Studies of Terelliinae (Diptera: Tephritidae): A Revision of the Genus *Neaspilota* Osten Sacken

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and
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ABSTRACT

Freidberg, Amnon, and Wayne N. Mathis. Studies of Terelliinae (Diptera: Tephritidae): A Revision of the Genus *Neaspilota* Osten Sacken. *Smithsonian Contributions to Zoology,* number 439, 75 pages, 204 figures, 1986.—The genus *Neaspilota* Osten Sacken is revised, and its relationships within the subfamily Terelliinae are discussed. The distribution of the genus ranges from Alaska to northern Mexico. The genus contains two monophyletic sublineages, herein recognized as subgenera: *Neaspilota,* sensu stricto, and *Neorellia,* new subgenus. Nineteen species are recognized, including eight new ones, the latter all in the subgenus *Neorellia: Neaspilota aenigma, N. albiseta, N. appendiculata, N. callistigma, N. footei, N. isochela, N. pubescens,* and *N. stecki.* The asymmetry of the male foretarsus, found in all but one species, is an excellent character at the specific and generic levels. The female spermatheca is likewise an important character at the generic/subgeneric level, but less so at the specific level. Approximately 60 host-plant species, all in the family Asteraceae, have been recorded for *Neaspilota.* Host plants have been listed under the appropriate species of *Neaspilota* and in a separate section. Species of *Neaspilota,* sensu stricto, are associated with species of *Vernonia,* while species of *Neorellia* are associated with many other genera, none, however, belonging to the tribe Cynareae, to which most of the known host plants of Holarctic Terelliinae belong.

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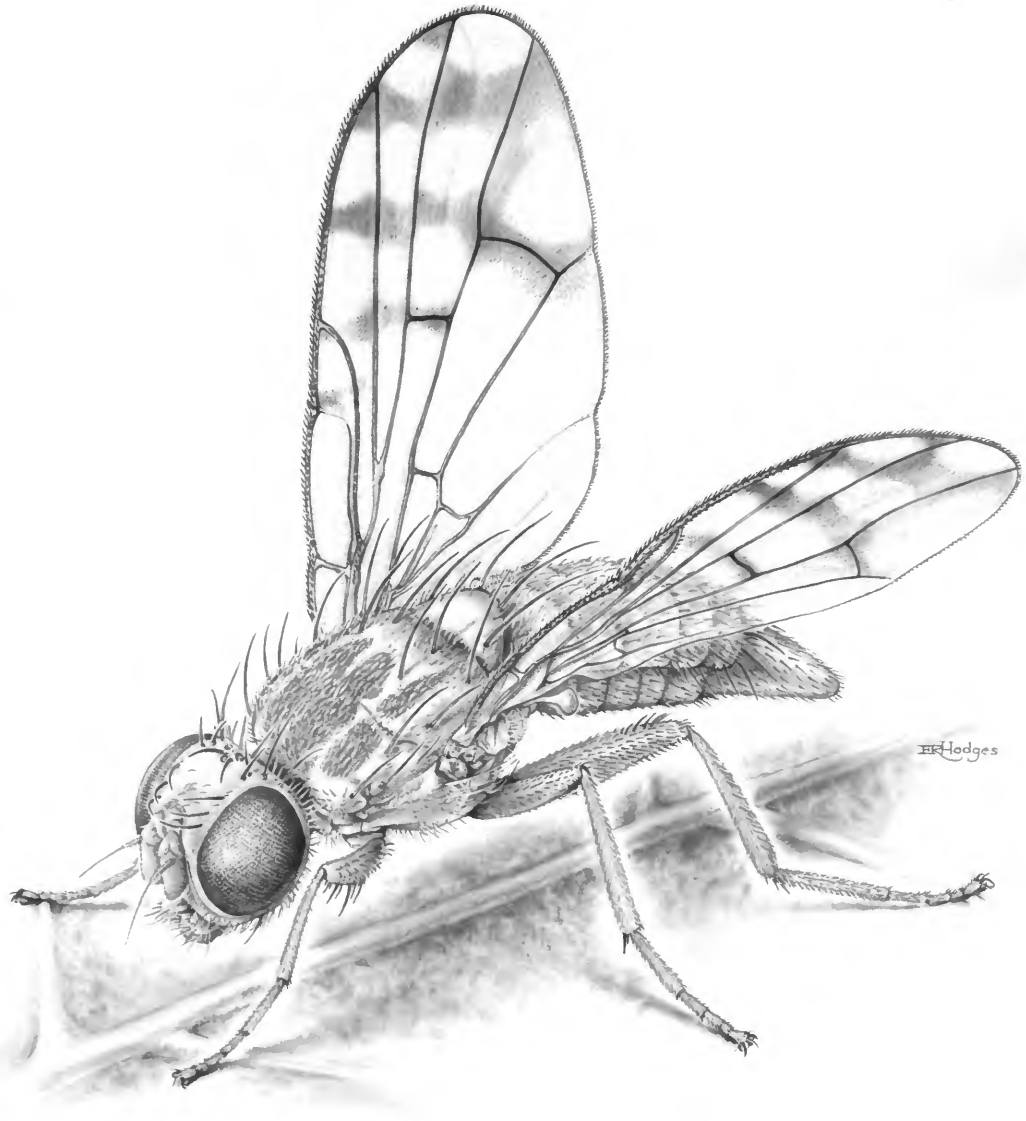

FIGURE 1.—*Neaspilota vernoniae*.

Studies of Terelliinae (Diptera: Tephritidae): A Revision of the Genus *Neaspilota* Osten Sacken

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and Wayne N. Mathis

Introduction

This revision is a contribution toward a better understanding of the systematics of the subfamily Terelliinae. The first contribution (Freidberg, 1985) dealt with the Palaeotropic genus *Craspedoxantha* Bezzi. Our purpose here is to revise the genus *Neaspilota* Osten Sacken, a strictly New World genus of the subfamily.

Neaspilota, initially considered as a subgenus of *Trypeta* Meigen, was proposed by Osten Sacken (1878:192) as a new name for *Aspilota* Loew (1873:286; preoccupied, Förster, 1862, Hymenoptera). Neither Loew nor Osten Sacken designated a type-species for their genus-group names. As a subgenus of *Trypeta, Neaspilota* originally included three Nearctic species, all described by Loew (1861a): *Trypeta alba, T. albidipennis,* and *T. vernoniae.* Coquillett (1910:511) subsequently fixed *T. alba* as the type-species of *Neaspilota.* Beginning with Williston (1896) *Neaspilota,* as *Neoaspilota* [sic], has been treated as a full genus.

Since Loew's paper (1861a), eight additional species have been described (see Foote, 1965; Ibrahim, 1982), but to date no comprehensive revision of the genus has been published. The most complete treatments of *Neaspilota* are those of Benjamin (1934; species of Florida), Quisenberry (1949; the most comprehensive key until now, with nine species), and Foote and Blanc (1963; Californian species).

Numerous records of individual species, as well as shorter keys, have been published; these are listed in the synonymical bibliographies of the appropriate species. Although most of these papers dealt with the taxonomy of adult *Neaspilota,* a few treated various biological aspects of the genus. Benjamin (1934) described the immature stages of species occurring in Florida, and Phillips (1946), Stegmaier (1968), and Schwitzgebel and Wilbur (1943) also dealt with the immature stages and life histories of various species of *Neaspilota.*

METHODS AND MATERIALS.—During the course of this study slightly over 4,000 specimens from most major North American collections were examined. Label data for all correctly identified specimens we examined were recorded, organized according to geographic province (country, state or province, and county for states of the United States), arranged alphabetically, and are presented under the appropriate species.

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If only the country was on the label, the specimen was not recorded. Locality data for which only the state was available or for which the specific locality could not be located within a county are listed at the end of a state's listing. Host data are included in the host plant summaries of each species only if there was an indication, usually from label data, that the fly was reared from the particular plant. In the specimens examined sections, host plants that were reared are indicated by an "ex."; all other plants mentioned are indicated by an "on." Abbreviations of institutions making specimens available to this study are those cited in the "Acknowledgments" section. Type specimens of all nominate taxa were studied. Label data accompanying each type are cited as given, with slashes to separate data of one label from another. Clarifying or interpretive comments are included within brackets.

The descriptive terminology, with the exceptions to be noted below, follows that published in the recent *Manual of Nearctic Diptera,* (McAlpine, 1981). We have followed Sabrosky (1983) in using "microtomentum" rather than pruinescence or pollinosity for the dust-like vestiture over much of the cuticular surface. The dust-like appearance is the result of cuticular microtrichia at various densities, not dust (pollinosity) or a waxy substance, as on a plum (pruinescence).

In McAlpine (1981), the middle portion of the frons is called the "frontal vitta," with mesofrons listed as a synonym. As frontal vitta is ambiguous, we have used the synonym, mesofrons, for this portion of the frons.

Throughout the descriptive text we use the term "major setae" for the following larger setae of the head collectively: inner and outer vertical setae; all fronto-orbital setae; ocellar setae; and genal setae. Usually these setae are similarly colored.

Ten meristic characters have been used for each species. With the exception of one character, for which two measurements were taken, at least five measurements were made for each character. Although a sample of five is too small for most statistical analyses, the ranges provided should help in characterizing a species, especially with ranges that do not or only slightly overlap.

1. Frontal-Head Ratio (width of frons/width of head): this ratio does not vary greatly within the genus (0.43–0.58), and in the subgenus *Neaspilota* it is usually less than 0.5 (0.43–0.51). In the subgenus *Neorellia* it is usually more than 0.5 (0.47–0.58). Intraspecific variation within both subgenera is small with few exceptions. Species notably below their subgeneric average are: *N. albiseta* and *N. signifera;* those above are: *N. brunneostigmata* and *N. isochela.*

2. Frontal Ratio (length/width): the length of the frons is measured between the vertex and the base of the antennae and is divided by the greatest width between the eyes.

3. First Flagellomere Ratio (length/height; assuming a porrect antenna): antennae are sometimes difficult to measure because of their orientation or distortion due to the drying process. In the subgenus *Neaspilota* the first flagellomere is elongate, with a ratio of 1.7–2.0, while in *Neorellia* this ratio is usually less than 1.7. In species of *Neorellia,* with a relatively high head (*N. aenigma, N. albiseta*), however, the antenna is more elongate, similar to that of the subgenus *Neaspilota.*

4. Aristal-Antennal Ratio (length of arista/length of antenna): this ratio averages greater in the subgenus *Neaspilota* than in *Neorellia.* The longest aristae are in *N. vernoniae* and *N. albidipennis,* while *N. isochela* and *N. signifera* have the shortest.

5. Stigmal Ratio (stigmal length/stigmal width): this and the following two ratios were measured in situ, without removing the wing and mounting it on a slide. In mounted wings, such as those photographed, the ratio is usually smaller. This ratio varies greatly inter- and intraspecifically. It is usually less in the subgenus *Neaspilota* (range 2.3–2.7) than in *Neorellia* (range 2.5–4.0).

6. Vein M Ratio (two straight measurements per species along vein M: distance between crossvein dm-cu and apex of vein M/distance between crossveins r-m and dm-cu): with the exception of *N. vernoniae,* where the ratio is less

variable and the least (2.0–2.33; subgeneric range 2.0–3.5), this ratio is highly variable and at best may serve for suprageneric considerations.

7. Crossvein Ratio (distance between crossveins dm-cu and r-m/length of r-m): as in the previous ratio, high variation lessens the value of this ratio except for *N. albiseta,* which has less variability and the greatest crossvein ratio (2.0–2.45; subgeneric range 1.16–2.45). In wings mounted on slides this ratio may be smaller.

8. Tergal 6/5 Ratio (length of tergum 6/length of tergum 5): this and the next two characters (9–10) are restricted to females. The tergal 6/5 ratio has historical and taxonomic significance in the higher classification of the Tephritidae. Within *Neaspilota* this ratio is highly variable, ranging from more to less than 1 in many species. The ratio does, however, average greater in the subgenus *Neaspilota* than in *Neorellia.* We caution against further conclusions as the method employed to measure distances for this ratio are not standardized. Specimens to be measured were traditionally dried, usually pinned, and the measuring process did not account for variability in the degree of telescoping of various terga.

9. Tergal-Oviscapal Measure (number of terga immediately preceeding oviscape with combined length equal to length of oviscape): this is the easiest but least accurate relative measure of the oviscapal length, being subject to the degree of distortion that occurred in the drying and telescoping process. Its main advantage is in being easy to estimate correctly in undistorted specimens. Within *Neaspilota* the oviscape varies in length from about equal to the combined length of terga 5–6 to almost as long as the preabdomen (length of combined terga 2–6).

10. Oviscapal Ratio (oviscapal length/oviscapal width): this ratio is more or less correlated with the previous one but is considerably more accurate.

Descriptions are composite. For the most part, information given in the generic or species group descriptions is not repeated in the species descriptions.

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AMNH American Museum of Natural History, New York (Dr. P.W. Wygodzinsky)
ANSP Academy of Natural Sciences of Philadelphia (Dr. Daniel Otte)
BMNH British Museum (Natural History), London, England (Mr. Brian H. Cogan)
CAS California Academy of Sciences, San Francisco (Dr. P.H. Arnaud, Jr.)
CNC Canadian National Collection, Ottawa, Canada (Dr. J.F. McAlpine)
CSDA California Department of Agriculture, Sacramento (Dr. M.S. Wasbauer)
CU Cornell University, Ithaca, New York (Dr. L.L. Pechuman)
FSCA Florida State Collection of Arthropods, Gainesville (Dr. H. Weems)
HU Humboldt Universität, East Berlin, DDR (Dr. H. Schumann)
ISU Iowa State University, Ames (Dr. R.E. Lewis)
KU University of Kansas, Lawrence (Dr. G.W. Byers)
MCZ Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Dr. Margaret Thayer)
MNHN Muséum National d'Histoire Naturelle, Paris, France (Mr. Loïc Matile)
NMW Naturhistorisches Museum, Vienna, Austria (Dr. Ruth Contreras-Lichtenberg)
OHSU Ohio State University, Columbus (Dr. C.A. Triplehorn)
ORSU Oregon State University, Corvallis (Dr. John D. Lattin)
STECK Private collection of Dr. Gary J. Steck, College Station, Texas
TAMU Texas A & M University, College Station (Dr. Gary J. Steck)
TAU Tel-Aviv University, Tel-Aviv, Israel
UCB University of California, Berkeley (Dr. E.I. Schlinger)
USNM former United States National Museum, collections in the National Museum of Natural History, Smithsonian Institution
USU Utah State University, Logan (Dr. W.J. Hanson)
WSU Washington State University, Pullman (Dr. W.J. Turner)
ZFM Zoologisches Forschungsingstitut und Museum A. Koenig, Bonn, Germany (Dr. H. Ulrich)

Hollis B. Williams organized locality data and prepared all distributional maps; Elaine R.S. Hodges prepared Figure 1 and inked the illustrations; A. Shoob prepared wing photographs; and Noreen M. Dinndorf typed the various drafts of the manuscript. Harold E. Robinson clarified many points of plant nomenclature. Special thanks are offered to Richard H. Foote, Ian M. White, Don R. Harris, and George C. Steyskal for critically reviewing the manuscript.

Subfamily TERELLIINAE

The subfamily Terelliinae is characterized by two apomorphic characters that occur rarely outside of this taxon. The first is the mesoclinate, posterior, orbital setae. Another apomorphy of most terelliines is a distinct black lyre-like pattern on the thorax, which otherwise is yellow.

Of the approximately 85 recognized species in Terelliinae most occur in the northern temperate regions of the Old and New Worlds, with small extensions into the Afrotropical and Oriental regions (mostly by nine species of *Craspedoxantha*). The Nearctic fauna includes three genera. *Orellia* Robineau-Desvoidy (three species) and *Chaetostomella* Hendel (one species) are almost entirely Palaearctic genera, and *Neaspilota* (19 species) is exclusively Nearctic. The generic key presented herein is modified from one Freidberg (1985) published.

Key to Genera of Terelliinae

1. Antennae widely separated at base, distance equals about one scapel width in female, about twice scapel width in male; face distinctly concave; antennal pedicel in male with long, medial, setulose projection, in female with moderately strong setulae (West Palaearctic) . . . . . ***Cerajocera*** Rondani

   Antennae and face not as above; distance between antennal bases in both sexes much smaller than width of scape 2

2. Two pairs of dorsocentral setae present (presutural and postsutural); wing with 4 transverse bands; lower calypter at most as long as upper calypter (Palaearctic) . . . . . ***Chaetorellia*** Hendel

   Only one pair of dorsocentral setae present (postsutural) (however, *Orellia blanda* Richter from Asia has two pairs of dorsocentral setae); wing pattern variable, sometimes lacking; lower calypter as long as upper or longer 3

3. Anterior part of gena ("vibrissal corner") usually with 3–6 strong, dark setae; mediotergite shining; both calypteres of the same length; wing with 4 transverse bands (Holarctic) . . . . . ***Chaetostomella*** Hendel

   Anterior part of gena without such setae; mediotergite usually mat; lower calypter usually longer than upper calypter 4

4. Scutellum with at least some blackish setulae; eye 1½–2 times as high as long; wing with a complete yellow costal band that is spotted with black, usually with cell CuP yellow and sometimes with an additional oblique or transverse band (Afrotropical and Oriental) . . . . . ***Craspedoxantha*** Bezzi

   Scutellum with whitish setulae only; eye usually less than 1½ times as high as long; wing entirely hyaline or with a different pattern 5

5. Female: Spermathecae uniformly ovate (*Neaspilota* sensu stricto) or truncate and invaginated apically (subgenus *Neorellia*), dark brown, surface relatively smooth. Male: Foretarsus usually asymmetrical, claws and

pulvilli asymmetrical (*N. footei* has symmetrical claws, *N. isochela* has a symmetrical foretarsus; spermatheca of both species truncate and invaginated). Vein R_{4+5} usually bare, rarely with 1–2 setulae dorsally at node; mesofrons in some species distinctly setulose (*Neaspilota* sensu stricto); small species, usually less than 5 mm in length (Nearctic). . . . . ***Neaspilota*** Osten Sacken

Female: Spermathecae more elongate, not truncate or invaginated, frequently convoluted, light brown or yellowish, surface rough, spiny. Male: Foretarsus, including claws, symmetrical. Vein R_{4+5} usually bearing 1 to a few setulae dorsally at node; mesofrons bare; length usually 5 mm or more 6

6. Wing usually entirely hyaline, sometimes somewhat infuscated; abdominal setulae mainly whitish; mid- and hindfemur posteroventrally without setae; apical section of vein M usually at least twice as long as penultimate section (western Palaearctic) . . . . . ***Terellia*** Robineau-Desvoidy

Wing usually with transverse bands or spots; when hyaline, then abdominal setulae brown or black, and apical section of vein M less than twice as long as penultimate section; mid- and hindfemur often with posteroventral setae (predominantly Holarctic, with a few species in the Oriental and Neotropical regions) . . . . . ***Orellia*** Robineau-Desvoidy

[We include *Galada* Hering within *Orellia*.]

Genus *Neaspilota* Osten Sacken

Aspilota Loew, 1873:286 [type-species: *Trypeta alba* Loew, by subsequent designation, Coquillett, 1910:511; preoccupied, Förster, 1862 (Hymenoptera)].—Osten Sacken, 1878:192 [catalog].

Neaspilota Osten Sacken, 1878:192 [as a subgenus of *Trypeta;* new name for *Aspilota* Loew; type-species: *Trypeta alba* Loew, automatic].—Coquillett, 1899:268 [generic key]; 1910:574 [nomenclature].—Aldrich, 1905:610 [catalog].—Phillips, 1923:122 [generic key], 139 [review].—Curran, 1932a:3 [key to species]; 1932b:3 [generic key]; 1934:289 [generic key].—Benjamin, 1934:9 [generic key], 34–36 [review].—Malloch, 1942:18 [key to species, discussion].—Quisenberry, 1949:83, 84 [key to species].—Foote and Blanc, 1963:5 [generic key], 33–35 [review, key, Californian species].—Foote, 1965:672 [catalog]; 1980:10 [generic key], 36 [diagnosis, discussion].—Stegmaier, 1968:46 [natural history].

Neoaspilota [sic] Williston, 1896:122 [unjustified emendation, generic key]; 1908:284, 287 [generic key].—Hendel, 1914:92 [generic key].

Aspilomyia Hendel, 1907:98 [unjustified new name for *Aspilota*, type-species: *Trypeta alba* Loew, automatic].

DESCRIPTION.—*Head:* Coloration: Yellow, with antenna sometimes more deeply yellow or face whitish; each ocellus surrounded by blackish ring, these sometimes enlarged and united to form one ocellar spot; slender portion of arista brown. Structure: Usually slightly to distinctly higher than long, infrequently as high as long, rarely longer than high; frontofacial angle small (95°–120°), projected, or angle wider (130°–140°) and rounded; frontal-head ratio 0.43–0.58; frons longer than wide, distinctly narrowed anteriorly, bare to distinctly setulose, frontal ratio 0.75–1.40; parafacial width 0.1–0.4 and genal width 0.4–1.0 width of first flagellomere, sometimes narrower; ratio of genal height/length of first flagellomere 0.3–1.0; face slightly concave; lower facial margin slightly to distinctly projected. Antenna slightly shorter or as long as face; 1st flagellomere ratio 1.4–2.0, this segment rounded apically or with indistinct dorsoapical point; aristal-antennal ratio 0.91–1.66; arista with short but distinct hairs, hairs at most as long as aristal width at base, spacing dense, or interspaced. Eye oval, relatively higher in specimens with high head. Proboscis capitate, with haustellum shorter or longer than antenna; labella short, distinctly shorter than antenna (*N. signifera* Co-

quillett with haustellum about twice as long as antenna and labella short spatulate, about as long as antenna); palpus spatulate, broadest preapically, or taeniate, parallel-sided, not projected beyond lower facial margin; occiput more or less uniformly convex. Chaetotaxy as follows: 2 orbital setae, posterior orbital seta mesoclinate; 3 subequal, frontal setae; ocellar seta about as long as frontal setae; fronto-orbital, ocellar, inner and outer vertical, and often genal setae usually concolorous, darker than other setae; postocellar, postvertical, and postorbital setae whitish or yellowish, acuminate (not flattened); setulae mostly pale, somewhat variable in density and coarseness on anterior part of gena and parafacials; microtomentum in most species sparse, inconspicuous.

Thorax: Coloration: Mostly yellow, but with the following structures or areas usually black or blackish, these sometimes pale or indistinct. A large, lyriform area on scutum, extended posteriorly from above the cervix, where it is shining, to behind transverse suture; it is mostly dull due to dense microtomentum; a small spot behind base of wing; ventral portion of katepisternum and meron; subscutellum; laterotergite posteriorly to near base of halter. Legs usually yellow; calypteres white; halter yellow. Structure: Scutum about as long as wide; scutellum rounded, dorsal surface flat or slightly convex. Chaetotaxy as follows: 1 postpronotal seta; 1 presutural seta; 1 dorsocentral seta, more or less transversely aligned with anterior supra-alar seta (the latter seta lacking in *N. signifera*); 2 posterior supra-alar setae (or 1 postalar and 1 intra-alar); 2 scutellar setae, the apical seta about 0.8 as long as basal seta; 2 notopleural setae; 1–2, rarely more, anepisternal setae; 1 anepimeral seta; 1 katepisternal seta; all setae usually concolorous, also with dark cephalic setae, anepimeral and katepisternal setae sometimes paler; scapular setae more than 4, whitish, distinguished from close, dorsal, semierect setulae by greater size and by being erect; setulae whitish, more or less coarse; microtomentum rather dense on scutum, postnotum, and black spots, otherwise indistinct; lower calypter larger than upper calypter.

Legs: Forefemur with a row of longer erect setae posteroventrally, posterodorsally with 2 more or less regular rows of setae; midfemur with a row of short, erect setae anteriorly in middle; hindfemur with 1 to few semierect anterodorsal and posterodorsal setae preapically; hindtibia usually with a conspicuous row of short setae ("tibial comb") anterodorsally; foretarsus of male usually modified, with 5th tarsomere, rarely also 4th, asymmetrical, with asymmetrical claws, with anterior pulvillus usually greatly reduced in size, with empodium usually indistinct, and with 2 adjacent, more or less long rows of short, thick setae or spines ("tarsal comb") anteroapically; spines vary from 1–10 or more in a row; comb generally longitudinal, but spines sometimes with different orientation; anterior claw usually larger than posterior claw, more strongly curved at base and resting against the tarsal comb.

Wing: Stigmal ratio 2.3–4.0; veins rather straight, distal sections of R_{4+5} and M usually somewhat curved posteriorly; wing apex usually between ends of R_{4+5} and M; cell R_5 parallel-sided; crossvein ratio 1.16–2.30; point of cell CuA_1 small but distinct; vein R_1 setulose dorsally (with or without an interruption) and ventrally at apex; vein R_{4+5} usually bare, rarely with 1–2 setulae dorsally at node; costal spines 2–3, slightly larger than costal setulae; wing entirely microtrichose, usually without extensive pattern, sometimes completely hyaline, including stigma; stigma, however, usually differs from rest of wing, being opaque yellow or having a brown spot; the intensity of the brown spot (pale brownish, brownish, brown, blackish brown) and its size relative to the stigma are usually good identification characters, but may vary somewhat intraspecifically or overlap interspecifically; wing sometimes with rather reduced, banded or reticulate-banded pattern.

Abdomen: Coloration: Usually predominantly to entirely yellow, with black spots on terga; shape and extent of black spots on terga somewhat variable interspecifically; abdomen rarely predominantly black; oviscape usually completely yellow, sometimes blackened to some de-

gree. Structure: Preabdomen: Fifth tergum of male about as long as combined length of 3rd and 4th terga; 5th sternum largest, with posterior margin deeply and broadly invaginated; 6th tergum of female shorter, as long as or longer than 5th tergum; tergal 6/5 ratio 0.53–1.44; sterna distinctly wider than long; dark setae, concolorous with cephalic setae, usually present on lateral margins of terga and posterior margin of at least (usually only) posterior tergum; setulae usually whitish, more or less coarse, in 2 species darker (brown or blackish); microtomentum inconspicuous or very sparse, obvious at most on black areas.

Male Terminalia: Epandrium (9th tergum) in posterior (= ventral) view oval or almost rounded, broadest at midheight or lower, closer to prensisetal level, with outer surstyli more or less curved mesally; mesal prensiseta larger and more obtuse than external one, sometimes wider than long; cerci sometimes with lateroventral cluster of setae; basiphallus long, coiled; distiphallus with rather strong and complex sclerotization, in most species with a long, sinuous, double, apical tube, in some species with only an indication of such a tube, or tube lacking entirely; sclerotization often with some areas appearing reticulate or scaly (visible only under high magnification); fultella with elongate apodeme; ejaculatory apodeme usually fan-shaped at apex.

Female Terminalia: Oviscape flattened in pinned specimens; its length varies interspecifically from shorter to longer than basal width, dorsally as long as combined length of posterior 2–5 terga; setulae fine, brown; rasper not studied; aculeus gradually tapered, with apex usually rather pointed, with 2 preapical setulae (sensilla ?), rarely with a more or less distinct mediodorsal carina; spermathecae 2, dark brown, ovate or truncate and invaginated, surface somewhat roughened, but lacking spines; distal portion of spermathecal duct slightly swollen.

Natural History and Host Plants

Information on natural history and host plants is generally sparse for *Neaspilota*. In Florida, Benjamin (1934) reared four species (*N. floridana* [as *N. alba*], *N. achilleae, N. dolosa,* and *N. punctistigma*) from host plants and described their larvae and puparia. Benjamin discovered that the larvae of three species (*N. achilleae, N. dolosa,* and *N. punctistigma*) feed singly in the flowers of their hosts. Phillips (1946) redescribed the immature stages of *N. achilleae,* and provided a description of *N. albidipennis.*

The immatures of *Neaspilota* lack conspicuous features. However, from a comparison of the larval anterior spiracles they can be divided into two groups, corresponding with the two subgenera proposed in this paper. The first group, which includes *N. achilleae, N. dolosa,* and *N. punctistigma* (subgenus *Neorellia*), has three to four digits in the anterior spiracle, while the second group, which includes *N. alba* and *N. albidipennis (Neaspilota,* sensu stricto), has six to eight digits. Because information on the remaining species is lacking, the consistency of this character throughout both subgenera requires further study.

In Kansas, Schwitzgebel and Wilbur (1943) studied some biological aspects of three *Neaspilota* species (*N. alba, N. albidipennis,* and *N. vernoniae*) associated with ironweed (*Vernonia interior*). Most of their observations, however, referred to *N. alba.* This latter species has two generations annually. The adults of the first generation emerge during May and June. A single egg is deposited in a flower head, and the larva feeds upon the developing seeds. The larval period lasts two to three weeks, and the entire life cycle of the first generation is completed in about a month. Larvae of the second generation were observed feeding in late September, and the species overwintered in this stage. The authors did not assess this species as a potential biocontrol agent of the weed.

During this study we maintained living adults of *N. achilleae* in a cage, hoping to observe behaviors related to the modified male foretarsi. The flies did not mate, nor did we observe any behavior that provided clues as to the significance of this modification. Nevertheless we spec-

ulate that the function of this modification is related to courtship or copulation and that the male uses the foretarsi to clasp the female.

Wasbauer (1972) compiled the most recent comprehensive host list for species of *Neaspilota,* but because that list was based, in many instances, on misidentified fruit flies and because we are providing new host records, a new list is presented herein. Although some species of *Neaspilota* were collected on plants belonging to other families, confirmed rearing records are restricted to the family Asteraceae (Compositae). Available records indicate that all species develop in flower or seed heads, apparently without causing the formation of galls.

Confirmed rearing records exist for only 13 species, thus much more rearing work will be necessary before a satisfactory knowledge of the host-plant associations within *Neaspilota* will be available. Rearing records are especially scarce from western United States, where about half of the known species of *Neaspilota* occur.

Although the host record is incomplete, it appears that oligophagy is the trend with *Neaspilota.* According to our current knowledge, the genus as a whole utilizes about 60 species of host plants belonging to some 20 genera. Most species with known host plants utilize more than one species, and there are already three species (*N. achilleae, N. dolosa,* and *N. punctistigma*) with more than ten known host plants each. This trend will undoubtedly become clearer, as more host plants are discovered. Some plant species are hosts to two or even three *Neaspilota* species; however, most plants are infested by only one *Neaspilota* species.

A notable observation from the list is that rearing records of *Neaspilota,* sensu stricto, are essentially all from the genus *Vernonia,* whereas those of the subgenus *Neorellia* do not include *Vernonia.* There are only minor exceptions to these associations. While we were not able to disprove the few exceptions, we still consider the overall host-plant evidence as strongly supportive of our ideas about the phylogeny of the genus and its two monophyletic lineages, herein recognized as subgenera. Twelve of the plant genera, comprising the great majority of the species that are known to be hosts of the subgenus *Neorellia,* belong to the tribe Astereae. The remaining seven genera of host plants belong to the Helenieae, Heliantheae (two genera), Lactuceae (two genera), Inuleae, and Eupatorieae.

Vernonia is the preferred host genus of many tephritids in the tropics, but among terelliines only some Afrotropical species of *Craspedoxantha* utilize this host genus; other species of *Craspedoxantha* apparently feed on non-related genera.

HOST PLANT LIST OF NEASPILOTA.—The host plant species we list herein fall into four categories. Most hosts are based on records we have confirmed. Some plants that we list are those we suspect to be hosts but lack confirming rearing data (marked with an asterisk). A few records are based on confirmed host label data but are still suspect, i.e., we question the accuracy of the label data (indicated by a ?). Finally, we include records of others (see Wasbauer, 1972, for a compilation) that we have not checked (indicated by a W). We have followed *Index Kewensis* in citing most plant names and their authors.

	Host Plant		Species of *Neaspilota*
1.	*Aphanostephus skirrhobasis* (DC) Trel.		*dolosa*
2.	*Aster adnatus* Nutt.		*achilleae*
3.	*Aster asteroides* (DC) Kuntze		*achilleae*
4.	*Aster bifoliatus* (Walt.) Ahles		*punctistigma*
5.	*Aster carolinianus* Walt.	W	*achilleae*
6.	*Aster concolor* L.		*achilleae*
7.	*Aster spinosus* Benth.		*viridescens*
8.	*Aster tanacetifolius* (HBK)	*	*dolosa*
9.	*Baeria Fremontii* (Torr.) Gray		*signifera*
10.	*Chrysopsis graminifolia* Elliott		*achilleae*
			punctistigma

	Host Plant		Species of *Neaspilota*
11.	*Chrysopsis hyssopifolia* Nutt.	?	*floridana*
			punctistigma
12.	*Chrysopsis latifolia* Small		*achilleae*
		*	*dolosa*
			punctistigma
13.	*Chrysopsis mariana* Elliott		*dolosa*
			punctistigma
14.	*Chrysopsis oligantha* Chapm.		*achilleae*
15.	*Chrysopsis pilosa* Nutt.		*punctistigma*
16.	*Chrysopsis Traceyi* Nutt.	W	*punctistigma*
17.	*Chrysopsis trichophylla* Elliott		*dolosa*
			punctistigma
18.	*Chrysopsis viscida* Greene	*	*dolosa*
19.	*Chrysopsis villosa* DC	W	*brunneostigmata*
20.	*Chrysopsis* sp.		*dolosa*
			isochela
			punctistigma
21.	*Chrysothamnus viscidiflorus* Nutt.	W	*brunneostigmata*
22.	*Chrysothamnus* sp.		*footei*
23.	*Coreopsis calliopsidea* Gray	*	*wilsoni*
24.	*Corethrogyne californica* DC	W	*brunneostigmata*
25.	*Corethrogyne filaginifolia* Nutt.	W	*brunneostigmata*
26.	*Erigeron canadensis* L.		*achilleae*
			footei
27.	*Erigeron nudicaulis* Michx.		*achilleae*
			dolosa
28.	*Erigeron strigosus* Muhlenberg		*achilleae*
			dolosa
29.	*Erigeron strigosus* Muhlenberg var. *Beyrichii* (Fisch. & Meyer) Gray	W	*dolosa*
30.	*Erigeron* sp.	W	*brunneostigmata*
		W	*dolosa*
31.	*Grindelia* sp.	*	*isochela*
32.	*Haplopappus Goodingii* (A. Nels.) M. & J.		*aenigma*
		W	*brunneostigmata*
33.	*Haplopappus Hartwegi* Blake	*	*aenigma*
34.	*Haplopappus venetus* (HBK) Blake var. *vernonioides* (Nutt.) Haller		*callistigma*
35.	*Hemizonia pungens* Torr. & Gray		*signifera*
36.	*Heracleum* sp. (Umbelliferae)	W	*achilleae*
37.	*Heterotheca Lamarckii* Cass.		*dolosa*
38.	*Hieracium argyraeum* Small		*achilleae*
39.	*Hieracium Gronovii* L.		*achilleae*
40.	*Hieracium scabrum* Michx.		*achilleae*
41.	*Hieracium venosum* L.		*achilleae*
42.	*Hieracium* sp.		*achilleae*
43.	*Machaeranthera canescens* Gray	W	*brunneostigmata*
44.	*Pluchea foetida* DC		dolosa
		?	*floridana*
			punctistigma
45.	*Pluchea imbricata* Nash		*punctistigma*
46.	*Pluchea rosea* Godfrey		*punctistigma*
47.	*Prenanthes trifoliata* Fernald		*achilleae*

	Host Plant		Species of *Neaspilota*
48.	*Sericocarpus acutisquamosus* Small		*achilleae*
			punctistigma
49.	*Sideranthus megacephalus* Small		*dolosa*
50.	*Sideranthus rubiginosus* Britton		*isochela*
51.	*Trilisa paniculata* Cass.		*achilleae*
52.	*Vernonia altissima* Nutt.		*floridana*
53.	*Vernonia angustifolia* Michx.		*floridana*
		?	*punctistigma*
54.	*Vernonia Baldwini* Torr.	W	*alba*
			albidipennis
55.	*Vernonia Blodgettii* Small		*floridana*
56.	*Vernonia interior* Small	W	*alba*
		W	*albidipennis*
		W	*vernoniae*
57.	*Vernonia noveboracensis* Willd.		*albidipennis*
58.	*Vernonia* sp.		*alba*
			albidipennis
		*	*vernoniae*

PHYLOGENY

As characterized here, *Neaspilota* is undoubtedly monophyletic. Its monophyly is established on characters from morphology, natural history, and zoogeography.

One of the most striking morphological characters, which has not been studied in detail until now, is the asymmetry of the male foretarsi (Figures 2–7). The existence of this modification was first noted by Malloch (1942), but it has not been studied in detail or used for classification. To the best of our knowledge, such asymmetry is unique among the Tephritidae. It involves the distal tarsomere(s), which usually bears a group of spines opposing the anterior claw, the modified anterior claw, and the reduced anterior pulvillus, and we consider these modifications to be apomorphic. There are several types of modifications of the foretarsi, beginning with the slight asymmetry of the fifth tarsomere, shown in *N. footei*, which, nevertheless, has symmetrical claws and pulvilli. The foretarsi of other species, such as those of the subgenus *Neaspilota,* are distinctly asymmetrical, with the structures of the fifth tarsomere greatly modified. The most asymmetrical foretarsi occur in *N. albiseta,* which has the fourth tarsomere asymmetrical in addition to the modifications of the fifth. Males of *N. isochela,* with their entirely symmetrical tarsi, resemble closely species of the Old World genus *Terellia.* In this case the decision that *N. isochela* belongs to *Neaspilota* is made because of its small size, lack of setulae on the node of vein R_{4+5}, its distribution (New World), and the shape and color of the female spermathecae, which, by being dark, truncate, and evaginated, are typical for *Neaspilota* (*Neorellia*), and differs markedly from the kind found in *Terellia. Neaspilota* is restricted to the Nearctic Region, while the other six or seven terelliine genera, coupled with over 75% of the known species of the subfamily, are either restricted to the Old World (particularly to the Palaearctic Region), or have poor representation in the Nearctic Region (three species of *Orellia* and one species of *Chaetostomella* occur in North America). Finally, *Neaspilota* deviates from what may be called the main stock of Terelliinae by not having hosts within the tribe Cynareae. This character occurs in a small minority of *Orellia* species in the Palaearctic and in *Craspedoxantha,* a Palaeotropical genus, which is also isolated from the main Palaearctic stock of the subfamily.

The subgenera proposed in this paper show synapomorphies with regard to the entire subfamily. In *Neaspilota,* sensu stricto, these are the setulose frons, the relatively short, ovate, and externally smooth spermathecae, and the lateroventral tufts of setulae on the male cerci. It should be noted, however, that species of *Xyphosia* Robineau-Desvoidy, a genus that may eventually be included in the Terelliinae, also have a setulose frons. In *Neorellia,* the synapomorphy is the truncate and evaginated spermathecae. The two subgenera are further characterized by traits of possible phylogenetic significance, which are difficult to assess, due to insufficient knowledge on the outgroup condition.

Based on its synapomorphies, *Neaspilota,* sensu stricto, seems to represent the more advanced species of the genus, while *Neorellia* appears to be more closely related to the main stock of Terelliinae, in particular to *Terellia* and *Orellia.* This assumption seems to fit the possibility that the ancestors of *Neaspilota* arrived in America through Beringia and subsequently spread over most of North America. While spreading, speciation took place, culminating in the formation of the four species of *Neaspilota,* sensu stricto, all confined more or less to eastern North America. The latter subgenus became established on plants of the genus *Vernonia,* which are missing from the flora of western North America. The phylogeny within *Neaspilota,* sensu stricto, is rather straightforward. *Neaspilota vernoniae* with distinct wing pattern and lack of tufts of setae on the male cerci seems to represent the more plesiomorphic condition, similar to what prevails in *Orellia,* possibly the most closely related genus. The apomorphic characters of *N. albidipennis* are the dark-abdominal setulae, the predominantly dark body, and the tufts of setulae on the male cerci, a character also shared with the remaining two species of the subgenus. These two species, *N. alba* and *N. floridana,* apparently are sister groups, although their apomorphic condition remains unsubstantiated.

