yellowish brown; tarsi yellowish brown with tarsomere 5 brown.

**Abdomen** (Figures 66–68, 211, 212): Background brown with yellowish silver microtomentum; tergite 2 posterior mediolateral margins with dense, silvery gray microtomentum, medioventral spots of silvery gray microtomentum, lateral margins with dense, silvery gray microtomentum; tergite 3 posterior mediolateral margins with dense, silvery gray microtomentum, lateral margins with dense, silvery gray microtomentum; tergite 4 with irregular patches of dense, silvery gray microtomentum covering entire segment; tergite 5 with irregular patches of dense, silvery gray microtomentum covering entire segment. Male genitalia (Figures 66–68): epandrium-cerci-surstyli complex fused; epandrium a U-shaped dorsal band with rounded anterodorsal and anteroventral projections; cercus laterally fused with epandrium and bearing many long setulae; surstylus with numerous posteroventral setae and 4 prominent long anteroventral setae; 10<sup>th</sup> sternite well developed, triangular, and situated ventrad of cerci; aedeagal apodeme triangular in lateral view, lateral projections rounded, posterior projections broad with rounded ventral projections, anterior projec-



FIGURES 66–68.—Male genitalia of *Nostima maculata*, new species: 66, epandrium, cercus, fused surstylus, lateral aspect; 67, internal male genitalia, ventral aspect; 68, same, lateral aspect. Scale = 0.05 mm.



FIGURE 69.—Distribution map for *Nostima maculata*, new species.

tion broad with pointed lateral projections; aedeagus crescent-shaped in lateral view, heavily sclerotized, with undulate posterior margin; subepandrial plate-gonite-hypandrium fused; subepandrial plate articulating laterally with ventral epandrium, rounded posterodorsal projections almost meeting dorsad of aedeagus; gonite with broad base, posterior projection rounded and undulate with 2 minute setulae and prominent ventromedial setulae; hypandrium broadly triangular.

**TYPE MATERIAL.**—The holotype male of *Nostima maculata* is labeled “R[epublica].A[rgentina]. TUCUMAN La cavera 23/28-XI-951 [23–28 Nov 1951] Aczel-Golbach [top and left border with black line; handwritten]/HOLOTYPE ♂ *Nostima maculata* Edmiston & Mathis USNM [red].” The holotype is double mounted (minuten through the left thorax and attached to a cork), is in good condition (left wing in an attached microvial; abdomen in a second attached microvial), and is deposited in the USNM.

**OTHER SPECIMENS EXAMINED** (1 ♂, 4 ♀).—**ARGENTINA.** *Salta*: Urundel, 25–31 Oct 1950, R.M. Golbach (1 ♀; USNM). *Tucumán*: V. Padre Monti, Burruyacu, 17 Jan–7 Feb 1948, R.M. Golbach (1 ♀; USNM).

**BRAZIL.** *São Paulo*: Barueri, 8 Oct 1955, K. Lenko (1 ♂; USNM).

**DOMINICAN REPUBLIC.** *San Juan*: Arroyo Cano (7 km N; 1 km S Los Frios; 18°52′N, 71°01′W; 1120 m; pine forest, sec-

ond growth), 1 Sep 1995, J. Rawlins, G. Onore, R. Davidson (1 ♀; CARN).

**ECUADOR.** *Cotapaxi*: Quevedo (66 km E), 15 Jan 1978, W.N. Mathis (1 ♀; USNM).

**DISTRIBUTION** (Figure 69).—*Neotropical*: Argentina (Salta, Tucumán), Brazil (São Paulo), Ecuador (Cotapaxi), West Indies (Dominican Republic).

**ETYMOLOGY.**—The species epithet, *maculata*, is derived from the Latin adjective *macula*, meaning spotted, which is descriptive of the wings and abdomen.

**REMARKS.**—A maculate wing with spurious veins may be homologous for *N. ilytheoides*, *N. maculata*, and *N. slossonae*.

### 18. *Nostima magnifica*, new species

FIGURES 70–73, 156, 213, 214

**DIAGNOSIS.**—*Nostima magnifica* is distinguished from congeners by the following combination of external characters: mesonotum distinctly bicolored, with medial portion between dorsocentral setae unicolorous, chestnut brown to blackish brown, and area immediately laterad silvery white to gray; gray stripe not much wider than fronto-orbital stripe; crossveins r-m and dm-cu concolorous with veins; tergite 2 with dense, silvery gray microtomentose posterolateral spot; tergite 3 with 2 dense, silvery gray microtomentose posterolateral spots; tergite 4 with dense, silvery gray microtomentose lateromedial spot; and

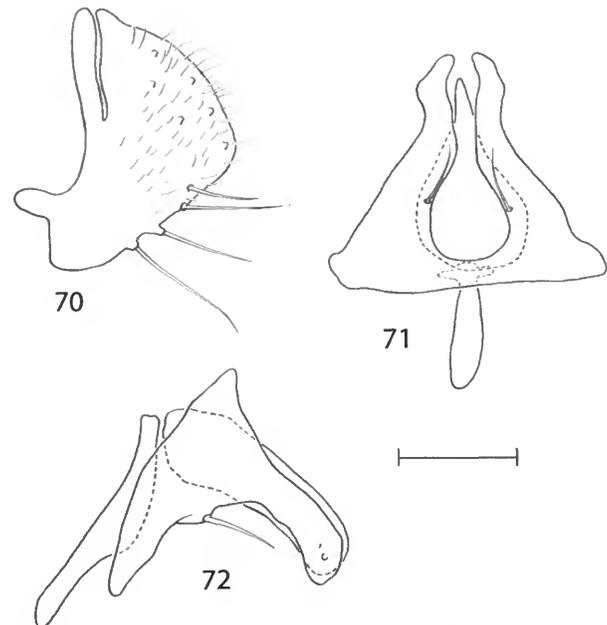
tergite 5 with dense, silvery gray microtomentose lateromedial spot.

**DESCRIPTION.**—Small shore flies, body length 1.04 mm; yellowish brown to dark brown with silvery gray and yellowish silver microtomentum.

**Head:** Frons with dark brown ventrolateral triangles, anterior semicircle brown with yellowish silver microtomentum, medioventrally slightly darker. Occiput ventrally shiny dark brown, dorsally with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paravertic seta absent. Scape and pedicel dorsally brown, ventrally yellowish brown; flagellomere 1 dorsally brown, ventrally yellowish brown; arista dorsally branched. Facial background brown to dark brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae and extending to gena. Medially along parafacial, a dark brown band extending lateroventrally below gena. Face medially covered with dense, silvery gray microtomentum, lateroventrally shiny dark brown. Gena covered dorsally with sparse, silvery gray microtomentum, ventrally shiny dark brown; postgena shiny dark brown with sparse, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax (Figure 156):** Scutal length 0.32 mm; scutellar length 0.10. Mesonotum medially brown with dense, yellowish silver microtomentum, slightly darker along dorsocentral line, with wide band of dense, silvery gray microtomentum laterally along dorsocentral line; scutellum dorsally brown with dense, yellowish silver microtomentum, laterally with dense, silvery gray microtomentum; anepisternum shiny brown with silvery gray microtomentum; katepisternum shiny brown with sparse, silvery gray microtomentum; subscutellum brown with sparse, yellowish silver microtomentum; anatergite brown with sparse, yellowish silver microtomentum. Chaetotaxy: 2 dorsocentral setae (posterior pair broken on single specimen); 2 notopleural setae (anterior seta broken on single specimen); lateral and apical scutellar setae (apical seta broken on single specimen). Wing (Figure 156): length 1.12 mm; width 0.44 mm; costal-vein ratio 1.50; M-vein ratio 0.27; amber background with yellowish brown veins and crossveins. Halter white. Legs yellowish brown; femora slightly darker distally; tarsomere 5 slightly darker.

**Abdomen (Figures 70–72, 213, 214):** Background yellowish brown to brown; tergites 1–3 yellowish brown with sparse, yellowish silver microtomentum; tergite 2 with dense, silvery gray microtomentose posterolateral spot; tergite 3 shiny brown with 2 dense, silvery gray microtomentose posterolateral spots; tergite 4 bare shiny brown with dense, silvery gray microtomentose lateromedial spot; tergite 5 bare shiny brown with dense, silvery gray microtomentose lateromedial spot. Male genitalia (Figures 70–72): epandrium-cerci-surstyli complex fused; epandrium a narrow dorsal band with rounded anterodorsal projection; cercus crescent-shaped, fused laterally with



FIGURES 70–72.—Male genitalia of *Nostima magnifica*, new species: 70, epandrium, cercus, fused surstylus, lateral aspect; 71, internal male genitalia, ventral aspect; 72, same, lateral aspect. Scale = 0.05 mm.

epandrium, separated dorsally from epandrium by V-shaped space; surstylus fused dorsally with epandrium, rounded with anterior projection, and bearing 4 long ventral setae; aedeagal apodeme triangular in lateral view, posterior projection rounded, anterior projection rounded, lateromedial projections pointed; subepandrial plate-gonite-hypandrium fused; subepandrial plate a narrow band; gonite with rounded posterior projection and prominent medioventral setula; hypandrium a small broad anterior projection from subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima magnifica* is labeled “ECUADOR Chimborazo Naranjapata Chilicay/16 June 1955 R Levi Castillo/HOLOTYPE ♂ *Nostima magnifica* Edmiston & Mathis USNM [red].” Specimen is glued by the left thorax to a paper point, is in good condition (right wing in an attached microvial; right side of abdomen and genitalia in a second attached microvial), and is deposited in the USNM.

**DISTRIBUTION (Figure 73).**—*Neotropical:* Ecuador (Chimborazo).

**ETYMOLOGY.**—The species epithet, *magnifica*, is of Latin derivation and is derived from *magnificus*, meaning noble, eminent, splendid. The name refers to the overall habitus of this magnificent species.

**REMARKS.**—The male genitalia and microtomentose pattern are unique among species of *Nostima*. The species is represented by the type specimen only.

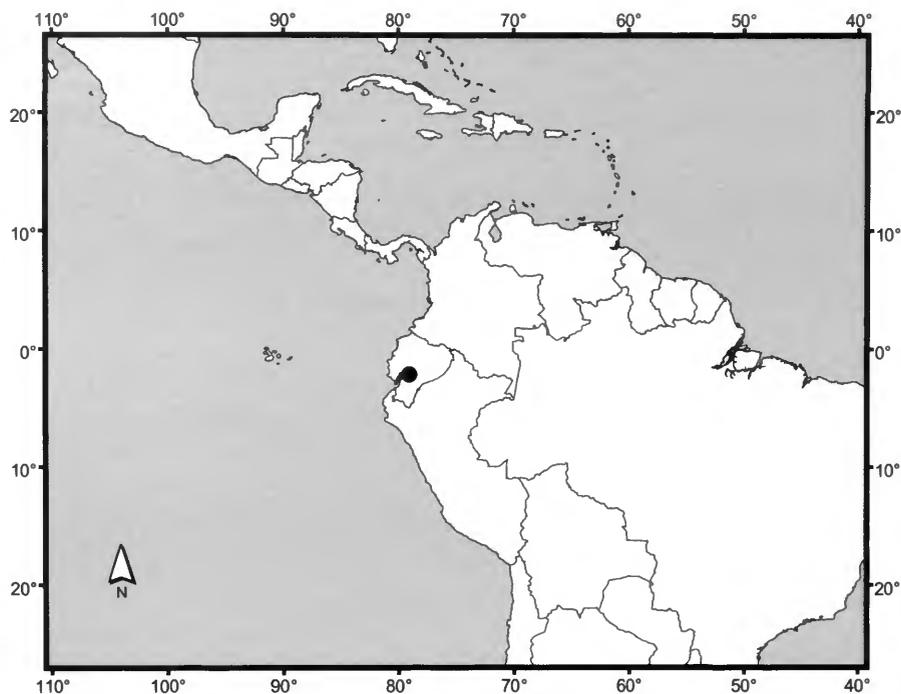


FIGURE 73.—Distribution map for *Nostima magnifica*, new species.

### 19. *Nostima melina*, new species

FIGURES 74–77, 157, 215, 216

**DIAGNOSIS.**—*Nostima melina* is distinguished from congeners by the following combination of external characters: paraverticlar seta present; gena brown with silvery gray microtomentum; mesonotum brown with yellowish silver microtomentum, lacking vittae; crossveins and veins unicolorous, not white; forefemur yellow; hindtibia banded; and tergites microtomentose, none shiny nor fasciate along posterior margin, tergites 3 and 4 with dense, silvery gray microtomentose posterolateral spot.

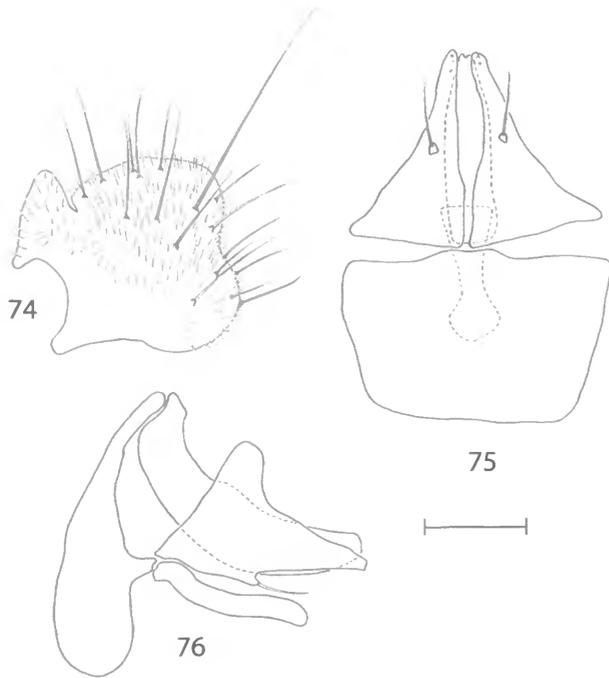
**DESCRIPTION.**—Small shore flies, body length 1.15–1.25 mm; yellowish brown, brown, to dark brown with yellowish silver, silvery gray, and silvery white microtomentum; legs yellow, apical tarsomeres yellowish brown.

**Head:** Frons with brown ventrolateral triangle with yellowish silver microtomentum, anterior semicircle brown with yellowish silver microtomentum. Occiput brown with yellowish silver microtomentum. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paraverticlar seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally. Facial background coloration yellowish brown with silver gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Gena brown with silvery gray microtomen-

tum; postgena brown with silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax (Figure 157):** Scutal length 0.42–0.46 mm; scutellar length 0.10–0.14 mm. Mesonotum brown with yellowish silver microtomentum; scutellum brown with yellowish silver microtomentum; anepisternum brown with yellowish silver microtomentum; katepisternum yellowish brown with sparse, yellowish silver microtomentum; subscutellum yellowish brown with sparse, yellowish silver microtomentum; anatergite yellowish brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 157): length 1.50–1.54 mm; width 0.61–0.62 mm; costal-vein ratio 1.21–1.30; M-vein ratio 0.22–0.26; amber background with pale brown veins and crossveins. Halter yellowish white. Legs yellowish brown; mid- and hindtibia with 2 dark bands; tarsomere 5 darker on all legs.

**Abdomen (Figures 74–76, 215, 216):** Background yellowish brown; tergites 1–5 covered with sparse, yellowish silver microtomentum. Male genitalia (Figures 74–76): epandrium-cerci-surstyli complex fused; epandrium a broad dorsal band with rounded anterodorsal projection and with rectangular anteroventral projection; cercus crescent-shaped, fused anteroventrally with epandrium, separated dorsally from epandrium by V-shaped space, and bearing many long setulae; surstylus fused dorsally with epandrium, rounded with anterior



FIGURES 74–76.—Male genitalia of *Nostima melina*, new species: 74, epanandrium, cercus, fused surstylus, lateral aspect; 75, internal male genitalia, ventral aspect; 76, same, lateral aspect. Scale = 0.05 mm.

projection, and bearing many long setae; aedeagal apodeme oval-shaped in lateral view, with broadly rounded anterior projection, pointed ventromedial projection, and narrowly rounded posterior projection; aedeagus crescent-shaped in lateral view with small C-shaped tip in ventral view; subepandrial plate-gonite fused; subepandrial plate reduced to small posterior margin of gonite and with rounded dorsal projections; gonite with broad base, posterior projection rectangular in lateral view and bearing prominent ventromedial setula; hypandrium a broad rectangular plate in ventral view, folded ventrad of gonites in dried specimens.

**TYPE MATERIAL.**—The holotype male of *Nostima melina* is labeled “KobbeBeach C[anal].Z[one]. July 1967 W. W. Wirth/HOLOTYPE ♂ *Nostima melina* Edmiston & Mathis USNM [red].” The holotype is double mounted (minuten inserted through the right thorax anterior of halter), is in excellent condition (abdomen slightly shriveled), and is deposited in the USNM.

**OTHER SPECIMENS EXAMINED (7♂, 5♀).**—BOLIVIA. *La Paz*: Chulumani (2 km S; 16°23.5'S, 67°31.8'W; 1750 m), 9–10 Mar 2001, W.N. Mathis (1♀; USNM).

**COSTA RICA.** *Alajuela*: Peñas Blancas (10°18'N, 84°46'W), 18 Aug 1986, L. Masner (1♀; CNC). *Guanacaste*: Bagaces (10°21'N, 85°20'W; Malaise trap), 20 Jul–18 Aug 1999, I. Jiménez Morera (1♀; INBIO); 11 Nov–8 Dec 1999, I. Jiménez Morera (1♂; INBIO); Bagaces (10°22'N, 85°22'W; Malaise

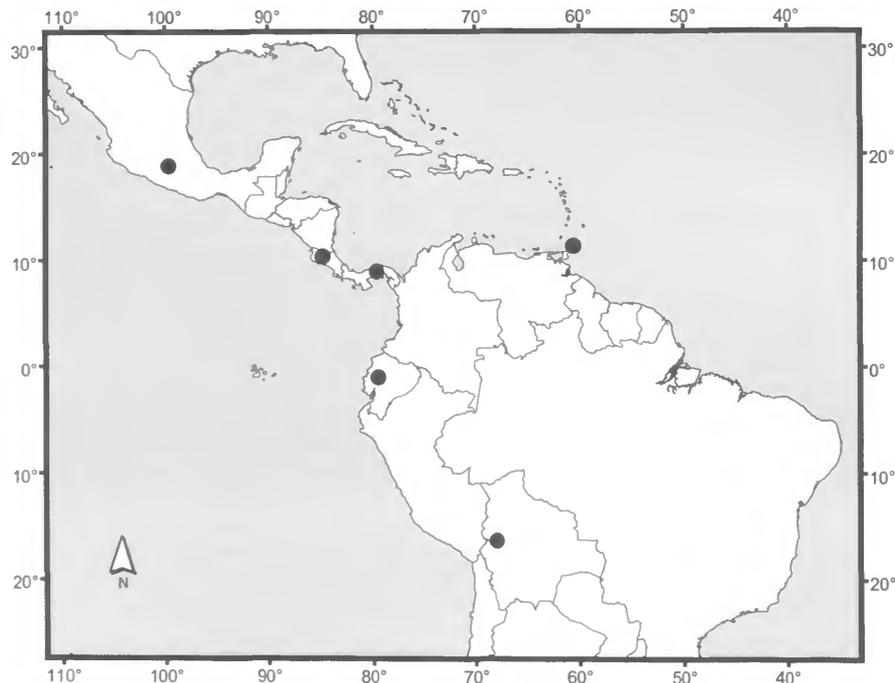


FIGURE 77.—Distribution map for *Nostima melina*, new species.

trap), 13 Sep–6 Oct 1999, I. Jiménez Morera (4♂; INBIO). *Puntarenas*: Coto Brus, Sabalito (8°53'N, 82°46'W), 28 Dec 1995, E. Navarro (1♀; INBIO).

ECUADOR. *Manabi*: Pichilingue, Mar 1958, M.R. Wheeler (1♂; USNM).

MEXICO. *México*: Ixtapan de la Sal (24 km S), 1 Aug 1962, N. Marston (1♀; KANS).

TRINIDAD AND TOBAGO. *Tobago*: Roxborough, Parlatuvier Road (Cacao plantation at 2<sup>nd</sup> milestone), 14 Oct 1937, J. Smart (1♂; BMNH).

DISTRIBUTION (Figure 77).—*Neotropical*: Bolivia (La Paz), Costa Rica (Alajuela), Ecuador (Manabi), Mexico (México), Panama (Canal Zone), Tobago.

ETYMOLOGY.—The species epithet, *melina*, is derived from the Latin adjective *melinus*, meaning quince yellow. The name refers to the honey-colored body.

REMARKS.—*Nostima melina* is one of the few species of the genus in this revision lacking microtomentose ornamentation on the abdominal tergites.

## 20. *Nostima negruzca*, new species

FIGURES 78–81, 158, 217, 218

DIAGNOSIS.—*Nostima negruzca* is distinguished from congeners by the following combination of external characters: frons with areas laterad of ocellar triangle shiny black, essentially bare of microtomentum; gena bare, shiny ventrally; mesonotum unicolorous, black; scutellum with dense microtomentum, appearing velvety black; veins and crossveins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler than other veins but not white; and tergite 5 with silvery gray microtomentose posterolateral spot.

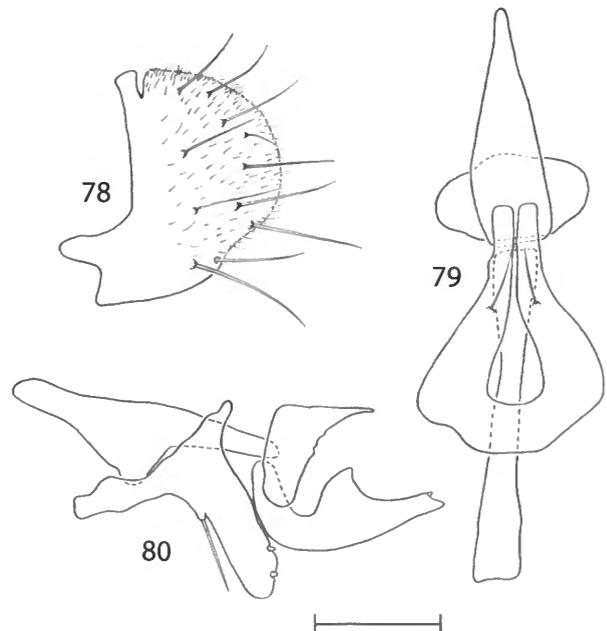
DESCRIPTION.—Minute to small shore flies, body length 0.95–1.21 mm; yellowish brown, brown, to black with silvery gray and yellowish silver microtomentum.

*Head*: Frontal height 0.06–0.09 mm; frontal width 0.24–0.26 mm; frons with shiny black ventrolateral triangles, anterior semicircle shiny black with medioventral band of sparse, silvery gray microtomentum between ocelli and frontal suture. Occiput ventrally shiny black, dorsally with sparse, silvery gray microtomentum. Outer vertical seta ½ length of inner vertical seta; paraverticilar seta absent. Scape and pedicel black; flagellomere 1 black dorsally, ventrally yellowish brown; arista dorsally branched. Facial background shiny black with sparse, silvery gray microtomentum. Parafacial shiny black; narrow band of silvery gray microtomentum along eye margin between ocelli and frontal suture. Face shiny black, medially with silvery gray microtomentum. Gena shiny black; postgena shiny black. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 158): Scutal length 0.34–0.38 mm; scutellar length 0.12–0.15 mm. Mesonotum shiny black with sparse, yellowish silver microtomentum, posterolateral margin with

silvery gray microtomentose base contiguous with dense, silvery gray microtomentum on lateral scutellum, posteromedial margin with velvety black microtomentum contiguous with velvety black microtomentum on scutellum; scutellar disc densely microtomentose, appearing velvety black, basolaterally with silvery gray microtomentum; anepisternum shiny black; katepisternum anterior ⅓ shiny black, posterior ⅓ with dense, silvery gray microtomentum; subscutellum shiny black with sparse, yellowish silver microtomentum; anatergite shiny black with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta ½–⅔ length of posterior seta; posterior notopleural seta absent; lateral scutellar seta ¼ length of apical seta. Wing (Figure 158): length 0.99–1.06 mm; width 0.38–0.44 mm; costal-vein ratio 1.05–1.10; M-vein ratio 0.17–0.20; amber background; veins brown, crossveins r-m and dm-cu slightly paler, M vein from below c to posterior dm-cu and ventral r-m pale brown. Halter white. Legs yellow to yellowish brown; femora yellow, pale yellowish brown distally; fore- and midtibia yellow, pale yellowish brown distally; hindtibia yellowish brown, darker distally; foretarsus yellow with tarsomere 1 yellowish brown; mid- and hindtarsi yellow with tarsomere 5 yellowish brown.

*Abdomen* (Figures 78–80, 217, 218): Background shiny black; tergites 1–3 with sparse, yellowish silver microtomentum; tergite 4 bare; tergite 5 with silvery gray microtomentose posterolateral spot. Male genitalia (Figures 78–80): epandrium-cerci-surstyli complex fused; epandrium a narrow dorsal band



FIGURES 78–80.—Male genitalia of *Nostima negruzca*, new species: 78, epandrium, cercus, fused surstyli, lateral aspect; 79, internal male genitalia, ventral aspect; 80, same, lateral aspect. Scale = 0.05 mm.

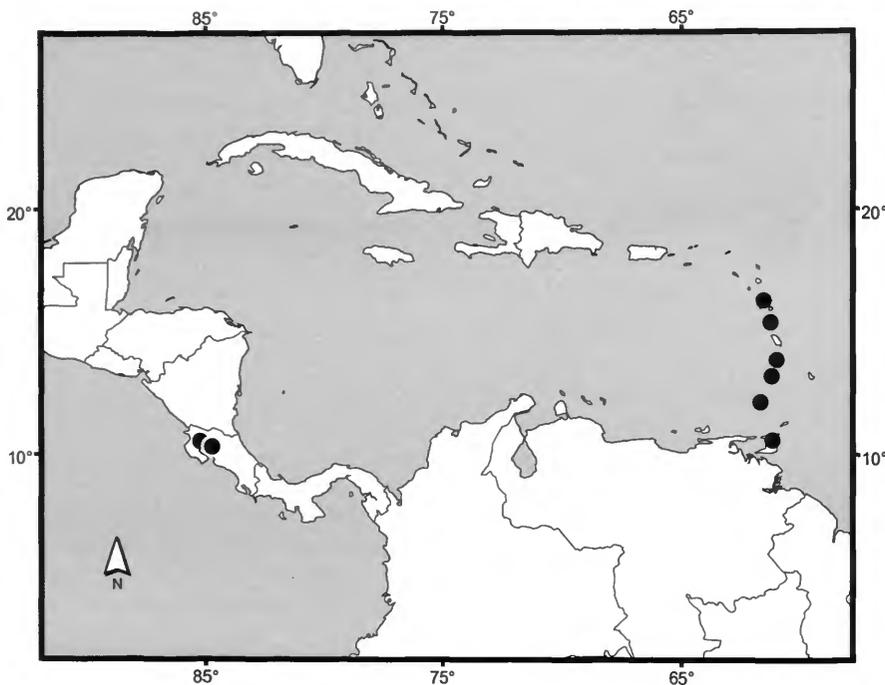


FIGURE 81.—Distribution map for *Nostima negruzca*, new species.

with rounded anteroventral projection; cercus crescent-shaped with many long setulae, fused laterally with epandrium, separated dorsally from epandrium by V-shaped space; surstylus reduced to small rounded projection with anterior projection; 10<sup>th</sup> sternite triangular in lateral view; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection rectangular; aedeagus with rounded posterior projection and rounded triangular mediodorsal projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate broad; gonite with broad rectangular posterior projections having 2 small cone-shaped setulae and a prominent medioventral setula, gonite with rounded dorsomedial projection; hypandrium broad, short, and anteriorly fused with subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima negruzca* is labeled "GRENADA. St. John: Concord Falls[,] 12°07.1'N, 61°43'W, 12 Sep 1997, WNMathis/HOLOTYPE ♂ *Nostima negruzca* Edmiston & Mathis USNM [red]." The holotype is glued by the legs to a paper point, is in fair condition (right and left foretarsus, right and left midtarsus, right hindleg, and left arista missing; right wing in an attached microvial; abdomen in a second attached microvial), and is deposited in the USNM. Seventeen paratypes (17♂; USNM) bear the same locality data as the holotype. Other paratypes are as follows: GRENADA. *St. Andrew*: Grand Étang (12°05.6'N, 61°41.7'W; lake), 14 Sep 1997, W.N. Mathis (1♀; USNM). *St. John*: Concord Falls (12°07.7'N, 61°43'W), 12 Sep 1997, V. Hollmann (2♂, 2♀; ZMHU). ST. VINCENT. *Charlotte*: Montreal (13°12'N,

61°11'W), 26 Mar–3 Sep 1989, 1991, 1997, D. and W.N. Mathis (5♂, 7♀; USNM). *St. Andrew*: Camden Park, 25 Mar 1989, W.N. Mathis (4♂, 4♀; USNM). *St. Patrick*: Palmiste Park, upper Rutland River (13°12.7'N, 61°14.9'W), 5 Sep 1997, W.N. Mathis (3♂, 1♀; USNM, ZMHU).

**OTHER SPECIMENS EXAMINED** (8♂, 10♀).—COSTA RICA. *Alajuela*: Peñas Blancas (10°18'N, 84°46'W), 18 Aug 1986, L. Masner (2♀; CNC); San Carlos, Fortuna (10°26'N, 84°43'W; Malaise trap), 1 Oct–26 Oct 1999, G. Carballo (1♀; INBIO). *Guanacaste*: Bagaces (10°22'N, 85°22'W; Malaise trap), 4 Jun–6 Jul 1999, I. Jiménez Morera (1♀; INBIO); Finca Loaiciga (6 km S Santa Cecilia; 500 m), 14 Oct 1992, P. Ríos (1♂; INBIO); La Cruz, Santa Cecilia (10°59'N, 85°25'W), 4 Nov 1991, D. Garcia (1♂; INBIO); La Cruz, Santa Elena (10°54'N, 85°43'W), 10 Sep 1993, F. Quesada (1♂; INBIO).

**DOMINICA.** Clarke Hall (Malaise trap), 11–20 Jan 1965, W.W. Wirth (1♀; USNM), 16 Feb 1965, W.W. Wirth (1♀; USNM), 21–31 Mar 1965, W.W. Wirth (2♀; USNM).

**GAUDELLOUPE.** Lamentin, Ravine Chaude, 25–30 Nov 2001, M. Martinez (3♂, 2♀; MART).

**ST. LUCIA.** Fond St. Lacques (13°50'N, 61°02'W), 13–14 Jun 1991, D. and W.N. Mathis (1♂; USNM).

**TRINIDAD AND TOBAGO.** *Trinidad*: Arena Forest, 7 Feb 1955, T.H.G. Aitken (1♂; USNM).

**DISTRIBUTION** (Figure 81).—*Neotropical*: Costa Rica (Alajuela, Guanacaste), Trinidad, West Indies (Dominica, Grenada, Guadeloupe, St. Lucia, St. Vincent).

ETYMOLOGY.—The species epithet, *negruzca*, is named for its very dark coloration and is derived from the Spanish word *negruzca*, meaning blackish.

REMARKS.—The collection records indicate that *N. negruzca* may be a Caribbean endemic.

### 21. *Nostima nitidigaster* Cresson

FIGURES 82, 159, 219, 220

*Nostima (Philygriola) nitidigaster* Cresson, 1947:43.—Wirth, 1968:17 [Neotropical catalog].—Mathis and Zatwarnicki, 1995:192 [world catalog].

DIAGNOSIS.—*Nostima nitidigaster* is distinguished from congeners by the following combination of external characters: frons densely microtomentose, mesofrons velvety black, fronto-orbits silvery gray; gena with silvery gray microtomentum; mesonotum shiny yellowish brown; scutellum velvety dark brown; veins and crossveins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler in color than other veins but not white; setae on tergites dorsally erect, long, especially on tergites 2 and 3; tergite 4 elongate, more than 2 times combined length of tergites 2 and 3; and abdomen lacking microtomentose spots.

DESCRIPTION.—Very small shore flies, body length 1.01–1.30 mm; yellowish brown to dark brown with yellowish silver and silvery gray microtomentum.

Head: Frons with velvety brown ventrolateral triangles, anterior semicircle brown with yellowish silver microtomen-

tum. Occiput with yellowish silver microtomentum; posterior margin of eye shiny dark brown. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, darker dorsally; arista dorsally branched. Facial background coloration brown with golden microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at antennae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face dark yellowish brown with silvery gray microtomentum. Gena covered with silvery gray microtomentum; postgena covered with sparse, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

Thorax (Figure 159): Scutal length 0.39–0.41 mm; scutellar length 0.12–0.13 mm. Mesonotum background shiny yellowish brown with sparse, golden microtomentum, medial line slightly darker, and slightly darker along supra-alar line; scutellum velvety dark brown, laterally with dense, silvery gray microtomentum; anepisternum shiny yellowish brown; katepisternum yellowish brown with silvery gray microtomentum; subscutellum shiny yellowish brown with sparse, silvery gray microtomentum; anatergite shiny yellowish brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{4}$  length of apical seta. Wing (Figure 159): length 1.11–1.15 mm; width 0.43–

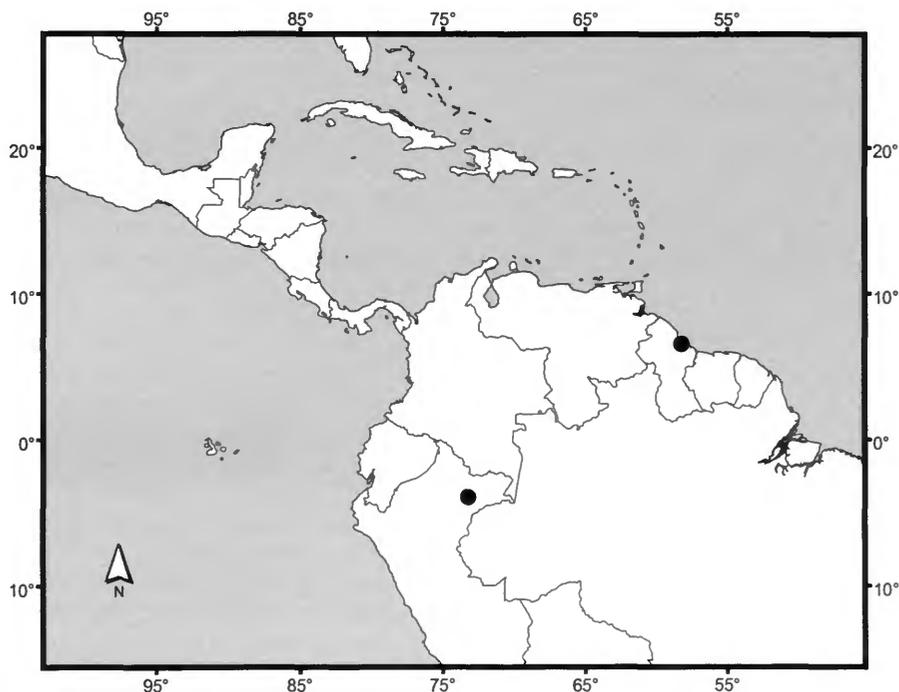


FIGURE 82.—Distribution map for *Nostima nitidigaster* Cresson.

0.46 mm; costal-vein ratio 0.86–0.92; M-vein ratio 0.23–0.26; background amber with light brown veins and crossveins. Halter yellowish white. Legs light yellowish brown, with tarsomere 5 slightly darker.

**Abdomen** (Figures 219, 220): Background shiny dark brown to black; tergite 2 bearing 2 long posteromedial setae, tergite 1 setulae longer than posterior scutellar setae; tergites 1–3 with very sparse dusting of yellowish microtomentum; tergites 2 and 3 reduced; tergite 4 elongate. Male unknown.

**TYPE MATERIAL.**—The holotype female of *Nostima nitidigaster* Cresson is labeled "Iquitos[.]Peru[.] MarApr 1931 RCS-hannon/TYPER No. Nostima nitidigaster E.T.Cresson, Jr. [red; species name handwritten]/Type No 70629 USNM [red; number handwritten]." The holotype is double mounted (glued to a paper point), is in fair condition (right wing and abdomen removed and dissected, parts in an attached microvial; left antenna missing, flagellomere 1 and arista of right antenna missing), and is deposited in the USNM (70629).

**OTHER SPECIMEN EXAMINED** (1 ♀).—GUYANA. Ceiba (~40 km S Georgetown; 6°29.9'N, 58°13.1'W), 21 Apr 1995, W.N. Mathis (1 ♀; USNM).

**DISTRIBUTION** (Figure 82).—*Neotropical*: Guyana, Peru (Loreto).

**ETYMOLOGY.**—Cresson named *N. nitidigaster* from the Latin words *nitidus*, meaning shiny, and *gaster*, meaning belly, to describe the shiny abdomen.

**REMARKS.**—Like many species of *Nostima*, our sampling of this species is woefully inadequate, making its distribution appear rather disjunct. The true distribution will undoubtedly be larger when sampling is more geographically complete.

## 22. *Nostima niveivenosa* Cresson

FIGURES 83–86, 160, 221, 222

*Nostima niveivenosa* Cresson, 1930b:80; 1941:7 [revision]; 1947:41 [compared with *N. spilogaster*]; 1948:253 [compared with *Hyadina albovenosa*].—Wirth, 1956:15 [Bahamas record]; 1965:745 [Nearctic catalog]; 1968:17 [Neotropical catalog].—Lizarralde de Grosso, 1989:53 [review, Argentina].—Mathis and Zlatwornicki, 1995:192 [world catalog].  
*Nostima (Nostima) niveivenosa*.—Cresson, 1947:41 [review].

**DIAGNOSIS.**—*Nostima niveivenosa* is distinguished from congeners by the following combination of external characters: crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; hindtibia banded; tergite 2 with sparse, silvery gray microtomentose posteromedial band; tergite 3 with microtomentose posterolateral band extending anterolaterally to anterior margin; tergite 4 with dense, silvery gray microtomentose dorso-medial and posterolateral spots; and tergite 5 mediodorsal ½ covered with dense, silvery gray microtomentose band tapering to an anteromedial point.

**DESCRIPTION.**—Minute to small shore flies, body length 0.90–1.15 mm; yellowish brown, brown, to dark brown with silvery gray, yellowish silver, and golden microtomentum.

**Head:** Frons with brown ventrolateral triangles covered with sparse, yellowish silver microtomentum, anterior semicircle pale brown with sparse, yellowish silver microtomentum, darker medioventrally. Occiput dark brown with silvery gray microtomentum, sparse ventrally. Outer vertical seta ½–⅔ length of inner vertical seta; paravertical seta minute. Scape yellowish brown; pedicel yellowish brown on posterior ⅔, brown on anterior ⅓; flagellomere 1 brown dorsally, yellowish brown ventrally; arista dorsally branched. Facial background yellowish brown with yellowish silver, silvery gray, and golden microtomentum; narrow band of golden microtomentum along eye margin beginning at vertical setae, extending along eye margin, and extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face covered medially with dense, golden microtomentum. Gena covered with dense, silvery gray microtomentum; postgena covered with silvery gray microtomentum, not as dense as genal microtomentum. Maxillary palpus yellow; prementum yellowish brown.

**Thorax** (Figure 160): Scutal length 0.30–0.40 mm; scutellar length 0.12–0.17 mm. Mesonotum postsutural region faintly vittate with same pattern as presutural region, presutural region distinctly vittate, medially brown, laterally bounded with silvery gray bands; dorsocentral line brown; silvery gray microtomentous stripe between dorsocentral line and interalar setae; scutellum brown with silvery gray microtomentum, laterally with dense, silvery gray microtomentum; anepisternum shiny brown with silvery gray microtomentum, sparse on dorsal ¼; katepisternum shiny brown with silvery gray microtomentum, sparse ventrally; subscutellum brown with silvery gray microtomentum; anatergite dark brown with silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta ⅔ length of posterior seta; anterior notopleural seta ⅔–¾ length of posterior seta; lateral scutellar seta ½–½ length of apical seta. Wing (Figure 160): length 0.93–1.10 mm; width 0.41–0.50 mm; costal-vein ratio 1.05–1.42; M-vein ratio 0.53–0.66; amber background; veins amber, except crossveins r-m and dm-cu white; slightly darker anteriorly in cells r<sub>1</sub>, r<sub>2+3</sub>, and br; slightly darker along M vein between crossveins r-m and dm-cu; crossveins r-m and dm-cu centered within white oval-shaped spots. Halter yellowish white. Legs yellow, yellowish brown, to brown; femora yellowish brown; fore- and midtibia yellowish brown; hindtibia faintly banded, medially yellowish brown, paler proximally and distally; tarsi yellowish brown with tarsomere 5 dark yellowish brown.

