ILLINOIS
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BULLETIN

The Genera of Nearctic Therevidae

Michael E. Irwin
Lyneborg

OF ILLINOIS
OIS INSTITUTE OF NATURAL RESOURCES

URAL HISTORY SURVEY DIVISION
MPAIGN, ILLINOIS

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CONTENTS

This report is printed by authority of the State of Illinois. It is a contribution from the Section of Economic Entomology of the Illinois Natural History Survey.

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(48940—1M—11-80)

Fig. 1. — *Thereva frontalis* Say adult female.

The Genera of Nearctic Therevidae

Michael E. Irwin and Leif Lyneborg

The first description of a North American therevid was of *Bibio abdominalis* from the West Indies (Fabricius 1805). Next, descriptions of Nearctic Therevidae were published by a European, C. R. W. Wiedemann (1821, 1824, and 1828), and an American, Thomas Say (1823, 1824, and 1829). Further descriptions followed thereafter by Macquart (1840), Walker (1848, 1850, 1852, and 1857), Rondani (1856), Bellardi (1861), Loew (1869*a*, 1869*b*, 1872, 1874, and 1876), Osten Sacken (1877 and 1887), Williston (1886), and Bigot (1889). The turn of the century brought a few new American dipterists into the picture (Johnson 1902 and 1926; Adams 1903 and 1904), but by far the most important therevid worker of that time was D. W. Coquillett, who published revisionary monographs of the Therevidae (1893*a* and 1893*b*) and added greatly to the concepts within the family (1894, 1898, 1904*a*, 1904*b*, and 1910). Following Coquillett, Otto Kröber of Germany became the reigning world authority on the Therevidae, and he added considerably to the number of described species in North America through revisions and new descriptions (1911, 1912, 1914, 1928*a*, 1928*b*, and 1929). In 1923 Frank Cole (1923*a*) published a monographic revision of the Therevidae of North America. This work has remained the definitive treatment for the area for the past 57 years. American workers, including Cole (1923*b*, 1925, 1959, 1960*a*, and 1960*b*), Hardy (1938 and 1943), James (1936 and 1949), James & Huckett (1952), and Bromley (1937), added occasional new descriptions and names to the slowly growing list of Therevidae of North America. In the late 1960's and 1970's, we became active in the area of therevid systematics. Lyneborg (1972) revised the *Xestomyza* group of Therevidae, including the genus *Henicomyia* from the Western Hemisphere, and Irwin (1977*a* and 1977*b*) revised three genera of North American Therevidae.

During the course of preparing the Therevidae chapter for the soon-to-be-published *Manual of Nearctic Diptera* (Canada Department of Agriculture 1981), we found that the previously published descriptions of genera were totally inadequate to form a framework for the therevid species of North America. The genus *Psilocephala* Zett., for instance, was found to be polyphyletic, containing species from several diverse ancestors. An effort to describe the many new genera contained herein was begun because we realized the definitive nature of the forthcoming *Manual of Nearctic Diptera* and the importance of establishing a generic base for the Therevidae founded on synapomorphies. We have restrained ourselves from grouping the genera beyond the subfamilial level simply because we feel that better natural groupings can be formed once genera from other parts of the world are included in the scheme.

We have attempted to place the described species in the new generic concepts at the end of each diagnosis. All North American genera are diagnosed, and male terminalia are figured for all genera. In total, 29 genera and 143 currently valid species have been described for North America, excluding *Apsilocephala* Kröber (1914) and its included species, *longistyla* Kröber (1914), which we feel does not belong within the family Therevidae. We have not included *Melanothereva* Malloch (1932:249) that occurs in Chile, Peru, and parts of Argentina and contains a single Nearctic species, *nigra* (Bellardi) [1861:92, ♂

(*Psilocephala*)] that, to our knowledge, has not been rediscovered since it was first described from Mexico.

The descriptions and keys follow morphological terminology developed by us. Male terminalia characters were originally defined and described by Lyneborg (1968*a*) and have since been modified slightly by Lyneborg (1972, 1976, and 1978) and by Irwin (1977*a* and 1977*b*). Female terminalia characters were defined and described by Irwin (1976). Other morphological features are generally accepted in Diptera literature, and we refrain from detailing them here. The immature stages of Therevidae have not been used in developing this preliminary classification. Larval and pupal stadia are being gathered and associated with adults in the hope that eventually they will help to elucidate the proper phylogenetic placement of species within genera and genera within suprageneric taxa.

ACKNOWLEDGMENTS

We wish to express our deep gratitude to Herbert J. Teskey, Canadian National Collection, and Donald W. Webb, Illinois Natural History Survey, for reviewing the manuscript. We also wish to thank John P. Sherrod for drawing the frontispiece, the late Kai L. Elsman and Robert Nielsen for illustrating the paper, and Sandy McGary for typing the manuscript. Robert M. Zewadski, Technical Editor of the Illinois Natural History Survey, edited the final version for publication.

This publication would not have been possible without the loan of material from nearly all of the major entomological collections in North America and the loan of type material from the United States National Museum of Natural History, the Canadian National Collection, the Philadelphia Academy of Natural Sciences, the California Academy of Sciences, the California Insect Survey (Berkeley), the American Museum of Natural History, Cornell University, the British Museum of Natural History, Martin Luther University (Halle), Naturhistorisches Museum (Vienna), Zoological Museum (Copenhagen), and others. To the curators who made these specimens available, we owe a great debt of gratitude. We especially acknowledge the help and encouragement of the curators from the University of California at Riverside, Saul I. Frommer; the University of California at Davis, Robert O. Schuster; and the University of California at Berkeley, Evert I. Schlinger.

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ABBREVIATIONS USED IN DESCRIPTIONS AND FIGURES

ad: anterodorsal
ae: aedeagus
av: anteroventral
c: cerci
dap: dorsal apodeme
dc: dorsocentral
dp: distiphallus
eap: ejaculatory apodeme
ep: epandrium
f_1: fore femur
f_2: middle femur
f_3: hind femur
gc: gonocoxite
gs: gonostylus
h: hypandrium
np: notopleural
pa: postalar
pap: parameral apodeme

pd: posterodorsal
pp: parameral process
pv: posteroventral
sa: supra-alar
sc: scutellar
t_1: fore tibia
t_2: middle tibia
t_3: hind tibia
vap: ventral apodeme
veps: ventral epandrial sclerite
vl: ventral lobe

FAMILY THEREVIDAE

Description of Adult

Slender to moderately thick-bodied flies (Fig. 1); length, excluding antennae, 2.5–15 mm. Background color light yellow to black. Body wholly or partly pilose, tomentose, pruinose, or some combination of these characters; setae usually prominent.

Head. — Hemispherical, not depressed at vertex, hypognathous to prognathous. Eyes dichoptic in female, holoptic in most males, usually without hairs in both sexes. Frons of female wide, reaching ocellar tubercle, often covered variously with pollen and scattered hairs; frons of male usually small, acutely to broadly triangular, tomentose to bare, often without hairs. Three prominent ocelli set at vertex or slightly anterior of vertex. Antenna three segmented, sometimes set on prominent frontal protuberance; scape variously setose; pedicel usually with a ring or two of short setae; first flagellomere without setae, or with setae usually confined to basal third; flagellar style comprises 1 or 2 flagellomeres and a terminal or subterminal spine set apically or subapically on apical flagellomere; spine elongate and prominent in some genera, but almost undetectable in others. Face often tomentose; lateral areas pilose or not; genae pilose or not, often with a darkened tomentose or bare stripe; occiput finely tomentose, often densely pilose from midpoint ventrally and prominently setose dorsally; postocular setae usually present though often slender. Palps one or two segmented, usually pilose and not prominent, set beside proboscis in subcranial cavity; proboscis slightly longer than palps, usually carried within subcranial cavity.

Thorax. — Scutum varies from nearly square to elongately rectangular when viewed from above, often sparsely to densely tomentose or pilose or both. Scutellum prominent, often without pile, but almost always tomentose. Pleuron variously pilose; upper portion usually densely tomentose; lower portion sometimes without pollen. One pair postalar setae; 1–6 pairs notopleural setae or more; 1 or 2 pairs supra-alar setae; usually 0–2 pairs dorsocentral setae, but 3 or more in a few species; 0–3, rarely 4, pairs scutellar setae.

Wing. — Venation remarkably uniform (Fig. 32); R_1 setose or not; R_4 elongate, usually S-shaped; cell d has m_1, m_2, m_3 arising from apex; CuA_1 does not meet posterior margin of cell d; crossvein m-cu present; cell cu-p closed behind; cell m_3 open or closed; abnormalities common in wing venation. Stigma usually well-developed. Wing hyaline to infuscate, sometimes banded or spotted, veins often surrounded by darker infuscation. Microtrichia from sparse to dense. Calypter well-developed. Halter large and well-developed.

Legs. — Usually fairly long and slender; hind legs longer than others. Fore coxa (Fig. 3) with none to several setae on anterior surface; middle coxa with (Fig. 4) or without (Fig. 5) pile on posterior surface; all femora bare to heavily setose, especially anteroventrally, often with long scalelike pile along dorsal surface; tibiae and tarsi setulose in definite longitudinal rows; fore tibia lacks setae anteroventrally. Five tarsomeres present; first tarsomere longest and sometimes swollen; claw with 2 pulvilli and a setalike central empodium or without empodium.

Abdomen. — Usually convex to flattened dorsally and tapering at apex, sometimes laterally compressed, always with 8 well-developed pregenital segments. Fine silvery pollen often adorns

abdomen, covering it completely in male of many species and in patterns on female. Tomentum and pile present or absent, usually longer and denser on male.

FEMALE TERMINALIA. — Characterized by large conspicuous sternite 8, functioning variously as a digging-anchoring apparatus for oviposition, a floor for genital chamber, and a guide for penial insertion during copulation (Irwin 1976). Sternite 9 (furca), acting as roof of genital chamber, completely internal, with 2 lateral sclerites fused posteriorly

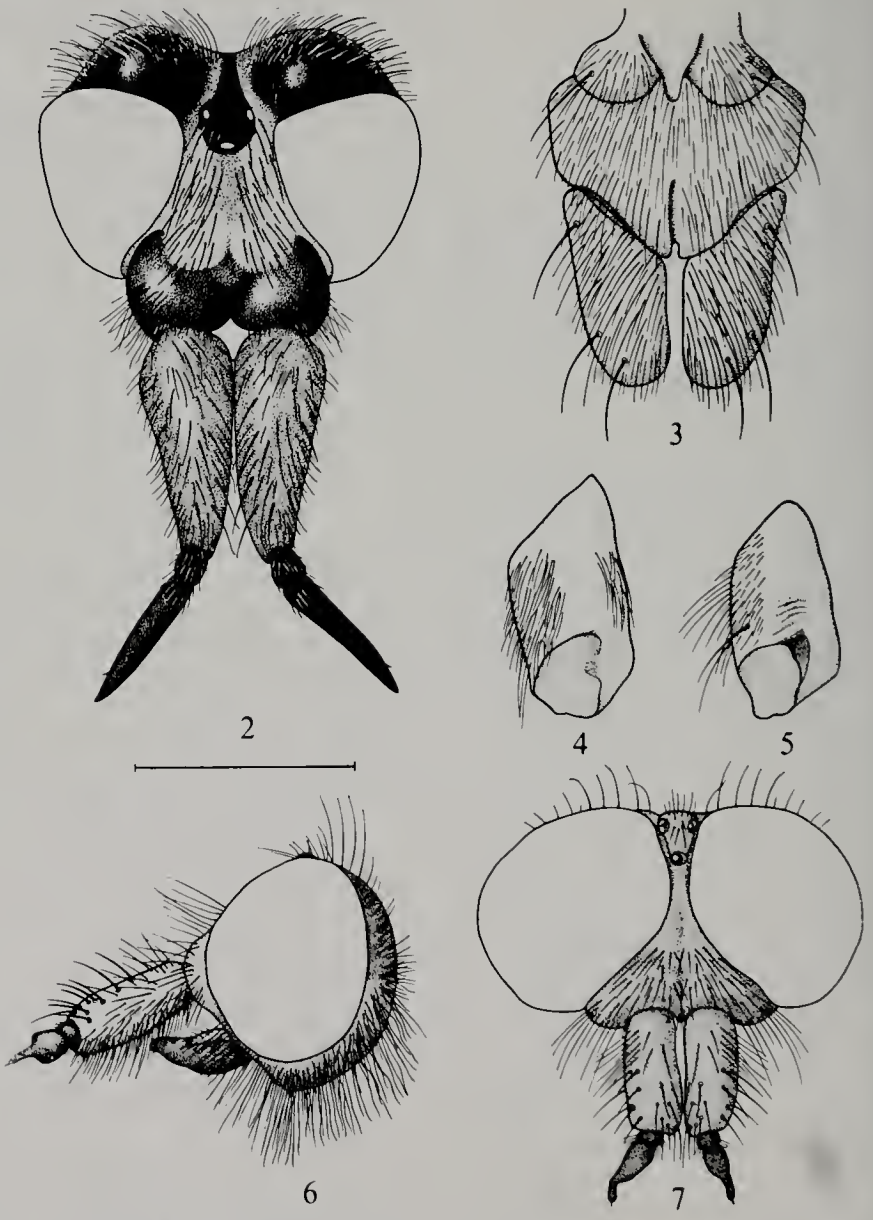

Fig. 2–7. 2. — *Nebritus pellucidus* Coq. male head in dorsal view. 3. — *Megalinga insignata* Irw. & Lyn. fore coxae, prasternum, and cervical lobes. 4. — *Pallicephala variegata* (Lw.) middle coxo. 5. — *Ozadiceromya mexicana* Big. middle coxa. 6. — *Tabuda varia* (Wlk.) head in lateral view. 7. — Dorsa-frontal view. Scale: 1 mm.

to a sclerotized bar that contains a membranous central sheath through which pass ducts of spermathecae and accessory glands. Three unsclerotized spermathecae and 2 accessory glands present. Tergite 8 generally unmodified. Tergite 9 usually