The phylogeny within the subgenus *Neorellia* is not resovled. Based on a preliminary analysis of the characters, it appears that numerous trees, some equally parsimonious, would result. Moreover, the host plants for this subgenus are rather incompletely known, and host plants are frequently good indicators of phylogenetic relationships. Therefore, we refrain from proposing a phylogeny for *Neorellia.*

Key to Subgenera of *Neaspilota*

Frons setulose; frontofacial angle rounded, barely projected anterior of eye; lower facial margin barely projected; head in profile appearing somewhat oval; spermatheca ovate, pear-shaped; male cerci usually with distinct lateroventral tuft of setulae; distiphallus usually lacking long, tubular structure, rarely with single moderately long tube; anterior spine of male tarsal comb usually enlarged; anepisternum usually with 2 large dark setae. Hosts: species of *Vernonia.* (Eastern and central United States) . . ***Neaspilota,*** sensu stricto

Frons usually bare, occasionally with 1–3 setulae; frontofacial angle and lower facial margin distinctly projected; head in profile not appearing oval; spermatheca truncate, invaginated apically; male cerci lacking tuft of setulae; distiphallus usually with long, sinuate, double tube; male tarsal comb with anterior spine not enlarged; anepisternum usually with 1 large, dark seta. Hosts: various, but not species of *Vernonia.* (Alaska to Mexico, throughout United States) . . . . . ***Neorellia,*** new subgenus

Subgenus *Neaspilota*, sensu stricto

Neaspilota (Neaspilota) Osten Sacken, 1878:286 [type-species: *Trypeta alba* Loew, by subsequent designation (Coquillett, 1910:511); see generic synonymy].

DIAGNOSIS.—Dark setae generally larger.

Head: 1.20–1.33 times as high as long; frons setulose, width usually less than half that of head; frontal-head ratio 0.43–0.51; frontofacial angle wide (130°–140°) and rounded; lower facial margin barely projected; parafacials 0.17–0.30 and gena 0.5–1.0 as wide as antenna; eye usually 1.4–1.7 as high as long; 1st flagellomere ratio 1.7–2.0; arista usually long, mostly sparsely haired, aristal-antennal ratio 1.20–1.65; proboscis with haustellum and labella shorter than antenna.

Thorax: Anepisternum with 2–3 distinctly darker setae; anteroapical spine of tarsal comb usually longer (up to 2–3 times) and thicker than rest of spines; pterostigma short, pterostigmal ratio 2.3–2.7; veins R_{4+5} and M distinctly curved posteriorly near apex; microtrichia at posterior margin of wing visible, slightly darker than pale areas of wing membrane.

Abdomen: Epandrium rounded to oval in posterior (= ventral) view, thick at dorsal side in lateral view, strongly narrowed ventrally; cerci usually with a lateroventral dense tuft of setae; distiphallus usually without a long tube; the 2 setulae (sensilla ?) near apex of aculeus approximate, nearly touching; spermatheca ovate, not truncate.

HOSTS.—Species of *Vernonia* (Asteraceae).

Key to Species of the Subgenus *Neaspilota*

1. Wing with several dark markings in addition to dark pterostigma; cerci with setae uniformly distributed, not forming tufts; head with anterior surface distinctly silvery . . . . . 4. ***N. vernoniae*** (Loew)
   Wing entirely hyaline or with darkened pterostigma only; cerci with lateroventral tuft of setae; head nearly lacking silver microtomentum 2
2. Abdominal setulae mostly brown, fine; body usually predominantly black; pterostigma uniformly dark, usually brown . . . . . 2. ***N. albidipennis*** (Loew)
   Abdominal setulae mostly whitish, coarse; body predominantly yellow; pterostigma hyaline to yellowish 3
3. Cerci with distinct, lateroventral tuft of setae; oviscape longer than its width at base, tergal-oviscapal measure 3; terga usually yellow, sometimes with dark areas . . . . . 1. ***N. alba*** (Loew)
   Cerci with lateroventral tuft of setae inconspicuous, obscured by surrounding setae; oviscape shorter than its width at base, tergal-oviscapal measure 2; terga predominantly black . . . . . 3. ***N. floridana*** Ibrahim

1. *Neaspilota (Neaspilota) alba* (Loew)

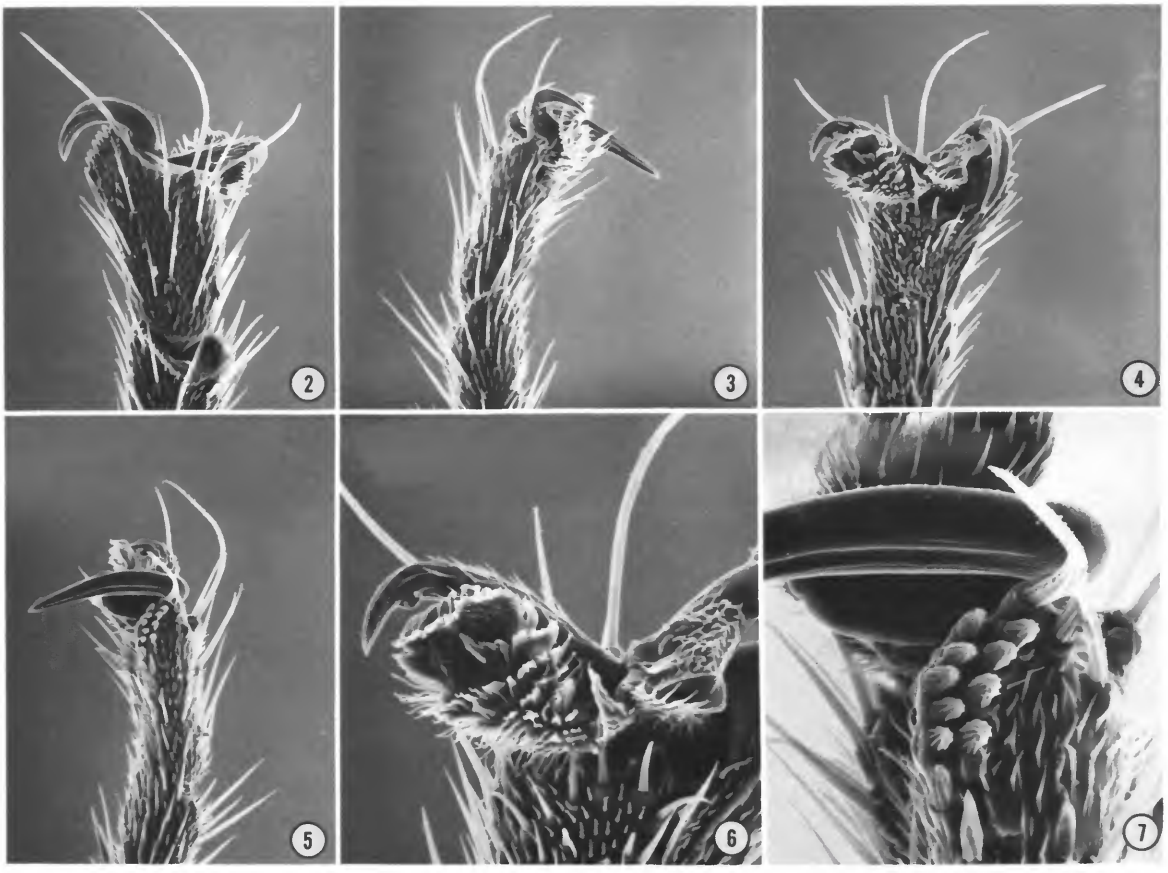
FIGURES 2–17, 185

Trypeta alba Loew, 1861a:345; 1861b:39 [see 1861a]; 1862:64 [key], 100 [review]; 1864:39 [see 1861a]; 1873:285 [review].—Osten Sacken, 1880:53 [list].—Doane, 1899:187 [comparison].—Coquillett, 1910:511.

Aspilota alba.—Loew, 1873:330 [list].

Trypeta (Aspilota) alba.—Osten Sacken, 1877:345 [list].

Neaspilota alba.—Johnson, 1900b:688 [list]; 1910:809 [list]; 1925:262 [list].—Snow, 1903:219 [list].—Aldrich, 1905:610 [catalog].—Cresson, 1907:101 [review].—Tucker, 1907:104 [list].—Hendel, 1914:92 [type-species of genus].—Phillips, 1923:139 [review]; 1946:116 [host list].—Curran, 1932a:3 [key].—Janes and Thomas,



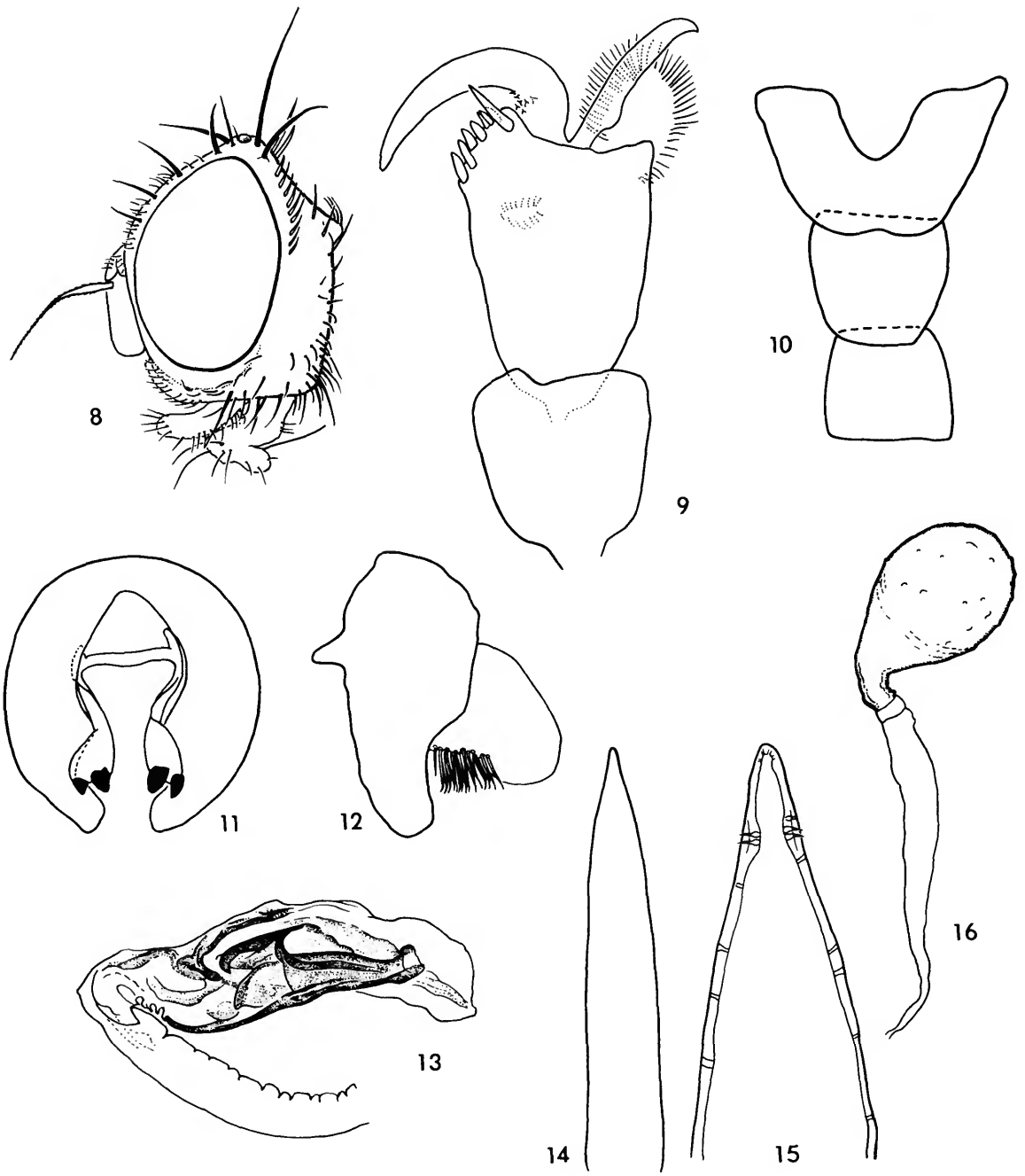
FIGURES 2–7.—Scanning electron micrographs of male right foreleg of *Neaspilota alba:* 2, dorsal aspect; 3, posterior aspect; 4, ventral aspect; 5, anterior aspect; 6, enlargement of 4; 7, enlargement of 5.

1932:103 [list].— Benjamin, 1934:36, 37 [misidentification, see *N. floridana*].—Malloch, 1942:19 [key].—Brandhorst, 1943:168 [host data].—Schwitzgebel and Wilbur, 1943:4–6 [discussion].—Quisenberry, 1949:84 [key].—Steyskal, 1957:93 [color of eye].—Foote, 1965:672 [catalog].—Cole, 1969:355 [list].—Wasbauer, 1972:119 [host list].—Ibrahim, 1982:297–300 [list, figures of male and female terminalia].

DESCRIPTION.—Wing length 2.70 to 3.91 mm.

Head (Figure 8): Frons with setulae yellowish, fine; frontal-head ratio 0.45–0.58; frontal ratio 0.85–1.0; 1st flagellomere ratio 1.75–2.0; aristal-antennal ratio 1.26–1.50; major setae yellowish brown.

Thorax: Dorsocentral setae transversely aligned slightly behind anterior supra-alar setae; pattern on scutum as in generic description; spots on pleura, especially katepisternum, rather indistinct; spot on laterotergite more distinct. Legs (Figures 2–7): Hindfemur with 1–3 anterodorsal setae, 1 posterodorsal seta, and 2 shorter anteroventral setae preapically; comb on hindtibia well developed; 5th tarsomere of male foreleg typically modified (Figures 2–7, 9), with anterior claw about 1.5–2.0 times as long as posterior claw, with comb short, 4–6 spines, with anteroapical spine distinctly longer. Wing (Figure 185): Pterostigmal ratio 2.5–2.7; crossvein ratio 1.54–1.81; wing apex equidistant from ends of veins



FIGURES 8–16.—*Neaspilota alba:* 8, head, lateral aspect; 9, male right foretarsus, dorsal aspect; 10, male sterna 3–5, ventral aspect; 11, epandrium, posterior aspect; 12, epandrium and cerci, lateral aspect; 13, distiphallus; 14, aculeus, dorsal aspect; 15, same, enlarged apex; 16, spermatheca.

R_{4+5} and M; wing, including pterostigma, entirely milky-hyaline; veins translucent yellow.

Abdomen: Generally yellow; setulae yellow; terga sometimes with blackish areas; sterna of male as in Figure 10; epandrium and cerci as in Figures 11, 12; cerci with distinct lateroventral tuft of setae (detectable at × 50); distiphallus (Figure 13) with a funnel-like structure at ventral side. Female: Tergal 6/5 ratio 0.95–1.25; tergal-oviscapal measure 2.5–3.5; oviscapal ratio 1.21–1.37; aculeus as in Figure 14, 15; spermatheca (Figure 16) with slightly roughened surface.

TYPE MATERIAL.—The male lectotype, herein designated, is labeled "Penn./Loew Coll./Type 3 13305 [red; numbers handwritten]/LECTOTYPE Trypeta alba Loew by Freidberg and Mathis [red; handwritten]." Paralectotypes (3♀; HU, MZC) bear the same locality data as the lectotype. The lectotype is double mounted (minute nadel in cork block), is in good condition, and is deposited in the Museum of Comparative Zoology, MCZ 13305.

OTHER SPECIMENS EXAMINED.—UNITED STATES. CONNECTICUT: Fairfield Co., Redding, 6 Sep 1937, A.L. Melander (2♂, 1♀; USNM). DELAWARE: (1♂; USNM). ILLINOIS. Champaign Co., Urbana, UI-Phillips Tract, Apr 1980, ex. *Vernonia* sp., G. Steck (2♂, 2♀; STECK, USNM). Kankakee Co., Saint Anne, 21 Aug 1934, D. DeLong, H. Ross (1♀; TAU). Mason Co., Bath, 7 Aug 1899 (1♀; USNM). Vermilion Co., Danville, 21 Sept 1915, J.M. Aldrich (1♂; USNM). INDIANA: Hendricks Co., Stilesville, 17 Aug 1902 (2♂, 1♀; BMNH). IOWA: Story Co., Ames, 9 Aug 1956, J.L. Laffoon (1♂; ISU); Story City, 4 mi (6.4 km) S, 9 Aug 1969, W.B. Stoltzfus (1♂; ISU). Boone Co., Ledges State Park, 1–5 Aug 1955, on *Asclepias verticillata,* W.L. Downes, J.L. Laffoon (2♂; ISU). KANSAS: Allen Co., 1915, R.H. Beamer (3♂; KU). Douglas Co., 5 Aug 1924, E.P. Breakey (2♀; KU); Lawrence, 26 Jun 1935, L.S. Henderson (1♀; KU). Kingman Co., 1918, R.H. Beamer (1♀; KU). Ottawa Co., Bennington, 5 mi (8 km) N, 17 Jun 1950, on *Helianthus petiolaris,* C.D. Michener (1♀; KU). Reno Co., 13–20 Aug 1917 (1♀; KU). Riley and Pottawatomie Cos., Manhattan, 10–24 May 1940, ex. *Vernonia interior,* R. Schwitzgebel, C.N. Ainslie (2♂, 1♀; FSCA, KU, USNM). MASSACHUSETTS: Barnstable Co., Woods Hole, Jun 1918, A.H. Sturtevant (1♀; USNM). MICHIGAN: Monroe Co., Monroe, 6 Aug 1949, G.C. Steyskal (1♀; USNM). St. Joseph Co., Nottawa, 18 Aug 1957, G.C. Steyskal (2♂; USNM). Wayne Co., Grosse Ile, 8–29 Aug 1948, G.C. Steyskal (3♂; USNM).

MISSOURI: C.V. Riley (2♀; MCZ). NEBRASKA: Hall Co., Cairo, 6 mi (9.6 km) W, 8 Aug 1955, on *Helianthus petiolaris,* C.W. Rettenmeyer (1♀; KU). Seward Co., Seward, 29 Jan 1942, C.T. Brandhorst (1♂ puparium; USNM). NEW JERSEY: Bergen Co., Ramsey, 30 Aug 1912 (1♂, 1♀; USNM). Camden Co., Clementon, 6 Aug 1893 (3♂; MCZ, OHSU, USNM). Union Co., Watchung Reservation, 26 Jul 1964, A.P. Moldenke (3♂, 1♀; AMNH). NEW YORK. Suffolk Co., Babylon, Long Island, 26 Jul 1932–25 Aug 1935, F.S. Blanton, Borders (173♂, 165♀; CAS, HU, OHSU, ORSU, TAMU, TAU, USNM); Cold Spring Harbor, Long Island, July (2♂, 2♀; USNM). NORTH CAROLINA: (1♂; USNM). OHIO: Sandusky Co., Fremont, 28 Aug 1956, on *Vernonia* sp., J.L. Laffoon (2♂, 1♀; ISU). Medina Co., Wadsworth, 2 mi (3.2 km) S, 23 May 1964 (1♂, 2♀, + 2 puparia; ISU). PENNSYLVANIA: Allegheny Co., Natrona, 31 Jul 1891 (1♂; MCZ). Chester Co., 24–25 Jul 1893, N. Banks (2♂; MCZ). Cumberland Co., Carlisle, 26 Jul–26 Aug 1918, ex. ironweed head, W.R. McConnell (3♂, 3♀, + puparium; USNM). Delaware Co., 23 Jul 1893–23 Jul 1913, C.W. Johnson (5♂, 6♀; AMNH, BMNH, MCZ, NMW, USNM); Delaware Water Gap, 9 Aug (1♂, 1♀; AMNH, MCZ). Montgomery Co., Glenside, 21 Apr 1907 (1♀; USNM). Pennsylvania, O. Sacken (5♂, 4♀; HU, MCZ, USNM). TEXAS: Burnet Co., Lampassas, 10 mi (16 km) SE and SW, 27 Jul–4 Aug 1980, ex. *Vernonia* sp., G. Steck (2♂, 7♀; STECK, USNM). Deaf Smith Co., Hereford, 5 mi (8 km) SW, 30 Jul 1953 (6♂, 6♀; KU). Jeff Davis Co., Fort Davis, 6 Jun 1953, P.W. Oman (1♀; USNM); Fort Davis, 11 mi (17.6 km) W, 21

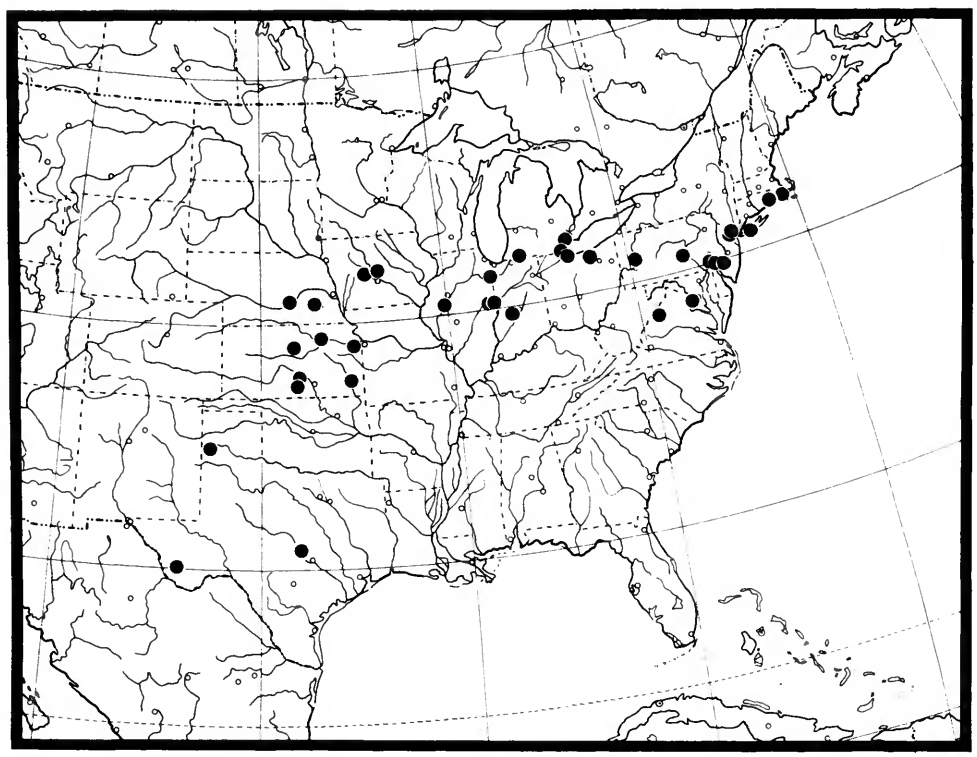


FIGURE 17.—Distribution map of *Neaspilota alba*.

Aug 1983, ex. *Vernonia* sp., G.J. Steck (9♂, 5♀; STECK, USNM). VIRGINIA: Independent City, Harrisonburg, 8 mi (12.8 km) E, 7 Aug 1967, W.B. Stoltzfus (7♂, 3♀; ISU); Harrisonburg, 7 mi (11.2 km) NE, 9 Nov 1968, W.B. Stoltzfus (1♂ puparium; ISU); Falls Church, 6 Aug, N. Banks (1♀; MCZ).

DISTRIBUTION (Figure 17).—Eastern United States; a relatively narrow and slightly curved distribution extending from western Texas northeastward along the bottom of the Great Lakes and into the Northeast. This species is the northern and western counterpart of *N. floridana*, and the distribution of the two species overlaps in Virginia, Missouri, and Kansas.

HOST PLANTS.—*Vernonia Baldwini* (Brandhorst, 1943:168), *V. interior* (Schwitzgebel and Wilbur, 1934:4), and *V.* sp. Other species of *Vernonia* that were recorded by Benjamin (1934:37) as hosts of *N. alba* are hosts of *N. floridana*.

REMARKS.—*Neaspilota alba* is similar to *N. floridana* but may be distinguished by the usually completely yellow abdomen in both sexes. Black spots occur only rarely, and when they do, they are usually irregular, unlike the wide, distinct black bands on the terga of *N. floridana*. Males have lateroventral tufts of setae on the cerci that are distinct (Figure 12), while those of *N. floridana* are inconspicuous (Figure 42). In females, the shape of the aculeus differs (Figures 14, 15) as does the length of the oviscape. The tergal-oviscapal measure in *N. alba* is three, whereas in *N. floridana* it is two.

2. *Neaspilota (Neaspilota) albidipennis* (Loew)

FIGURES 18–27, 186

Trypeta albidipennis Loew, 1861a:345; 1861b:39 [see 1861a]; 1862:64 [key], 100 [review]; 1864:39 [see 1861a]; 1873:286 [review].

Aspilota albidipennis.—Loew, 1873:330 [list].

Trypeta (Neaspilota) albidipennis.—Osten Sacken, 1878:192 [catalog].

Neaspilota albidipennis.—Johnson, 1900b:688 [list]; 1910:802 [list].—Aldrich, 1905:610 [catalog].—Phillips, 1923:139, 140 [review]; 1946:53 [description of larva], 116 [host list].—Curran, 1932a:3 [key]; 1934:290 [figures of head].—Benjamin, 1934:36 [key].—Malloch, 1942:19 [key].—Schwitzgebel and Wilbur, 1943:7 [list].—Quisenberry, 1949:84 [key].—Steyskal, 1957:93 [note on eye color].—Foote, 1965:672 [catalog].—Wasbauer, 1972:119 [host list].

Neaspilota albipennis [sic].—Johnson, 1925:263 [list].

DESCRIPTION.—Resembling *N. alba* but differing as follows: wing length 2.85 to 4.28 mm.

Head (Figure 18): Frontal-head ratio 0.44–0.49; frontal ratio 0.86–0.96; 1st flagellomere ratio 1.75–2.00; aristal-antennal ratio 1.40–1.60; antenna more deeply yellow than other parts; face and parafacial with sparse microtomentum, often distinct; setae darker and stronger; major setae brown to dark brown.

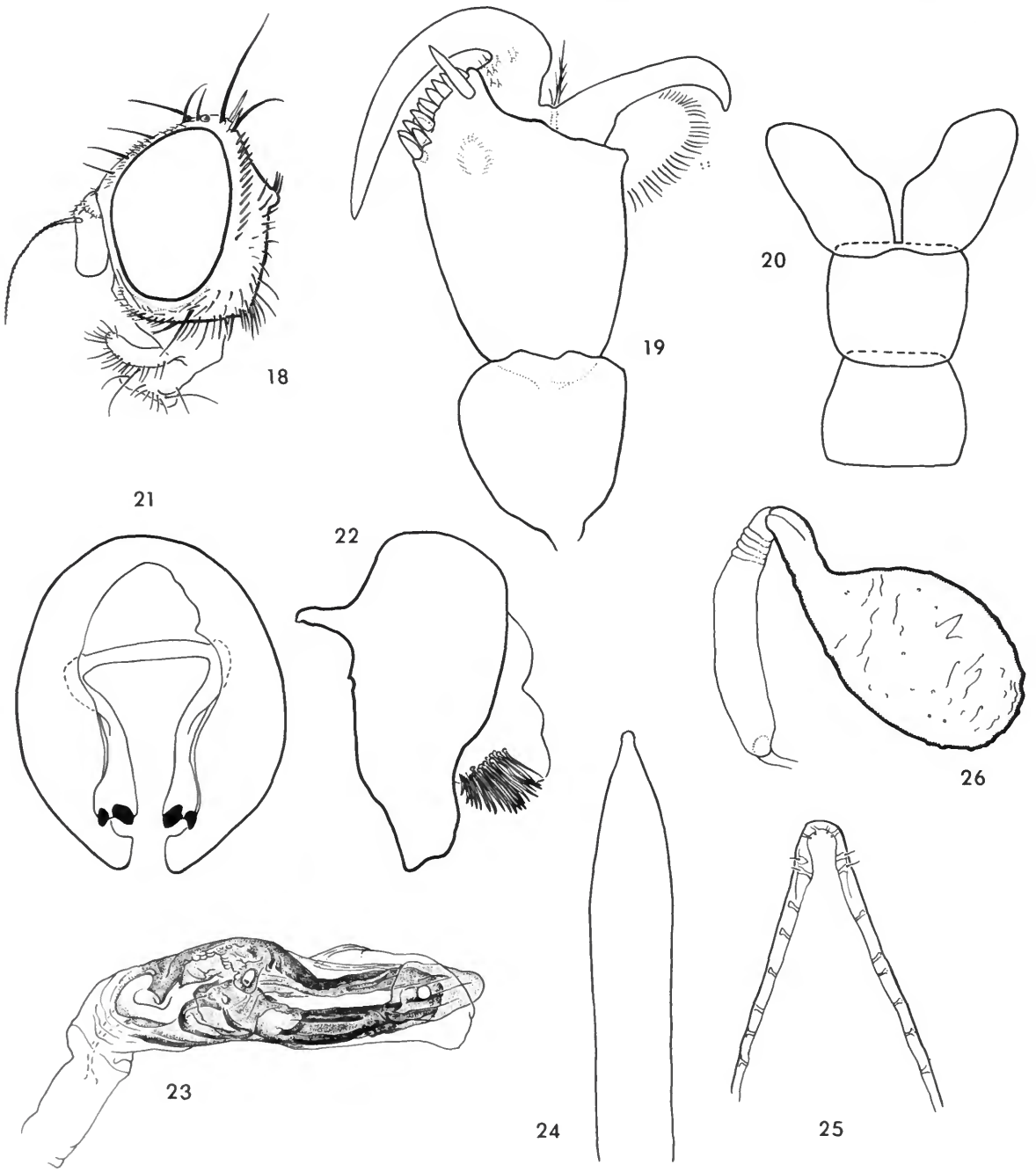
Thorax: Coloration variable from mostly black with yellow postpronotum, notopleural area, and posterior margin of scutum, to predominantly yellow, with the usual black areas on scutum, postnotum, and pleura; in addition, large areas on proepisternum, lower part of anepisternum, and anepimeron blackish. Legs: Hindfemur with 2 strong preapical setae anterodorsally and 6 short setae anteroventrally; 5th tarsomere of male foreleg (Figure 19) more asymmetrical than in *N. alba,* with anterior claw twice as long as posterior claw, and with comb containing more spines; femora and tibiae blackish brown except for their apices; pale specimens generally with legs entirely yellow. Wing (Figure 186): Pterostigmal ratio 2.3–2.7; crossvein ratio 1.1–1.5; wing apex closer to end of vein R_{4+5} than to end of vein M; wing mainly milky white; pterostigma entirely and uniformly brown, in generally paler specimens pterostigma brownish yellow or gray; veins translucent yellow, becoming brownish toward apex.

Abdomen: Dorsum entirely black, or terga more or less narrowly yellowish laterally and along posterior margins; setulae, except on the 1–2 anterior terga, fine, brown; setae at margin of posterior tergum and at lateral margin of other terga very strong, progressively weaker anteriorly, especially distinct in female; sterna of male as in Figure 20, 5th sternum cleft along middle; epandrium and cerci as in Figures 21, 22; distiphallus as in Figure 23. Female: Tergal 6/5 ratio 1.0–1.4; tergal-oviscapal measure 2.8–3.8; oviscapal ratio 1.00–1.22, pale to dark brown; aculeus as in Figures 24, 25, apex relatively broadly rounded; spermatheca (Figure 26) with rougher surface.

TYPE MATERIAL.—The male lectotype, herein designated, is labeled "Penn./Loew Coll./albidipennis Lw [apparently handwritten by Loew]/Type 13306 [red, number handwritten]/LECTOTYPE Trypeta albidipennis Loew by Freidberg and Mathis [red, handwritten]." Paralectotypes (3♂, 1♀; HU, MCZ, USNM) bear the same locality data as the lectotype. The lectotype is double mounted (minute nadel in cork block), is in good condition, and is deposited in the Museum of Comparative Zoology, MCZ 13306.

OTHER SPECIMENS EXAMINED.—UNITED STATES. ILLINOIS: Urbana, Ul-Phillips Tract, Apr 1980, ex. *Vernonia* sp., G. Steck (2♂; USNM). IOWA: Fremont Co., Sidney, 3 mi (4.8 km) SW, 5 Aug 1969, ex. *Vernonia baldwini,* W.B. Stoltzfus (2♂, 5♀; ISU); Waubonsie State Park, 5 Aug 1969, W.B. Stoltzfus (3♂; ISU). Story Co., Story City, 4 mi (6.4 km) S, 9 Aug 1969, W.B. Stoltzfus (3♂; ISU). KANSAS: Douglas Co., Baldwin, Jul, J.C. Bridwell (2♂; USNM); 5 Aug 1924, E.P. Breakey (2♂; KU). Shawnee Co., 13 Jun 1923, R.H. Beamer (1♀; KU). MARYLAND: Montgomery Co., Bethesda, 24 Aug 1976, G.C. Steyskal (1♀; USNM). MICHIGAN: Livingston Co., E.S. George Reserve, 25 Jul 1943–9 Jul 1949, G.C. Steyskal (17♂, 7♀; OHSU, USNM). Monroe Co., Monroe, 6 Aug 1949, G.C. Steyskal (3♂; USNM). St. Joseph Co., Nottawa, 18 Aug 1957, G.C. Steyskal (1♂, 1♀; USNM). Wayne Co., Grosse Ile., 23 Jul 1951, G.C. Steyskal (1♂, 1♀; USNM). NEBRASKA: Custer Co., Broken Bow, 1 Jul 1953, R.R. Dreisbach (2♂; USNM). Phelps Co., Holdrege, 3 mi (4.8 km) S, 11 Jul 1972, W.B. Stoltzfus (1♀; ISU).

NEW JERSEY: Bergen Co., Ramsey, 30 Jul 1912 (1♀; USNM). Burlington Co., Riverton, 11 Aug



FIGURES 18–26.—*Neaspilota albidipennis:* 18, head, lateral aspect; 19, male right foretarsus, dorsal aspect; 20, male sterna 3–5, ventral aspect; 21, epandrium, posterior aspect; 22, epandrium and cerci, lateral aspect; 23, distiphallus; 24, aculeus, dorsal aspect; 25, same, enlarged apex; 26, spermatheca.

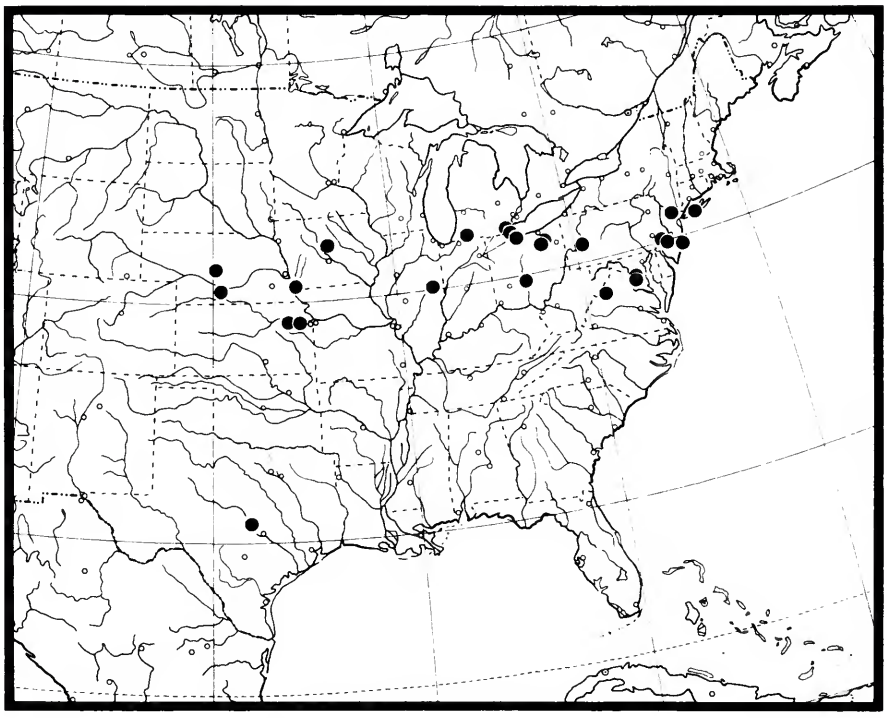


FIGURE 27.—Distribution map of *Neaspilota albidipennis.*

1901 (1♀; MCZ). Camden Co., Clementon, 6 Aug 1893 (2♂; KU, MCZ); Pennsauken, 8 Aug 1924, H.C. Hallock (4♂, 3♀; USNM). Gloucester Co., Westville, 14 Aug 1892 (1♂; MCZ). Ocean Co., Highpoint, 1 Sep 1935, F.S. Blanton, Borders (1♂; USNM). NEW YORK: Dutchess Co., Pecksville, 10 Aug 1935, F.S. Blanton, Borders (1♂; USNM). Suffolk, Co., Babylon, Long Island, 13 Aug 1932–28 Aug 1935, F.S. Blanton, Borders (191♂, 171♀; BMNH, CAS, HU, MNHN, OHSU, ORSU, TAMU, TAU, USNM); Cold Spring Harbor, Long Island, Jul (2♂, 2♀; USNM). OHIO: Medina Co., Wadsworth, 3 mi (4.8 km) NE, 16 Jul 1964, W.B. Stoltzfus (2♂; ISU). Portage Co., Kent, 1 mi (1.6 km) S, 16 Jul 1964, W.B. Stoltzfus (1♂; ISU); 4 mi (6.4 km) E, 16 Jul 1964, W.B. Stoltzfus (1♂; ISU). Sandusky Co., Fremont, 28 Aug 1956, J.L. Laffoon (2♂; ISU). Ohio, Lockbourne, 6 Jul 1900 (1♀; OHSU). PENNSYLVANIA: Allegheny Co., Natrona, 8 Jul 1894 (1♂; MCZ). Chester Co., 24 Jul 1893 (1♂; KU). Delaware Co. (1♂, 1♀; USNM); 28 Jul 1893 (3♂; BMNH, MCZ, NMW). Montgomery and Delaware Cos., Bryn Mawr, Jul 1953, E.S. Ross (3♂, 1♀; CAS). Philadelphia Co., Philadelphia, 7 Aug 1891 (1♀; MCZ). Pennsylvania (9♂, 6♀; HU, MCZ, USNM). TEXAS: Burleson Co., Lake Somerville, Welch Park, 30 May 1975, S.J. Merritt (1♂; STECK). Burnet Co., Lampassas, 10 mi (16 km) SE, 4 Aug 1980, ex. *Vernonia* sp., G. Steck (1♀; USNM). VIRGINIA: Rockingham Co., 1 Feb 1970, ex. *Vernonia noveboracensis* (1♀; ISU). Independent City, Falls Church, 25 Aug, ex. *Vernonia* (1♂, 1♀; MCZ); 6 Aug (1♀; MCZ). Virginia, 28 Aug (1♀; KU).

DISTRIBUTION (Figure 27).—Northeastern quarter of the United States between 38° and 43° north latitude and between 72° and 100° west longitude.

HOST PLANTS.—*Vernonia Baldwini, V. interior* (Schwitzgebel and Wilbur, 1934:4), *V. noveboracensis,* and *V.* sp.

REMARKS.—This species is distinguished by its predominantly black coloration. Specimens from Michigan and Kansas, however, are paler than most, having the thorax, legs, and abdomen less extensively black, and the pterostigma grayish, not blackish. Other character states of the lighter colored specimens, including the terminalia, conform well with the darker specimens, hence both color forms are considered to be conspecific.

3. *Neaspilota (Neaspilota) floridana* Ibrahim

FIGURES 28–37, 187

Neaspilota floridana Ibrahim, 1982:297.

DESCRIPTION.—Resembling *N. alba* but differing as follows: wing length 2.18 to 4.06 mm.

Head (Figure 28): Slightly shorter, occiput being less convex; frontal ratio 0.9–1.0; frontal-head ratio 0.43–0.47; 1st flagellomere ratio 1.7–2.0; aristal-antennal ratio 1.20–1.44; major setae brownish yellow.