**Abdomen** (Figures 83–85, 221, 222): Background yellowish brown; tergites 1–5 shiny yellowish brown with sparse, yellowish silver microtomentum; tergite 2 with sparse, silvery gray microtomentose posteromedial band and with microtomentose posterolateral band extending anterolaterally to anterior margin; tergite 3 with microtomentose posterolateral band extending anterolaterally to anterior margin; tergite 4 with dense, silvery gray microtomentose circular-shaped dorso-

medial spots, posterolaterally with dense, silvery gray microtomentose spots; tergite 5 with mediodorsal ½ covered with dense, silvery gray microtomentose band tapering to anteromedial point. Male genitalia (Figures 83–85): epandrium and surstylus fused, cerci separate from epandrium-surstylus, not forming a single, mostly to completely fused complex; epandrium a well-developed, inverted U-shaped band, evenly wide across dorsum, anteroventral margin (at merger with wide base of surstylus) with rounded projection to which apical arm of hypandrium and lateral portion of subepandrial plate meet; cercus broadly crescent-shaped, bearing long setulae; surstylus elongate in lateral view with apical portion rectangular, ventral margin with four short cone-shaped setae; 10<sup>th</sup> sternite well developed, triangular, situated ventrad of cercus; subepandrial plate an arch dorsad of aedeagus, widely and shallowly V-shaped in dorsal view, articulated laterally with epandrium and fused laterally with apex of lateral hypandrial arm; aedeagal apodeme elongate, triangular, posterior projection spatulate with pointed lateral projections, anterior projection narrowly pointed, lateral projections pointed; aedeagus in lateral view about as long as wide, with base more heavily sclerotized and sinuous, extending posterior portion broadly rounded, in posterior view higher than wide, somewhat saddle-shaped; gonite in lateral view with narrow base, thereafter apically broadened with rounded dorsal margin, apical portion with 2 pointed projections, the 2<sup>nd</sup> projection longer, projections in lateral view forming a serrate or crenulate apical margin, also with ventrolateral projection bearing a seta; hypandrium in ventral view with rounded anterior projections, thereafter posteriorly narrowing then extending further posteriorly as 1 medial and 2 lateral arms, medial arm extending ventrally to aedeagal apodeme, lateral arms extending with apices fused to lateral extensions of subepandrial plate.

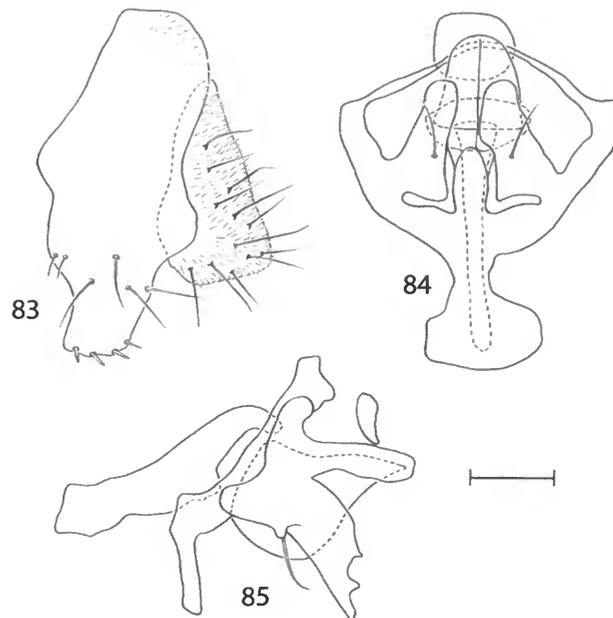
**TYPE MATERIAL.**—The holotype female of *Nostima niveivenosa* Cresson is labeled “Aguadilla Jan 1899/Porto Rico Aug Busck/Type No. 21850 [handwritten] U.S.N.M. [red]/TYPE No. Nostima [handwritten] NIVEIVENOSA [handwritten] E. T. Cresson, Jr. [red].” The holotype is glued by the left thorax to a paper point, is in good condition (dusty; right wing broken, flagellomere 1 missing, and many setae broken), and is deposited in the USNM.

**OTHER SPECIMENS EXAMINED** (91 ♂, 104 ♀).—ANTIGUA. “Sweeping Prison Cotton,” 17 Feb 1908, H A B (1 ♂; ANSP).

**BAHAMAS.** Long Island, Deadman’s Cay, 11 Mar 1953, E.B. Hayden (1 ♀; AMNH). Turks and Caicos Islands, South Caicos Island, 11 Feb 1953, E.B. Hayden, G.B. Rabb (1 ♀; AMNH).

**BARBADOS.** *Christchurch*: Rockley Beach (13°04.4′N, 59°35.3′W), 2 Sep 1997, V. Hollmann, W.N. Mathis (3 ♂, 1 ♀; USNM, ZMHU). *St. Joseph*: Joes River (13°12.8′N, 59°32.3′W), 10 Sep 1996, W.N. Mathis (1 ♀; USNM).

**BELIZE.** *Stann Creek*: Salt Creek (12 km N Dangriga), 28 Mar 1988, W.N. Mathis (1 ♀; USNM).



FIGURES 83–85.—Male genitalia of *Nostima niveivenosa* Cresson: 83, epandrium, cercus, fused surstylus, lateral aspect; 84, internal male genitalia, ventral aspect; 85, same, lateral aspect. Scale = 0.05 mm.

**BOLIVIA.** *La Paz*: Chulumani (2 km S; 16°23.5′S, 67°31.8′W; 1750 m), 9–10 Mar 2001, W.N. Mathis (3 ♂, 5 ♀; USNM); Guanay (3 km E; 15°30.2′S, 67°52.3′W; 500 m), 14 Mar 2001, W.N. Mathis (1 ♂; USNM); Guanay (1 km E; 15°30.2′S, 69°52.3′W; 500 m), 13 Mar 2001, S.D. Gaimari (1 ♀; USNM).

**BRAZIL.** *Rio de Janeiro*: Grajahu, 20 Aug 1938, S. Lopes (1 ♀; ANSP); Ilha de Marambaia (23°03.6′S, 43°59.1′W), 4 Sep 2000, D. and W.N. Mathis (2 ♂; USNM).

**COLOMBIA.** *Antioquia*: Medellín (30 km NW; 2440 m), Feb 1958, M.R. Wheeler (1 ♂, 3 ♀; USNM).

**COSTA RICA.** *Alajuela*: Peñas Blancas (10°18′N, 84°46′W), 18 Aug 1986, L. Masner (1 ♀; CNC). *Cartago*: La Suiza, 21 Apr–Aug 1921, P. Schild (7 ♂, 6 ♀; ANSP, HNHM, USNM). *Guanacaste*: Liberia (10°46′N, 85°18′W), 5 Nov 2001, D. Bruceño (1 ♀; INBIO). *Heredia*: Santo Domingo, INBio Parque (9°58.4′N, 84°5.6′W), 14 Jun 2003, J. Edmiston, D. and W.N. Mathis (1 ♂; USNM). *Puntarenas*: Dominical (9°14.8′N, 83°51.4′W; beach), 11–12 Jun 2003, J. Edmiston, D. and W.N. Mathis (4 ♂, 6 ♀; USNM); Playa Jacó (9°36.5′N, 84°37.4′W; beach), 13 Jun 2003, J. Edmiston, D. and W.N. Mathis (4 ♂, 3 ♀; USNM); Río Surubres, Bonefil Farm (245 m), 20 Oct 1909, P.P. Calvert (1 ♀; ANSP). *San José*: La Caja (8 km W), 1930, H. Schmidt (1 ♂; USNM); Punta Rincón (5 km S; 8°42.1′N, 83°30.8′W; 95 m), 10–11 Aug 2001, D. and W.N. Mathis (8 ♂, 5 ♀; USNM).

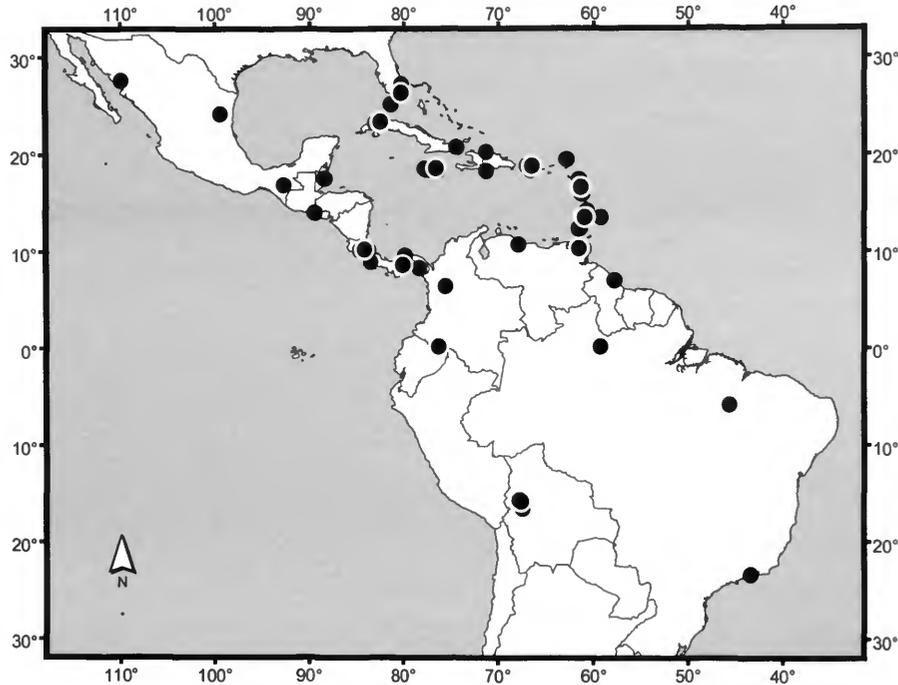


FIGURE 86.—Distribution map for *Nostima niveivenosa* Cresson.

**CUBA.** *Guantánamo:* Baracoa (30 km SE, Manzo Abaja, village between La Maquina and Sabano), 26 Feb 1992, M. von Tschirnhaus (3♂, 4♀; UBZI). *Havana:* San Antonio de los Baños (22°54.9'N, 82°29.3'W), 8 Dec 1994, W.N. Mathis (1♂; USNM). *Pinar del Rio:* Soroa (22°47.7'N, 83°W), 4–6 Dec 1994, W.N. Mathis (3♂, 4♀; USNM); Soroa (2 km NW; 22°48.6'N, 83°1.0'W), 4–5 Dec 1994, W.N. Mathis (1♂, 1♀; USNM).

**DOMINICA.** Cabrit Swamp (15°35'N, 61°29'W), 22 Mar 1989, W.N. Mathis (4♂, 1♀; USNM). Clarke Hall Estate (at light), Jun 1964, O.S. Flint, Jr. (1♀; USNM); 3 Jun 1966, G.C. Steyskal (1♂; USNM); 6 Jun 1966, G.C. Steyskal (1♀; USNM).

**DOMINICAN REPUBLIC.** *Pedernales:* Las Abejas cloud forest (30 km N Cabo Rojo; 18°09'N, 71°38'W; 1300 m), 17–19 Jan 1989, 1999, L. Masner, J.E. Swann (3♂, 7♀; CNC, USNM).

**ECUADOR.** *Orellana:* Rio Tiputini (0°38.2'S, 76°8.9'W), 12–26 Aug 1999, W.N. Mathis, A. Baptista, M. Kotrba (1♂; USNM).

**EL SALVADOR.** *La Libertad:* Santa Tecla, Oct 1965, N.L.H. Krauss (1♀; USNM). *San Salvador:* San Salvador, 2 Jun 1958, L.J. Bottimer (1♀; USNM). *Santa Ana:* Lago de Coatepeque, Oct 1953, W.B. Heed (1♀; USNM).

**GRENADA.** *St. Andrew:* Grand Étang (12°05.6'N, 61°41.7'W; lake), 14 Sep 1997, W.N. Mathis (3♂, 3♀; USNM). *St. George:* Point Salinas Airport (12°0.3'N, 61°47.7'W), 12

Sep 1997, W.N. Mathis (1♂; USNM). *St. John:* (12°07.1'N, 61°43'W), 12 Sep 1997, W.N. Mathis (1♀; USNM).

**GUADELOUPE.** Lamentin, Ravine Chaude, 25–30 Nov 2001, M. Martinez (1♀; MART).

**GUYANA.** Georgetown (6°48.6'N, 58°8.6'W; 340 m), 20–29 Aug 1997, W.N. Mathis (4♂, 1♀; USNM).

**HONDURAS.** *Francisco:* Valle de Angeles (14°9.4'N, 87°2.4'W), 29 Sep 1995, D. and W.N. Mathis (1♀; USNM).

**JAMAICA.** *Manchester:* Mandeville (18°03.5'N, 77°31.9'W), 7–13 May 1996, D. and W.N. Mathis, H.B. Williams (1♂; USNM); near Mandeville (18°03.5'N, 77°31.9'W), 15–18 Apr 2000, W.N. Mathis (1♀; USNM). *Portland:* Crystal Springs (18°12.5'N, 76°37.9'W), 18 May 1996, D. and W.N. Mathis, H.B. Williams (1♂; USNM); Reach (4 km N; 18°03.6'N, 76°20.4'W), 15 May 1996, D. and W.N. Mathis, H.B. Williams (2♂; USNM). *St. Andrew:* Clydesdale (black light), 4–9 Dec 1975, G.F. Hevel (1♂; USNM). *St. Elizabeth:* Ys Falls (18°09.3'N, 77°49.5'W), 17–18 Apr 2000, W.N. Mathis (1♀; USNM). *St. Thomas:* Bath River, Bath (17°56.8'N, 76°21.6'W), 16 May 1996, D. and W.N. Mathis, H.B. Williams (1♀; USNM).

**MEXICO.** *Chiapas:* Puenta Macalapa (“light trap”), 22 May 1964, F.S. Blanton (1♂; USNM). *Guerrero:* Guerrero (8 km S; 4 km E Chilpancingo), 6 Aug 1962 (1♂; KANS). *Morelos:* Yautepec (12 km S), 15 Aug 1962, N. Marston (1♂; KANS). *Nuevo Leon:* Monterrey (32 km S), 7 Nov 1946, F.E. Skinner (2♂, 4♀; CAS). *Sonora:* Navjoa (16 km E; light

trap), 13 Aug 1959, F. Werner, Nutting (1♂, 1♀; USNM). *Tamaulipas*: Ciudad Victoria (10 km N), 17 Nov 1948, E.S. Ross (1♀; CAS); Forlon, 30 Sep 1938, L.J. Lipovsky (1♀; KU).

PANAMA. *Canal Zone*: Fort Gulick, 21 Aug 1952, F.S. Blanton (1♀; USNM); Kobbe Beach (mangrove), Jul 1967, W.W. Wirth (1♂; USNM). *Cocle*: Playa Santa Clara, 2 Jul 1967, W.W. Wirth (1♀; USNM). *Darien*: Garachine, Feb 1953, F.S. Blanton (1♀; USNM).

PUERTO RICO. Arecibo (18°28.7'N, 66°42'W; beach), 23 Sep 1995, D. and W.N. Mathis (1♀; USNM). Camp Tortuguero, 24 Jun 1952, F.S. Blanton (1♀; USNM). Isabela, Guajataca Forest, 22 Jun 1955, J.A. Ramos, J. Maldonado-Capriles (4♀; USNM). Playa de Guayanilla (18°0.4'N, 66°46.1'W), 19 Sep 1995, D. and W.N. Mathis (11♂, 7♀; USNM). Quebrada Grande (Caribbean National Forest, road 186; 18°18'24"N, 66°50'W; 450 m), 25 Jun 2002, N.E. Woodley (1♀; USNM). Yauco-Lares Road (km 22), 18 Jul 1953, J.A. Ramos, J. Maldonado-Capriles (1♂; USNM).

ST. LUCIA. Fond St. Jacques (13°50'N, 61°02'W), 13–14 Jun 1991, D. and W.N. Mathis (1♂, ♀; USNM).

ST. MARTIN. Paradise Peak, 11 Feb 1978, S.A. Marshall (2♀; CNC).

ST. VINCENT. *Charlotte*: Montreal (13°12.6'N, 61°11.3'W), 3 Sep 1997, W.N. Mathis (1♂; USNM). *St. Patrick*: Palmiste Park, upper Rutland River (13°12.7'N, 61°14.9'W), 5 Sep 1997, V. Hollmann, W.N. Mathis (2♂; USNM, ZMHU).

TRINIDAD AND TOBAGO. *Trinidad*: St. George: Arima (8 km N; 10°41'N, 61°18'W), Verdant Vale, 19 Jun 1993, W.N. Mathis (1♂; USNM). St. Patrick: Chatham (10°05'N, 61°44'W; beach), 25 Jun 1993, W.N. Mathis (1♀; USNM).

UNITED STATES. *Florida*: Dade County, Hialeah, 11 Oct 1970, C. Stegmaier (1♀; USNM); Miami, 17 Sep 1971, J.C. Buff (2♀; USNM). Highlands County, Lake Placid, Archbold Biological Station, Price Tract (Malaise trap), Sep 1990, W.W. Wirth (1♀; USNM). Monroe County, Big Pine Key, 10 Apr 1970, W.W. Wirth (1♀; USNM). Palm Beach County, Royal Palm Park, 22 Jul 1948, R.H. Beamer (1♀; USNM).

VENEZUELA. San Estaban [at least 5 localities with this name in Venezuela], Nov 1939, P. Anduze (1♂; USNM).

DISTRIBUTION (Figure 86).—*Nearctic*: United States (Florida). *Neotropical*: Bahamas, Belize (Stann Creek), Bolivia (La Paz), Brazil (Rio de Janeiro), Colombia (Antioquia), Costa Rica (Alajuela, Cartago, Guanacaste, Heredia, Puntarenas, San José), Ecuador (Orellana), El Salvador (La Libertad, San Salvador, Santa Ana), Guyana, Honduras (Francisco), Mexico (Chiapas, Guerrero, Morelos, Nuevo Leon, Sonora, Tamaulipas), Panama (Canal Zone, Cocle, Darien), Trinidad, Venezuela, West Indies (Antigua, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, Puerto Rico, St. Lucia, St. Martin, St. Vincent).

ETYMOLOGY.—The species epithet, *niveivenosa*, is derived from the combined Latin roots *nive*, meaning snowy, and *veno*,

meaning vein, and describes the white spots around the wing veins.

REMARKS.—*Nostima niveivenosa* is one of the most widespread and commonly collected species of *Nostima*. Frequently, this species occurs in grassy areas near human dwellings.

### 23. *Nostima picta* (Fallén)

FIGURES 87–90, 161, 223, 224

*Notiphila picta* Fallén, 1813:254.—Stenhammar, 1844:156 [review].—Cresson, 1930a:101 [designation as type for genus].—Sturtevant and Wheeler, 1954:241 [revision, key].

*Notiphila pullula* Fallén, 1823:11 [Sweden; ST (sex ?), ZIL].—Zetterstedt, 1846:1913 [synonymy].

*Ephydra (Hydrina) picta*.—Haliday, 1839:405 [generic combination].

*Philygria picta*.—Loew, 1860:25 [generic combination].—Hollmann-Schirmmacker, 1998:105–107 [revision].

*Philygria picta* variety *nigripes* Strobl, 1880:35 [Austria. Michael; ST ♀, DC-SA]; 1900:3 [generic emendation].—Hollmann-Schirmmacker, 1998:106 [synonymy].

*Philygria pullula*.—Becker, 1905:203 [generic combination].

*Philygriola picta*.—Hendel, 1917:42 [generic combination].—Frey, 1936:114 [Canary Islands].

*Nostima (Philygriola) picta*.—Cresson, 1930a:101 [generic combination]; 1933:68 [compared with *N. scutellaris*]; 1944:176 [review]; 1949:260 [key in Cresson (1944) revised].—Sturtevant and Wheeler, 1954:241 [review].—Wirth and Stone, 1956:469 [list, California].—Frey, 1958:56 [list, Canary Islands].—Cole, 1969:400 [list, western United States].—Rossi, 1993:35 [parasite: *Stigmatomyces latinus* Rossi (Laboulbeniaceae)].

*Nostima scutellaris* Cresson, 1933:68. [New synonymy.]

*Nostima (Philygriola) scutellaris* Cresson, 1944:176 [review].

*Nostima scutellaris scutellaris*.—Sturtevant and Wheeler, 1954:241 [revision].—Wirth, 1965:745 [Nearctic catalog].—Cole, 1969:400 [list, western North America].—Mathis and Zatwamicki, 1995:193 [world catalog]. [New synonymy.]

*Nostima scutellaris occidentalis* Sturtevant and Wheeler, 1954:242.—Wirth and Stone, 1956:469 [list, California].—Wirth, 1965:745 [Nearctic catalog].—Cole, 1969:400 [list, western North America].—Mathis and Zatwamicki, 1995:193 [world catalog]. [New synonymy.]

*Nostima picta picta*.—Mathis and Zatwamicki, 1995:192 [world catalog].

*Nostima picta nigripes*.—Mathis and Zatwamicki, 1995:193 [generic combination, revised status].

DIAGNOSIS.—*Nostima picta* specimens are distinguished from congeners by the following combination of external characters: gena with dense microtomentum ventrally; velvety black microtomentum on posterior margin of scutum and over entire scutellar disc; mesonotum striped laterally; wing crossveins paler than veins, white, at least anterior portion; and tergite 5 of male lacking silvery white microtomentum along posterior margin.

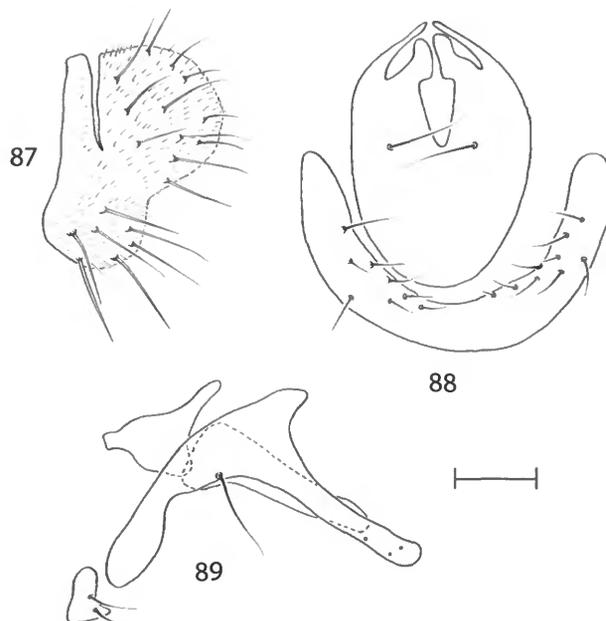
DESCRIPTION.—Small shore flies, body length 1.15–1.30 mm; pale to dark brown with silver, silvery gray, velvety black, yellowish silver, and golden microtomentum.

*Head*: Frons with velvety black ventrolateral triangles, anterior semicircle dark brown with golden microtomentum. Occiput dorsally with silvery gray microtomentum, ventrally shiny dark brown. Outer vertical seta ½ length of inner vertical seta; paravertical seta absent. Scape and pedicel brown;

flagellomere 1 with dorsal  $\frac{1}{3}$  brown and ventral  $\frac{2}{3}$  dark yellowish brown; arista dorsally branched. Facial background pale to dark brown with silvery gray microtomentum; band of silvery gray microtomentum along eye margin from below inner vertical seta, along parafacial, and extending to gena. Gena covered with silvery gray microtomentum, but not as dense as on parafacial; postgena ventrally with silvery gray microtomentum as on gena, dorsally shiny, pale to dark brown. Maxillary palpus yellow; prementum yellowish brown.

**Thorax** (Figure 161): Scutal length 0.30–0.43 mm; scutellar length 0.17–0.19 mm. Mesonotum medially brown with yellowish silver microtomentum; posterior margin with dense, velvety black microtomentum; silvery gray microtomentose vitta lateral to dorsocentral line, anteriorly vitta covering postpronotum but vitta narrowing posteriorly; scutellum covered dorsally with dense, velvety black microtomentum contiguous with black microtomentum on posterior mesonotal margin, laterally with dense, silvery gray microtomentum contiguous with silvery gray lateral vitta on mesonotum; anepisternum dorsal  $\frac{1}{3}$  pale to dark brown with yellowish silver microtomentum, medial  $\frac{1}{3}$  shiny dark brown with sparse microtomentum, ventral  $\frac{1}{3}$  with dense, silvery gray microtomentum; katepisternum pale to dark brown, dorsal  $\frac{1}{2}$  with dense, silvery gray microtomentum, ventral  $\frac{1}{2}$  with less dense, yellowish silver microtomentum; subscutellum shiny dark brown with sparse, yellowish silver microtomentum; anatergite shiny dark brown with sparse, yellowish silver microtomentum, ventral  $\frac{1}{8}$  bare. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 161): length 1.12–1.21 mm; width 0.49–0.55 mm; costal-vein ratio 0.74–0.98; M-vein ratio 0.18–0.26; uniformly amber colored with dark brown veins; crossveins r-m and dm-cu yellowish white. Halter whitish yellow. Legs yellowish brown to dark brown; tibia banded on pale specimens; tarsomere 5 brown.

**Abdomen** (Figures 87–89, 223, 224): Background brown, shiny; tergites 1–3 covered dorsally with pale yellowish silver microtomentum, dorsolaterally area with slightly less dense microtomentum; tergite 4 often with lateromedial circular spot of dense, silvery gray microtomentum; tergite 5 without dense, silvery gray microtomentum. Male genitalia (Figures 87–89): epandrium-cerci-surstylus complex fused; epandrium a narrow dorsal band; cercus crescent-shaped with many long setulae, separated dorsally from epandrium by narrow V-shaped space; surstylus reduced and rounded with anterior projection, dorsally fused with epandrium, bearing long ventral setae; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection somewhat irregular club-shaped and covered with minute projections giving anterior projection a rough appearance, lateral projections arc-shaped; aedeagus elongate and rectangular with rounded ventral projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate a narrow band; gonite broadly fused anteriorly with subepandrial plate, with rounded posterior projection, promi-



FIGURES 87–89.—Male genitalia of *Nostima picta* (Fallén): 87, epandrium, cercus, fused surstylus, lateral aspect; 88, internal male genitalia, ventral aspect; 89, same, lateral aspect. Scale = 0.05 mm.

nent ventromedial setula, and rounded elongate dorsal projection; hypandrium broadly fused posteriorly with subepandrial plate, anteriorly broadly rounded.

**TYPE MATERIAL.**—Two syntype specimens, a male and female, with determination labels in Fallén's handwriting are in the Swedish Museum of Natural History, Stockholm. The lectotype male, herein designated to stabilize and make more universal the use of this name, is labeled "*N[otiphila]. picta* ♂ [handwritten, presumably by Fallén]/Riksmuseum Stockholm [green]/LECTOTYPE ♂ *Notiphila picta* Fallén J.F. Edmiston & W.N. Mathis [red]." The lectotype is pinned with a thin, short pin and is in poor condition (overgrown with fungus). The paralectotype female, herein designated, is labeled "*N. picta* ♀ [handwritten]/Riksmuseum Stockholm [green]/PARALECTOTYPE *Notiphila picta* Fallén J.F. Edmiston & W.N. Mathis [red]."

The holotype male of *Nostima scutellaris* Cresson is labeled "Michigan City Ind. June 29, 1915/♂/TYPE *Nostima SCUTELLARIS* ♂ E.T.Cresson, Jr. [red; species name and gender handwritten]/Type No 44806 U.S.N.M. [red; number handwritten]/*Nostima picta* (Fallén) Det. J. Edmiston, OFM January 1989." The holotype is double mounted (angulate minuten wrapped to main pin), is in excellent condition, and is deposited in the USNM (44806).

The holotype female of *Nostima scutellaris occidentalis* Sturtevant and Wheeler is labeled "Pasadena Calif. Mr. 15. 53 [15 Mar 1953] [handwritten]/HOLOTYPE *Nostima scutellaris*

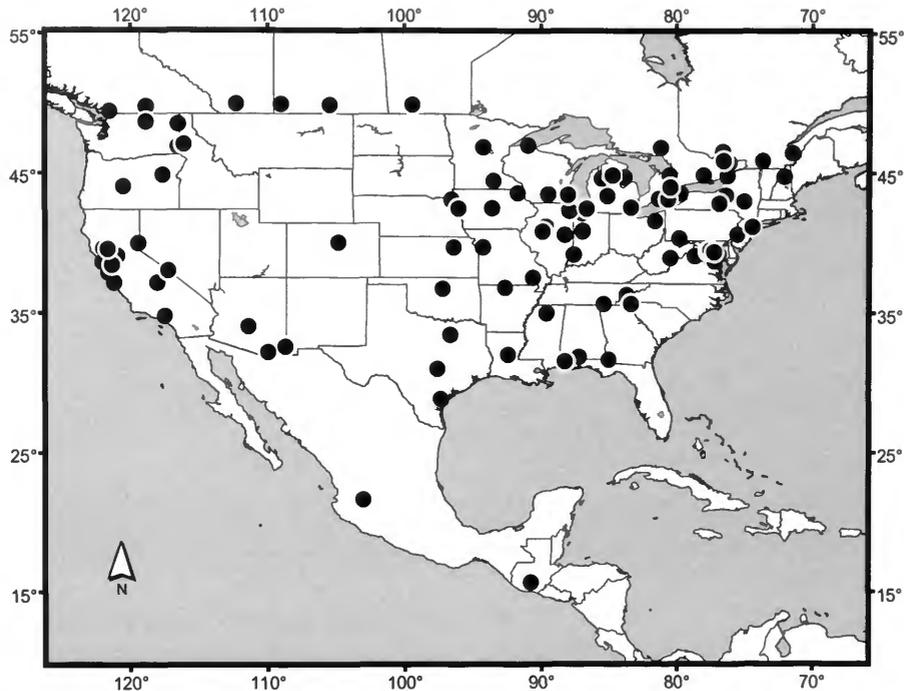


FIGURE 90.—Distribution map for *Nostima picta* (Fallén).

occidentalis Stvt & Whlr [red]/TYPE 6702 [red; number handwritten]/ANSP ANSP [yellow].” The holotype is double mounted (glued to a paper triangle), is in fair condition (some setae missing, thorax slightly distorted, left side of specimen obliterated by glue), and is deposited in the ANSP (6702).

OTHER SPECIMENS EXAMINED (109♂, 169♀).—CANADA. *Alberta*: Lethbridge, 6 Jun 1916 (1♂; USNM). *British Columbia*: Mission City, 28 Jun 1953, W.R.M. Mason (1♂; CNC); Penticton, 12 Aug 1967, J.R. Vockeroth (2♂; CNC); Terrace, 1–7 Apr 1933, M.E. Hippisley (1♂; ANSP). *Manitoba*: Aweme (swept from *Agropyron occidentali*), 23 May–17 Oct 1913, 1915, 1917, P. Criddle (1♂, 2♀; CNC); Treesbank, 7 Sep–17 Oct 1915, P. Criddle (1♂, 2♀; CNC, USNM). *New Brunswick*: Kouchibouguac National Park, 2 Jul 1977, J.R. Vockeroth (2♂; CNC). *Ontario*: Bell’s Corner, 10 Apr 1952, J.F. McAlpine (1♀; CNC), 7 Jul 1952, J.F. McAlpine (1♀; CNC); Collingwood Township, Black Ash Creek No. 3, 27 Sep 1953, F.P. Ide (1♀; CNC); Guelph, 26 Mar–25 Jul 1956, 1976, 1979, K. Barber, S.A. Marshall, D.C. Murell, D.H. Pengelly (5♀; GUEL); Marmora, 26 Jun–30 Jul 1952, J.R. Vockeroth (2♂, 1♀; CNC); Normandale, 20 May 1956, J.R. Vockeroth (1♀; CNC); Orwell (pan trap), 14 Jun 1978, J.M. Cumming (1♀; GUEL); Ottawa (window of Science Service Building, vacuumed from cow dung/wet conifer area), 10 May–1 Nov 1916, 1956, G. Beaulieu, J.G. Chillcott, S.A. Marshall, R.J. Palfrey, J.R. Vockeroth (7♂, 9♀; CNC); Ottawa, Mer Bleue, 14 Jun 1972, H.J. Teskey (1♂; CNC); Pt. Pelee, 22 Jul 1979, J.M.

Heraty (1♂; GUEL); Rockwood, 29 May 1957, D.H. Pengelly (1♀; GUEL); St. Lawrence Island National Park, Thwartway Island, 23 Jul 1976, W. Reid (1♀; CNC); Sudbury, 22 Jul 1915, H.S. Parish (1♀; USNM); Vineland Station, 1937 (1♀; CNC); Windsor, 5 Jun 1966, K.A. Spencer (1♂, 1♀; BMNH). *Quebec*: Beechgrove, 10 May 1962, J.R. Vockeroth (1♂, 2♀; CNC), 16 May 1962, J.R. Vockeroth (1♂, 5♀; CNC); Lac Philippe, 28 Aug 1955, J.R. Vockeroth (1♂; CNC), 7 Jul 1968, J.R. Vockeroth (1♂; CNC); Mt. St. Hilaire (150–215 m), 4 Jun 1963, J.R. Vockeroth (1♂, 1♀; CNC). *Saskatchewan*: Assiniboia, 26 Jun 1955, J.R. Vockeroth (1♂; CNC); Cypress Hills, 26 May 1955, J.R. Vockeroth (1♀; CNC); Estevan, 20 May 1916 (1♂; ANSP); St. Victor (among grass roots on dry prairie), 27 Jun 1955, J.R. Vockeroth (1♂; CNC); Willows (on ground among *Carex* roots), 19 Jun 1955, J.R. Vockeroth (1♂, 1♀; CNC).

GUATEMALA. Antigua, Sep 1959, N.L.H. Krauss (1♀; USNM).

MEXICO. Jalisco: Tlaquepaque, Sep 1965, N.L.H. Krauss (1♂; USNM). Veracruz: Coatepec, 6 Sep 1951, A.H. Sturtevant (1♂; USNM).