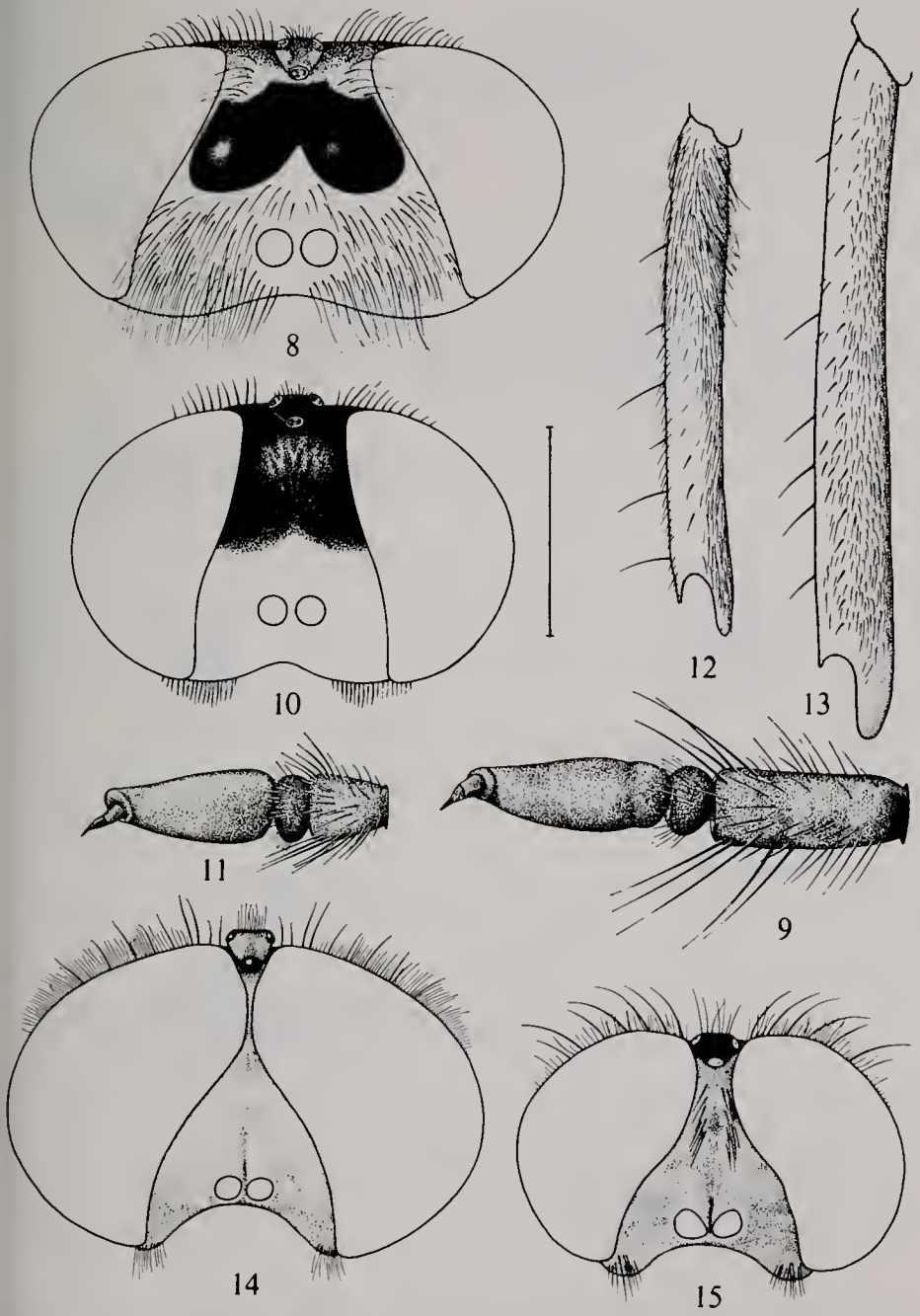

Fig. 8–15. 8. — *Thereva plebeja* (L.) female head in frontal view. 9. — Antenna. 10. — *Psilocephala* sp. female head in frontal view. 11. — Antenna. 12. — *Pandivirilia limata* (Coq.) hind femur in ventral view. 13. — *Viriliricta mantivaga* (Coq.) hind femara in ventral view. 14. — *Pandivirilia limata* (Coq.) male head in frontol view. 15. — *Dichaglena amplifrons* (Cole) male head in frontal view. Scale: 0.5 mm for 9 and 11, 1 mm for others.

a single sclerite, generally with extended lateral margins fused to posterolateral margins of furca. Tergite 10 always divided though often fused with tergite 9; digging-anchoring spines often present posterodorsally and anterolaterally although reduced in Phycinae. Sternites 10 and 11 (hypoproct or subanal plate) generally a single plate, usually heavily sclerotized though more thinly so in some genera of Phycinae. Cerci disc shaped, attached to tergite 10 in most groups, but fused into a single sclerite in *Pherocera, Parapherocera,* and *Schlingeria.*

MALE TERMINALIA (Fig. 107–114). — Fairly uniform in plan. Sclerites forming sternite 8 and tergite 8 unmodified to narrowly constricted medially. Tergite

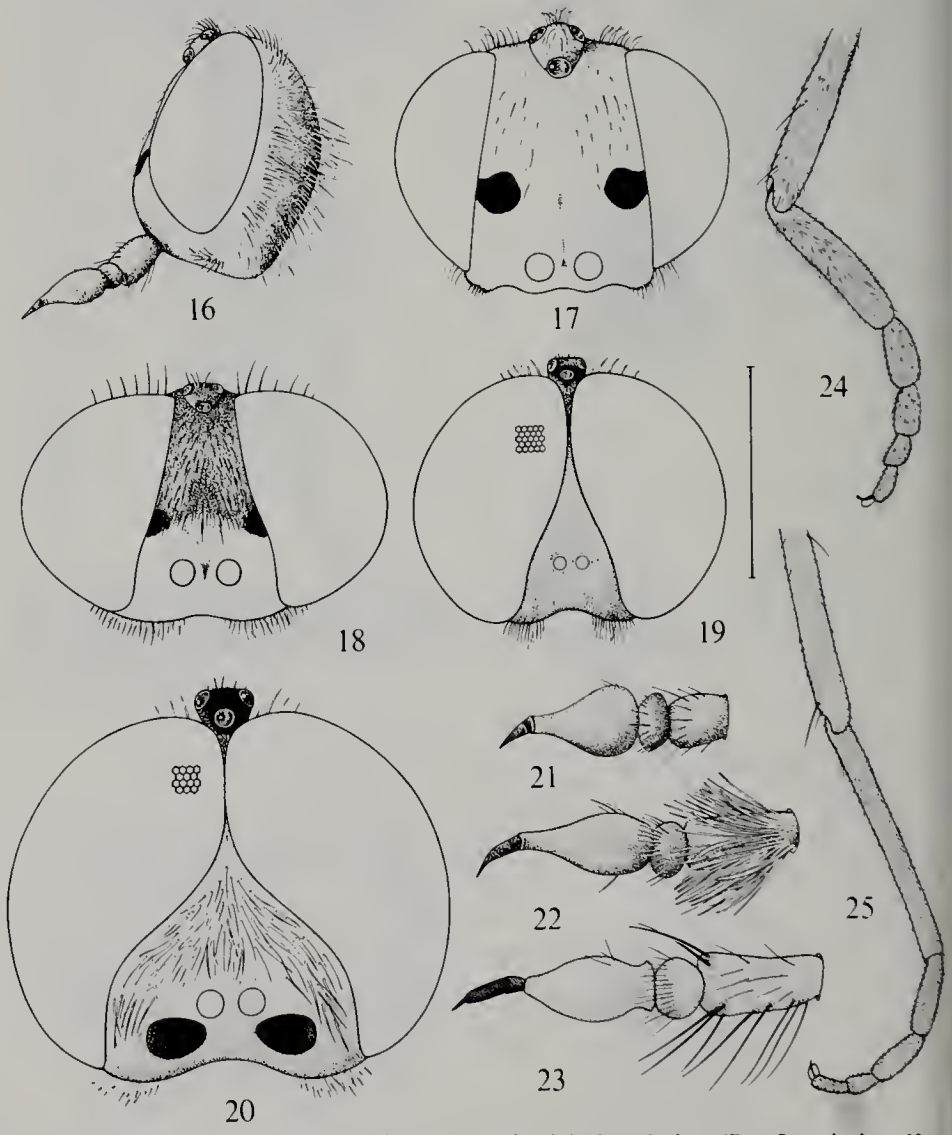

Fig. 16–25. 16. — *Litolinga acuta* (Adams) female head in lateral view. 17. — Frontal view. 18. — *Brachylinga baccata* (Coq.) female head in frontal view. 19. — *Arenigena semitaria* (Coq.) male head in frontal view. 20. — *Ammanaios niveus* (Kräb.) male head in frontal view. 21. — *Arenigena semitaria* (Coq.) antenna. 22. — *Ammanaios niveus* (Kröb.) antenna. 23. — *Rhagiafarma maculipennis* (Kröb.) antenna. 24. — *Cyclatelus rufiventris* (Lw.) female fore tarsus. 25. — *Penniverpa festina* (Coq.) female fore tarsus. Scale: 0.5 mm for 21–23, 1 mm for others.

9, the epandrium, acting as a large covering for terminalia, variously haired, often with posterolateral lobes of various sizes and shapes; bears ventral epandrial sclerite and cerci apically. Sternite 9, the hypandrium, large in some genera, nar-

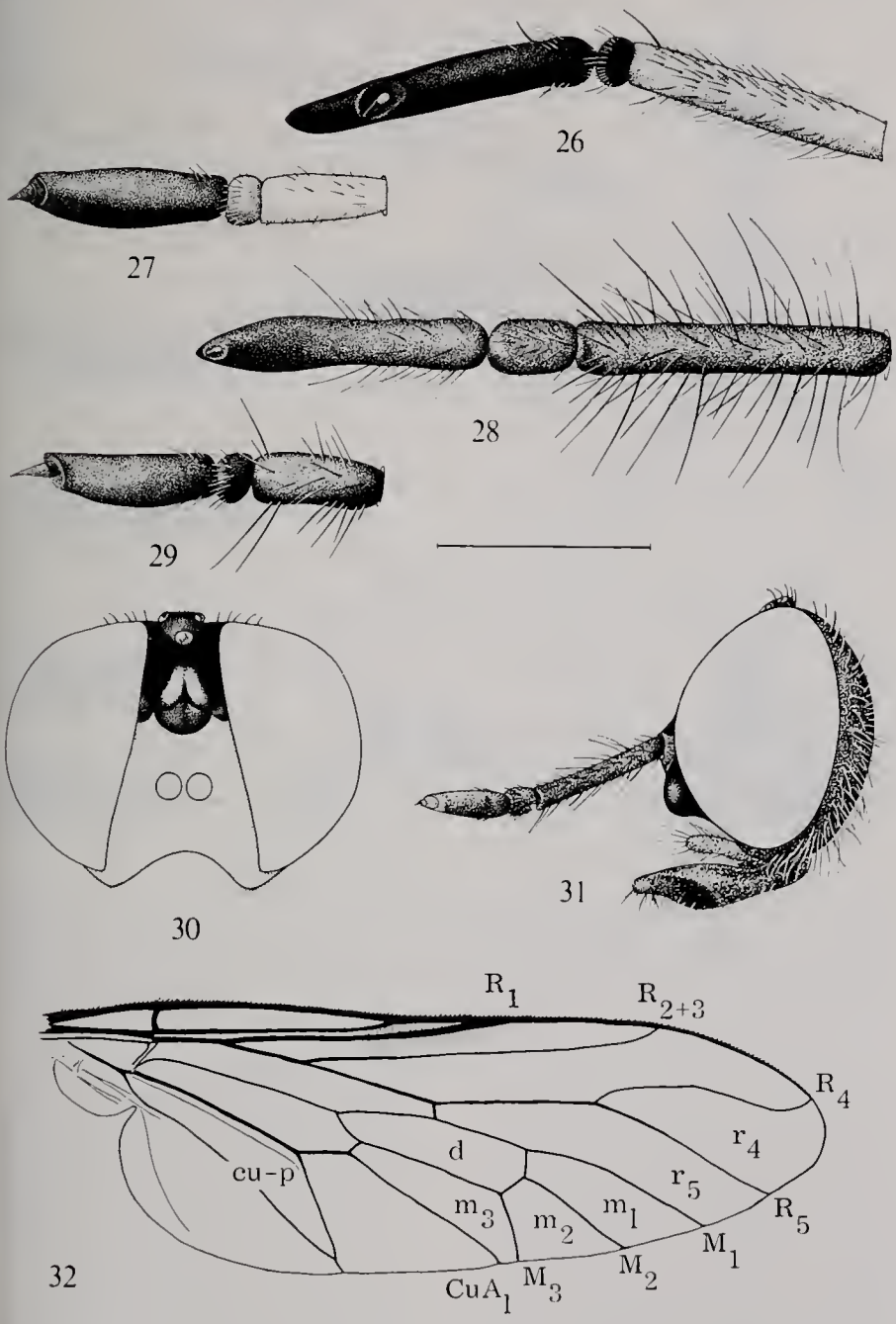

Fig. 26–32. 26. — *Cyclotelus pruinosus* Wlk. antenna. 27. — *Cyclotelus rufiventris* (Lw.) antenna. 28. — *Ozodiceromya mexicana* Big. antenna. 29. — *Ozodiceromya signatipennis* (Cole) antenna. 30. — *Cyclotelus rufiventris* (Lw.) female head in frontal view. 31. — *Chromolepida bella* Cole male head in lateral view. 32. — *Pandivirilia limata* (Caq.) wing. Scale: 1.3 mm for 26, 0.5 mm for 27–29, 1 mm for 30, and 0.7 mm for 31.

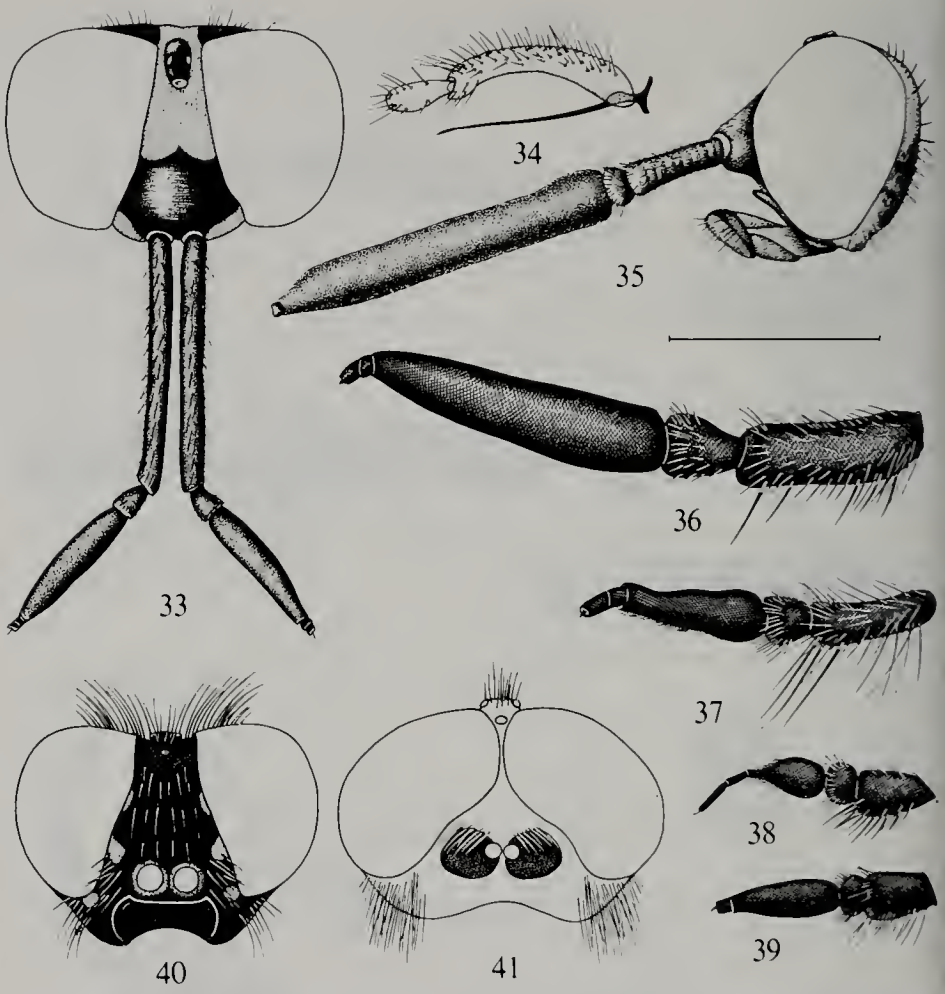

Fig. 33–41. 33. — *Phycus brunneus* (Wlk.) male head in anterodorsal view. 34. — *Phycus brunneus* (Wlk.) palp. 35. — *Henicamyia hubbardii* Coq. male head in lateral view. 36. — Antenna of an unnamed species of *Phycus* from southern California. 37. — *Parapherocera montana* Irw. antenno. 38. — *Pherocera* sp. antenna. 39. — *Schlingeria ammobata* Irw. antenna. 40. — *Parapheracera montana* Iwr. male head in frontal view. 41. — *Pherocera* sp. male head in frontal view. Scale: 0.5 mm for 34 and 36–39; 1 mm for 33, 35, 40, and 41.