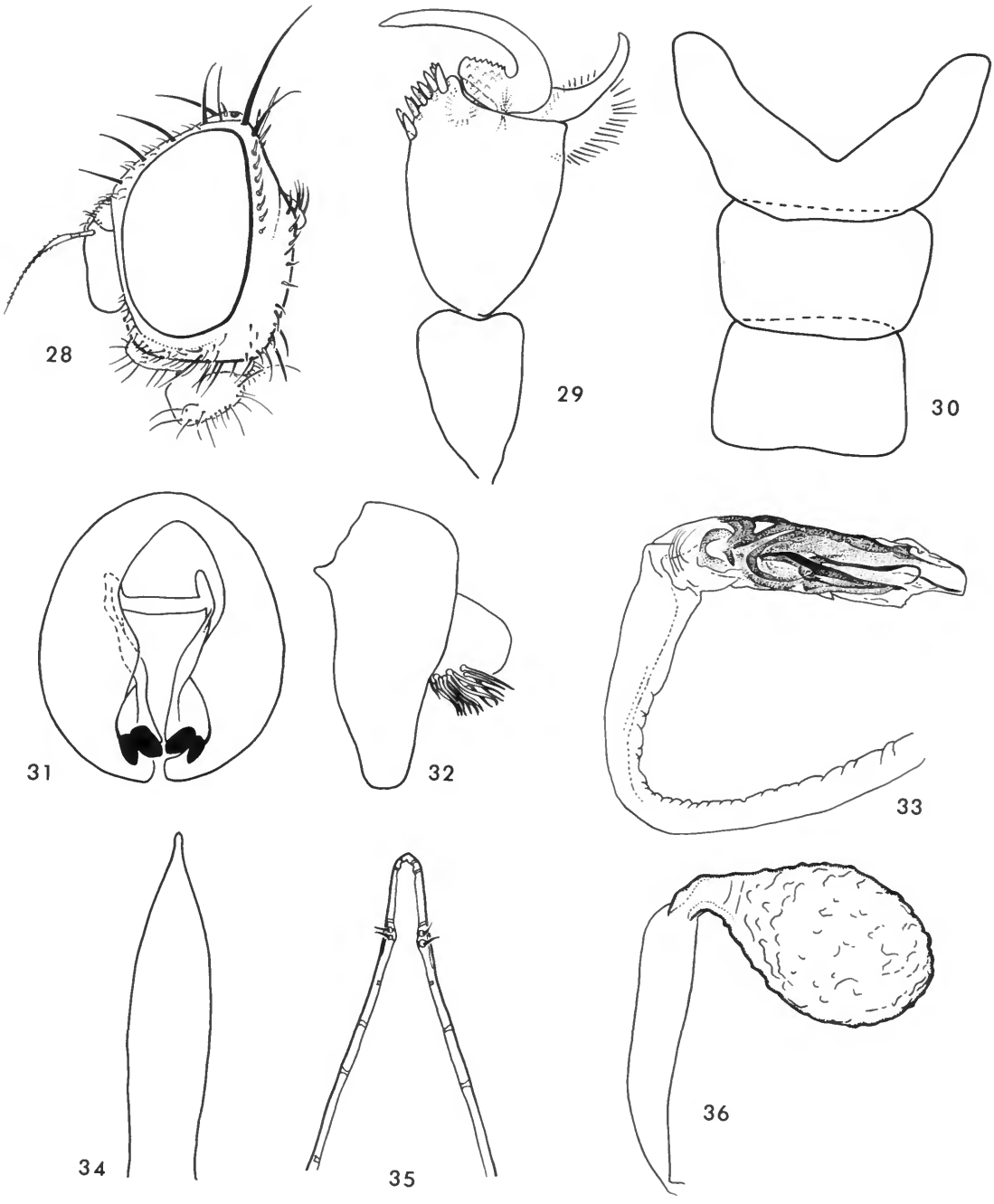
Thorax: As in *N. alba*. Legs: Fifth tarsomere of male foreleg (Figure 29) with anteroapical spine slightly thicker, but not longer, than remaining spines. Wing (Figure 187): Pterostigmal ratio 2.3–2.7; crossvein ratio 1.27–1.60.

Abdomen: Yellow, terga mainly black, with narrow yellow posterior and lateral margins; yellow margins of posterior terga wider; sterna of male as in Figure 30; epandrium and cerci as in Figures 31, 32, with prensisetae relatively larger; setae on cerci relatively longer, lateroventral tuft of setae sparser and less distinct among other setae; distiphallus as in Figure 33. Female: Tergal 6/5 ratio 0.93–1.15; tergal-oviscapal measure 2.0; oviscapal ratio 1.00–1.25; aculeus as in Figures 34, 35, more pointed; spermatheca (Figure 36) with rougher surface.

TYPE MATERIAL.—Holotype female is from Florida, Orange Co., Orlando, 19 Apr 1931, D.J. Nicholson. The specimen was reared from *Vernonia angustifolia*. The Smithsonian loaned this specimen to Dr. R. Ibrahim, University of Florida. Unfortunately we have been unable to recover this loan, which is held by the Florida State Collection of Arthropods, Gainesville, Florida.

OTHER SPECIMENS EXAMINED.—UNITED STATES. ARKANSAS: Clark Co., Arkadelphia, 14 Sep 1908, C.E. Hood (1♂; USNM); C.V. Riley (1♂; USNM). FLORIDA: Brevard Co., Cocoa, 24–26 Jun 1930, ex. *Vernonia gigantea*, D.J. Nicholson (4♂, 7♀; USNM); Sharpes, 14 Jun 1930, ex. *Vernonia gigantea*, D.J. Nicholson (1♀; USNM). Charlotte Co., 4–17 Jun 1930, ex. *Vernonia blodgettii*, Pope, White (19♂, 16♀; USNM); Cleveland, 1–28 Jun 1930, ex. *Vernonia blodgettii*, Pope, White (16♂, 10♀; USNM); Peace River, 30 May 1930, ex. *Pluchea foetida*, Pope, White (2♂; USNM). Collier Co., Carnestown, 12–19 May 1930, ex. *Vernonia blodgettii*, D.J. Nicholson (14♂, 17♀; USNM). Hillsborough Co., Thonotosassa, 10–17 Jun 1930, ex. *Vernonia gigantea*, Pope, White (3♀; USNM). Lake Co., Fruitland Park, 26 Jun 1930, ex. *Vernonia* sp., E.T. Evans (3♀; USNM); 25–28 Jun 1930, E.T. Evans (1♀; USNM); Leesburg, 14 Jul 1930, ex. *Vernonia scaberrima*, E.T. Evans, D.J. Nicholson (1♀; USNM). Marion Co., Ocala, 14 Jul 1930, ex. *Vernonia gigantea*, E.T. Evans, D.J. Nicholson (6♂; USNM). Orange Co., Conway, 7 Jul 1930, ex. *Vernonia scaberrima*, Pope, White (1♂; USNM); Orlando, 19 Apr–30 Jul 1930, ex. *Vernonia scaberrima*, D.J. Nicholson (109♂, 118♀; TAU, USNM); Pine Castle, 17 Jun 1930, ex. *Chrysopsis hyssopifolia*, D.J. Nicholson (1♂; USNM); Plymouth, 14 Jul 1930, ex. *Vernonia scaberrima*, E.T. Evans, D.J. Nicholson (1♂; USNM); Tangerine, 14 Jul 1930, ex. *Vernonia scaberrima*, E.T. Evans, D.J. Nicholson (1♀; USNM); Winter Park, 30 Jun 1930, ex. *Vernonia scaberrima*, D.J. Nicholson (2♂, 4♀; USNM). Seminole Co., Altamonte Springs, 8 Jul 1930, ex. *Vernonia scaberrima*, D.J. Nicholson (1♀; USNM). Florida, 21 Jun–14 Jul 1930, D.J. Nicholson (2♂, 3♀; USNM). GEORGIA: White Co., Nacooche, 26 Aug 1935, ironweed, V.T. Phillips (2♂, 1♀; FSCA).

KANSAS: Douglas Co., 5 Aug 1934, E.P. Breakey (1♀; KU); July (1♂; KU). Riley and Pottawatomie Cos., Manhatten, 9 Jun 1934, C.W. Sabrosky (1♀; FSCA). Wilson Co., 866 ft (260 m), 1936, R.H. Beamer (1♀; KU). LOUISIANA: East Baton Rouge Parish, Baton Rouge, 17 Sep



FIGURES 28–36.—*Neaspilota floridana:* 28, head, lateral aspect; 29, male right foretarsus, dorsal aspect; 30, male sterna 3–5, ventral aspect; 31, epandrium, posterior aspect; 32, epandrium and cerci, lateral aspect; 33, distiphallus; 34, aculeus, dorsal aspect; 35, same, enlarged apex; 36, spermatheca.

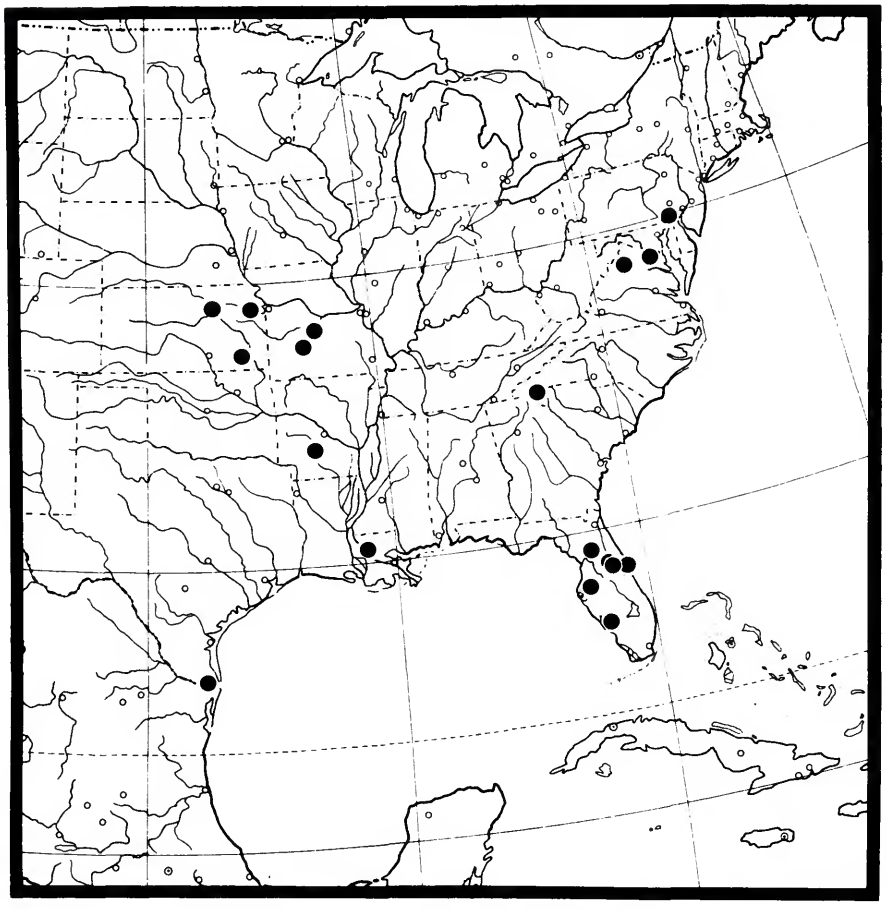


FIGURE 37.—Distribution map of *Neaspilota floridana.*

1909, Vernoma (1♀; USNM). MISSOURI: Laclede Co., Lebanon, 20 Jul–20 Aug 1953, C.D. Michener (1♀; KU). Miller Co., Iberia, 16 Aug 1964, A.R. Moldenke (1♀; AMNH). NORTH CAROLINA: Macon Co., Highlands 3800 ft (1150 m), 4 Jun 1957, J.R. Vockeroth (1♂; HU). PENNSYLVANIA: Chester Co., ex. *Vernonia* sp., 24 Jul 1895 (1?; KU). TEXAS: Hidalgo Co., Donna, Aug 1931–Aug 1932, ex. *Vernonia* sp., J.W. Monk (5♂, 4♀; OHSU, ORSU, TAMU, USNM). Milam Co., New Clarkson, 7 Jul–28 Aug 1982, on *Vernonia Baldwinii* and *Circium texanum,* G. Tillman (4♀; TAMU); New Clarkson, 10 mi (16 km) S Rosebud, 7–28 Jul 1982, ex. *Vernonia* sp., G. Tillman (16♂, 15♀; TAMU). VIRGINIA: Arlington Co., Rosslyn, 25 Aug 1912, J.R. Malloch (1♀; USNM). Independent City, Falls Church, 6 Aug, N. Banks (1♀; USNM). Page Co., Shenandoah, 21 Jul 1939, W.W. Wirth (1♀; USNM).

DISTRIBUTION (Figure 37).—Southeastern quarter of the United States; Kansas to Pennsylvania, south to Texas and Florida.

HOST PLANTS.—*Vernonia altissima* (as *V. gigantea*), *V. angustifolia* (as *V. scaberrima*), *V. Blodgettii, V.* sp. Also recorded were *Pluchea foetida* (2 specimens reared) and *Chrysopsis hyssopifolia* (1 specimen reared), but these records are doubtful.

REMARKS.—This species is the southern and eastern counterpart of *N. alba,* differing from it by the characters given in the key and in the

"Remarks" section of *N. alba* (page 16). Benjamin (1934), unaware of these differences when he compared his specimens from Florida with types of *N. alba*, considered these two species to be conspecific.

4. *Neaspilota (Neaspilota) vernoniae* (Loew)

FIGURES 1, 38–47, 188

Trypeta vernoniae Loew, 1861a:346; 1861b:40 [see 1861a]; 1862:63 [key], 101 [review]; 1864:40 [see 1861a]; 1873:286 [review].—Johnson, 1900b:687 [list].

Aspilota vernoniae.—Loew, 1873:330 [list].

Trypeta (Neaspilota) vernoniae.—Osten Sacken, 1878:192 [catalog].

Neospilota [sic] *vernoniae* Johnson, 1895:337 [unjustified emendation; list].

Neaspilota vernoniae.—Coquillett, 1899:262 [list].—Aldrich, 1905:610 [catalog].—Johnson, 1910:802 [list]; 1913:84 [list].—Benjamin, 1934:36 [key].—Malloch, 1942:18 [key].—Schwitzgebel and Wilbur, 1943:6, 7 [discussion].—Quisenberry, 1949:83 [key].—Steyskal, 1957:93 [note on eye color].—Foote, 1965:672 [catalog].—Wasbauer, 1972:120 [host list].

Terellia vernoniae.—Phillips, 1923:138-139 [review].—Johnson, 1925:262 [list].

DESCRIPTION.—Resembling *N. alba* but differing as follows: wing length 3.38 to 4.73 mm.

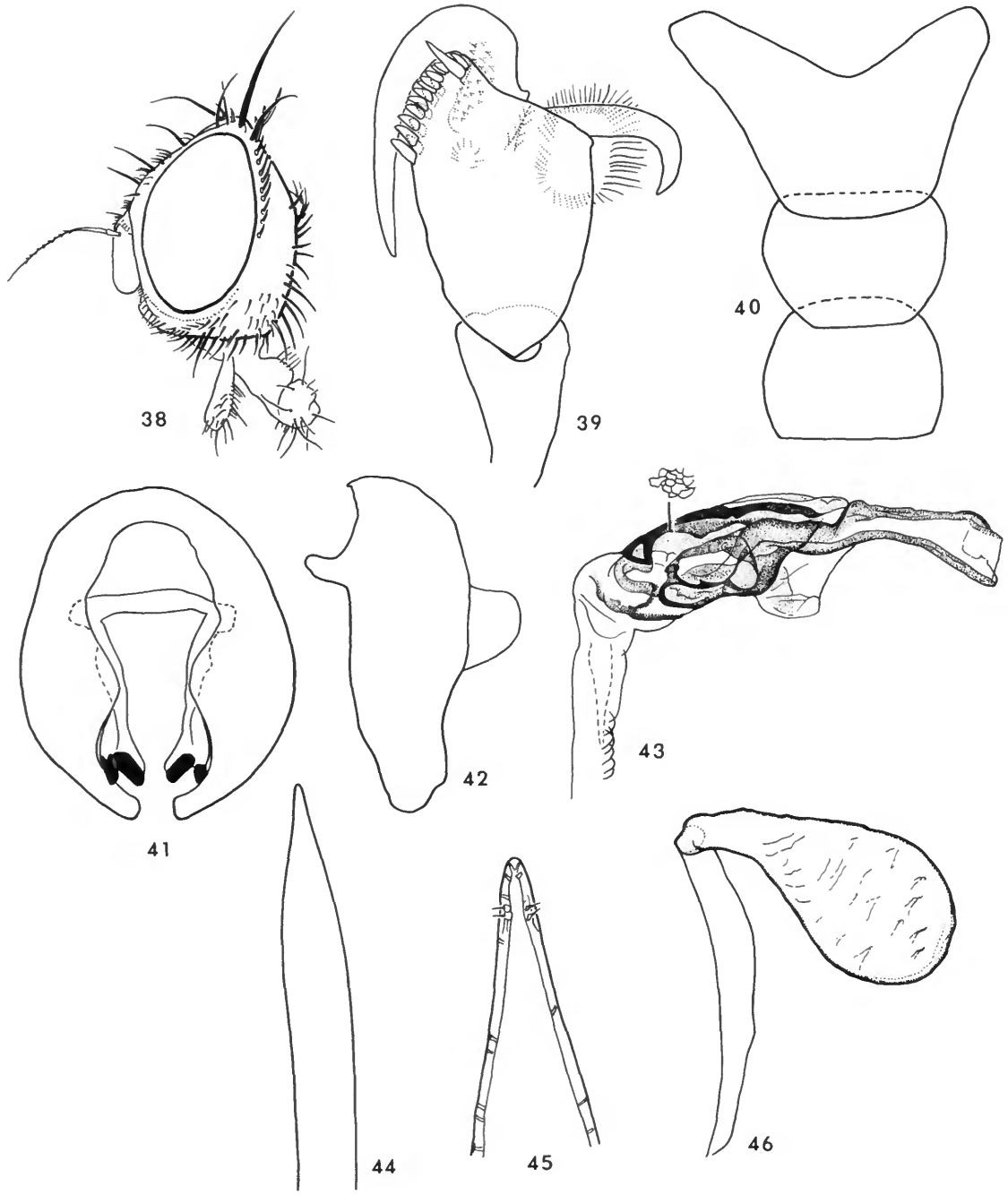
Head (Figure 38): Frons with fine, yellowish or brownish setulae; frontal head ratio 0.47–0.51; frontal ratio 0.90–1.05; 1st flagellomere ratio 1.85–1.95; aristal-antennal ratio 1.40–1.65; arista almost appearing bare; parafrontal, parafacial, lunule, and face with sparse but distinct, silvery microtomentum; major setae brownish yellow to brown.

Thorax: Dorsocentral setae transversely aligned slightly behind anterior supra-alar setae; dark areas on thorax generally pale, mostly brown, those on metathorax blackish. Legs: Tarsal comb with more spines, about 10 in each row; 5th tarsomere of male foreleg as in Figure 39. Wing (Figure 188): Pterostigmal ratio 2.3–2.7; crossvein ratio 1.81–2.08; wing apex closer to end of vein R_{4+5} than to end of M; R_{4+5} usually bare, sometimes with 1–2 setulae dorsally at node; wing with rather variable, diffuse, banded-reticulate pattern, extended from base of pterostigma to crossveins and to ends of R_{4+5} and M, mainly occupying radial cells; a complete transverse band usually present at line of crossvein dm-cu, and a shorter one from apex of cell R_1 to apex of cell M; the two bands sometimes connected in cell M along vein M; very diffuse spots sometimes visible in the center of discal cell, in cell CuA_1 and in the axillary lobe; apex of cell R_5 with a larger rounded hyaline spot; veins at hyaline areas yellow, otherwise brown.

Abdomen: Yellow with mostly yellowish setulae; setulae brown on lateral and posterior margins of terga, notably on the posterior tergum; sterna of male as in Figure 40; epandrium and cerci as in Figures 41, 42; cerci lacking tuft of setae; distiphallus (Figure 43) with an elongate, apical, funnel-like structure. Female: Tergal 6/5 ratio 0.83–1.13; tergal-oviscapal measure 2.5–3.5; oviscapal ratio 1.0–1.25; aculeus as in Figures 44, 45; spermatheca as in Figure 46.

TYPE MATERIAL.—The male lectotype, herein designated, is labeled "Penn./Loew Coll./Type 2 13307 [red; numbers handwritten]/LECTOTYPE Trypeta vernoniae Loew by Freidberg and Mathis [red; handwritten]. Paralectotypes (1♂, 2♀; HU, MCZ) bear the same locality data as the lectotype. The lectotype is double mounted (minute nadel in cork block), is in good condition, and is deposited in the Museum of Comparative Zoology, MCZ 13307.

OTHER SPECIMENS EXAMINED.—CANADA. NEWFOUNDLAND: Terra Nova National Park, 6 Jul 1961, C.P. Alexander (1♂; USNM). UNITED STATES. IOWA: Dickenson Co., Excelsior Fen Farm, 18 Jul 1964, L. Richards (1♂; ISU). Fremont Co., Waubonsie State Park, 5 Aug 1969, W.B. Stoltzfus (1♂, 1♀; ISU). Guthrie Co., Jamaica, 3 mi (4.8 km) S, 4 mi (6.4 km) S, 30 Jul 1969, W.B. Stoltzfus (2♀; ISU). Hamilton Co., Little Wall Lake, 2 mi (3.6 km) S Jewell, 16–18 Jul 1969, W.B. Stoltzfus (1♂, 2♀; ISU). Page Co., Shenandoah, 10 Jul 1963, D.R. Riley (1♀; ISU). Pocahontas Co., Kalso Prairie, 25 Jul 1972, W.B. Stoltzfus (2♂, 1♀; ISU). KANSAS: Douglas Co., 5 Aug 1924, E.P. Breakey (1♀; KU). MASSACHUSETTS: Bristol Co., Westport Factory, 31 Jul 1913



FIGURES 38–46.—*Neaspilota vernoniae:* 38, head, lateral aspect; 39, male right foretarsus, dorsal aspect; 40, male sterna 3–5, ventral aspect; 41, epandrium, posterior aspect; 42, epandrium and cerci, lateral aspect; 43, distiphallus; 44, aculeus, dorsal aspect; 45, same, enlarged apex; 46, spermatheca.

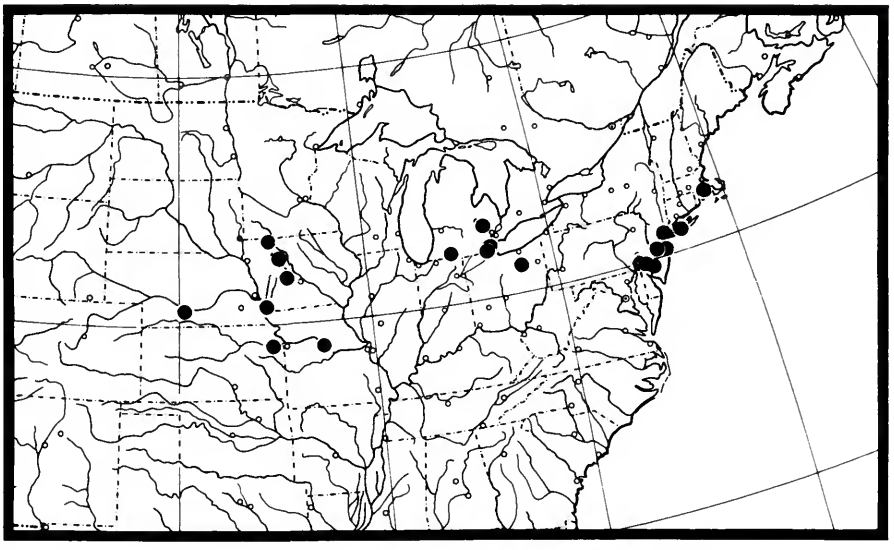


FIGURE 47.—Distribution map of *Neaspilota vernoniae.*

(1♀; USNM). MICHIGAN: Livingston Co., E.S. George Reserve, 25 Jul 1943–9 Jul 1949, G.C. Steyskal (7♂, 1♀; TAU, USNM). Monroe Co., Monroe, 6 Aug 1949, G.C. Steyskal (2♀; USNM). St. Joseph Co., Nottawa, 18 Aug 1957, G.C. Steyskal (2♀; USNM). Wayne Co., Grosse Ile, 11 Aug 1957, G.C. Steyskal (1♀; USNM). MISSOURI: Boone Co., Columbia, 20 Jul 1970, F.D. Parker (1♂, 1♀; CSDA). NEBRASKA: Phelps Co., Holdrege, 3 mi (4.8 km) S, 11 Jul 1972, W.B. Stoltzfus (1♂; ISU). NEW JERSEY: Mercer Co., Princeton, 10 Aug 1933, F.S. Blanton (1♂, 1♀; CAS, USNM). Monmouth Co., Farmingdale, Jul 1914 (1♀; MCZ). Camden Co., Clementon, 6 Aug 1893, J.M. Aldrich (2♂, 2♀; KU, MCZ, USNM). Union Co., Watchung Reservation, Jul 1964, A.R. Moldenke (1♂; AMNH).

NEW YORK: Suffolk Co., Babylon, Long Island, 25 Jul–9 Aug 1933, F.S. Blanton (7♂, 7♀; BMNH, CAS, OHSU, ORSU, TAMU); Islip, Long Island, 4 Aug 1933, F.S. Blanton (1♂, 1♀; AMNH). Riverhead, Long Island, 24 Jul 1933, F.S. Blanton (1♂, 1♀; OHSU). OHIO: Medina Co., Wadsworth, 6 mi (9.6 km) S, 20 Apr 1964 (1♀; ISU). PENNSYLVANIA: Chester Co., 24–29 Aug 1893, on *Vernonia* sp. (1♂, 2♀; KU, MCZ). Delaware Co., 19 Aug 1891–23 Aug 1893 (2♂, 1♀; BMNH, MCZ, USNM). Pennsylvania (2♂, 3♀; HU, MCZ).

DISTRIBUTION (Figure 47).—Northeastern quarter of the United States between 38° and 44° north latitude and between 70° and 100° west longitude. We have not seen specimens from Florida, thus Johnson's record (1895:337) of this species from that state remains unconfirmed. It may actually refer to *N. achileae*, a species superficially similar.

HOST PLANTS.—*Vernonia interior* (Schwitzgebel and Wilbur, 1934:5) and *V.* sp.

REMARKS.—This is one of the most distinctive species of the genus, being distinguished by its large size and patterned wing. It superficially resembles *N. achilleae,* which also has a similar wing pattern, but that species is smaller, has dark setulae on the abdomen, and belongs to a different subgenus (see key to subgenera for additional differences). Males of *N. vernoniae* lack latero-ventral tufts of setae on the cerci. Otherwise the species conforms well with the subgeneric concept as diagnosed.

Neorellia, new subgenus

TYPE-SPECIES—*Neaspilota punctistigma* Benjamin, by present designation.

DIAGNOSIS.—Dark setae generally smaller.

Head: Normally 1.05–1.10 times as high as long, occasionally 1.15–1.20, in *N. signifera* 0.95; frons bare; frontal head ratio 0.47–0.58; frontofacial angle variable, obtuse (95°–120°), not rounded; lower facial margin distinctly projected; parafacials 0.1–0.4 and gena 0.4–0.9 times as wide as antenna; eye usually 1.2–1.5 times as high as long; 1st flagellomere ratio 1.38–2.00; arista densely haired, usually short; aristal-antennal ratio 0.90–1.45; proboscis with haustellum usually about as long as antenna (in *N. signifera* about twice as long) and with labella shorter or as long as antenna.

Thorax: Anepisternum with 1 distinctly dark seta; anteroapical spine of tarsal comb in male not particularly longer or thicker than rest of spines; pterostigma usually long, pterostigmal ratio 2.5–4.0; veins R_{4+5} and M curved posteriorly or straight; microtrichia along posterior margin of wing pale, transparent, indistinct.

Abdomen: Epandrium oval in posterior view, usually not particularly thick at dorsal side in lateral view, often barely narrowing ventrally; cerci without tufts of setae; distiphallus usually with long, sinuous, double tube; the 2 setulae (sensilla ?) near apex of aculeus close together or rather separated; spermatheca truncate and invaginated apically.

HOSTS.—Various Asteraceae, but not including *Vernonia*.

Key to Species of the Subgenus *Neorellia*

1. Abdominal setulae brown, fine; wing with distinct pattern, including more or less complete transverse band aligned with crossvein dm-cu . . . . . 5. ***N. achilleae*** Johnson

   Abdominal setulae whitish, coarse; wing without pattern as above, at most pterostigma brownish or apex infuscate 2

2. Head distinctly longer than high; haustellum elongate, about twice as long as antenna; labella spatulate; anterior supra-alar seta lacking; pterostigma with basal half brown . . . . . 16. ***N. signifera*** (Coquillett)

   Head as high or higher than long; haustellum slightly longer or shorter than antenna; labella capitate; anterior supra-alar seta present; pterostigma variable 3

3. Scutum with whitish setulae arranged in 5 distinct, longitudinal rows, area between stripes nearly bare; abdomen shining; 5th tarsomere of male foreleg with anterobasal spinose projection; tergal-oviscapal measure 2.5; pterostigma with basal 1/3 to 2/3 brown . . . . . 14. ***N. pubescens***, new species

   Scutum with whitish setulae more or less uniformly distributed; abdomen subshining; 5th tarsomere of male foreleg not as above; oviscape and pterostigma variable 4

4. Abdominal tergal pattern with 4 triangular black areas basally on each tergum, lateral triangular areas broader, areas sometimes fused to form 2 spots on each tergum; pterostigma yellow, brownish at basal 0.33–0.50 . . . . . 19. ***N. wilsoni*** Blanc and Foote

   Abdominal tergal pattern with black areas not as above or terga entirely yellowish; pterostigma variable 5

5. Distal 1–3 tarsomeres darker than others, black in male, brown in female; tergal-oviscapal measure 4–5; pterostigma yellow, increasingly brown toward base; large species, wing length 3.05–4.30 mm . . . . . 9. ***N. brunneostigmata*** Doane

Tarsi unicolorous; oviscape shorter, or if as long, then body shorter and pterostigma hyaline or yellowish 6

6. Pterostigma with blackish brown spot on basal 0.66–0.75; 5th tarsomere of male foreleg with transverse rows of spines; tergal-oviscapal measure 2; aculeus broadly rounded at apex; ventral valves extended laterally beyond dorsal valve . . . . . 10. ***N. callistigma,*** new species

Pterostigma hyaline, yellow, or with paler or smaller dark spot; 5th tarsomere of male foreleg not as above, usually with longitudinal comb; oviscape usually distinctly longer; aculeus pointed, ventral valves not extended laterally beyond dorsal valve 7

7. Hindtibia with 1–2 semierect, short but distinct setae preapically and posteroventrally; pterostigma with squarish or rounded brown spot at basal 0.33, usually not quite reaching vein R_1; abdominal terga mostly blackish . . . . . 15. ***N. punctistigma*** Benjamin

Hindtibia lacking setae as above; pterostigma and usually abdominal terga not as above 8

8. Head distinctly higher than long, height-to-length ratio about 1.15, with all cephalic setae usually concolorous, whitish; pterostigma opaque, yellow; 4th and 5th tarsomeres of male foreleg asymmetrical, 4th tarsomere with anteroapical spinose projection; tergal-oviscapal measure 2.0–2.8 . . . . . 7. ***N. albiseta,*** new species

Head lower, with some setae darker than others; 4th and sometimes also 5th tarsomeres of male foreleg symmetrical; oviscape variable 9

9. Fifth tarsomere of male foreleg, including claws and pulvilli, symmetrical; midfemur of male with longer, sparse, erect setae ventrally at basal half; comb of hindtibia indistinct; tergal-oviscapal measure 4.5–5; pterostigma and veins yellowish . . . . . 13. ***N. isochela,*** new species

Fifth tarsomere of male foreleg distinctly asymmetrical; setae on midfemur variable; comb of hindtibia variable; oviscape considerably shorter; pterostigma and veins variable 10

10. Comb on hindtibia indistinct; pterostigma usually hyaline or light yellow; abdomen with terga usually yellow, sometimes with narrow, blackish bands; mid- and hindfemur of male with row of long, erect setae ventrally; 5th tarsomere of male foreleg, including claws and pulvilli, distinctly asymmetrical; spermatheca about as long as wide . . . . . 11. ***N. dolosa*** Benjamin

Comb on hindtibia distinct; pterostigma variable; abdomen with or without blackish bands; mid- and hindfemur of male with short indistinct setulae ventrally; 5th tarsomere of male foreleg distinctly asymmetrical, or almost symmetrical, with symmetrical claws and pulvilli; shape of spermatheca variable 11

11. Fifth tarsomere of male foreleg almost symmetrical, with symmetrical claws and pulvilli; pterostigma usually hyaline or light yellow; abdomen usually with terga more or less blackish basally, banded; spermatheca distinctly longer than wide ..... 12. ***N. footei,*** new species

    Fifth tarsomere of male foreleg, including claws and pulvilli, distinctly asymmetrical; pterostigma usually distinctly brown basally; abdomen completely yellow or banded; shape of spermatheca variable 12

12. Dorsocentral setae transversely aligned with or slightly ahead of anterior supra-alar setae; distiphallus robust, heavily sclerotized, lacking long tubes; spermatheca about twice as long as wide; wing usually distinctly darkened, with dark pterostigma, crossveins, longitudinal veins (especially at distal half), and microtrichia (especially on anterior half), but sometimes only the pterostigma and the apices of the longitudinal veins dark ..... 18. ***N. viridescens*** Quisenberry

    Dorsocentral setae transversely aligned slightly behind anterior supra-alar setae; distiphallus with long tube(s); spermatheca much shorter; wing not darkened, at most pterostigma and veins dark 13

13. Tarsal comb of male with only 2 rows of 2–3 spines each; distiphallus with long double tube; preaedeagal tube blackish; pterostigma with a distinct brown spot basally; abdomen usually completely yellow, sometimes with very narrow brown bands basally on terga 3–5; tergal-oviscapal measure about 2 ..... 17. ***N. stecki,*** new species

    Tarsal comb of male with more spines; distiphallus with single longer tube or with the double tube shorter; preaedeagal tube yellowish; pterostigma with the brown at base merged with the yellow at apex; abdomen completely yellow or banded; tergal-oviscapal measure higher, usually around 3 14

14. Pterostigma mainly yellow, light brownish at basal 1/3 to 1/2, without distinct border line between brown and yellow; epandrium with elongate, posterior process ventrally; distiphallus with extremely long tube; spermatheca slightly longer than wide; larger species, wing length averages 3.5 mm ..... 8. ***N. appendiculata,*** new species

    Pterostigma brown at basal 1/2 to 2/3, yellow at apex; proximal border of brown sharp, distal border not so; epandrium lacking long, posterior process ventrally; distiphallus with moderately long, sinuate, double tube; spermatheca as long as wide; smaller species, wing length averages 2.5 mm ..... 6. ***N. aenigma,*** new species

5. *Neaspilota (Neorellia) achilleae* Johnson

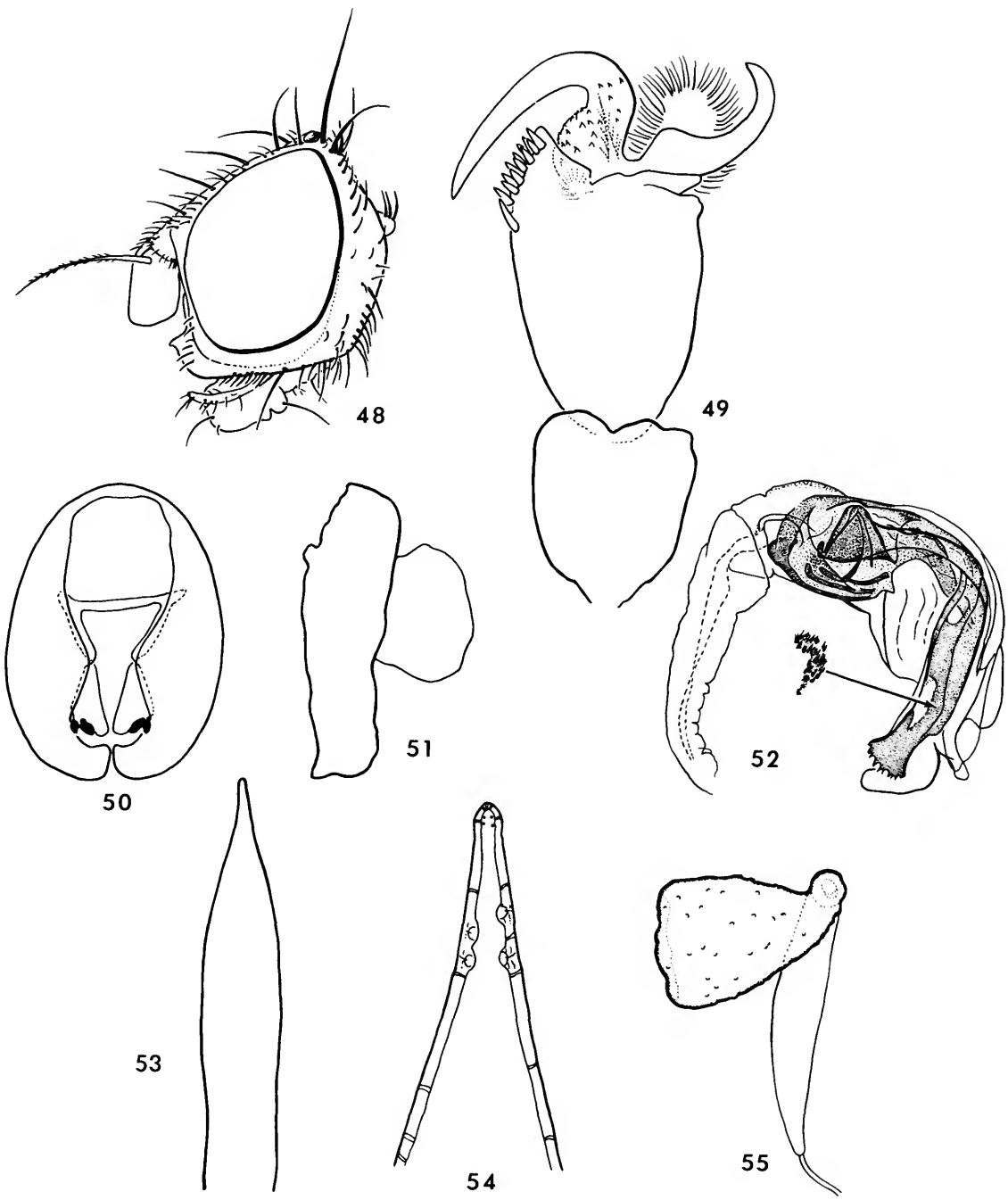
FIGURES 48–56, 189

Neaspilota achilleae Johnson, 1900a:328; 1909:113 [list]; 1910:802 [list]; 1913:84 [list]; 1925:263 [list]; 1927:218 [list]; 1930:151 [list].—Aldrich, 1905:610 [catalog].—Sturtevant, 1918:36 [list].—Phillips, 1923:139, 140 [review]; 1946:51 [description of larva], 116 [host list].—Curran, 1932a:3 [key].—Benjamin, 1934:36, 37 [review].—Malloch, 1942:19 [key].—Procter, 1946:395 [list].—Quisenberry, 1949:84 [key].—Foote, 1965:672 [catalog].—Stegmaier, 1968:47 [discussion].—Wasbauer, 1972:118 [host list].

Trypeta achilleae.—Johnson, 1900b:687 [list].—Baker, 1904:30 [list].

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 1.95 to 3.53 mm.