UNITED STATES. *Alabama*: Alab/2243 [only information on label] (1♀; USNM). Escambia County, Escambia (bermuda grass), 10 Mar 1937, Turner, Anderson (1♀; USNM). Mobile County, Kushla, Oct 1924, A.H. Sturtevant (1♀; USNM). *Arizona*: Cochise County, Huachuca Mountains (1675 m), 25 Mar 1967, D.M. Wood (1♂, 1♀; CNC); Portal,

South West Research Station, 8 May 1967, D.M. Wood (1 ♀; CNC). Maricopa County, Tempe, 19–21 Jun 1917, J.M. Aldrich (2 ♂; ANSP, USNM). *Arkansas*: Marion County, Yellville, 20 Sep 1954, A.H. Sturtevant (1 ♀; USNM). *California*: Alameda County, Berkeley, 18 May 1915, M.C. VanDuzee (1 ♀; CAS). Colusa County, Wilbur Hot Spring (16 km S), 27 May 1950, L.W. Quate (1 ♀; USNM). Contra Costa County, Marsh Creek Springs, 22 May 1954, H.B. Leech (1 ♀; CAS); Lafayette, 6 Apr 1968, D.D. Munroe (1 ♀; CNC). Fresno County, Pinehurst, 15 May 1950 (1 ♀; USNM); Sequoia National Park, 6 Aug 1940, R.H. Beamer (1 ♀; KU), 6 Aug 1940, D.E. Hardy (1 ♀; KU). Inyo County, Lone Pine, 28 Jul 1940, D.E. Hardy (1 ♀; USNM). Lake County, Clear Lake Oaks, 19 Apr 1954, E.I. Schlinger (6 ♂, 4 ♀; USNM). Los Angeles County, Pasadena, 7 Apr 1953, A.H. Sturtevant (1 ♂; USNM). Marin County, Inverness, 10 May 1968, D.D. Munroe (1 ♂, 3 ♀; CNC). Mono County, Oasis, Aug 1950, E.R. Tinkham (1 ♂, 7 ♀; USNM). Nevada County, Sagehen Creek, near Hobart Mills (150 m; marshy lake and stream margin), 13 Jul 1961, J.G. Chillcott (1 ♂; CNC). San Mateo County, San Gregorio, Bryant Lot. 2, 5 Feb 1954 (1 ♀; CAS). Sonoma County, Stillwater Cove, 23 May 1954, E.I. Schlinger (1 ♂; USNM). Yolo County, Davis, 5 Apr 1952, E.I. Schlinger (1 ♀; USNM). *Colorado*: Jefferson County, Phillipsburg, 3 Jul 1947, M.T. James (1 ♂; USNM). *District of Columbia*: Rock Creek Park, 16 Sep 1956, P.H. Arnaud, Jr. (1 ♂; USNM); Washington (quarantine greenhouse/*Nepheium opositifolium*), 20 Apr 1918, H.L. Sanford (1 ♀; USNM). *Georgia*: Seminole County, Sealey's Spring District (21 Lot 235), 21 Mar 1954, G.C. Steyskal (1 ♀; MICH). *Idaho*: Latah County, Big Meadow Creek Recreation Area (8 km NW Troy), 31 Jul 1979, R.S. Zack (1 ♂; ZACK). *Illinois*: Champaign County, Urbana (in greenhouse), 6–7 Feb 1931, H.H. Ross (4 ♂, 1 ♀; INHS, USNM). Cook County, Maywood, 21 Jun 1949, A.L. Melander (1 ♂; USNM). Mason County, Forest City, Mason State Forest, 21 May 1953, J.F. McAlpine (1 ♀; CNC). Peoria County, Peoria, 20 May–26 Aug 1917, 1918, J.M. Aldrich (2 ♀; ANSP, USNM). *Indiana*: Knox County, Vincennes (1 ♀; USNM). LaPorte County, Michigan City, 29 Jun 1915 (1 ♂, ANSP; 4 ♀, USNM). Tippecanoe County, LaFayette (swept from grass), Mar–30 Aug 1915, 1916, 1930, J.M. Aldrich (3 ♂, 4 ♀; USNM). *Iowa*: Allamakee County, Waterville (5 km ESE; 43°11.0'N, 91°41.1'W), 2 Aug 1960, D. Deonier (1 ♂, 1 ♀; USNM). Monona County, Lewis and Clark State Park (along shore of small lake), 17 Aug 1953, J.L. Laffoon (1 ♂; IOWA); 13 Jun 1970, R.R. Pinger, Jr. (1 ♀; IOWA). Story County, Ames, 20 Apr 1947, J.L. Laffoon (1 ♂; IOWA). *Kansas*: Riley County, Manhattan, 16 Jul 1935, D.A. Wilbur (1 ♀; ANSP). *Louisiana*: Rapides County, Alexandria (17.5 km SW), 21 Mar 1960, J.G. Chillcott (1 ♀; CNC). *Maryland*: Calvert County, Chesapeake Beach, 6 Sep, J.M. Aldrich (1 ♀; USNM). Montgomery County, Colesville, 14 Jul 1975, W.W. Wirth (1 ♀; USNM); Plummers Island (at light), 19 May–10 Oct 1914, R.C. Shannon (1 ♂, 1 ♀; ANSP, USNM). Prince Georges County, Anacostia (from hot house), 22 Oct 1894 (5 ♂, 5 ♀; USNM); Suitland Bog, 14 Jun 1951, W.W. Wirth (2 ♀; USNM). *Michigan*: Berrien County, Stevensville, 29 May 1938, C.W. Sabrosky (1 ♀; ANSP). Ionia County, Lyons, 10 Aug 1941, C.W. Sabrosky. Iosco County, 3 Jul 1950, G.C. Steyskal (2 ♀; USNM). Menominee County, Stephenson (1 ♀; USNM). Roscommon County, Roscommon, 20 Jun 1953, R.R. Dreisbach (1 ♀; USNM). Wayne County, Grosse Ile, 5 Oct 1947, G.C. Steyskal (1 ♀; USNM). Wexford County, Cadillac, 15 Jun 1941, C.W. Sabrosky (1 ♀; USNM). *Minnesota*: Crow Wing County, Nisswa, 6 Jun 1922, W.W. Hoffmann (1 ♀; UMIN). Houston County, 26 May 1940, M.W. Wing (1 ♀; UMIN). Waseca County, Waseca (Experiment Station), 23 Jul 1953 (1 ♀; USNM). *Mississippi*: Lafayette County, Oxford, 21 Aug 1981, J.R. Vockeroth (1 ♂; CNC). *Missouri*: Jackson County, Atherton, 27 Sep 1915 (1 ♂; USNM). Wayne County, Williamsville, 6 Jul 1955, E.C. Becker (1 ♂; CNC). *New Hampshire*: Coos County, Mt. Washington/Lakes of the Clouds (1525 m), 9 Aug 1954, E.C. Becker, E. Munroe, W.R.M. Mason (2 ♀; CNC). *New Jersey*: Cumberland County, Vineland, Jul 1954, M.R. Wheeler (1 ♂; USNM). Essex County, Newark (city yard), 9 Oct, E.L. Dickerson, C.W. Johnson (1 ♀; MCZ); Newark (city yard collection), 14 Aug, E.L. Dickerson, C.W. Johnson (1 ♀; MCZ); Newark, 12 Oct, E.L. Dickerson (1 ♂; ANSP). *New York*: New York City (greenhouse), 3 Apr 1922, A.H. Sturtevant (1 ♀; USNM). Onondaga County, Manlius, 20 Aug 1873, H.H. Smith (1 ♀; CU). Tompkins County, Savage Farm Lot (C.U. 964; "Kansas alfalfa"/biol. note 68154), 18 Aug 1968, A.G. Wheeler (1 ♀; CU); Savage Farms (CU Lot 964), 29 Jun 1968, A.G. Wheeler, "in copula/Dupuits Alfalfa" (1 ♂, 1 ♀; CU); Savage Farm Lot 964, 12 Jul 1968, A.G. Wheeler, "sample DuPuits Alfalfa" (1 ♀; CU). Schoharie County, Summit, Whiteface Mountain, 14 Jul 1958, A.L. Melander (1 ♂; ANSP). *North Carolina*: Macon County, Highlands (1175 m), 29 Jun 1958, J.L. Laffoon (1 ♂; IOWA); Highlands (1160 m), 7–10 May 1957, J.R. Vockeroth (1 ♂, 1 ♀; CNC); Wilson's Gap (945 m), 12 May 1957 (1 ♂; CNC). Stanly County, Morrow Mountain State Park, 19 Jun 1958, D.A. Young (1 ♀; USNM). Swain County, Great Smoky Mountain Park, Clingman's Dome (on ground among *Carex* mats; 1920–2025 m), 17 May–22 Aug 1957, J.G. Chillcott, J.R. Vockeroth (9 ♂, 9 ♀; CNC). *Ohio*: Butler County, Oxford (Mal-lot's Lawn), 15 Sep 1978, B.A. Steinly (4 ♂, 3 ♀; USNM). Mercer County, St. Mary's State Park, Grand Lake (40°32.8'N, 84°27.9'W) (grass shore, 100 net sweeps), 18 Aug 1976, B.A. Steinly (1 ♀; USNM). Portage County, Kent, 12 Jun 1969, R. Maibauer (1 ♀; KENT); near Kent State University Stadium, 10 Jun 1987, J. Edmiston (1 ♀; KENT). *Oklahoma*: Logan County, Orlando (5 km S), 15 Jul 1962, P. Marston (1 ♂; KANS). *Oregon*: Baker County, Wetmore Campground (1375 m; Malaise trap), 29 Jun–5 Aug 1965 (1 ♀; CNC). Deschutes County, La Pine (9.5 km N), 3 Jul 1971, G.C. Steyskal (1 ♀; USNM). *Pennsylvania*: Bedford County, Bedford, 6 Aug 1977, G. Steyskal (1 ♀; USNM). Fayette County, Ohio

(below falls), 2–11 Aug 1905 (1♂, 2♀; CARN, USNM). Montgomery County, Willow Grove, 4 Jul (1♂; USNM). *South Dakota*: Union County, Elk Point, 31 Jul 1915 (1♂; USNM); Elk Point (swept from *Melilotus*/Webster No. 13754), C.N. Ainslie (1♂; USNM). *Tennessee*: Hamilton County, East Ridge, 6 May 1952, O. Peck (1♀; CNC). Sevier County, Gatlinburg, Great Smokey Mountains National Park (3D Heath Bald; 1495 m), 13 Aug 1947, R.H. Whitaker (1♀; USNM). *Texas*: Dallas County, Dallas, 7–8 May 1908, C.R. Jones (3♀; USNM). San Patricio County, Welder Wildlife Refuge near Sinton, 19–23 Mar 1965, J.G. Chillcott (1♀; CNC). Travis County, Austin (some specimens at light), 11 Mar–Dec 1950, 1953, 1954, 1958, M.R. Wheeler (4♂, 4♀; USNM). *Virginia*: Arlington County, Alexandria, 6 Jul 1952, W.W. Wirth (1♂; USNM), 1952 [month, date illegible], W.W. Wirth (1♀; USNM). Fairfax County, Fairfax, Jul 1954, M.R. Wheeler (1♂; USNM); Dead Run, 21 Apr 1916, R.C. Shannon (1♀; ANSP). Giles County, Mt. Lake, 9 Sep 1976, G. Steydalk (1♀; USNM). Madison County, Whiteoak Canyon, south of Stony Man (1067 m), 22 Jul 1961, R.J. Gagne (1♀; IOSU). Stafford County, Aquia Harbour (5 km N Stafford; 38°27.9'N, 77°23.3'W), 15 May 2000 (1♀; USNM). Westmoreland County, Westmoreland State Park, 26 May 1956, W.W. Wirth (1♂, 1♀; USNM). *Washington*: Franklin County, Sacajawea State Park, 12 Jul 1988, D. and W.N. Mathis (1♂, 3♀; USNM). Okanogan County, 24 Jun 1964, H.R. Dodge (1♀; WSU). Pend Oreille County, Indian Island, Pend Oreille River, near Furport, 23 Jun 1982, R.S. Zack (2♂, 2♀; WSU). Whitman County, Colton (collected on grazed grassland), 17 Jun 1948, K.L. Sturges (1♀; USNM); Steptoe Canyon (16 km SW Colton), 24 Apr 1981, R.S. Zack (1♀; WSU). *West Virginia*: Pocahontas County, Sharp Knob (1372 m), 18 May 1965, J.G. Chillcott (1♂, 1♀; CNC). *Wisconsin*: Dane County, Madison, 14 Jun 1938, H.R. Dodge (1♀; USNM); “T7 NR9 EB16,” 4 Oct 1951, R.H. Jones (1♀; USNM); “T7 NR9 EB16,” 30 Sep 1952, R.H. Jones (1♀; USNM). Milwaukee County, Milwaukee, 17 Sep 1954, A.H. Sturtevant (1♂; USNM). Washburn County, “T39N R12W B33,” 29 Jun 1953, R.H. Jones (1♀; USNM); “T39N R12W B32,” 30 Jun 1953, R.H. Jones (1♂; USNM).

**DISTRIBUTION** (Figure 90).—*Nearctic*: Canada (Alberta, British Columbia, Manitoba, New Brunswick, Ontario, Quebec, Saskatchewan), United States (Alabama, Arizona, Arkansas, California, Colorado, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington, West Virginia, Wisconsin). *Neotropical*: Guatemala, Mexico (Jalisco, Veracruz). *Palaearctic*: Afghanistan, Austria, Azores, Belgium, Bulgaria, Canary Islands, Czech Republic, Egypt, Estonia, Finland, France, Germany, Great Britain, Hungary, Italy, Japan (Hokkaido, Honshu), Macedonia, Madeira Islands, Morocco, Netherlands, Poland, Romania,

Russia (European Territory, Far East), Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine.

**ETYMOLOGY**.—The root *pict* in Latin means variegated or painted. This common species of *Nostima* would have caught the eye of early collectors because of the color variation on the head, thorax, and abdomen of such a minute fly.

**REMARKS**.—Intraspecific color variation, especially on the legs and face, led Cresson (1933, 1944) and Sturtevant and Wheeler (1954) to recognize *Nostima picta*, *Nostima scutellaris scutellaris*, and *Nostima scutellaris occidentalis*. Cresson examined only 13 specimens of *N. scutellaris* from Indiana and Illinois, a few specimens of *N. picta* from the western United States, and one specimen *N. picta* from New York. In Cresson's (1944, 1949) reviews, he separated the species by describing *N. scutellaris* as having a velvety black frons and entirely yellow legs, and *N. picta* as being without an entirely black frons and having legs generally darker. In studying the types and all paratype specimens that Cresson designated as *N. scutellaris*, the coloration of the frons and legs was not useful in separating the material into distinct species. Sturtevant and Wheeler (1954) used a quantitative wing ratio to separate two specimens of *N. picta* collected in California from 15 specimens of *N. scutellaris*. Furthermore, Sturtevant and Wheeler divided *N. scutellaris* into two subspecies and defined *N. scutellaris* as having yellow legs, at most faintly brownish, and *N. scutellaris occidentalis* as having brownish black legs. We have studied 241 specimens from North America and 101 specimens from Europe. Facial and leg coloration is highly variable, even among specimen series collected on the same day from the same locale. Genitalia from all the Nearctic and European specimens are identical.

In an attempt to document the color variations, all complete specimens in good condition were rated for facial color, hind-femoral color, and tergite 4 microtomentum. Facial color was categorized as pale brown or dark brown. Hindfemur color was classified as yellow, yellowish brown, or brown. The presence or absence of a silvery gray microtomentose spot on tergite 4 was recorded. The possible combinations of these characters are listed in Table 1.

Phenotypes 1, 2, 3, 5, 7, 8, 9, and 12 were observed among the Nearctic specimens. Phenotypes 1, 2, 3, 5, 8, 9, 11, and 12 were observed among the European specimens. No specimens of phenotypes 6 or 10 were found. Facial and leg color characters are subjective, and gradations often made the categorization difficult. Ambiguous color patterns diminish the importance of this characteristic; however, the presence or absence of the microtomentose spot on tergite 4 can be easily determined and may indicate a relationship between *N. picta* from the Nearctic and Europe.

Among Nearctic specimens, 94 males had a spot on the fourth tergite, as compared with five males from Europe. The disparity possibly represents differences in genotype frequencies between isolated Nearctic and European populations. Nearctic and European specimens have identical genitalia, and the

TABLE 1.—Coloration analysis for the femur, face, and tergite 4 of *Nostima picta*.

Phenotype	Femur color	Face color	Tergite 4 microtomentous spot	North America/Europe			
				Male	Female	Totals	Percent
1	yellow	light brown	present	1/2	13/3	14/5	6.2/5.0
2	yellowish brown	light brown	present	41/4	52/6	93/10	42.1/9.9
3	brown	light brown	present	3/2	2/0	5/2	2.3/2.0
4	yellow	light brown	absent	0/0	0/0	0/0	0/0
5	yellowish brown	light brown	absent	2/1	5/1	7/2	3.2/2.0
6	brown	light brown	absent	0/0	0/0	0/0	0/0
7	yellow	dark brown	present	0/0	6/0	6/0	3.0/0
8	yellowish brown	dark brown	present	13/2	30/3	43/5	19.5/5.0
9	brown	dark brown	present	21/6	26/8	47/14	21.3/13.1
10	yellow	dark brown	absent	0/0	0/0	0/0	0/0
11	yellowish brown	dark brown	absent	0/3	0/12	0/15	0/14.0
12	brown	dark brown	absent	1/14	5/34	6/48	3.0/47.5
TOTALS				82/34	139/67	221/101	

unspotted character state still occurs throughout North America (notice the location of phenotypes 5 and 12); therefore, separation into Nearctic and European species or subspecies with no evidence of reproductive isolation presently seems unwarranted. *Nostima picta* is apparently a morphologically diverse Holarctic species.

#### 24. *Nostima pulchra* (Williston)

FIGURES 91–94, 162, 225, 226

*Hydrellia pulchra* Williston, 1896:399.—Jones, 1906:185 [catalog].

*Nostima pulchra*.—Hendel, 1930:141 [review, Argentina record].—Cresson, 1938:34 [Brazil record]; 1941:6–7 [revision]; 1947:42 [review].—Wirth, 1965:745 [Nearctic catalog].—Wirth, 1968:17 [Neotropical catalog].—Lizarralde de Grosso, 1989:53 [review, Argentina].—Mathis and Zatwarnicki, 1995:193 [world catalog].

*Philygria basilis* Cresson, 1914:246.—Hendel, 1930:141 [synonymy].

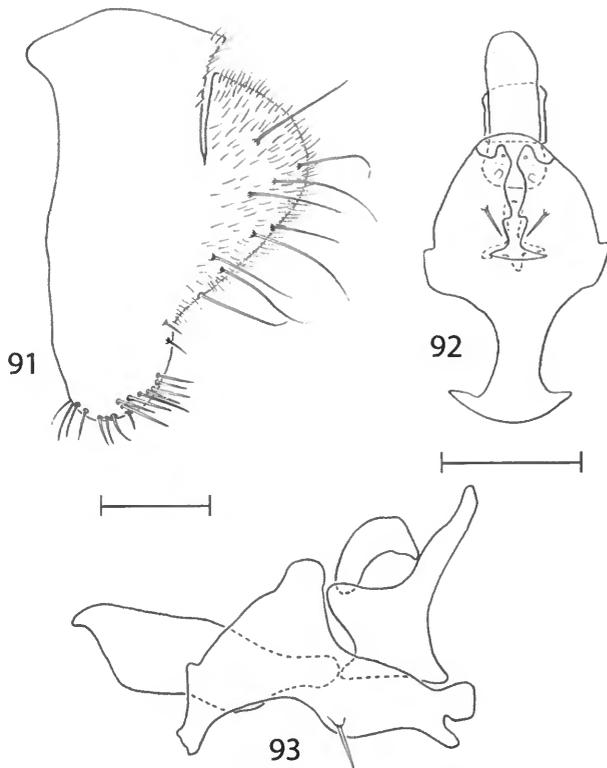
**DIAGNOSIS.**—*Nostima pulchra* is distinguished from congeners by the following combination of external characters: crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; wing with dark, slightly arched, transverse band at about basal 1/3; hindtibia banded; tergite 2 with silvery gray microtomentose posterolateral spot; tergite 3 posterolateral margins with dense, silvery gray microtomentous band not reaching lateral margins and dorsomedially angled anteriorly; tergite 3 with silvery gray microtomentose posterolateral spot; tergite 4 with roughly oval-shaped, silvery microtomentose anterodorsal spots; tergite 4 with silvery gray microtomentose posterolateral spots; and tergite 5 posteromedial margins with semicircle of silvery gray microtomentum, lateral margins with silvery gray microtomentose spot.

**DESCRIPTION.**—Small shore flies, body length 1.22–1.50 mm; brown to black with silver, silvery gray, yellowish silver, and yellowish microtomentum.

**Head:** Frontal height 0.08–0.12 mm; frontal vitta with brown ventrolateral triangles, anterior semicircle dark brown with silvery gray microtomentum, inner ocellar circle brown,

black shiny spots below vertical setae along eye. Occiput dorsally with silvery gray microtomentum, ventrally shiny black. Outer vertical seta 1/2–2/3 length of inner vertical seta; paravertic seta minute. Scape yellowish brown, ventrally with silvery gray microtomentum, pedicel ventrally yellowish brown and dorsally dark brown; flagellomere 1 dorsal 2/3 yellowish brown and ventral 1/3 brown; arista dorsally branched. Facial background brown with silvery gray microtomentum; band of silvery gray microtomentum along eye margin from level of ocelli, along parafacial, and extending to gena. Gena with dorsal 1/3 covered with silvery gray microtomentum, ventral 2/3 shiny black; postgena ventrally with silvery gray microtomentum as on gena, dorsally shiny black. Maxillary palpus yellow; prementum shiny brown.

**Thorax** (Figure 162): Scutal length 0.49–0.55 mm; scutellar length 0.17–0.23 mm. Mesonotum brown with pattern of silver and yellowish microtomentum, medially with brown band, lateromedially with silvery gray microtomentose presutural vitta; presutural silvery gray spots lateral to dorsocentral line; postsutural vitta silvery gray, sparsely microtomentose, and extending to scutellum; scutellum dorsally brown with sparse, silvery gray microtomentum, laterally with dense, silvery gray microtomentum contiguous with silvery gray lateral vitta on mesonotum; anepisternum dorsal 2/3 black with silvery gray microtomentum, ventral 1/3 shiny black; katepisternum dorsal 1/3 black with silvery gray microtomentum, ventral 2/3 shiny black; subscutellum dark brown with silvery gray microtomentum; anatergite dark brown with yellowish silver microtomentum, ventral margin shiny. Chaetotaxy: anterior dorso-central seta 1/2–2/3 length of posterior seta; anterior notopleural seta 1/2–2/3 length of posterior seta; lateral scutellar seta length 1/4–1/3 of apical seta. Wing (Figure 162): length 1.25–1.54 mm; width 0.58–0.72 mm; costal-vein ratio 0.90–1.18; M-vein ratio 0.39–0.55; pale brown with dark brown band across posterior wing, from posterior cell r<sub>1</sub> through posterior r<sub>2+3</sub> cell, posterior r<sub>4+5</sub> cell, anterior dm cell, and anterior cua cell; darkest in r<sub>1</sub> cell, gradually fading ventrally; posteriorly veins and humeral crossvein dark brown, anteriorly veins pale brown, r-m



FIGURES 91–93.—Male genitalia of *Nostima pulchra* (Williston): 91, epanthrium, cercus, fused surstylus, lateral aspect; 92, internal male genitalia, ventral aspect; 93, same, lateral aspect. Scale = 0.05 mm.

and dm-cu crossveins white. Halter yellow with yellowish brown knob. Legs yellowish brown to dark brown; femora dark brown with yellowish brown apex; mid- and hindtibia yellowish brown with medioproximal and mediolateral brown bands; tarsomere 5 brown on all legs.

**Abdomen** (Figures 91–93, 225, 226): Background brown to dark brown; tergite 1 dark brown and covered with sparse, yellowish silver microtomentum; tergite 2 covered with sparse, yellowish silver microtomentum, posteromedial margins with a narrow band of silvery gray microtomentum becoming narrower lateromedially, silvery gray microtomentose posterolateral spot, lateral margins with silvery gray microtomentum; tergite 3 covered with sparse, silvery gray microtomentum, posterolateral margins with dense, silvery gray microtomentous band not reaching lateral margins and dorsomedially angled anteriorly, lateral margins with silvery gray microtomentum and with silvery gray microtomentose posterolateral spot; tergite 4 shiny brown, with roughly oval-shaped, silvery microtomentose anterodorsal spots, with silvery gray microtomentose posterolateral spots, and with lateral margins with silvery gray microtomentum; tergite 5 shiny brown, posteromedial margins with semicircle of silvery gray microtomentum, lateral

margins with silvery gray microtomentose spot. Male genitalia (Figures 91–93): epanthrium-cerci-surstyli complex fused; epanthrium a broad U-shaped dorsal band with posteroventral rounded projection; cercus crescent-shaped with many long setulae, fused ventrally with epanthrium, separated dorsally from epanthrium by V-shaped space; surstylus fused dorsally with epanthrium, ventral margin with many small setae; 10<sup>th</sup> sternite crescent-shaped in lateral view; aedeagal apodeme triangular in lateral view, posterior projection with two small indentations, anterior projection block-shaped, lateral projections spike-shaped; aedeagus heavily sclerotized with rounded dorsal and ventral projections; subepandrial plate-gonite-hypandrium fused; subepandrial plate broad with dorsal projection forming arch dorsad of aedeagus; gonite with rounded posteroventral projection, rectangular posterodorsal projection, and ventromedial prominent setulae; hypandrium broadly fused posteriorly with subepandrial plate, narrow medially, and broad with lateral points anteriorly.

**TYPE MATERIAL.**—The holotype male of *Hydrellia pulchra* Williston is labeled “Type [circular label with red perimeter]/St. Vincent, W.I. H. H. Smith W. Indies 1907-66/May/[rectangular gray label with no inscription]/Hydrellia pulchra Will [handwritten, rectangular label with thick and thin red lines along border, thicker line outside, folded in half].” The holotype is double mounted (minuten pin through the bottom of the middle thorax, minuten attached to a white cardboard holder), is in good condition (right wing apex and left flagellomere 1 missing), and is deposited in the BMNH.

The holotype female of *Philygria basilis* Cresson is labeled “Argentina Vezényi/Tucuman 1905.XI [Nov 1905]/HOLOTYPE Philygria BASILIS E.T.Cresson Jr [red; species name handwritten]/typus [red margin, typical type label of HNHM].” The holotype is double mounted (minuten in block of kerria), is in good condition (right wing and some mesonotal setae missing), and is deposited in the HNHM. A female paratype (ANSP) is labeled “Paraguay Vezényi/Asuncion 905. vi. 1. [1 Jun 1905].”

**OTHER SPECIMENS EXAMINED** (45♂, 60♀).—ARGENTINA. *Catamarca*: La Merced (18 km N; 1000 m), 26 Sep 1968, L.E. Peña (1♀; CNC). *Chaco*: Colonia Benitez, 1–7 Dec 1948, R.M. Golbach (1♂; USNM). *Iguazu*: Iguazu, 4–10 Oct 1927, R.C. and E.M. Shannon (1♂; USNM). *Misiones*: Posadas, May 1961, N.L.H. Krauss (1♀; USNM). *Salta*: Aguaray, Jun 1926, Lind (1♀; STUT); Embarcacion, 2–6 Feb 1950, R.M. Golbach (1♂; USNM); Urundel, 8–12 Feb 1949, M.L. Aczel (1♀; USNM); Urundel, 25–31 Jan 1950, R.M. Golbach (1♂; USNM). *Tucumán*: Lacavera, 23–28 Nov 1951, R.M. Golbach (4♂, 3♀; USNM); V. Padre Monti, Burreyacu, 17 Jan–7 Feb 1948, R.M. Golbach (1♂; USNM).

**BELIZE.** *Cayo*: El Cayo, 1959, N.L.H. Krauss (1♀; USNM).

**BOLIVIA.** *La Paz*: Caranavi (15°50.2'S, 67°33.4'W; 670 m), 12 Mar 2001, W.N. Mathis (1♀; USNM); Coroico, Yungas de La Paz, 6–7 Jan 1976 (1100–1600 m), L.E. Peña (1♀; CNC);

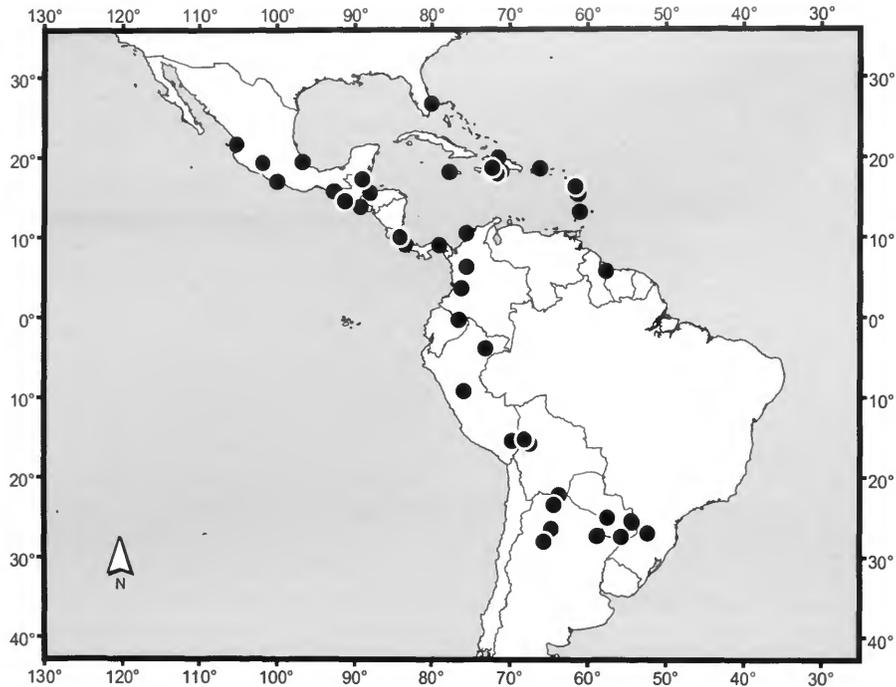


FIGURE 94.—Distribution map for *Nostima pulchra* (Williston).

Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W.N. Mathis (7♂, 5♀; USNM); Guanay (1 km E; 15°30.2'S, 69°52.3'W; 500 m), 13 Mar 2001, S.D. Gaimari (2♂, 1♀; USNM); Mapiri (15°18.6'S, 68°13'W; 720 m), 15 Mar 2001, W.N. Mathis (1♀; USNM).

**BRAZIL.** *Paraná:* Foz do Iguacu (25°30.1'S, 54°32.4'W), 26 Aug 2000, D. and W.N. Mathis (1♂, 1♀; USNM). *Santa Catarina:* Nova Teutônia (300–500 m), May 1937, 1945, F. Plaumann (1♂, 1♀; BMNH, USNM).

**COLOMBIA.** *Antioquia:* Medellín (30 km NW; 2440 m), Feb 1958, M.R. Wheeler (1♂; USNM). *Bolívar:* Cartagena, Jun 1953, N.L.H. Krauss (1♂; USNM). *Valle:* Palmira (near Cali; 1005 m), Nov 1955, W.B. Heed (1♀; USNM).

**COSTA RICA.** *Alajuela:* Higuito, San Mateo, P. Schild (1♂; USNM). *Puntarenas:* Buenos Aires, Potrero Grande (9°1'N, 83°0'W), 28 Aug 1996, R. Villalobos (1♀; INBIO); Palmar Sur (light trap; rain forest), Aug 1962, F.S. Blanton (1♀; USNM). *San José:* San José, Farm La Caja, 10 Jan–8 Aug, H. Schmidt (2♀; USNM).

**DOMINICA.** Clarke Hall (light trap), 1–8 Aug 1964, T.J. Spilman (1♂, 1♀; USNM); Layou River mouth, 9 Jan 1965, W.W. Wirth (1♂; USNM).

**DOMINICAN REPUBLIC.** *Barahona:* Barahona (11 km S; 18°07.7'N, 71°04'W), 15 May 1995, W.N. Mathis (1♂, 4♀; USNM). *Dajabon:* Loma de Cabrera (9 km S; disturbed pastures in mesic woodland; 19°21'N, 71°37'W; 620 m), 12 Jul 1992, J. Rawlins, S. Thompson, C. Young, R. Davidson (1♂;

CARN). *Pedernales:* Cabo Rojo, Alcoa Road (km 56), 18 Jan 1989, S.A. Marshall (2♂; GUEL); Las Abejas cloud forest (30 km N Cabo Rojo; 18°09'N, 71°38'W; 1300 m), 17 Jan 1989, L. Masner (12♂, 6♀; CNC); (38 km NNW Cabo Rojo; 18°09'N, 71°38'W, 1250 m), 15 Jul 1987, J.E. Rawlins, R.L. Davidson (1♀; CARN); Pedernales (18°01.8'N, 71°44.7'W), 19–20 Mar 1999, W.N. Mathis (1♀; USNM).

**ECUADOR.** *Napo:* Limoncocha (Malaise trap), 15 Jun 1977, P.J. Spangler, D.R. Givens (1♀; USNM).

**EL SALVADOR.** *La Libertad:* Santa Tecla, Oct 1965, N.L.H. Krauss (1♀; USNM).

**GUADELOUPE.** Lamentin, Ravine Chaude, 25–30 Nov 2001, M. Martinez (1♀; MART).

**GUATEMALA.** *Suchitepequez:* San Antonia Suchitepequez (Malaise trap), 6 Jul 1965, P.J. Spangler (1♂; USNM).

**GUYANA.** Dubulay Ranch, Berbice River (5°40.9'N, 57°51.5'W), 9–11 Apr 1994, W.N. Mathis (1♀; USNM).

**HAITI.** Petionville (305 m), Jun–Jul 1959, W.B. Heed, H.L. Carson (1♀; USNM).

**HONDURAS.** *Cortes:* San Pedro Sula (8 km S; 15°25.7'N, 88°1.4'W), 25–26 Sep 1995, D. and W.N. Mathis (1♀; USNM).

**MEXICO.** *Chiapas:* Finca Prusia (33 km S Jaltenango; 1000 m), 10–12 May 1985, W.N. Mathis (1♀; USNM). *Guerrero:* Acapulco, 16–30 Aug 1938, L.J. Lipovsky (1♀; KU). *Michoacan:* Puente Garnica (light trap; 388 m), 20 Aug 1964, F.S. Blanton, A. Broce (1♂; USNM). *Nayarit:* San Blas, 12 Aug

1954, R.E. Ryckman, C.P. Christianson, D. Spencer (1 ♀; USNM). *Veracruz*: Veracruz, Oct 1962, N.L.H. Krauss (1 ♀; BMNH).

PANAMA. *Canal Zone*: Camaron, Ft. Kobbe, 23 Jun 1952, F.S. Blanton (1 ♀; USNM); Camaron, Ft. Kobbe, 17 Jul 1952, F.S. Blanton (1 ♀; USNM).

PARAGUAY. *Central*: Asunción, Jul 1961, N.L.H. Krauss (1 ♂, 1 ♀; USNM).

PERU. *Huánuco*: Monzon Valley, Tingo Maria, 11 Nov 1954, E.I. Schlinger, E.S. Ross (3 ♀; CAS); Tingo Maria (1 km S), 6 Feb 1984, W.N. Mathis (1 ♀; USNM); Tingo Maria (6 km S), 8 Feb 1984, W.N. Mathis (3 ♀; USNM). *Loreto*: Río Itaya (25 km S Iquitos), 22 Feb 1984, W.N. Mathis (1 ♂; USNM).

PUERTO RICO. Palo Seco, 24 Jan 1933 (1 ♀; AMNH).

ST. VINCENT. *Charlotte*: South Rivers (13°4.6'N, 61°9.3'W), 8 Sep 1997, W.N. Mathis (1 ♀; USNM).

UNITED STATES. *Florida*: Palm Beach County, Lake Worth (bay shore), 8 Aug 1951, W.W. Wirth (1 ♀; USNM).

DISTRIBUTION (Figure 94).—*Nearctic*: United States (Florida). *Neotropical*: Argentina (Buenos Aires, Catamarca, Chaco, Iguazu, Misiones, Salta, Tucumán), Belize (Cayo), Bolivia (La Paz), Brazil (Paraná, Santa Catarina), Colombia (Antioquia, Bolívar, Valle), Costa Rica (Alajuela, Puntarenas, San José), Ecuador (Napo), El Salvador (La Libertad), Guatemala (Suchitepequez), Guyana, Honduras (Cortes), Mexico (Chiapas, Guerrero, Michoacan, Nayarit, Veracruz), Panama (Canal Zone), Paraguay (Central), Peru (Huánuco, Loreto), West Indies (Dominica, Dominican Republic, Guadeloupe, Haiti, Puerto Rico, St. Vincent).

Etymology.—The species epithet, as indicated by its Latin root, *pulcher*, meaning beautiful, refers to this species' attractiveness. Specimens of this species, which are large and have a distinctive wing band, are truly beautiful.

REMARKS.—*Nostima pulchra* is one of the most widespread and commonly collected species of *Nostima*. The black basal wing band is distinct, but the wing coloration may be homologous with the maculation found on the wings of *N. ilytheoides*, *N. maculata*, and *N. slossonae*.

## 25. *Nostima quinquenotata* Cresson

FIGURES 95–98, 163, 227, 228

*Nostima quinquenotata* Cresson, 1930b:79.—Sturtevant and Wheeler, 1954:241 [review].—Wirth, 1965:745 [Nearctic catalog].—Mathis and Zatzwornicki, 1995:193 [world catalog].

*Nostima (Philygriola) quinquenotata*.—Cresson, 1944:176–177 [review].

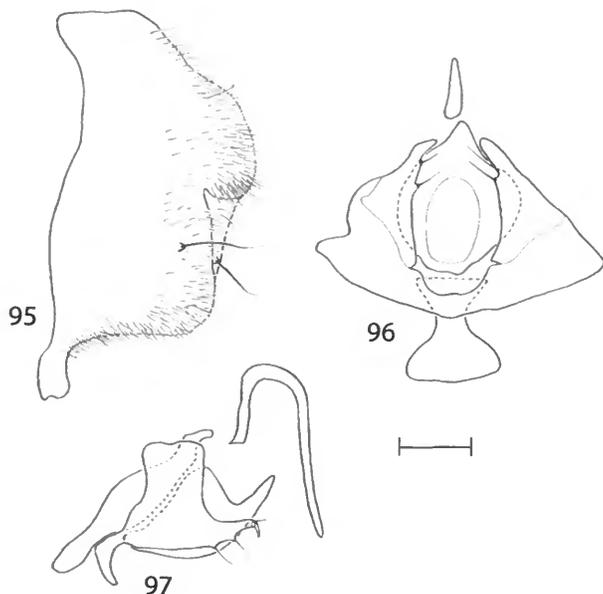
DIAGNOSIS.—*Nostima quinquenotata* is distinguished from congeners by the following combination of external characters: gena with ventral portion bare, shiny; mesonotum distinctly bicolorous, with medial portion between dorsocentral setae unicolorous, chestnut brown to blackish brown, and area immediately laterad silvery white to gray; wing conspicuously spotted; and tergites lacking dense, microtomentose spots.

Description.—Minute to small shore flies, body length 0.72–1.15 mm; pale brown to brown with silvery gray, yellowish silver, and golden microtomentum.

*Head*: Frons with yellowish brown ventrolateral triangles with golden microtomentum, anterior semicircle yellowish brown with golden microtomentum, slightly darker medioventrally. Occiput with sparse, silvery gray microtomentum. Outer vertical seta  $\frac{2}{3}$ – $\frac{3}{4}$  length of inner vertical seta; paravertical seta absent. Scape and pedicel with dorsal  $\frac{1}{3}$  yellowish brown and ventral  $\frac{2}{3}$  yellow; flagellomere 1 dorsally yellowish brown and ventrally yellow; arista dorsally branched. Facial background yellowish brown to brown with yellowish silver microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at inner vertical seta, extending along parafacial, and continuing to gena. Medially along parafacial, a narrow yellowish brown band extending lateroventrally below gena. Face medially covered with yellowish silver microtomentum, slightly less dense in face center. Gena covered with dense, silvery gray microtomentum, sparse posteriorly, ventrally bare and shiny brown; postgena covered with silvery gray microtomentum as on posterior gena. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 163): Scutal length 0.29–0.43 mm; scutellar length 0.12–0.13 mm. Mesonotum yellowish with yellowish brown microtomentum, sparse medially; brown vitta with yellowish brown microtomentum along dorsocentral line; band of silvery gray microtomentum between dorsocentral line and interalar setae; anteriorly, silvery gray band covering postpronotum not as dense; scutellum dorsally brown with yellowish golden microtomentum, laterally with dense, silvery gray microtomentum contiguous with mesonotal band; anepisternum yellow; katepisternum yellow; subscutellum yellowish brown with silvery golden microtomentum; anatergite dorsal  $\frac{2}{3}$  yellowish brown with silvery golden microtomentum and ventral  $\frac{1}{3}$  shiny, yellowish brown. Chaetotaxy: anterior dorsocentral seta  $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{2}$  length of apical seta. Wing (Figure 163): length 0.90–1.12 mm; width 0.36–0.48 mm; costal-vein ratio 1.23–1.68; M-vein ratio 0.12–0.19; pale amber background; veins and crossveins brown; 5 circular iridescent bluish white spots approximately equal in size with 2 spots in  $r_{2+3}$  cell, posterior  $r_{2+3}$  spot anterior to  $R_1$ , anterior  $r_{2+3}$  spot above dm-cu, 1 spot in  $r_{4+5}$  cell, 1 spot in medial cell, and 1 spot in  $cu_1$ . Halter yellow. Legs yellow; tarsomere 5 yellowish brown on all legs.

*Abdomen* (Figures 95–97, 227, 228): Background yellow brown, slightly paler laterally, shiny; tergites 1–5 covered with sparse, yellowish silver microtomentum. Male genitalia (Figures 95–97): epandrium-cerci-surstyli complex fused; epandrium a broad U-shaped band with broadly rounded anteroventral projection; cercus crescent-shaped, fused ventrally with epandrium, separated from epandrium by dorsolateral V-shaped space; surstylus with broad undulated ventral projection and rectangular posterior projection, covered with setulae; 10<sup>th</sup>



FIGURES 95-97.—Male genitalia of *Nostima quinquenotata* Cresson: 95, epanthrium, cercus, fused surstylus, lateral aspect; 96, internal male genitalia, ventral aspect; 97, same, lateral aspect. Scale = 0.05 mm.

sternite thin elongate triangular, folded dorsally into a U-shape; aedeagal apodeme triangular in lateral view with rounded posterior projection, pointed lateromedial projections, and broad

spatulate anterior projection; aedeagus heavily sclerotized with rounded dorsolateral projections and broad ventral triangular projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate with narrow lateral arms articulated with epanthrium; gonite base broad, posterior projection hook-shaped with 1 posterior seta and 2 lateromedial setae; hypandrium small, rectangular, and broadly fused medially with subepandrial plate.

**TYPE MATERIAL.**—The holotype female of *Nostima quinquenotata* Cresson is labeled "Dorchester Co. nr. Lloyds Md Jul 10, 07/H S Barber Collector/Type No. 21851 U.S.N.M. [red]/Holo-TYPE Philygria [handwritten] 5-NOTATA [handwritten] E. T. Cresson Jr. [red]/471." The holotype is glued by the left thorax to a paper point, is in good condition (many thoracic setae broken; left foreleg, right hindleg, and right midtibia and tarsus missing), and is deposited in the USNM.

**OTHER SPECIMENS EXAMINED** (13 ♂, 23 ♀).—**UNITED STATES.** *Alabama:* Macon County, La Place near Tuskegee, 9 Jun 1917 (1 ♀; CU). Mobile County, Kushla [day, year illegible] 1924, A.H. Sturtevant (1 ♀; USNM); Whistler, 27 Aug 1918, A.H. Sturtevant (1 ♂; USNM). *Florida:* Alachua County, Gainesville, 29 Apr 1937, L.J. Bottimer (1 ♀; USNM). Leon County, Tallahassee, 3 Jul 1947, L.D. Beamer (1 ♀; KU). Orange County, Orlando, 7 Feb 1918, G.G. Ainslie (1 ♀; USNM). Polk County, Loughman, 8 May 1930, R.H. Beamer (4 ♂; KU). Wakulla County, Wakulla, 10 Jul 1939, R.H. Beamer (1 ♀; KU). *Georgia:* Clinch County, Billy's Island, Okefenokee Swamp, Jun 1912 (1 ♂; CU); Okefenokee Swamp,

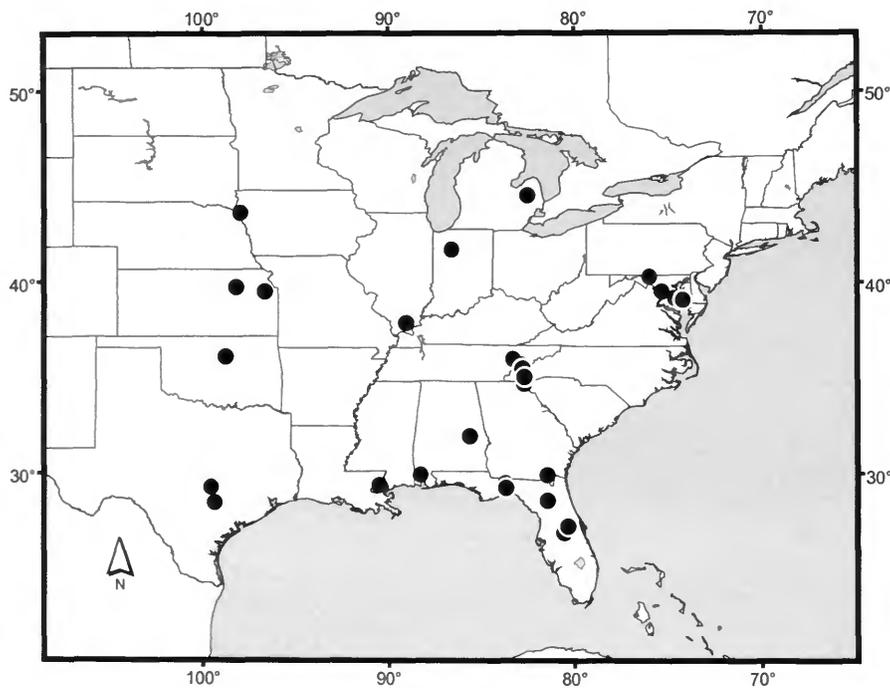


FIGURE 98.—Distribution map for *Nostima quinquenotata* Cresson.