row to absent in others, variously free from or fused to gonocoxites. Gonocoxites fused or free ventrally. Each gonocoxite often extends posteriorly as a broad to narrow lobe well beyond insertion of gonostylus, usually with one or more additional appendages. These appendages include ventromedially a ventral lobe that appears to function as an aedeagal guide and dorsally a paramere (= dorsal gonocoxal process). Paramere composed of (1) a rod-shaped apodeme most anteriorly on gonocoxite and in some groups with a connecting sclerotized bridge to aedeagus, (2) a midsection closely fused with dorsal edge of gonocoxite, and (3) a free distal portion, the parameral process, usually shaped as a style bearing setae apically, but entirely absent in many genera. Gonostylus variously shaped, moving in a dorsoventral or oblique direction and not opposed, seemingly lying within genital cavity of female during copulation. Aedeagus consists of a short to long variously twisted distiphallus, an elongate

or vestigial dorsal apodeme, a simple or forked ventral apodeme sometimes having 2 extensions toward tip of distiphallus, and a variously shaped ejaculatory apodeme. Aedeagus attached at one or more of three sites, (1) by anterior edge of intersegmental membrane below epandrium (usually as a basal extension of ventral epandrial sclerite) to distal margin of dorsal apodome, (2) by parameral apodeme to dorsolateral portion of aedeagus, or (3) by ventral lobe to midventral section of aedeagus.

KEY TO THE GENERA OF NEARCTIC THEREVIDAE

1. Middle coxa with pile on posterior surface (Fig. 4) 2
   Middle coxa without pile on posterior surface or with only a few appressed scalelike hairs (Fig. 5) 20
2. Prosternum with pile in and around central depression (Fig. 3) 3
   Prosternum without pile in and around central depression 15
3. Lower frons in both sexes entirely shiny; head strongly protruding anteriorly; compound eyes of male separated by more than width of ocellar tubercle (Fig. 2) ..... **Nebritus** Coquillett (p. 249)
   Lower frons at least partially tomentose; head not strongly protruding anteriorly; compound eyes separated at most by width of ocellar tubercle 4
4. Lateral portion of face, at least upper part, without pile 5
   Lateral portion of face, at least upper part, with pile 13
5. Paired cervical lobes anterior to prosternum, each with a strong black seta in addition to whitish pile (Fig. 3). Veins R_{2+3} and R_4 have a deep curve before wing margin. Distiphallus deeply cleft at apex (Fig. 164) .. **Megalinga** Irwin & Lyneborg (p. 242)
   Paired cervical lobes anterior to prosternum without a strong black seta, with only whitish pile present. Vein R_{2+3} usually has a gentle curve before wing margin. Distiphallus not cleft 6
6. Macrosetae of mesonotum all pale. Parameral process present, enlarged, and modified distally (Fig. 149 and 156). Cell m_3 closed ..... **Arenigena** Irwin & Lyneborg (p. 238)
   Macrosetae of mesonotum usually all black; if macrosetae pale (some *Lysilinga*), then cell m_3 open. Parameral process absent or present and simple. Cell m_3 only rarely closed 7
7. Scape in lateral view distinctly wider than first flagellomere (Fig. 54 and 55); pile of scape long and dense 8
   Scape in lateral view narrower than or as wide as first flagellomere (Fig. 21–23); pile of scape short and sparse 9
8. Male frons has pile. Lower part of female frons has pile. Fore and middle femora without setae. Epandrium (Fig. 42 and 43) has posterolateral corners only slightly projecting and not extending to distal margin of cerci and ventral epandrial sclerite; the latter often greatly enlarged. Hypandrium absent (Fig. 44) ..... **Dialineura** Rondani (p. 204)
   Male frons without pile. Lower part of female frons without pile. Fore and/or middle femora usually have some short setae. Epandrium (Fig. 48 and 49) has posterolateral corners strongly projecting, extending to or beyond distal margin of cerci and ventral epandrial sclerite. Hypandrium (Fig. 50) present as a small narrow transverse sclerite between anteroventral margins of gonocoxites .. **Pallicephala** Irwin & Lyneborg (p. 206)
9. One pair of scutellar setae and genal area (Fig. 16) have darkened wedge or stripe; ocellar tubercle very prominent, especially in male ..... **Litolinga** Irwin & Lyneborg (p. 234)
   Two pairs of scutellar setae or genal area not darker than lower portion of occiput, uniform in color and texture; ocellar tubercle normal 10
10. Palps constricted a short distance before apex. Wing strongly maculated. Male frons prominent, with long, dense, black pile. Female abdomen yellowish brown with median row of dark spots ..... **Rhagioforma** Irwin & Lyneborg (p. 236)
    Palps not constricted apically. Wing not strongly maculated. Male frons with or without long, dense pile. Female abdomen variously colored, usually brownish to grayish, without median row of dark spots 11
11. Pile of fore femur pale and erect, composed of long, uniform, thin hairs. Parameral process large, free; gonostylus simple, slender (Fig. 66 and 67) ..... **Pandivirilia** Irwin & Lyneborg, in part (p. 212)

Pile of fore femur composed of appressed whitish, scaly hairs and slender, erect hairs that are whitish or blackish. Paramere without a distal portion; gonostylus hook-shaped, bearing groups of setae (Fig. 122, 129, and 130) 12

12. Dorsocentral setae absent. Abdomen orange to reddish brown in both sexes. Aedeagus (Fig. 122) about half as long as gonocoxite; distal section of distiphallus subapical, projecting downward (Fig. 125)..... ...**Lysilinga** Irwin & Lyneborg (p. 230)

One or two pairs of dorsocentral setae present. Abdomen gray or black. Aedeagus (Fig. 129) usually more than half as long as gonocoxite; distal section of distiphallus apical (Fig. 133) ..... **Brachylinga** Irwin & Lyneborg (p. 232)

13. Frons (Fig. 20) in both sexes has dense, appressed pile of whitish, scaly hairs. Macrosetae of mesonotum pale. A circular blackish area usually present in and around each anterior tentorial pit ..... **Ammonaios** Irwin & Lyneborg (p. 240)

Frons in both sexes has pile of erect, normal hairs. Macrosetae of mesonotum black. Area in and around anterior tentorial pits not differently colored from rest of face..... 14

14. Male has epandrium as long as or longer in midline than wide (Fig. 103); aedeagus has ventral projections adjoining distiphallus (Fig. 104). Male abdomen covered entirely by whitish pile. Female frons has pattern formed by dull pale or dark colored tomentum, without subshiny to shiny calli ....**Acrosathe** Irwin & Lyneborg (p. 223)

Male epandrium much shorter in midline than wide (Fig. 81); aedeagus without ventral projections adjoining distiphallus (Fig. 83). Male abdomen covered entirely by whitish pile only in a few species. Female frons (Fig. 8) in most species has callus or calli that are large, shiny, black or at least subshiny medially ....**Thereva** Latreille (p. 216)

15. Scape (Fig. 6) distinctly longer and wider than first flagellomere. Head protruding anteriorly 16

Scape not longer or wider than first flagellomere. Head not strongly protruding anteriorly 17

16. Male has compound eyes (Fig. 7) separated by at least width of anterior ocellus. Two supra-alar setae and 1 dorsocentral seta present. Cell m_3 broadly open. Parameral process knoblike (Fig. 96)...**Tabuda** Walker (p. 221)

Male has compound eyes separated by less than width of anterior ocellus. One supra-alar seta present; dorsocentral setae absent. Cell m_3 closed or narrowly open. Parameral process extends beyond level of gonocoxite (Fig. 88) **Tabudamima** Irwin & Lyneborg (p. 219)

17. Mesonotal pile of male short, sparse, and appressed; hairs shorter than width of scape. Hind femur (Fig. 13) has sparse, appressed pile and many short, scattered, black setae on entire ventral surface in addition to normal row of strong, anteroventral setae.... ..**Viriliricta** Irwin & Lyneborg (p. 208)

Mesonotal pile of male long, abundant, erect; hairs distinctly longer than width of scape. Hind femur (Fig 12) has denser, usually erect pile and at most a few short, black, posteroventral setae apically in addition to usual row of strong anteroventral setae..... 18

18. Male compound eyes (Fig. 15) separated by at least width of anterior ocellus. Female has black or blackish brown tibiae. Female has tergite 4 entirely shiny black..... **Dichoglena** Irwin & Lyneborg (p. 210)

Male compound eyes (Fig. 14) separated by less than half width of anterior ocellus. Female has yellowish brown tibiae. Female has tergite 4 at least partly tomentose 19

19. Lower frons of both sexes has whitish pile; upper, lateral portion of face with long, whitish pile. Hypandrium (Fig. 73) present; distiphallus long, its tip twisted (Fig. 75)..... ..**Spiriverpa** Irwin & Lyneborg (p. 214)

Lower frons of both sexes either without pile or with blackish pile; upper, lateral portion of face in most species without pile, but if pile present, then black. Hypandrium (Fig. 66) absent; distiphallus short, its tip not twisted (Fig. 68) ....**Pandivirilia** Irwin & Lyneborg, in part (p. 212)

20. Prosternum has pile in and around central depression (Fig. 3)..... 21

Prosternum without pile in and around central depression..... 24

21. A pair of shiny, black, raised calli on upper face below antennal bases (Fig. 31). Thorax and abdomen clothed with totally appressed, broad scales in addition to normal pile.... .....**Chromolepida** Cole (p. 258)

Face without shiny calli. Pile of thorax and abdomen composed of semi-appressed, scaly hairs and erect, normal hairs 22

22. Cell m_3 broadly open. Male frons entirely tomentose and without pile; female frons entirely tomentose. Fore tibia has at most 2 or 3 very short posteroventral setae; fore tibia and first tarsomere very slender (Fig. 25) ..**Penniverpa** Irwin & Lyneborg (p. 227)

Cell m_3 closed or narrowly open (in some *Breviperna*). Male frons usually partly shining and with pile; female frons variously shining (not in *Breviperna*). Fore tibia has several stout posteroventral setae; fore tibia and first tarsomere stout (Fig. 24)..... 23

23. Entire frons in both sexes covered with tomentum, without shiny areas. Male dichoptic. Large, broadly built species with short broad antennae..... .....**Breviperna** Irwin (p. 247)

Frons in both sexes at least partly shiny. Small and slenderly built species, with slender antennae (Fig. 28 and 29)...**Ozodiceromya** Bigot (p. 254)

24. Hind femur has appressed, scaly hairs, usually also some anteroventral setae. Tergite 10 of female heavily spinose; distal spines stout, short, projecting dorsally and laterally; basal spines slim, long, projecting ventrally..... 25

Hind femur has erect, normal hairs, without anteroventral setae. Tergite 10 of female slenderly spinose; spines of only one kind. **PHYCINAE**..... 26

25. First tarsomere of foreleg swollen (Fig. 24). Scutellum short, with pile on margin only; katepisternum without pile. Male terminalia partly telescoped and concealed within abdomen, usually yellowish. Parameral process absent (Fig. 182)..... .....**Cyclotelus** Walker (p. 251)

First tarsomere of foreleg not swollen. Scutellum long, with long pile on disc; katepisternum has long, pale pile. Male terminalia prominently projecting, polished black; parameral process large, prominently extends beyond gonocoxite (Fig. 107)..... .....**Psilocephala** Zetterstedt (p. 225)

26. Scutellar setae absent..... 27

One pair scutellar setae present..... 28

27. One or two notopleural setae present; mesopleuron without pile. First flagellomere much longer than scape (Fig. 35). Middle and hind tarsi have very short setae. Genital opening of female directed dorsally..... .....**Henicomyia** Coquillett (p. 262)

Three notopleural setae; mesopleuron has long pile. First flagellomere only slightly longer than scape (Fig. 39). Middle and hind tarsi have very long, thin setae. Genital opening of female posteriorly directed ....**Schlingeria** Irwin (p. 268)

28. Palps distinctly two segmented, with apical segment shorter (Fig. 34). Hind femur has very short, uniform hairs. Cerci of male project posteriorly beyond ventral epandrial sclerite (Fig. 204). Antenna distinctly longer than depth of head (Fig. 33)..... .....**Phycus** Walker (p. 260)

Palps one segmented. Hind femur has elongate hairs. Cerci and ventral epandrial sclerite of male project the same distance posteriorly. Antenna shorter than or about as long as depth of head 29

29. Antenna at least as long as depth of head; shining, raised callus present between antennal base and subcranial cavity (Fig. 40); male dichoptic.... .....**Parapherocera** Irwin (p. 264)

Antenna shorter than depth of head; no raised callus between antennal base and subcranial cavity; male holoptic (Fig. 41) (except for a single undescribed species from Mexico)..... .....**Pherocera** Cole (p. 266)

Subfamily Therevinae

These attributes characterize the North American members of the subfamily Therevinae.

1. Usually without a strong sclerotized bridge between dorsal apodeme of aedeagus and paramere; if such a bridge is present (*Cyclotelus,* some *Ozodiceromya*), hypandrium undetectable.
2. Ventral apodeme of aedeagus not forked and not vestigial, projects anteriorly as a simple sclerite.
3. Tergite 10 of female has a group of thickened spines (acanthophorites) set in posterodorsal and posterolateral positions and a second group of thinner, often longer spines set lateroventrally on tergite 9; tergite 9 fused with tergite 10.
4. Intersegmental membrane between sternite 8 and sternite 9 (furca) of female sclerotized.
5. Pregenital abdominal segments have spiracles in the pleural membrane.
6. Vein R_1 not setose.

Genus Dialineura Rondani

(Fig. 42–47)

Dialineura Rondani 1856:155. Type-species: *Musca anilis* Linnaeus 1761:442 by original designation. Type-locality: Sweden.

Reference: Lyneborg 1968*b*.

Diagnosis

Small- to medium-sized, moderately slender species.