Head (Figure 48): Slightly higher than long;



Figures 48–55.—*Neaspilota achilleae:* 48, head, lateral aspect; 49, male right foretarsus, dorsal aspect; 50, epandrium, posterior aspect; 51, epandrium and cerci, lateral aspect; 52, distiphallus; 53, aculeus, dorsal aspect; 54, same, enlarged apex; 55, spermatheca.

frontal ratio 0.86–1.08; frontal-head ratio 0.48–0.54; parafacial narrower; 1st flagellomere ratio 1.44–1.71; aristal-antennal ratio 1.20–1.40; major setae brownish yellow, genal seta paler.

Thorax: Dorsocentral setae transversely aligned with or slightly behind anterior supraalar setae. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; forefemur of male with unusually long and thin setae along its length posteroventrally; midfemur with a row of long, thin setae ventrally at basal ½ to ⅔; 5th tarsomere of male foreleg (Figure 49) with longer comb, with 2 rows of about 8 spines each; hindfemur with a few irregular rows of long, thin setae ventrally at basal ½ to ⅔; forefemur of female normal for genus; mid- and hindfemur without long thin setae; comb on hindtibia very well developed. Wing (Figure 189): Pterostigmal ratio 2.66–3.13; crossvein ratio 1.42–1.64; wing distinctly spotted; a square brown spot filling basal half of pterostigma; cell R_1 with brown spot posterior of pterostigma; a pale brown spot extending from node of vein R_{4+5} to dm-cu crossvein, covering this vein; a distinct spot present on r-m crossvein; a transverse band present on line of dm-cu crossvein from costa to vein CuA_1, sometimes fused with a triangular spot at apex of cell R_1; apex of cell R_{2+3} with a triangular spot; cell R_{4+5} preapically with an area of brown microtrichia, often fused with the spots at apex of cell R_1 and R_3, forming narrow brown stripes on apex of veins R_{4+5} and M; brown spots may be reduced or include few small hyaline spots; veins yellow, brown at the spots.

Abdomen: Yellow, with fine brown setulae and setae; epandrium and cerci as in Figures 50, 51; distiphallus (Figure 52) with a rather long tube, fringed at apex. Female: Tergal 6/5 ratio 0.76–0.92; tergal-oviscapal measure 2.5–3.2; oviscapal ratio 0.96–1.13, yellow with brownish base and apex; aculeus as in Figures 53, 54; spermatheca as in Figure 55.

TYPE MATERIAL.—The male lectotype, herein designated, is labeled "Avalon, 6. 30. 95 [30 Jun 1895] N[ew]. J[ersey] [date handwritten]/ CWJohnson Collector/CoType No. 5333 U.S.N.M. [red; number handwritten]/ LECTOTYPE Neaspilota achilleae Johnson by Freidberg and Mathis [red; handwritten]." Three paralectotypes bear the same label data as the lectotype (3♀; BMNH, NMW). The lectotype is directly pinned, is in good condition (both wings are slightly torn), and is deposited in the National Museum of Natural History, Smithsonian Institution, USNM 5333.

OTHER SPECIMENS EXAMINED.—CANADA. NEWFOUNDLAND: Bay of Islands, 21–24 Jul (1♂; AMNH). UNITED STATES. ALABAMA: Mobile Co., Saraland, 26 Oct 1916 (1♀; USNM); Kushla, 8 Sep 1921–Oct 1924, A.H. Sturtevant (3♂; USNM). ARIZONA: Cochise Co., 2 mi (3.2 km) W Chiricahua, Chiricahua Mtns. Nat. Monument, 3 Jul 1950, R. Smith (1♂; AMNH). CALIFORNIA: Inyo Co., Batchelder Spr., 16 Jun 1940, H.K. Court (1♀; ZFM); Lone Pine, 28 Jul 1940, R.H. Beamer (1♂; KU); Olancha, 21 Sep 1980, A. Freidberg (1♀; TAU); Westgard Pass, 19 Jul 1961, G.I. Stage (1♂, 1♀; UCB, CSDA). Los Angeles Co., Palmdale, 23 Jul 1940, R.H. Beamer (1♀; KU). Monterey Co., Gavilan Hill, 6 Oct 1952, A.L. Melander (1♀; USNM). San Diego Co., San Diego, 30 Mar 1916, H.G. Dyar (1♂; USNM); La Mesa, 27 Sep 1958, P. Rude (1♀; CSDA).

FLORIDA: Alachua Co., Gainesville, 20 Apr 1967, W.W. Wirth (1♂; USNM). Brevard Co., Indian River City, 24 Apr–21 Jun 1930, ex. *Hieracium argyraeum,* D.J. Nicholson (10♂, 5♀; USNM); Merritt Island, 26 Apr–23 Nov 1930, on *Hieracium argyraeum,* D.J. Nicholson (3♂, 3♀; USNM). Citrus Co., Crystal River, 30 Sep 1930, ex. *Hieracium scabrum,* D.J. Nicholson (1♀; USNM). Escambia Co., Pensacola, 27 May–3 Jun 1930, ex. *Chrysopsis oligantha* and *Erigeron ramosus,* D.J. Nicholson (3♂, 4♀; USNM). Hamilton Co., Jasper, 6 mi (9.6 km) from, Nov 1930, ex. *Hieracium* sp., D.J. Nicholson (1♂; USNM). Highlands Co., Archbold Biological Station, 4 Apr 1963, J.G. and B.L. Rozen (1♀; AMNH). Hillsborough Co., Tampa, 27 Apr–1 Jun 1930, ex. *Hieracium argyraeum,* Pope, White, D.J. Nicholson (2♂, 3♀; USNM). Liberty Co., Torreya State

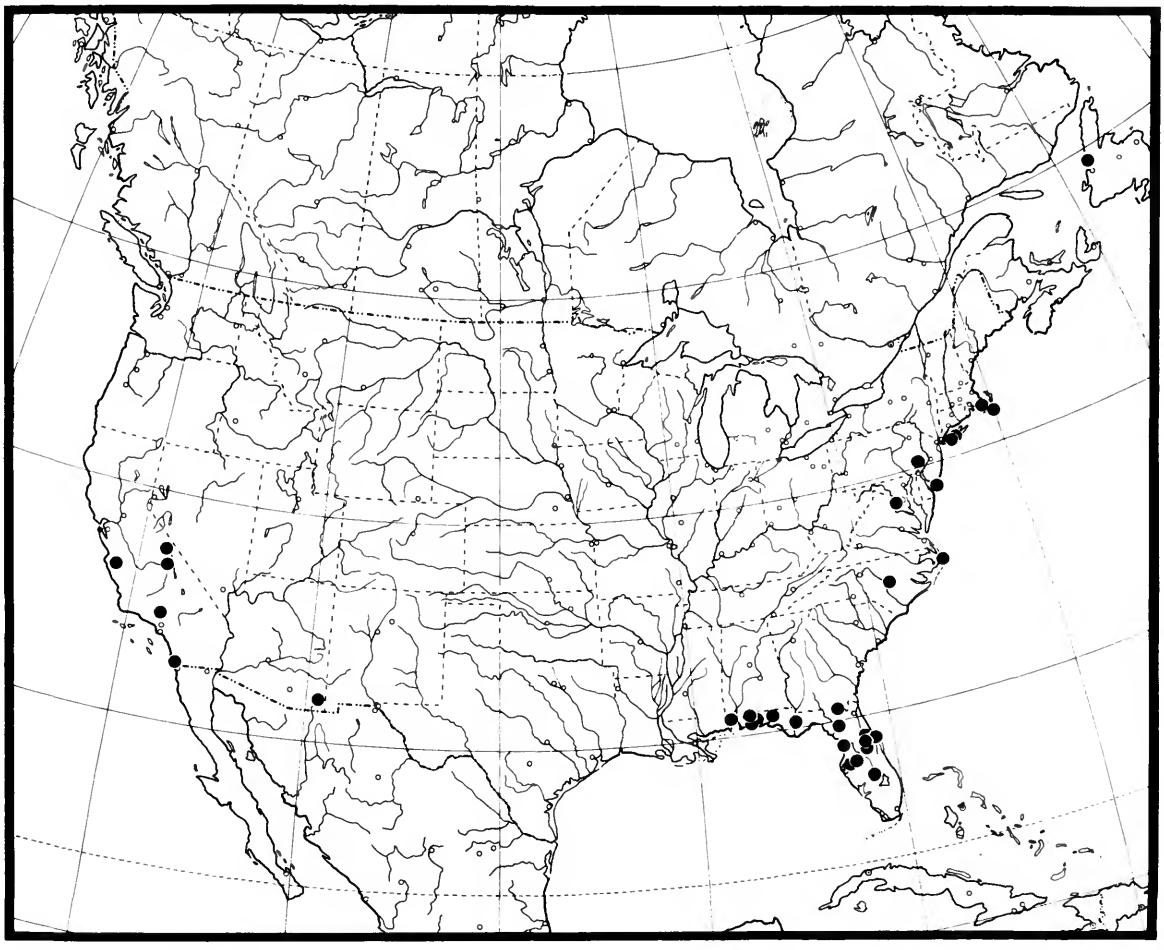


FIGURE 56.—Distribution map of *Neaspilota achilleae.*

Park, 22 Apr 1967, W.W. Wirth (1♂; USNM). Okaloosa Co., Crestview, 27 May–29 Sep 1930, ex. *Chrysopsis oligantha* and *Erigeron vernus,* D.J. Nicholson (1♂, 3♀; USNM).

Orange Co., 9 Jul 1930, ex. *Sericocarpus acutisquamosus,* S.F. Blanton (1♀; USNM); Bithlo, 29 Apr–17 Jun 1930, ex. *Sericocarpus acutisquamosus,* D.J. Nicholson (4♂, 3♀; USNM); Conway, 17–28 Jun 1930, on *Vernonia scaberrima* and ex. *Hieracium argyraeum,* Pope, White, D.J. Nicholson (2♂, 1♀; USNM); Orlando, 7 Jun 1893–10 Oct 1930, ex. *Aster concolor, Erigeron ramosus, E. vernus, Hieracium argyraeum, H. gronovii, H. scabrum,* and *Trilisa paniculata,* D.J. Nicholson, F.S. Blanton (84♂, 90♀; USNM); Orlando, 3 mi (4.8 km) E, 18–19 Feb 1931, ex. *Hieracium scabrum,* D.J. Nicholson (1♀; USNM); Orlando, 3.5 mi (5.6 km) E of, 15 Mar 1931, D.J. Nicholson (1♂; USNM); Orlo Vista, Sep 1930–25 Feb 1931, ex. *Chrysopsis ?microcephala* and *Hieracium scabrum,* D.J. Nicholson (59♂, 56♀; USNM); Pine Castle, 4 Jul–30 Nov 1930, ex. *Aster concolor* and *Hieracium argyraeum,* D.J. Nicholson (3♀; USNM); Plymouth, 25 Jul–1 Aug 1930, ex. *Hieracium argyraeum,* Pope, Dodd, White (4♂, 2♀; USNM); Taft, 2 Jan 1930, ex. *Chrysopsis latifolia,* D.J.

Nicholson (1♀; USNM). Osceola Co., Narcoossee, 1–3 May 1930, ex. *Hieracium argyraeum,* D.J. Nicholson (4♀; USNM). Polk Co., Griffin, 24 Jan–24 Jun 1930, ex. *Hieracium argyraeum,* Pope, White (4♂, 6♀; USNM). Santa Rosa Co., Escambia River, 27 May–2 Jun 1930, ex. *Erigeron ramosus,* D.J. Nicholson (1♂, 2♀; USNM); Milton, 26 Oct 1932, F.S. Blanton (1♂, TAMU). Seminole Co., Oviedo, 21 Dec 1929–9 Jan 1930, ex. *Aster adnatus,* D.J. Nicholson (2♂, 1♀; USNM). Walton Co., De Funiak Springs, 10 Mar–29 May 1930, ex. *Erigeron ramosus,* D.J. Nicholson (2♂, 1♀; USNM). Washington Co., Caryville, 7 Jun 1930, ex. *Sericocarpus acutisquamosus,* D.J. Nicholson (1♂; USNM). Benson Springs, 24 Jun 1930, ex. *Erigeron ramosus,* Pope, White (2♀; USNM); Northwest Florida, 30–31 May 1930, D.J. Nicholson (2♀; USNM); caught in rearing cage, May–24 Jun 1930, D.J. Nicholson (1♂, 1♀; USNM).

MASSACHUSETTS: Barnstable Co., Woods Hole, 7 Jul–17 Sep 1899–1923, on *Achillea millefolium, Chrysanthemum leucanthemum,* and *Sericocarpus,* A.L. Melander, A.H. Sturtevant (11♂, 8♀; BMNH, AMNH, USNM, WSU). Nantucket Co., Nantucket, 24 Jun, C.W. Johnson (1♂; USNM). NEW JERSEY: Cape May Co., Anglesea, Sep (1♂, MCZ); Avalon, 30 Jun–22 Jul 1894, C.W. Johnson (1♂, 5♀; USNM, NMW, UK); Jun 1930 (2♀; KU). NEW YORK: Nassau Co., Farmingdale, Long Island, 1 Jul 1931-1933, ex. *Hieracium venosum* and *Sericocarpus asteroides,* F.S. Blanton (8♂, 4♀; CAS, OHSU, USNM). Suffolk Co., Babylon, Long Island, 26 Jun–5 Aug 1931–1933, ex. *Erigeron pusillus, Hieracium venosum,* and *Prenanthes trifoliata,* F.S. Blanton (125♂, 140♀; CSDA, ISU, OHSU, ORSU, TAMU, USNM); Cold Spring Harbor, Jul–5 Aug 1927, A.L. Melander (1♂, 1♀; USNM); Farmingdale, 1 Jul 1931–1933, ex. *Hieracium venosum,* F.S. Blanton (6♂, 6♀; ORSU, TAMU); Huntington, Long Island, 28 Jul–16 Aug 1962, P.H. Arnaud (1♂, 1♀; AMNH); Islip, Long Island, 10 Jun 1931–24 Jun 1933, ex. *Hieracium venosum,* F.S. Blanton (86♂, 63♀; CAS, HU, ISU, TAMU, TAU, USNM, USU). NORTH CAROLINA: Dare Co., Nags Head, 5 Jun 1967, J.R. Powers (1♂; UCB). Wayne Co., Goldsboro, 21 Oct 1922 (1♂; USNM). PENNSYLVANIA: Montgomery Co., 4 Jul 1892 (2♂; KU). VIRGINIA: Arlington Co., Bon Air, 15 Aug 1936 (1♀; USNM). Independent City, Falls Church, 4 Jun (1♀; MCZ). Kearney, 25 May 1936, J.C. Bridwell (1♂, 1♀; USNM).

DISTRIBUTION (Figure 56).—Eastern and Gulf coasts of North America from Newfoundland to Alabama and southwestern United States, southern California and Arizona.

HOST PLANTS.—*Aster adnatus, A. asteroides* (as *Sericocarpus asteroides*), *A. carolinianus* (Benjamin, 1934:37), *A. concolor, Chrysopsis graminifolia* (as *C. microcephala*), *C. latifolia, C. oligantha, Erigeron canadensis* (as *E. pusillus*), *E. strigosus* (as *E. ramosus*), *E. nudicaulis* (as *E. vernus*), *Heracleum* sp. (Phillips, 1946:52), *Hieracium argyreaeum, H. Gronovii, H. scabrum, H. venosum, H.* sp., *Prenanthes trifoliata, Trilisa paniculata, Sericocarpus acutisquamosus.*

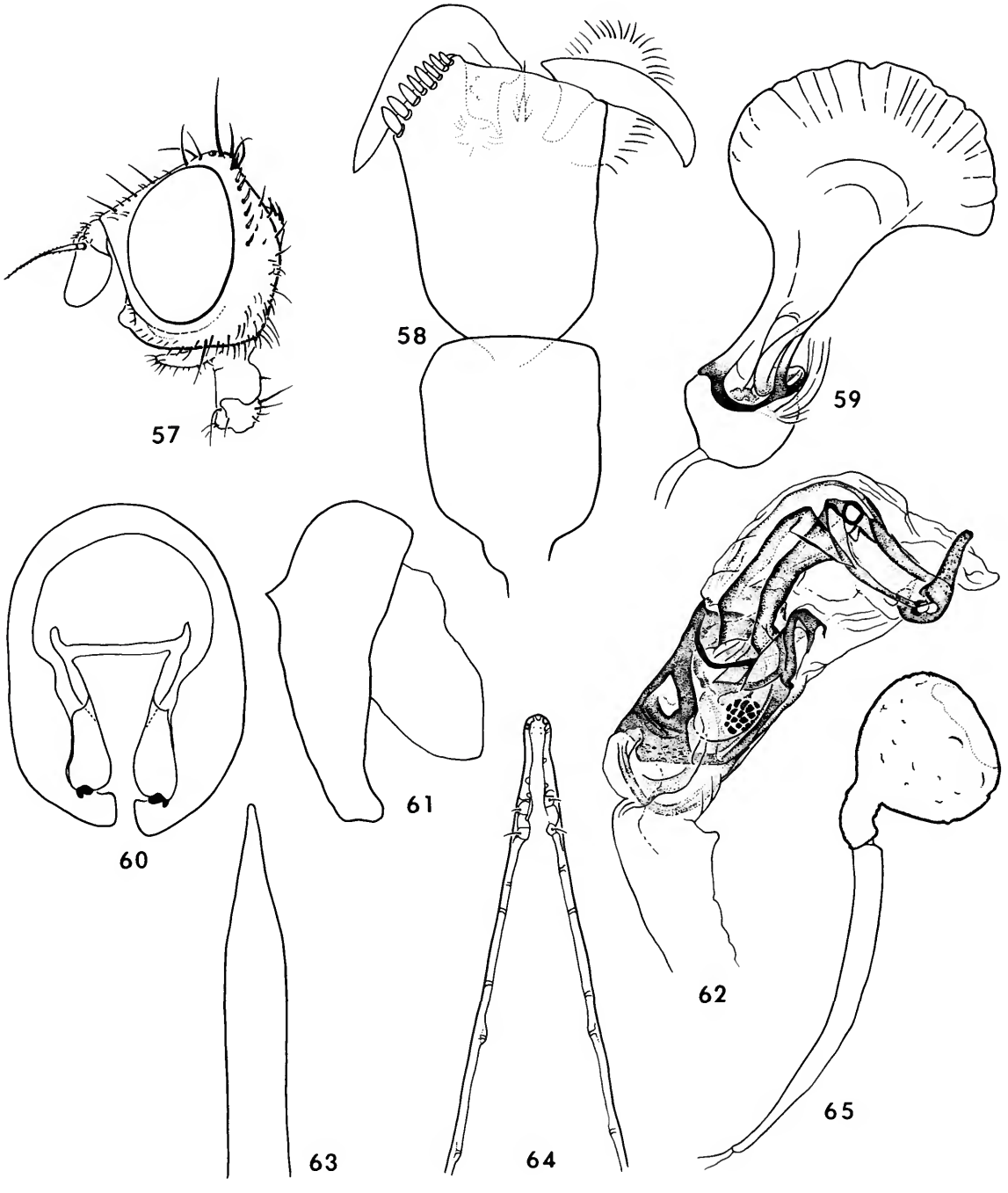
REMARKS.—This species is distinctive, although superficially resembling smaller specimens of *N. vernoniae.* It differs from *N. vernoniae* by being smaller, by having dark setulae on the abdomen, and by the characters given in the subgeneric key. From other congeners it is readily distinguished by its patterned wing and dark abdominal setulae.

The known distribution of *N. achilleae* is peculiar. It is apparently widespread and common and has been reared from several host plants from numerous sites along the east coast. However, several specimens have also been examined from California and Arizona. The latter specimens are smaller on the average than their eastern counterparts, but otherwise they seem to be conspecific. Further collecting and rearing will be necessary to determine whether the distribution of this species is disjunct or if the species actually extends across southern United States.

6. *Neaspilota (Neorellia) aenigma,* new species

FIGURES 57–66, 190

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.10–3.22 mm.



FIGURES 57–65.—*Neaspilota aenigma:* 57, head, lateral aspect; 58, male right foretarsus, dorsal aspect; 59, ejaculatory apodeme, lateral aspect; 60, epandrium, posterior aspect; 61, epandrium and cerci, lateral aspect; 62, distiphallus; 63, aculeus, dorsal aspect; 64, same, enlarged apex; 65, spermatheca.

Head (Figure 57): Distinctly higher than long, height-to-length ratio about 1.1; frontal-head ratio 0.50–0.53; frontal ratio 0.81–0.96; 1st flagellomere ratio 1.71–1.86; aristal-antennal ratio 1.00–1.22; parafacial and gena slightly narrower; major setae shorter than normal (inner vertical seta about half as long as frontal width at vertex), brown, genal seta yellowish.

Thorax: Dorsocentral setae distinctly aligned transversely behind anterior supra-alar setae; setae brown, anepimeral and katepisternal yellowish. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg typically modified (Figure 58), with 2 rows of about 8 spines in comb. Wing (Figure 190): Pterostigmal ratio 2.85–4.00; crossvein ratio 1.50–2.25; apical sections of veins R_{4+5} and M slightly curving posteriorly or straight, wing apex closer to end of vein M; pterostigma brown at basal 0.50–0.66, yellow at apex; proximal border of brown sharp, distal border not so; veins at apical ½ of wing brown, otherwise yellow.

Abdomen: Entirely yellow or with narrow black bands at anterior margin of terga 4–5 in male, 3–6 in female; ejaculatory apodeme as in Figure 59; epandrium and cerci as in Figures 60, 61; distiphallus as in Figure 62. Female: Tergal 6/5 ratio 0.69–0.88; tergal-oviscapal measure 3.2–3.5; oviscapal ratio 1.19–1.38; aculeus as in Figures 63, 64; spermatheca as in Figure 65.

TYPE MATERIAL.—The male holotype is labeled "CALIFORNIA Inyo Co. Death Val[ley]./ Junc[t]ion 21. IX. 1980 [21 Sep 1980] A[.]Freidberg." The allotype and three male paratypes bear the same label data as the holotype. Other paratypes are as follows: MEXICO. SONORA: Nogales, 11 Sep 1965, A.E. Michelbacher (1♂; UCB). UNITED STATES. ARIZONA: Cochise Co., Apache, 24 Aug 1969, J.G. and K.C. Rozen (1♂; AMNH); Apache, 17.5 mi (28 km) SW, 14 Aug 1969, J.G. and K.C. Rozen (1♂; AMNH); Douglas, 6 mi (9.6 km) E, 5 Sep 1958, on *Haplopappus hartwegi*, P.D. Hurd (2♀; UCB); Willcox, 2.5 mi (4 km) S, 17 Aug 1956, E. Ordway (1♀; UCB). Gila Co., Roosevelt Lake, 2200 ft (660 m), 17 Apr 1967, D.M. Wood (6♂; CNC). Pima Co., Organ Pipe Cactus National Monument, Williams Spring, 16 Feb 1970, P.H. Arnaud (5♂, 1♀; CAS); Tucson, 28 Mar 1967, D.M. Wood (1♀; CNC). Arizona, Quitobaquito, 18 Apr 1947, A.L. Melander (1♂; USNM). CALIFORNIA: Inyo Co., Olancha, 21 Oct 1980, A. Freidberg (2♂; USNM). COLORADO: Weld Co., Nunn, Pawnee Grassland Pasture, 2 Oct 1972, ex. *Haplopappus spinulosus*, R. Lavigne (2♂; USNM). TEXAS: Brewster Co., Big Bend National Park, Panther Junction, 3500 ft (1050 m), 7–16 May 1959, F. McAlpine (2♀; CNC). Jeff Davis Co., Fort Davis, 23 mi (37 km) W, 5000 ft (1500 m), 1 Jun 1959, F. McAlpine (1♀; CNC); Fort Davis, 10 mi (16 km) W, near Point of Rocks, 29 May 1959, F. McAlpine (1♂; CNC). The holotype is double mounted (minute nadel in a polyporus block), is in excellent condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.

DISTRIBUTION (Figure 66).—Southwestern United States and northern Mexico (Colorado

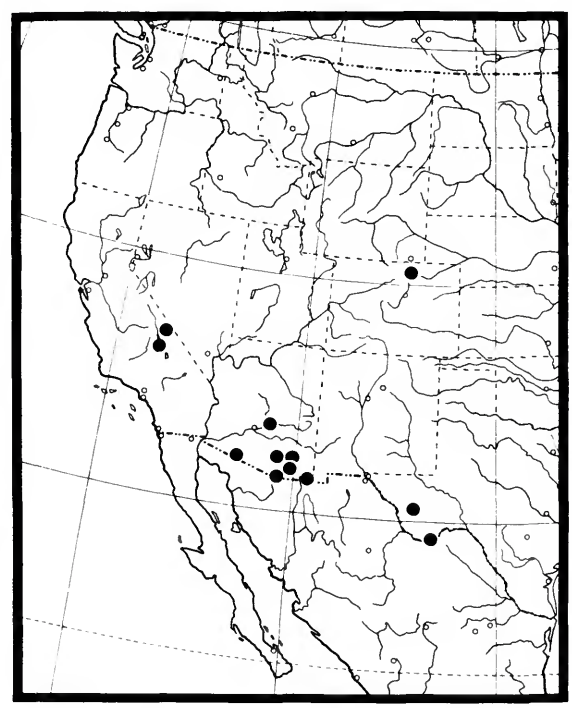


FIGURE 66.—Distribution map of *Neaspilota aenigma*.

westward to California, southward through Texas to northern Mexico).

HOST PLANTS.—*Haplopappus Goodingii* (as *H. spinulosus*); possibly *H. hartwegi.*

ETYMOLOGY.—The specific epithet, *aenigma,* is of Greek derivation and refers to the difficulty and possible confusion in distinguishing this species.

REMARKS.—This species is rather similar to *N. stecki* and to some specimens of *N. viridescens.* It can be distinguished from *N. stecki* by the brown area at the base of the pterostigma, which is lighter and intergrades smoothly into the apical yellow area of the pterostigma, by the male distiphallus, which is less sclerotized (lighter) and has the double tube shorter, and by the longer oviscape and more pointed aculeus. It differs from *N. viridescens* primarily by the shorter cephalic setae, by the more posterior alignment of the dorsocentral setae, which are inserted behind the anterior supra-alar setae rather than before, by the distiphallus, which practically lacks the double tube in *N. viridescens,* and by the spermathecae, which in *N. aenigma* are about as long as wide, and in *N. viridescens* they are about twice as long as wide.

7. *Neaspilota (Neorellia) albiseta,* new species

FIGURES 67–75, 191

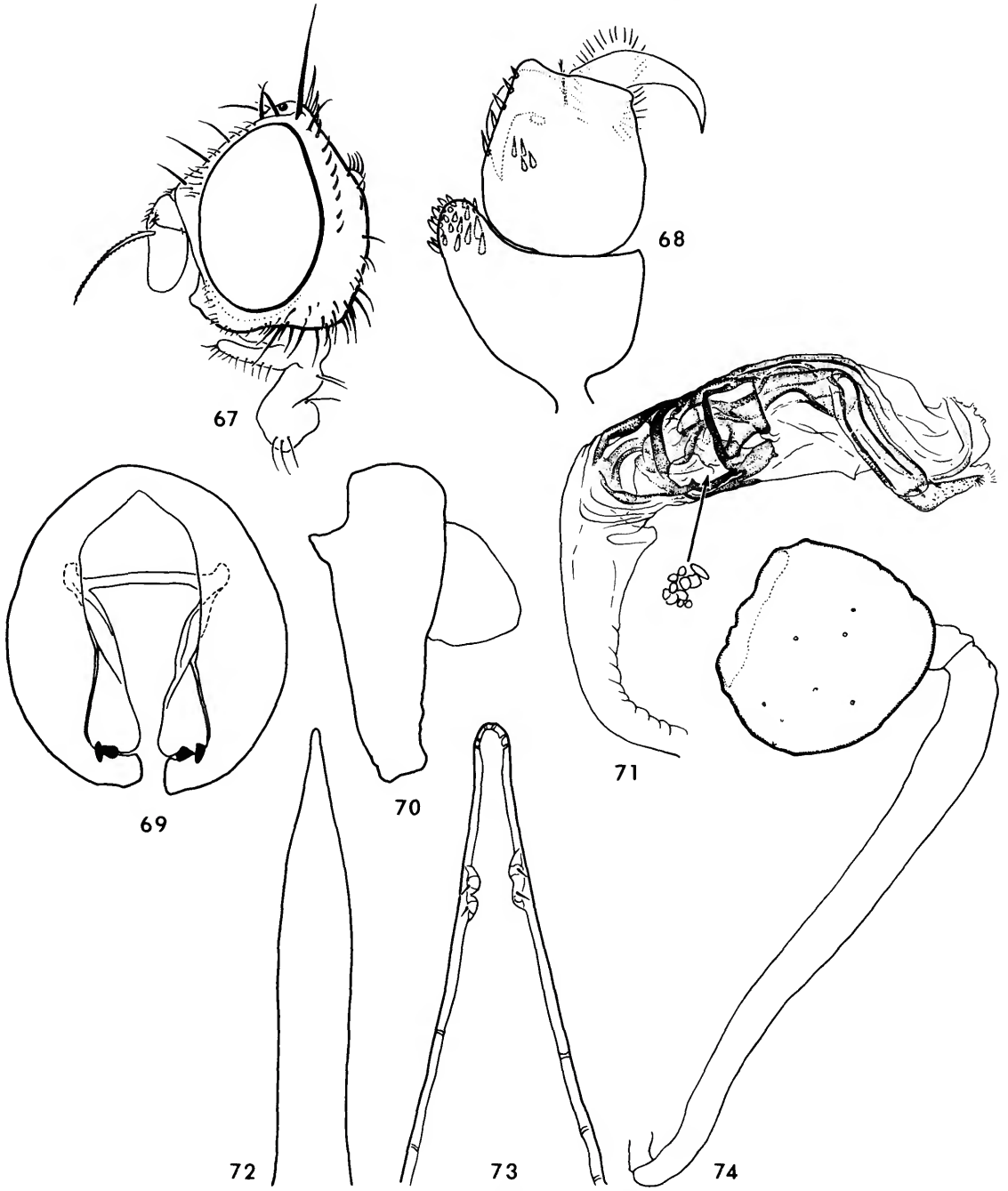
DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.48 to 3.60 mm.

Head (Figure 67): Considerably higher than long; frontal ratio 0.86–1.00; frontal-head ratio 0.47–0.52; 1st flagellomere ratio 1.69–2.00; aristal-antennal ratio 1.00–1.16; haustellum shorter than antenna; head and antenna usually distinctly whitish; major setae usually whitish (all cephalic setae concolorous), rarely pale yellow.

Thorax: Dorsocentral setae aligned transversely slightly behind anterior supra-alar setae; setae brownish, setae on pleura paler. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; setae at ventral side of mid- and hindfemora relatively short, but distinct; comb on hindtibia short, mainly distinct at midlength of tibia; 5th tarsomere of male foreleg as in Figure 68; with the claws about equally long; 4th tarsomere also asymmetrical, with an anteroapical spinose projection. Wing (Figure 191): Pterostigmal ratio 2.62–3.14; crossvein ratio 2.00–2.45; apical section of vein R_{4+5} and vein M almost straight; wing apex closer to M; pterostigma opaque, more or less uniformly yellow; r-m and dm-cu crossveins and longitudinal veins distad of line of dm-cu brown; veins otherwise pale yellow.

Abdomen: Yellow; male sometimes with short, narrow, black band at anterior margin of 5th tergum; setae at posterior margin of terga brown in male, whitish in female; epandrium and cerci as in Figures 69, 70; distiphallus as in Figure 71. Female: Tergal 6/5 ratio 0.73–0.93; tergal-oviscapal measure 2.0–2.8; oviscapal ratio 1.03–1.17; aculeus as in Figures 72, 73; spermatheca as in Figure 74.

TYPE MATERIAL.—The male holotype is labeled "CALIFORNIA Inyo Co. Death Val[ley]./ Junc[t]ion, 21. IX. 1980 [21 Sep 1980] A[.] Freidberg." Allotype female bears the same label data as the holotype. Other paratypes are as follows: UNITED STATES. ARIZONA: Mojave Co. Kingman, 6 mi (9.6 km) SE, 14 Jul 1977, A.J. Gilbert (1♀; CSDA). CALIFORNIA: Inyo Co. Antelope Springs, 8 mi (12.8 km) SW Deep Spring, 2 May–1 Jul 1961, on *Eriogonum heermannii,* J. Powell, G.I. Stage (10♂, 13♀; CSDA, UCB, USNM); Lone Pine, 28 Jul 1940, D.E. Hardy (1♀; KU); Lone Pine, 3.5 mi (5.6 km) W, 8 Jul 1961, H.V. Daly (1♂; UCB); Mazourka Canyon, 8 mi (12.8 km) NE Independence, 11 May 1969, on *Sphaeralcea ambigua,* A. Rude (1♂; UCB); Olancha, 21 Sep 1980, A. Freidberg (3♂, 1♀; TAU, USNM). Kern Co. Rosamond, 23 Jul 1940, R.H. Beamer (1♀; KU); Kernville, 24 Jul 1940, R.H. Beamer (1♀; KU). San Bernardino Co. Verdemont, 6 mi (9.6 km) N San Bernardino, 22 May 1945, A.L. Melander (1♀; USNM). NEVADA: Lander Co. Austin, 12 Aug 1940, L.J. Lipovsky (1♂; KU). The holotype is double mounted (minute nadel in polyporus block), is in excellent condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.



FIGURES 67–74.—*Neaspilota albiseta:* 67, head, lateral aspect; 68, male right foretarsus, dorsal aspect; 69, epandrium, posterior aspect; 70, epandrium and cerci, lateral aspect; 71, distiphallus; 72, aculeus, dorsal aspect; 73, same, enlarged apex; 74, spermatheca.

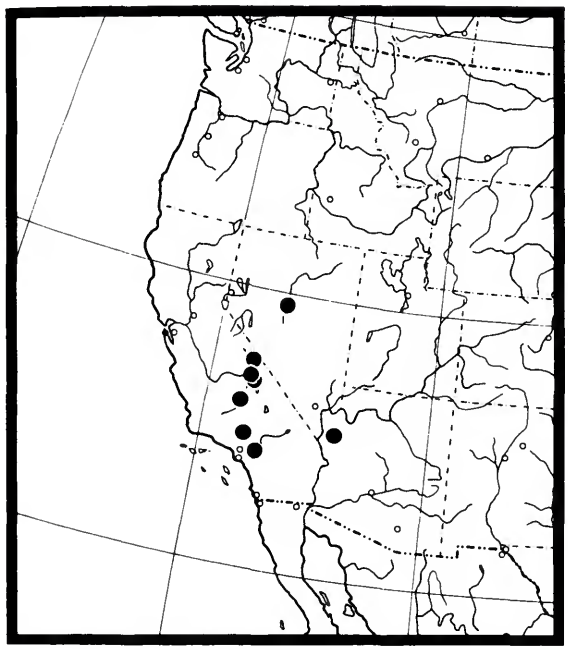


FIGURE 75.—Distribution map of *Neaspilota albiseta.*

DISTRIBUTION (Figure 75).—Southwestern United States: Arizona westward to southern California, northward to central Nevada.

HOST PLANTS.—Unknown.

ETYMOLOGY.—The specific epithet, *albiseta,* is of Latin derivation and refers to the whitish cephalic setae.

REMARKS.—This species is distinguished from other congeners by its head, which in profile is considerably higher than long, by its yellowish pterostigma, and by its whitish cephalic setae. In addition, males have an anteroapical spinose projection on the fourth tarsomere of the foreleg that is apparently unique. The latter is not unlike the spinose projection on the fifth tarsomere of males of *N. pubescens,* and the two species are apparently closely related.

8. *Neaspilota (Neorellia) appendiculata,* new species

FIGURES 76–84, 192

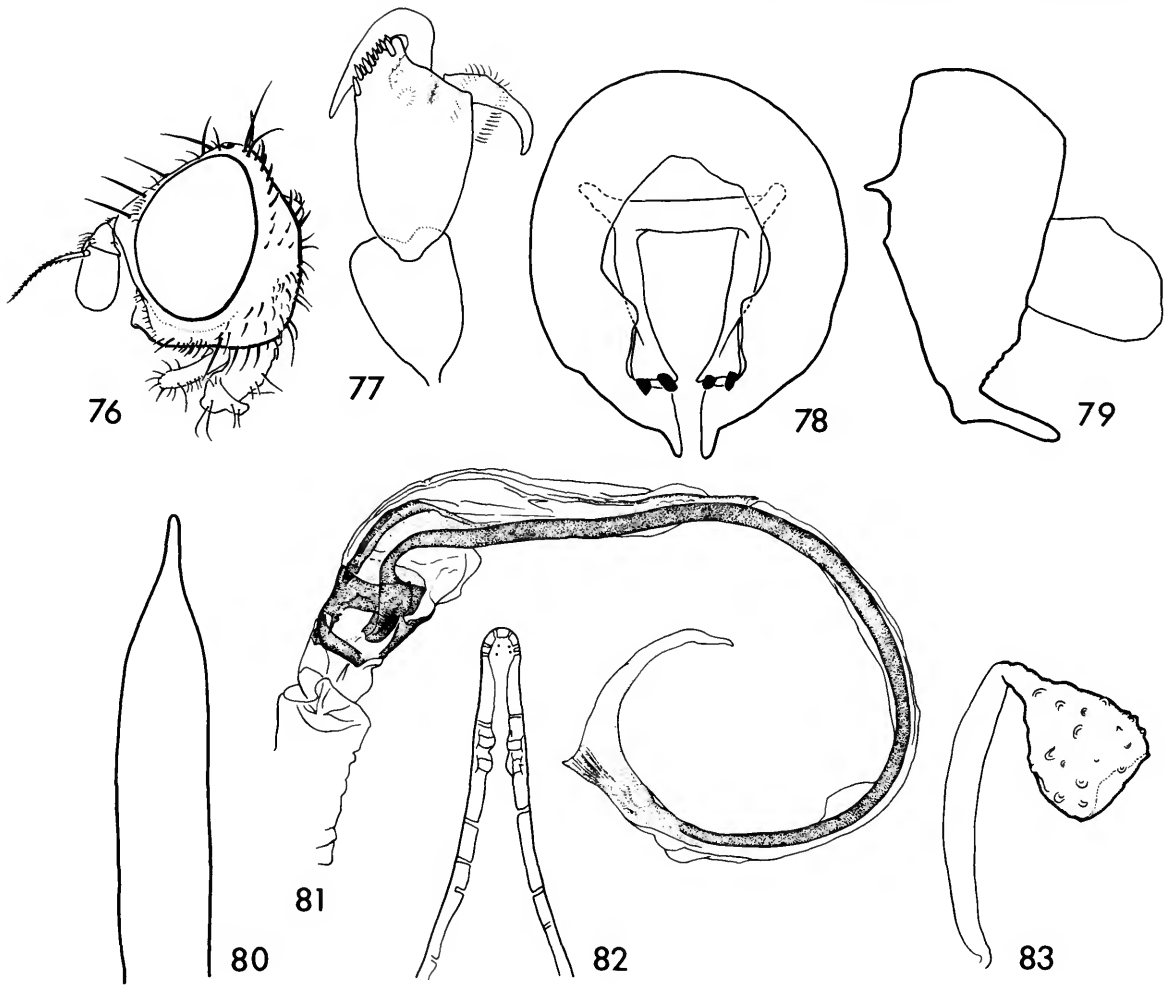
DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 3.23 to 4.13 mm.

Head (Figure 76): Frontofacial angle strongly projected, more than lower facial margin; frontal ratio 0.85–0.90; frontal-head ratio 0.49–0.52; parafacial narrower; 1st flagellomere ratio 1.55–1.75; aristal-antennal ratio 1.00–1.27; haustellum somewhat shorter than antenna; 2nd antennal segment with a blackish dorsolateral spot; major setae pale brown, genal setae paler.