23 March 1952, J.R. Vockeroth (1 ♀; CNC). Rabun County, Clayton (610 m), 18–26 May 1911, J.C. Bradley (1 ♀; CU). *Illinois*: Johnson County, Parker, 17 Apr 1914 (1 ♂; ILNH). *Indiana*: Tippecanoe County, LaFayette (swept from grass), 16 Apr 1915 (1 ♀; ANSP). *Iowa*: Woodbury County, Sioux City, Stone State Park, 17 Jun 1957, J.L. Laffoon (1 ♀; IOWA). *Kansas*: Douglas County, Lawrence, 11 Nov 1895, H. Kahl (1 ♀; CARN). Riley County, Manhattan, 23 Jun 1930, D.A. Wilbur (1 ♀; ANSP). *Louisiana*: St. Tammany County, Mandeville, 16 Jun 1917, R.C. Shannon (1 ♀; CU). *Maryland*: Calvert County, Chesapeake Beach, 2 Aug, J.M. Aldrich (1 ♂, 1 ♀; ANSP, USNM). Montgomery County, Glen Echo, 1 Jul 1923, J.R. Malloch (1 ♀; USNM). Washington County, Hagerstown, 24 Sep 1915, P.R. Myers (1 ♀; USNM). *Michigan*: Lapeer County, Lapeer (21 km N), 30 May 1937, C.W. Sabrosky (1 ♀; ANSP). *North Carolina*: Macon County, Franklin (61 m), 8 May 1957, J.R. Vockeroth (1 ♂; CNC). Swain County, Great Smoky Mountain National Park, Clingman's Dome (1920–2025 m), 20 May 1957, J.R. Vockeroth (2 ♀; CNC); Clingman's Dome (1160 m), 8 May 1957, J.R. Vockeroth (1 ♂; CNC). Wake County, 13 Jun 1958, D.A. Young (1 ♂; USNM). *Oklahoma*: Payne County, Stillwater (4 mi N, 15 mi W; prairie pasture), 8 Aug 1957, A. Stoner (1 ♀; USNM). *Tennessee*: Knox County, Knoxville, 28 Aug 1916 (1 ♀; USNM). Sevier County, Gatlinburg, Cove Forest (4400 ft), 12 Jul 1947, R.M. Whittaker (1 ♂; USNM). *Texas*: Gonzales County, Ottine, Palmetto State Park, 7 Oct 1950 (1 ♀; USNM). Travis County, Austin, 13 Oct 1950 (1 ♂, 1 ♀; USNM).

**DISTRIBUTION** (Figure 98).—*Nearctic*: United States (Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, North Carolina, Oklahoma, Tennessee, Texas).

**ETYMOLOGY**.—The species epithet, as indicated by the Latin roots *quinque*, meaning five, and *nota*, meaning mark, refers to the five iridescent wing spots.

**REMARKS**.—*Nostima quinquenotata* has a limited North American distribution. Externally, the wing maculation pattern of *N. quinquenotata* resembles that of the South American *N. stellata*.

## 26. *Nostima schildi* Cresson

FIGURES 99–102, 164, 229, 230

*Nostima schildi* Cresson, 1941:4.—Wirth, 1968:17 [Neotropical catalog].—Lizarralde de Grosso, 1989:54 [review, Argentina].—Mathis and Zatzwarciki, 1995:193 [world catalog].  
*Nostima (Nostima) schildi*.—Cresson, 1947:41 [review].

**DIAGNOSIS**.—*Nostima schildi* is distinguished from congeners by the following combination of external characters: gena with silvery gray microtomentum; mesonotum vittate; scutellum laterally covered with silvery gray microtomentum; hindtibia banded; tergite 2 posterolaterally with dense, silvery gray microtomentum; tergite 3 with dense, silvery gray microtomen-

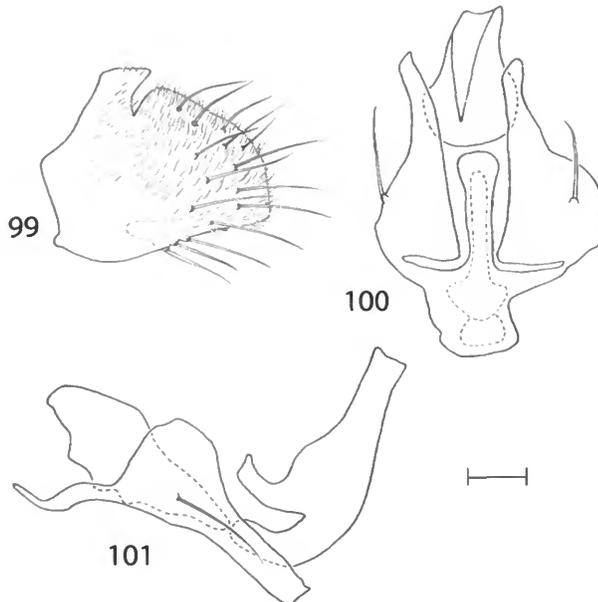
tose band along posterolateral margin; tergite 4 with dense, silvery gray microtomentum in trapezoidal band along posterior margin and covering  $\frac{2}{3}$  of mediodorsum; tergite 5 posteromedially with dense, silvery gray microtomentose triangular spot; and wing veins and crossveins unicolorous.

**DESCRIPTION**.—Small shore flies, body length 1.20–1.70 mm; yellowish brown to brown with yellowish silver and silvery gray microtomentum.

**Head**: Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown but slightly paler than ventrolateral triangles and with yellowish silver microtomentum, darker medioventrally. Occiput with silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally; arista dorsally branched. Facial background yellowish brown with yellowish silver and silvery gray microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face yellowish brown and covered with sparse, yellowish silver microtomentum. Gena covered with silvery gray microtomentum; postgena covered with silvery gray microtomentum less dense than on gena. Maxillary palpus yellow; prementum yellowish brown.

**Thorax** (Figure 164): Scutal length 0.40–0.58 mm; scutellar length 0.14–0.23 mm. Mesonotum brown, vittate with silvery gray microtomentum, vittae posteriorly not distinct; mesonotum medially with dark brown line laterally bounded with silvery gray bands; dorsocentral line brown; silvery gray stripe between dorsocentral line and interalar setae; scutellum brown with sparse, yellowish silver microtomentum, laterally with silvery gray microtomentum; anepisternum shiny brown with sparse, silvery gray microtomentum; katepisternum brown with sparse, silvery gray microtomentum; subscutellum brown with sparse, yellowish silver microtomentum; anatergite shiny brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; supra-alar setae present; anterior notopleural seta  $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 164): length 1.40–1.76 mm; width 0.59–0.78 mm; costal-vein ratio 0.97–1.48; M-vein ratio 0.20–0.35; amber background, anteriorly slightly darker, with pale brown veins and crossveins. Halter yellowish white. Legs yellowish brown to brown; hindfemur yellowish brown proximally, darker distally; foretibia yellowish brown proximally, darker distally; hindtibia yellowish brown with medioproximal and mediobasal brown band; tarsi yellowish brown, tarsomere 5 slightly darker.

**Abdomen** (Figures 99–101, 229, 230): Background yellowish brown; tergites 1–5 covered with sparse, yellowish silver microtomentum; tergite 2 posterolaterally with dense, silvery gray microtomentum; tergite 3 with dense, silvery gray micro-



FIGURES 99–101.—Male genitalia of *Nostima schildi* Cresson: 99, epandrium, cercus, fused surstylus, lateral aspect; 100, internal male genitalia, ventral aspect; 101, same, lateral aspect. Scale = 0.05 mm.

tomtose band along posterolateral margin; tergite 4 with dense, silvery gray microtomentum in trapezoidal band along posterior margin covering  $\frac{2}{3}$  of mediodorsum, lateral margins

with dense, silvery gray microtomentum; tergite 5 with dense, silvery gray microtomentum posteromedially in triangular spot. Male genitalia (Figures 99–101): epandrium-cerci-surstyli complex fused; epandrium a U-shaped band with rounded anterior-ventral projection; cercus crescent-shaped with many long setulae, fused ventromedially with epandrium, separated dorsally from epandrium by V-shaped space; surstylus dorsally fused with epandrium, rounded with anterior projection, and bearing several long setae; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection narrowly pointed, lateral projections broadly pointed and extending laterally beyond gonite; aedeagus heavily sclerotized, with posterior groove in ventral view, anteriorly bifurcate in dorsal view; subepandrial plate-gonite-hypandrium fused; subepandrial plate narrow; gonite anterolaterally fused with subepandrial plate, with medioventral prominent setulae, posterior projection rectangular in lateral view with small posterodorsal lobe; hypandrium fused posterolaterally with subepandrial plate, with spatulate posterior projection and irregularly rounded anterior projection.

**TYPE MATERIAL.**—The holotype male of *Nostima schildi* Cresson is labeled “La Suiza de Turrialba COSTA RICA Pablo Schild/[black circle]/TYPE *Nostima* SCHILDI E.T. Cresson, Jr. 6604 [red; species name and number handwritten, number written along left margin of label] [red]/ANSP [yellow].” The holotype is double mounted (plant spine through thorax, spine in a thin, rectangular plastic mount), is in good condition (wrinkled abdomen), and is deposited in the ANSP (6604).

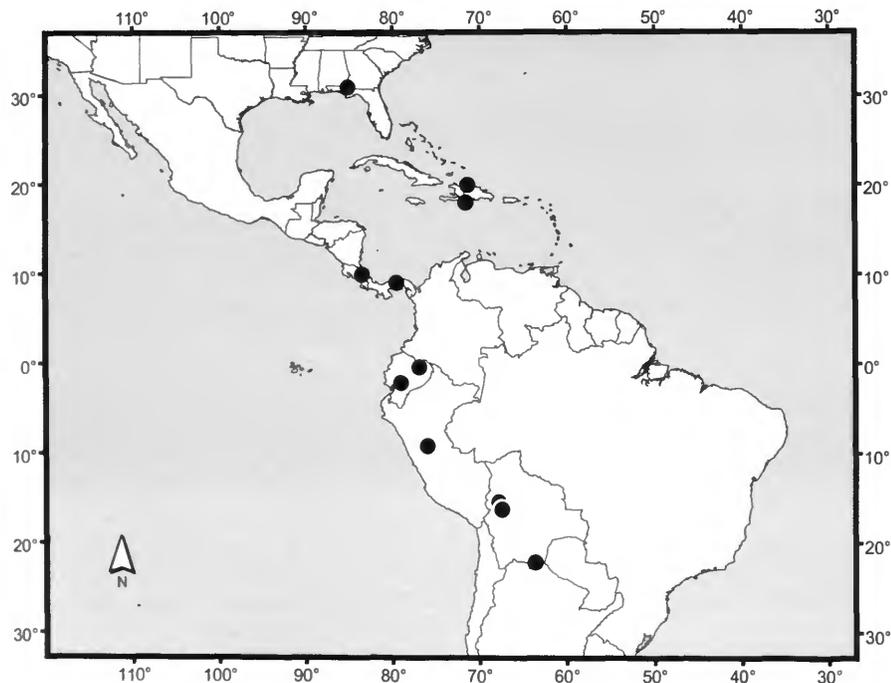


FIGURE 102.—Distribution map for *Nostima schildi* Cresson.

OTHER SPECIMENS EXAMINED (14 ♂, 23 ♀).—ARGENTINA. *Salta*: Aguaray, 14–19 Feb 1950, R.M. Golbach (1 ♂; USNM).

BOLIVIA. *La Paz*: Apa Apa (8 km S Chulumani; 16°22'S, 67°30.4'W, 1960 m), 23 Mar 2001, S. Gaimari (1 ♂; USNM); Chulumani (2 km S; 16°23.5'S, 67°31.8'W; 1750 m), 9–10 Mar 2001, W.N. Mathis (1 ♀; USNM); Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W.N. Mathis (3 ♂, 3 ♀; USNM).

COSTA RICA. *Cartago*: La Suiza, Jul–Aug, P. Schild (1 ♂, 5 ♀; ANSP).

DOMINICAN REPUBLIC. *Azua*: Barrero (7 km WNW; Sierra Martin Garcia; east side of crest; cloud forest adjacent to disturbed forest; 18°21'N, 70°58'W, 860 m), 25–26 Jul 1992, C. Young, R. Davidson, S. Thompson, J. Rawlins (1 ♂, 2 ♀; CARN). *Barahona*: Paraíso (9.2 km NW; confluence of Río Nizao and Río Coltico; 18°03'N, 71°12'W; 230 m), 9–10 Aug 1990, J. Rawlins, S. Thompson (1 ♀; CARN). *Dajabon*: Loma de Cabrera (9 km S; 19°21'N, 71°37'W; 620 m; disturbed pastures in mesic woodland), 12 Jul 1992, J. Rawlins, S. Thompson, C. Young, R. Davidson (1 ♂; CARN). *Pedernales*: Cabo Rojo (Alcoa Road, km 26), 17–20 Jan 1989, S.A. Marshall, J. Swann (1 ♀; GUEL); Cabo Rojo (26 km N; 18°06'N, 71°38'W; 730 m; mesic deciduous forest with scattered pines), 16 Jul 1992, C. Young, R. Davidson, S. Thompson, J. Rawlins (1 ♀; CARN); Las Abejas cloud forest (30 km N Cabo Rojo; 18°09'N, 71°38'W; 1300 m), 17 Jan 1989, L. Masner (1 ♂, 4 ♀; CNC); Las Abejas cloud forest (37 km N Cabo Rojo; 4 km E Las Abejas; 18°10'N, 71°37'W; 1440 m), 12 Jul 1987, J.E. Rawlins, R.L. Davidson (1 ♀; CARN); Las Abejas cloud forest (38 km NNW Cabo Rojo; 18°09'N, 71°38'W; 1250 m), 15 Jul 1987, J.E. Rawlins, R.L. Davidson (2 ♀; CARN).

ECUADOR. *Chimborazo*: Naranjapata, Chilicay, 16 Jun 1955, R. Levi Castillo (2 ♂; USNM). *Napo*: Coca, Napo River, 25–30 Apr 1965, L.E. Peña (1 ♂; CNC).

PANAMA. *Canal Zone*: Balboa, Feb 1958, M.R. Wheeler (1 ♀; USNM).

PERU. *Huánuco*: Tingo Maria, Sep 1955, T. Dobzhansky, C. Pavan (1 ♂; USNM); Tingo Maria, Monzon Valley, 11 Dec 1954, E.I. Schlinger, E.S. Ross (1 ♀; USNM).

UNITED STATES. *Florida*: Jackson County, Florida Caverns State Park (Malaise trap), 26 May 1973, W.W. Wirth (1 ♂; USNM).

DISTRIBUTION (Figure 102).—*Nearctic*: United States (Florida). *Neotropical*: Argentina (Salta), Bolivia (La Paz), Costa Rica (Cartago), Ecuador (Chimborazo, Napo), Panama (Canal Zone), Peru (Huánuco), West Indies (Dominican Republic).

ETYMOLOGY.—*Nostima schildi* was named to honor Pablo Schild, an early twentieth century collector of Costa Rican Diptera.

REMARKS.—*Nostima schildi* is a widespread tropical and subtropical species. The relatively few collection records may be a reflection of its small size, but *N. schildi* has been found where intensive collecting of small Diptera has occurred.

## 27. *Nostima simuliflavida*, new species

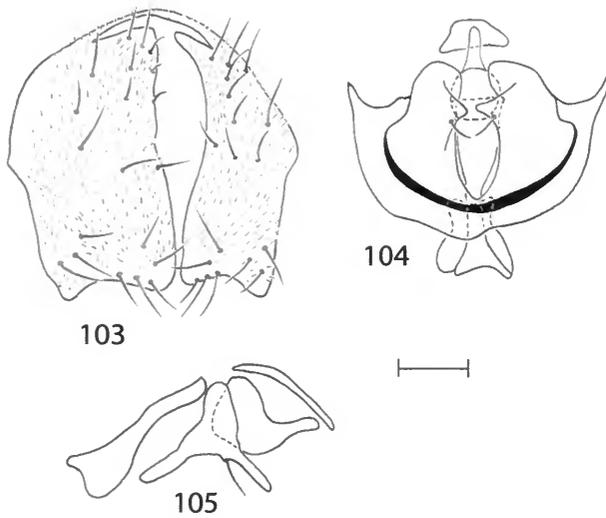
FIGURES 103–106, 165, 231, 232

DIAGNOSIS.—*Nostima simuliflavida* is distinguished from congeners by the following combination of external and genitalic characters: mesonotum with a distinctive yellowish brown stripe; veins and crossveins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler in color than other veins; tergites yellowish brown and lacking dense microtomentose spots; and epandrium and cercus fused, epandrium with rounded mediolateral projection. *Nostima simuliflavida* can be distinguished from *N. flavida* only by the genitalic structures.

DESCRIPTION.—Minute shore flies, body length 0.85–0.95 mm; pale to dark yellowish brown with silvery gray microtomentum.

*Head*: Frons with brown ventrolateral triangles, anterior semicircle brown with golden microtomentum, darker medioventrally. Occiput brown with silvery gray microtomentum. Outer vertical seta  $\frac{3}{4}$  length of inner vertical seta; paraverticlar seta absent. Scape and pedicel dorsally yellowish brown, ventrally yellow; flagellomere 1 with ventral  $\frac{2}{3}$  yellowish brown and dorsal  $\frac{1}{3}$  brown; arista dorsally branched. Facial background yellowish brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at inner vertical seta, extending along parafacial, and continuing to gena. Medially along silvery parafacial, a narrow yellowish brown band extending lateroventrally below gena. Face medially yellowish brown with sparse, silvery gray microtomentum, center of face slightly paler. Gena dorsally covered with dense, silvery gray microtomentum, ventrally shiny, yellowish brown; postgena brown, covered with silvery gray microtomentum extending to occiput. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 165): Scutal length 0.29–0.36 mm; scutellar length 0.10–0.13 mm. Mesonotum yellowish brown with golden microtomentum, mediolaterally slightly paler; dorso-central line yellowish brown with golden microtomentum; band of silvery gray microtomentum between dorsocentral line and interalar setae; postpronotum lateral  $\frac{1}{3}$  yellowish brown, medial  $\frac{2}{3}$  with silvery gray microtomentum; scutellum dorsally yellowish brown with golden microtomentum, laterally with dense, silvery gray microtomentum contiguous with mesonotal band; anepisternum yellow; katepisternum yellow; subscutellum yellowish brown; anatergite yellowish brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{3}{4}$  length of posterior seta; anterior notopleural seta  $\frac{3}{4}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 165): length 0.93–1.12 mm; width 0.36–0.43 mm; costal-vein ratio 1.36–2.16; M-vein ratio for males 0.13–0.21; pale amber background with yellowish brown veins and crossveins, crossveins r-m and dm-cu slightly paler in color. Halter yellow. Legs yellowish to yellowish brown; tarsomere 5 yellowish brown on all legs.



FIGURES 103–105.—Male genitalia of *Nostima simuliflavida*, new species: 103, epiandrium, cercus, fused surstyli, lateral aspect; 104, internal male genitalia, ventral aspect; 105, same, lateral aspect. Scale = 0.05 mm.

**Abdomen** (Figures 103–105, 231, 232): Tergites yellowish brown to brown, shiny, no microtomentum. Male genitalia (Figures 103–105): epiandrium-cerci-surstyli complex fused; epiandrium a narrow dorsal band with rounded anteromedial projection; cercus broadly fused ventrally with epiandrium, sep-

arated dorsally by small V-shaped space, lacking hook-like lateroventral projection, rounded; surstyli broadly fused dorsally with epiandrium, rectangular, and with many ventral setae; 10<sup>th</sup> sternite trapezoidal in ventral view; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection triangular with rounded lateral projection, lateral projection pointed; aedeagus sclerotized with rounded posterior projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate a narrow band with rounded posterolateral projections, subepandrial plate fused with epiandrium and forming shelf-like structure; gonites broadly fused anteriorly with subepandrial plate, with rounded posterior projection, ventromedial prominent setulae, and rounded posterodorsal projection; hypandrium a small anterior plate, fused posteriorly with subepandrial plate.

**TYPE MATERIAL.**—The holotype male of *Nostima simuliflavida* is labeled “DOMINICA, W.I.[.] Cabrit Swamp[,] 22–25 Mar. 1965[,] W. W. Wirth/Bredin-Archbold SmithsonianBio. Surv. Dominica/HOLOTYPE ♂ *Nostima simuliflavida* Edmiston & Mathis USNM [red].” The holotype is double mounted (minuten pin through the right thorax and attached to a white plastic mount), is in good condition (left wing in an attached microvial), and is deposited in the USNM. Paratypes are as follows: DOMINICA. Cabrit Swamp (15°35'N, 61°29'W), 22–25 Mar 1965, W.W. Wirth (1♂; USNM); Macoucheri (at light), 5 Mar 1965, W.W. Wirth (1♂; USNM). ST. LUCIA. Fond St. Jacques (13°50'N, 61°02'W), 13–14 Jun 1991, D. and W.N. Mathis (1♀; USNM). TRINIDAD AND TOBAGO. *Tobago*:

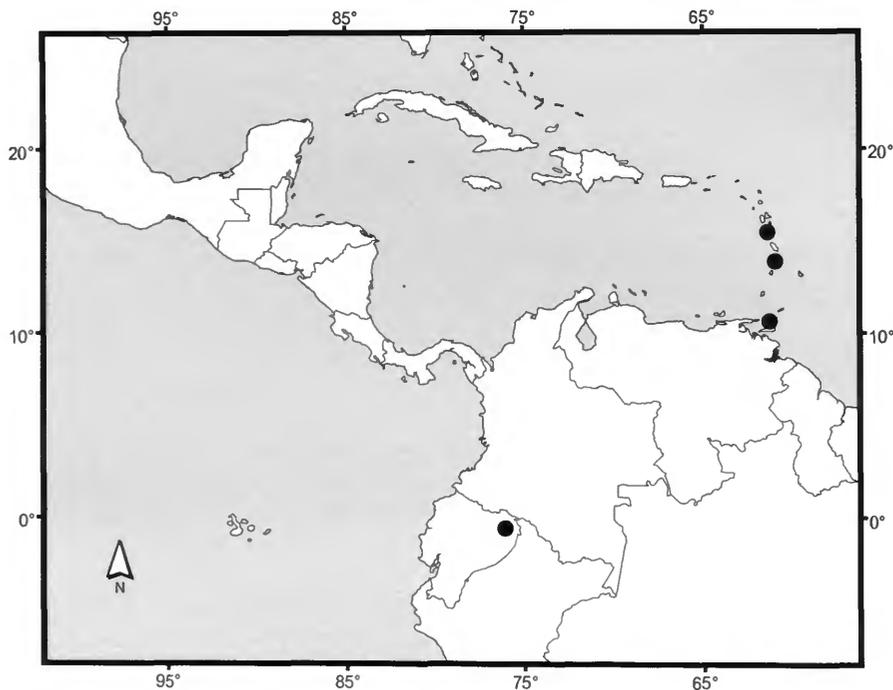


FIGURE 106.—Distribution map for *Nostima simuliflavida*, new species.

Roxborough, Parlatuvier Road (Cacao plantation at 2<sup>nd</sup> milestone), 14 Oct 1937, J. Smart (1 ♂; USNM). *Trinidad*: Luzon, May 1914 (1 ♀; NRS); Piarco, Savannah, 29 Oct 1937, J. Smart (1 ♀; BMNH).

OTHER SPECIMEN EXAMINED (1 ♂).—ECUADOR. *Orellana*: Río Tiputini (0°38.2'S, 76°8.9'W), 12–26 Aug 1999, W.N. Mathis, A. Baptista, M. Kotrba (1 ♂; USNM).

DISTRIBUTION (Figure 106).—*Neotropical*: Ecuador (Orellana), Trinidad and Tobago, West Indies (Dominica, St. Lucia).

ETYMOLOGY.—The species epithet, *simuliflavida*, is of Latin derivation and is a combination of *simulo*, meaning copy or imitate, and *flavida*, which is the species it closely resembles.

REMARKS.—*Nostima simuliflavida* is distinguished from *N. flavida* only by the shape of the male genitalia. Even though we have only a few specimens from limited areas, the structures of the male genitalia are distinct and justify the recognition of *N. simuliflavida* as a separate species. Females and males have not been collected from the same locality, but the males and females from Trinidad and Dominica are assumed to be the same species.

The difficulty of collecting very small flies such as *N. simuliflavida* may be a reason for the limited collection records. More specimens are needed of both *N. flavida* and *N. simuliflavida* to clarify their relationship.

## 28. *Nostima slossonae* Coquillett

FIGURES 107–110, 166, 233–234

*Nostima slossonae* Coquillett, 1900a:35.—Jones, 1906:187 [catalog].—Cresson, 1918:49 [review]; 1930a:101 [compared with *N. picta*]; 1938:33 [notes]; 1941:5–6 [revision].—Sturtevant and Wheeler, 1954:242 [review].—Wirth, 1965:745 [Nearctic catalog]; 1968:17 [Neotropical catalog].—Lizarralde de Grosso, 1989:54 [review, Argentina].—Mathis and Zatwarnicki, 1995:194 [world catalog].

*Philygria calverti* Cresson, 1914:247; 1918:49 [synonymy].

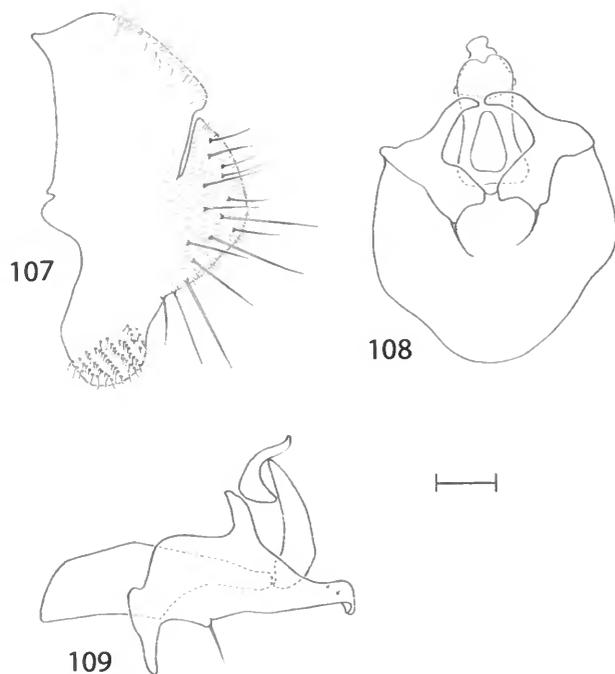
*Nostima (Nostima) slossonae*.—Cresson, 1947:42 [review].

DIAGNOSIS.—*Nostima slossonae* is distinguished from congeners by the following combination of external characters: wing spotted, white spots on a dark background, with spurious veins within some white spots; portions of crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with brown veins; tergite 2 with silvery gray microtomentose spots on mediolateral anterior and posterior margins; tergite 2 with dense, silvery gray microtomentose posterolateral spots touching posterior margin; tergite 3 with silvery gray microtomentose spots on mediolateral posterior margin projected anteromedially; tergite 3 with dense, silvery gray microtomentose posterolateral spots; tergite 4 with dense, silvery gray microtomentose mediolateral spots; tergite 4 with dense, silvery gray microtomentose posterolateral spots; tergite 5 with dense, silvery gray microtomentose mediolateral oval-shaped spots; and tergite 5 with dense, silvery gray microtomentose posterolateral spots touching posterior margins.

DESCRIPTION.—Small shore flies, body length 1.00–1.45 mm; brown to dark brown with silver, silvery gray, yellowish silver, and golden microtomentum.

*Head*: Frons with dark brown ventrolateral triangles, anterior semicircle brown with yellowish silver microtomentum, darker medioventrally. Occiput dorsally with dense, silvery gray microtomentum, ventrally dark brown without microtomentum. Outer vertical seta ½ length of inner vertical seta; paraverticilar seta minute. Scape dark yellowish brown, pedicel dark yellowish brown ventrally, yellowish brown dorsally; flagellomere 1 brown dorsally, yellowish brown ventrally; arista dorsally branched. Facial background brown with yellowish silver and silvery gray microtomentum; narrow band of silvery golden microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face covered medially with yellowish silver microtomentum, face medioventrally slightly darker, appearing banded. Gena dorsal ½ covered with dense, silvery gray microtomentum, ventral ½ shiny dark brown; postgena covered with dense, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum dark yellowish brown.

*Thorax* (Figure 166): Scutellar length 0.39–0.52 mm; scutellar length 0.15–0.19 mm. Mesonotum brown, vittate with yellowish silver microtomentum; mesonotum medially with brown line laterally bounded with silvery bands; dorsocentral line brown, broken with silvery gray areas connecting medial and lateral stripes; silvery stripe between dorsocentral line and interalar setae; postpronotum with brown and silvery gray patches; scutellum brown dorsally with sparse, yellowish silver microtomentum, laterally with dense, yellowish silver microtomentum; anepisternum striped with dense, silvery gray microtomentum on dorsal ¼, dense, yellowish silver microtomentum on medial ½, and shiny brown with sparse microtomentum on ventral ¼; katepisternum shiny brown with dense, yellowish silver microtomentum on dorsal ¾ and sparse, yellowish silver microtomentum on ventral ⅓; subscutellum shiny brown with yellowish silver microtomentum; anatergite shiny brown with yellowish silver microtomentum on dorsal ¾, ventral ¼ bare. Chaetotaxy: anterior dorsocentral seta ½–¾ length of posterior seta; anterior notopleural seta ½ length of posterior seta; lateral scutellar seta ½ length of apical seta. Wing (Figure 166): length 1.16–1.47 mm; width 0.53–0.72 mm; costal-vein ratio 0.56–0.66; M-vein ratio 0.81–1.03; maculate with white spots on amber to dark brown background; veins brown, except white if inside spot; spurious veins in white spots in proximal r<sub>1</sub> cell, in distal r<sub>1</sub> cell, posterodistally from R<sub>2+3</sub> at point where R<sub>2+3</sub> curves toward costa, across distal r<sub>2+3</sub> cell apex, posteriorly from R<sub>4+5</sub> at ⅔ distance from crossvein r-m to wing margin, posteriorly from M<sub>2</sub> for distance from dm-cu to margin, ventrally from CuA<sub>1</sub> at ¾ distance from CuA<sub>1</sub> origin, and in distal dm cell; crossvein r-m posterior ¾ white, distal ¼



FIGURES 107–109.—Male genitalia of *Nostima slossonae* Coquillett: 107, epandrium, cercus, fused surstylus, lateral aspect; 108, internal male genitalia, ventral aspect; 109, same, lateral aspect. Scale = 0.05 mm.

brown; dm-cu anterior  $\frac{1}{3}$  and posterior  $\frac{1}{3}$  white, brown medially. Halter yellow with yellowish brown knob. Legs yellowish brown to brown; femora dark yellowish brown proximally, paler distally; fore- and midtibia yellowish brown medially, paler proximally and distally; hindtibia yellowish brown with medioproximal and mediolateral brown bands; tarsi yellow to yellowish brown with tarsomere 5 brown.

**Abdomen** (Figures 107–109, 233, 234): Background brown; tergites 1–5 covered with sparse, silvery gray microtomentum; tergite 2 with silvery gray microtomentose spots on mediolateral anterior and posterior margins, dense, silvery gray microtomentose posterolateral spots touching posterior margin, and dense, silvery gray microtomentum on lateral margins; tergite 3 with silvery gray microtomentose spots on mediolateral posterior margin projected anteromedially, dense, silvery gray microtomentose posterolateral spots, and dense, silvery gray microtomentum on lateral margins; tergite 4 with dense, silvery gray microtomentose mediolateral spots, dense, silvery gray microtomentose posterolateral spots, and dense, silvery gray microtomentum on lateral margins; tergite 5 with dense, silvery gray microtomentose mediolateral oval-shaped spots, dense, silvery gray microtomentose posterolateral spots touching posterior margins, and dense, silvery gray microtomentum on lateral margins. Male genitalia (Figures 107–109): epandrium-cerci-surstyli complex fused; epandrium a broad U-shaped band with rounded anterodorsal projection and rounded

anteroventral projection; cercus crescent-shaped with many long setulae, ventrally fused with epandrium and separated dorsally from epandrium by V-shaped space; surstylus dorsally fused with epandrium, ventrally with many rows of short setae; 10<sup>th</sup> sternite hook-shaped in lateral view; aedeagal apodeme triangular in lateral view, posterior projection T-shaped, anterior projection pointed, lateral projections broadly pointed; aedeagus crescent-shaped; subepandrial plate-gonite-hypandrium fused; subepandrial plate a narrow band; gonite anteriorly fused with subepandrial plate, gonite with prominent ventromedial setulae; posterior projection rounded with 2 minute setulae, dorsal projection broadly rounded; hypandrium posteriorly fused with subepandrial plate forming a U-shaped shield.

**TYPE MATERIAL.**—The holotype female of *Nostima slossonae* Coquillett is labeled “BISC. BAY, FLA. [folded in half]/ Mrs Slosson Collector/Type No 4297 [handwritten] U.S.N.M. [red]/*Nostima slossonae* Coq. [handwritten, white with black line border].” The holotype is in poor condition, being broken into two parts (head glued to a paper point by the posterior side; thorax and abdomen glued to the same paper point by the left side; setae of the head and thorax broken; right wing torn; antennae, mouthparts, right foreleg, left foretibia and tarsus missing), and is deposited in the USNM.

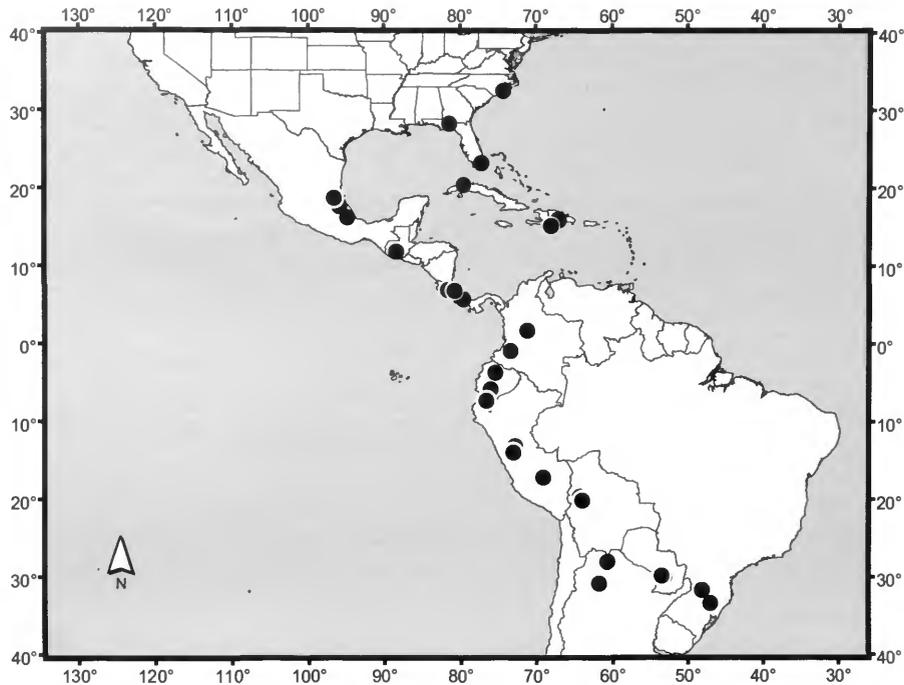
The holotype female of *Philygria calverti* Cresson is labeled “Alajuela C[osta] R[ica] 15 IX 1909 [15 Sep 1909] 3100 ft. alt./P P Calvert Sweeping/TYPE *Nostima* CALVERTI E. T. Cresson, Jr. 6064 [red; species name and number handwritten; number written along right margin of label].” The holotype is double mounted (minuten in a thin piece of cardboard), is in good condition (left flagellomere 1 and most of right foreleg missing), and is deposited in the ANSP (6064).

**OTHER SPECIMENS EXAMINED** (43 ♂, 50 ♀).—ARGENTINA. *Salta*: Urundel, 25–31 Jan 1950, R.M. Golbach (1 ♀; USNM). *Tucumán*: San Pedro de Colalao, 14 Oct 1968, L.E. Peña (1 ♂; CNC).

**BOLIVIA.** *La Paz*: Apa Apa (8 km S Chulumani; 16°22'S, 67°30.4'W; 1960 m), 10 Mar 2001, W.N. Mathis (2 ♀; USNM); Caranavi (15°50.2'S, 67°33.4'W; 670 m), 12 Mar 2001, A. Freidberg (1 ♀; USNM); Chulumani (2 km S; 16°23.5'S, 67°31.8'W; 1750 m), 9–10 Mar 2001, W.N. Mathis (2 ♂, 9 ♀; USNM); Guanay (3 km E; 15°30.2'S, 67°52.3'W; 500 m), 14 Mar 2001, W.N. Mathis (4 ♂; USNM); San Pedro (3 km NE, 16°S, 67°35.3'W; 780 m), 12 Mar 2001, W.N. Mathis (1 ♀; USNM).

**BRAZIL.** *Santa Catarina*: Nova Teutônia, 6 Nov 1936, F. Plaumann (1 ♀; BMNH); Nova Teutônia, 17 Nov 1936, F. Plaumann (1 ♀; BMNH); Nova Teutônia, 15 Mar 1937, F. Plaumann (1 ♀; BMNH); Nova Teutônia, 2 Jun 1938, F. Plaumann (1 ♂; USNM); Nova Teutônia, (300–500 m), Oct 1962, F. Plaumann (1 ♂; CNC); Nova Teutônia, Nov 1962, F. Plaumann (1 ♀; CNC). *São Paulo*: São Paulo, 1928, J. Gyorgy (1 ♂; HNHM).

**COLOMBIA.** *Cauca*: Popayan (80 km N), M.R. Wheeler (1 ♂; USNM); Popayan (43 km S), M.R. Wheeler (1 ♀;

FIGURE 110.—Distribution map for *Nostima slossonae* Coquillett.

USNM). *Cundinamarca*: Villeta (16 km W; 1600 m), 15 Mar 1955, E.I. Schlinger, E.S. Ross (1 ♀; CAS).

**COSTA RICA.** *Alajuela*: Alajuela (945 m), 15 Oct 1909, P.P. Calvert (1 ♀; ANSP); Higuito, San Mateo, P. Schild (1 ♂; USNM). *Cartago*: La Suiza, Mar–Nov 1921, 1922, 1923, 1924, 1926, P. Schild (14 ♂, 7 ♀; HNHM, USNM, ZMAN); Paraíso, Orori (9°41'N, 83°46'W), 19 Aug 2002, M. Alfaro (1 ♀; INBIO). *Heredia*: Santo Domingo, INBio Parque (9°58.4'N, 84°5.6'W), 14 Jun 2003, J. Edmiston, D. and W.N. Mathis (2 ♂, 1 ♀; USNM). *San José*: Río Virilla (near Colón; 9°55.3'N, 84°16'W), 26 Jun 2001, W.N. Mathis (1 ♀; USNM); San José, La Caja (8 km W), 1930, H. Schmidt (4 ♀; DEI, USNM).