HEAD. — Frons of male at its narrowest narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 2.0–2.5× as wide as ocellar tubercle; male frons entirely tomentose with long pile over most of its surface; female frons entirely and uniformly tomentose, sometimes with a dull, dark, transverse band over middle, with tomentum of lower frons sometimes paler than that of upper frons; female frons has short, rather sparse pile over most of its surface; head markedly protruding anteriorly, antennae thus set on a distinct protuberance; a dark, dull band at antennal level apparent in certain views,

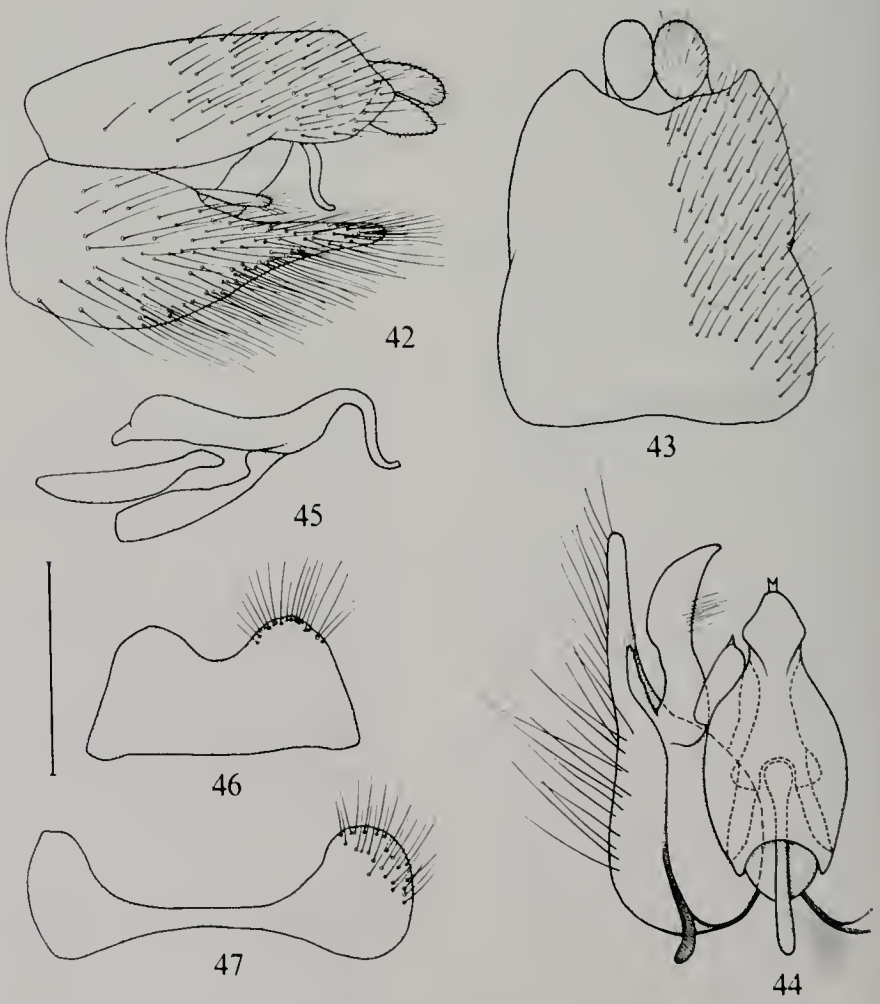

Fig. 42–47. — *Dialineura anilis* (L.) male terminalia. 42. — Genitalia in lateral view. 43. — Epandrium with appendages in dorsal view. 44. — Right ganacoxite with appendages and aedeagus in dorsal view. 45. — Aedeagus in lateral view. 46. — Sternite 8. 47. — Tergite 8. Scale: 0.5 mm.

but facial and genal calli absent; lateral portion of face usually bare, only pilose in *affinis* Lyneborg (1968*b*:157 ♂) from China; gena has long, pale pile; depth of head 1.1–1.3× length of antennae; scape 1.0–1.3× as long as flagellum, thickened; flagellar style apical and two segmented, with a small terminal spine; palps one segmented.

Thorax. — np 2–4 (usually 3), sa 2, pa 1, dc 1–3; sc 2; mesonotal pile in male long, uniform, erect, pale, with a few black hairs intermixed; mesonotal pile in female of two types: in the first, moderately long, sparse, erect, black and in the other short, rather dense, semi-appressed, pale; prosternum has long, pale pile in and around central depression. Wing. — Cell m_3 open; veins R_4 and R_5 of equal length; cell r_4 2.1–2.4× as long as wide at apex; color hyaline with faint grayish or brownish tinge; stigma pale brownish to dark brownish. Legs. — Fore coxa has 2–4 apical setae on anterior surface; middle coxa has long pile on posterior surface; hind femur has 6–10 anteroventral setae.

Abdomen. — Slender to moderately broad, gradually tapering from segment 3 onward; abdomen not telescoped; dorsum somewhat flattened in female, more convex in male; male dorsum covered entirely by silvery gray tomentum and whitish pile; female dorsum extensively tomentose, some species having distinct, dark, shining, anterior bands.

Male Terminalia (Fig. 42–47). — Tergite 8 (Fig. 47) rather large and markedly constricted medially; sternite 8 (Fig. 46) comparatively large, bilobed (i.e., has a deep V- or U-shaped incision in posterior margin); epandrium (Fig. 43) longer medially than wide, in most species more markedly narrowing posteriorly than in the type-species and has a distinct, lateral incision (Lyneborg 1968*a*); cerci free (Fig. 43), well sclerotized, never extending beyond ventral epandrial sclerite; ventral epandrial sclerite varies greatly in size, in the type-species (Fig. 43) not extending beyond cerci, but in other species from moderately (e.g., in *gorodkovi*) to noticeably extending beyond cerci, being longer than half length of epandrium; ventral epandrial membrane weak, reaching to near anterior margin of epandrium, but not attached to anterior margin of aedeagus; parameral apodeme not attached to aedeagus; distiphallus (Fig. 44) in dorsal view comparatively long and wide, sometimes provided with small spines; in lateral view, distiphallus (Fig. 45) suddenly downcurved with extreme apex upcurved; dorsal apodeme 2–4× as wide as distiphallus base, often with 2 tooth-shaped outshoots dorsally, its distal margin has a semicircular incision; ventral apodeme large, usually extending beyond dorsal apodeme and narrowly spoon shaped; ejaculatory apodeme simple, slightly thickened both proximally and distally; ventral lobes of gonocoxite long, slender, lamellate, directed obliquely upward and loosely attached to midventral surface of aedeagus; parameral process short, narrow, reaching far short of posterior apex of gonocoxite and rarely visible in lateral view (Fig. 42); parameral apodeme short and narrow; some species show an additional small, finger-like process on inner side of gonocoxite slightly distad of parameral process insertion (Lyneborg 1975: Fig. 2); gonocoxites not united ventrally except by a weak membrane; gonocoxite (Fig. 42) in lateral view characteristically projects and gradually narrows posteriorly; hypandrium totally absent.

Habitat

The habitat of the North American species is totally unknown.

Distribution

The one species recorded from the Nearctic Region has been found only in Manitoba, Canada. Several described species occur throughout the Palearctic Region.

Included Species

gorodkovi Zaitzev 1971:191 ♂, ♀. Distribution. — Fort Churchill, Manitoba, Canada; also Siberia in Asia.

No undescribed specimens are known to us.

Genus **Pallicephala** Irwin & Lyneborg, new genus (Fig. 4 and 48–55)

Feminine

Derivation of name: *palla* (Greek) = ball; *kephale* (Greek) = head.

Type-species: *Psilocephala variegata*

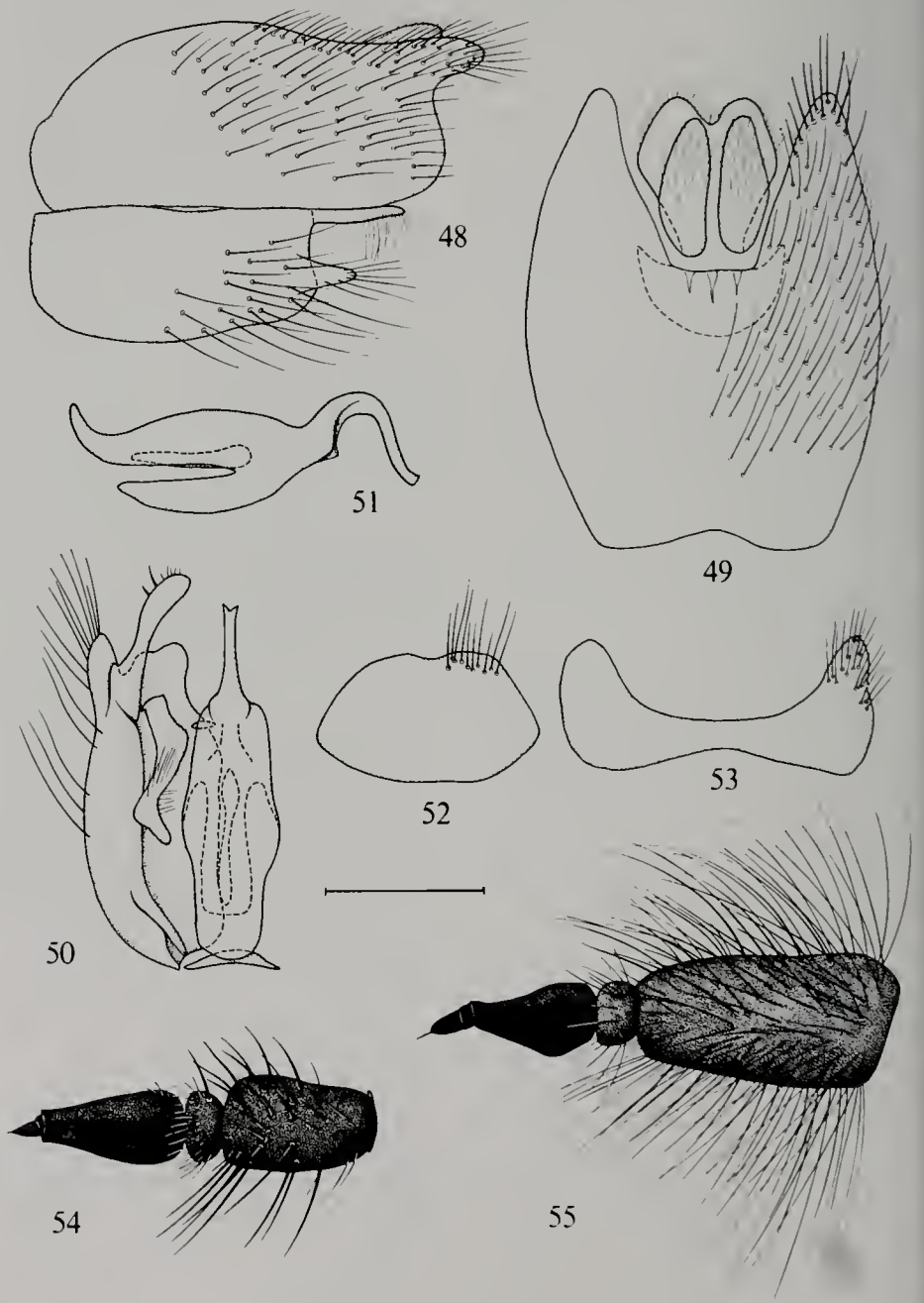

Fig. 48–55. — *Pallicephala* spp. 48–53. — *P. willistani* (Cale) male terminalia. 48. — Genitalia in lateral view. 49. — Epandrium with appendages in dorsal view. 50. — Right ganacaxite with appendages and aedeagus in dorsal view. 51. — Aedeagus in lateral view. 52. — Sternite 8. 53. — Tergite 8. 54. — Antenna of *P. variegata* (Lw.). 55. — Antenna of *P. willistani* (Cale). Scale: 0.5 mm.

Loew 1869*b*:170 by present designation. Type-locality: "Canada" (probably eastern Canada).

Diagnosis

Moderate to large-sized, slender to heavy-bodied species.

Head. — Frons of male at its narrowest narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 2.2–2.5× as wide as ocellar tubercle; male frons entirely tomentose, uniformly colored, and without pile; female frons entirely tomentose, either uniformly colored or upper part darker than lower part, or has a pair of dark, velvety spots; pile of female frons restricted to upper two-thirds and in most species short and sparse; head rather prominently protrudes anteriorly; a dull, darkened band crosses frons at antennal level, but facial and genal calli absent; lateral portion of face without pile; genae have long pile; head 1.1–1.5× deeper than antennal length (Fig. 54 and 55); scape 0.8–1.2× as long as flagellum, thickened in most species; flagellar style apical, stout, two segmented, with a small, terminal spine; palps one segmented.

Thorax. — np 3–5, sa 1–2, pa 1, dc 1–4, sc 1–2; mesonotal pile in most species short, pale, and semi-erect to appressed, but short, black, erect pile also occurs, and *willistoni* has long pile composed of black and white hairs; prosternum has long, pale pile in and around central depression. Wing. — Cell m_3 open (except in *variegata*); vein R_4 distinctly longer than vein R_5; cell r_4 1.9–2.5× as long as wide at apex; color hyaline with faint grayish-brown tinge, sometimes maculated; most species have a distinct, brown stigma. Legs. — Fore coxa has 2–3 pale or black, ventrally directed setae close to apical margin; these setae are slender in most species, but stout in *willistoni;* middle coxa has pile on posterior surface (Fig. 4); hind femur with 2–10 anteroventral setae.

Abdomen. — Moderately broad to broad, gradually tapering from base to apex; abdomen not telescoped; dorsum of male convex, of female more flattened; dorsum of male entirely tomentose or has blackish anterior bands on anterior tergites; dorsum of female has blackish anterior bands, with posterior parts of tergites tomentose.

Male Terminalia (Fig. 48–53). — Tergite 8 (Fig. 53) small and only moderately constricted medially; sternite 8 (Fig. 52) small, often without a distinct incision; epandrium (Fig. 49) shorter or slightly longer in midline than wide, posterolateral corners greatly project and broadly rounded, extending beyond cerci and ventral epandrial sclerite; cerci free (Fig. 49), well sclerotized, not extended beyond ventral epandrial sclerite; ventral epandrial sclerite sclerotized only as a bilobed area below cerci; membrane below epandrium reduced to 2 narrowly triangular sections posteriorly; parameral apodeme not attached to aedeagus; distiphallus (Fig. 50) in dorsal view short compared with dorsal apodeme, seen laterally (Fig. 51) suddenly downcurved; ventral apodeme forms a short spoon; ejaculatory apodeme short and simple; ventral lobes of gonocoxites directed upward, lamellate, narrowing distally, and have an attachment to ventral surface of aedeagus; parameral process large, extending beyond posterior margin of gonocoxite; gonocoxites not fused ventrally, but attached for a long distance by a membrane; gonocoxite in lateral view (Fig. 48) shows a process posteroventrally; hypandrium well developed, free (Fig. 50).

Habitat

Nothing is known of the habitats that species of this genus occupy except for *willistoni,* often found in oak grasslands along dry or nearly dry stream beds.

Distribution

Species in the genus *Pallicephala* are largely found in western North America; one species is found in the Great Lakes region of North America.