Thorax: Dorsocentral setae aligned posterior of anterior supra-alar setae; 2nd and 3rd anepisternal setae often developed; katepisternal and anepimeral setae paler than other dark setae. Legs: Hind tibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg (Figure 77) elongate, with comb longer and bearing 2 rows of about 9 spines each. Wing (Figure 192): Pterostigmal ratio 2.77–4.00; crossvein ratio 1.76–2.08; wing apex closer to end of vein M than to R_{4+5}; wing milky white or slightly grayish; pterostigma mainly yellow, pale brownish at basal ⅓ to ½, without distinct border line between brown and yellow; r-m and dm-cu crossveins and longitudinal veins distally brownish, veins otherwise yellow.

Abdomen: Yellow; terga 3–5 in male, 3–6 in female with narrow black bands at anterior margin; band on 5th tergum of male wider, with posterior evagination in the middle; some bands sometimes lacking; epandrium and cerci as in Figures 78, 79; epandrium thick at dorsal side in lateral view, conspicuously narrowed ventrally; outer surstylus with long posteroventral, spinelike projection; distiphallus (Figure 80) very large, with relatively simple sclerotization and very long tube. Female: Tergal 6/5 ratio 0.8–1.0; tergal-oviscapal measure 2.2–3.5; oviscapal ratio 1.14–1.18; aculeus (Figures 81, 82) tapered at distal ⅓; with apex relatively broadly rounded; spermatheca (Figure 83) with relatively rough surface.

TYPE MATERIAL.—The male holotype is labeled "Williams 22. 7 [22 Jul; date handwritten] Ar[izona]/JSBarber Collector." Allotype female is labeled "24 mi. S. Hanksville, 7500′ Henry Mts. Utah 29. VII. 1968 J. E. H. Martin." Other paratypes are as follows: UNITED STATES. ARIZONA: Cochise Co., Willcox, 14 Sep 1935,



FIGURES 76–83.—*Neaspilota appendiculata:* 76, head, lateral aspect; 77, male right foretarsus, dorsal aspect; 78, epandrium, posterior aspect; 79, epandrium and cerci, lateral aspect; 80, distiphallus; 81, aculeus, dorsal aspect; 82, same, enlarged apex; 83, spermatheca.

F.H. Parker (1♂; USNM). Coconino Co., Page, 25 Sep 1980, A. Freidberg (1♂; TAU); Williams, Jul 1922, H.S. Barber (1♂; USNM). CALIFORNIA: San Bernardino Co., Barton Flats, S. Fork Camp, 9 Oct 1944, A.L. Melander (3♂; USNM). IDAHO: Lemhi Co., Double Springs Pass, Patterson, 15 Jul 1968, on *Cercocarpus ledifolius,* M.M. Furniss (1♂; USNM). NEW MEXICO: Colfax Co., Eagle Nest, 5 mi (8 km) S, 14 Aug 1971, J. Rozen (1♂; AMNH). Hidalgo Co., Animas, 7 Sep 1979, on *Helianthus annuus,* E.G. and J.M. Linsley (1♂; USNM). UTAH: Cache Co., Blacksmith Fork Canyon, 22 Aug 1972, W.J. Hanson (1♀; USU). Wayne Co., Hanksville, 24 mi (38 km) S, 7500 ft (2500 m) elevation, Henry Mountains, 29 Jul 1968, J.E.H. Martin (1♂, 2♀; CNC). WYOMING: Niobrara Co., Lance Creek, 14 Aug 1895, W.M. Wheeler (1♂; KU). Sweetwater Co., Farson, 20 mi (32 km) W, 20 Jul 1965, G. Bohart, P. Torchio (1♂; USU). The holotype is double mounted

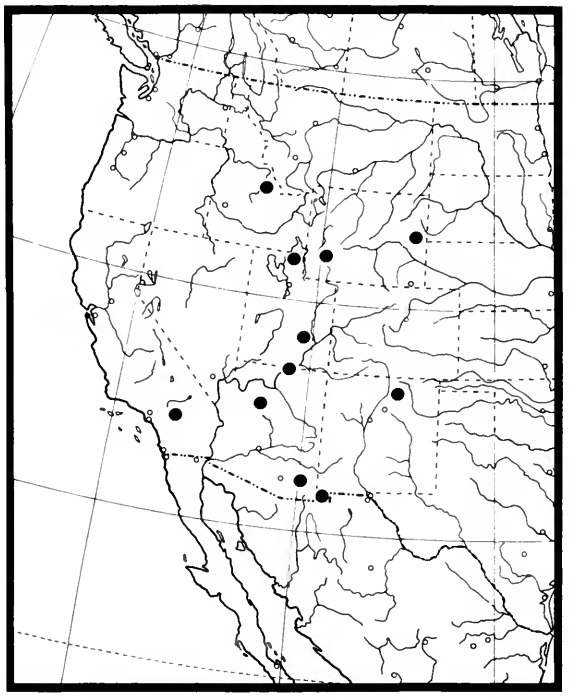


FIGURE 84.—Distribution map of *Neaspilota appendiculata.*

(minute nadel in foam base), is in good condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.

OTHER SPECIMENS EXAMINED.—UNITED STATES. ARIZONA: Arizona, 2122, 2123 (3♀; MCZ, USNM). COLORADO: "Colorado" 2781 (1♀; MCZ). WYOMING: Buck Creek [many in Wyoming], 14 Aug 1895 (1♀; KU).

DISTRIBUTION (Figure 84).—Widespread in western United States between 32° and 46° north latitude and between 104° and 118° west longitude.

HOST PLANTS.—Unknown.

ETYMOLOGY.—The specific epithet, *appendiculata,* is of Latin derivation and refers to the elongate, posteroventral projection of the male epandrium.

REMARKS.—Males of this species are easily distinguished from other congeners, but females are not. Characters that are somewhat useful for both sexes are: body size large; pterostigma mainly yellow, with pale brown base. The male terminalia differ markedly from any congener: the epandrium (Figures 78, 79) has a long posteroventral projection on both sides (usually detectable without dissection) and the distiphallus (Figure 80) is extremely large and long. The only species with characters similar to these is *N. wilsoni,* which is considered to be closely related to *N. appendiculata.*

9. *Neaspilota (Neorellia) brunneostigmata* Doane

FIGURES 85–93, 193

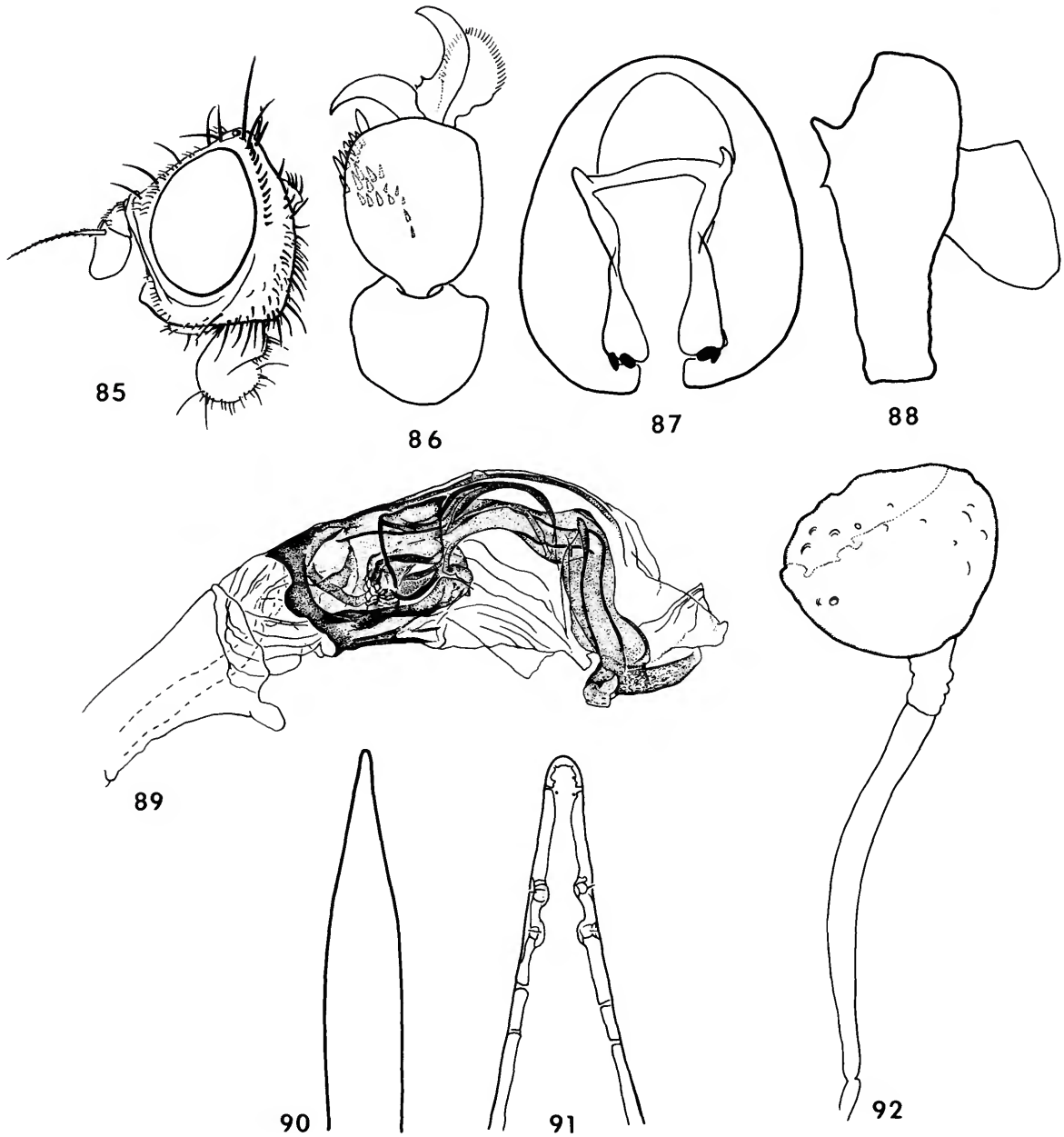
Neaspilota brunneostigmata Doane, 1899:187.—Cole and Lovett, 1921:326 [list].—Curran, 1932a:3 [key].—Benjamin, 1934:36 [key].—Foote and Blanc, 1963:33 [review].—Foote, 1965:672 [catalog].—Cole, 1969:355 [review].—Wasbauer, 1972:119 [host list].

Neaspilota brunneistigma [sic].—Aldrich, 1905:610 [catalog].—Malloch, 1942:19 [key].—Quisenberry, 1949:84 [key].

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 3.08 to 4.28 mm.

Head (Figure 85): Higher than long; frontal-head ratio 0.53–0.55; frontal ratio 0.80–0.89; 1st flagellomere ratio 1.55–1.76; aristal-antennal ratio 1.14–1.36; gena about as wide as antenna; haustellum shorter than labella; major setae pale brown, genal seta sometimes paler.

Thorax: Dorsocentral setae transversely aligned slightly behind anterior supra-alar setae, pale brown, anepimeral and katepisternal setae sometimes paler. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg (Figure 86) with claws about equally long, with spines extended nearly to middle of tarsomere; same tarsomere dark brown to black (darker than rest of leg, which is yellowish), sometimes 4th or 4th and 3rd tarsomeres of foreleg, and 5th tarsomere of mid- and hindleg also darker; 5th tarsomere of female distinctly, although sometimes very slightly, darker than rest of tarsomeres (dark color espe-



FIGURES 85–92.—*Neaspilota brunneostigmata:* 85, head, lateral aspect; 86, male right foretarsus, dorsal aspect; 87, epandrium, posterior aspect; 88, epandrium and cerci, lateral aspect; 89, distiphallus; 90, aculeus, dorsal aspect; 91, same, enlarged apex; 92, spermatheca.

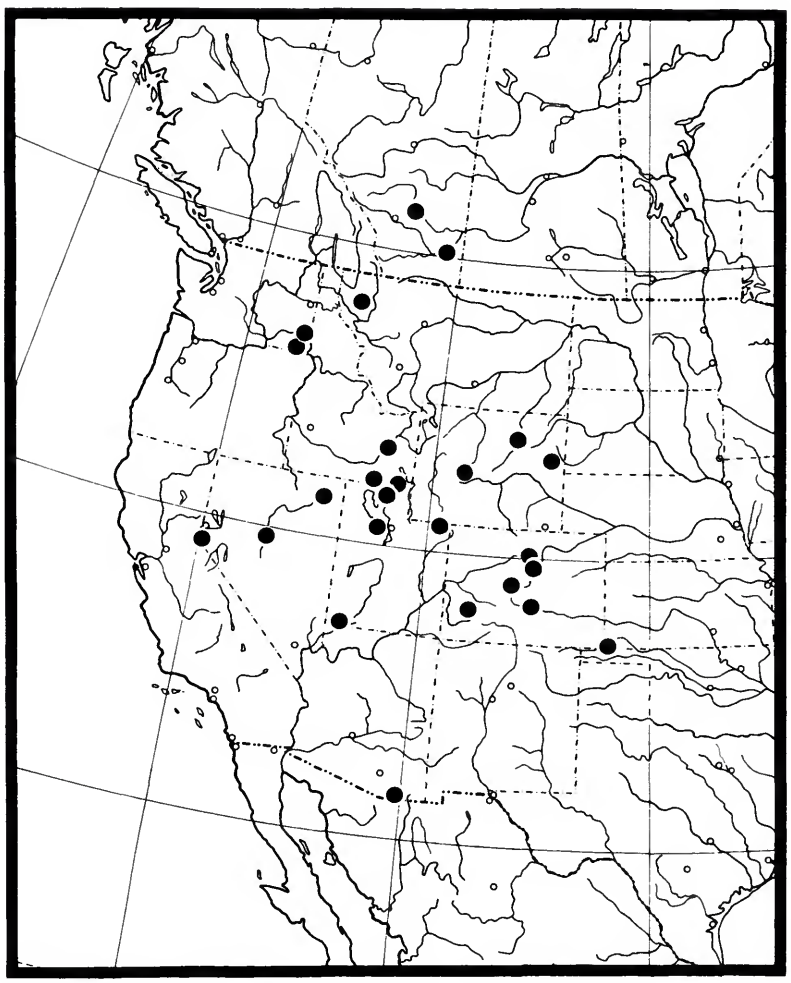


FIGURE 93.—Distribution map of *Neaspilota brunneostigmata.*

cially obvious when tarsomere viewed obliquely). Wing (Figure 193): Pterostigmal ratio 2.88–3.38; crossvein ratio 1.69–2.27; veins R_{4+5} and M almost straight, wing apex closer to end of vein M; wing mainly hyaline, pterostigma yellow, becoming increasingly brown toward base, but not dark brown; veins yellow, toward apex brown, sometimes extensively brown.

Abdomen: Entirely yellow or with black bands; terga 4–5 of male often, terga 3–6 of female rarely with narrow black bands at anterior margin, sometimes interrupted in middle; epandrium and cerci as in Figures 87, 88; distiphallus as in Figure 89. Female: Tergal 6/5 ratio 0.75–0.87; tergal-oviscapal measure 3.2–4.5; oviscapal ratio 1.33–1.66; oviscape yellow, sometimes somewhat brown dorsally at base; aculeus as in Figures 90, 91; spermatheca (Figure 92) wider than long.

TYPE MATERIAL.—The female lectotype, designated by Foote (1966), is labeled "Pullman Wash[ington] Collector C. V. Piper/ 25 [handwritten in pencil]/Type [handwritten]/Type 94 [red; handwritten]/brunneo-stigma [red; hand-

written]." The lectotype is directly pinned, is in fair condition (the right wing has been removed and is slide mounted), and is deposited in the Maurice T. James Insect Collection, Washington State University, WSU 12.

OTHER SPECIMENS EXAMINED.—CANADA. ALBERTA: Drumheller, 11 Aug 1957, A.R. and J.E. Brooks (4♂, 3♀; CNC); Medicine Hat, 1 Apr 1956, E.E. Sterns (1♂; CNC). UNITED STATES. ARIZONA: Cochise Co., Apache, 24 Aug 1969, J.G. and K.C. Rozen (1♂; AMNH). COLORADO: Boulder Co., Boulder, 5 mi (8 km) S, 16 Jun 1961, C.H. Mann (2♂, 1♀; CNC); Lafayette, 16 Aug 1973, W.J. Hanson, G.F. Knowlton (1♂, 1♀; USU); Longmont, 16 Aug 1973, W.J. Hanson, G.F. Knowlton (1♂; USU); Niwot Ridge nr Ward, 5 Aug 1961, J.R. Stainer (1♀; CNC); Valmont Butte, 7 Jun 1961, W.R.M. Mason (1♀; CNC). Boulder and Weld Cos., Boulder Canyon, 8 Aug 1960, R.K. Dreisbach (1♀; CSDA). Fremont Co., Florence, 6 mi (9.6 km) NE, 11 Aug 1964, J.G., B.L., and K.C. Rozen, (1♀; AMNH). Jefferson Co., Mt. Vernon nr Golden, 31 Jul 1961, C.H. Mann (1♂; CNC). Lake Co., Tennessee Pass, 30 Jul–2 Aug 1919 (1♀; AMNH). Ouray Co., Ridgway, 10 Jul 1919 (1♂; USNM). Mt. Evans, 28 Jul 1961, W.R.M. Mason (1♀; CNC). Pinegree Park, 19–24 Aug 1935, D.A. Wilbur (1♂; FSCA). IDAHO: Bingham Co., Collins, 27 Jul 1898 (1♂; USNM). Franklin Co., Preston, 2 Jul 1937, G.F. Knowlton (1♀; USU). Oneida Co., Curlew Reservoir, 2 Sep 1969, G.F. Knowlton, (1♀; USU); Ireland Canyon, 2 Sep 1969, G.F. Knowlton (1♂; USU).

KANSAS: Morton Co., 3200 ft (960 m), F.H. Snow (2♀; CAS, KU). MONTANA: Flathead Co., East Flathead, 25 Jul 1902 (1♂, 1♀; USNM). NEVADA: Lander Co., Austin, 12 Aug 1940, R.H. Beamer (1♂; KU). Independent City, Carson City (1♂; MCZ). Elko Co., 1 Jun 1968, G.E. Bohart (2♀; USU). UTAH: Box Elder Co., Cedar Hills, 1 Sep 1970, G.F. Knowlton (1♀; USU); Garland, 7 Sep 1925, G.F. Knowlton (1♂; USNM). Daggett Co., Dowd Spring, 1 Aug 1972, G.F. Knowlton (2♂; USU). Tooele Co., Clover, 8 Jul 1954, G.F. Knowlton (1♂; KU). Washington Co., Zion National Park, 13 Aug 1929, P.W. Oman (1♀; KU). WASHINGTON: Columbia Co., Dayton, 15 May 1937, R.E. Williams (1♀; USNM). Whitman Co., Pullman, 21 May 1933–28 Oct 1949, R.D. Shenefelt, G.S. Batchelor, C.V. Piper (1♂, 3♀; WSU); Wawawai, 30 May 1921, A.L. Melander (1♀; USNM). WYOMING: Fremont Co., Union Pass Road, 17 Jul 1961, B.H. Poole (1♀; CNC). Johnson Co., Powder River, 1 Aug 1950, R.R. Dreisbach, R.K. Schwab (1♂; USNM). Niobrara Co., Lusk, 40 mi (64 km) N, Jul 1895 (1♀; KU).

DISTRIBUTION (Figure 93).—Widespread in western North America between 31° and 52° north latitude and between 101° and 120° west longitude.

HOST PLANTS.—Some of the specimens that Foote and Blanc (1963:34) recorded as reared from *Aster spinosus* and that we examined were misidentified and are *N. viridescens*. Other plants Wasbauer (1972:119) recorded as hosts for this species (*Aster spinosus, Chrysothamnus viscidiflorus, Corethrogyne filaginifolia* var. *incana, Corethrogyne filaginifolia* var. *virgata, Erigeron* sp., *Haplopappus Goodingii* (as *H. spinulosus turbinellus*), *Heterotheca villosa,* and *Machaeranthera canescens*) have not been confirmed.

REMARKS.—In the original description, Doane (1899) did not designate a holotype, nor did he state specifically whence the specimens of the syntype series came. He only mentioned that the syntypes comprised three males and two females. Subsequently, Foote (1966:122) designated one syntype, a female from Pullman, Washington, as the lectotype. The lectotype conforms with Doane's description in its large size and long ovipositor, but its distal tarsomeres are only slightly darker than the rest of the leg, a character that is distinctive for males of the species and sometimes difficult to detect in females. However, the other two characters are usually sufficient to characterize females. The smaller specimens in Doane's syntype series may belong to different species. The name of this species has been misapplied to several species, mainly from western United States.

10. *Neaspilota (Neorellia) callistigma*, new species

FIGURES 94–102, 194

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.10–3.15 mm.

Head (Figure 94): Distinctly higher than long; frontal-head ratio 0.49–0.54; frontal ratio 0.85–1.00; 1st flagellomere ratio 1.44–1.57; aristal-antennal ratio 1.16–1.27; haustellum shorter than antenna; major setae brown.

Thorax: As in *N. punctistigma*. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg (Figure 95) with comb transverse rather than longitudinal; claws about equally long. Wing (Figure 194): Pterostigmal ratio 2.44–3.00; crossvein ratio 1.50–2.25; apical sections of veins R_{4+5} and M almost straight; wing apex closer to end of vein M; wing mainly hyaline, pterostigma with a striking blackish brown spot, occupying basal 0.66–0.75, with apex yellow; costa, especially between ends of veins R_{2+3} and R_{4+5}, brown; other veins yellow; however, crossveins r-m and dm-cu, apices of veins R_{2+3}, R_{4+5}, and M slightly darker.

Abdomen: Yellow; epandrium and cerci as in Figures 96, 97; distiphallus as in Figure 98. Female: Tergal 6/5 ratio 0.66–0.88; tergal-oviscapal measure 2.0–2.5; oviscapal ratio 0.83–0.94; oviscape yellow, sometimes narrowly brownish at base; aculeus (Figures 99, 100) with broadly rounded, almost blunt, apex, with ventral valves extended laterally beyond margins of dorsal valve, with a distinct median dorsal carina; spermatheca as in Figure 101.

TYPE MATERIAL.—The male holotype is labeled "San Diego Calif[ornia] IV-23-20 [23 Apr 1920] E P Van Duzee/Donor E P Van Duzee." Allotype female is labeled "Jatama Beach Sta. Barn. Co. [Santa Barbara Co.] VII-9-1965 [9 Jul 1965] /E.M. Omi Collector/CIS/Neaspilota brunneostigmata Doane Det. F. L. Blanc '76." Other paratypes are as follows: MEXICO. BAJA CALIFORNIA: Ensenada, Jun 1952, N.L.H. Kruass (1♀; USNM). UNITED STATES. CALIFORNIA: Orange Co., 14 Jul 1929, R.H. Beamer (1♀; KU); San Clemente, 23 May 1944, A.L. Melander (1♂; USNM). San Diego Co., Coronado Island, 19 Sep 1937, R.H. Crandell (1♀; AMNH); La Jolla, 13 Jul 1941, B. Hogden (2♀; KU, USNM); La Mesa, 28 Sep 1958, P. Rude (1♂, 1♀; UCB); San Diego, 23 Apr 1920, E.P. van Duzee (1♂; CAS); San Ysidro, 6 Aug 1948, ex. *Haplopappus venetus* var. *vernonioides* (12♂, 7♀; CSDA, USNM). San Luis Obispo Co., Simmler, 14 mi (22.4 km) W, 7 Oct 1967, J. Powell (1♀; UCB). Santa Barbara Co., Jatama Beach, 9 Jul 1965, E.M. Omi (1♀; UCB). The holotype is pinned directly, is in good condition, and is deposited in the California Academy of Sciences, CAS 15709.

DISTRIBUTION (Figure 102).—Pacific coast of southern California and northern Baja California.

HOST PLANTS.—*Haplopappus venetus* (Humboldt, Bonpland, Kunth) Blake variety *vernonioides* (Nuttall) Haller (Foote and Blanc, 1963, as *N. signifera*, misidentification).

ETYMOLOGY.—The specific epithet, *callistigma*, is of Greek derivation and refers to the "beautiful" pterostigma.

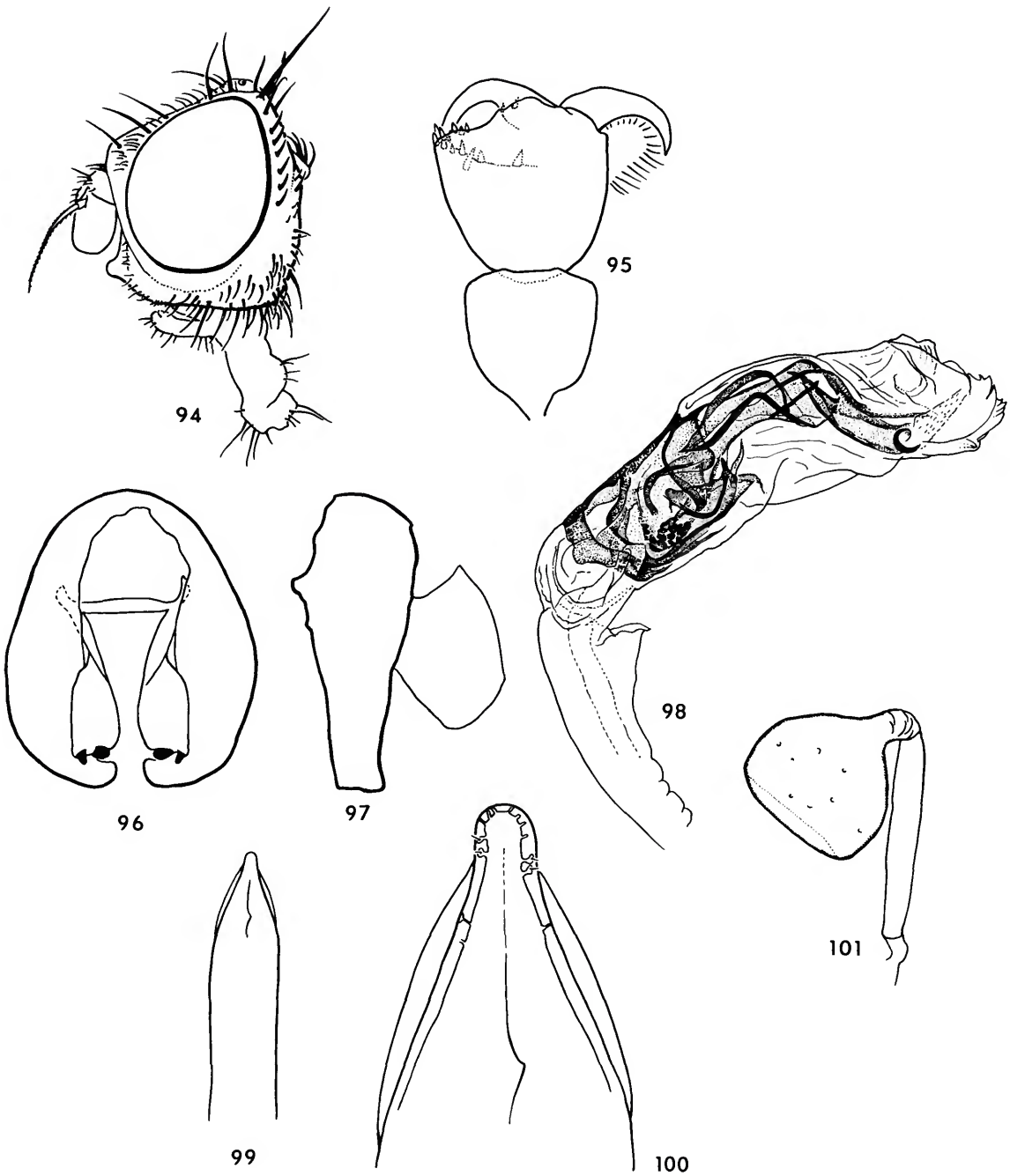
REMARKS.—This species can be readily distinguished from other congeners by its mostly blackish brown pterostigma, the apex of which is yellow. Males are characterized by having a transverse comb on the fifth tarsomere of the foreleg. In females, the aculeus has a very broadly rounded apex, a distinct dorsomedian carina, and the ventral valves are visible dorsally.

11. *Neaspilota (Neorellia) dolosa* Benjamin

FIGURES 103–111, 195

Neaspilota dolosa Benjamin, 1934:39.—Malloch, 1942:19–20 [key, discussion].—Phillips, 1946:116 [host list].—Quisenberry, 1949:84 [key].—Foote, 1965:672 [catalog].—Stegmaier, 1968:47 [discussion].—Wasbauer, 1972:119 [host list].

DESCRIPTION.—Resembling N. punctistigma but differing as follows: wing length 2.02 to 3.23 mm. Head (Figure 103): Slightly higher than



FIGURES 94–101.—*Neaspilota callistigma:* 94, head, lateral aspect; 95, male right foretarsus, dorsal aspect; 96, epandrium, posterior aspect; 97, epandrium and cerci, lateral aspect; 98, distiphallus; 99, aculeus, dorsal aspect; 100, same, enlarged apex; 101, spermatheca.

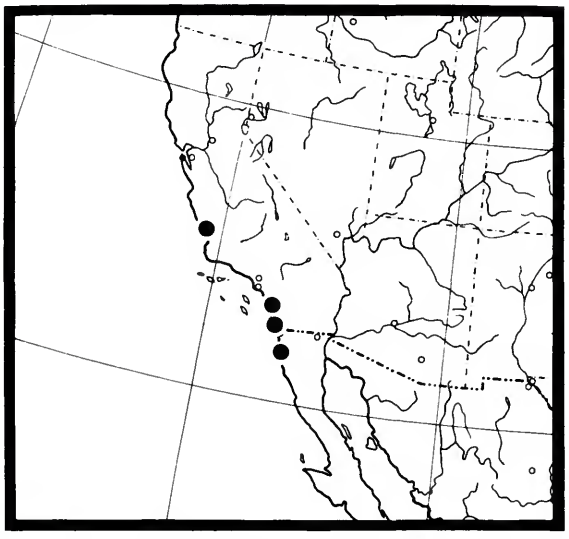
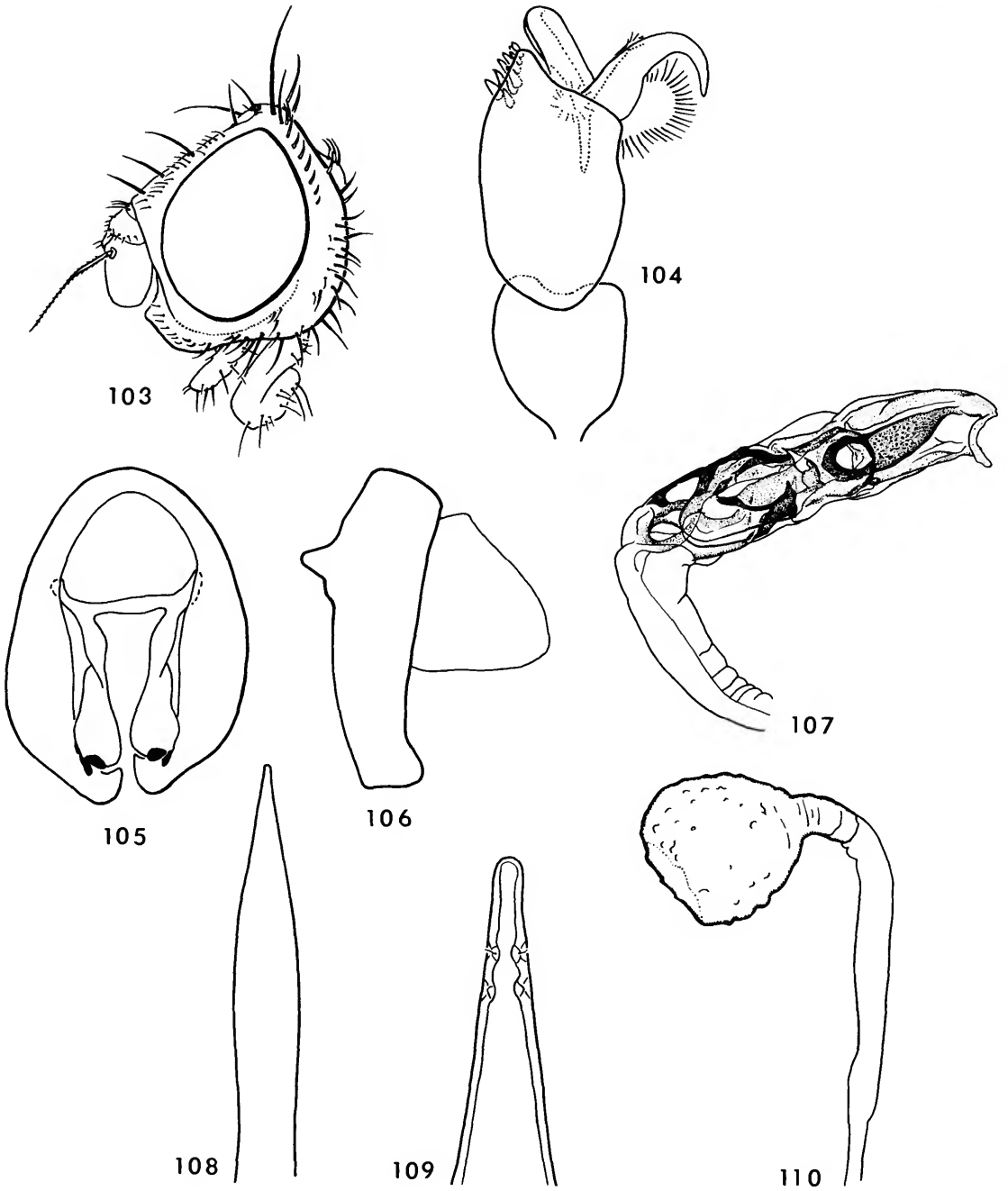


FIGURE 102.—Distribution map of *Neaspilota callistigma.*

long; frontal-head ratio 0.52–0.53; frontal ratio 0.90–0.98; 1st flagellomere ratio 1.40–1.86; aristal-antennal ratio 1.10–1.26; lower facial margin projecting about as much as frontofacial angle; major setae golden yellow, genal setae paler. Thorax: As in N. punctistigma. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; mid- and hindfemur of male with a small group of fine, long, yellow setae ventrally at base and a row of progressively shorter setae extended toward apex; setae in female much shorter, rather indistinct; comb of hindtibia indistinct; 5th tarsomere of male foreleg typically modified (Figure 104), with 2 rows of about 5–6 spines each. Wing (Figure 195): Pterostigmal ratio 3.00–3.45; crossvein ratio 1.16–1.47; wing including pterostigma usually entirely milky hyaline; pterostigma often opaque, yellowish, more so at base, sometimes pale brownish at basal; 1/2; veins yellow. Abdomen: Usually entirely yellow, terga 3–5, especially in male, sometimes with narrow blackish bands at anterior margin, not reaching lateral margin; epandrium and cerci as in Figures 105, 106; epandrium in profile slightly concave posteriorly, almost parallel-sided; distiphallus (Figure 107) with extremely short preapical tube, represented mainly by a sclerotized ring. Female: Tergal 6/5 ratio 0.85–1.22; tergal-oviscapal measure 2.5–3.8; oviscapal ratio 1.07–1.41; aculeus as in Figures 108, 109; spermatheca as in Figure 110.

Type Material.—The male holotype is labeled "Orlando 10 June 1930 Fl[orid]a. [date handwritten]/Bred from Heterotheca subaxillaris/D. J. Nicholson Coll./Type No. 54403 U.S.N.M. [red; number handwritten]." Allotype female with same label data except date, which is 13 June 1930 [Benjamin's original description states "14 June" as the collection date, the date on the specimen labeled as the allotype, however, is as noted above]. Benjamin (1934) and Malloch (1942) both stated that there are approximately 150 paratypes, all reared from *Heterotheca subaxillaris.* Most of these, however, are not labeled. The holotype is double mounted (minute nadel in cork block), is in good condition, and is deposited in the National Museum of Natural History, Smithsonian Institution, USNM 54403.

OTHER SPECIMENS EXAMINED.—MEXICO. TAMAULIPAS: Jimenez, 5 mi (8 km) S, 13 Feb 1969, D. Riley (1♂, 1♀; ISU); Matamoros, Tamps, 27 Sep 1954 (1♂; KU). UNITED STATES. ARKANSAS: Sevier Co., De Queen, 6 Jun 1951, L.D. Beamer (1♀; KU). FLORIDA: Alachua Co., Micanopy, 21 Jun–12 Jul 1930, ex. *Chrysopsis trichophylla* and *Heterotheca subaxillaris,* E.T. Evans, D.J. Nicholson (7♂, 11♀; USNM). Brevard Co., 21 Jun 1930, ex. *Pluchea foetida,* D.J. Nicholson (1♀; USNM); Bonaventure, 20 Jun 1930, Beavers (1♂; USNM); Cocoa, 16–24 Jun 1930, ex. *Heterotheca subaxillaris,* D.J. Nicholson (3♂, 5♀; USNM); Indian River City, 26 Mar–14 Apr 1930, ex. *Erigeron vernus,* D.J. Nicholson (2♂, 2♀; USNM); Rockledge, 14–17 Jun 1930, ex. *Chrysopsis,* A.B. Beavers (2♀; USNM). Broward Co., 14 May 1930, ex. *Chrysopsis,* D.J. Nicholson (1♂, 1♀; USNM); Hollywood, 15 May 1930, D.J. Nicholson (1♀; USNM); Hollywood, 3 mi (4.8 km) SW, 16 May 1930, ex. *Chrysopsis* sp., D.J. Nicholson (1♀; USNM). Dade Co., Miami, 16–19 May 1930, D.J. Nicholson (1♀; USNM); Opalocka [Opa Locka], 7–17 May 1930, ex. *Erigeron*



FIGURES 103–110.—*Neaspilota dolosa:* 103, head, lateral aspect; 104, male right foretarsus, dorsal aspect; 105, epandrium, posterior aspect; 106, epandrium and cerci, lateral aspect; 107, distiphallus; 108, aculeus, dorsal aspect; 109, same, enlarged apex; 110, spermatheca.

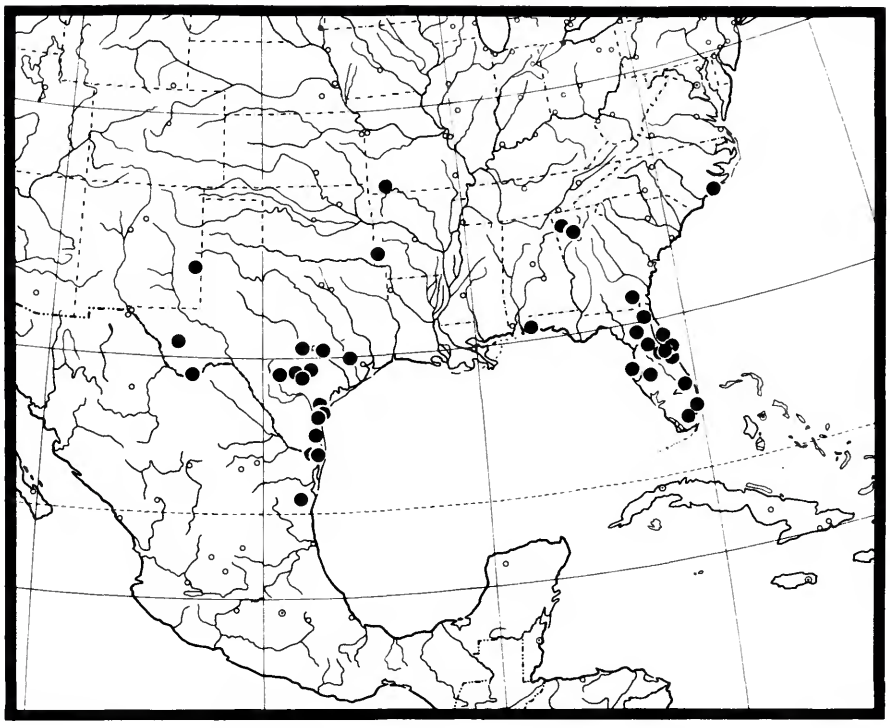


FIGURE 111.—Distribution map of *Neaspilota dolosa*.

vernus and *E.* sp., D.J. Nicholson (1♂, 1♀; USNM). Duval Co., Jacksonville, 14 Oct 1932, F.S. Blanton (2♂; BMNH, CAS). Escambia Co., Belleview, 14 Jul 1930, ex. *Heterotheca subaxillaris*, E.T. Evans, D.J. Nicholson (1♂, 1♀; USNM). Lake Co., Clermont, 20 Jun–2 Jul 1930, ex. *Heterotheca subaxillaris*, D.J. Nicholson (2♂, 3♀; USNM); Leesburg, 14 Jul 1930, ex. *Heterotheca subaxillaris*, E.T. Evans, D.J. Nicholson (2♂; USNM). Marion Co., Weirsdale, 12 Jul 1930, ex. *Heterotheca subaxillaris*, E.T. Evans, D.J. Nicholson (1♂; USNM). Martin Co., Indiantown, 5 Jun 1930, ex. *Pluchea foetida*, Beavers (1♀; USNM).