**CUBA.** *Havana*: San Antonio de los Baños (22°54.9'N, 82°29.3'W), 8 Dec 1994, W.N. Mathis (1 ♂, 1 ♀; USNM).

**DOMINICAN REPUBLIC.** *Pedernales*: Sierra de Baoruco (Las Abejas; 18°09'N, 71°38'W; 1300 m; cloud forest), 17 Jan 1989, L. Masner (1 ♂; CNC). *Peravia*: San José Ocoa (10 km NE; 18°35'N, 70°25.6'W), 21 May 1998, D. and W.N. Mathis (1 ♂, 2 ♀; USNM); San José de Ocoa (18 km N; 830 m), 24 Jul 1986, D.A. Grimaldi (1 ♀; AMNH).

**ECUADOR.** *Chimborazo*: Chilicay, Jul 1955, R. Levi Castillo (1 ♂, 1 ♀; USNM). *El Oro*: Pinas, 10 Oct 1954, R. Levi Castillo (1 ♀; USNM). *Pichincha*: Quito (2 km N; near Rumiucudia ruin), 4 Mar 1984, R. Haswell (1 ♂; WASH).

**GUATEMALA.** *Chimaltenango*: Yepocapa, 1948–1949, H.T. Dalmat (1 ♀; USNM).

**MEXICO.** *Puebla*: Huauchinango, Dec 1958, A. Faberge (1 ♂; USNM). *San Luis Potosí*: Tamazunchale, 23 Nov 1946, F.E. Skinner (1 ♀; CAS). *Veracruz*: Orizaba, 11–4 1957 [month and date indistinguishable], R. and K. Dreisbach (1 ♂; USNM).

**PANAMA.** *Chiriquí*: Volcan, 9 Dec 1952, F.S. Blanton (1 ♀; USNM).

**PARAGUAY.** *Central*: Asunción Villa Morra, Vezenyi (1 ♂; HNHM). *Cordillera*: Caacupe, Instituto Agr. Nacional, 2 Aug 1981, R.D. Cavo (1 ♂; USNM).

**PERU.** *Cuzco*: Machu Picchu (museum; 1385 m), 11–14 Aug 1971, C. and M. Vardy (1 ♂, 1 ♀; BMNH). *Huánuco*: Espensa (11 km N Huánuco), 5 Feb 1984, W.N. Mathis (1 ♀; USNM); Monson Valley, Tingo Maria, 26 Oct 1954, E.I. Schlinger, E.S. Ross (1 ♂; CAS); Monson Valley, Tingo Maria, 11 Nov 1954, E.I. Schlinger, E.S. Ross (1 ♀; CAS); Tingo Maria (24 km NE; 700 m), 11 Nov 1954, E.I. Schlinger, E.S. Ross (1 ♀; CAS).

**UNITED STATES.** *Florida*: Dade County, Biscayne Bay, A.T. Slosson (1 ♂, 1 ♀; AMNH); Miami (light trap), 12 Nov 1964, J.C. Buff (1 ♂; USNM). Leon County, Tallahassee (Tall Timber Reservation), 8 Mar 1977, M. Altieri (1 ♂; USNM). *North Carolina*: Onslow County, Ashe Island (emergence trap 4–7), 14 Oct 1975, T.D. Edwards (1 ♂, 1 ♀; USNM).

**DISTRIBUTION** (Figure 110).—*Nearctic*: United States (Florida, North Carolina). *Neotropical*: Argentina (Salta, Tucumán), Bolivia (La Paz), Brazil (Santa Catarina, São Paulo),

Colombia (Cauca, Cundinamarca), Costa Rica (Alajuela, Cartago, Heredia, San José), Ecuador (Chimborazo, El Oro, Pichincha), Guatemala (Chimaltenango), Mexico (Puebla, San Luis Potosí, Veracruz), Panama (Chiriquí), Paraguay (Central, Cordillera), Peru (Cuzco, Huánuco), West Indies (Cuba, Dominican Republic).

ETYMOLOGY.—The species was named to honor Mrs. Annie T. Slosson who collected the holotype.

REMARKS.—*Nostima slossonae* is one of the larger species of *Nostima*, and for this reason it may be better represented in collections. A maculate wing with spurious veins may be homologous for *N. ilytheoides*, *N. maculata*, and *N. slossonae*.

Specimens of *N. slossonae* from different locations exhibit some external morphological differences. The distance between the white spot in the distal portion of cell  $r_1$  and the white spot located posterodistally along vein  $R_{2+3}$  at the point where  $R_{2+3}$  curves toward the costa is shorter on specimens from Florida, North Carolina, Cuba, and the Dominican Republic than on specimens from Central and South America. Also, the dorsal spots on tergites 3–5 from Florida, North Carolina, Cuba, and the Dominican Republic are slightly smaller; however, the genitalia of these specimens have the same structures as specimens from Central and South America. Whereas these differences may represent different populations, or even the emergence of a subspecies, this slight variation does not warrant the recognition of another species.

### 29. *Nostima spilogaster* Cresson

FIGURES 111–114, 167, 235, 236

*Nostima (Nostima) spilogaster* Cresson, 1947:41.—Wirth, 1956:16 [compared with *N. giovannolii*]; 1968:17 [Neotropical catalog].—Lizarralde de Grosso, 1989:54 [review, Argentina].—Mathis and Zatwamicki, 1995:194 [world catalog].

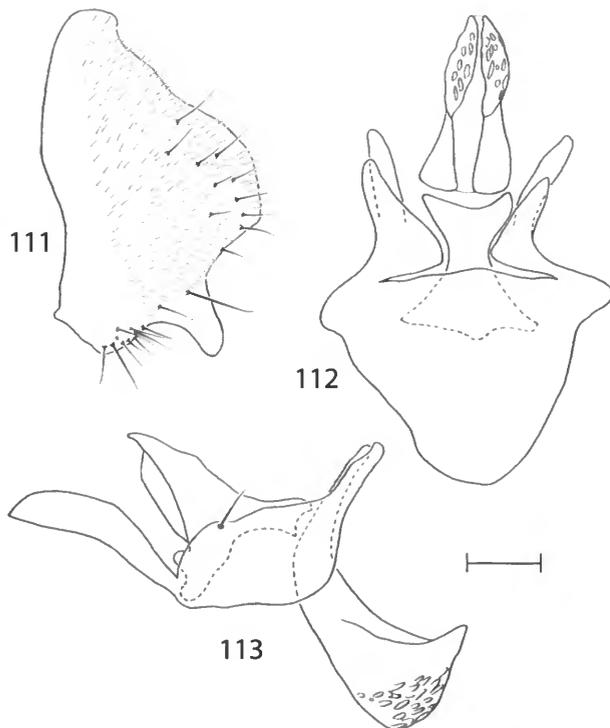
DIAGNOSIS.—*Nostima spilogaster* is distinguished from congeners by the following combination of external characters: gena bare ventrally, shiny; crossveins paler than veins, at least anterior portion white; tergite 2 with silvery gray, sparsely microtomentose posteromedial spot; posterolateral margin of tergite 3 with silvery gray microtomentum extending laterally to cover margin; posterolateral margin of tergite 4 with dense, silvery gray microtomentose spots; and tergite 5 with posteromedial and lateral margins with bands of dense, silvery gray microtomentum.

DESCRIPTION.—Minute to small shore flies, body length 0.95–1.25 mm; yellow, yellowish brown, to brown with yellowish silver, golden, and silvery gray microtomentum.

**Head:** Frons with brown ventrolateral triangles, anterior semicircle pale brown with sparse, yellowish silver microtomentum. Occiput with dense, silvery gray microtomentum laterally, sparse, silvery gray microtomentum medially. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel yellowish brown ventrally, dark yellowish brown dorsally; flagellomere 1 dark yellowish brown dorsally; arista dorsally branched. Yellowish brown parafacial, continuing to gena. Facial background coloration brown with yellowish silver and silvery gray microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along silvery gray parafacial, a narrow yellowish brown band extending lateroventrally below gena. Face medially yellowish brown with sparse, silvery gray microtomentum, center of face slightly paler. Gena dorsally covered with dense, silvery gray microtomentum, ventrally shiny, yellowish brown; postgena brown, covered with silvery gray microtomentum extending to occiput. Maxillary palpus yellow; prementum yellowish brown.

**Thorax (Figure 167):** Scutal length 0.34–0.43 mm; scutellar length 0.13–0.17 mm. Mesonotum brown with presutural vittae, postsuturally brown with sparse, yellowish silver microtomentum; presutural mesonotum medially with brown line laterally bounded with silvery bands; dorsocentral line brown; silvery gray stripe laterally along dorsocentral line; postpronotum silvery gray anteriorly, brown posteriorly; scutellum brown dorsally with yellowish silver microtomentum, laterally with dense, silvery gray microtomentum; anepisternum with silvery gray microtomentum, sparse ventrally; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{2}{3}$ , ventral  $\frac{1}{3}$  yellowish brown with sparse, silvery gray microtomentum; subscutellum brown with yellowish silver microtomentum; anatergite shiny brown, yellowish silver microtomentum on dorsal  $\frac{3}{4}$ , ventral  $\frac{1}{4}$  bare. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{2}{3}$  length of apical seta. Wing (Figure 167): length 1.04–1.41 mm; width 0.45–0.65 mm; costal-vein ratio 1.02–1.33; M-vein ratio 0.24–0.31; background and veins amber, crossveins r-m and dm-cu mostly to entirely white. Halter yellowish white. Legs generally yellow with yellowish brown and dark brown tarsomeres; femora and tibia yellow, bowed; tarsi yellow with tarsomere 4 yellowish brown and tarsomere 5 dark brown.

**Abdomen (Figures 111–113, 235, 236):** Background brown with sparse, yellowish silver microtomentum; tergite 2 with silvery gray sparsely microtomentose posteromedial spot, posterolateral and lateral margins with silvery gray microtomentum; tergite 3 posterolateral margin with silvery gray microtomentum extending laterally to cover lateral margin; posterolateral margin of tergite 4 with dense, silvery gray microtomentose spots; posteromedial and lateral margins of tergite 5 with bands of dense, silvery gray microtomentum. Male genitalia (Figures 111–113): epandrium-cerci-surstyli complex fused; epandrium a narrow U-shaped band; cercus completely fused laterally with epandrium, bearing many long setulae, and with rounded posteroventral projection; surstylus fused dorsally with epandrium, posteroventrally with many small setae; aedeagal apo-



FIGURES 111–113.—Male genitalia of *Nostima spilogaster* Cresson: 111, epanthrium, cercus, fused surstylus, lateral aspect; 112, internal male genitalia, ventral aspect; 113, same, lateral aspect. Scale = 0.05 mm.

deme triangular in lateral view, posterior projection sharply pointed laterally, anterior projection sharply pointed laterally, lateral projections sharply pointed; aedeagus U-shaped with ventral groove, ventrally with field of spines, posteriorly with bluntly rounded curved dorsal projection; subepandrial plate-gonite fused; subepandrial plate narrow; gonite fused anterolaterally with subepandrial plate, with prominent medial setulae, posterior projection rounded, ventral projection broadly triangular; hypandrium a triangular plate, rounded anteriorly.

**TYPE MATERIAL.**—The holotype male of *Nostima spilogaster* Cresson is labeled “Higuito San Mateo CR/Pablo Schild Coll/Type No. Nostima [handwritten] spilogaster [handwritten] E. T. Cresson, Jr. [red]/Type No 70633 [handwritten] USNM [red].” The holotype is double mounted (wooden minuten through ventral thorax, minuten glued to a paper point), is in fair condition (dusty with cob webs; many setae of head and thorax broken; left flagellomere 1 missing; left wing in an attached microvial), and is deposited in the USNM (70633).

**OTHER SPECIMENS EXAMINED** (96♂, 76♀).—ARGENTINA. *Misiones*: Ignacio, Misiones, May 1961, N.L.H. Krauss (1♂; USNM); Iguazu, 4–10 Oct 1927, R.C. and E.M. Shannon (1♂; USNM); Posadas, May 1961, N.L.H. Krauss (1♂; USNM). *Salta*: Embarcación, 2–6 Feb 1950, R.M. Golbach (5♂, 3♀; USNM).

BARBADOS. *Christ Church*: Rockley Beach (13°04.3′N, 59°35.2′W), 1–2 Sep 1997, W.N. Mathis (13♂, 9♀; USNM); Rockley Beach, 29 Aug–2 Sep, V. Hollmann (1♂, 4♀; ZMHU). *St. Joseph*: Joes River (13°12.8′N, 59°32.3′W), 10 Sep 1996, W.N. Mathis (2♂, 1♀; USNM). *St. Thomas*: Farmers (13°12.8′N, 59°35.5′W), 2 Sep 1997, W.N. Mathis (3♂, 1♀; USNM).

BELIZE. *Stann Creek*: Salt Creek (12 km N Dangriga), 28 Mar 1988, W.N. Mathis (1♂; USNM).

BOLIVIA. *La Paz*: Chulumani (2 km S; 16°23.5′S, 67°31.8′W; 1750 m), 9–10 Mar 2001, W.N. Mathis (1♀; USNM); Guanay (3 km E; 15°30.2′S, 67°52.3′W; 500 m), 14 Mar 2001, W.N. Mathis (5♂, 3♀; USNM); Mapiri (15°18.6′S, 68°13′W; 720 m), 15 Mar 2001, W.N. Mathis (4♀; USNM).

BRAZIL. *Paraná*: Londrina, 5 Sep 1960, P. Marston (1♀; KANS). *Rio de Janeiro*: Ilha de Marambaia (23°03.6′S, 43°59.1′W), 4 Sep 2000, D. and W.N. Mathis (1♀; USNM). *Rio Grande do Sul*: Bagé, 28 Feb 1961, P. Marston (1♀; KANS). *Santa Catarina*: Nova Teutônia, 25 Mar 1938, F. Plaumann (1♂; BMNH); Nova Teutônia, Apr 1950, F. Plaumann (1♀; USNM); Nova Teutônia, Aug 1964, F. Plaumann (1♀; CNC).

COSTA RICA. *San José*: San José La Caja (8 km W), 1930, H. Schmidt (1♀; USNM).

DOMINICA. *Cabrit Swamp* (15°35′N, 61°29′W), 22 Mar 1989, W.N. Mathis (2♀; USNM). *Clarke Hall Estate*, 8–10 Jan to 1–8 Aug 1964, 1965, 1966, T.J. Spilman, G.C. Steyskal, W.W. Wirth (6♂, 2♀; USNM). *Grand Savane*, 8 Sep 1965, D.L. Jackson (1♂; USNM). *Layou River* (mouth), 20 Jan 1965, W.W. Wirth (2♂; USNM). *Pont Casse* (15°22′N, 61°21′W), 18 Jun 1991, D. and W.N. Mathis (1♂; USNM). *Toucarí*, 21 Mar 1989, W.N. Mathis (2♂; USNM).

DOMINICAN REPUBLIC. *Azuá*: Padre Las Casas (8 km NE; Río Las Cuevas; 18°46′N, 70°53′W; 580 m), 7 Aug 1990, J. Rawlins, S. Thompson (1♀; CARN). *Independencia*: Los Pinos (4 km S; Loma de Vientos; 18°35′N, 71°46′W; 455 m; semiarid deciduous forest with pastures), 23 Jul 1992, R. Davidson, J. Rawlins, S. Thompson, C. Young (1♂; CARN).

ECUADOR. *Orellana*: Río Tiputini (0°38.2′S, 76°8.9′W), 12–26 Aug 1999, W.N. Mathis, A. Baptista, M. Kotrba (4♂, 3♀; USNM).

EL SALVADOR. *Santa Ana*: Cerro Monte Cristo (2134 m), Feb 1954, W.B. Heed (1♂; USNM).

GRENADA. *St. Andrew*: Grand Étang (12°05.6′N, 61°41.7′W; lake), 13–14 Sep 1997, W.N. Mathis (3♂, 6♀; USNM); *La Force Bridges* (12°07.6′N, 61°39.8′W), 13 Sep 1997, W.N. Mathis (1♂; USNM).

GUADELOUPE. *Lamentin*, Ravine Chaude, 25–30 Nov 2001, M. Martinez (2♂; MART).

GUATEMALA. *Izabal*: Las Escobas, 15 Jul 1986, L. LeSage (1♀; CNC).

GUYANA. *Georgetown* (6°48.6′N, 58°8.6′W), 20–29 Aug 1997, W.N. Mathis (2♂, 3♀; USNM).

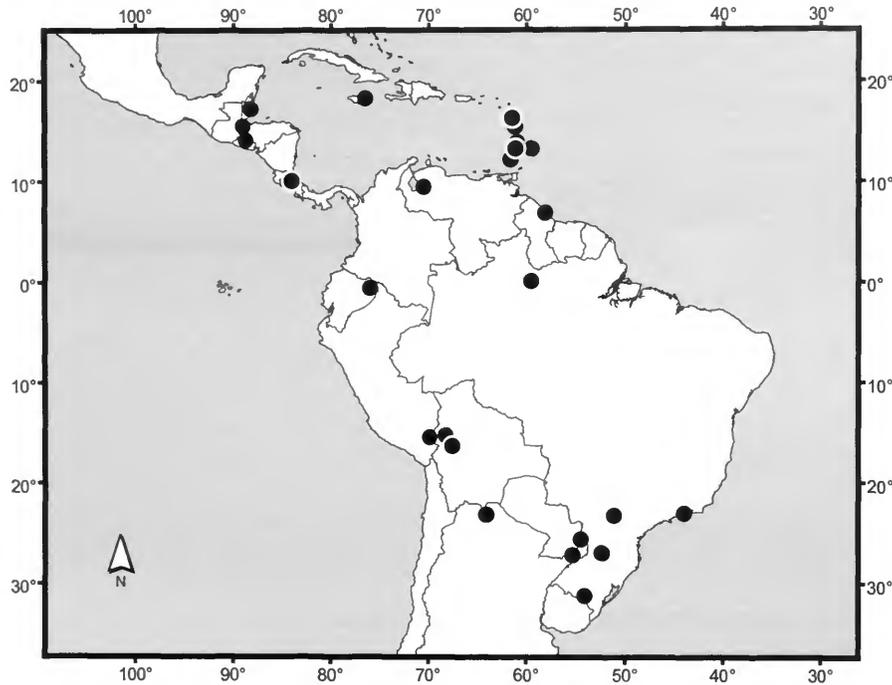


FIGURE 114.—Distribution map for *Nostima spilogaster* Cresson.

**JAMAICA.** *Portland:* Crystal Springs (18°12.5'N, 76°37.9'W), 18 May 1996, D. and W.N. Mathis, H.B. Williams (8♂, 2♀; USNM); Reach (4 km N; 18°03.6'N, 76°20.4'W), 15 May 1996, D. and W.N. Mathis, H.B. Williams (6♂, 3♀; USNM). *St. Andrew:* Cinchona (18°04.4'N, 76°39.3'W; 1400 m), 29 Apr 2000, W.N. Mathis (1♂; USNM). *St. Thomas:* Bath River, Bath (17°56.8'N, 76°21.6'W), 16 May 1996, D. and W.N. Mathis, H.B. Williams (3♂, 1♀; USNM).

**ST. LUCIA.** Fond St. Jacques (13°50'N, 61°02'W), 13–14 Jun 1991, D. and W.N. Mathis (12♂, 12♀; USNM). Soufrière Botanical Garden (13°51'N, 61°04'W), 12 Jun 1991, D. and W.N. Mathis (1♂, 1♀; USNM).

**ST. VINCENT.** *Charlotte:* Montreal (13°12'N, 61°11'W), 26 Mar 1989, W.N. Mathis (1♂, 2♀; USNM). *St. Andrew:* Camden Park, 25 Mar 1989, W.N. Mathis (1♂; USNM); Camden Park (13°10.2'N, 61°14.7'W), 4 Sep 1997, D. and W.N. Mathis (1♂, 1♀; USNM). *St. George:* Kingstown, Botanical Garden, 25–27 Mar 1989, W.N. Mathis (1♂, 1♀; USNM). *St. Patrick:* Hermitage (13°15'N, 61°12.9'W), 9 Sep 1997, W.N. Mathis (1♂, 1♀; USNM).

**VENEZUELA.** *Trujillo:* Motatan, 1 Aug 1930, H.J. MacGillivray (2♀; ZMAM).

**DISTRIBUTION** (Figure 114).—*Neotropical:* Argentina (Misiones, Salta), Belize (Stann Creek), Bolivia (La Paz), Brazil (Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina), Costa Rica (San José), Ecuador (Orellana), El Salvador (Santa Ana), Guatemala (Izabal), Guyana, Venezuela (Trujillo), West

Indies (Barbados, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, St. Lucia, St. Vincent).

**ETYMOLOGY.**—Cresson named *N. spilogaster* from the Latin words *spilo*, meaning spot, and *gaster*, meaning belly, for the spotted appearance of the lateral thorax.

**REMARKS.**—*Nostima spilogaster* has triangle-shaped microtomentose spots along the abdomen and white spots around the wing crossveins, which are similar to those found in *N. lutea*, *N. niveivenosa*, and *N. spinosa*.

### 30. *Nostima spinosa*, new species

FIGURES 115–118, 168, 237, 238

**DIAGNOSIS.**—*Nostima spinosa* is distinguished from congeners by the following combination of external characters: mesonotum unicolorous; crossveins r-m and dm-cu white (sometimes surrounded by white spot), contrasted with yellowish to brownish veins; tergite 2 with sparse, silvery gray microtomentose spots along posteromedial margin; tergites 2 and 3 with dense, silvery gray microtomentum on posterolateral margins and extending anterolaterally in triangular pattern to cover lateral tergite; and posterior margin of tergite 5 covered with band of dense, silvery gray microtomentum.

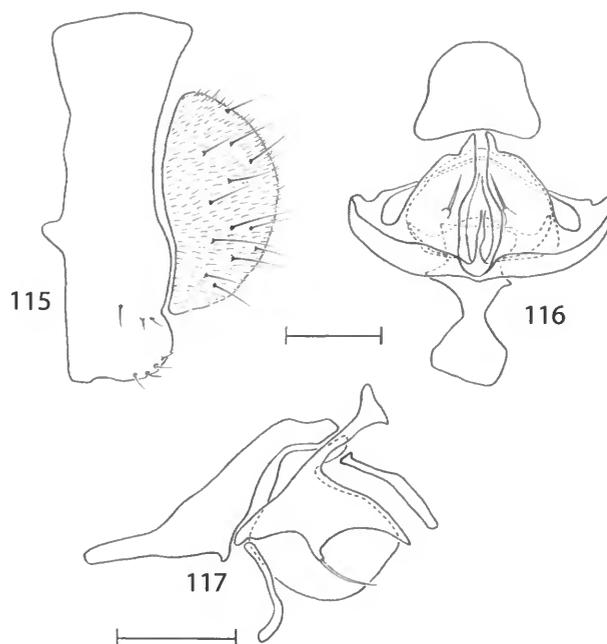
**DESCRIPTION.**—Minute to small shore flies, body length 0.80–1.10 mm; yellowish brown to brown with yellowish silver and silvery gray microtomentum.

**Head:** Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle yellowish

brown with yellowish silver microtomentum. Occiput with dense, silvery gray microtomentum with sparse band medially. Outer vertical seta  $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellowish brown, dorsally slightly darker; flagellomere 1 brown dorsally, ventrally yellowish brown; arista dorsally branched. Facial background brown with yellowish silver and silvery gray microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at antennae, extending and gradually blending with silvery gray microtomentum on gena. Face covered medially with dense, yellowish silver microtomentum. Gena covered with dense, silvery gray microtomentum; postgena covered with dense, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum brown.

**Thorax** (Figure 168): Scutal length 0.34–0.37 mm; scutellar length 0.12–0.15 mm. Mesonotum unicolorous brown with silvery gray microtomentum, slightly darker circles at base of dorsocentral setae and supra-alar setae; scutellum brown, slightly darker than mesonotum, with silvery gray microtomentum and with dense, silvery gray microtomentum on lateral margins; anepisternum appearing striped, dorsal  $\frac{1}{4}$  bare, black, and ventral  $\frac{3}{4}$  with dense, silvery gray microtomentum, microtomentum sparse medially; katepisternum with dense, silvery gray microtomentum on dorsal  $\frac{1}{4}$ , and ventral  $\frac{3}{4}$  bare, black; subscutellum brown with yellowish silver microtomentum; anatergite yellowish silver microtomentum on dorsal  $\frac{3}{4}$ , shiny black, bare on ventral  $\frac{1}{4}$ . Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$  length of posterior seta; anterior scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 168): length 0.92–0.98 mm; width 0.44–0.46 mm; costal-vein ratio 1.08–1.17; M-vein ratio 0.75–0.93; amber background, slightly darker in b-m, along M between crossveins r-m and dm-cu and in m; veins yellowish brown, crossveins r-m and dm-cu white. Halter yellowish white. Legs yellowish brown to brown; hindtibia yellowish brown with medioproximal and mediolateral brown bands; tarsi yellowish brown with tarsomere 5 brown.

**Abdomen** (Figures 115–117, 237, 238): Background dark brown with yellowish silver microtomentum; tergite 2 with sparse, silvery gray microtomentose spots along posteromedial margin, posterolateral margins with dense, silvery gray microtomentum extending anterolaterally in triangular pattern to cover lateral tergite; tergite 3 shiny, posterolateral margins with dense, silvery gray microtomentum extending anterolaterally in triangular pattern to cover lateral tergite; tergite 4 shiny, mediolaterally with dense, silvery gray microtomentum extending anterolaterally and posterolaterally in triangular pattern to cover lateral tergite; tergite 5 shiny, posterior margin covered with band of dense, silvery gray microtomentum. Male genitalia (Figures 115–117): epandrium and surstyli fused; epandrium a well-developed inverted U-shaped band evenly wide across dorsum, anteroventral margin with rounded projection to which apical arm of hypandrium and lateral portion of subepandrial plate meet; cercus broadly crescent-shaped, bearing long setulae; surstylus elongate in lateral view with ventral portion rectangular, ventral margin bearing setae; 10<sup>th</sup> sternite well



FIGURES 115–117.—Male genitalia of *Nostima spinosa*, new species: 115, epandrium, cercus, fused surstylus, lateral aspect; 116, internal male genitalia, ventral aspect; 117, same, lateral aspect. Scale = 0.05 mm.

developed, triangular, situated ventrad of cercus, with rounded anterodorsal projection; aedeagal apodeme elongate, triangular, posterior projection spatulate, anterior projection broadly triangular, lateral projections pointed; aedeagus in lateral view as long as broad, posterior portion broadly rounded, anterior portion more heavily sclerotized with rounded dorsal projection; subepandrial plate-gonite fused; subepandrial plate a narrow arch dorsad of aedeagus, articulated laterally with epandrium; gonite in lateral view with broad base with prominent, pointed, posterodorsal projection and ventrolateral projection bearing prominent spinose setula; hypandrium trapezoidal with pointed anterolateral projections.

**TYPE MATERIAL.**—The holotype male of *Nostima spinosa* is labeled “BERMUDA: Paget Parish Botanical Gardens 15 November 1987 N.E. Woodley/HOLOTYPE ♂ *Nostima spinosa* Edmiston & Mathis USNM [red].” The holotype is glued by the right thorax to a paper point, is in good condition (left wing in an attached microvial), and is deposited in the USNM. Paratypes are as follows: **BERMUDA.** *Devonshire:* Devonshire Marsh (32°18'N, 64°45'W), 30 May 1991, W.N. Mathis (2 ♀; USNM); Devonshire Marsh (32°18'N, 64°44'W), 29 May 1991, W.N. Mathis (1 ♀; USNM). *Hamilton:* Shelly Bay Beach (32°19'N, 64°44'W), 31 May 1991, W.N. Mathis (1 ♂; USNM). *Paget:* Hungry Bay (32°17'N, 64°45'W; beach), 2 Jun 1991, W.N. Mathis (1 ♂; USNM); Paget Marsh (32°17'N, 64°47'W), 3 Jun 1991, W.N. Mathis (22 ♂, 13 ♀; USNM). *St. George:* 23 Jan 1934, A.L. Melander (1 ♀; USNM). *War-*

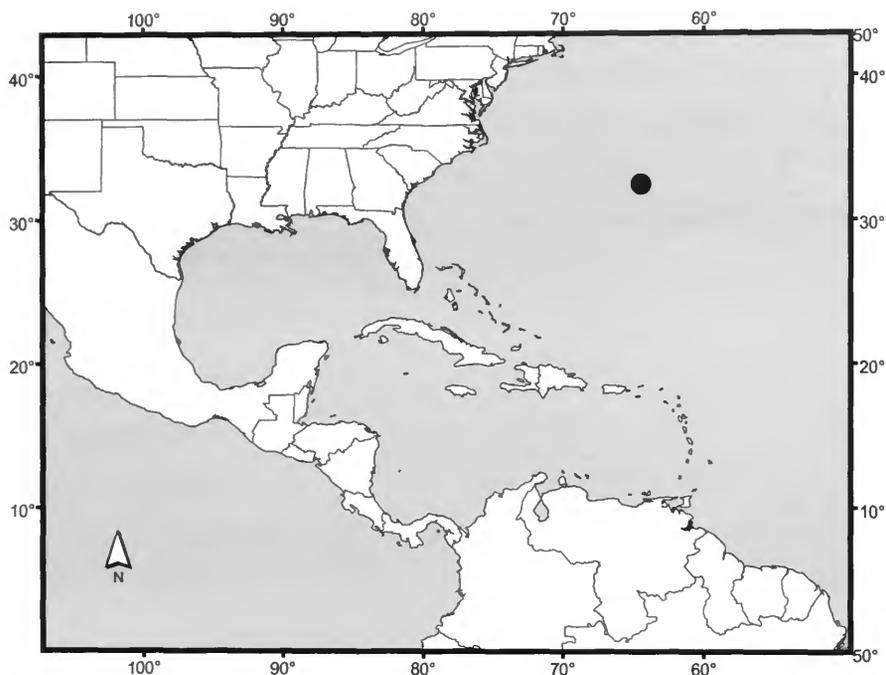


FIGURE 118.—Distribution map for *Nostima spinosa*, new species.

wick: Warwick Long Bay, 18 Nov 1987, N.E. Woodley (1 ♂; USNM).

DISTRIBUTION (Figure 118).—*Nearctic*: Bermuda.

ETYMOLOGY.—The species epithet, *spinosa*, is derived from the Latin word *spina*, meaning spine. The name refers to the prominent spine located ventrally on the gonite.

REMARKS.—*Nostima spinosa* has triangle-shaped microtomentose spots along the abdomen and white spots around the wing crossveins, which are similar to those found in *N. lutea*, *N. niveivenosa*, and *N. spilogaster*.

### 31. *Nostima stellata*, new species

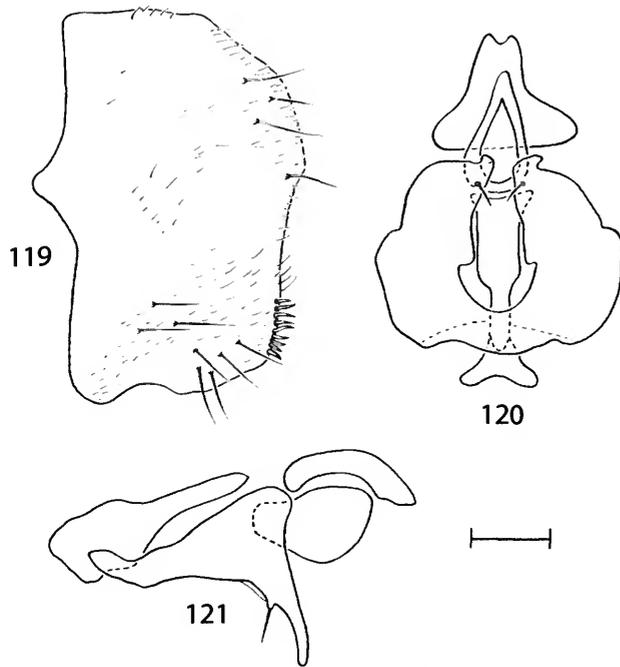
FIGURES 119–122, 169, 239, 240

DIAGNOSIS.—*Nostima stellata* is distinguished from congeners by the following combination of external characters: gena with ventral portion bare, shiny; mesonotum distinctly bicolored, with medial portion between dorsocentral setae unicolorous, yellowish brown with golden microtomentum, and area immediately laterad with silvery gray microtomentum; wing conspicuously spotted: cell  $r_{2+3}$  with 3 spots (2 spots apical of vein  $R_1$  and 1 spot basal of spurious vein); cell  $r_{4+5}$  with 1 L-shaped spot subapically and along vein M overlapping into cell m; cell m with 1 spot medially; cell  $cua_1$  with 1 spot distally; vein  $R_{2+3}$  with subapical spurious vein; and tergites lacking dense, microtomentose spots.

DESCRIPTION.—Minute to small shore flies, body length 0.90–1.10 mm; yellowish brown to brown with yellowish silver, golden, and silvery gray microtomentum.

*Head*: Frons with brown ventrolateral triangles, anterior semicircle brown with golden brown microtomentum, slightly darker medially. Occiput brown with yellowish silver microtomentum. Outer vertical seta  $\frac{1}{2}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellowish brown; flagellomere 1 with ventral  $\frac{2}{3}$  yellowish brown and dorsal  $\frac{1}{3}$  brown; arista dorsally branched. Facial background coloration yellowish brown with golden microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at inner vertical seta, extending along parafacial, and continuing to gena. Face medially yellowish brown with sparse, yellowish silver microtomentum, center of face slightly paler. Medially along silvery parafacial, a narrow yellowish brown band extending lateroventrally below gena. Gena dorsally covered with dense, silvery gray microtomentum, ventrally bare and shiny brown; postgena brown, covered with silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 169): Scutal length 0.33–0.38 mm; scutellar length 0.13–0.14 mm. Mesonotum yellowish brown with golden microtomentum, mediolaterally slightly paler coloration; dorsocentral line yellowish brown with golden microtomentum; band of silvery gray microtomentum between dorsocentral line and intra-alar setae; scutellum dorsally yellowish



FIGURES 119–121.—Male genitalia of *Nostima stellata*, new species: 119, epandrium, cercus, fused surstylus, lateral aspect; 120, internal male genitalia, ventral aspect; 121, same, lateral aspect. Scale = 0.05 mm.

brown with golden microtomentum, slightly darker laterally, laterally with dense, silvery gray microtomentum contiguous with mesonotal band; anepisternum yellow; katepisternum yellow; subscutellum yellowish brown; anatergite yellowish brown with sparse, silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 169): length 1.06–1.12 mm; width, 0.38–0.43 mm; costal-vein ratio 1.67–1.80; M-vein ratio 0.16; generally pale amber background; veins and cross-veins brown; vein  $R_{2+3}$  with subapical spurious vein; vein  $CuA_1$  slightly S-shaped; 6 white spots as follows: cell  $r_{2+3}$  with 3 spots (2 spots apical of vein  $R_1$  and 1 spot basal of spurious vein); cell  $r_{4+5}$  with 1 L-shaped spot subapically and along vein M overlapping into cell m; cell m with 1 spot medially; cell  $cua_1$  with 1 spot distally. Halter yellowish white. Legs yellow to yellowish brown, slightly darker distally; tarsomere 5 yellowish brown.

**Abdomen** (Figures 119–121, 239, 240): Background shiny dark brown; tergites 1 and 2 with sparse, yellowish golden microtomentum; tergites 3–5 shiny dark brown. Male genitalia (Figures 119–121): epandrium-cerci-surstyli complex fused; epandrium broad in dorsal region of complex with rounded anteromedial projection; cercus completely fused laterally with epandrium, with many setulae; surstylus broadly rectangular and completely fused dorsally with epandrium, with many long

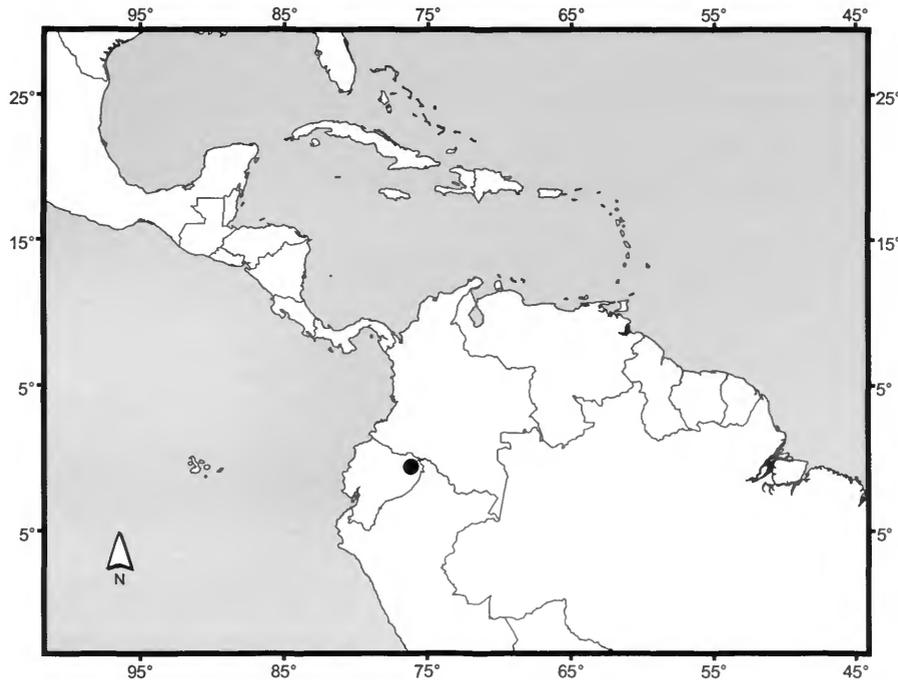


FIGURE 122.—Distribution map for *Nostima stellata*, new species.

setae and with posteroventral region of dense smaller setae; 10<sup>th</sup> sternite well developed, triangular, situated ventrad of cerci; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection triangular with rounded lateral projections, medial projections rounded; aedeagus rectangular in lateral view, triangular in ventral view with rounded posterior projection; subepandrial plate-gonite-hypandrium fused; subepandrial plate dorsally fused with epandrium to form shelf-like plate, ventrally fused with hypandrium, laterally fused with gonite, posteriorly separated from gonite by V-shaped space; gonite with rounded posterior projection and prominent ventrolateral setulae; hypandrium fused posteriorly with subepandrial plate, with small rounded anterior margin.

**TYPE MATERIAL.**—The holotype male of *Nostima stellata* is labeled "ECUADOR. P[ue]rt[o]. Or[e]ll[a]na: RioTiputini(0°38.2'S, 76°8.9'W)[.] 12–26Aug 1999, W.N.Mathis, A. Baptista, M. Kotrba/HOLOTYPE ♂ *Nostima stellata* Edmiston & Mathis USNM [red]." The holotype is double mounted (minuten in a plastic block), is in good condition (abdomen removed and dissected, parts in an attached microvial; left wing missing), and is deposited in the USNM. One paratype (1 ♀; USNM) bears the same locality label data as the holotype.

**DISTRIBUTION** (Figure 122).—*Neotropical*: Ecuador (Orellana).

**ETYMOLOGY.**—The species epithet, *stellata*, is derived from the Latin noun *stella*, meaning star, and alludes to the pattern of spots on the wing.

**REMARKS.**—The single spurious vein located ventrodistally on vein R<sub>1</sub> is not considered to be homologous with the spurious veins of *N. ilytheoides*, *N. maculata*, and *N. slossonae*.

### 32. *Nostima tresguttata*, new species

FIGURES 123, 170, 241, 242

**DIAGNOSIS.**—*Nostima tresguttata* is distinguished from congeners by the following combination of characters: face evenly microtomentose, mostly unicolorous, lacking bare, shiny areas; mesonotum between dorsocentral setal tracks dark, chestnut brown, densely microtomentose, usually with a whitish gray or gray narrow stripe just laterad of dorsocentral setae, stripe not much wider than fronto-orbital stripe; postpronotum and dorsal 1/3 of anepisternum light yellowish brown ventrally, contrasted with dark yellowish brown ventrally; wing uniformly and distinctly amber colored; veins and crossveins unicolorous, yellowish brown; vein R<sub>2+3</sub> short, straight to very shallowly arched anteriorly, approximate to costal vein; apical section of vein CuA<sub>1</sub> long, about 5–6 times length of crossvein dm-cu; and pleural areas mostly gray, microtomentose, largely unicolorous, lacking stripes.