Included Species

flavipilosa (Cole) 1923*a*:62 ♂, ♀ (*Psilocephala* as a subspecies of *var-*

iegata Loew), new combination. Distribution. — Central California.

fuscipennis (Cole) 1923*a*:62 ♀ (*Psilocephala*), new combination. Distribution. — Washington.

occidentalis (Cole) 1923*a*:61 ♂ (*Psilocephala* as a subspecies of *variegata* Loew), new combination. Distribution. — Oregon.

variegata (Loew) 1869*b*:170 ♂ (*Psilocephala*), new combination. Distribution. — Great Lakes region of North America.

willistoni (Cole) 1965:352 (*Dialineura*), new combination. Distribution. — Pacific northwest southward to San Francisco Bay and Santa Cruz County, California.

crassicornis Williston 1886:293 ♂, ♀ (*Thereva*), not Bellardi 1861:88.

No undescribed species of this genus are at hand.

Genus **Viriliricta** Irwin & Lyneborg, new genus (Fig. 13 and 56–60)

Feminine

Derivation of name: *virilia* (Latin) = male genitals; *rictus* (Latin) = open, gaped.

Type-species: *Psilocephala montivaga* Coquillett 1893*b*:226 by present designation. Type-locality: Los Angeles County, California.

Diagnosis

Large though rather slender flies.

HEAD. — Frons of male at its narrowest at least as wide as width of anterior ocellus; frons of female narrow, at level of anterior ocellus 1.3–1.8× as wide as ocellar tubercle; male frons dull to subshiny, usually extensively darkened over most of its area, silver-gray to whitish tomentum usually restricted to lower, lateral parts; upper male frons has lateral rows of short, black, semi-appressed hairs (a few hairs may occur on lower frons); female frons extensively tomentose or subshiny black, tomentum dark, with richer, but shorter pile than that of male; head moderately to greatly protruding anteriorly; facial and genal calli absent; lateral portion of face without pile; gena has a few short hairs; head depth 1.2–1.4× antennal length; flagellum slender, 1.4–1.7× as long as scape; scape slender; flagellar style apical, two segmented, with a minute terminal spine; palps one segmented.

THORAX. — np 4–5, sa 2, pa 1, dc 1–2, sc 2; mesonotal pile of both sexes short, sparse and semi-appressed, not longer than width of scape; prosternum bare in and around central depression. WING. — Cell m_3 open; vein R_4 distinctly longer than vein R_5; cell r_4 2.7–3.0× as long as wide at apex; color hyaline with grayish to brownish tinge; stigma distinct. LEGS. — Fore coxa has 2–3 apical setae on anterior surface; middle coxa has sparse, short, whitish pile on posterior surface; hind femur (Fig. 13) has sparse, appressed pile, especially at base, 5–7 anteroventral setae, many additional, short, scattered, black setae on ventral surface; fore and middle femora usually have ventral setae in similar position.

ABDOMEN. — Male abdomen distinct; rather wide, short, tapering from base to apex (in *montivaga*); in other species longer, more slender, and nearly equally wide throughout; dorsum always distinctly convex; male dorsum may be entirely tomentose or may have a pattern of shiny black and tomentose areas; female dorsum shiny brownish to blackish with tomentose areas laterally on first few segments.

MALE TERMINALIA (Fig. 56–60). — Tergite 8 (Fig. 60) comparatively large and strongly constricted medially; sternite 8 (Fig. 59) also rather large, more or less distinctly incised along posterior margin; epandrium (Fig. 58) about as long at midline as wide, with large, broadly rounded posterolateral corners; cerci free, well sclerotized, not projecting beyond ventral epandrial sclerite; ventral epandrial sclerite large, reaching or nearly reaching anterior margin of epandrium, without distinct attachment to anterior

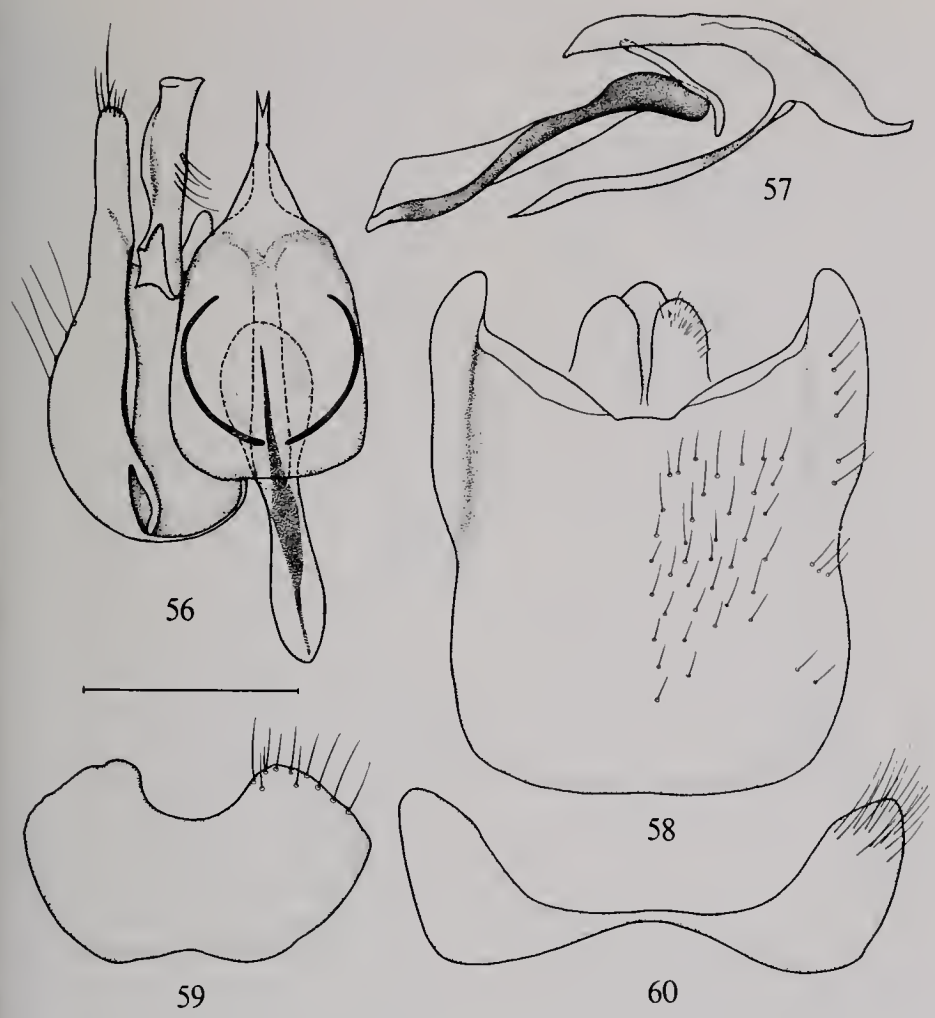

Fig. 56–60. — *Viriliricta montivaga* (Coq.) male terminalia. 56. — Right gonocaxite with appendages and aedeagus in dorsal view. 57. — Aedeagus in lateral view. 58. — Epandrium with appendages in dorsal view. 59. — Sternite 8. 60. — Tergite 8. Scale: 0.5 mm.

margin of aedeagus; ventral epandrial sclerite rather well sclerotized, especially posteriorly, where it is pointed and keel shaped, and diverges from cerci; parameral apodeme without attachment to aedeagus; distiphallus in dorsal view gradually tapering, in lateral view positioned in same plane as longitudinal axis of aedeagus (Fig. 57); dorsal apodeme large, rectangular; ventral apodeme long, slender; ejaculatory apodeme extends slightly anteriorly beyond dorsal apodeme; ventral lobes of gonocoxites moderately large, rounded and directed toward and loosely attached to ventral surface of aedeagus; ventral lobes not attached ventrally along midline; parameral process protrudes prominently beyond level of posterior margin of gonocoxite; parameral apodeme moderately long and slender; gonocoxites not united ventrally (Fig. 66) even by a membrane; gonocoxites in lateral view short and truncate posteriorly; hypandrium absent.

Habitat

Little is known about the habitat of these species. An adult of *V. montivaga*

was captured while resting on a leaf of a bush near a stream. All species seem to inhabit mountainous areas.

Distribution

Two species exist in the mountains of eastern North America and a third in western North America.

Included Species

canadensis (Cole) 1923*a*:57 ♀ (*Psilocephala*), new combination. Distribution. — Ontario, Canada. This species may prove to be conspecific with *grandis* (Johnson).

grandis (Johnson) 1902:24 ♀ (*Psilocephala*), new combination. Distribution. — Quebec, Canada, and New York.

montivaga (Coquillett) 1893*b*:226 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Mountains of California, Nevada, Arizona, and Utah.

One undescribed species from Tennessee is at hand.

Genus **Dichoglena** Irwin & Lyneborg, new genus (Fig. 15 and 61–65)

Feminine

Derivation of name: *dicha* (Greek) = in two parts; *glene* (Greek) = eyeball.

Type-species: *Psilocephala amplifrons* Cole 1925:85 by present designation. Type-locality: New York, West Danby. This species was erected as *latifrons* Cole 1923*a*:73 not *latifrons* Frey 1921: 82 (*Aristothereva*).

Diagnosis

Medium- to large-sized flies from somewhat slender to slightly broad.

HEAD. — Frons of male (Fig. 15) at its narrowest distinctly wider than, and up to twice as wide as, width of anterior ocellus; frons of female narrow, at level of anterior ocellus only 1.4–1.5× as wide as ocellar tubercle; male frons in frontal view dull brownish to blackish, in dorsal view shows silver gray tomentum, with sparse but rather long, black pile laterally on upper and/or lower part; female frons subshiny to shiny black or brown nearly overall, or on upper half only; pile denser than in male; head only slightly protrudes anteriorly; facial and genal calli absent; lateral portion of face bare; gena has short, stiff pile which may extend to lower face; head depth 1.2–1.3× length of antennae; scape slender, 0.5–0.6× as long as flagellum; flagellar style apical, two segmented, with a minute terminal spine; palps one segmented.

THORAX. — np 3–4, sa 2, pa 1, dc 0–2, sc 2; mesonotal pile of male long, erect, uniform, whitish; hairs much longer than width of scape; mesonotal pile of female much shorter, semi-appressed, black; prosternum bare in and around central depression. WING. — Cell m_3 open; vein R_4 longer than vein R_5; cell r_4 2.1–2.5× as long as wide at apex; color hyaline with grayish brown tinge; stigma distinct. LEGS. — Fore coxa has 2 or 3 apical setae on anterior surface; middle coxa has whitish pile on posterior surface; hind femur has 4–5 anteroventral setae.

ABDOMEN. — Slender, only slightly tapering from base to apex, and not telescoped; dorsum convex to rather flattened; male dorsum entirely covered by silver gray tomentum and by whitish pile: female dorsum extensively shiny to subshiny blackish, with small areas of tomentum on posterolateral corners of tergites 2–3 and 5–6; tergite 4 entirely shiny (cf. *Viriliricta, Pandivirilia,* and *Spiriverpa*).

MALE TERMINALIA (Fig. 61–65). — Tergite 8 (Fig. 64) comparatively very large, wider than epandrium, moderately constricted in middle; sternite 8 (Fig. 65) also large, only indistinctly incised posteriorly; epandrium (Fig. 63) shorter in midline than wide; posterolateral corners of epandrium greatly projecting; cerci free, well sclerotized, do not project beyond ventral epandrial sclerite; ventral epandrial sclerite well sclerotized overall, short, tapering anteriorly, far short of reaching anterior margin of epandrium: parameral apodeme without attachment to aedeagus; distiphallus in dorsal view (Fig. 61) narrow and short compared

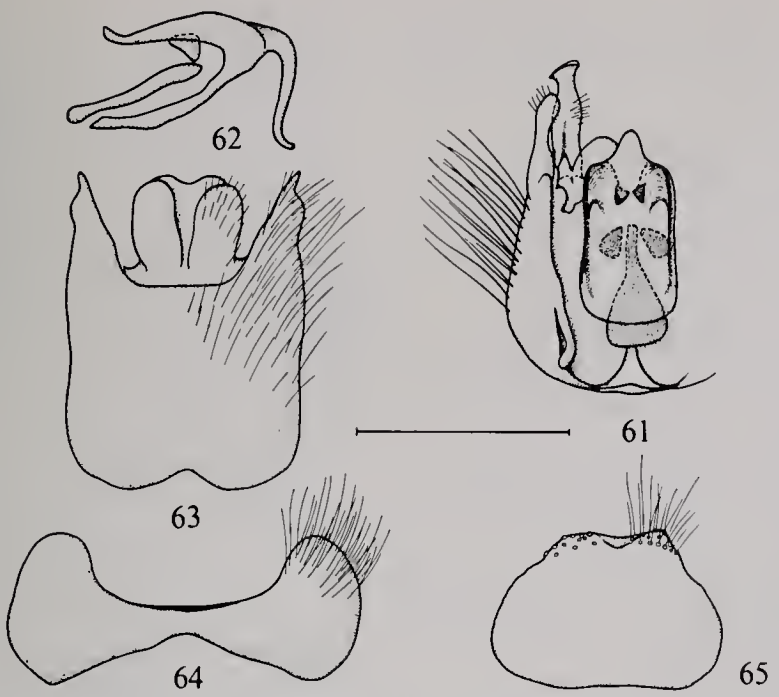

Fig. 61–65. — *Dichaglena amplifrons* (Cole) male terminalia. 61. — Right gonocoxite with appendages and aedeagus in dorsal view. 62. — Aedeagus in lateral view. 63. — Epandrium with appendages in dorsal view. 64. — Tergite 8. 65. — Sternite 8. Scale: 0.5 mm.

with rest of aedeagus, suddenly downcurved, terminating in a long, S-curved tube (Fig. 62); in caudal view straight; dorsal apodeme rectangular; ventral apodeme narrow and longer than dorsal apodeme; ejaculatory apodeme flat in lateral view, greatly enlarged distally in dorsal view; ventral lobes of gonocoxites large, rounded, directed obliquely upward and backward, with a strong attachment to ventral surface of aedeagus; parameral process slender, prominently protruding beyond posterior margin of gonocoxites; parameral apodeme rather long and narrow; gonocoxites (Fig. 67) not united ventrally, but touch for a long distance; gonocoxite in lateral view truncate with lower, posterior corner projecting; hypandrium present as a band-shaped sclerite firmly attached to gonocoxites (Fig. 61).

Habitat

Nothing is known of the habitat occupied by adults or larvae of species in this genus. All specimens examined were apparently collected in forested areas.

Distribution

Members of this genus are found in the western, central, northeastern, and eastern portions of the United States (California, Colorado, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, North Carolina, South Carolina, Florida, Illinois, and Kansas) and in eastern Canada (Ontario).

Included Species

amplifrons (Cole) 1925:85 ♂ (*Psilocephala*), new combination. Distribution. — Southeastern Canada and northeastern to eastern USA.

latifrons (Cole) 1923*a*:73 ♂ (*Psilocephala*), not Frey 1921:82 (*Aristothereva*).

borealis (Cole) 1923*a*:126 ♀ (*Thereva*), new combination. Distribution. — Michigan, northern Illinois.

melampodia (Loew) 1869*a*:9 ♀ (*Psilocephala*), new combination. Distribution. — Central to southeastern USA.

nigrina (Kröber) 1914:53 ♀ (*Psilocephala*), new combination. Distribution. — Florissant, Colorado.

A few undescribed species fit within the boundaries of this genus; these are from western North America.