Orange Co., Fairvilla, 15–16 May 1930, ex. *Heterotheca subaxillaris*, Benjamin, Berry (2♂, 1♀; USNM); Fort Christmas, 1 May 1930, ex. *Erigeron vernus*, D.J. Nicholson (1♂; USNM); Lockart, 30 Jun–2 Jul 1930, ex. *Heterotheca subaxillaris*, D.J. Nicholson (2♂; USNM); Maitland, 5 Jul 1930, ex. *Heterotheca subaxillaris*, D.J. Nicholson (2♂; USNM); Orlando, 30 Oct 1929–14 Jul 1930, ex. *Chrysopsis trichophylla*, *Erigeron ramosus*, *E. vernus*, and *Heterotheca subaxillaris*, J.M. Aldrich, D.J. Nicholson, Williams, Benjamin, F.S. Blanton, E.T. Evans (58♂, 44♀; OHSU, ORSU, TAMU, TAU, USNM); Orlando, near Williams (3♀; USNM); Orlando, 7 mi (11.2 km) E, 7–9 Dec 1929, ex. *Chrysopsis mariana*, D.J. Nicholson (2♂, 1♀; USNM); St. Johns River, 28–29 Apr 1930, ex. *Erigeron vernus*, D.J. Nicholson (2♂, 1♀; USNM). Osceola Co., Deer Park, 29 Apr–2 May 1930, ex. *Erigeron vernus*, D.J. Nicholson (8♂, 5♀; USNM). Pasco Co., Jasamin Point, 2 Jun–7 Jul 1930, ex. *Sideranthus megacephalus*, D.J. Nicholson (3♂, 5♀; USNM); New Port Richey, 30 Jun–2 Jul 1930, ex. *Heterotheca subaxillaris*, D.J. Nicholson (2♂, 2♀; USNM). Polk Co., 1 May 1930, Polk, White (1♀; USNM). Seminole Co., Forest City, 12–30 Jul 1930, ex. *Chrysopsis trichophylla* and *Heterotheca subaxillaris*,

D.J. Nicholson (9♂, 10♀; USNM). Volusia Co., Cow Creek, 21 Mar 1930 (1♀; USNM). Rocky Point, 2 May 1930, ex. *Heterotheca subaxillaris*, D.J. Nicholson (1♂; USNM); Southern Florida, 12 May 1930, D.J. Nicholson (1♂, 1♀; USNM). Wilson, 2 May 1930, on *Helenium* sp., D.J. Nicholson (1♂; USNM). GEORGIA: Cobb Co., Marietta, 20 May 1965, R.C. Froeschner (1♀; USNM). Floyd Co., Morrison, Mar 1877 (1♀; NMW). Ware Co., Waycross, 22 Mar 1952, J.R. Vockeroth (1♀; CNC).

MISSOURI: Taney Co., Branson, 15–17 Sep 1939, E.C. Van Dyke (1♂, 1♀; CAS). NEW MEXICO: Roosevelt Co., Kenna, 9 Aug 1941, B. Hogden (1♀; KU). NORTH CAROLINA: Cartaret Co., Bogue Island, 17 Oct 1974, G.C. Steyskal (2♂, 1♀; USNM). TEXAS: Aransas Co., Rockport, 10 mi (16 km) N, 18 Apr 1952, on *Aster tanacetifolius*, C. Michener, Beamers, A. Wille, W. Laberge (2♂; KU). Bastrop Co., McDade, 10 May 1954, L.D. Beamer (1♂; KU). Bexar Co., San Antonio, 3 Apr 1942, A.L. Melander (6♂, 3♀; USNM). Brazos Co., College Station, 11 Jan–18 Sep 1927–1979, on *Monarda* sp., S.J. Merritt, H.J. Reinhard (2♂, 3♀; TAMU); Koppe's Bridge, Wellborn, 5 mi (8 km) SW, 22 Jun 1972, E.E. Grissell (1♂, TAMU). Brewster Co., Alpine, 28 Apr 1942, A.L. Melander (1♂; USNM); Big Bend National Park, Panther Jct., 7 May 1959, J.F. McAlpine (3♀; CNC); Boquillas area, 7 May 1959, J.F. McAlpine (CNC); Persimmon Gap, Big Bend National Park, 2 May 1959, L.J. Bottimer (4♂, 4♀; CNC). Caldwell Co., Lockhart, 4 mi (6.4 km) N, 27 Sep 1965, Asteraceae (1♀; USU); Luling, 4 mi (6.4 km) N, 27 Sep 1965, on *Chrysopsis viscida*, R.W. Thorp (1♂; CSDA). Cameron Co., Brownsville, Jun, ex. *Erigeron* sp., Bridwell (3♂, 5♀; USNM, KU); La Feria, 28 Mar 1951, L.D. Beamer (1♂; KU); Southmost, 13 Apr 1950, Beamers, Stephen, Michener, Rozens (1♀; KU). Galveston Co., Galveston, May–Jun 1900, F.H. Snow (6♂, 3♀; KU, USNM). Gillespie Co., Fredericksburg, 18 Apr 1959, on umbellifer, J.F. McAlpine (1♀; CNC). Gonzales Co., Palmetto State Park, 19 Apr 1963, M.G. Naumann (1♂; KU). Hidalgo Co., Anzaldus Dam, 15 Feb 1969, D. Riley (1♂; ISU); Donna, 1 Jul 1932–4 Apr 1933, J.W. Monk (3♂; FSCA).

Jeff Davis Co., Fort Davis, 10 mi (16 km) W near Point of Rocks, 2 Jun 1959, J.F. McAlpine (1♀; CNC). Kenedy Co., Raymondville, 20 mi (32 km) N, highway 77, 22 Apr 1984, G.J. Steck, T. Friedlander (1♂, 2♀; STECK, USNM). Medina Co., Hondo, 25 Apr 1942, A.L. Melander (2♂, 2♀; USNM). Nueces Co., Mustang Island, 23 Sep 1979, on *Heterotheca subaxillaris*, G. Steck (1♂, 3♀; STECK, USNM); Padre Island nr Pt. Aransas, 23 Mar 1965, J.G. Chillcott (2♂; CNC). Refugio Co., Tivoli, 5 mi (8 km) SW, 18 Apr 1952, on *Aster tanacetifolius*, Michener, Beamers, Wille, LaBerge (10♂, 2♀; KU). Robertson Co., Camp Colley, 16 Oct 1982, on *Heterotheca latifolia*, G. Tillman (2♀; TAMU); Camp Creek Lake, 3 mi (4.8 km) S, 17 May 1970, J.C. Schaffner (1♂; TAMU); New Clarkson, 7 Jan 1982, on *Heterotheca latifolia*, G. Tillman (1♂; TAU). Terrell Co., Sanderson, 28–29 Apr 1959, W.R.M. Mason, J.F. McAlpine (4♀; CNC). Travis Co., Austin, 11 mi (17.6 km) W, Heep Farm, 28 Jun 1972, E.E. Grissell (1♂; TAMU); Barton Creek, 15 Sep 1979, on *Heterotheca latifolia*, G. Steck (5♂, 4♀; STECK, USNM). Victoria Co., Victoria, 9 Jul 1908–3 Jun 1910, on *Cassia* sp., J.D. Mitchell (1♂, 3♀; USNM). Wilson Co., Stockdale, 8 mi (12.8 km) S, 23 Sep 1979, on *Heterotheca latifolia*, G. Steck (4♂, 4♀; STECK, USNM). Texas, Belfrage (1♂; HU). Banos, 16 Sep 1938, L.S. Jones (2♀; USNM).

DISTRIBUTION (Figure 111).—North Carolina westward to east-central New Mexico, southward to northeastern Mexico and Florida (24° to 37° north latitude, 77° to 103° west longitude).

HOST PLANTS.—*Aster tanacetifolius* (needs confirmation), *Chrysopsis latifolia* (as *Heterotheca latifolia*, needs confirmation), *C. mariana*, *C. trichophylla*, *C. viscida* (needs confirmation), *C.* sp., *Erigeron strigosus* (as *E. ramosus*), *E. strigosus* var. *Beyrichii* (Stegmaier, 1968:47), *E. nudicaulis* (as *E. vernus*), *E.* sp. (Wasbauer, 1972:119), *Heterotheca Lamarckii* (as *H. subaxillaris*), *Pluchea foetida* (only one specimen reared, needs confirmation), *Sideranthus megacephalus*.

REMARKS.—This species is distinguished from congeners by the lack of a distinct hindtibial comb in both sexes and by having long, ventral setae on the mid- and hindfemora of males. The latter character is also common to *N. isochela,* but the two species are distinguished by the conformation of the male foretarsi. In *N. dolosa* the foretarsus is distinctly asymmetrical; while in *N. isochela* it is symmetrical. The length of the female oviscape also distinguishes the two species. In *N. dolosa* the tergal-oviscapal measure is 2.5 to 4.0, whereas it is 4.5 to 5.0 in *N. isochela.*

Owing to variation in the pterostigmal coloration, this species is sometimes difficult to distinguish. In such cases, leg characters are useful, especially in conjunction with genital characters, of which the distiphallus (Figure 107) is the most typical.

12. *Neaspilota (Neorellia) footei,* new species

FIGURES 112–120, 196

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.55 to 3.53 mm.

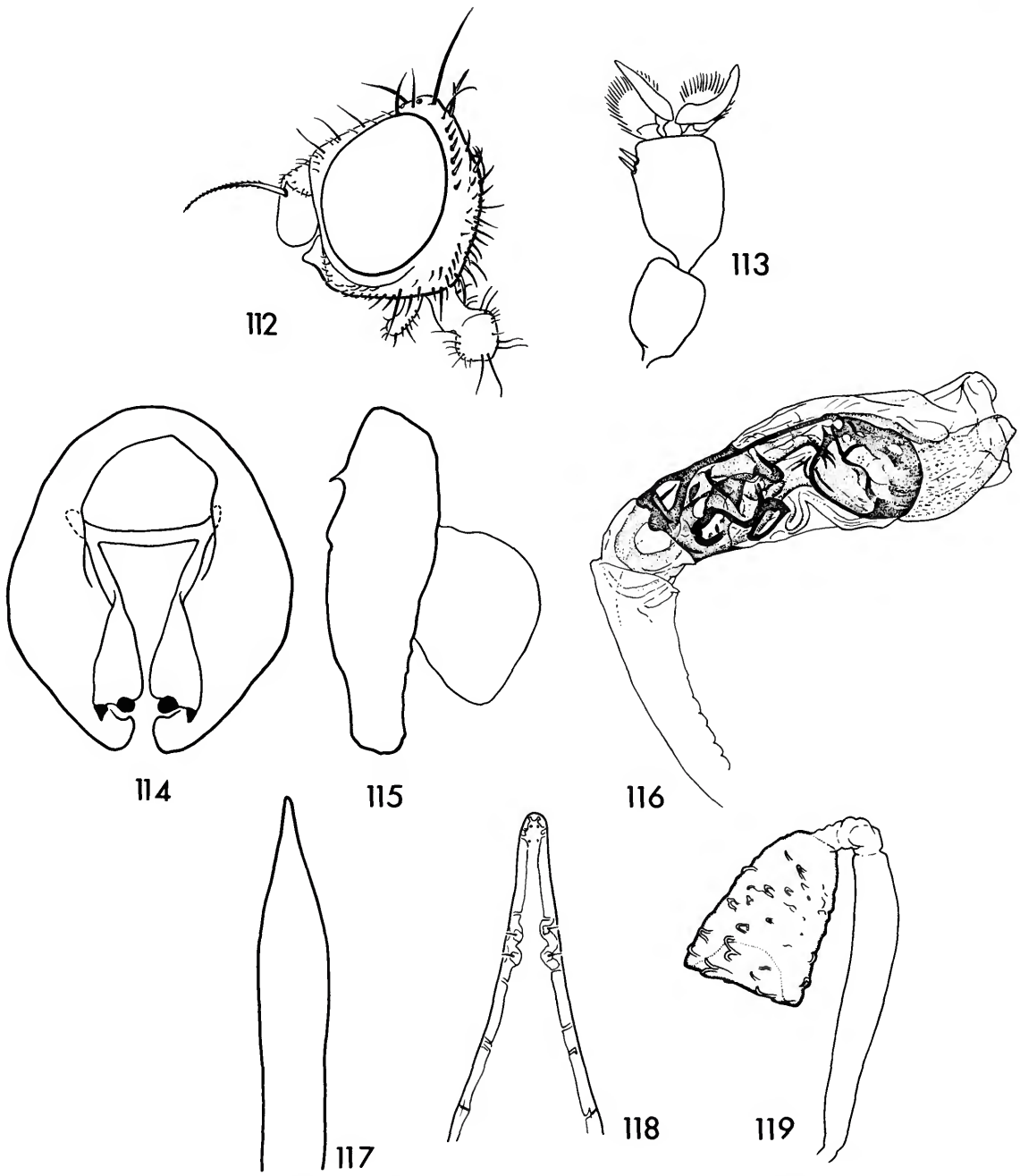
Head (Figure 112): Distinctly higher than long; frontal-head ratio 0.52–0.56; frontal ratio 0.79–0.85; 1st flagellomere ratio 1.43–1.71; aristal-antennal ratio 1.13–1.35; parafacial narrower; haustellum shorter than antenna; major setae pale brown.

Thorax: As in *N. punctistigma* but with dorsocentral setae often transversely aligned slightly anterior of anterior supra-alar setae. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg (Figure 113) almost symmetrical, with 1–2 elongate spines anteroapically, with symmetrical claws and pulvilli; tarsi occasionally darker than remaining structures. Wing (Figure 196): Pterostigmal ratio 2.55–3.66; crossvein ratio 1.59–2.00; wing milky hyaline, with pale yellow to brownish pterostigma; veins yellow, becoming more brownish toward apex, especially so the costa.

Abdomen: Yellow, terga 3–5 in male, 3–6 in female with more or less broad black bands at anterior part, sometimes leaving only narrow yellow posterior margins; bands less distinct, narrower or more often lacking in female; epandrium and cerci as in Figures 114, 115; distiphallus (Figure 116) without distinct apical tube. Female: Tergal 6/5 ratio 0.86–1.15; tergal-oviscapal measure 2.5–3.8; oviscapal ratio 1.06–1.30; aculeus as in Figures 117, 118; spermatheca (Figure 119) rather oblong, with rough surface.

TYPE MATERIAL.–The male holotype is labeled "V1RG1N1A Frederick Co. White Hall 14 V 1979 [14 May 1979] A Freidberg." Allotype female and 6 paratypes (4♂, 2♀; BMNH, USNM) are from Suffolk Co., Babylon, Long Island, 23 Sep 1933–26 Sep 1935, F.S. Blanton, Borders. Other paratypes are as follows: CANADA. ONTARIO: Simcoe, 14 Jun 1939, G.E. Shewell (1♂; CNC). SASKATCHEWAN: East Evan, Aug 1929, P.C. Brown (1♀; CNC); Indian Head, 8 Aug 1939, C.R. Douglas (1♂; CNC); Pheasant City, 13 Jul 1937, A.R. Brooks (1♂, CNC). UN1TED STATES. ALABAMA: Mobile Co., Kushla, Sep 1929 (1♂; USNM). CALIFORNIA: Alpine Co., 3 mi (4.8 km) W Hwy 395 on 89, 24 Aug 1976, ex. *Chrysothamnus* sp., A.J. Gilbert, D. Griffin (1♂; CSDA). Los Angeles Co., Angeles National Forest, Windy Spring, 27 Jun 1974, D.D. Wilder (2♂; ORSU). CONNECTICUT: Fairfield Co., Redding, 3 Aug 1931, A.L. Melander (1♂; USNM). GEORGIA: Muscogee Co., Columbus, 18 Aug 1938, D.G. Hall (1♀; USNM). Rabun Co., Rabun Bald, 16 Jul 1957, J.G. Chillcott (1♂; CNC). Towns Co., Brasstown Bald Mt., 19 Aug 1957, J.G. Chillcott (1♂, 2♀; CNC). MARYLAND: Montgomery Co., Takoma Park, Sep 1920, W.A.S. (1♀; KU). MASSACHUSETTS: Barnstable Co., East Falmouth, 22 Aug 1924 (2♂; USNM); Woods Hole, 6 Jun–Aug 1923 (1♂, 2♀; USNM).

NEW YORK: Nassau Co., Farmingdale, 1 Aug 1932, ex. *Erigeron pusillus,* F.S. Blanton (1♂; USNM). Suffolk Co., Cold Spring Harbor, 24 Jul 1900–4 Aug 1927, A.L. Melander (2♀; AMNH, USNM). NORTH CAROLINA: Jackson



FIGURES 112–119.—*Neaspilota footei:* 112, head, lateral aspect; 113, male right foretarsus, dorsal aspect; 114, epandrium, posterior aspect; 115, epandrium and cerci, lateral aspect; 116, distiphallus; 117, aculeus, dorsal aspect; 118, same, enlarged apex; 119, spermatheca.

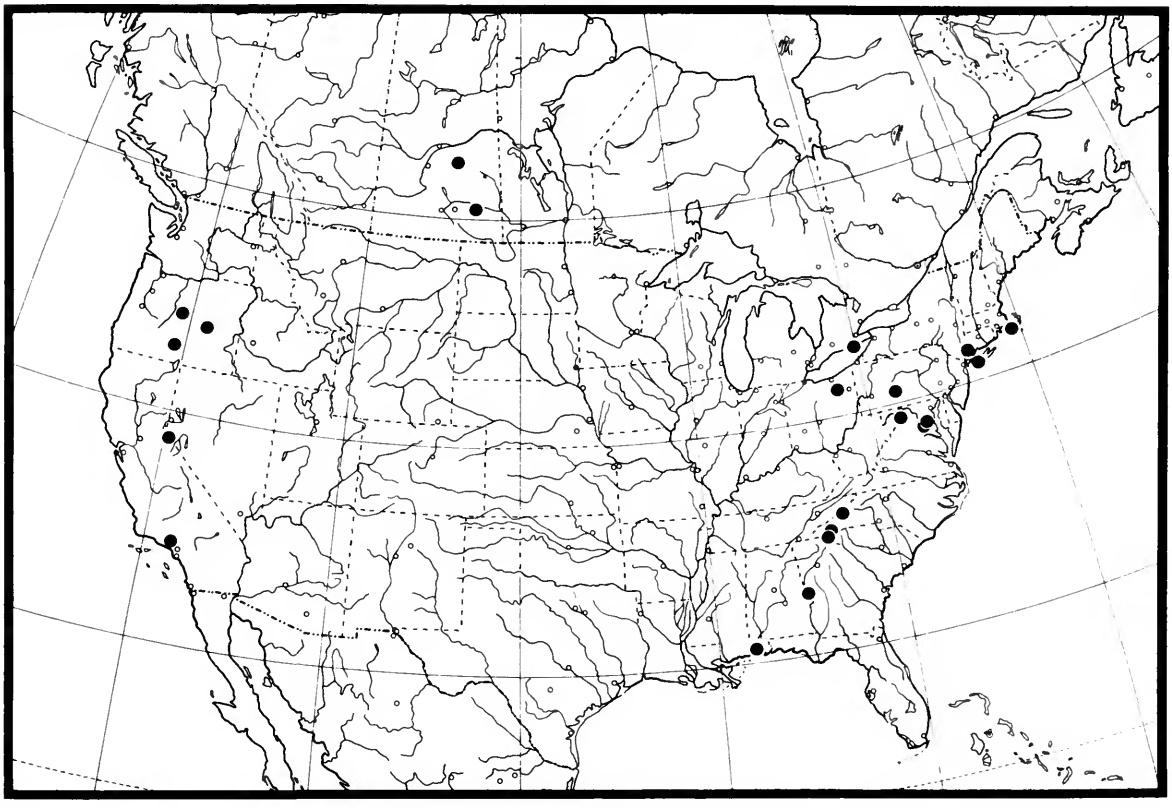


FIGURE 120.—Distribution map of *Neaspilota footei.*

Co., Glenville, 5 Aug 1957, W.R. Richards (1♂; CNC). Macon Co., Highlands, 14–18 Jul 1957, W.R. Richards, J.G. Chillcott (2♂; CNC); Wayah Bald, base of, 11 Aug 1957, W.R. Richards, (1♂; USNM). Mitchell Co., Roan Mountain, 13 Aug 1957, J.G. Chillcott (1♀; CNC). Yancey Co., Mt. Mitchell, 12 Jul 1957, J.G. Chillcott (2♂; CNC). OHIO: Summit Co., 24–28 Aug 1937, L.J. Lipovsky (2♂; KU). OREGON: Crook Co., Ochoco Summit, 14 Aug 1971, P. Oman (1♂; ORSU). Grant Co., Seneca, 2 mi (3.2 km) S, 14 Aug 1971, P. Oman (2♂, 2♀; ORSU). Lake Co., Summer Lake, 16 Aug 1939, Gray and Schuh (1♂; ORSU). PENNSYLVANIA: Huntingdon Co., Cornpropsts Mills, 10 Jul 1973 (1♀; CAS). VIRGINIA: Frederick Co., White Hall, 14 May 1979, A. Freidberg (1♂; TAU). Independent City, Falls Church, 18 May (1♀; MCZ). Virginia, Kearney, 25 May 1936, J.C. Bridwell (2♂, 1♀; USNM). The holotype is double mounted (minute nadel in foam rectangular block), is in excellent condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.

DISTRIBUTION (Figure 120).—The known distribution of this species forms a wide, inverted U, i.e., along both coasts and across southern Canada (Canada: Ontario, Saskatchewan. United States: Alabama, California, Connecticut, Georgia, Maryland, Massachusetts, New York, North Carolina, Ohio, Oregon, Pennsylvania, Virginia).

HOST PLANTS.—*Erigeron canadensis* (as *E. pusillus*), and *Chrysothamnus* sp.

ETYMOLOGY.—The specific epithet, *footei,* is a Latinized patronym to honor and recognize our colleague and friend, Dr. Richard H. Foote, for

his numerous contributions to the study of fruit flies generally and to this revision specifically.

REMARKS.—Recognition of females of this species is rather difficult, unless they are associated with males. The following combination of characters is useful for identifying females: abdomen usually banded and pterostigma yellowish, together with oblong spermathecae. Males are more easily characterized, using the external characters of the female as well as the almost symmetrical foretarsus and the lack of a tube in the distiphallus.

Although the distribution of this species, as compared to others of the genus, is suspect, we could find no significant differences between the eastern and western populations. The distributional pattern, however, could be an artifact, resulting from insufficient collecting in the Midwest and central-south United States.

13. *Neoaspilota (Neorellia) isochela*, new species

FIGURES 121–129, 197

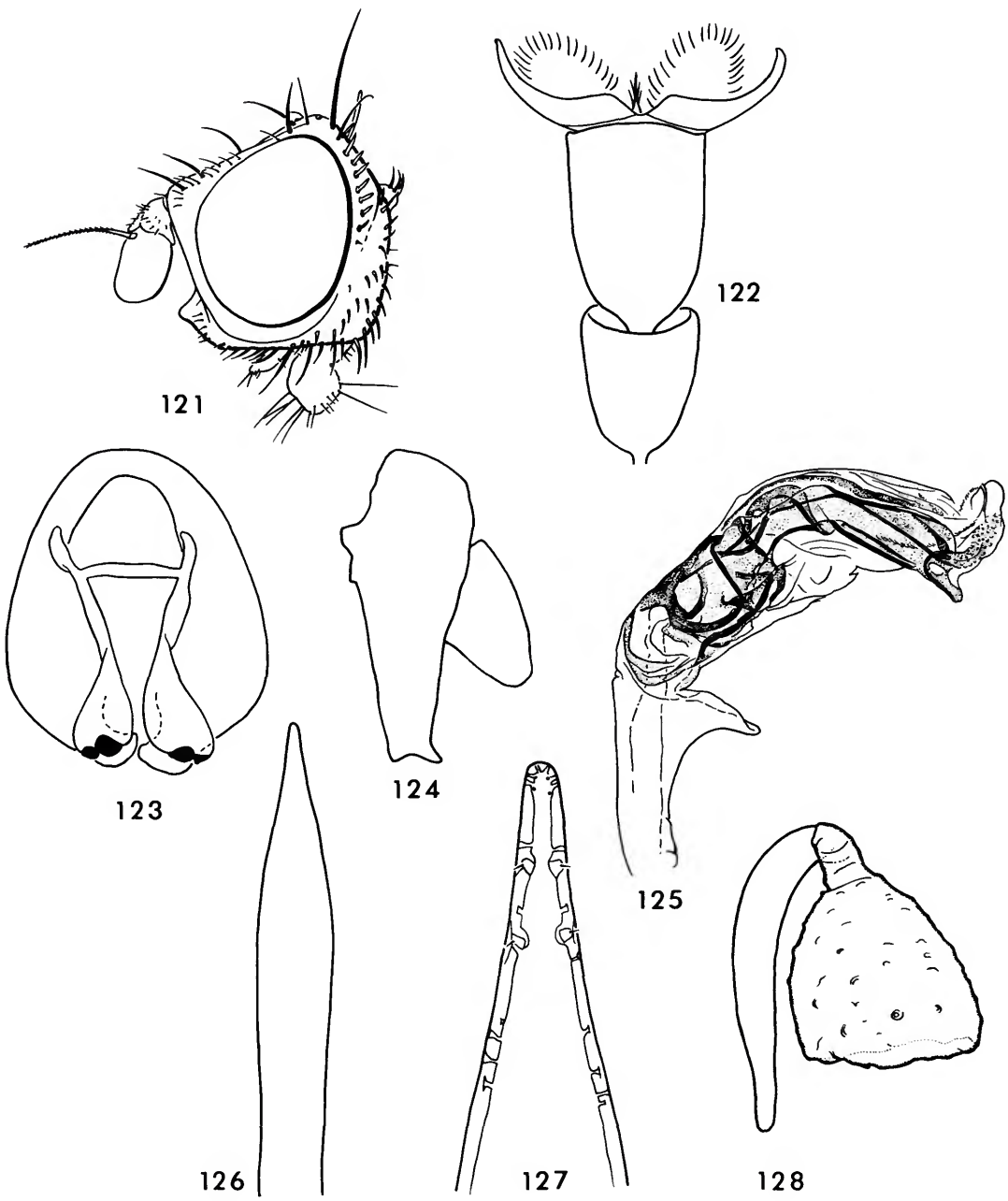
DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.63 to 3.60 mm.

Head (Figure 121): Frontal-head ratio 0.55–0.58; frontal ratio 0.77–0.97; 1st flagellomere ratio 1.46–1.73; aristal-antennal ratio 1.05–1.27; major setae brownish yellow, genal seta paler.

Thorax: Dorsocentral setae transversely aligned with or slightly anterior of anterior supra-alar setae: setae brownish yellow, anepimeral seta paler. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; forefemur of male with sparse, long setae ventrally at basal half; hindfemur with moderately short setae ventrally; comb of hindtibia indistinct; 5th tarsomere of male foreleg including claws and pulvilli symmetrical (Figure 122); claws and pulvilli relatively large. Wing (Figure 197): Pterostigmal ratio 2.86–3.66; crossvein ratio 1.36–2.20; veins R_{4+5} and M almost straight; wing apex closer to end of vein M; wing milky hyaline, with yellowish pterostigma and veins; pterostigma sometimes with a brownish tinge at base.

Abdomen: Yellow, rarely with short, narrow blackish bands at anterior margin of terga 3–5; epandrium and cerci as in Figures 123, 124; epandrium with a posteroventral short and pointed projection; prensisetae short and broad; distiphallus (Figure 125) with rather long, double tube and well-developed "preaedeagal" flap. Female: Tergal 6/5 ratio 0.86–1.10; tergal-oviscapal measure 4.5–5.2; oviscapal ratio 1.43–1.59; aculeus as in Figures 126, 127; spermatheca as in Figure 128.

TYPE MATERIAL.—The male holotype is labeled "Hunter No 1014/Bred Sideranth. rubignos. head/W4 3b. 10/4 [handwritten]/MexiaTex[as] IX 29 1903 [29 Sep 1903]/Neaspilota alba Loew." Allotype female is labeled with the same locality and host plant data as the holotype, but the date is "10 Oct 1905" and "On" is substituted for "Bred." Other Paratypes are as follows: UNITED STATES. FLORIDA: Levy and Citrus Cos., Yankeetown, 31 Jul 1930, R.H. Beamer (2♂; KU). ILLINOIS: Morgan Co., Meredosia, 28 May 1917 (1♂; TAU). TEXAS: Brewster Co., Chicos Mountains, Basin, 6000 ft (1800 m) elevation, Big Bend National Park, 29–30 Apr 1959, J.F. McAlpine (1♂; CNC); Persimmon Gap, Big Bend National Park, 2 May 1959, L.J. Bottimer (1♂, 1♀; CNC). Caldwell Co., Luling, 2 mi (3.2 km) S, 11 Jun 1953, on corn (1♂; KU). Dallas Co., Dallas, 16 Jul–19 Sep 1905–1954, J.G. Chillcott, C.R. Jones (2♂; CNC, USNM). Donley Co., Clarendon, 31 Jul 1909 (emerged 4–14 Aug), ex. *Chrysopsis* sp., Safro (4♂, 5♀; USNM). Ellis Co., Ennis, 21 Sep 1905, on *Sideranthus rubiginosus*, (2♂, 1♀; USNM). Jeff Davis Co., Davis Mountains, 30 Apr 1954, L.D. Beamer (1♀; KU). Limestone Co., Mexia, 29 Sep 1903, ex. *Sideranthus rubiginosus*, Hunter (3♂, 4♀; BMNH, USNM). Terrell Co., Sanderson, 28–29 Apr 1959, J.F. McAlpine, W.R.M. Mason (2♀; CNC). Uvalde Co., Uvalde, 14 Apr 1952, Michener, Beamers, Wille, LaBerge (1♂; KU). Wichita



FIGURES 121–128.—*Neaspilota isochela:* 121, head, lateral aspect; 122, male right foretarsus, dorsal aspect; 123, epandrium, posterior aspect; 124, epandrium and cerci, lateral aspect; 125, distiphallus; 126, aculeus, dorsal aspect; 127, same, enlarged apex; 128, spermatheca.

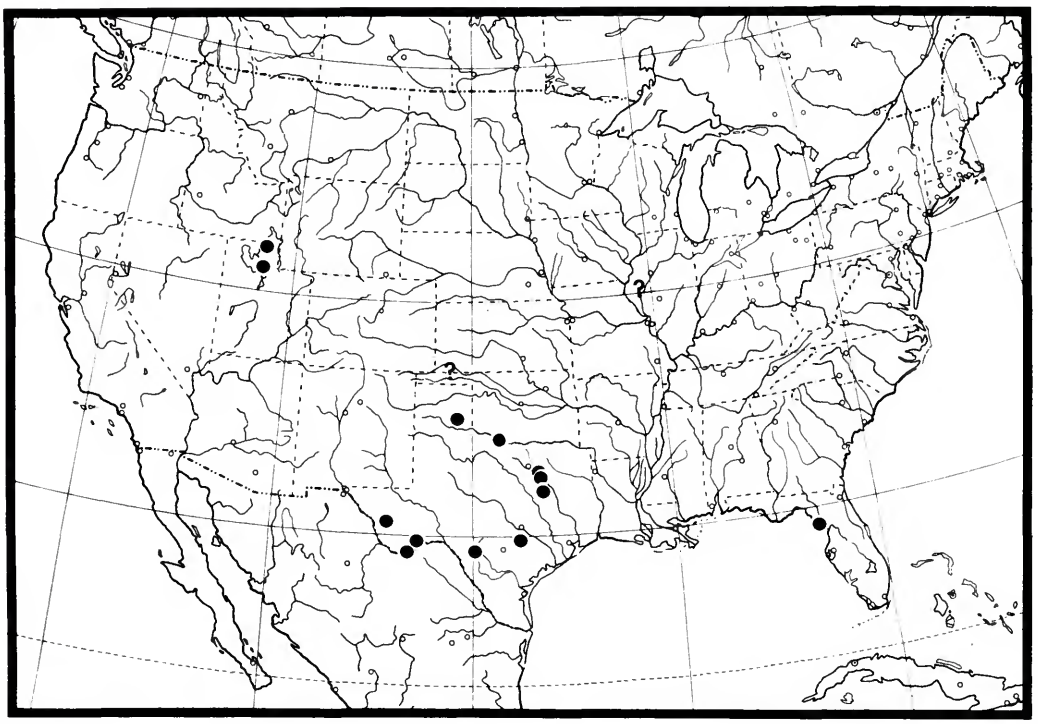


FIGURE 129.—Distribution map of *Neaspilota isochela.*

Co., Electra, 9 mi (14.4 km) N, 27 Jun 1948, C. and P. Vaurie (1♂; AMNH).

UTAH: Cache Co., Logan Canyon, 26 Aug 1961, on *Grindelia* sp., G.F. Knowlton (1♂; KU). Davis Co., Farmington, 4 Sep 1934, G.F. Knowlton, C.F. Smith (1♂; AMNH). The holotype is double mounted (glued to a paper point), is in good condition, and is deposited in the National Museum of Natural Hisory, Smithsonian Institution.

OTHER SPECIMENS EXAMINED.—KANSAS: Seward Co., Liberal, 16 Aug 1945, R.H. Beamer (1♂; KU). NEBRASKA: Keith Co., Paxton, 6 mi (9.6 km) N, 5 Jul 1972, W.B. Stoltzfus (1♀; ISU). Although both of these specimens are probably determined correctly, we cannot be entirely sure, but for different reasons. The first specimen listed is in poor condition, especially its foretarsi, which are entangled in the mounting glue. Thus we cannot see this important character. The female has a tergal-oviscapal measure between this species and *N. dolosa*. Thus again, we are not entirely confident of its identity. Both specimens are also at the border of the known distribution of this species. For these reasons we have elected not to include them in the paratype series.

DISTRIBUTION (Figure 129).—United States, Florida westward through Texas to Utah, northward to Nebraska (?).

HOST PLANTS.—*Chrysopsis* sp., *Grindelia* sp. (needs confirmation), and *Sideranthus rubiginosus.*

ETYMOLOGY.—The specific epithet, *isochela,* is of Greek derivation and refers to the symmetrical claws of the male foretarsus.

REMARKS.—Both sexes of this species are distinguished from congeners by the yellow abdomen and pterostigma. In addition, males have symmetrical foretarsi, including the claws and pulvilli; their mid- and hindfemora have long

ventral setae; and the hindtibia lacks a distinct comb. Females have the longest oviscape in the genus when compared with the preabdomen, averaging five terga.

Most collection records are from Texas, but the species is also recorded from Florida, Kansas, and Utah.

14. *Neaspilota (Neorellia) pubescens*, new species

FIGURES 130–138, 198

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.45–2.90 mm.

Head (Figure 130): Considerably higher than long; frontal-head ratio 0.54–0.56; frontal ratio 0.75–0.85; 1st flagellomere ratio 1.38–1.85; aristal-antennal ratio 1.11–1.18; parafacial narrower; haustellum shorter than antenna; major setae pale brown, external vertical and genal setae whitish, upper orbitals and internal vertical setae occasionally whitish.

Thorax: Dorsocentral setae transversely aligned slightly behind anterior supra-alar setae; mesonotum with setulae arranged in 5 longitudinal rows, including median, dorsocentral and lateral rows, most obvious from anterior view; few or no setulae between rows; microtomentum along the stripes more whitish, otherwise yellowish; setae on dorsum pale brown, setae on pleura whitish. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg (Figure 131) with an anterobasal spinose projection, with comb rather reduced, with anterior claw distinctly larger than posterior claw. Wing (Figure 198): Pterostigmal ratio 2.83–3.60; crossvein ratio 1.79–2.00; veins R_{4+5} and M straight or slightly curved posteriorly, wing apex equidistant from ends of both veins; wing mainly hyaline, with basal 0.33–0.66 of pterostigma brown, with apex of pterostigma yellowish; border between brown and yellow diffused; veins mainly yellow, crossveins r-m and dm-cu and distal sections of longitudinal veins brownish or brown.

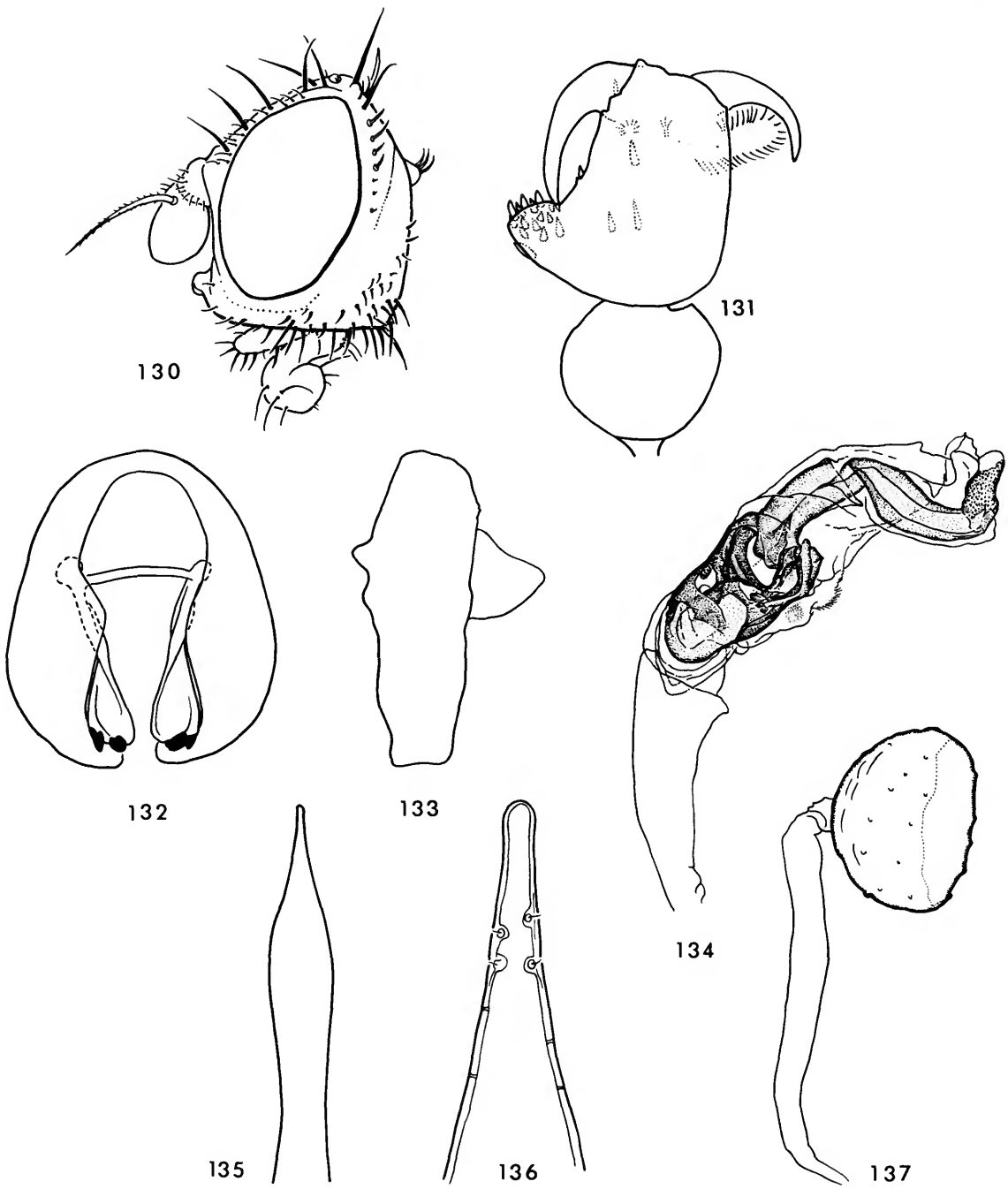
Abdomen: Mainly yellow; terga 4–5 in male, 4–6 in female with narrow brownish band at anterior margin, often interrupted in middle; abdomen relatively strongly shining; epandrium and cerci as in Figures 132, 133; distiphallus as in Figure 134. Female: Tergal 6/5 ratio 0.53–0.88; tergal-oviscapal measure 2.5–3.2; oviscapal ratio 0.91–1.14; oviscape yellow, somewhat brownish dorsally at base and apex; aculeus as in Figures 135, 136; spermatheca (Figure 137) wider than long.