**DESCRIPTION.**—Minute to small shore flies, body length 0.85–1.25 mm; generally dark colored with area between dorsocentral setae brown with silvery gray microtomentose lateral stripes; legs yellow to yellowish brown.

**Head:** Frons with brown velvety ventrolateral triangles, anterior semicircle brown with yellowish silver microtomentum. Occiput medially brown with yellowish silver microtomentum, laterally with silvery gray microtomentose stripes contiguous with thoracic stripes. Outer vertical seta 1/2–2/3 length of inner vertical seta; paravertical seta absent. Scape and pedicel dark yellowish brown; flagellomere 1 brown; arista dorsally branched. Facial background coloration brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Face brown with silvery gray microtomentum. Medially along silvery parafacial, a narrow brown band extending lateroventrally below gena. Gena brown with silvery gray microtomentum; postgena brown with sparse, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax** (Figure 170): Scutal length 0.35–0.45 mm; scutellar length 0.15–0.21 mm. Mesonotum medially brown with yellowish silver microtomentum, slightly darker along dorso-central line, intra-alar line with dense, silvery gray microtomentum; scutellum medially brown with yellowish silver microtomentum, slightly darker laterally, with lateral stripes of dense, silvery gray microtomentum; anepisternum dorsal 1/3 light yellowish brown, ventral 2/3 dark yellowish brown with silvery gray microtomentum; katopisternum yellowish brown with silvery gray microtomentum; subscutellum brown with yellowish silver microtomentum; anatergite brown with yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta 1/3–1/2 length of posterior seta; anterior notopleural seta 1/2–2/3 length of posterior seta; lateral scutellar seta 1/3 length of apical seta. Wing (Figure 170): length 0.98–1.46 mm; width 0.38–0.60 mm; costal-vein ratio 1.34–1.58; M-vein ratio 0.21–0.22; amber background with yellowish brown veins and crossveins. Halter yellowish white. Legs pale yellowish brown with tarsomere 5 slightly darker.

**Abdomen** (Figures 241, 242): Background shiny dark brown; tergite 1 dark brown and covered with sparse, yellowish silver microtomentum; tergite 2 covered with sparse, yellowish silver microtomentum, posterodorsal margins with yellowish silver microtomentum; tergite 3 covered with sparse, yellowish silver microtomentum, posterolateral margins with rectangular spot of dense, silvery gray microtomentum; tergite 4 shiny dark brown, posterolateral margins with spot of dense, silvery gray microtomentum; tergite 5 shiny dark brown, posterolateral margins with spot of dense, silvery gray microtomentum. Male unknown.

**TYPE MATERIAL.**—The holotype female of *Nostima tresguttata* is labeled "ECUADOR: Napo Prov. Baeza (17 km. S.) 1815 m. elev. 17 Jan 1978 W.N.Mathis/HOLOTYPE ♀ *Nostima tresguttata* Edmiston & Mathis USNM [red]." The holotype is double mounted (minuten inserted through right thorax anterior of halter), is in good condition (right wing in an attached microvial), and is deposited in the USNM.

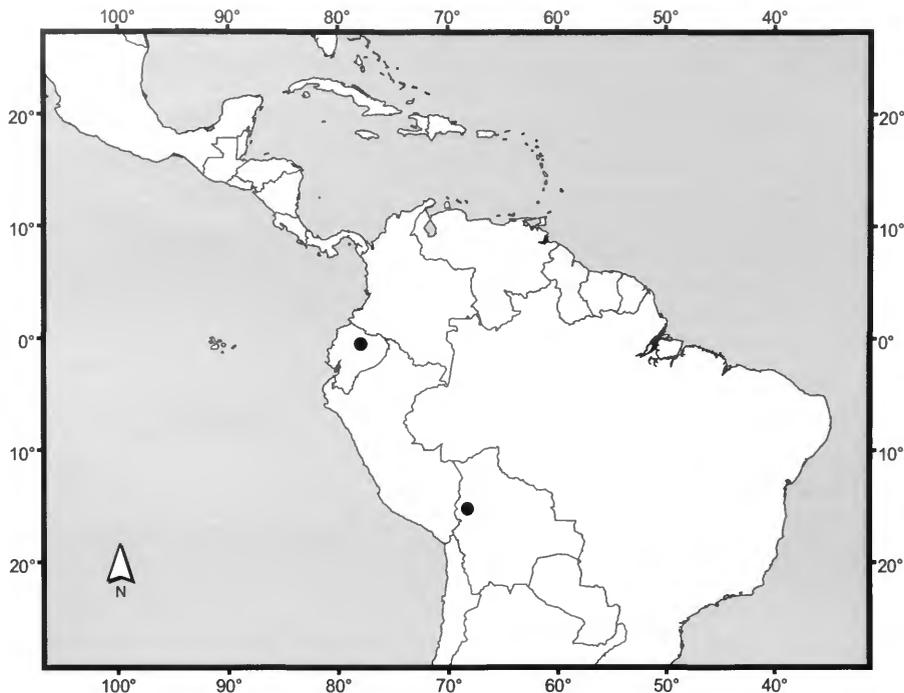


FIGURE 123.—Distribution map for *Nostima tresguttata*, new species.

OTHER SPECIMEN EXAMINED (1 ♀).—BOLIVIA. *La Paz*: Mapiro (15°17.8'S, 68°15.6'W; 750 m), 16 Mar 2001, W.N. Mathis (1 ♀; USNM).

DISTRIBUTION (Figure 123).—*Neotropical*: Bolivia (La Paz), Ecuador (Napó).

ETYMOLOGY.—The species epithet, *tresguttata*, is of Latin derivation and is a combination of *tres*, meaning three, and *guttata*, meaning a small spot. The name refers to the three spots along the abdomen.

REMARKS.—The unique maculation pattern of the abdomen provides the evidence that these female specimens represent a new species even though males are unavailable as additional confirmation.

We note variation in color in the pleural area. The female from Bolivia has a yellowish band that extends from the postpronotum through the dorsal one-third of the anepisternum. Although the holotype, which is from Ecuador, is paler in this area, a distinct band is not evident.

### 33. *Nostima velutina*, new species

FIGURES 124–127, 171, 243, 244

DIAGNOSIS.—*Nostima velutina* specimens are distinguished from congeners by the following combination of external characters: gena with dense microtomentum ventrally; velvety black microtomentum on scutum between dorsocentral setae and over entire scutellar disc, slightly less dense anteriorly; me-

sonotum striped laterally; wing crossveins paler than veins, white, at least anterior portion; and tergite 5 of male with silvery gray microtomentum along posteriomedial margin.

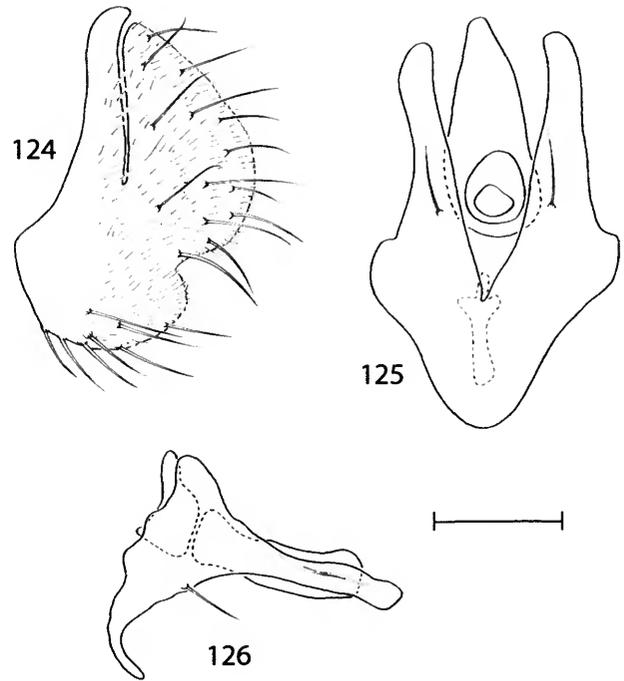
DESCRIPTION.—Small shore flies, body length 1.15–1.25 mm; pale to dark brown with silver, silvery gray, velvety black, velvety brown, yellowish silver, and golden microtomentum.

*Head*: Frons with velvety brown ventrolateral triangles, anterior semicircle brown with yellowish silver microtomentum. Occiput brown with yellowish silver microtomentum, laterally with silvery gray microtomentous stripes contiguous with silvery gray microtomentum on thorax. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta absent. Scape and pedicel yellowish brown; flagellomere 1 yellowish brown ventrally, brown dorsally. Facial background coloration yellowish brown with golden silvery microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face yellowish brown with golden silvery microtomentum. Gena with dense, silvery gray microtomentum; postgena dorsally with dense, silvery gray microtomentum in band contiguous with band of silvery gray microtomentum laterally on thorax. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 171): Scutal length 0.38–0.42 mm; scutellar length 0.18–0.19 mm. Mesonotum yellowish brown with

yellowish silver microtomentum, darker along dorsocentral line, stripe of silvery gray microtomentum along interalar line; scutellum medially yellowish brown with yellowish silver microtomentum, darker laterally, with lateral silvery gray microtomentum contiguous with silvery gray microtomentum on mesonotum; anepisternum yellowish brown with sparse, yellowish silver microtomentum; katapisternum dorsally with silvery gray microtomentum, ventrally yellowish brown with sparse, yellowish silver microtomentum; subscutellum yellowish brown with sparse, yellowish silver microtomentum; anatergite yellowish brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of apical seta. Wing (Figure 171): length 1.08–1.30 mm; width 0.49–0.58 mm; costal-vein ratio 0.80–0.93; M-vein ratio 0.40–0.63; amber background with brown veins; crossveins r-m and dm-cu white and surrounded by white spot. Halter yellowish white. Legs pale yellowish brown with tarsomere 5 darker.

**Abdomen** (Figures 124–126, 243, 244): Tergites 1–5 shiny dark brown; tergite 4 with oval-shaped silvery gray microtomentose posterolateral spot; tergite 5 with small, silvery gray microtomentose patch on posteromedial margin. **Male genitalia** (Figures 124–126): epandrium-cerci-surstyli complex fused; epandrium U-shaped; cercus crescent-shaped with many setulae, fused ventrally with epandrium, separated dorsally from epandrium by narrow V-shaped groove; subepandrial plate-



FIGURES 124–126.—Male genitalia of *Nostima velutina*, new species: 124, epandrium, cercus, fused surstylus, lateral aspect; 125, internal male genitalia, ventral aspect; 126, same, lateral aspect. Scale = 0.05 mm.

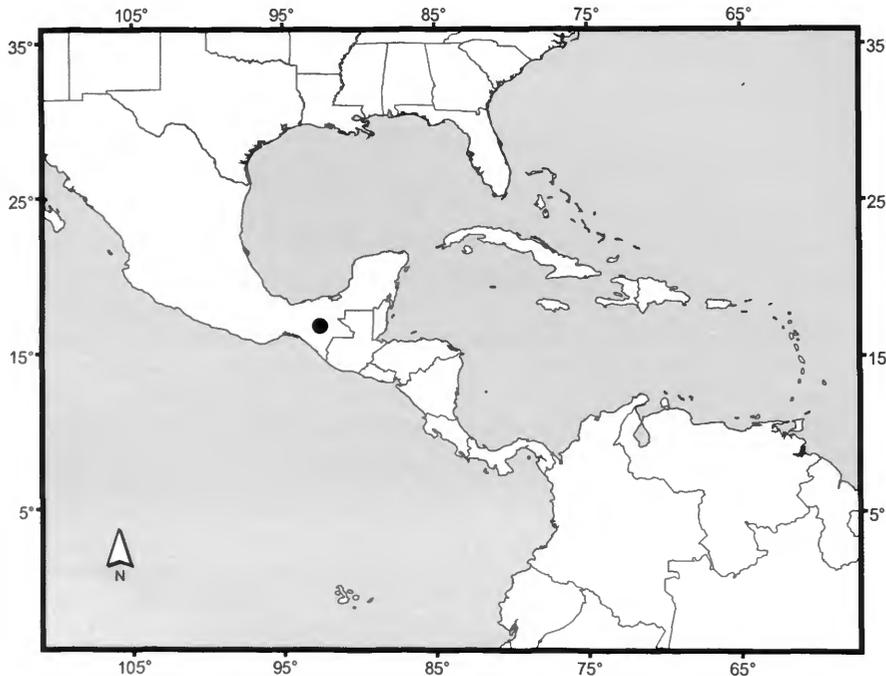


FIGURE 127.—Distribution map for *Nostima velutina*, new species.

gonite-hypandrium fused; surstylus completely fused ventrally with epandrium and with many ventral setae; aedeagal apodeme triangular in lateral view with rounded anterior and posterior projections, lateral medial projections rounded; aedeagus rectangular with tip curved dorsally; subepandrial plate reduced to a broad rounded dorsal projection; gonite with broad base and prominent medioventral setulae; gonite with posterior undulate projection with spatulate tip; hypandrium broadly triangular in ventral view.

**TYPE MATERIAL.**—The holotype male of *Nostima velutina* is labeled "MEXICO, Chi[apa]s. San Cristobal de Las Casas 7087[,] 18–19.V. 1969 [18–19 May 1969] B.V. Peterson/HOLOTYPE ♂ *Nostima velutina* Edmiston & Mathis CNC [red]." The holotype is glued on the right side of the head and thorax to a pin, is in good condition (thorax with small amount of dust; right wing torn posteriorly; left wing in an attached microvial), and is deposited in the CNC. One paratype (1 ♂; CNC) bears the same locality label data as the holotype.

**DISTRIBUTION** (Figure 127).—*Neotropical*: Mexico (Chiapas).

**ETYMOLOGY.**—The species epithet, *velutina*, is derived from the Latin adjective *velutinus*, meaning velvety. The name refers to the velvety appearance of the head and thorax.

**REMARKS.**—This species has external characters that are similar to the holarctic *N. picta*, as well as an elongated epandrium-surstylus that is similar to the widespread *N. slossonae* and *N. elegantula*. The exact relationships between *N. velutina* and other species of *Nostima* will depend upon collection of more material of *N. velutina*, which is presently represented by two specimens.

### 34. *Nostima williamsi*, new species

FIGURES 128–131, 172, 245, 246

**DIAGNOSIS.**—*Nostima williamsi* is distinguished from congeners by the following combination of characters: face evenly microtomentose, mostly unicolorous, lacking bare, shiny areas; mesonotum between dorsocentral setal tracks dark, chestnut brown, densely microtomentose, usually with a whitish gray or gray narrow stripe just laterad of dorsocentral setae, stripe not much wider than fronto-orbital stripe; wing uniformly and distinctly amber colored; veins and crossveins unicolorous, amber; vein  $R_{2+3}$  short, straight to very shallowly arched anteriorly, near to costal vein; apical section of vein  $CuA_1$  long, about 5–6 times length of crossvein  $dm-cu$ ; pleural areas mostly gray, microtomentose, mostly unicolorous, lacking stripes; and hindfemur of male normally developed, uniform dorsally and ventrally, similar to that of female.

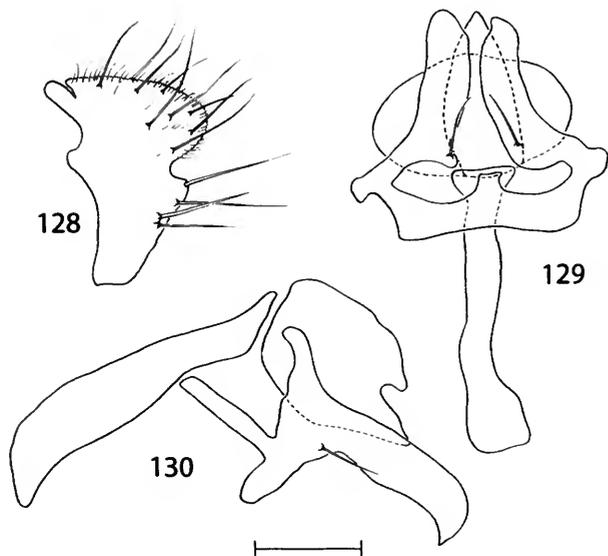
**DESCRIPTION.**—Small shore flies, body length 1.04–1.14 mm; generally dark colored with area between dorsocentral setae brown with silvery gray microtomentose lateral stripes; legs yellow to yellowish brown.

**Head:** Frons with brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle brown with

yellowish silver microtomentum. Occiput with yellowish silver microtomentum medially and laterally, and with lateral bands of silvery gray microtomentum contiguous with thoracic and facial stripes of silvery gray microtomentum. Outer vertical seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta minute. Scape and pedicel dark yellowish brown; flagellomere 1 yellowish brown ventrally, dark yellowish brown dorsally; arista dorsally branched. Facial background coloration brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical setae, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a brown band extending lateroventrally below gena. Face brown with silvery gray microtomentum. Gena covered with silvery gray microtomentum; postgena covered with sparse, silvery gray microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax** (Figure 172): Scutal length 0.38–0.42 mm; scutellar length 0.14 mm. Mesonotum yellowish brown with silvery yellow microtomentum, darker laterad of dorsocentral band, intra-alar band with dense, silvery gray microtomentum; scutellum medially yellowish brown with silvery yellow microtomentum, darker laterad, with lateral margins covered with dense, silvery gray microtomentum contiguous with intra-alar band; anepisternum yellowish brown with silvery gray microtomentum; katepisternum brown with silver gray microtomentum dorsally and bare ventrally; subscutellum brown with sparse, yellowish silver microtomentum; anatergite brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$ – $\frac{1}{2}$  length of apical seta. Wing (Figure 172): length 0.97–1.38 mm; width 0.39–0.55 mm; costal-vein ratio 1.08–1.44; M-vein ratio 0.16–0.17; amber background with yellowish brown veins and crossveins. Halter yellowish white. Legs pale yellowish brown; tarsi yellowish brown with tarsomere 5 slightly darker.

**Abdomen** (Figures 128–130, 245, 246): Background shiny dark brown; tergite 1 dorsally with sparse, yellowish microtomentum; tergite 2 dorsally with sparse, yellowish microtomentum and with dense, silver-colored microtomentose ventrolateral spot; tergite 3 dorsally with sparse, yellowish microtomentum and with dense, silver-colored microtomentose ventrolateral spot; tergite 4 shiny brown bare with dense, silver-colored microtomentose rounded ventrolateral spot; tergite 5 shiny brown bare. Male genitalia (Figures 128–130): epandrium-cerci-surstyli complex fused; epandrium a narrow dorsal band with rounded anteromedial projection; cercus crescent-shaped, fused laterally with epandrium, separated dorsally from epandrium by V-shaped space, bearing many long setulae; surstylus fused dorsally with epandrium, rounded, and with anterior and posterior projections, posteromedially bearing many long setulae; aedeagal apodeme rectangular with spatulate posterior projection and broadly rounded anterior projection; aede-



FIGURES 128–130.—Male genitalia of *Nostima williamsi*, new species: 128, epandrium, cercus, fused surstylus, lateral aspect; 129, internal male genitalia, ventral aspect; 130, same, lateral aspect. Scale = 0.05 mm.

agus with dorsal and ventral rounded projections in lateral view, in ventral view dorsal projection forming broad oval-shaped structure nearly as broad as gonites; subepandrial plate-gonite-hypandrium fused; subepandrial plate reduced to nar-

row band with small rounded dorsal projection; gonite with broad pointed posterior projection and prominent ventrolateral setula; hypandrium broadly triangular in ventral view with rectangular anterior projection folded and projected poster-oventrally.

**TYPE MATERIAL.**—The holotype male of *Nostima williamsi* is labeled “Higuito San Mateo C[osta]R[ica]/Pablo Schild Coll/HOLOTYPE ♂ *Nostima williamsi* Edmiston & Mathis USNM [red].” The holotype was broken while removing the abdomen; and the head and thorax are stored in an attached microvial; the abdomen is in a glycerin-filled microvial. The holotype is deposited in the USNM.

**OTHER SPECIMENS EXAMINED** (1 ♂, 2 ♀).—**COSTA RICA.** *Alajuela:* Higuito, San Mateo, P. Schild (1 ♂; USNM). *Heredia:* Heredia (Paso Llano; 1900 m), 27 Jan 1982, K.A. Spencer (1 ♀; WALES).

**JAMAICA.** *St. Andrew:* Hardwar Gap (18°04.2'N, 76°44'W; 1170 m), 27 Apr 2000, W.N. Mathis (1 ♀; USNM).

**DISTRIBUTION** (Figure 131).—*Neotropical:* Costa Rica (Alajuela, Heredia), West Indies (Jamaica).

**ETYMOLOGY.**—The species epithet, *williamsi*, is a genitive patronym to recognize the many contributions of Ms. Hollis B. Williams to the study of shore flies specifically and to Diptera generally.

**REMARKS.**—With better sampling, we suspect that this species will be found on other islands of the Greater Antilles and perhaps throughout Central America.

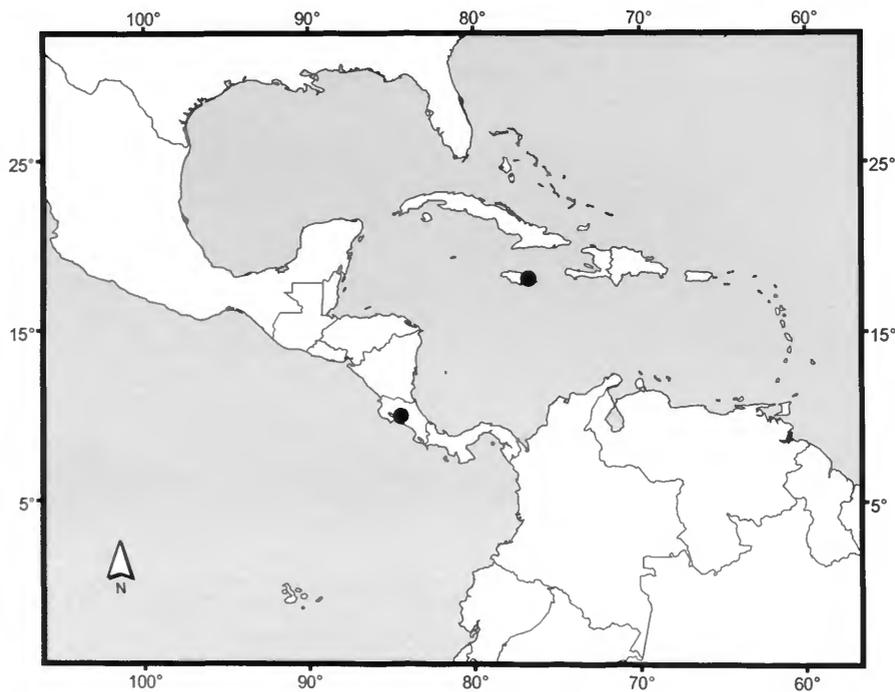


FIGURE 131.—Distribution map for *Nostima williamsi*, new species.

35. *Nostima willistoni* Wirth

FIGURES 132–135, 173, 247, 248

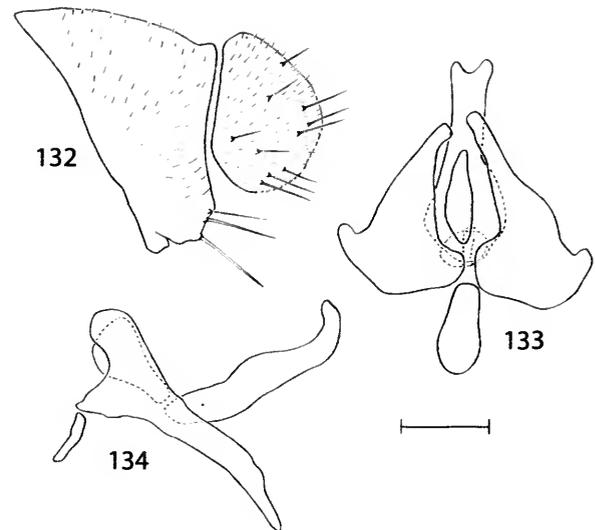
*Hydrina nitida* Williston, 1896:400 [preoccupied, Robineau-Desvoidy, 1830].  
*Nostima willistoni* Wirth, 1968:17 [replacement name for *Hydrina nitida* Williston, 1896, not Robineau-Desvoidy, 1830; Neotropical catalog].—Mathis and Zatwarnicki, 1995:194 [world catalog].

**DIAGNOSIS.**—*Nostima willistoni* is distinguished from congeners by the following combination of external characters: gena brown with silvery gray microtomentum; mesonotum unicolorous or mostly so, brown, shiny, sparsely microtomentose, not vittate; veins and crossveins generally unicolorous, yellowish brown to brown, at most crossveins r-m and dm-cu slightly paler in color than other veins; and tergites with pattern of microtomentose spots.

**DESCRIPTION.**—Minute to small shore flies, body length 0.90–1.05 mm; yellowish brown, brown, to dark brown with yellowish silver and silvery gray microtomentum.

**Head:** Frons with brown ventrolateral triangles covered with sparse, yellowish silver microtomentum, anterior semicircle shiny dark brown with sparse, yellowish silver microtomentum, medioventrally microtomentum more dense. Occiput shiny brown with sparse, yellowish silver microtomentum. Outer vertical seta absent; paravertical seta absent. Scape yellowish brown; pedicel yellowish brown, slightly darker dorsally; flagellomere 1 ventrally yellowish brown, slightly darker dorsally; arista dorsally branched. Facial background brown with yellowish silver and silvery gray microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at antenna, extending and gradually blending with silvery gray microtomentum on gena. Medially along parafacial, a dark brown band extending lateroventrally below gena. Face brown, covered with sparse, yellowish silver microtomentum, center of face with dense microtomentum. Gena shiny brown and covered with sparse, silvery gray microtomentum; post-gena shiny brown and covered with sparse, silvery gray microtomentum. Maxillary palpus yellow; prementum yellowish brown.

**Thorax** (Figure 173): Scutal length 0.33–0.39 mm; scutellar length 0.09–0.12 mm. Mesonotum shiny brown with sparse, yellowish silver microtomentum; scutellum shiny dark brown with dense, yellowish silver microtomentum; anepisternum shiny brown with sparse, silvery gray microtomentum; katapisternum shiny brown with sparse, silvery gray microtomentum; subscutellum shiny brown with sparse, yellowish silver microtomentum; anatergite shiny brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{3}$  length of posterior seta; anterior scutellar seta  $\frac{1}{4}$  length of posterior seta. Wing (Figure 173): length 0.90–1.11 mm; width 0.44–0.52 mm; costal-vein ratio 0.75–0.90; M-vein ratio 0.17–0.30; amber background with brown veins and crossveins. Halter yellowish white. Legs generally yellow to yellowish brown; tarsomeres slightly darker than other leg segments.



FIGURES 132–134.—Male genitalia of *Nostima willistoni* Wirth: 132, epanandrium, cercus, fused surstylus, lateral aspect; 133, internal male genitalia, ventral aspect; 134, same, lateral aspect. Scale = 0.05 mm.

**Abdomen** (Figures 132–134, 247, 248): Background shiny brown; tergites 1–5 covered with sparse, yellowish silver microtomentum; tergite 4 with silvery gray microtomentose posterolateral spot touching posterior margin. Male genitalia (Figures 132–134): epanandrium-surstyli fused; epanandrium a broad U-shaped band; cercus crescent-shaped and bearing many long setae; surstylus fused dorsally with epanandrium, with 3 long posteroventral setae on a posterior projection and with rectangular anterior projection; aedeagal apodeme triangular in lateral view, posterior projection spatulate, anterior projection with pointed lateral projections, anterior projection rounded; aedeagus heavily sclerotized, with anterior oval-shaped opening and pointed postero-ventral projection in ventral view; subepandrial plate reduced to region along posterior margin of gonites, plate with rounded dorsolateral projections; gonites broadly fused anteriorly to subepandrial plate, with rounded posterior projections; hypandrium triangular with squarely rounded posterior projections and broadly rounded anterior projection.

**TYPE MATERIAL.**—The holotype male of *Hydrina nitida* Williston is labeled “Type [circular label with red perimeter]/500 ft./[purple square]/St. Vincent, W.I. H. H. Smith/W. Indies. 1907-66./Hydrina nitida Will [handwritten; rectangular label with two red lines around perimeter, outer line thicker; folded in half].” The holotype is glued to a plastic point, is in poor condition (glue covering body; most setae and legs, except hindcoxa and hindfemur, missing), and is deposited in the BMNH.

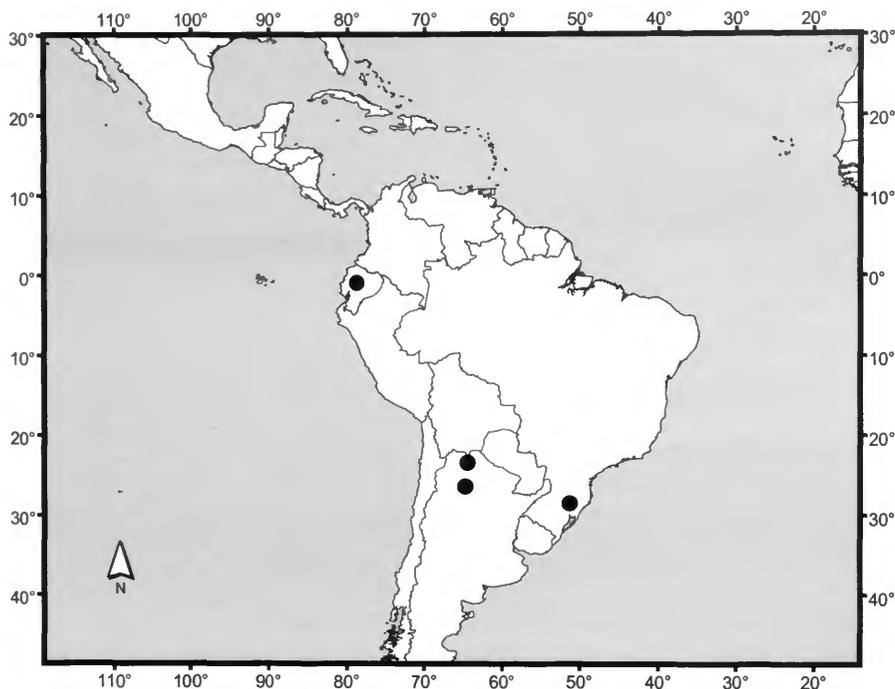


FIGURE 135.—Distribution map for *Nostima willistoni* Wirth.

OTHER SPECIMENS EXAMINED (5♂, 3♀).—DOMINICA. *Magnets* Gutter, 1–7 Mar 1965, W.W. Wirth (4♂, 3♀; USNM).

ST. VINCENT. H.H. Smith (1♂; BMNH).

DISTRIBUTION (Figure 135).—*Neotropical*: West Indies (Dominica, St. Vincent).

ETYMOLOGY.—W.W. Wirth named this species to honor Samuel W. Williston who originally described this species.

REMARKS.—*Nostima willistoni* was collected in 1907 by H.H. Smith and again in 1965 by W.W. Wirth. Originally, *N. willistoni* was named by Williston as *Hydrina nitida* from the Latin word *nitid*, meaning shiny and handsome. The shiny dark body with silvery gray microtomentum of *N. willistoni* adequately represents the original nomenclature.

### 36. *Nostima xenohypopia*, new species

FIGURES 136, 174, 249, 250

DIAGNOSIS.—*Nostima xenohypopia* is distinguished from congeners by the following combination of external characters: face anteromedially projected with rounded V-shaped projection; wing maculate with brown crossveins r-m and dm-cu; wing veins R<sub>4+5</sub> and M sinuous; tergites 3–5 with 2 parallel rows of microtomentose spots; and tergite 2 with large, round, microtomentose mediolateral spots.

DESCRIPTION.—Small shore flies, body length 1.48 mm; yellowish brown to brown with whitish silver microtomentum.

*Head*: Frons with brown ventrolateral triangles with whitish silver microtomentum, anterior semicircle brown with whitish silver microtomentum. Occiput brown with whitish silver microtomentum. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paraverticilar seta present. Scape and pedicel dorsally brown, ventrally whitish gray; flagellomere 1 dorsally brown, ventrally whitish gray. Facial background coloration yellowish brown with whitish gray microtomentum; narrow band of whitish silver microtomentum along eye margin beginning at outer vertical seta and extending to gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face anteromedially projected with rounded V-shaped projection. Face ventrally, medially, and dorsally with whitish gray microtomentum, darker yellowish brown bands medially across face between ocelli and also across face below medial shield-shaped whitish gray microtomentous band. Gena and postgena with whitish silver microtomentum, ventral margin of gena, ventral margin of postgena, and dorsal margin of gena shiny dark brown and forming contiguous bands with thoracic microtomentum pattern. Maxillary palpus yellow; prementum yellowish brown.

*Thorax* (Figure 174): Scutal length 0.41 mm; scutellar length 0.10 mm. Mesonotum medially with brown line laterally bounded with whitish gray bands; dorsocentral line brown, broken with whitish gray areas connecting medial and lateral stripes; whitish gray stripe between dorsocentral line and interalar seta; postpronotum with patches of brown and whitish sil-

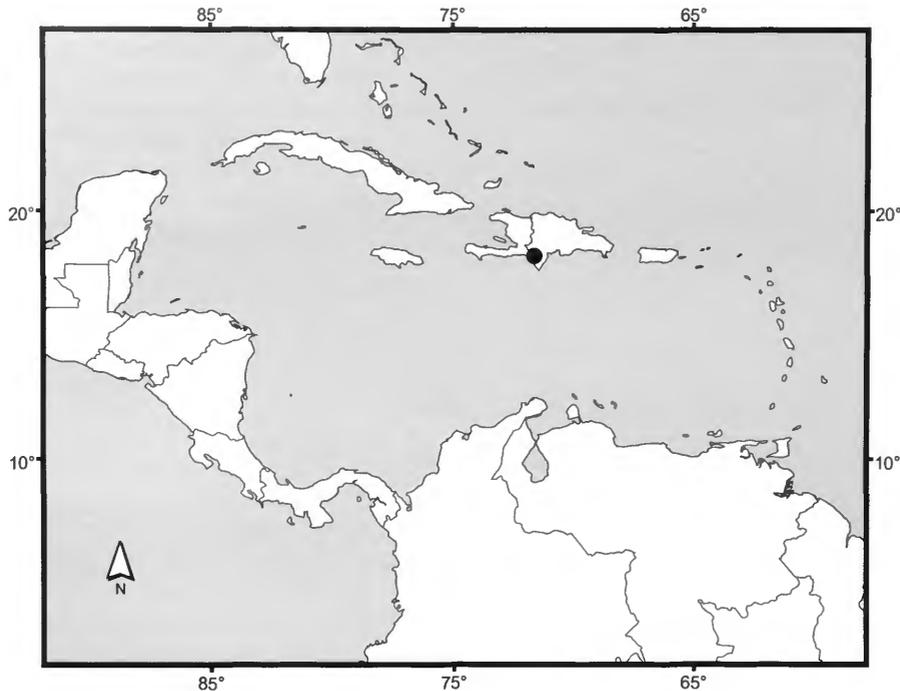


FIGURE 136.—Distribution map for *Nostima xenohypopia*, new species.

ver microtomentum; scutellum brown dorsally with dense, whitish gray microtomentum between bases of apical scutellar setae, dorsolaterally with dense, whitish gray microtomentum; anepisternum striped, brown with whitish silver microtomentum on dorsal  $\frac{1}{4}$  and on ventral  $\frac{1}{4}$  below midline; katepisternum striped brown, with whitish silver microtomentum on medial  $\frac{1}{3}$ ; subscutellum yellowish brown with sparse, yellowish silver microtomentum; anatergite yellowish brown with sparse, yellowish silver microtomentum. Chaetotaxy: anterior dorso-central seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$ – $\frac{2}{3}$  length of posterior seta; lateral scutellar seta  $\frac{1}{3}$  length of posterior seta. Wing (Figure 174): length 1.39 mm; width 0.59 mm; costal-vein ratio 1.08; M-vein ratio 0.40; maculate with white spots on amber background; veins brown except in white spots; crossveins brown; brown band in c cell from C through anterior tip of vein  $R_1$ ; posteriorly  $r_1$  cell white with darker brown medial area posteriad of sc break, a round white postero-dorsal spot, and brown around vein  $R_{2+3}$ ; cell  $r_{2+3}$  brown with crescent-shaped white spot ventrad of white spot in  $r_1$  cell, a triangular light brown spot posteriad of vein  $R_{2+3}$  and dorsad of vein  $R_{4+5}$ , a round white dorsoposterior spot extending through C vein, and an oval-shaped white ventroposterior spot; cell br anteriorly light brown, posteriorly white; vein  $R_{4+5}$  sinuous; cell  $r_{4+5}$  with round white posterior spot, a crescent-shaped white medial spot, and an hourglass-shaped white region at posterior tip of cell; crossveins r-m and dm-cu surrounded with dark brown bands; cell dm with oval-shaped

white posterior spot, an oval-shaped white spot and an hourglass-shaped white spot posteriad of dm-cu, M vein distad of dm-cu sinuous; cell  $cua_1$  with round white medial spot and with round white ventroposterior spot along ventral wing margin. Halter yellowish brown, ventrally with whitish gray microtomentum. Legs yellowish brown.

**Abdomen** (Figures 249, 250): Background yellowish brown with sparse, yellowish silver microtomentum; tergite 2 bearing 4 long posteromedial setae; tergites 1–5 covered with sparse, yellowish silver microtomentum; tergite 2 with 3 rounded whitish gray microtomentose mediolateral spots; tergite 3 with a rounded whitish gray microtomentose mediodorsal spot, a rounded whitish gray microtomentose laterodorsal spot, a crescent-shaped whitish gray microtomentose lateral spot, and a rounded whitish gray microtomentose lateral spot; tergite 4 with a crescent-shaped whitish gray microtomentose mediodorsal spot, a rectangular whitish gray microtomentose lateral spot, and a rounded whitish gray microtomentose lateroventral spot; tergite 5 with a rounded whitish gray microtomentose spot, a rectangular whitish gray microtomentose lateral spot, and a rounded whitish gray microtomentose lateroventral spot. Male unknown.

**TYPE MATERIAL.**—The holotype female of *Nostima xenohypopia* is labeled “DOMINICAN REP. Pedernales Prov. Sra. [Sierra] de Bahoruco “Las Abejas” 1300m/17.1.1989 [17 Jan 1989] L. Masner Cloud forest/HOLOTYPE ♀ *Nostima xenohypopia* Edmiston & Mathis CNC [red].” The holotype is

glued directly to the side of a pin, is in excellent condition (left wing removed and in a microvial attached to the pin), and is deposited in the CNC.

DISTRIBUTION (Figure 136).—*Neotropical*: West Indies (Dominican Republic).

ETYMOLOGY.—The species epithet, *xenohypopia*, is derived from the Greek words *xeno*, meaning strange, and *hypopion*, meaning the part of the face under the eyes, in recognition of the distinctive shape of the facial projection found in this species.

REMARKS.—*Nostima xenohypopia* and *N. xenoptera* have very similar facial, wing, and genitalia characteristics.

### 37. *Nostima xenoptera*, new species

FIGURES 137, 175, 251, 252

DIAGNOSIS.—*Nostima xenoptera* is distinguished from congeners by the following combination of external characters: face anteromedially projected with rounded V-shaped projection; wing maculate with brown crossveins r-m and dm-cu; wing veins R<sub>4+5</sub> and M sinuous; tergites 3–5 with 2 parallel rows of microtomentose spots; and tergites 3 and 4 with triangulate microtomentose mediodorsal spots.

DESCRIPTION.—Very small shore flies, body length 0.92–1.18 mm; yellowish brown with yellowish silver microtomentum.