Genus **Pandivirilia** Irwin & Lyneborg, new genus (Fig. 12, 14, 32, and 66–71)

Neuter, but as adjective takes feminine form.

Derivation of name: *pando* (Latin) = lay open; *virilia* (Latin) = male genitals.

Type-species: *Psilocephala limata* Coquillett 1894:99 by present designation. Type-locality: Colorado and Washington.

Diagnosis

HEAD. — Frons of male (Fig. 14) at its narrowest distinctly narrower than width of anterior ocellus; frons of female narrow, at level of anterior ocellus 1.5–1.8× as wide as ocellar tubercle; male frons usually has silver gray to whitish tomentum, in a few species tomentum somewhat darker above; frons without pile, or with dark pile on lateral, lower part only; female frons darker on upper half than lower half, either caused by brownish tomentum or because upper frons distinctly subshiny to shiny brownish black to black overall, never forming bare, polished calli, since upper darkened frons has distinct, black pile; head moderately protrudes anteriorly; facial and genal calli absent; lateral portion of face and gena without pile or pile sparse and restricted to lower face and gena; head depth 1.4–1.8× antennal length; scape slender, 0.5–0.8× as long as flagellum; flagellar style apical, two segmented, with a small terminal spine; palps one segmented.

THORAX. — np 3–6, sa 2, pa 1, dc 1–2. sc 2; mesonotal pile of male long, erect, uniform, sometimes composed of both pale and dark hairs; pile distinctly longer than width of scape; mesonotal pile of female shorter and more appressed; prosternum bare in and around central depression. WING (Fig. 32). — Cell m_3 open; vein R_4 longer than, or at least as long as, vein R_5; cell r_4 2.0–2.5× as long as wide at apex; color hyaline, often with a grayish or brownish tinge; stigma usually distinct. LEGS. — Fore coxa has 1–3 apical setae on anterior surface; middle coxa with long, whitish pile on posterior surface; hind femur (Fig. 12) has 5–8 anteroventral setae and usually a few short posteroventral setae near apex.

ABDOMEN. — Rather slender, gradually tapering from base to apex, not telescoped; dorsum convex to rather flattened; male dorsum with silver-gray to whitish tomentum and exclusively whitish pile; female dorsum has broad, shiny, blackish, anterior bands on anterior segments.

MALE TERMINALIA (Fig. 66–71). — Tergite 8 (Fig. 70) small and greatly constricted medially; sternite 8 (Fig. 71) small, bilobate, with deep, V-shaped incision on posterior margin; epandrium (Fig. 69) from nearly as long along midline as to distinctly longer along midline than wide, with prominently projecting posterolateral corners and with a deep incision in posterior margin; cerci free, well sclerotized, do not project beyond ventral epandrial sclerite; ventral epandrial sclerite large, reaching to anterior margin of epandrium, with or without a weak, membranous attachment to anterior margin of aedeagus; ventral epandrial sclerite largely membranous, only a small area below cerci sclerotized; parameral apodeme without attachment to aedeagus; distiphallus in dorsal view (Fig. 67) short and narrow compared with rest of aedeagus, suddenly downcurved and slightly S-curved (Fig. 68), in caudal view straight; dorsal apodeme rectangular, arched; ventral apodeme long, equally wide or slightly widening distally; ejaculatory apodeme usually

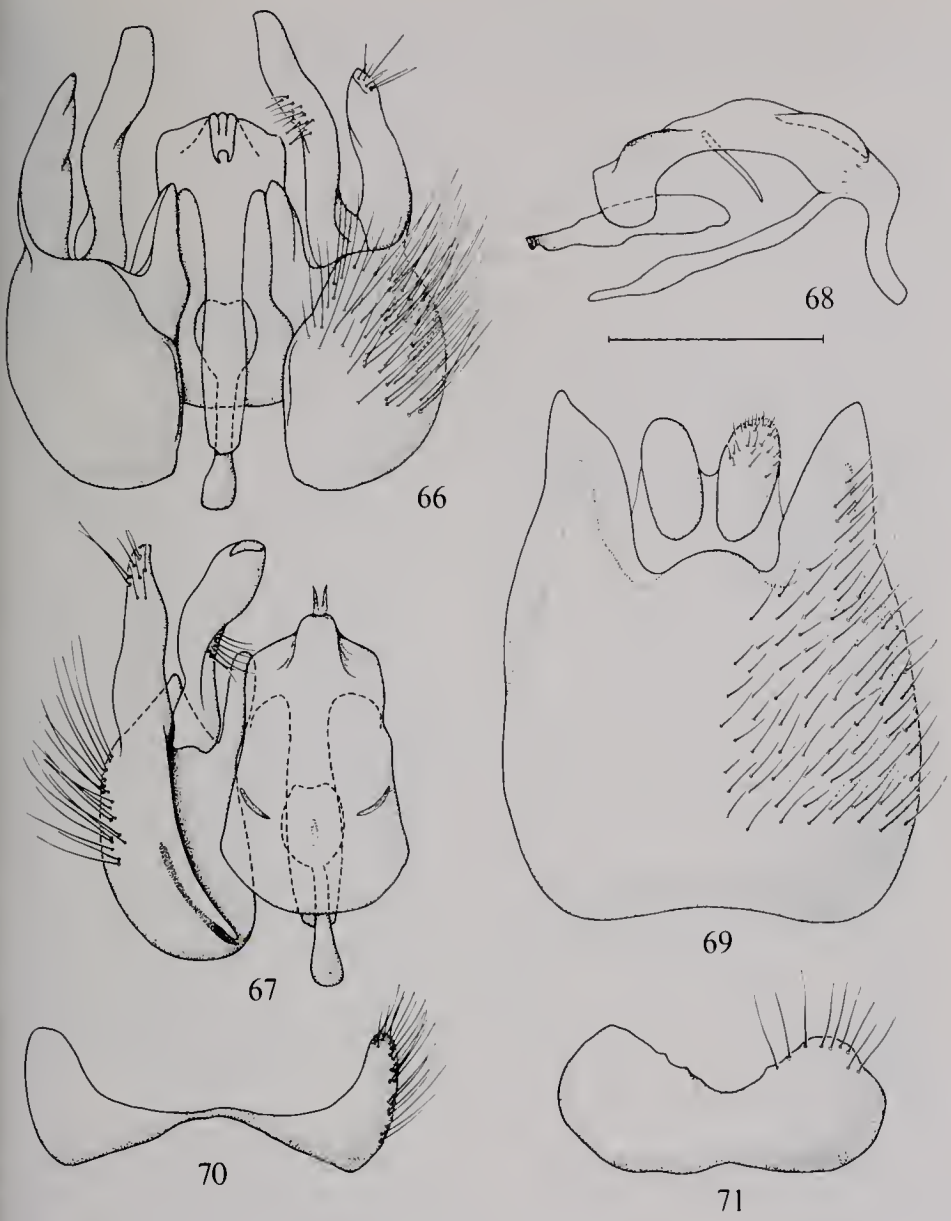

Fig. 66–71. — *Pandivirilia limata* (Caq.) male terminalia. 66. — Gonacaxite with appendages and aedeagus in ventral view. 67. — Right ganocoxite with appendages and aedeagus in dorsal view. 68. — Aedeagus in lateral view. 69. — Epandrium with appendages in dorsal view. 70. — Tergite 8. 71. — Sternite 8. Scale: 0.5 mm.

slightly extended anteriorly beyond dorsal apodeme; ventral lobes of gonocoxites large, rounded, directed obliquely upward, with a membranous attachment to ventral surface of aedeagus; ventral lobes connected along midline by a membrane; parameral process protrudes prominently beyond level of posterior margin of gonocoxite; parameral apodeme short and narrow; gonocoxites not united ventrally

(Fig. 66), in lateral view short and truncate posteriorly; hypandrium absent.

Habitat

Specimens of this genus have been collected in forested areas in mountains of western North America. A pupa was collected from an old pine log in the San Bernardino Mountains, California.

Distribution

Most species are from western North America (British Columbia, Washington, Oregon, California, Idaho, Utah, Colorado, Montana, Nevada, Arizona) with at least one species from the northern and eastern United States (Wisconsin, New York, Maine) and eastern Canada (Nova Scotia, Ontario).

Included Species

argentifrons (Cole) 1923*a*:56 ♂ (*Psilocephala*), new combination. Distribution. — Pennsylvania.

bussi (James) *in* James & Huckett 1952:265 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Canada (Yukon Territory) southward into northwestern USA (Washington).

limata (Coquillett) 1894:99 ♀ (*Psilocephala*), new combination. Distribution. — Western North America.

pollinosa (Cole) 1923*a*:72 ♂ (*Psilocephala*), new combination. Distribution. — Sierra Nevada Mountains, California.

Several undescribed species are at hand.

Genus **Spiriverpa** Irwin & Lyneborg, new genus (Fig. 72–79)

Feminine

Derivation of name: *spira* (Latin) = twist; *verpa* (Latin) = penis.

Type-species: *Thereva lunulata* Zetterstedt 1838:523 by present designation.

Type-locality: Norway.

Diagnosis

Medium-sized, moderately broad species.

HEAD. — Frons of male at its narrowest no wider than half width of anterior ocellus; frons of female at level of anterior ocellus 1.8–2.0× as wide as ocellar tubercle; tomentum on male frons uniformly whitish silver, or at most indistinctly darker on upper lateral part; pile all whitish and long, restricted to lower lateral portion of frons; tomentum on female frons darker on upper half than on lower half; pile blackish above, whitish below, shorter and more appressed than in male; head moderately protrudes anteriorly; facial and genal calli absent; lateral portion of face and gena has long, whitish pile; antennae (Fig. 79) 0.7–0.8× as long as depth of head; scape slender, 0.6–0.7× as long as flagellum; flagellar style apical, two segmented, with a minute terminal spine; palps one segmented.

THORAX. — np 2–4 (usually 3), sa 2–3 (usually 2), pa 1, dc 1–2 (usually 2), sc 2; mesonotal pile in male dense, uniform, erect, rather long and whitish; in female two types of pile; one is moderately long, scalelike, appressed, whitish, and the other is longer, normal, erect, and blackish; prosternum without pile in and around central depression. WING. — Cell m_3 open at wing margin (closed in some males); vein R_4 longer than vein R_5; cell r_4 2.1–2.3× as long as wide at apex; color grayish hyaline with pale brownish stigma. LEGS. — Fore coxa has 2 apical setae on anterior surface; middle coxa has long, whitish pile on posterior surface; hind femur has 5–7 anteroventral setae.

ABDOMEN. — Rather slender, gradually tapering from anterior margin of segment 3 to apex; abdomen not telescoped, rather flattened on dorsum; male dorsum has silver-grayish tomentum and long, whitish pile; female dorsum has blackish anterior bands on first segments and shorter, partly blackish pile.

MALE TERMINALIA (Fig. 72–78). — Tergite 8 (Fig. 77) rather large and greatly constricted medially; sternite 8 (Fig. 78) also large with a wide incision in posterior margin; epandrium (Fig. 76) from nearly as long in midline as to dis-

tinctly longer in midline than wide, with strongly projecting, posterolateral corners forming a deep incision in posterior margin; cerci free, well sclero-

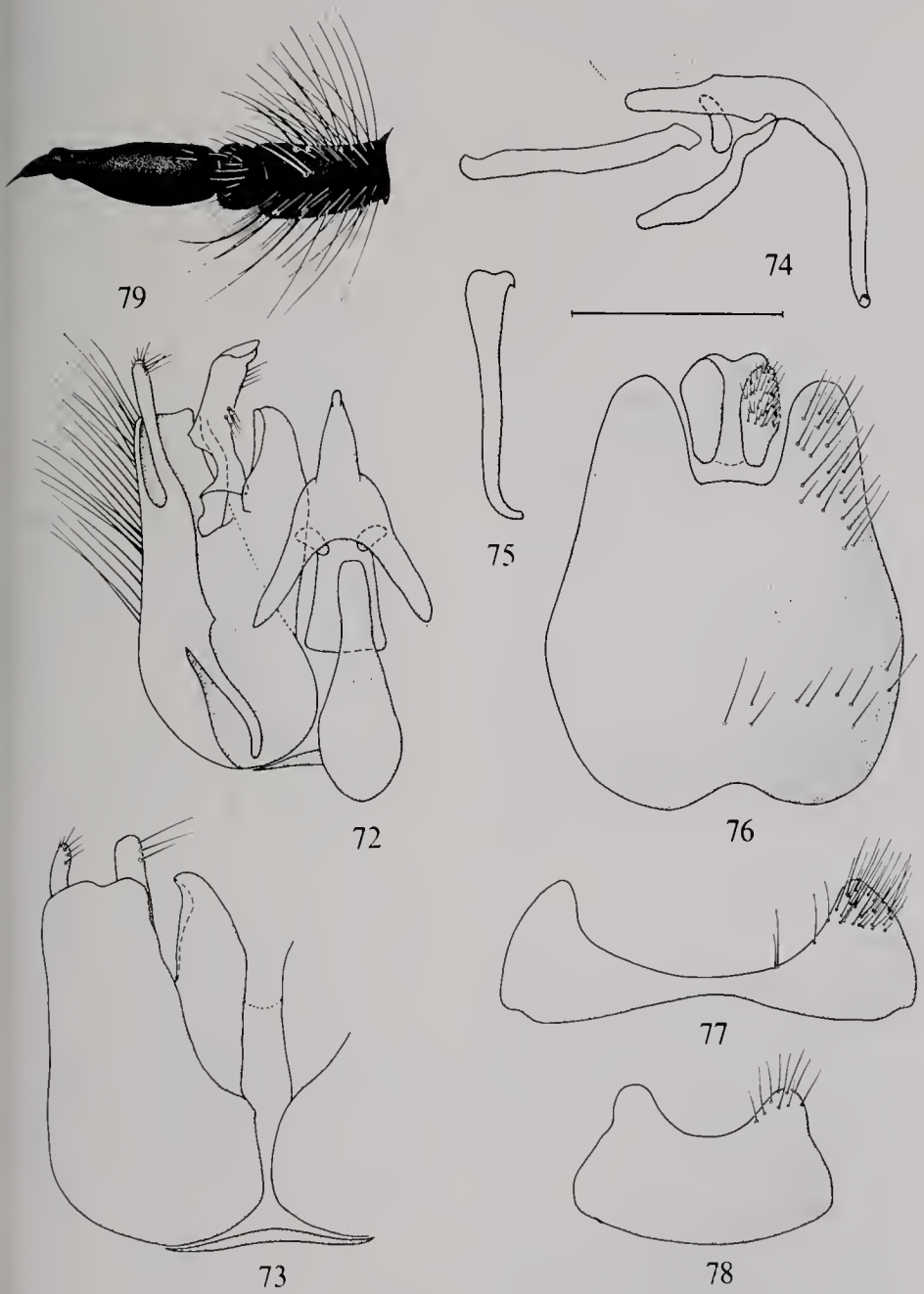

Fig. 72–79. — *Spiriverpa lunulata* (Zett.). 72–78. — Male terminalia. 72. — Right ganocoxite with appendages and aedeagus in dorsal view. 73. — Ganocoxites and hypandrium in ventral view. 74. — Aedeagus in lateral view. 75. — Distiphallus in caudal view. 76. — Epandrium with appendages in dorsal view. 77. — Tergite 8. 78. — Sternite 8. 79. — Antenna. Scale: 0.5 mm.

tized, not projecting beyond ventral epandrial sclerite; ventral epandrial sclerite large, reaching to anterior margin of epandrium, with a membranous attachment to anterior margin of aedeagus; ventral epandrial sclerite largely membranous, only portion below cerci well sclerotized; parameral apodeme without attachment to aedeagus; distiphallus (Fig. 74) very long, slender, its apex (Fig. 75) twisted to the right (with respect to specimen as a whole); dorsal apodeme short, V shaped, continuing into a membrane; ventral apodeme narrowly spoon shaped; ejaculatory apodeme flat in lateral view, with a spoon-shaped distal extension in dorsal view; ventral lobes of gonocoxite large and complex, directed upward at an angle of about 45° to longitudinal axis; ventral lobes connected on their ventral surface by a weakly sclerotized membrane; this membrane binds the gonocoxites posteroventrally (Fig. 73); a membranous attachment also present between ventral lobes and ventral surface of aedeagus; parameral process long, very slender, may or may not reach beyond level of posterior margin of gonocoxite; parameral apodeme also long and slender; gonocoxites not united ventrally, in lateral view obliquely truncate posteriorly; hypandrium (Fig. 73) free, forming a narrow band adjoining anterior margin of gonocoxites.