TYPE MATERIAL.—The male holotype is labeled "Barton Flat SoForkCamp 12/9/44 [12 Sep 1944] CAL[ifornia] ALMelander/ALMelander Collection 1961 [right ⅓ of label stippled green]." Allotype female is labeled with the same label data. Other paratypes are as follows: UNITED STATES. CALIFORNIA: Los Angeles Co., Claremont, Baker (3♂, 1♀; CAS, MCZ, USNM). Monterey Co., Gavilan Hill, 1–6 Oct 1952, A.L. Melander (1♂, 6♀; USNM). Riverside Co., park near Idyllwild, 2 Sep 1959, P.A. Rude (1♀; UCB); Upper Santa Ana River, 21 Sep 1949, A.L. Melander (1♂; USNM). San Bernardino Co., Barton Flats, S Fork Camp, 9 Dec 1944, A.L. Melander (1♂, 1♀; USNM); Camp Angelus, 22 Aug 1953, A.L. Melander (1♀; USNM). San Diego Co., La Mesa, 1 Jun–15 Sep, 1958, 1962, P.A. Rude (1♂, 1♀; UCB); Mt. Home, 18 Aug 1947, A.L. Melander (♀; USNM); Ortega Highway El Cariso, 19 Oct 1944, A.L. Melander (1♂; USNM). San Luis Obispo Co., San Luis Obispo, 26 Sep 1934, A.L. Melander (1♀; USNM). The holotype is double mounted (minute nadel in paper base), is in good condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.

DISTRIBUTION (Figure 138).—Southern California south of 35° north latitude and west of the Sierra Nevada Mountains.

HOST PLANTS.—UNKNOWN. ETYMOLOGY.—The specific epithet, *pubescens,* is of Latin derivation and refers to the five longitudinal patches of setulae on the mesonotum.

REMARKS.–This species is distinguished from congeners by the five longitudinal patches of



FIGURES 130–137.—*Neaspilota pubescens:* 130, head, lateral aspect; 131, male right foretarsus, dorsal aspect; 132, epandrium, posterior aspect; 133, epandrium and cerci, lateral aspect; 134, distiphallus; 135, aculeus, dorsal aspect; 136, same, enlarged apex; 137, spermatheca.

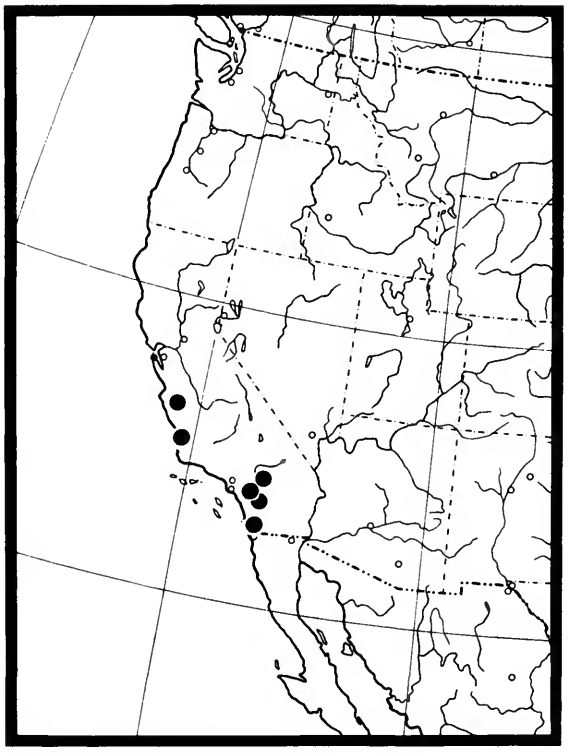


FIGURE 138.—Distribution map of *Neaspilota pubescens.*

setulae on the mesonotum. If the setulae have been rubbed off, specimens are still recognizable, as the areas bearing the patches of setulae are generally silvery gray microtomentose. Moreover, the abdomen is shinier than most species of the genus, and some of the usually dark cephalic setae are often whitish. The male foretarsus has an anterobasal, spinose projection on the fifth tarsomere, apparantly a unique character.

15. *Neaspilota (Neorellia) punctistigma* Benjamin

FIGURES 139–148, 199

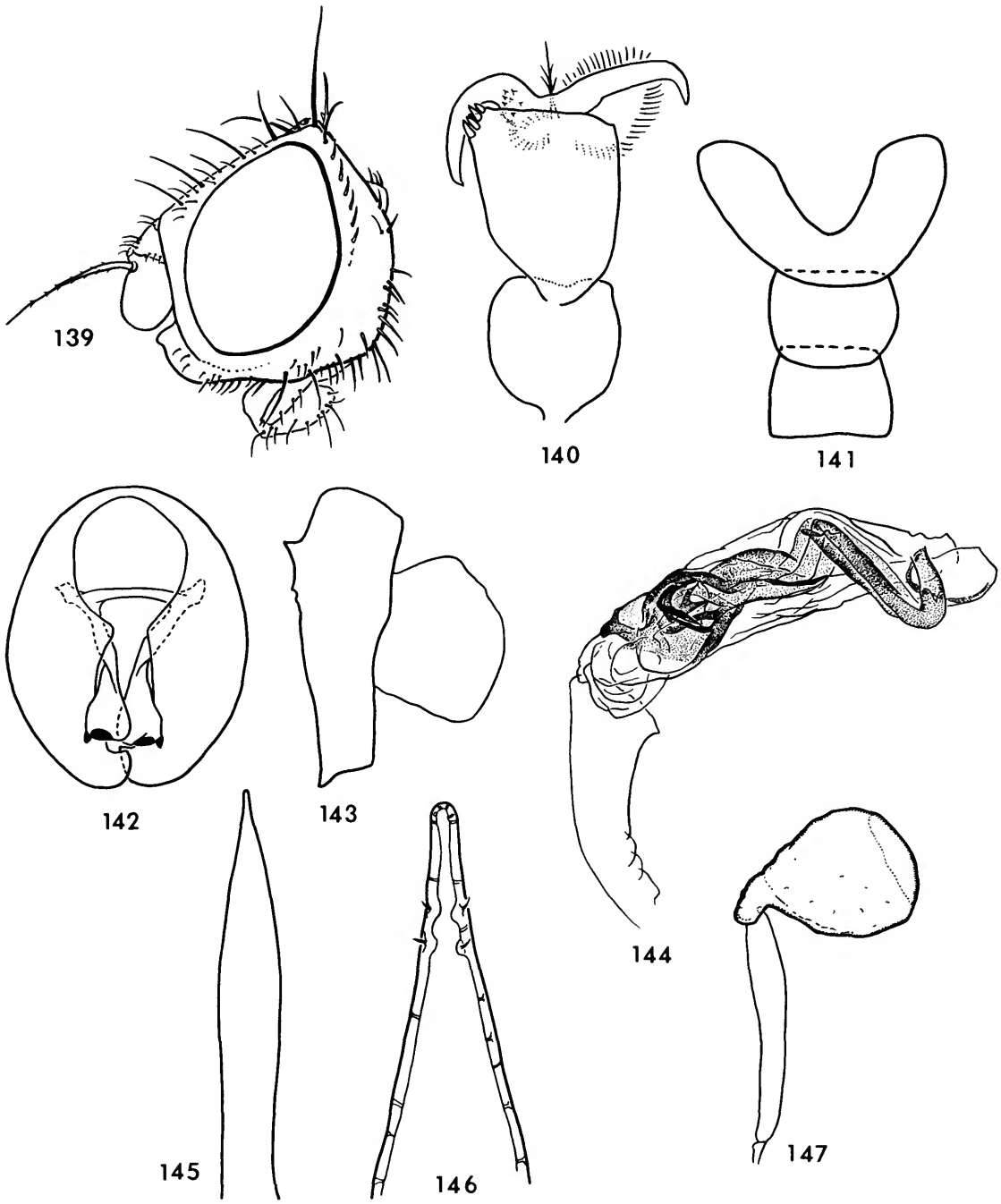
Neaspilota punctistigma Benjamin, 1934:38.—Malloch, 1942:19 [key, discussion].—Phillips, 1946:116 [host list].—Quisenberry, 1949:84 [key].—Foote, 1965:672 [catalog].—Wasbauer, 1972:119 [host list].

DESCRIPTION.–Wing length 1.95 to 3.08 mm. *Head* (Figure 139): About as long as high; frontal-head ratio 0.49–0.53; frontal ratio 1.05–1.10; 1st flagellomere ratio 1.38–1.66; aristal-antennal ratio 1.06–1.42; parafacial 0.25; gena 0.5 as wide as antenna; lower facial margin projecting anterior of frontofacial angle; haustellum about as long as antenna; labella shorter; major setae golden yellow, genal seta paler.

Thorax: Dorsocentral setae about transversely aligned with anterior supra-alar setae; pattern on mesonotum and other dark spots on thorax normal, with normal microtomentum and setulae; anepimeral seta paler than other major setae. Legs: Mid- and hindfemur lacking well-developed ventral setae; hindfemur with 1–2 semierect anterodorsal setae preapically; 1 posterodorsal seta and 2–3 small anteroventral setae; hindtibia with well-developed comb and posteroventrally with 2, sometimes 1, semierect setae preapically; setae of female slightly smaller than those of male; 5th tarsomere of male foreleg (Figure 140) with tarsal comb short, consisting of 2 rows of 4 spines each; posterior pulvillus rudimentary but distinct. Wing (Figure 199): Pterostigmal ratio 2.86–3.50; crossvein ratio 1.76–2.00; apical sections of veins R_{4+5} and M slightly curving posteriorly; wing apex about equidistant from ends of both veins; wing mainly hyaline; pterostigma with a squarish brown spot at basal 0.33, usually not quite reaching vein R_1, sometimes rather pale; veins yellow.

Abdomen: Yellow with large black spots on terga, leaving narrow yellow posterior and lateral margins; tergum 1 usually mainly yellow; sterna of male as in Figure 141; epandrium and cerci as in Figures 142, 143; epandrium with an anteroventral, short, and pointed projection; distiphallus (Figure 144) with long, sinuous double tube. Female: Tergal 6/5 ratio 1.00–1.44; tergal-oviscapal measure 2.5–3.2; oviscapal ratio 1.04–1.21; aculeus as in Figures 135, 136; spermatheca (Figure 137) invaginated, with a surface slightly and finely roughened.

TYPE MATERIAL.—The male holotype is labeled "Ft. Christmas 4 mi E 6–14–1930 [14 Jun 1940] Fl[orid]a. ["4 mi E" and date handwritten] /Bred from Pulchea [sic, Pluchea] foetida/D. J. Nicholson Coll./Type No. 54402 U.S.N.M. [red;



FIGURES 139–147.—*Neaspilota punctistigma:* 139, head, lateral aspect; 140, male right foretarsus, dorsal aspect; 141, male sterna 3–5, ventral aspect; 142, epandrium, posterior aspect; 143, epandrium and cerci, lateral aspect; 144, distiphallus; 145, aculeus, dorsal aspect; 146, same, enlarged apex; 147, spermatheca.

number handwritten]/punctistigma Type Benj [yellow; apparently handwritten by Malloch]." There is no specimen in the USNM with label data as cited by Benjamin, although a female bearing an allotype label and from Bithlo, Florida, 14 June 1930, is in the collection. The holotype is double mounted (minute nadel in cork block), is in good condition, and is deposited in the National Museum of Natural History, Smithsonian Institution. Numerous other paratypes, all from Florida and reared from *Pluchea foetida,* are in the collection, although unlabeled.

OTHER SPECIMENS EXAMINED.—FLORIDA: Alachua Co., Micanopy, 24 Jun 1930, ex. *Chrysopsis trichophylla,* E.T. Evans (1♀; USNM). Brevard Co., 21 Jun 1930, ex. *Pluchea foetida,* D.J. Nicholson (1♂; USNM); Melbourne, 18 Jun 1930, Beavers (1♀; USNM). Charlotte Co., 29 May–8 Jun 1930, ex. *Chrysopsis trichophylla,* Pope, White (1♂, 4♀; USNM); Cleveland, 7–28 Jun 1930, ex. *Chrysopsis trichophylla* and *Pluchea foetida,* Pope, White (2♂, 6♀; USNM). Dade Co., Hialeah, 18 May 1967, ex. *Pluchea rosea,* C.E. Stegmaier (1♂; USNM); Homestead, 9 Aug 1930, L.D. Tuthill (1♀; KU). Hardee Co., Zolfo Springs, 15 Jul 1939, A.T. Hardy (1♀; KU). Hillsborough Co., 11 Jun 1930, ex. *Chrysopsis trichophylla, C. mariana,* and *Sericocarpus acutisquamosus,* D.J. Nicholson (3♀; USNM); Lutz, 29 Apr 1930, Polk, on *Sericocarpus* sp., White (1♀; USNM); Plant City, 5–6 Aug 1930, ex. *Chrysopsis trichophylla* and *C.* sp., S.F. Blanton (1♂, 3♀; USNM); Tampa, 26 Apr–10 Aug 1930, ex. *Chrysopsis mariana,* Polk, White, D.J. Nicholson, F.S. Blanton (11♂, 9♀; TAMU, USNM). Lake Co., Leesburg, 12–14 Jul 1930, ex. *Chrysopsis trichophylla,* E.T. Evans, D.J. Nicholson (1♂, 1♀; USNM); Mt. Dora, 14 Jul 1930, ex. *Chrysopsis pilosa,* E.T. Evans, D.J. Nicholson (2♂; USNM). Marion Co., Weirsdale, 10 Jun–14 Jul 1930, ex. *Chrysopsis trichophylla* and *Pluchea foetida,* E.T. Evans, D.J. Nicholson (1♂, 3♀; USNM). Martin Co., Indiantown, 9–20 Jun 1930, ex. *Chrysopsis trichophylla, C. mariana,* and *C.* sp., A.B. Beavers (14♂, 10♀; USNM).

Okaloosa Co., Boggy Creek, 27 Aug–9 Sep 1930, ex. *Chrysopsis trichophylla, Pluchea foetida,* and, *Sericocarpus acutisquamosus,* D.J. Nicholson (5♂, 2♀; USNM). Orange Co., 6 Sep 1930, D.J. Nicholson (1♀; USNM); Bithlo, 26 Apr–17 Jul 1930, ex. *Chrysopsis trichophylla, Pluchea foetida,* and *Sericocarpus acutisquamosus,* D.J. Nicholson (16♂, 21♀; USNM); Conway, 2 Jul–26 Aug 1930, ex. *Chrysopsis trichophylla, Pluchea foetida,* and *Sericocarpus acutisquamosus,* D.J. Nicholson (3♂, 5♀; USNM); Fort Christmas, 30 May–21 Jun 1930, ex. *Pluchea foetida,* D.J. Nicholson (6♂, 8♀; USNM); Fort Christmas, 4 mi (6.4 km) E, 14–17 Jun 1930, ex. *Pluchea foetida,* D.J. Nicholson (11♂, 9♀; USNM); Gotha, 23 Oct 1929, ex. *Chrysopsis hyssopifolia,* E. West (2♀; USNM); Lockhart, 14–16 Oct 1930, ex. *Chrysopsis hyssopifolia,* D.J. Nicholson (4♀; USNM); Orlando, 26 Apr–1 Oct 1930, ex. *Chrysopsis hyssopifolia, C. latifolia, C. pilosa, C. trichophylla, C.* sp., *Pluchea foetida, P. imbricata, Sericocarpus acutisquamosus, S. bifoliatus,* and *Vernonia scaberrima,* D.J. Nicholson, Benjamin, Beavers, F.S. Blanton (113♂, 101♀; TAU, USNM); Orlando, 3 mi (4.8 km) E, 6 Sep 1930, ex. *Pluchea imbricata,* D.J. Nicholson (2♂,

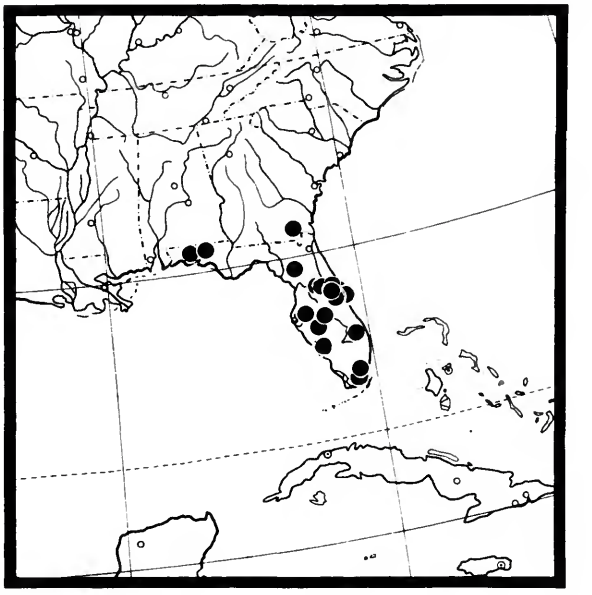


FIGURE 148.—Distribution map of *Neaspilota punctistigma.*

4♀; USNM); Orlando, 3 mi (4.8 km) SW, 8–16 Sep 1930, ex. *Pluchea imbricata*, D.J. Nicholson (11♂, 16♀; USNM); Orlando, 5 mi (8 km) W, 11–16 Sep 1930, ex. *Sericocarpus bifoliatus*, D.J. Nicholson (2♂, 2♀; USNM); Orlando nr, 10 Sep 1930, ex. *Sericocarpus bifoliatus*, D.J. Nicholson (1♂; USNM); Orlovista, 15 Sep–12 Dec 1930, ex. *Chrysopsis acutisquamosus, C. hyssopifolia, C. microcephala, C.* sp., D.J. Nicholson (3♂, 2♀; USNM); Pine Castle, 14 Jun–1 Oct 1930, ex. *Chrysopsis hyssopifolia*, D.J. Nicholson (7♂, 7♀; USNM); Vineland, 14–18 Jul 1930, ex. *Chrysopsis trichophylla*, D.J. Nicholson (4♀; USNM); Windermere, 11 Sep 1930, ex. *Chrysopsis* sp., D.J. Nicholson (1♀; USNM).

Orange and Seminole Cos., Golden Rod, 5 Aug 1930, ex. *Chrysopsis trichophylla*, D.J. Nicholson, (21♂, 13♀; USNM). Osceola Co., Holopaw, 24 Apr–2 May 1930, ex. *Sericocarpus acutisquamosus*, D.J. Nicholson (2♀; USNM). Polk Co., 17–24 Jun 1930, ex. *Chrysopsis pilosa*, Pope, White (2♂, 2♀; USNM); Lakeland, 2 May 1930, on *Erigeron vernus*, Polk, White (1♀; USNM). Seminole Co., Forest City, 26 Jun–14 Jul 1930, ex. *Chrysopsis trichophylla* and *Pluchea foetida*, D.J. Nicholson (18♂, 13♀; USNM); Lake Mary, 30 Jun–7 Jul 1930, ex. *Chrysopsis trichophylla*, D.J. Nicholson (8♂, 12♀; USNM); Longwood, 30 Jun–5 Jul 1930, ex. *Chrysopsis trichophylla* and *Pluchea foetida*, D.J. Nicholson (4♂, 8♀; USNM); Oviedo, 17 Jun–8 Aug 1930, ex. *Chrysopsis trichophylla* and *Pluchea foetida*, D.J. Nicholson (6♂, 10♀; USNM). Washington Co., Caryville, 2–7 Jun 1930, ex. *Pluchea foetida* and *Sericocarpus acutisquamosus*, D.J. Nicholson (2♀; USNM). Florida, Branchboro, 17 Jun 1930, ex. *Pluchea foetida*, Pope, White (1♂; USNM); 5 Aug 1930, D.J. Nicholson (1♀; USNM); 8 Jun 1930, D.J. Nicholson (1♀; USNM); 21–28 Jun 1930, D.J. Nicholson (1♂, 1♀; USNM). South Florida, 14 May 1930, D.J. Nicholson (1♀; USNM). GEORGIA: Ware Co., Laura S. Walker St. Park, 23 Jul 1958, J.L. Laffoon (1♂; ISU). S. Georgia, Morrison (1♀; USNM).

DISTRIBUTION (Figure 148).—Southeastern United States: Florida, Georgia, and Alabama.

HOST PLANTS.—*Aster bifoliatus* (as *Sericocarpus bifoliatus*), *Chrysopsis graminifolia* (as *C. microcephala*), *C. hyssopifolia, C. latifolia, C. mariana, C. pilosa, C. Traceyi* (Benjamin, 1934:39), *C. trichophylla, C.* sp., *Pluchea foetida, P. imbricata, P. rosea, Sericocarpus acutisquamosus, Vernonia angustifolia* (as *V. scaberrima* doubtful).

REMARKS.—This species is distinguished from congeners by having one or two semierect, posteroventral setae inserted preapically on the hindtibia. This character is sometimes difficult to see because of the locality and small size of the setae. In addition, the head is relatively long (about as long as high in profile), as is the haustellum (about as long as antenna), and the terga are predominantly black.

16. *Neaspilota (Neorellia) signifera* (Coquillett)

FIGURES 149–157, 200

Trypeta (Neaspilota) signifera Coquillett, 1894:73.

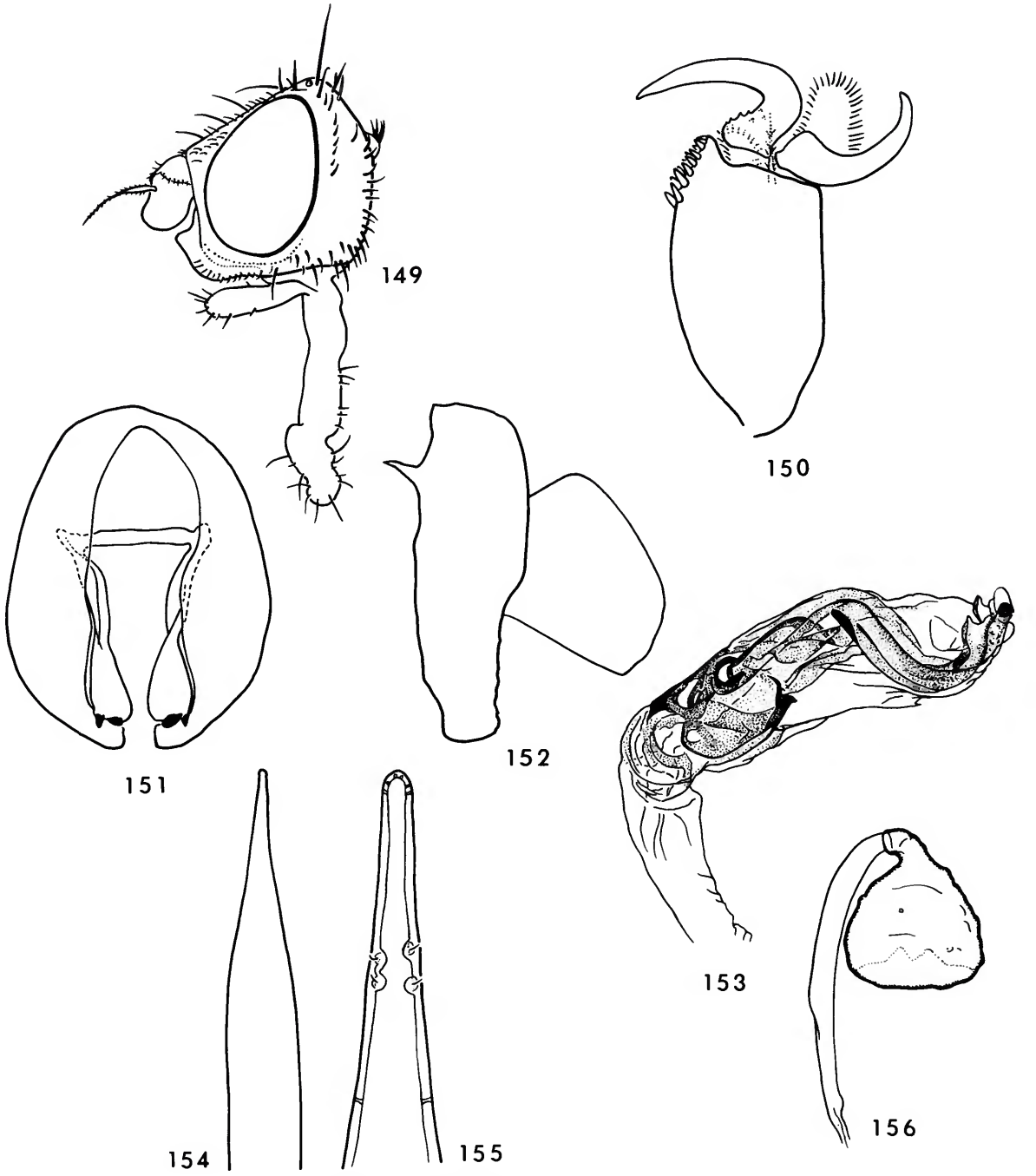
Trypeta signifer [sic].—Doane, 1899:187 [comparison].—Johnson, 1913:84 [list].

Neaspilota signifera.—Aldrich, 1905:610 [catalog].—Curran, 1932a:3 [key].—Benjamin, 1934:36 [key].—Malloch, 1942:19 [key].—Quisenberry, 1949:84 [key].—Foote and Blanc, 1963:34 [review].—Foote, 1965:672 [catalog].—Cole, 1969:355 [discussion].—Wasbauer, 1972:120 [host list].

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.55 to 3.30 mm.

Head (Figure 149): Distinctly longer than high; frontal-head ratio 0.49–0.53; frontal ratio 1.00–1.07; 1st flagellomere ratio 1.50–1.62; aristal-antennal ratio 0.91–1.25; lower facial margin strongly projected anterior of frontofacial angle; proboscis with haustellum strongly elongate, about twice as long as antenna; labella elongate, spatulate, about as long as antenna; palpus elongate; major setae brown, genal seta paler.

Thorax: Anterior supra-alar setae lacking; dorsocentral setae transversely aligned about midway between suture and anterior margin of scutellum. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; femora lack-



FIGURES 149–156.—*Neaspilota signifera:* 149, head, lateral aspect; 150, male right foretarsus, dorsal aspect; 151, epandrium, posterior aspect; 152, epandrium and cerci, lateral aspect; 153, distiphallus; 154, aculeus, dorsal aspect; 155, same, enlarged apex; 156, spermatheca.

ing well-developed ventral setae; comb of hind-tibia distinct, though not well developed; 5th tarsomere of male foreleg (Figure 150) elongate, with spines shorter and more numerous (2 rows of about 7 spines). Wing: Pterostigmal ratio 2.88–3.43; crossvein ratio 1.58–1.84; apical sections of veins R_{4+5} and M straight or almost so; wing apex at end of vein M or close to it; wing mainly hyaline; pale brown spot present on humeral crossvein; approximately basal half of pterostigma brown, the rest yellowish; r-m and dm-cu crossveins brown; apical portions of longitudinal veins beyond crossveins brown, the remaining portions yellow.

Abdomen: Yellow; epandrium and cerci as in Figures 151, 152; distiphallus as in Figure 153. Female: Tergal 6/5 ratio 0.75–1.12; tergal-oviscapal measure 2.2–3.2; oviscapal ratio 1.03–1.23; aculeus (Figures 154, 155) tapered on apical half; spermatheca as in Figure 156.

TYPE MATERIAL.—The male lectotype, herein designated, is labeled "Los Angeles Co., CAL[ifornia]./Coquillett Collector/Cotype No. 912 U.S.N.M. [red; number handwritten]/Trypeta signifera Type. Coq. [handwritten]/Neaspilota signifera Coq. [handwritten; black submarginal border]/LECTOTYPE Trypeta (Neaspilota) signifera Coquillett by Freidberg and Mathis [red; handwritten]." Paralectotypes (5♂, 1♀; all partially damaged either by dermestids or the pin) have the same locality data as the lectotype. The lectotype is directly pinned (the top specimen of four males on the same pin), is in poor condition (left foreleg missing, abdomen greasy, pin obscuring much of the thorax), and is deposited in the National Museum of Natural History, Smithsonian Institution, USNM 912.

OTHER SPECIMENS EXAMINED.—MEXICO. BAJA CALIFORNIA NORTE: San Quintin, 3.2 km S, 23 Jul 1977, D. Weissman, C. Mullinex (5♂, 8♀; CAS). Sonora, 2 Jun 1929, Saric? (1♂; CAS). UNITED STATES. ARIZONA: Cochise Co., [Huachuca Peak] Sunnyside Canyon, 9 Jul 1940, L.C. Kuitert (1♂; KU). CALIFORNIA: Alameda Co., Berkeley, 16 May 1907–27 May 1915, C. Fuchs, E.P. Van Duzee, M.C. Van Duzee (1♂, 3♀; USNM, UCB, AMNH, MCZ). Colusa Co., Colusa, 1 Sep 1955, R.O. Schuster (1♂, 1♀; UCB). El Dorado Co., Cool, 29 Mar 1964–23 Mar 1965, J. Powell, A.J. Slater (2♂, 2♀; UCB); Greenwood, 21 Jun 1967, J. Powell (1♀; UCB); Walnut Creek, 24 May 1949, P.D. Hurd (10♂, 9♀; UCB, CSDA). Fresno Co, Fresno, 21 Mar–24 Apr 1923, M.E. Phillips (6♂, 8♀; KU, OHSU, ORSU, TAMU). Glenn Co., Artois, 11–15 Jul 1952, E.G. Linsley, R.F. Smith, H.L. Hanson (3♀; UCB); Willows, 19 mi (30 km) W, 2 Jul 1952, on *Melilotus* sp., R.F. Smith, H. Hanson (1♀; UCB). Kern Co., Rosamond, 23 Jul 1940, R.H. Beamer (5♂, 5♀; KU). Los Angeles Co., Claremont, Baker (1♀; USNM); Los Angeles, Coquillet (6♂; USNM); Pasadena, J.M. Aldrich (1♂; USNM). Mariposa Co., Bear Creek, 10 mi (16 km) N Mariposa, 30 May 1959, G.I. Stage (2♂; UCB); Mariposa (Pines), 26 Jul 1977, A.J. Gilbert, D.

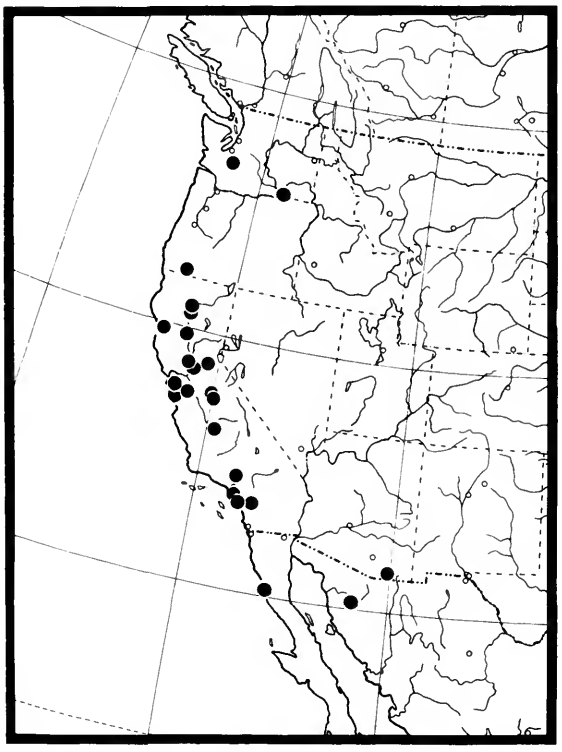


FIGURE 157.—Distribution map of *Neaspilota signifera*.

Griffin (1♂; CSDA); Mt. Bullion, 1.9 mi (3 km) W, 30 May 1959, G.I. Stage (2♂, 1♀; UCB).

Mendocino Co., Eel River R. S., 7 mi (11.2 km) W, 12 Jun 1972, on *Achillea millefolium*, J. Powell (1♀; UCB). Orange Co., Sunset Beach, 30 Jul 1935, R.H. Beamer (1♀; KU). Riverside Co., Cabazon, 9 Apr 55, A.L. Melander (1♀; USNM); Riverside, 1 May 1935, A.L. Melander (2♂; USNM); San Jacinto, 29 May 1917, E.P. Van Duzee (1♂; TAU); Temecula, 25 May 1944, A.L. Melander (1♂, 1♀; USNM). Sacramento Co., Sacramento, 25 Apr 1960–20 Apr 1961, ex. *Baeria fremontii*, W.E. Simonds, I. Savage (2♂, 2♀; CSDA); No. 299, 25 Apr 1929, on alfalfa, C.C. Wilson (1♂; CDSA). San Bernardino Co., Verdemont, 1 May 1946, A.L. Melander (1♀; USNM). San Joaquin Co., Tracy, 21 Jun 1949, R.F. Smith (1♀; UCB). Santa Clara Co., San Jose, 20 May 1947, C.D. Duncan (1♀; CSDA). Shasta Co., Redding, 12 mi (19 km) N, 10 Jun 1931, H.A. Scullen (2♂, 1♀; ORSU); Round Mountain, 1 mi (1.6 km) SW, 3 Jul 1975, J. Powell (1♀; UCB). Solano Co., Dixon, 10 mi (16 km) SE, Yolo-by-Pass, 1 May 1971–19 May 1972, on *Baeria* sp., W.W. Middlekauff (7♂, 5♀; CSDA, UCB); Rio Vista, 2 Jun 1949, R.S. Beal (1♀; UCB). Stanislaus Co., Adobe Creek, 6 May 1948, R.F. Smith (1♂; UCB); Westley, 1 Apr 1948, on *Brassia*, P.D. Hurd (2♂, 2♀; USNM). Sutter Co., Nicolaus, 27 Jun 1935, R.H. Beamer (1♀; KU). Tulare Co., Woodville, 4 mi (6.4 km) N, 8 Sep 1959, on *Wislizenia refracta*, R.R. Snelling (2♂; UCB). Tuolumne Co., near Jacksonville, 18 May 1961, O.W. Richards (1♂; BMNH). Yolo Co., Davis, 20 Apr 1977, M.A. Cazier (1♂, 2♀; AMNH).

OREGON: Jackson Co., Applegate, 4 Aug 1952, on *Asclepias mexicana*, H.A. Scullen (7♂, 8♀; ORSU). WASHINGTON: Pierce Co., La Grande, 4 mi (6.4 km) E, 13 Jul 1918, ex. *Centromedia pungens*, H.H. Severin (1♀; UCB). Walla Walla Co., Lowden, 5 mi (8 km) NW, 29 May 1957, E.F. Dailey (2♂, 3♀; WSU). Washington, Manteca, 4 Sep 1918, H.H. Severin (1♂, 3♀; UCB); Manteca, 5 mi (8 km) SE, 6 Sep 1918, ex. *Centromedia pungens*, H.H. Severin (1♀; UCB).

DISTRIBUTION (Figure 157).—Western North America from the state of Washington south through Oregon to California and across southern Arizona to northern Mexico.

HOST PLANTS.—*Baeria Fremontii* and *Hemizonia pungens* (as *Centromedia pungens*).

REMARKS.—This species is distinctive among congeners and any other species of the subfamily by its lack of anterior supra-alar setae and by having an elongate proboscis, the haustellum of which is about twice as long as the antenna.

17. *Neaspilota (Neorellia) stecki*, new species

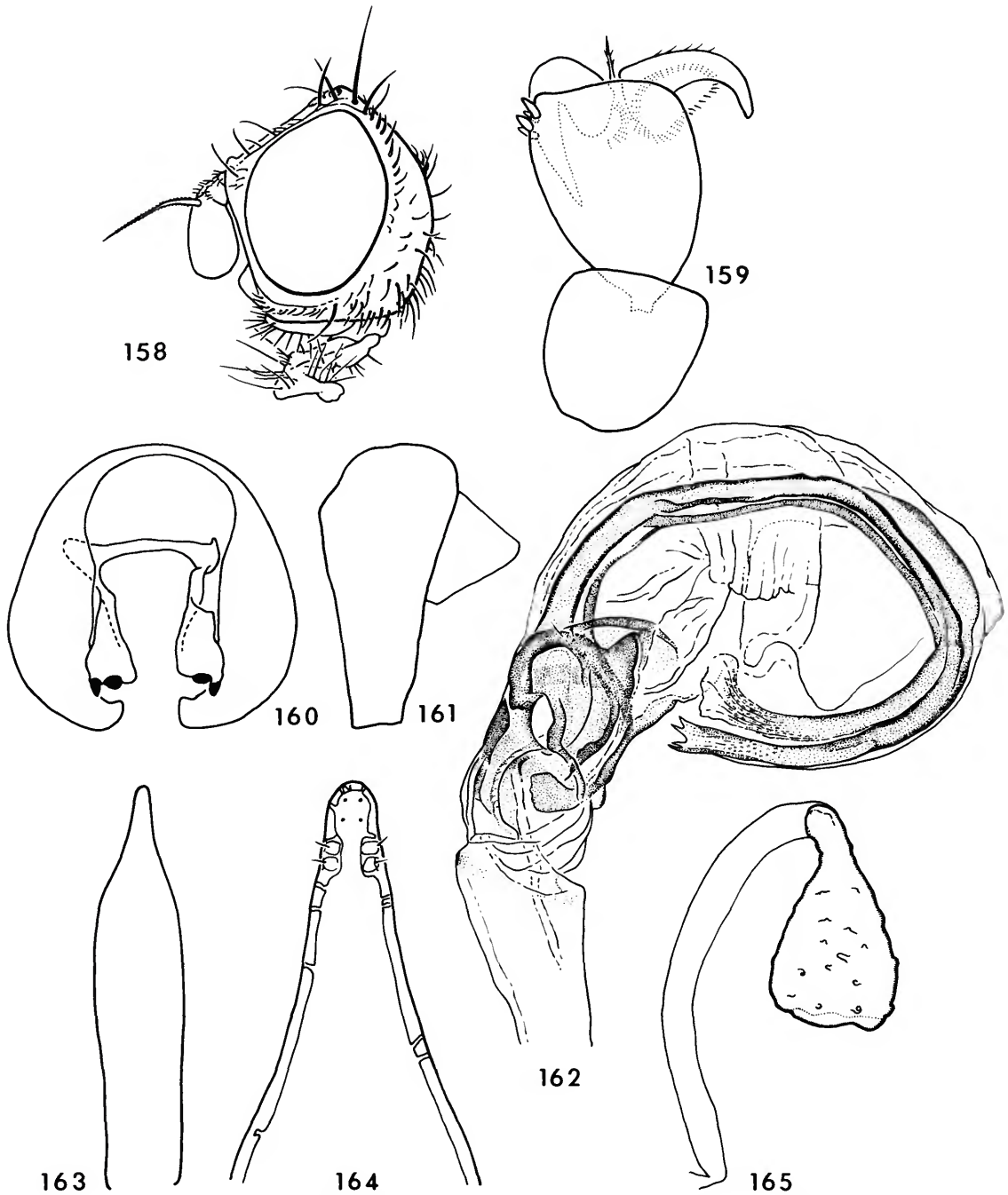
FIGURES 158–166, 201

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 3.0–3.3 mm.