*Head*: Frons with yellowish brown ventrolateral triangles with yellowish silver microtomentum, anterior semicircle yellowish brown with yellowish silver microtomentum. Occiput yellowish brown with silvery gray microtomentum. Outer vertical seta ½ length of inner vertical seta; paraverticilar seta present. Scape and pedicel dorsally yellowish brown, ventrally yellow; flagellomere 1 dorsally yellowish brown, ventrally yellow. Facial background coloration yellowish brown with yellowish silver microtomentum; narrow band of yellowish silver microtomentum along eye margin beginning at outer vertical seta and extending to gena. Medially along parafacial, a yellowish brown band extending lateroventrally below gena. Face anteromedially projected with rounded V-shaped projection immediately below position of minimal medial distance on face between ocelli; a darker yellowish brown microtomentose band medially across face between ocelli. Gena with dense, silvery gray microtomentum; postgena shiny with very sparse microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

*Thorax* (Figure 175): Scutal length 0.34–0.38 mm; scutellar length 0.10–0.11 mm. Mesonotum medially with brown line laterally bounded with silvery bands; dorsocentral line brown, broken with silvery gray areas connecting medial and lateral stripes; silvery stripe between dorsocentral line and interalar seta; postpronotum with brown and silvery gray patches; scutellum dorsally brown with dense, yellowish silver microtomentum, dorsolaterally with sparse, yellowish silver microtomentum, ventrally with dense, yellowish silver microtomen-

tum; anepisternum striped, yellowish silver microtomentum on dorsal ⅓, brown with sparse microtomentum on medial ⅓, yellowish silver microtomentum on ventral ⅓; katapisternum brown with yellowish silver microtomentum; subscutellum shiny brown with yellowish silver microtomentum; anatergite brown with yellowish silver microtomentum. Chaetotaxy: anterior dorsocentral seta ½ length of posterior seta; anterior notopleural seta ⅓–¾ length of posterior seta; lateral scutellar seta ⅓ length of apical seta. Wing (Figure 175): length 1.10–1.20 mm; width 0.49–0.50 mm; costal-vein ratio 1.24–1.25; M-vein ratio 0.33–0.42; maculate with white spots on amber background; veins brown except in white spots; crossveins brown; dark brown band in c cell from vein C through posterior tip of vein R<sub>1</sub> to vein R<sub>2+3</sub>; posteriorly r<sub>1</sub> cell white with small light brown medial area and brown around vein R<sub>2+3</sub>, vein R<sub>2+3</sub> continuing posteriorly beyond point at which vein curves toward wing margin; cell r<sub>2+3</sub> brown with 2 round white spots and an M-shaped white posterodorsal spot, vein R<sub>4+5</sub> sinuous and brown except for white tip; cell r<sub>4+5</sub> with 2 round white spots and with V-shaped white region across posterior tip of cell, crossveins r-m and dm-cu surrounded with dark brown bands; cell dm with round white posterior spot and 2 round white spots posterior of dm-cu; M vein distad of dm-cu sinuous. Halter yellowish brown. Legs yellowish brown; tarsi yellow brown, with tarsomere 5 slightly darker.

*Abdomen* (Figures 251, 252): Background brown; tergites 1–5 covered with sparse, yellowish silver microtomentum, and yellowish silver spots arranged in parallel rows; tergite 2 with 2 yellowish silver microtomentose mediodorsal spots; tergite 3 with a triangulate yellowish silver microtomentose mediodorsal spot, a yellowish silver microtomentose laterodorsal spot, and 2 yellowish silver microtomentose lateral spots; tergite 4 with a triangulate yellowish silver microtomentose mediodorsal spot, a yellowish silver microtomentose laterodorsal spot, and 2 yellowish silver microtomentose lateral spots; tergite 5 with 2 yellowish silver microtomentose mediodorsal spots and 2 yellowish silver microtomentose lateral spots. Male unknown.

TYPE MATERIAL.—The holotype female of *Nostima xenoptera* is labeled "COSTA RICA. Puntarenas[:] Rincon(3km SW, 9°55'N, 84°13'W, 10m) Oct–Dec 1990, P. Hanson Malaise trap/HOLOTYPE ♀ *Nostima xenoptera* Edmiston & Mathis USNM [red]." The holotype is double mounted (taken from alcohol, glued to a paper triangle), is in fair condition (flagellomere 1 missing; head and thoracic setae missing; wings removed and in a microvial attached to the pin), and is deposited in the USNM.

OTHER SPECIMEN EXAMINED (1 ♀).—JAMAICA. Try, Good Hope, 22 Aug 1966, H.F. Howden (1 ♀; CNC).

DISTRIBUTION (Figure 137).—*Neotropical*: Costa Rica (Puntarenas), West Indies (Jamaica).

ETYMOLOGY.—The species epithet, *xenoptera*, is derived from the Greek words *xeno*, meaning strange, and *ptera*, mean-

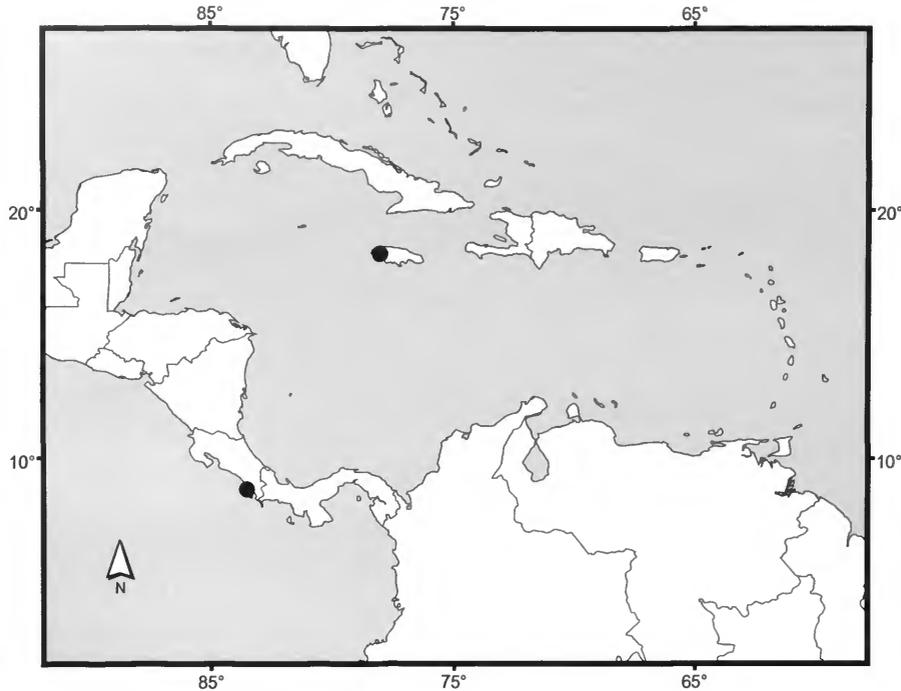


FIGURE 137.—Distribution map for *Nostima xenoptera*, new species.

ing wing, in recognition of the distinctive coloration of the wing found in this species.

REMARKS.—*Nostima xenoptera* and *N. xenohypopia* have very similar facial, wing, and genitalic characteristics.

### 38. *Nostima ypsilon*, new species

FIGURES 138, 176, 253, 254

DIAGNOSIS.—*Nostima ypsilon* is distinguished from congeners by the following combination of external characters: brown band medially across face; mesonotum vittate; lateral scutellar setae absent; wing maculate with white crossveins r-m and dm-cu; and tergites 2–4 with microtomentose lateral spots.

DESCRIPTION.—Small shore flies, body length 1.08–1.09 mm; yellowish brown with silvery gray microtomentum.

**Head:** Frons with brown ventrolateral triangles with silvery gray microtomentum, anterior semicircle brown with silvery gray microtomentum. Occiput brown with silvery gray microtomentum. Outer vertical seta  $\frac{2}{3}$  length of inner vertical seta; paravertical seta present. Scape and pedicel dorsally yellowish brown, ventrally yellow; flagellomere 1 dorsally dark yellowish brown, ventrally yellowish brown; arista dorsally branched. Facial background coloration yellowish brown with silvery gray microtomentum; narrow band of silvery gray microtomentum along eye margin beginning at vertical seta and extending to gena. Medially along parafacial, a brown band ex-

tending lateroventrally below gena. Face ventromedially and dorsomedially yellowish brown with silvery gray microtomentum and with a darker yellowish brown sparsely microtomentose band medially across face between ocelli. Gena with dense, silvery gray microtomentum; postgena shiny with very sparse microtomentum. Maxillary palpus yellowish brown; prementum yellowish brown.

**Thorax** (Figure 176): Scutal length 0.38–0.39 mm; scutellar length 0.11–0.12 mm. Mesonotum medially with silvery gray band surrounded with elongate oval-shaped brown band laterally bounded with silvery gray stripe; dorsocentral line brown, broken with silvery gray areas connecting medial and lateral silvery gray stripes; silvery gray stripe between dorsocentral line and interalar seta; postpronotum brown with silvery gray microtomentum; scutellum brown dorsally with silvery gray microtomentum, brown around bases of scutellar setae; subscutellum dark yellowish brown, shiny with sparse, yellowish silver microtomentum; anepisternum yellowish brown with silvery gray microtomentum, ventrally slightly darker; katepisternum brown with silvery gray microtomentum; anatergite brown with silvery gray microtomentum. Chaetotaxy: anterior dorsocentral seta  $\frac{1}{2}$  length of posterior seta; anterior notopleural seta  $\frac{1}{2}$  to  $\frac{2}{3}$  length of posterior seta; lateral scutellar seta absent. Wing: length 0.97–1.12 mm; width 0.48–0.57 mm; costal-vein ratio 0.69–0.83; M-vein ratio 0.59–0.67; maculate with white spots on amber background; veins brown except in white

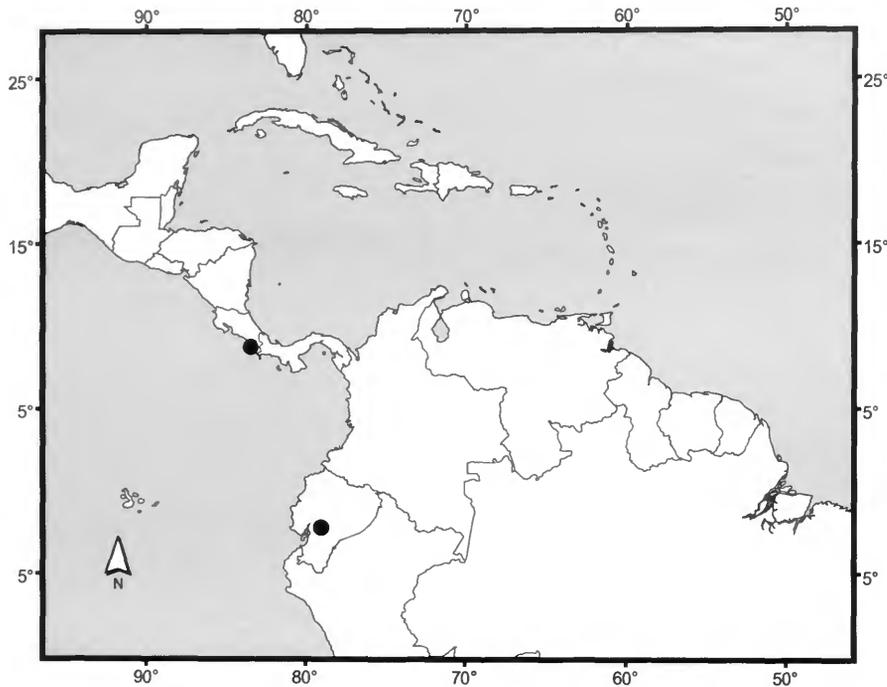


FIGURE 138.—Distribution map for *Nostima ypsilon*, new species.

spots; crossveins white; sc cell posteriorly with white round spot extending through C;  $r_1$  cell posteriorly white, white ventrad of costal break and anteriorly with 2 elongate oval-shaped white spots; cell  $r_{2+3}$  brown with 3 elongate oval-shaped white spots; cell  $r_{4+5}$  anteriorly with 2 round white spots, medially with an elongate oval-shaped spot, and posteriorly with 2 round white spots on same dorsal-ventral axis; crossveins r-m and dm-cu white; round white spot posteriad of dm-cu; vein  $CuA_1$  with rounded dorsal projection ventrad of point below costal break, and not extending beyond dm-cu; 2 white spots along ventral margin of  $CuA_1$ . Halter yellowish brown. Legs yellowish brown; tarsi yellow brown with tarsomere 5 slightly darker.

**Abdomen** (Figures 253, 254): Background brown; tergites 1–5 covered with sparse, yellowish silver microtomentum; tergites 2–4 laterally with silvery gray microtomentose spots. Male unknown.

**TYPE MATERIAL.**—The holotype female of *Nostima ypsilon* is labeled “COSTA RICA. Puntarenas[:] Rincon (3km SW, 9°55'N, 84°13'W, 10m) Oct–Dec 1990, P. Hanson Malaise trap/HOLOTYPE ♀ *Nostima ypsilon* Edmiston & Mathis USNM [red].” The holotype is double mounted (taken from alcohol, glued to a paper triangle), is in good condition (right wing removed and in a microvial attached to the pin), and is deposited in the USNM.

**OTHER SPECIMENS EXAMINED** (2 ♀).—ECUADOR. *Chimborazo*: Naranjapata Chilicay, 16 Jun 1955, R. Levi Castillo (2 ♀; USNM).

**DISTRIBUTION** (Figure 138).—*Neotropical*: Costa Rica (Puntarenas), Ecuador (Chimborazo).

**ETYMOLOGY.**—The species epithet, *ypsilon*, is derived from the Greek word *ypsilon*, which is the twentieth letter in the Greek alphabet, in recognition that this is the twentieth of 21 new species described in this revision.

**REMARKS.**—Three features indicate that the Ecuadorian specimens are the same species as the Costa Rican holotype. First, the mesonotum of the Ecuadorian specimens appears to have a uniformly dense covering of silvery gray microtomentum, except for dark brown circles around the bases of the dorsoventral and scutellar setal insertions; second, these specimens also have the same wing patterns as the holotype; and third, only the ventral scutellar setae are present.

#### Phylogenetic Considerations

Hollmann-Schirmacher (1998) used two exemplars of *Nostima* and placed *Nostima* within his “*picta*-group” of the genus *Philygria*. He used the following characters to separate the “*picta*-group” (our *Nostima*) from his other *Philygria* species groups (Hollmann-Schirmacher’s synapomorphies, as presented in his cladogram, are noted by an asterisk (\*)): (\*1) arista pectinate; (\*2) facial setae in one row; (\*3) anterior dorso-central setae absent; (4) apical setae of gonite reduced; and (5) ventral gonites with a vesicular extension.

By extending his analysis to include the closely related genus *Garifuna* and the 38 New World species of *Nostima*, as well as making observations on two Afrotropical species and an Australian species, we have discovered that the apical gonial setae are not reduced on *Nostima quinquenotata*, pectinate arista are not found on *Nostima duoseta* from Australia, and the apical gonial setae are not reduced on *Nostima flavitarsis* from Africa. Considering a broader sample of species, the vesicular extension of the ventral gonites is not distinctive and is a highly interpretable character. *Garifuna* has pectinate arista, no anterior dorsocentral setae, and one row of facial setae. Thus, the synapomorphies and distinguishing characters suggested by Hollmann-Schirmacher cannot be supported when one considers a broader range of species and genera that are closely related to *Nostima*.

Our analysis indicates there is one synapomorphic character, the lack of acrostichal setae, that distinguishes *Nostima* from other taxa presently included in the tribe Hyadinini. Hollmann-Schirmacher (1998) recognized this character for his "picta-group," but he did not include it as a synapomorphy within his cladograms.

For our cladistic analysis of New World *Nostima*, we considered the closely related genus *Philygria* to be the outgroup (all *Philygria* species groups of Hollmann-Schirmacher except the "picta-group"), and we also included the closely related genus *Garifuna* within our analysis. Character polarities were determined by treating *Philygria* and *Garifuna* as the outgroups.

In the character list that follows, a zero (0) indicates the plesiomorphic state; one through six (1–6) are derived states. A cladogram (Figure 255) is used to convey hypothetical relationships; the discussion is to supplement the cladogram and is intended only to complement the latter. Autapomorphies have not been included in this phylogenetic analysis. Because male genitalic structures are considered to be phylogenetically significant in our analysis, a matrix of characters (Table 2) was constructed only for species with male exemplars.

CHARACTERS USED FOR PHYLOGENETIC ANALYSIS

Head

1. Facial setae: (0) 2 rows; (1) 1 row.
2. Arista: (0) many small branches; (1) few long branches.

Thorax

3. Dorsocentral setae: (0) presutural or sutural present; (1) presutural or sutural absent.
4. Acrostichal setae: (0) 2 rows; (1) 1 row; (2) absent.
5. Wings: (0) maculate with white or dark spots; (1) hyaline.
6. Spurious wing veins: (0) absent or on R<sub>2+3</sub> only; (1) present.
7. Round wing spots: (0) absent; (1) present.

TABLE 2.—Matrix of characters and their states used in the cladistic analysis of the species of *Nostima*, *Philygria*, and *Garifuna*. Numbers for characters and character states correspond with those used in the text. *Philygria* is the outgroup.

Taxa	Characters									
	0	0	0	0	0	0	0	0	0	1
	1	2	3	4	5	6	7	8	9	0
<i>Philygria</i>	0	0	0	0	0	0	0	0	1	0
<i>Garifuna</i>	1	1	1	1	0	0	0	0	0	0
<i>N. abbreviata</i>	1	1	1	2	1	0	0	1	5	1
<i>N. approximata</i>	1	1	1	2	1	0	0	1	6	0
<i>N. atriscuta</i>	1	1	1	2	1	0	0	1	4	0
<i>N. canens</i>	1	1	1	2	1	0	0	1	5	0
<i>N. cinnamea</i>	1	1	1	2	1	0	0	1	6	0
<i>N. duaguttata</i>	1	1	1	2	1	0	0	1	6	0
<i>N. elegantula</i>	1	1	1	2	0	0	0	0	2	0
<i>N. flavida</i>	1	1	1	2	1	0	0	1	4	0
<i>N. footei</i>	1	1	1	2	1	0	0	1	6	0
<i>N. franciscana</i>	1	1	1	2	1	0	0	1	5	0
<i>N. gilvipes</i>	1	1	1	2	1	0	0	1	5	1
<i>N. giovannolii</i>	1	1	1	2	0	0	0	0	2	0
<i>N. ilytheoides</i>	1	1	1	2	0	1	0	0	2	0
<i>N. lineata</i>	1	1	1	2	1	0	0	1	4	0
<i>N. lucida</i>	1	1	1	2	1	0	0	1	4	0
<i>N. lutea</i>	1	1	1	2	0	0	0	0	3	0
<i>N. maculata</i>	1	1	1	2	0	1	0	0	2	0
<i>N. magnifica</i>	1	1	1	2	1	0	0	1	6	0
<i>N. melina</i>	1	1	1	2	1	0	0	1	6	0
<i>N. negruzca</i>	1	1	1	2	1	0	0	1	6	0
<i>N. niveivenosa</i>	1	1	1	2	0	0	0	0	3	0
<i>N. picta</i>	1	1	1	2	1	0	0	1	6	0
<i>N. pulchra</i>	1	1	1	2	0	0	0	0	2	0
<i>N. quinquenotata</i>	1	1	1	2	1	0	1	1	4	0
<i>N. schildi</i>	1	1	1	2	1	0	0	1	6	0
<i>N. simuliflavida</i>	1	1	1	2	1	0	0	1	4	0
<i>N. slossonae</i>	1	1	1	2	0	1	0	0	2	0
<i>N. spilogaster</i>	1	1	1	2	0	0	0	0	2	0
<i>N. spinosa</i>	1	1	1	2	0	0	0	0	3	0
<i>N. stellata</i>	1	1	1	2	1	0	1	1	4	0
<i>N. velutina</i>	1	1	1	2	0	0	1	0	6	0
<i>N. williamsi</i>	1	1	1	2	1	0	0	1	5	0
<i>N. willistoni</i>	1	1	1	2	1	0	0	1	5	0

Abdomen

8. Abdominal microtomentum: (0) present dorsally and laterally; (1) reduced dorsally with tendency for large bare dorsal areas.
9. Epandrium-surstyli: (0) epandrium and surstyli not fused; (1) epandrium and surstyli fused and with row of large setae; (2) epandrium and surstyli fused, both surstyli elongate with many small ventral setae; (3) epandrium and surstyli fused, both surstyli elongate with 4 ventral setae; (4) epandrium and surstyli fused, surstyli broadly rectangular; (5) epandrium and surstyli fused, surstyli rounded with anterior and posterior projections; (6) epandrium and surstyli fused, surstyli rounded with anterior projections.
10. Elongated posteroventral surstyler projections: (0) absent; (1) present.

Facial, arisal, and thoracic setae seem to be stable characters and are useful for distinguishing *Nostima* from closely related genera. Within the genus *Nostima*, the wing, abdominal microtomentum, and male genitalic characters provide excellent characters for describing lineages. Generally, the more highly derived species have characteristic reduction of microtomentum, elaboration or reduction of wing maculation, and fusion of male genitalic structures.

Using the option "implicit enumeration" (ie-) of Hennig86 (Farris, 1988), our analysis of the character matrix produced a most parsimonious tree that is certain to be of minimal length. This tree has a length of 16 steps, a consistency index of 1.0, and a retention index of 1.0. The large size of our data set, especially the number of taxa, precluded use of exhaustive searches (options "ie\*" or "ie") to discover all of the most parsimonious trees. The tree generated using "ie-," however, is of minimal length and clearly represents the major relationships among the species within this genus. As depicted on the cladogram (Figure 255), several major groupings of species are evident. Because this revision only includes New World species and because we consider these species to be only a limited geographic and temporal representation (because of limited sampling) of the New World species, we do not wish to establish or recognize species groups herein; instead, we propose some possible lineages.

#### GENERIC-LEVEL PHYLOGENY

With the monophyly of *Nostima* established within Hyadnini, the cladistic relationships between *Nostima* and the closely related genera *Philygria* and *Garifuna* were analyzed. For this portion of the cladistic analysis, synapomorphic states for five characters (1–4, 9) were used to distinguish *Philygria*, *Garifuna*, and *Nostima*. As determined from the decisions about the polarity of characters, *Philygria* has a derived shape of the epandrium-surstylus (character 9); however, all other character states for *Philygria* are plesiomorphic. Synapomorphies for *Garifuna* and *Nostima* include reduced facial setae (character 1), few long branches on arista (character 2), and reduced dorsocentral setae (character 3). *Garifuna* has two rows of acrostichal setae, the plesiomorphic state for character 4. *Nostima* has no acrostichal setae (character 4), the synapomorphic state. As indicated from this analysis, *Garifuna* is possibly congeneric with *Nostima*; however, the purpose and scope of this revision precludes completely addressing the relationship between *Nostima* and *Garifuna*, and for now we do not propose this synonymy.

#### *Nostima* PHYLOGENY

THE *niveivenosa* AND *elegantula* LINEAGES.—The *niveivenosa* and *elegantula* lineages considered together represent species that have the epandrium and surstyli fused into an elongate saddle-shaped structure (character 9, states 2 and 3). The synapomorphic state of the ventral surstyli setae reduced to four occurs in species of the *niveivenosa* lineage, and the syna-

pomorphic state of many small ventral surstyli setae occurs in species of the *elegantula* lineage. Within the *elegantula* lineage, *Nostima ilytheoides*, *N. maculata*, and *N. slossonae* have spurious wing veins (character 6), which is the derived condition. Otherwise, these lineages have a suite of plesiomorphic characters, including maculate wings (character 5) and abdominal microtomentum present dorsally and laterally (character 8). With their less reduced epandrium-surstyli and their possession of many plesiomorphic characters, these lineages occupy more basal positions within the phylogeny.

THE *picta*, *gilvipes*, AND *flavida* LINEAGES.—The *picta*, *gilvipes*, and *flavida* lineages have two synapomorphies, namely, hyaline wings (character 5) and reduced abdominal microtomentum (character 8) with many shiny areas and with the dense areas of microtomentum limited to lateral spots. Within these lineages, the epandrium-surstyli have synapomorphic states with variously modified surstyli (character 9). The epandrium-surstyli for species within the *picta* lineage have rounded surstyli with anterior projections (character 9, state 6). The epandrium-surstyli for species within the *gilvipes* lineage have rounded surstyli with anterior and posterior projections (character 9, state 5). The epandrium-surstyli for species within the *flavida* lineage have broadly rectangular surstyli (character 9, state 4).

Within the *gilvipes* lineage, *Nostima abbreviata*, *N. canens*, and *N. gilvipes* have the synapomorphic condition of prominent elongated posteroventral surstyli projections (character 10). Within the *flavida* lineage, *Nostima quinquenotata* and *N. stellata* have the synapomorphic character state of round white wing spots (character 7).

Five species included within this revision (*Nostima nitidigaster*, *N. tresguttata*, *N. xenohypopia*, *N. xenoptera*, *N. ypsilon*) were excluded from the phylogenetic analysis because characteristics of the phylogenetically significant male genitalia are not yet known. The completely reduced abdominal microtomentum, small size, and yellow to yellowish-brown habitus of *Nostima xenohypopia*, *N. xenoptera*, and *N. ypsilon* indicate their probable placement in the *flavida* lineage. The reduced microtomentum (lateral spots only), small size, and generally dark habitus of *N. nitidigaster* and *N. tresguttata* indicate their probable placement in the *picta* lineage.

#### Zoogeographic Considerations

The distributions of New World species of *Nostima*, analyzed from the perspective of the proposed phylogenetic lineages, provides preliminary information about divergence patterns (Table 3). Within lineages, species are either widespread throughout the Neotropical Region, widespread throughout the Nearctic Region, or have a limited distribution. Although these distributions probably represent real patterns, collecting biases are also reflected. Of the 1851 specimens examined for this revision, 771 (42%) were collected by the second author, and most specimens have been collected since 1985 in the West Indies, Central America (Belize and Costa Rica), and South

America (Bolivia and Ecuador). The second author's collecting trips were often very limited by time constraints and by the number of habitats sampled. Except for Belize, the collection trips were one-time samplings in each habitat. For Belize, the extensive temporal and spatial sampling was done in marine habitats, which are not typical habitats for freshwater, blue-green algae feeding species of *Nostima*. Most of the other specimens considered in this revision were collected by dipterists who were mostly unfamiliar with the specific habits of Ephydriidae, with W.W. Wirth being a notable exception. Generally, very small Diptera are ignored or are not captured in the general collecting done by most entomologists in the Neotropical Region.

In an attempt to secure a large specimen sample, other than those deposited in the Smithsonian's National Museum of Natural History, specimens from all major and many minor collections in the United States and Western Europe were examined. Most collections from Central and South America, however, were not examined, because *Nostima* species are mostly known to a handful of Ephydriidae investigators, and the South American collections have not been sorted. Even with the many collecting and sampling biases encountered in this revision, some preliminary comments can be made regarding the distributions that will be confirmed or challenged as other museum collections become available and as future collecting provides more specimens.

An important question arising from the distributional information of this revision is, "Are the limited distributions really limited distributions, or are they the result of sampling error?" Assuming these limited distributions represent a real pattern in the New World within each lineage, there are species that may exemplify divergence and speciation after geographic isolation at the periphery.

**The *niveivenosa* Lineage Distributions.**—*Nostima niveivenosa* occurs in Florida, throughout Central and South America, and throughout the Caribbean. *Nostima lutea*, however, has been collected only on the Dominican Republic and St. Vincent, and *N. spinosa* has been found only on Bermuda. This pattern clearly represents the possibility that some speciation has occurred within peripheral or isolated populations relative to a more widely distributed species.

**THE *elegantula* LINEAGE DISTRIBUTIONS.**—Within this lineage, all species except *N. giovannolii* have widespread distributions throughout Central and South America, and all except *N. ilytheoides* and *N. velutina* have been collected in the West Indies. North Carolina is the northernmost collection site for any species within this lineage. These species represent the largest specimens of *Nostima*, and *N. slossonae* can often be collected in domestic gardens. The widespread distribution of these species may be an artifact of their affinity for habits located near human habitations, but certainly the *elegantula* lineage is well represented in the New World tropics.

**THE *picta* LINEAGE DISTRIBUTIONS.**—*Nostima picta* occurs throughout the northern hemisphere from North America

through Europe to the Far East, but only a few specimens have been collected from Mexico and Guatemala. Species that may be closely related to *N. picta* include the North American *N. approximata* and a few other Neotropical species (*N. cinnamea*, *N. duaguttata*, *N. footei*, *N. magnifica*, *N. schildi*). The direct relationship, if any, between *N. picta* and the Neotropical species cannot be determined from the limited number of specimens available.

**THE *gilvipes* LINEAGE DISTRIBUTIONS.**—*Nostima gilvipes* occurs throughout the Neotropical Region and extends as far north as Mexico and Florida. A distributional pattern within this lineage includes Central and South America for *N. abbreviata* and *N. canens*. *Nostima franciscana* has been found throughout the West Indies, with a few specimens from Guatemala and Colombia, and *N. williamsi* occurs in Costa Rica and Jamaica. *Nostima willistoni* has been found on Dominica and St. Vincent. A possible divergence pattern appears between the widespread and commonly collected *N. gilvipes* and species with more limited distributions in this lineage (*N. williamsi*, *N. willistoni*), with *N. franciscana* representing a widespread West Indies species.

**THE *flavida* LINEAGE DISTRIBUTIONS.**—The species within the *flavida* lineage are generally more yellowish in habitus and are represented in collections by some of the smallest specimens of *Nostima*. *Nostima flavida* occurs in the Dominican Republic and from Mexico to Argentina, but *N. quinquenotata* has only been collected in the United States. *Nostima simuliflavida*, which can only be distinguished from *N. flavida* through genital characters, has been collected in Ecuador and on Dominica, St. Lucia, and Trinidad and Tobago. *Nostima atriscuta* and *N. lineata* have been collected only in the West Indies, and *N. stellata* has been collected only in Ecuador. *Nostima quinquenotata*, although found throughout the eastern and central United States, is represented by only 37 specimens among examined collections. The very small size and light-colored bodies of these flies makes seeing them difficult, which suggests the distribution patterns are strongly biased with collection errors. Consequently, the distributional relationships among these species are unclear.

### Concluding Remarks

Numerous shore-fly species of *Nostima* undoubtedly remain to be collected, described, and analyzed, especially from the Old World. Within the entire tribe, relationships among genera, as well as among species, remain somewhat problematic and will need reconsideration. This revision of the New World species of *Nostima* is a small but hopefully significant step in closing gaps that exist in our knowledge about the entire tribe. Most of these gaps could be closed through more extensive collection of adults and immature stages from broader geographic areas and throughout all seasons.

TABLE 3.—Distribution of lineages in the New World.

Taxa	North America and Mexico	Central America	West Indies	South America
<i>niveivenosa</i> lineage				
<i>N. lutea</i>	—	—	Dominican Republic, St. Vincent	—
<i>N. niveivenosa</i>	United States (Florida), Mexico (Chiapas, Guerrero, Morelos, Nuevo Leon, Sonora, Tamaulipas)	Belize, Costa Rica, El Salvador, Honduras, Panama	Antigua, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, Puerto Rico, St. Lucia, St. Martin, St. Vincent	Bolivia (La Paz), Brazil (Rio de Janeiro), Colombia (Antioquia), Ecuador (Orellana), Guyana, Trinidad, Venezuela
<i>N. spinosa</i>	Bermuda	—	—	—
<i>elegantula</i> lineage				
<i>N. elegantula</i>	Mexico (San Luis Potosí, Veracruz)	Costa Rica, El Salvador	Dominican Republic	Argentina (Catamarca, Tucumán), Bolivia (La Paz), Brazil (Santa Catarina)
<i>N. giovannolii</i>	United States (Florida)	—	Bahamas, Cuba, Dominican Republic	—
<i>N. ilytheoides</i>	Mexico (Hidalgo, México, Puebla)	Costa Rica	—	Brazil (Pernambuco), Colombia (Cundinamarca, Valle), Ecuador (Manabi, Pichincha), Peru (Lambayeque, Lima), Venezuela (Tachira)
<i>N. maculata</i>	—	—	Dominican Republic	Argentina (Salta, Tucumán), Brazil (São Paulo), Ecuador (Cotapaxi)
<i>N. pulchra</i>	United States (Florida), Mexico (Chiapas, Guerrero, Michoacan, Nayarit, Veracruz)	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama	Dominica, Dominican Republic, Guadeloupe, Haiti, Puerto Rico, St. Vincent	Argentina (Buenos Aires, Catamarca, Chaco, Iguazu, Misiones, Salta, Tucumán), Bolivia (La Paz), Brazil (Paraná, Santa Catarina), Colombia (Antioquia, Bolivar, Valle), Ecuador (Napo), Guyana, Paraguay (Central), Peru (Huánuco, Loreto)
<i>N. slossonae</i>	United States (Florida, North Carolina), Mexico (Puebla, San Luis Potosi, Veracruz)	Costa Rica, Guatemala, Panama	Cuba, Dominican Republic	Argentina (Salta, Tucumán), Bolivia (La Paz), Brazil (Santa Catarina, São Paulo), Colombia (Cauca, Cundinamarca), Ecuador (Chimborazo, El Oro, Pichincha), Paraguay (Central, Cordillera), Peru (Cuzco, Huánuco)
<i>N. spilogaster</i>	—	Belize, Costa Rica, El Salvador, Guatemala	Barbados, Dominica, Dominican Republic, Grenada, Guadeloupe, Jamaica, St. Lucia, St. Vincent	Argentina (Misiones, Salta), Bolivia (La Paz), Brazil (Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina), Ecuador (Orellana), Guyana, Venezuela (Trujillo)
<i>N. velutina</i>	Mexico (Chiapas)	—	—	—
<i>picta</i> lineage				
<i>N. approximata</i>	Bermuda, United States (Florida, Kansas, Maryland, Ohio, Oklahoma, Virginia)	—	Grand Cayman	—
<i>N. cinnameu</i>	—	—	Bahamas	—

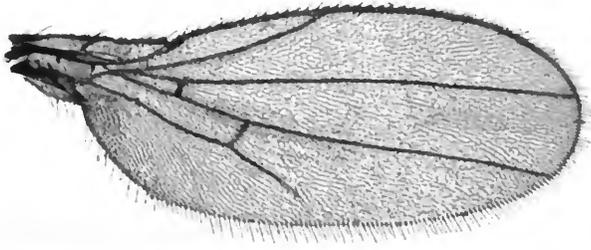
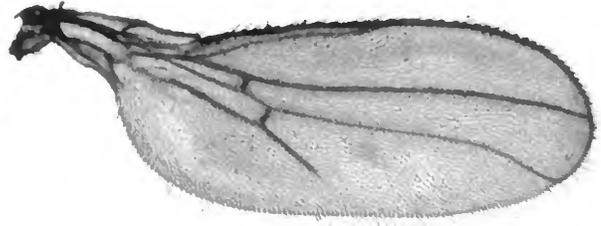
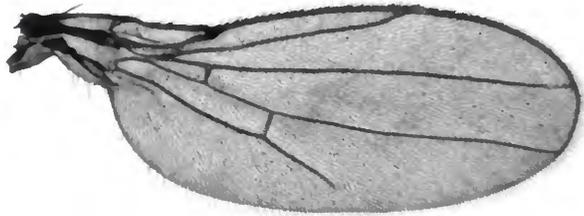
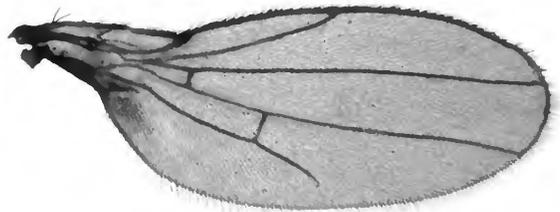
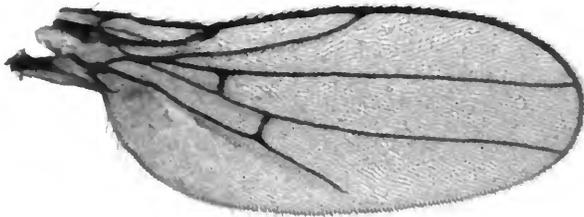
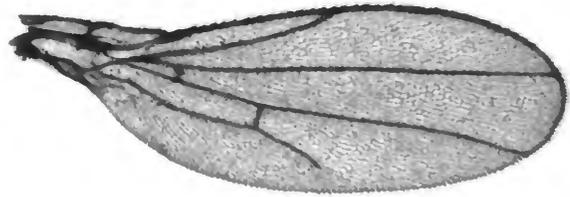
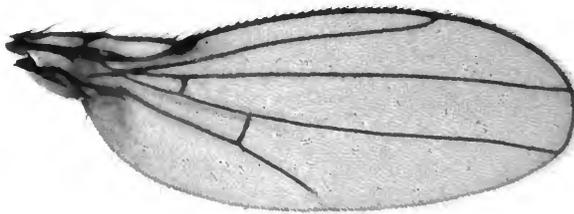
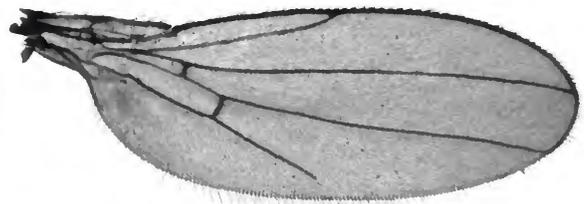
TABLE 3.—Continued.

Taxa	North America and Mexico	Central America	West Indies	South America
<i>picta</i> lineage cont.				
<i>N. duaguttata</i>	—	Costa Rica	Dominican Republic	Guyana
<i>N. footei</i>	—	Panama	—	—
<i>N. magnifica</i>	—	—	—	Ecuador (Chimborazo)
<i>N. melina</i>	Mexico (México)	Costa Rica, Panama	—	Bolivia (La Paz), Ecuador (Manabi), Tobago
<i>N. negruzca</i>	—	Costa Rica	Dominica, Grenada, Guadeloupe, St. Lucia, St. Vincent	Trinidad
<i>N. picta</i>	Canada (Alberta, British Columbia, Manitoba, New Brunswick, Ontario, Quebec, Saskatchewan), United States (Alabama, Arkansas, Arizona, California, Colorado, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington, West Virginia, Wisconsin), Mexico (Jalisco, Veracruz)	Guatemala	—	—
<i>N. schildi</i>	United States (Florida)	Costa Rica, Panama	Dominican Republic	Argentina (Salta), Bolivia (La Paz), Ecuador (Chimborazo, Napo), Peru (Huánuco)
<i>gilvipes</i> lineage				
<i>N. abbreviata</i>	Mexico (Veracruz)	Costa Rica	—	Brazil (Rio de Janeiro), Colombia (Antioquia, Cundinamarca), Ecuador (Chimborazo, Pichincha)
<i>N. canens</i>	—	Costa Rica, Guatemala	—	Bolivia (La Paz), Brazil (Rio de Janeiro), Ecuador (Pichincha, Manabi), Guyana, Peru (Huánuco, Madre de Dios), Venezuela (Aragua)
<i>N. franciscana</i>	—	Guatemala	Cuba, Dominica, Dominican Republic, Guadeloupe, Jamaica, Puerto Rico, St. Vincent	Colombia (Cundinamarca, Valle)
<i>N. gilvipes</i>	United States (Florida), Mexico (Chiapas, Guerrero, Puebla, Veracruz)	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama	Cuba, Dominican Republic, Grenada, Jamaica, St. Lucia	Bolivia (La Paz), Brazil (Rio de Janeiro), Colombia (Antioquia, Magdalena, Valle), Ecuador (Los Ríos, Manabi), Guyana, Trinidad, Venezuela (Barinas)
<i>N. williamsi</i>	—	Costa Rica	Jamaica	—
<i>N. willistoni</i>	—	—	Dominica, St. Vincent	—
<i>N. atriscuta</i>	—	—	Dominican Republic, Jamaica	—

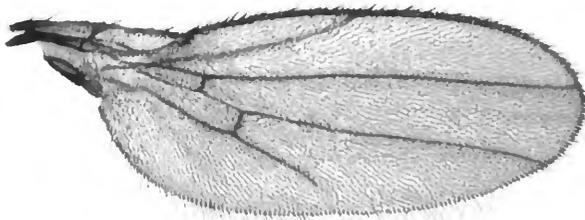
TABLE 3.—Continued.