Habitat

We do not know the exact habitat of this group of species, but many specimens have been collected in the sand dunes along the Great Lakes, especially along the eastern shore of Lake Michigan. We suspect that species in this genus inhabit sandy substrates.

Distribution

Species of the genus *Spiriverpa* are found along the Atlantic coast from Florida to Vermont, in Ontario and New Brunswick, Canada, and throughout the New England, Great Lakes, and Midwest states (including Kansas) westward through Colorado to Oregon and northward to Alaska, including parts of Canada.

Included Species

albiceps (Loew) 1869*b*:166 ♀ (*Thereva*), new combination. Distribution. — Northeastern United States.

? *albifrons* (Say) 1829:156 ♂ (*Thereva*), new combination. Distribution. — Indiana.

bella (Kröber) 1914:64 ♂, ♀ (*Thereva*), new combination. Distribution. — Northeastern United States. (This species may be conspecific with *senex* (Walker).)

bella nigrimana (Kröber) 1914:64 ♂ (*Thereva*), new combination. Distribution. — Massachusetts. (This subspecies may be the same as *bella* (Kröber).)

candidata (Loew) 1869*a*:8 ♂ (*Thereva*), new combination. Distribution. — Eastern North America and westward along the Great Lakes. (This species may be synonymous with *senex* (Walker).)

cinerascens (Cole) 1923*a*:97 ♀ (*Thereva*), new combination. Distribution. — Oregon.

cockerelli (Cole) 1923*a*:99 ♂, ♀ (*Thereva*), new combination. Distribution. — Rocky Mountains, especially Colorado northward into Canada.

nitoris (Coquillett) 1894:101 ♀ (*Thereva*), new combination. Distribution. — Southern portion of midwestern United States.

senex (Walker) 1848:224 ♀ (*Thereva*), new combination. Distribution. — Southeastern Canada.

There are a few undescribed species within this genus from western North America and one described species from northern Europe.

Genus **Thereva** Latreille
(Fig. 8, 9, and 80–87)

Feminine

Thereva Latreille 1796:167. Type-species: *Musca plebeja* Linnaeus 1758: subsequent monotypy by Latreille

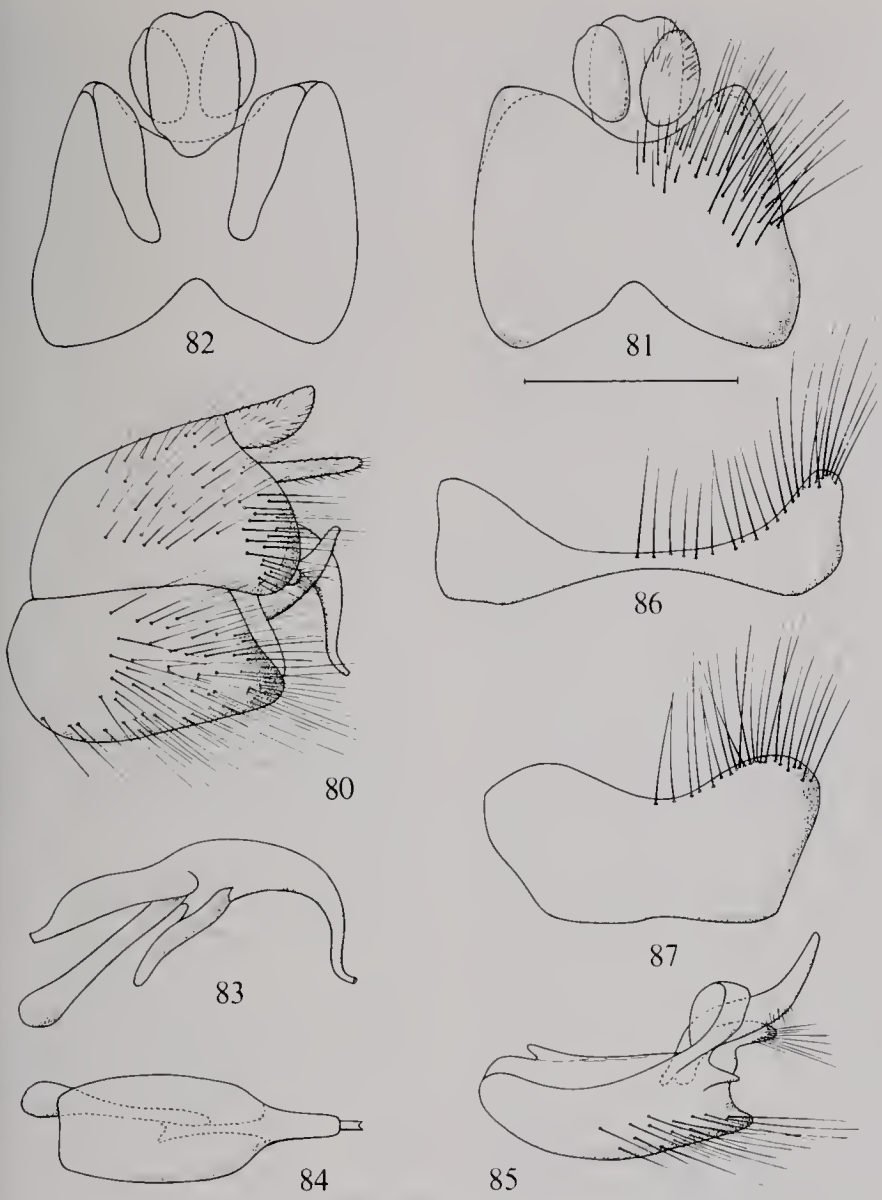

Fig. 80–87. — *Thereva plebeja* (L.) male terminalia. 80. — Genitalia in lateral view. 81. — Epandrium with appendages in dorsal view. 82. — Epandrium with appendages in ventral view. 83. — Aedeagus in lateral view. 84. — Aedeagus in dorsal view. 85. — Right ganacaxite in ventral view. 86. — Tergite 8. 87. — Sternite 8. Scale: 0.5 mm.

(1802:441). Type-locality: Northwestern Europe.

Thereua, Loew error.

Reference: Coquillett 1893*a*, Cole 1923*a*.

Diagnosis

Medium- to large-sized, heavy-bodied, usually densely pilose species.

Head. — Frons of male at its narrowest much narrower than half width of anterior ocellus; frons of female (Fig. 8) at level of anterior ocellus 2.0–3.0× as wide as ocellar tubercle; frons of female almost always has a pattern formed by differentially colored tomentum and cen-

tral, shiny callosity (in some species there are two callosities on raised portions of frons); frons of male variously tomentose and pilose, only rarely with a shining callosity; head of each sex exceptionally wide; eyes of both sexes have single facet size; long, thin pile over frons (especially lower part above antennae of females), face, and genae of both sexes; gena wide in frontal view; head protrudes slightly at level of antennae; head depth 1.0–1.3× antennal length (Fig. 9); scape 0.8–1.2× as long as flagellum; flagellar style apical, two segmented, with a short, heavy terminal spine; palps one segmented.

THORAX. — np 3–5, sa 1–2, pa 1, dc 0–2, sc 2; mesonotal pile usually long, dense, erect on males; mesonotal pile of two types on female: one is short, erect, usually dark, the other is appressed, bronze colored; prosternum has long pile in and around central depression. WING. — Cell m_3 open or closed; veins R_4 and R_5 of about equal length; cell r_4 about 1.5–2.5× as long as wide at apex; color variable, from hyaline to heavily mottled, veins in some species surrounded by dark infuscation; stigma usually distinct, light to dark brown. LEGS. — Fore coxa with 2–5 (usually 4) apical setae on heavily pilose anterior surface; middle coxa has long pile on anterior and posterior surfaces; femora have setae in anteroventral position or setae lacking on fore and/or middle femora.

ABDOMEN. — Moderately broad, tapering abruptly toward apex; abdomen not telescoped; dorsum somewhat flattened in female, more convex in male; pattern variable, with tomentum entirely whitish gray (rare) to brownish in definite bands (common); abdomen of both sexes pilose, pile usually erect, denser and longer on male.

MALE TERMINALIA (Fig. 80–87). — Tergite 8 (Fig. 86) rather variable, large, and greatly constricted medially; sternite 8 (Fig. 87) variable, generally large, rectangular shaped, posterior margin often notched; epandrium (Fig. 81 and 82) wider than long along midline, posterolateral margins not extending posteriorly as far as cerci; cerci free, well sclerotized; ventral epandrial sclerite (Fig. 82) composed of a sclerotized midposterior section below cerci and 2 lateral sclerotizations attached by a membrane to posterolateral margins of epandrium, but not extending anteriorly to base of epandrium and not strongly connected to aedeagus; aedeagus (Fig. 83 and 84) rather small, simple; parameral apodeme not attached to aedeagus; distiphallus short, slightly downcurved distally, in dorsal view several times wider basally than distally; dorsal apodeme broader and projects anteriorly farther than ventral apodeme; ejaculatory apodeme simple, stick shaped; gonocoxites not united ventrally except by a thin membrane, usually broadly rounded posteriorly, often with a distinct projection; parameral process long, fingerlike, often extending to or beyond level of posterior corner of epandrium; gonostylus (Fig. 85) well developed, long, usually directed posteriorly and dorsally, thicker basally than distally, and hooklike apically; ventral lobe (Fig. 85) long, irregularly shaped, not extending posteriorly to apex of gonostylus; hypandrium present as a narrow sclerite between ventrobasal part of gonocoxites.

Habitat

Species in the genus *Thereva* seem restricted to mountainous areas and to the northern boreal and coniferous zones in North America. Irwin reared larvae from mixed montane leaf litter from the San Bernardino Mountains in southern California.

Distribution

The genus *Thereva* ranges widely over the Holarctic Region and parts of the Afrotropical Region (Lyneborg 1976; Lyneborg & Spitzer 1974), but within the Western Hemisphere it is generally confined to the boreal and mountainous areas of western, northern, and eastern North America.

Included Species

albopilosa Kröber 1912:256 ♂. Distribution. — Colorado.

aurofasciata Kröber 1912:263 ♂. Distribution. — Southern Colorado.
bakeri Cole 1923*a*:124 ♂, ♀. Distribution. — Southern California.
brunnea Cole 1923*a*:108 ♂, ♀. Distribution. — British Columbia, Canada, and Washington.
cingulata Kröber 1912:267 ♀. Distribution. — Colorado.
comata Loew 1869*a*:7 ♂. Distribution. — California.
concavifrons Kröber 1914:70 ♀. Distribution. — New Mexico.
diversa Coquillett 1894:100 ♂. Distribution. — Colorado.
duplicis Coquillett 1893*a*:198 ♂, ♀. Distribution. — South Dakota and Montana.
egressa Coquillett 1894:99 ♂. Distribution. — Colorado.
flavicauda Coquillett *in* Baker 1904: 23 ♀. Distribution. — Nevada.
flavicincta Loew 1869*b*:168 ♂. Distribution. — Northeastern United States.
gilvipes Loew 1869*b*:168 ♀.
flavipilosa Cole 1923*a*:125 ♂. Distribution. — Fresno County, California.
flavohirta Kröber 1914:70 ♀. Distribution. — Colorado.
foxi Cole 1923*a*:112 ♂. Distribution. — Washington.
frontalis Say 1824:370 ♂, ♀. Distribution. — Northwestern United States and southwestern Canada.
fucata Loew 1872:74 ♂, ♀. Distribution. — California.
fucatoides Bromley 1937:99 ♂, ♀. Distribution. — Utah.
hirticeps Loew 1874:382 ♀. Distribution. — San Francisco Bay area, California.
johnsoni Coquillett 1893*a*:200 ♀. Distribution. — Washington.
macdunnoughi Cole 1925:87 ♂, ♀. Distribution. — Alberta, Canada.
nebulosa Kröber 1912:264 ♂. Distribution. — California.
neomexicana Cole 1923*a*:117 ♀. Distribution. — Southern Nevada.
nigripilosa Cole 1923*a*:110 ♂. Distribution. — British Columbia, Canada.
niveipennis Kröber 1914:66 ♂. Distribution. — Central coastal California.
pseudoculata Cole 1923*a*:121 ♂, ♀. Distribution. — Utah.
strigipes Loew 1869*b*:169 ♀. Distribution. — Winnipeg, Canada.
ustulata Kröber 1912:265 ♂. Distribution. — Winnipeg, Canada.
utahensis Hardy 1938:145 ♀. Distribution. — Utah.

Genus **Tabudamima** Irwin & Lyneborg, new genus (Fig. 88–93)

Feminine

Derivation of name: *Tabuda* = genus name in the Therevidae; *mimos* (Greek) or *mimus* (Latin) = imitator.

Type-species: *Thereva melanophleba* Loew 1876:112 by present designation. Type-locality: San Francisco, California.

Diagnosis

Small, moderately broad species.

Head. — Frons of male at its narrowest narrower than width of anterior ocellus; frons of female 1.8–2.0× as wide as ocellar tubercle; male frons entirely tomentose, with long, black pile; tomentum on frons gray; female frons entirely tomentose, often with dark transverse band and shorter pile than that of male; frons impressed; head noticeably protrudes anteriorly; facial and genal calli absent; lateral portion of face and gena has long pile, black on face, white on gena; head depth 1.0–1.1× antennal length; scape thickened, 1.3–1.5× length of flagellum; flagellar style apical, obviously one segmented, with a minute terminal spine; palps one segmented.