Head (Figure 158): Distinctly higher than long, height-to-length ratio 1.06–1.16; frontal-head ratio 0.54–0.55; frontal ratio 1.16–1.30; 1st flagellomere ratio 1.49–1.72; aristal-antennal ratio 1.06–1.12; major setae shorter than normal (inner vertical seta about half as long as frontal width at vertex), light brown, genal seta yellowish.

Thorax: Setae light brown, anepimeral seta yellowish. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg typically modified (Figure 159), with 2 rows of 2–3 spines in a comb. Wing (Figure 201): Pterostigmal ratio 2.27–2.48; crossvein ratio 1.25–2.22; wing apex closer to end of vein M; pterostigma brown at basal 0.25–0.40, yellow or hyaline at apex; proximal border of brown coloration sharp, distal border not always so; veins mostly yellow, slightly darkened toward apices.

Abdomen: Entirely yellow or with narrow brown bands basally on terga 3 through 5; epandrium and cerci as in Figures 160, 161; distiphallus as in Figure 162. Female: Tergal 6/5 ratio 0.9; tergal-oviscapal measure 2.1; oviscapal ratio 1.3; aculeus as in Figures 163, 164; spermatheca (Figure 165) invaginated, with a surface slightly and finely roughened.



FIGURES 158–165.—*Neaspilota stecki:* 158, head, lateral aspect; 159, male right foretarsus, dorsal aspect; 160, epandrium, posterior aspect; 161, epandrium and cerci, lateral aspect; 162, distiphallus; 163, aculeus, dorsal aspect; 164, same, enlarged apex; 165, spermatheca.

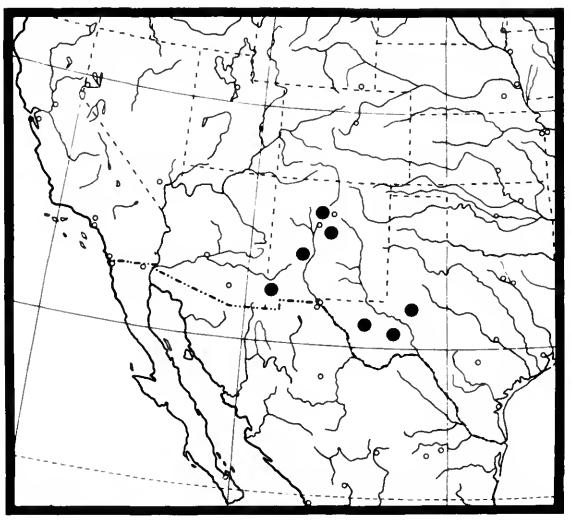


FIGURE 166.—Distribution map of *Neaspilota stecki.*

TYPE MATERIAL.—The male holotype is labeled "New Mexico Willard, Torrance Co. 20 Jul [19]80. sweeping Compositae G. Steck [handwritten]." Other paratypes are as follows: UNITED STATES. NEW MEXICO: Hidalgo Co., Lordsburg, 1 May 1942, A.L. Melander (1♂; USNM). Sandoval Co., San Ysidro, 10 Jun 1977, W.J. Hanson and G.F. Knowlton (2♂; USU). Torrance Co., Willard, 20 Jul 1980, sweeping Compositae, G. Steck (2♂; USNM). The holotype is double mounted (glued to a paper point), is in good condition, and is deposited in the National Museum of Natural History, Smithsonian Institution.

DISTRIBUTION (Figure 166).—New Mexico.

HOST PLANTS.—Unknown.

ETYMOLOGY.—The specific epithet, *stecki,* is a Latinized patronym to recognize Dr. Gary J. Steck, the collector of the holotype of this species, as well as numerous other specimens we studied as part of this revision.

REMARKS.—This species is very similar to *N. aenigma,* and is distinguished from it externally by the brown area at the base of the pterostigma, which is darker, rather conspicuous, and is in a sharp contrast to the remaining hyaline or yellow area (intergrading into it in *N. aenigma*). The distiphallus has a longer double tube and is darker (more sclerotized), appearing black, a character that can be observed even when only partly exposed outside the tergal pouch, or, sometimes even through the 5th tergum. The tarsal comb, with two rows of only two to three spines each, distinguishes it further from *N. aenigma,* as well as from most other congeners. In the female, the oviscape is distinctly shorter, the tergal-oviscapal measure being about two (above three in *N. aenigma*), and the apex of the aculeus is much broader.

18. *Neaspilota (Neorellia) viridescens* Quisenberry

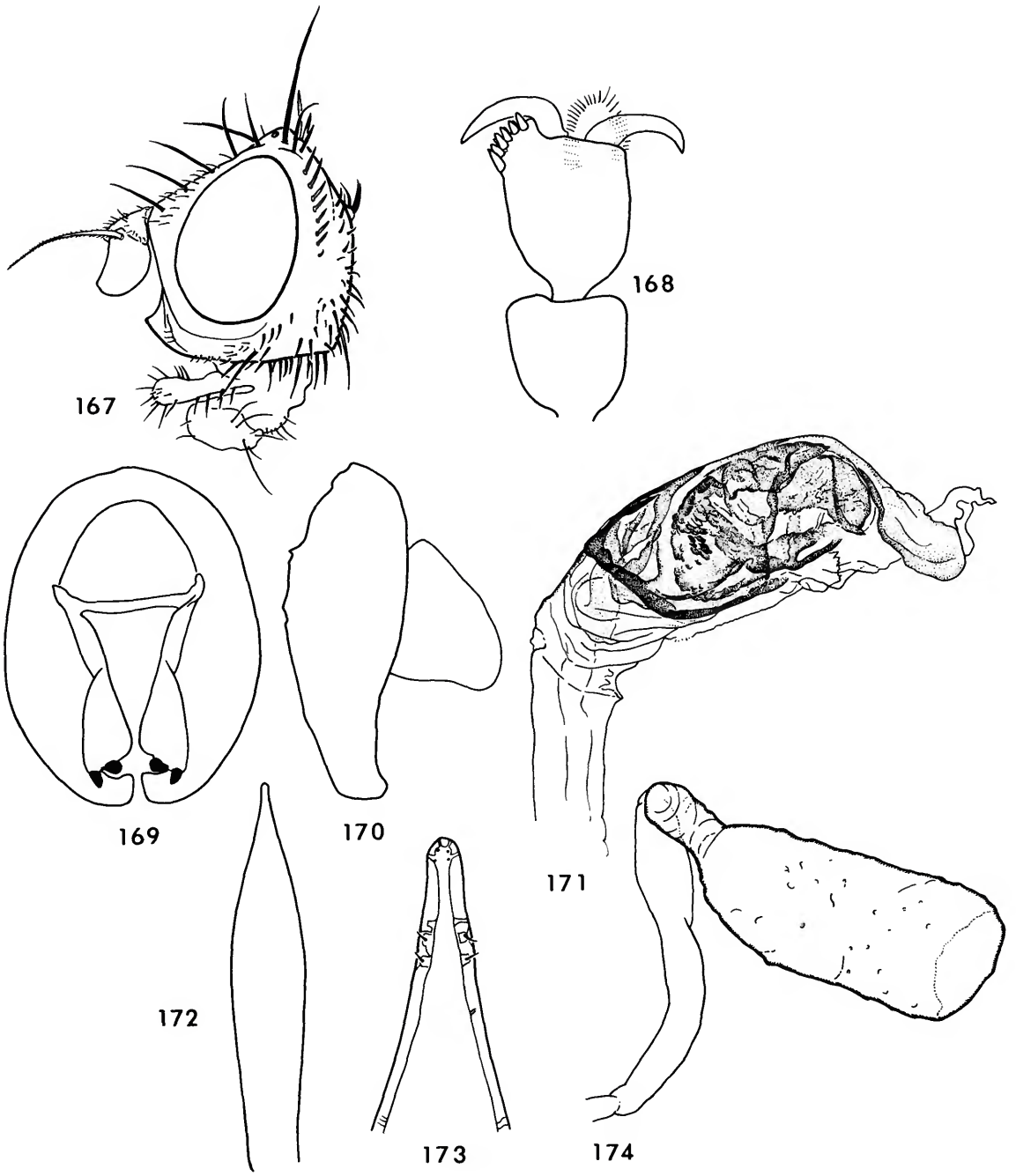
FIGURES 167–175, 202, 203

Neaspilota viridescens Quisenberry, 1949:82.—Foote, 1965:672 [catalog].—Wasbauer, 1972:120 [list].

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 2.75–4.13 mm.

Head (Figure 167): Higher than long; frontal-head ratio 0.54–0.59; frontal ratio 0.80–0.97; 1st flagellomere ratio 1.63–1.75; aristal-antennal ratio 1.19–1.25; parafacial 0.5, gena about as wide as antenna; haustellum shorter than antenna; 2nd segment of antenna sometimes with a small blackish spot dorsally; 3rd segment of antenna sometimes brown; major setae pale brown to brown.

Thorax: Dorsocentral setae transversely aligned with or slightly anterior of anterior supra-alar setae. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; fifth tarsomere of male foreleg typically modified (Figure 168), with anterior claw somewhat longer than posterior claw. Wing (Figures 202, 203): Pterostigmal ratio 3.25–3.75; crossvein ratio 1.56–2.25; veins R_{4+5} and M almost straight; wing apex about equidistant from ends of both veins; wing without distinct pattern, brownish, especially around distal portions of radial veins and crossveins r-m and dm-cu; veins dark brown at those places, otherwise yellow; pterostigma entirely



FIGURES 167–174.—*Neaspilota viridescens:* 167, head, lateral aspect; 168, male right foretarsus, dorsal aspect; 169, epandrium, posterior aspect; 170, epandrium and cerci, lateral aspect; 171, distiphallus; 172, aculeus, dorsal aspect; 173, same, enlarged apex; 174, spermatheca.

brown (though not very dark) or somewhat yellowish at apex; some specimens have entirely hyaline wing, excluding pterostigma; microtrichia at brownish areas gray, otherwise white.

Abdomen: Partly or entirely yellow; male with rather broad black bands at anterior part of terga 3–5, usually emarginate or interrupted in the middle; female with narrower (less than 0.25 of length of tergum) bands on terga 3–5; some or all bands sometimes lacking; epandrium and cerci as in Figures 169, 170; distiphallus (Figure 171) with many "scales" and without an apical tube. Female: Tergal 6/5 ratio 0.75–0.88; tergal-oviscapal measure 2.0–2.5; oviscapal ratio 0.93–1.18; aculeus as in Figures 172, 173; spermatheca long (Figure 174), more than twice as long as wide.

TYPE MATERIAL.—The female holotype is labeled "[Routt Co.,] Rabbit Ears Pass Colo[rado] VI-26-46 [26 Jun 1946; "Pass" and date handwritten]/MTJames Collector/HOLOTYPE Neaspilota viridescens 1947 Quisenberry [red; handwritten]." The holotype is double mounted (glued to a paper point), is in poor condition (the left wing has been removed and is slide mounted; the right wing is missing; the legs are compactly tucked under the body, making them difficult to study), and is deposited in the National Museum of Natural History, Smithsonian Institution. Quisenberry (1949) stated that the holotype was in the "Colorado A. and M. College collection"; this specimen has now been permanently deposited in the USNM (H. Evans, pers. comm.).

OTHER SPECIMENS EXAMINED.—CANADA. ALBERTA: Banff, 14 mi (22.4 km) W, 4500 ft (1350 m), 11 Aug 1955, J.R.W. McGillis (1♂; CNC). Banff National Park, Eisenhower Junction, 15 Jul 1962, K.C. Herrmann (1♂, 1♀; CNC). Medicine Hat, 1 Jun 1952, A.R. Brooks (1♀; CNC). Waterton, 17 Jul 1923, H.L. Seamans (1♂; CNC). BRITISH COLUMBIA: Cash Creek, 20 Jul 1975, F.L. Blanc, on wild rose (1♀; CSDA). Hedley, 24 Jul 1923, C.B. Garrett (1♀; CNC). Richter Pass, Osoyoos, 24 May 1959, R.E. Leech (1♀; CNC). Royal Oak, 14 Aug 1918, W. Downes (1♂; CNC). White Lake, Oliver, 28 May 1959, L.A. Kelton (1♂; CNC). SASKATCHEWAN: Chaplin, 21 Jun 1954, Brooks and Wallis (1♂; CNC). Elbow, 23 May–20 Jun 1960, A.R. Brooks (9♂, 17♀; CNC). YUKON TERRITORY: Rose Lake, S Canol Road, 24 Jul 1973, D.M. and G. Wood (1♂; CNC). UNITED STATES. ALASKA: Richard Highway, mile 236 16-26 Jun 1951, W.R.M. Mason and J.R. McGillis (4♂, 2♀; CNC). Fairbanks, 30 Jun 1921, J.M. Aldrich (1♂; USNM). CALIFORNIA: Eldorado Co., Fallen Leaf Lake, 6000 ft (1800 m), 23 Aug 1953, J.D. Lattin (2♂; ORSU). Kern Co., Indian Wells, 8 mi (12.8 km) N Inyo-Kern turnoff, 12 Apr 1960, C.A. Toschi (1♂; UCB). Los Angeles Co., Los Angeles National Forest, Windy Spring, 27 Jun 1974, D.D. Wilder (1♀; CAS). Mariposa Co., Yosemite National Park, Glacier Point Road, 1 Jul 1947, A.L. Melander (1♂; USNM). Nevada Co., Sage Hen Creek, 17 Jul 1968, D.S. Horning (1♀; CSDA). Placer Co., Norden, 1 mi (1.6 km) S, 25 Aug 1964, F.L. Blanc (1♂; CSDA). Solano Co., hills NE Vullejo, 16 Aug 1962, J. Powell (1♂; UCB). San Bernardino Co., Barton Flat, 9 Oct 1944, A.L. Melander (2♂; USNM). San Diego Co., San Ysidro 18 Aug–10 Oct 1948, 1950, ex. *Aster spinosus*, E.D. Algert, F.L. Blanc (5♂, 1♀; USNM). San Mateo Co., Half Moon Bay, 23 Feb, E.P. VanDuzee (1♀; UCB). Sierra Co., Yuba Pass, 6–9 Jul 1970, 1972, R.M. Bohart, P. Goodpasture, Slobodchiknoff (3♂, 2♀; CAS, CSDA).

COLORADO: Boulder Co., Boulder, 5 mi (8 km) S, 5800 ft (1750 m), 16 Jun 1961, C.H. Mann (1♀; CNC). Gunnison Co., Crested Butte, 15 mi (24 km) SE Jack's Cabin, cutoff road, 8300 ft (2500 m), 6 Aug 1974, Lincoln and Moldenke (1♂; CAS). Pueblo Co., Pueblo, 21 mi (33.6 km) S, 11 Aug 1964, J.G., B.L., and K.C. Rozen (1♂; AMNH); Pueblo, 10 mi (16 km) W, 11 Aug 1964, J.G. and B.L. Rozen (1♀; AMNH). Echo Lake, Mt. Evans, 9600 ft (2900 m), 26 Jul 1961, B.H. Poole (1♂; CNC). IDAHO: Big Meadows, 11 Jul 1926, R.W. Heegele (1♂; AMNH). MONTANA: Glacier Co., Glacier National Park, Medicine Lake, 3 Aug 1935, A.L. Melander (1♂; USNM). OREGON: Baker Co., Anthony Lake, Blue Mountains, 7100 ft (2100 m), 3 Aug 1929,

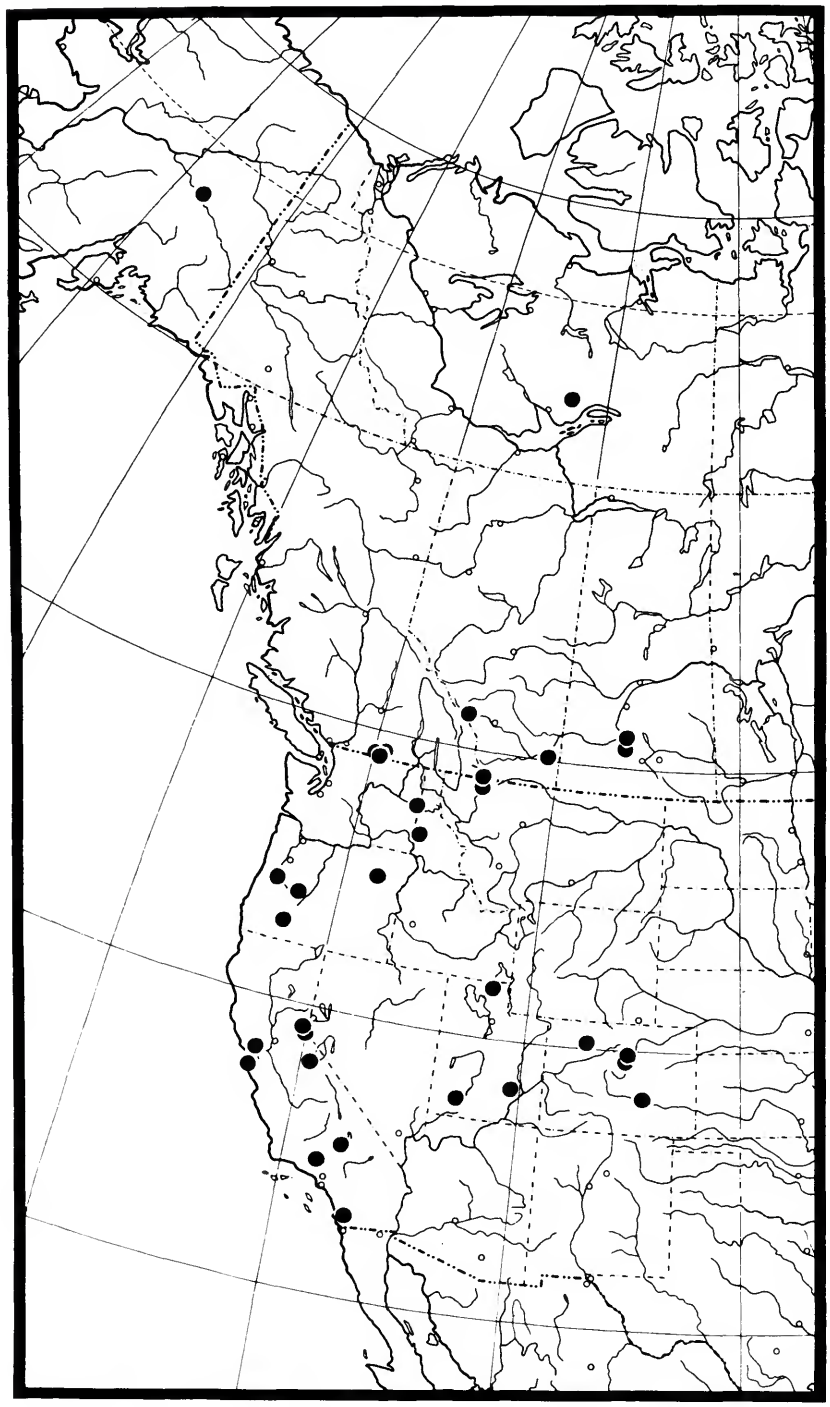


FIGURE 175.—Distribution map of *Neaspilota viridescens.*

H.A. Scullen (1♂, ORSU). Deschutes Co., Lava Lake, 25 Jul 1915, A.L. Lovett (2♂, 4♀; ORSU). Klamath Co., Crater Lake National Park, near headquarters, 6400–6600 ft (1900–2000 m), 4 Aug 1980, H.A. Scullen (1♂; AMNH). Oregon, Duffy Prairie, 26 Jul 1915, A.L. Lovett (3♂, 4♀; ORSU, UCB); Swim, 2 Jul 1929, G. Ferguson (1♂; ORSU); Suttlelake, 5 mi (8 km) W, 30 Jul 1939, Gray and Schuh (1♀; ORSU). UTAH: Cache Co., Blacksmith Fork Creek, 9–10 Aug 1970, W.J. Hanson (1♂; BMNH). Duchesne Co., Mirror Lake, Wasatch Mountains, 8 May 1956, A.L. Melander (1♂; USNM). Iron Co., Cedar Canyon, 26 Jul 1968, G.F. Knowlton (2♀; BMNH). Wayne Co., Hanksville, 7500 ft (2250 m), Henry Mountains, 29 Jul 1968, J.E.H. Martin (1♂, 1♀; CNCM). WASHINGTON: Spokane Co., Mica, 14 Jul 1918, A.L. Melander (1♀; USNM). Whitman Co., Kamiak Butte, 13 Jul 1917, A.L. Melander (1♂; USNM).

DISTRIBUTION (Figure 175).—Western North America from Alaska and the Yukon Territory southward through Washington and Montana to California and Colorado.

HOST PLANTS.—*Aster spinosus.*

REMARKS.—Most studied specimens of this species are fairly easily characterized by the dark appearance of the wings (see description). A long series of specimens from Elbow, Saskatchewan, are generally smaller, and have a much lighter appearance of the wing. These, as well as some similar U.S. specimens, can be distinguished from other congeners by the more anterior alignment of the dorsocentral setae (which are inserted before the anterior supra-alar setae) and by the relative high gena, which is often almost equal to the antennal height, both chracters being sometimes difficult to assess. Characters of the terminalia unique for this species are the spermathecae, which are twice as long as wide, and the distiphallus, which is robust, heavily sclerotized, and lacks tubes.

The majority of the specimens that were left undetermined during this study probably belong to *N. viridescens.* It is often difficult to distinguish this species from *N. aenigma,* and all of these specimens would have to be dissected to ascertain their identity.

19. *Neaspilota (Neorellia) wilsoni* Blanc and Foote

FIGURES 176–184, 204

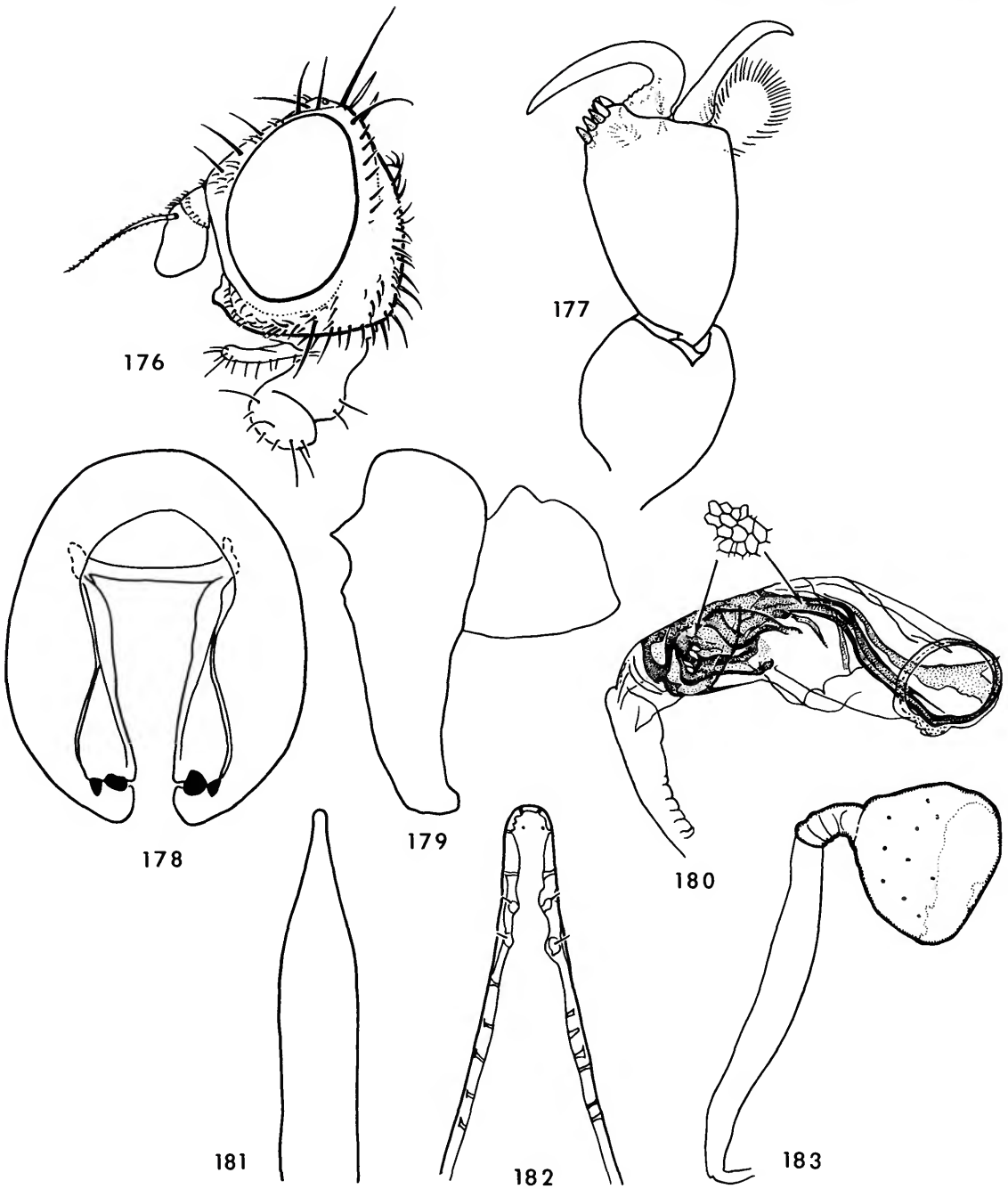
Neaspilota wilsoni Blanc and Foote, 1961:78.—Foote, 1965:672 [catalog].—Foote and Blanc, 1963:35 [review].—Wasbauer, 1972:120 [list].

DESCRIPTION.—Resembling *N. punctistigma* but differing as follows: wing length 3.08 to 3.91 mm.

Head (Figure 176): Higher than long; frontal-head ratio 0.49–0.55; frontal ratio 0.77–0.97; 1st flagellomere ratio 1.57–1.75; aristal-antennal ratio 1.00–1.44; haustellum shorter than antenna; 2nd segment of antenna with a blackish spot dorsally; major setae brown.

Thorax: Dorsocentral setae transversely aligned with or slightly posterior of anterior supra-alar setae; setae brown, anepimeral seta sometimes whitish. Legs: Hindtibia lacking semierect setae preapically and posteroventrally; 5th tarsomere of male foreleg typically modified (Figure 177). Wing (Figure 204): Pterostigmal ratio 3.37–3.86; crossvein ratio 1.74–2.25; distal section of veins R_{4+5} and M almost straight; wing apex closer to end of vein M; wing mainly hyaline; pterostigma yellow, brownish at basal 3rd to half, without distinct border line between the brown and yellow; crossveins r-m and dm-cu usually brown, longitudinal veins distally brown, veins otherwise yellow.

Abdomen: Mainly yellow; terga 3–5 in male, 3–6 in female, each with 4 triangular black spots at anterior margin; the 2 spots on either side in male usually fused together along anterior margin; spots in female smaller than in male, usually not fused, sometimes indistinct on terga 3 or 6; epandrium and cerci as in Figures 178, 179; epandrium with a short and blunt posteroventral projection; distiphallus (Figure 180) with a long and narrow, convoluting tube, becoming paler apically. Female: Tergal 6/5 ratio 0.76–0.85; tergal-oviscapal measure 2.5–3.0; oviscapal ratio



FIGURES 176–183.—*Neaspilota wilsoni:* 176, head, lateral aspect; 177, male right foretarsus, dorsal aspect; 178, epandrium, posterior aspect; 179, epandrium and cerci, lateral aspect; 180, distiphallus; 181, aculeus, dorsal aspect; 182, same, enlarged apex; 183, spermatheca.

0.93–1.09; aculeus (Figures 181, 182) relatively broadly rounded at apex; spermatheca as in Figure 183.

TYPE MATERIAL.—The male holotype is labeled "Jacolitas Cyn. Fresno Co. Cal[iforina] V-15-1956 [15 May 1956; locality and part of date handwritten]/ Swept from Composite ["Composite" handwritten]/H.L.Wilson Collector/Cal. Dept. Agr. No. 56E183 [number handwritten]/ [paper triangle with head glued to it]/[a green disc]/o HOLOTYPE Neaspilota wilsoni B & F det RHFoote 1960 ["♀ HOLOTYPE" and species name handwritten; red border]/California Academy of Sciences Type No. 10198 [number handwritten]." The holotype is double mounted (glued to a paper point), is in fair condition (the head has been broken off and is glued to an attached paper point), and is deposited in the California Academy of Sciences, CAS 10198. In addition to the holotype, we have examined seven of the 16 paratypes listed in Blanc and Foote (1961).

According to Wasbauer (1970) many type specimens held by the California Department of Agriculture have been deposited elsewhere, including the type of *N. wilsoni,* which was transferred to the California Academy of Sciences, as recorded by Arnaud (1979).

OTHER SPECIMENS EXAMINED.—CALIFORNIA: Fresno Co., Coalinga, 15–21 May 1956, on composite, H.L. Wilson (2♂; 2♀; USNM); Coalinga, 15 mi (24 km) N, 28 Mar 1956, on *Coreopsis calliopsidea,* H.L. Wilson (2♂; CSDA); Jacolitos Canyon, 15 May 1956, H.L. Wilson (2♂, 2♀, in copula; USNM, CAS). Fresno or Monterey Co., Jacolitos Canyon, 8 Apr 1966, R.O. Schuster (2♂, 2♀; CSDA). San Benito Co., Idria (Gem Mine), 5 Jul 1954, on *Achillea millefolium,* R.F. Smith, E.G. Linsley (1♂; UCB). San Benito and Fresno Cos., Panoche Creek, San Benito-Fresno Co. line, 21 Apr 1967, J. Powell (1♀; UCB).

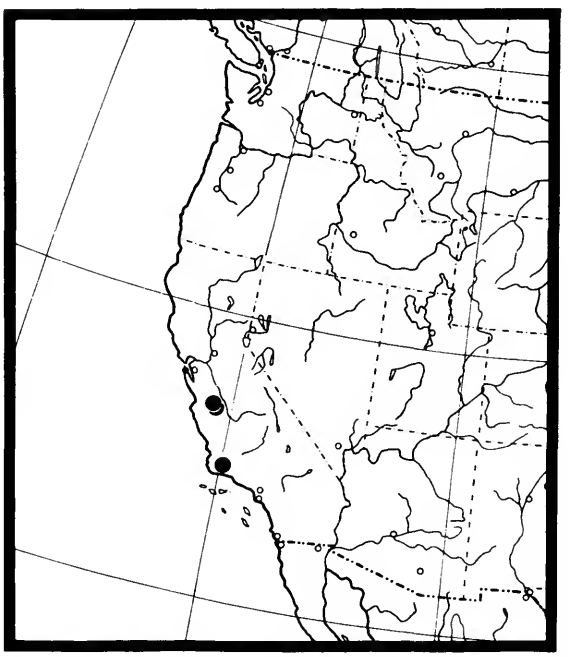


FIGURE 184.—Distribution map of *Neaspilota wilsoni.*

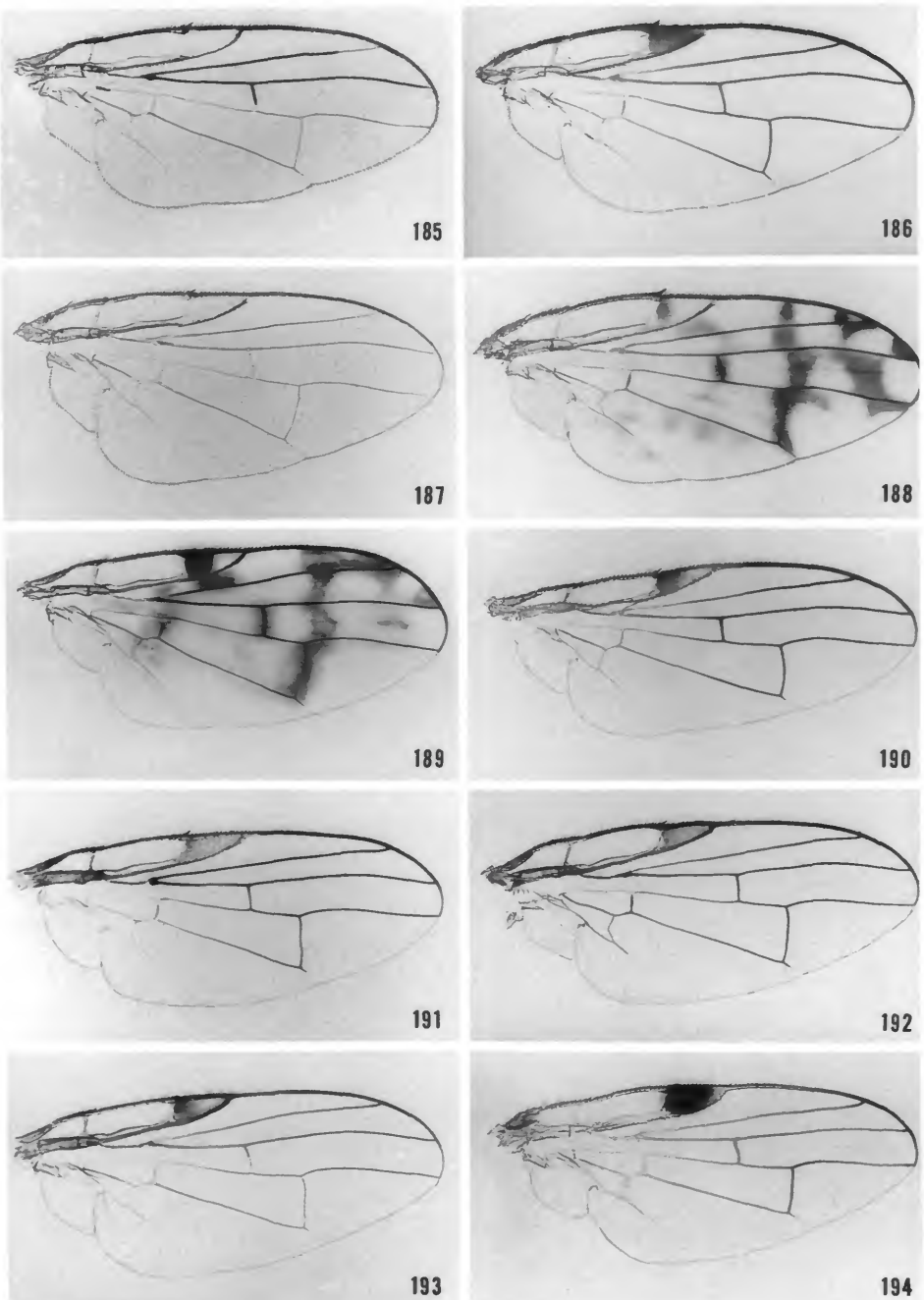
Ventura Co., Quatal Canyon, NW corner Ventura Co., 9 May 1959, on *Encelia actoni,* P.D. Hurd (1♀; UCB).

DISTRIBUTION (Figure 184).—Southern California south of 36° north latitude and west of the Sierra Nevada Mountains.

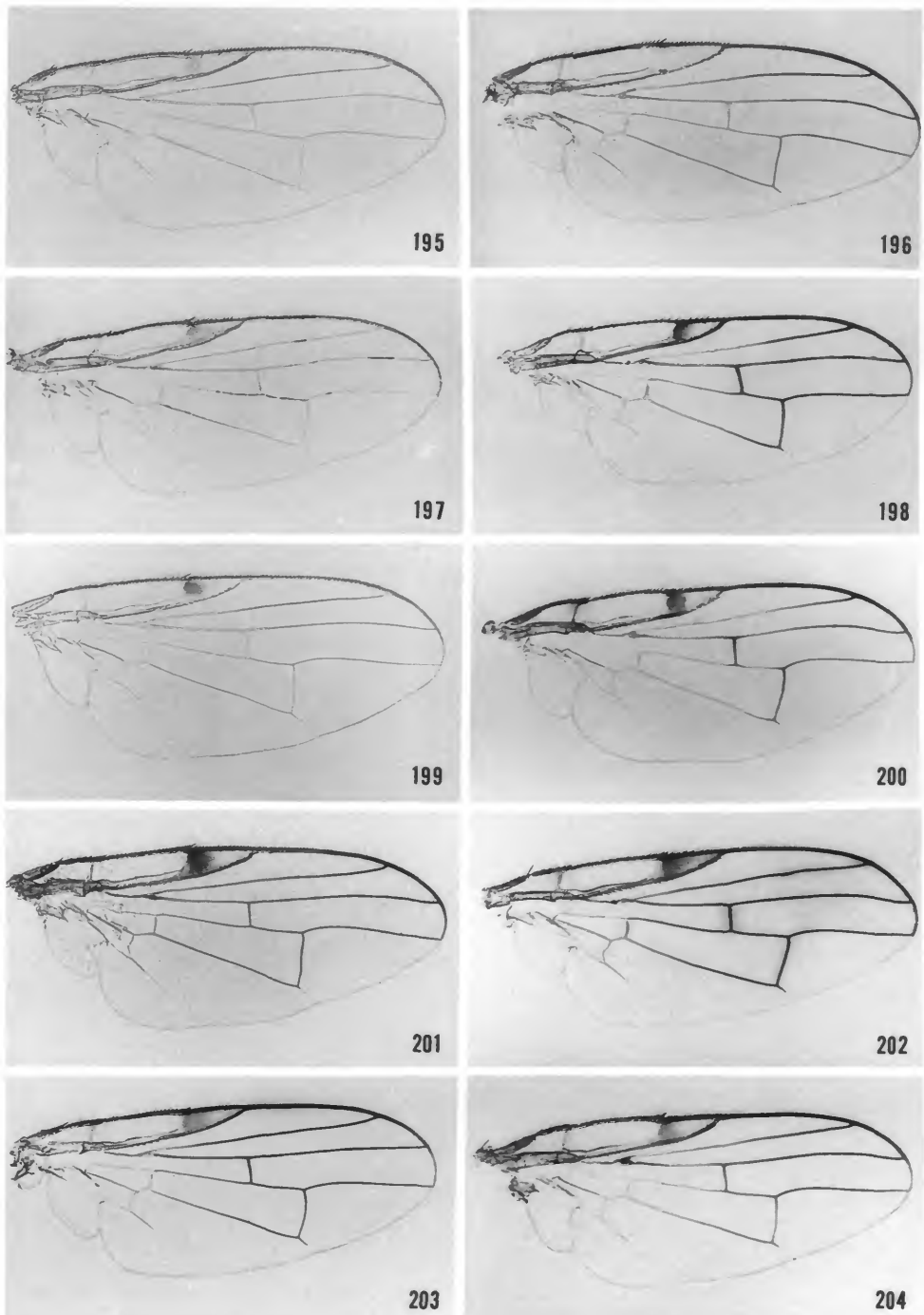
HOST PLANTS.—Unknown.

REMARKS.—Externally this species is distinguished from similar congeners by the tergal pattern, which consists of four rows of black spots, as in specimens of many other terelliine genera. The male distiphallus (Figure 180) is characterized by the long, narrow, and convoluted tube; the female is characterized by the aculeus (Figure 181), which is relatively broadly rounded apically.

This species has not been recorded since its original description.



FIGURES 185–194.—Wings of *Neaspilota* species. 185, *Neaspilota alba;* 186, *N. albidipennis;* 187, *N. floridana;* 188, *N. vernoniae;* 189, *N. achilleae;* 190, *N. aenigma;* 191, *N. albiseta;* 192, *N. appendiculata;* 193, *N. brunneostigmata;* 194, *N. callistigma.*



FIGURES 195–204.—Wings of *Neaspilota* species. 195, *N. dolosa;* 196, *N. footei;* 197, *N. isochela;* 198, *N. pubescens;* 199, *N. punctistigma;* 200, *N. signifera;* 201, *N. stecki;* 202, *N. viridescens;* 203, *N. viridescens;* 204, *N. wilsoni.*

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