Taxa	North America and Mexico	Central America	West Indies	South America
<i>flavida</i> lineage				
<i>N. flavida</i>	Mexico (Guerrero)	Costa Rica, El Salvador, Panama	Dominican Republic	Argentina (Tucumán)
<i>N. lineata</i>	—	—	Dominica	—
<i>N. lucida</i>	—	—	—	Bolivia (La Paz), Peru (Cuzco)
<i>N. quinquenotata</i>	United States (Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, North Carolina, Oklahoma, Tennessee, Texas)	—	—	—
<i>N. simuliflavida</i>	—	—	Dominica, St. Lucia	Ecuador (Orellana), Trinidad & Tobago
<i>N. stellata</i>	—	—	—	Ecuador (Orellana)

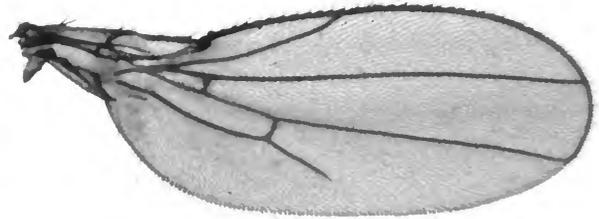
Figures 139—255

139 *Nostima abbreviata*140 *Nostima approximata*141 *Nostima atriscuta*142 *Nostima canens*143 *Nostima cinnamea*144 *Nostima duaguttata*145 *Nostima elegantula*146 *Nostima flavida*

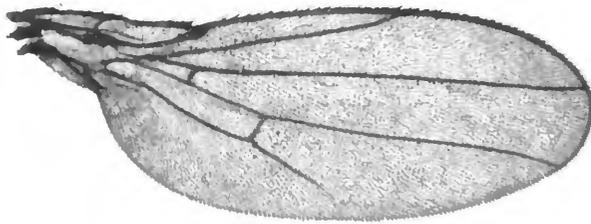
FIGURES 139–146.—Wings: 139, *Nostima abbreviata*; 140, *N. approximata*; 141, *N. atriscuta*; 142, *N. canens*; 143, *N. cinnamea*; 144, *N. duaguttata*; 145, *N. elegantula*; 146, *N. flavida*.



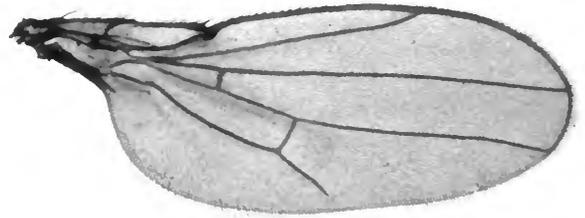
147 *Nostima footei*



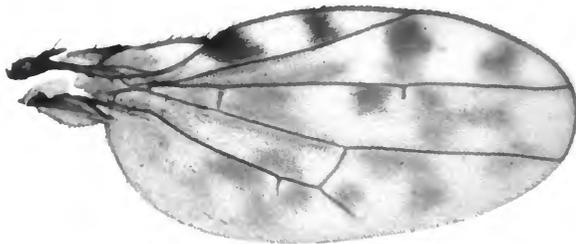
148 *Nostima franciscana*



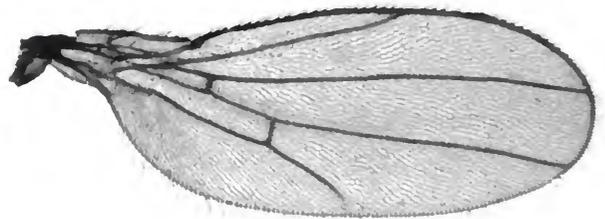
149 *Nostima gilvipes*



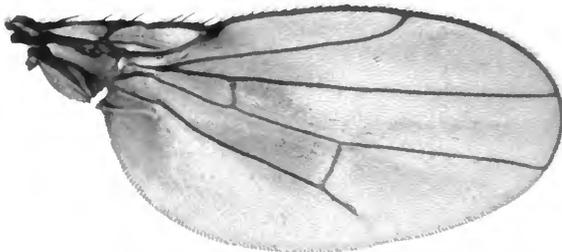
150 *Nostima giovannolii*



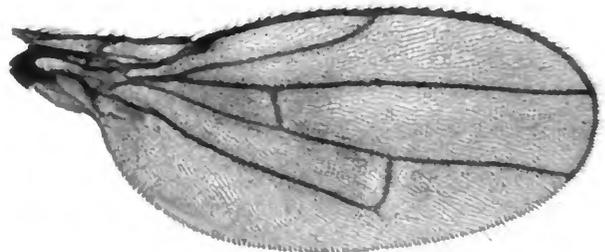
151 *Nostima ilytheoides*



152 *Nostima lineata*

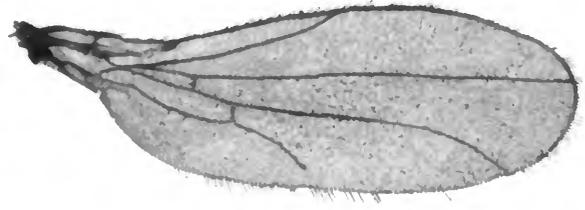
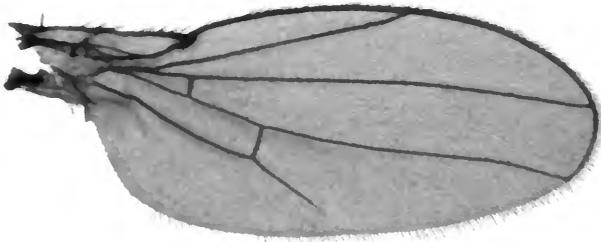
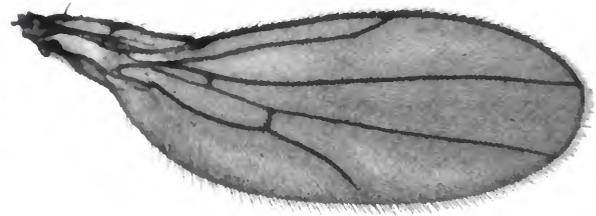
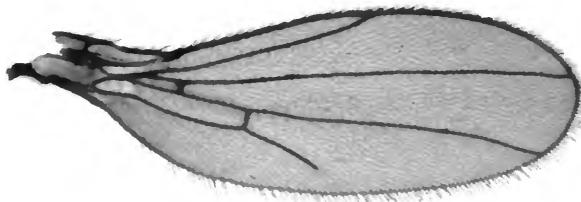
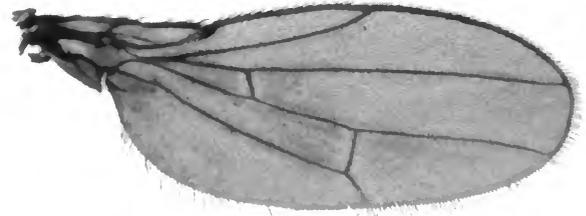
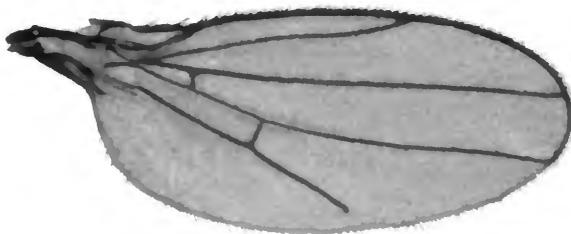
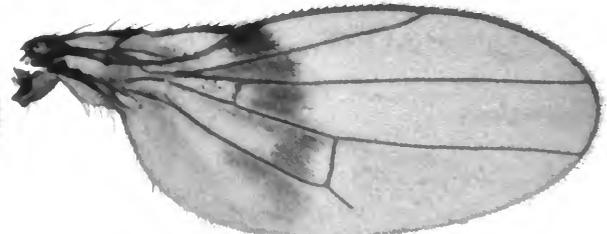


153 *Nostima lucida*

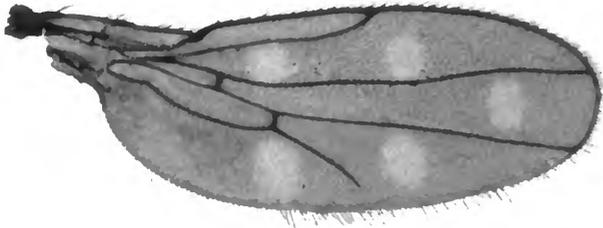


154 *Nostima lutea*

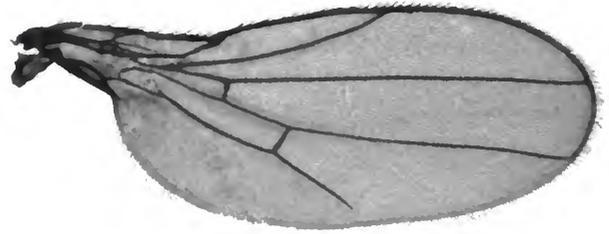
FIGURES 147–154.—Wings: 147, *Nostima footei*; 148, *N. franciscana*; 149, *N. gilvipes*; 150, *N. giovannolii*; 151, *N. ilytheoides*; 152, *N. lineata*; 153, *N. lucida*; 154, *N. lutea*.

155 *Nostima maculata*156 *Nostima magnifica*157 *Nostima melina*158 *Nostima negruzca*159 *Nostima nitidigaster*160 *Nostima niveivenosa*161 *Nostima picta*162 *Nostima pulchra*

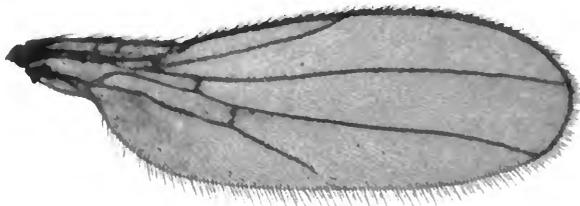
FIGURES 155–162.—Wings: 155, *Nostima maculata*; 156, *N. magnifica*; 157, *N. melina*; 158, *N. negruzca*; 159, *N. nitidigaster*; 160, *N. niveivenosa*; 161, *N. picta*; 162, *N. pulchra*.



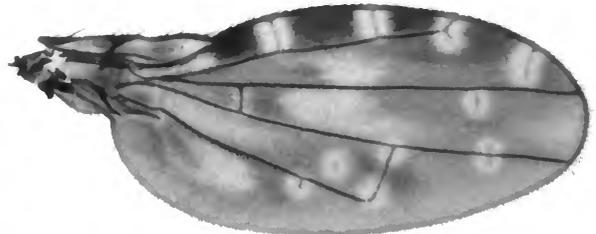
163 *Nostima quinquenotata*



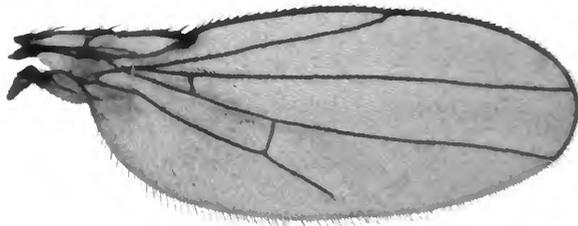
164 *Nostima schildi*



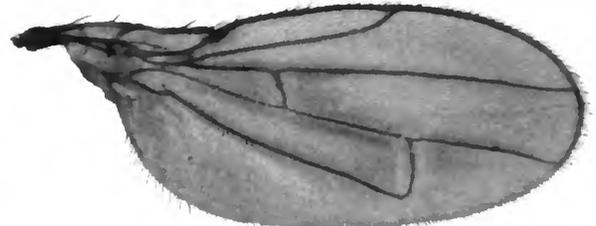
165 *Nostima simuliflavida*



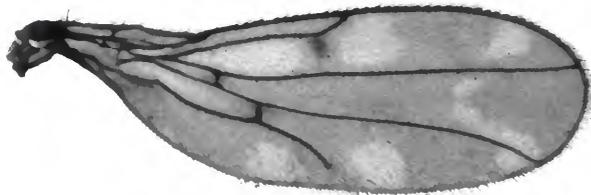
166 *Nostima slossonae*



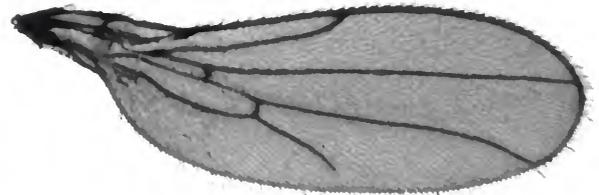
167 *Nostima spilogaster*



168 *Nostima spinosa*

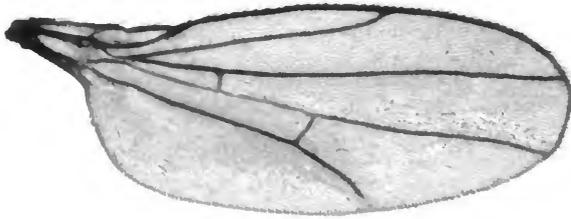
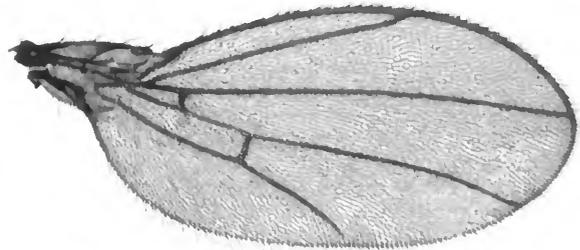
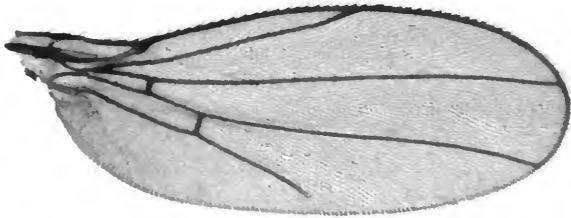
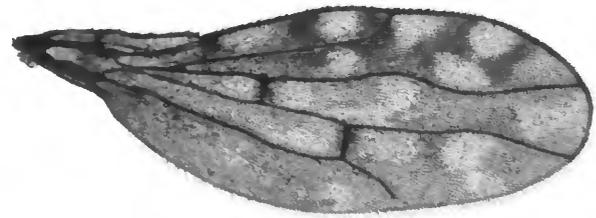
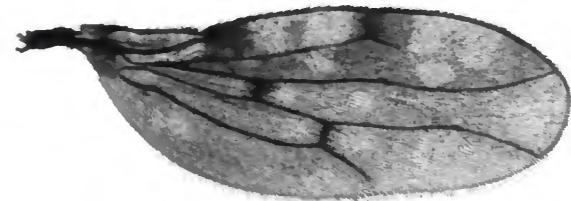
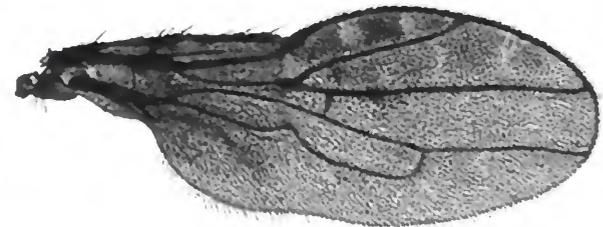


169 *Nostima stellata*

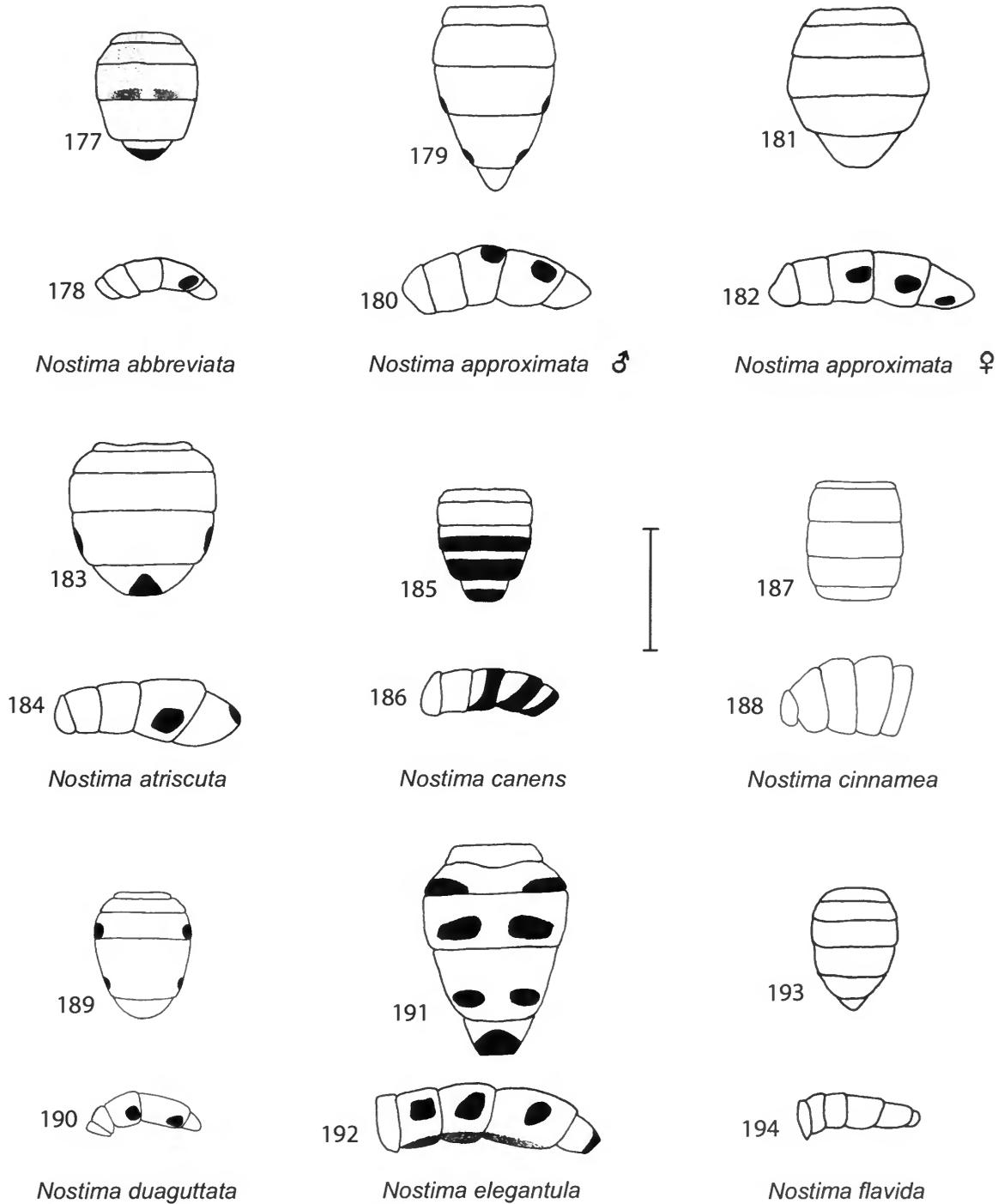


170 *Nostima tresguttata*

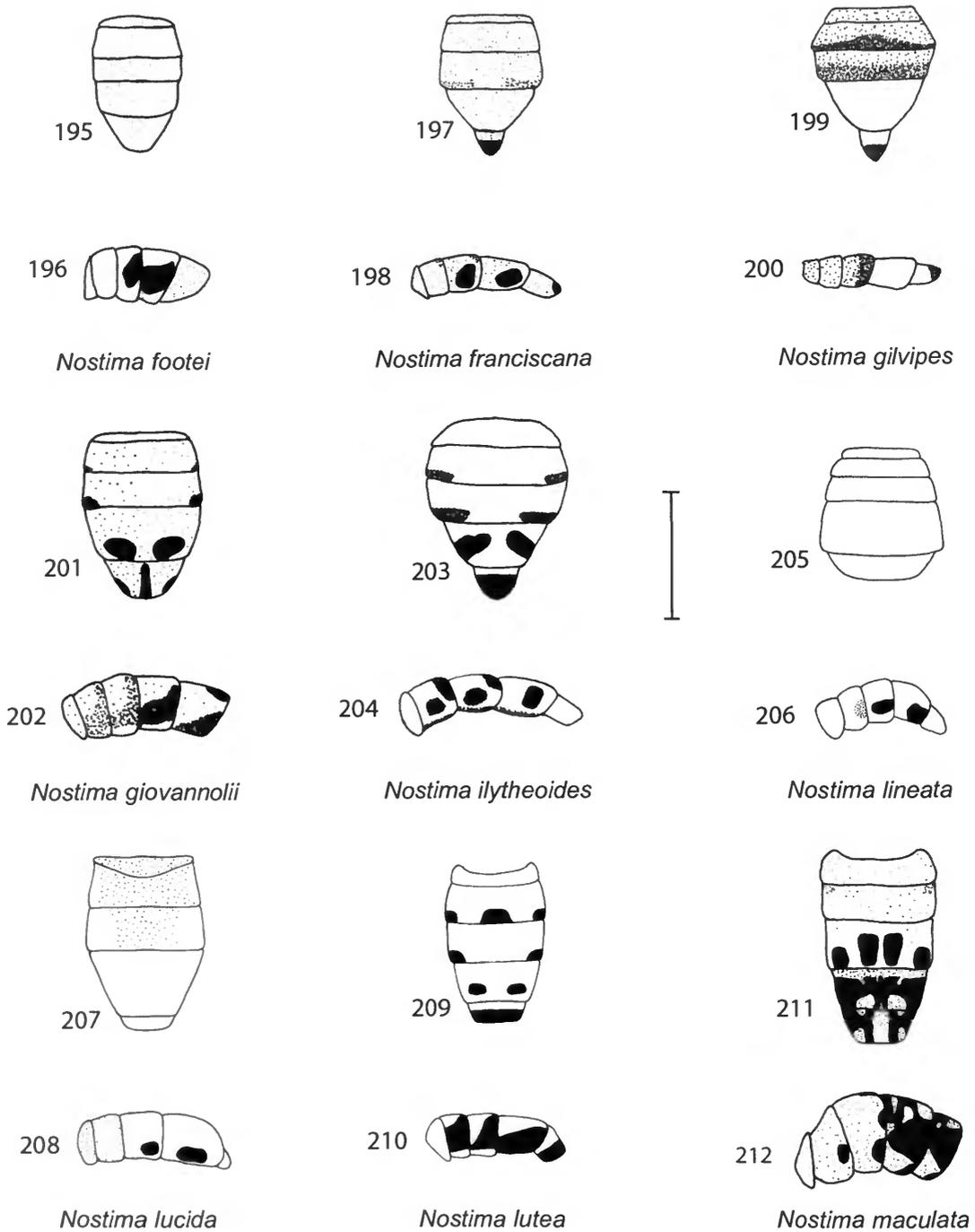
FIGURES 163–170.—Wings: 163, *Nostima quinquenotata*; 164, *N. schildi*; 165, *N. simuliflavida*; 166, *N. slossonae*; 167, *N. spilogaster*; 168, *N. spinosa*; 169, *N. stellata*; 170, *N. tresguttata*.

171 *Nostima velutina*172 *Nostima williamsi*173 *Nostima willistoni*174 *Nostima xenohypopia*175 *Nostima xenoptera*176 *Nostima ypsilon*

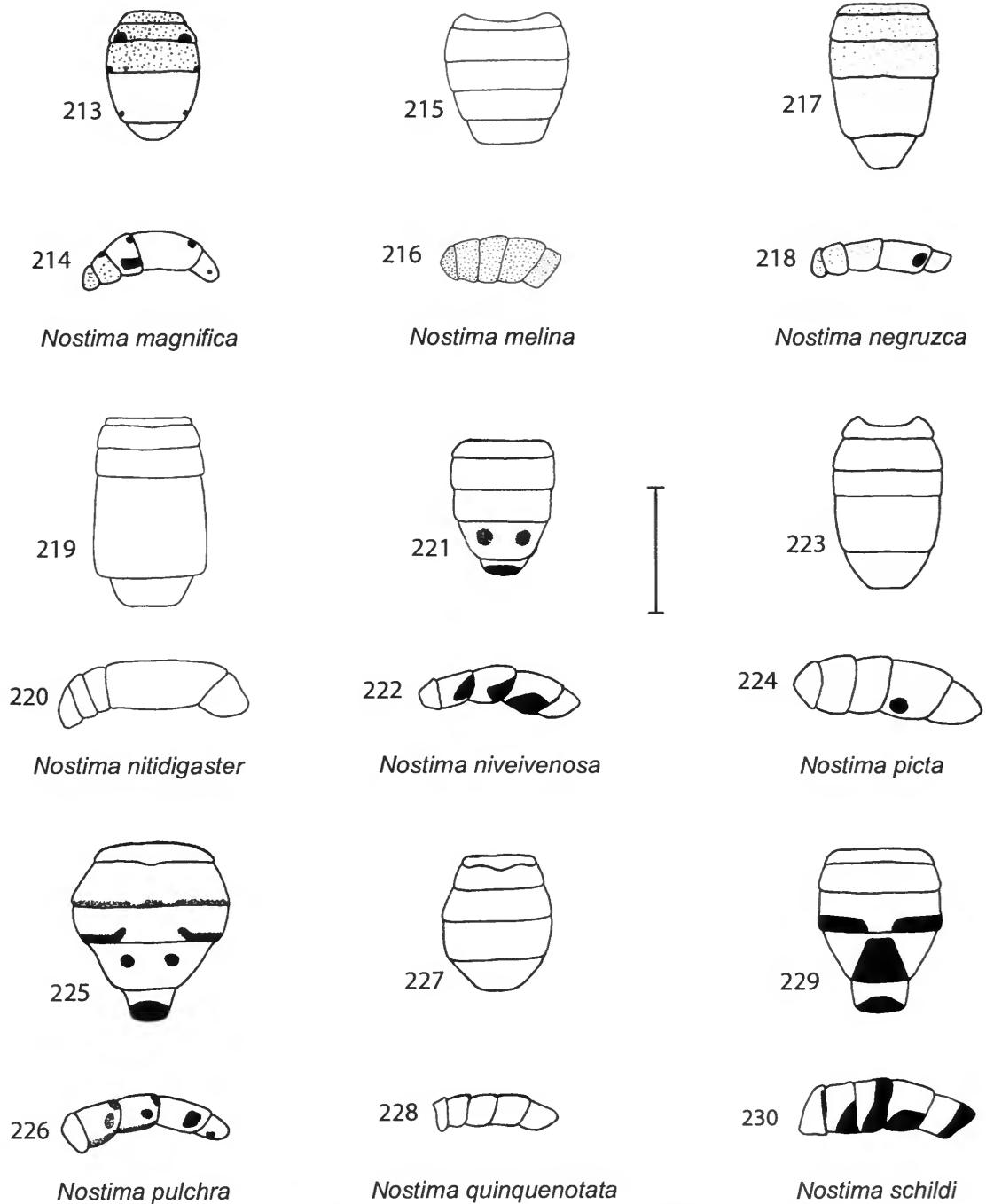
FIGURES 171–176.—Wings: 171, *Nostima velutina*; 172, *N. williamsi*; 173, *N. willistoni*; 174, *N. xenohypopia*; 175, *N. xenoptera*; 176, *N. ypsilon*.



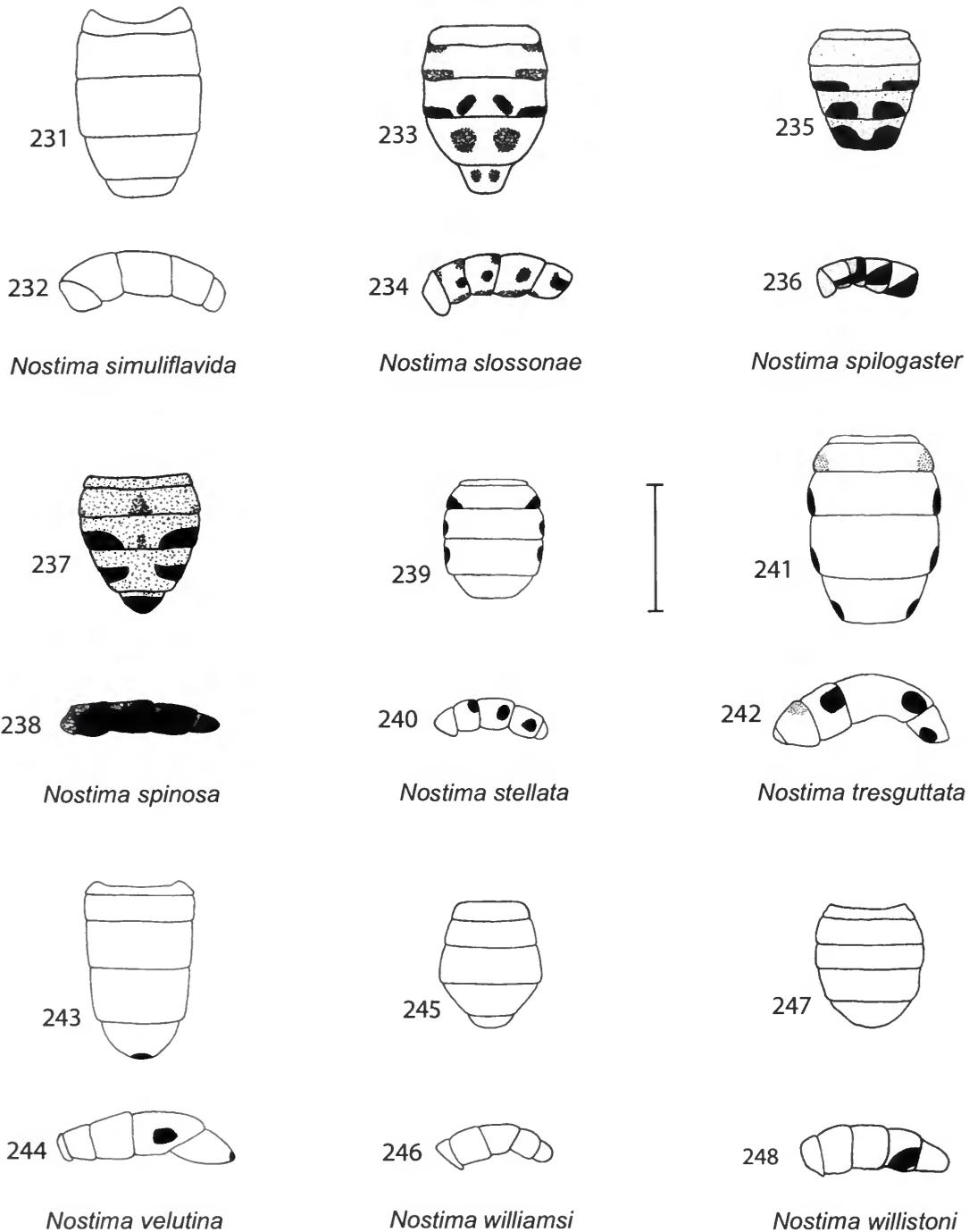
FIGURES 177-194.—Abdominal tergites, microtomentum patterns: 177, *Nostima abbreviata*, dorsal aspect; 178, *N. abbreviata*, lateral aspect; 179, *N. approximata* ♂, dorsal aspect; 180, *N. approximata* ♂, lateral aspect; 181, *N. approximata* ♀, dorsal aspect; 182, *N. approximata* ♀, lateral aspect; 183, *N. atriscuta*, dorsal aspect; 184, *N. atriscuta*, lateral aspect; 185, *N. canens*, dorsal aspect; 186, *N. canens*, lateral aspect; 187, *N. cinnamea*, dorsal aspect; 188, *N. cinnamea*, lateral aspect; 189, *N. duaguttata*, dorsal aspect; 190, *N. duaguttata*, lateral aspect; 191, *N. elegantula*, dorsal aspect; 192, *N. elegantula*, lateral aspect; 193, *N. flavida*, dorsal aspect; 194, *N. flavida*, lateral aspect. Scale = 0.5 mm.



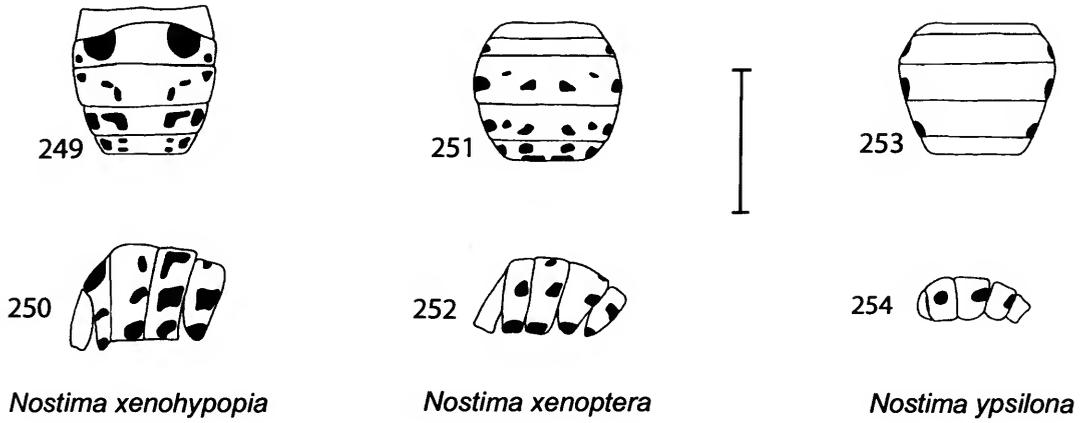
FIGURES 195–212.—Abdominal tergites, microtomentum patterns: 195, *Nostima footei*, dorsal aspect; 196, *N. footei*, lateral aspect; 197, *N. franciscana*, dorsal aspect; 198, *N. franciscana*, lateral aspect; 199, *N. gilvipes*, dorsal aspect; 200, *N. gilvipes*, lateral aspect; 201, *N. giovannolii*, dorsal aspect; 202, *N. giovannolii*, lateral aspect; 203, *N. ilytheoides*, dorsal aspect; 204, *N. ilytheoides*, lateral aspect; 205, *N. lineata*, dorsal aspect; 206, *N. lineata*, lateral aspect; 207, *N. lucida*, dorsal aspect; 208, *N. lucida*, lateral aspect; 209, *N. lutea*, dorsal aspect; 210, *N. lutea*, lateral aspect; 211, *N. maculata*, dorsal aspect; 212, *N. maculata*, lateral aspect. Scale = 0.5 mm.



FIGURES 213–230.—Abdominal tergites, microtomentum patterns: 213, *Nostima magnifica*, dorsal aspect; 214, *N. magnifica*, lateral aspect; 215, *N. melina*, dorsal aspect; 216, *N. melina*, lateral aspect; 217, *N. negruzca*, dorsal aspect; 218, *N. negruzca*, lateral aspect; 219, *N. nitidigaster*, dorsal aspect; 220, *N. nitidigaster*, lateral aspect; 221, *N. niveivenosa*, dorsal aspect; 222, *N. niveivenosa*, lateral aspect; 223, *N. picta*, dorsal aspect; 224, *N. picta*, lateral aspect; 225, *N. pulchra*, dorsal aspect; 226, *N. pulchra*, lateral aspect; 227, *N. quinquenotata*, dorsal aspect; 228, *N. quinquenotata*, lateral aspect; 229, *N. schildi*, dorsal aspect; 230, *N. schildi*, lateral aspect. Scale = 0.5 mm.



FIGURES 231–248.—Abdominal tergites, microtomentum patterns: 231, *Nostima simuliflavida*, dorsal aspect; 232, *N. simuliflavida*, lateral aspect; 233, *N. slossonae*, dorsal aspect; 234, *N. slossonae*, lateral aspect; 235, *N. spilogaster*, dorsal aspect; 236, *N. spilogaster*, lateral aspect; 237, *N. spinosa*, dorsal aspect; 238, *N. spinosa*, lateral aspect; 239, *N. stellata*, dorsal aspect; 240, *N. stellata*, lateral aspect; 241, *N. tresguttata*, dorsal aspect; 242, *N. tresguttata*, lateral aspect; 243, *N. velutina*, dorsal aspect; 244, *N. velutina*, lateral aspect; 245, *N. williamsi*, dorsal aspect; 246, *N. williamsi*, lateral aspect; 247, *N. willistoni*, dorsal aspect; 248, *N. willistoni*, lateral aspect. Scale = 0.5 mm.



FIGURES 249–254.—Abdominal tergites, microtomentum patterns: 249, *Nostima xenohypopia*, dorsal aspect; 250, *N. xenohypopia*, lateral aspect; 251, *N. xenoptera*, dorsal aspect; 252, *N. xenoptera*, lateral aspect; 253, *N. ypsilon*, dorsal aspect; 254, *N. ypsilon*. Scale = 0.5 mm.

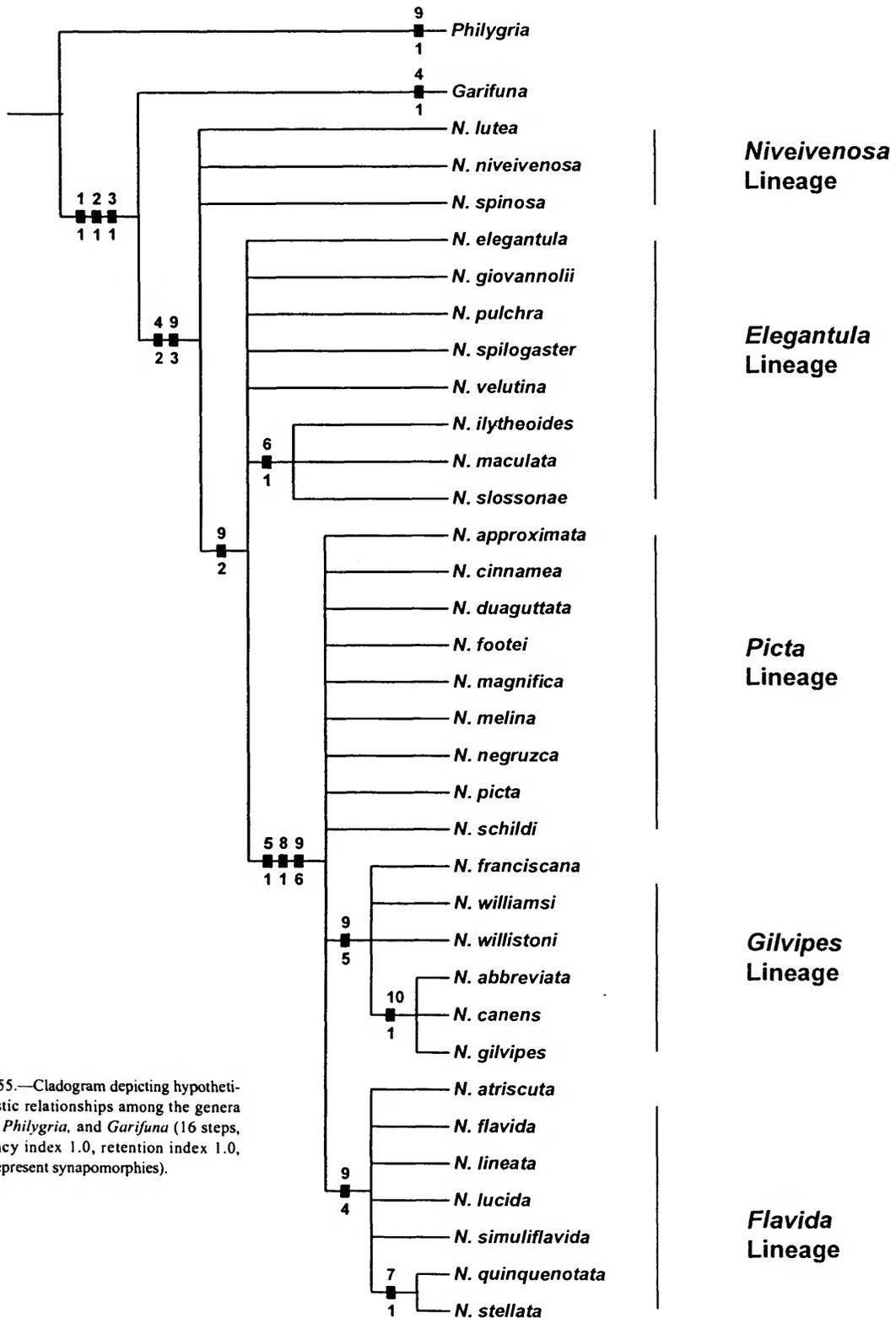


FIGURE 255.—Cladogram depicting hypothetical cladistic relationships among the genera *Nostima*, *Philygria*, and *Garifuna* (16 steps, consistency index 1.0, retention index 1.0, squares represent synapomorphies).

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