Thorax. — np 3, sa 1, pa 1, dc 0, sc 2; mesonotal pile in male very long, uniform, composed of white and black hairs; mesonotal pile in female of two types: the first is moderately long, scalelike, semi-appressed, white, and the other is long, erect, black; prosternum without pile in and around central depression (this may be difficult to discern because of long, dense pile on fore coxa). Wing. — Cell m_3 closed or narrowly open; vein

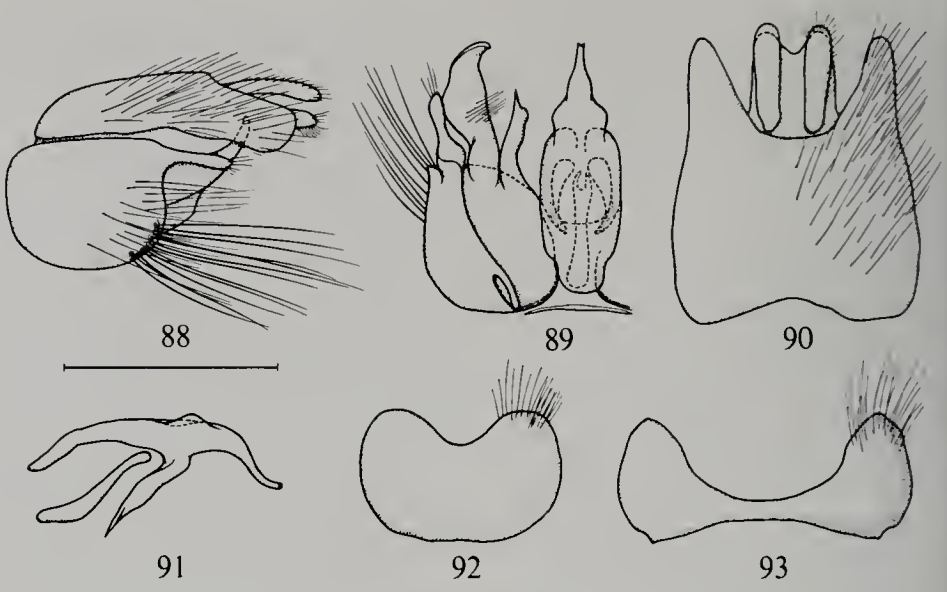

Fig. 88–93. — *Tabudamima melanophleba* (Lw.) male terminalia. 88. — Genitalia in lateral view. 89. — Right ganacoxite with appendages and aedeagus in dorsal view. 90. — Epandrium with appendages in dorsal view. 91. — Aedeagus in lateral view. 92. — Sternite 8. 93. — Tergite 8. Scale: 0.5 mm.

R_4 longer than vein R_5; cell r_4 2.1–2.2× as long as wide at apex; color grayish hyaline in male, but has more brownish tinge in female; veins very strong and dark; vein R_4 often has recurrent vein near base; stigma blackish brown. LEGS. — Fore coxa has at most a single, apical seta on anterior surface; middle coxa has whitish pile on posterior surface; hind femur has 4–5 anteroventral setae.

ABDOMEN. — Slender, gradually tapering from segment 2 to apex; abdomen not telescoped; dorsum somewhat flattened in both sexes; dorsum of male entirely tomentose and pilose; tomentum silvery white; dorsum of female has broad, blackish anterior bands on first tergites, otherwise tomentose; tomentum gray on female dorsum.

MALE TERMINALIA (Fig. 88–93). — Tergite 8 (Fig. 93) comparatively large and greatly constricted medially; sternite 8 (Fig. 92) large, broad oval, with semicircular incision in posterior margin; epandrium (Fig. 90) shorter in midline than wide, its posterolateral corners prominently extended, but simply rounded; cerci free, strongly sclerotized, elongate, but not extending beyond ventral epandrial sclerite; ventral epandrial sclerite only sclerotized beyond cerci, continuing anteriorly into a weak membrane reaching to about middle of epandrium, with no attachment to aedeagus; parameral apodeme without attachment to aedeagus; distiphallus (Fig. 89) gradually tapers, in lateral view (Fig. 91) short and only moderately curving; dorsal apodeme oval; ventral apodeme short and broad; ejaculatory apodeme shaped like a rod; ventral lobes of gonocoxites large, rather complex and have a membranous attachment to ventral surface of aedeagus; parameral process moderately long and slender (Fig. 89); gonocoxites not united ventrally, not even attached by a membrane; in lateral view (Fig. 88) gonocoxites nearly circular in shape; hypandrium (Fig. 89) free, forming a long, very narrow strip.

Habitat

Little is known of the habitat of these species except that several specimens were collected in coastal sand dune habitats in California.

Distribution

Species in the genus *Tabudamima* seem confined to the northwestern United States, with specimens collected from Washington, Oregon, California, and Nevada. Those from California are concentrated in the San Francisco Bay area southward along the coast to San Diego County and inland in the Sierra Nevada Mountains and in the San Bernardino and Santa Rosa mountains of southern California.

Included Species

melanophleba (Loew) 1876:317 ♂, ♀ (*Thereva*), new combination. Distribution. — San Francisco Bay area, California.

There are several closely related undescribed species in this genus.

Genus Tabuda Walker
(Fig. 6, 7, and 94–100)

Tabuda Walker 1852:197. Type-species: *Thereva fulvipes* Walker 1852:197 by original monotypy (= *T. varia* Walker 1848:221). Type-locality: Florida.

Metaphragma Coquillett 1894:97. New synonym. Type-species: *Xestomyza planiceps* Loew 1872:75 by original designation. Type-locality: California.

Diagnosis

Medium- to large-sized, robust flies.

Head (Fig. 6 and 7). — Frons of male at its narrowest from as wide as anterior ocellus to as wide as ocellar tubercle; frons of female at level of anterior ocellus about 2.5× as wide as ocellar tubercle; frons without distinct tomentum pattern, or at most with a pair of small, dark patches laterally; pile on lower frons moderately thick, composed of long, black hairs; upper frons bare or has thin pile laterally; head moderately to prominently protruding anteriorly, antennae thus set on a distinct protuberance; facial and genal calli absent; lateral portion of face and gena has long pile; head depth 1.0–1.3× antennal length; scape thickened, 1.7–2.0× as long as flagellum; flagellar style apical, stout, obviously one segmented, with a minute terminal spine; palps one segmented.

Thorax. — np 3–5, sa 2, pa 1, dc 1, sc 2; mesonotal pile of two types: one is moderately long, scalelike, rather dense, semi-appressed, and the other is long, erect, sparse; prosternum without pile in and around central depression. Wing. — Cell m_3 open; vein R_4 longer than vein R_5; cell r_4 2.3–2.6× as long as wide at apex; color grayish brown to brown, with darker stigma or anterior margin intensively darkened, and with darker patches, especially around crossveins. Legs. — Fore coxa with 1 or 2 apical setae on anterior surface; middle coxa with whitish pile on posterior surface; hind femur with 5–8 anteroventral setae.

Abdomen. — Rather broad, with sides nearly parallel from segments 1 through 3; thereafter, abdomen tapers slightly and gradually; male abdomen distinctly telescoped; abdominal tergites 6 and 7 visible only as narrow bands; dorsum of abdomen somewhat flattened; male dorsum has silver gray tomentum; female dorsum mostly subshiny to dull brown.

Male Terminalia (Fig. 94–100). — Tergite 8 (Fig. 100) small and greatly constricted medially; sternite 8 (Fig. 99) small, oval, has a semicircular incision into posterior margin; epandrium (Fig. 97) shorter in midline than wide, its posterolateral corners rounded; cerci free (Fig. 97), strongly sclerotized, elongate, extending distinctly beyond ventral epandrial sclerite; ventral epandrial sclerite reaches or nearly reaches anterior margin of epandrium, but has at most a loose and weak attachment to anterior margin of aedeagus; ventral epandrial sclerite has three strongly sclerotized areas: a small semicircular area below cerci and a larger pair below epandrium; parameral apodeme and ventral lobes of gonocoxite not attached to aedeagus; distiphallus (Fig. 98) rather long, S curved; a semicircular, narrow, sclerotized ring in dorsal membrane surrounds

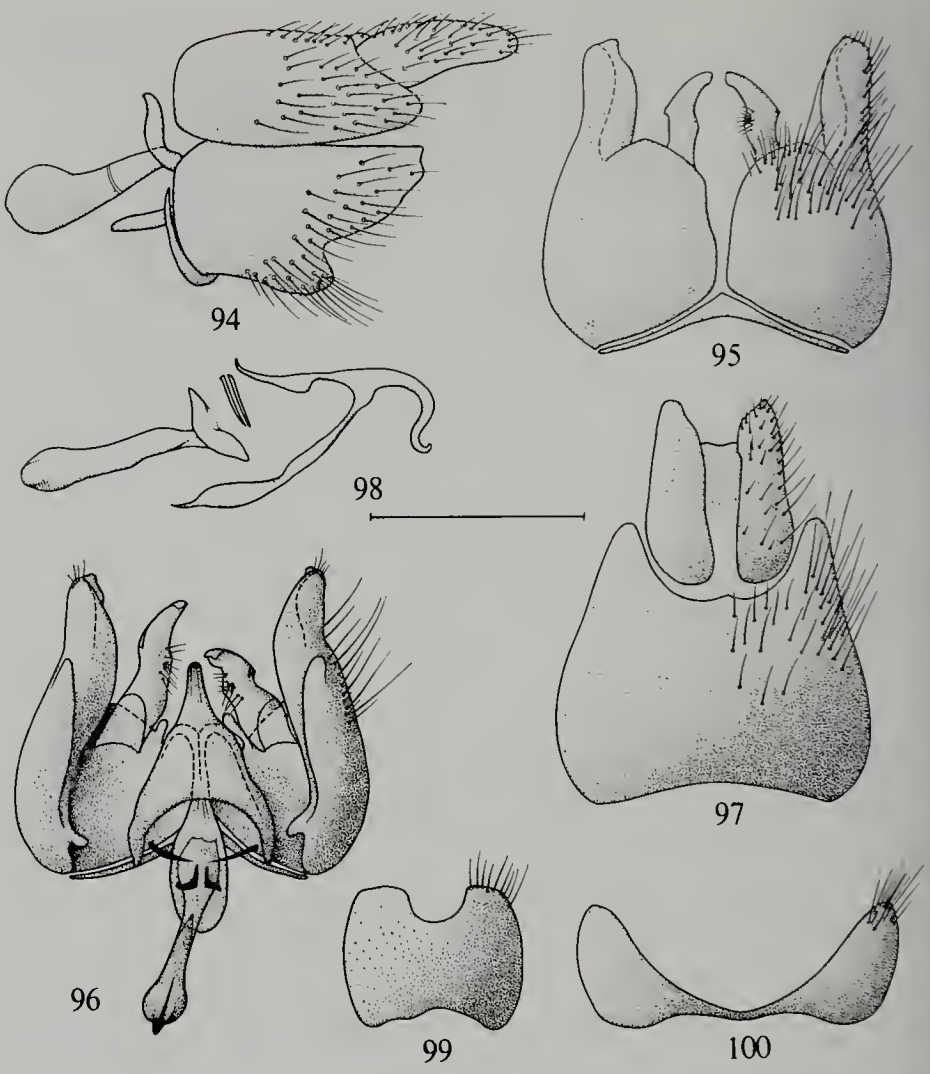

Fig. 94–100. — *Tabuda varia* Wlk. male terminalia. 94. — Genitalia in lateral view. 95. — Gonocaxites and hypandrium in ventral view. 96. — Gonacaxites with appendages and aedeagus in dorsal view. 97. — Epandrium with appendages in dorsal view. 98. — Aedeagus in lateral view. 99. — Sternite 8. 100. — Tergite 8. Scale: 0.5 mm.

proximal portion of ejaculatory apodeme; ventral apodeme large, narrowly spoon shaped distally; ejaculatory apodeme has enlarged proximal and distal sections; ventral lobes of gonocoxite (Fig. 96) small, narrow, directed upward, but not visible in ventral view; parameral process strongly united with dorsal surface of gonocoxite, at most a wartlike process present; parameral apodeme distinct but small; gonocoxites (Fig. 95) not united ventrally, short and high in lateral view (Fig. 94), project dorsally; hypandrium (Fig. 95) free, forming a long, narrow band adjoining anterior margin of gonocoxites for a long distance.

Habitat

Little is known as to the habitat that these interesting looking flies occupy. One specimen of *planiceps* was collected in sand dunes near San Francisco. Two specimens of *borealis* were collected on sand near coyote holes (Cole 1923*a*:83).

Distribution

Species of *Tabuda* appear to be confined to the western coast of North America (*T. planiceps*), eastern North America (*T. varia*), and north-central North America (*T. borealis*).

Included Species

borealis Cole 1923*a*:82 ♂, ♀. Distribution. — Saskatchewan, Canada.

planiceps (Loew) 1872:75 ♀ (*Xestomyza*), new combination. Distribution. — Western coast of North America from British Columbia, Canada, southward to southern California, United States.

varia (Walker) 1848:221 ♀ (*Thereva*), new combination. Distribution. — Eastern North America from Florida northward to Massachusetts and westward to Pennsylvania.

fulvipes Walker 1852:197 ♂, new name for *Thereva nervosa* Walker.

nervosa Walker 1848:223 ♂ (*Thereva*), not Loew 1845:28.

No undescribed species of *Tabuda* are known to us.

Note

The genus *Metaphragma* was created by Coquillett (1894:97) for *Xestomyza planiceps* Loew 1872:75. *T. planiceps* is unique in having an additional crossvein between R_5 and vein M_1 that forms a closed cell anterior to the discal cell. This additional cell is similar in shape and size to the discal cell; however, in characters such as those of the male terminalia, *planiceps* falls within the strict definition of *Tabuda*. For that reason we have synonymized *Metaphragma* Coq. with *Tabuda* Walker.

Genus Acrosathe Irwin & Lyneborg, new genus (Fig. 101–106)

Feminine

Derivation of name: *akra* (Greek) = projection; *sathe* (Greek) = phallus.

Type-species: *Bibio annulata* Fabricius 1805:68 by present designation. Type-locality: Denmark.

Diagnosis

Medium-sized, moderately thick-bodied species.

Head. — Frons of male at its narrowest narrower than width of anterior ocellus (in *bimaculata* (Cole) about 3× as wide as anterior ocellus); frons of female at level of anterior ocellus 1.3–2.4× as wide as ocellar tubercle; male frons tomentose; tomentum silvery white to gray, upper corner more or less dull black or brown (with two dull darkened areas in *bimaculata*); male frons has long, usually pale, pile; lower part of female frons tomentose and pilose, as in male, tomentum silvery gray, pile pale straw; upper part of female frons tomentose, often with dull black areas, tomentum brownish to brownish gray, pile brown or black; head distinctly protrudes anteriorly at antennal level; lateral portion of face and gena has long, pale pile; head depth 1.2–1.5× antennal length; scape slender, 0.8–1.0× as long as flagellum; flagellar style apical, two segmented, with a small terminal spine; palps one segmented.

Thorax. — np 3–4 (usually 3), sa 1–2 (usually 2), pa 1, dc 1–2, sc 2; mesonotal pile of male of some species long, erect, uniform; mesonotal pile of male of other species and of all females of two kinds: one is long to moderately long, erect, normal, and the other is shorter, semi-appressed, scalelike; prosternum has long pile in and around central depression. Wing. — Cell m_3 in most species closed and has short common vein to wing margin; cell m_3 occasionally open; vein R_4 distinctly longer than vein R_5; cell r_4 2.0–2.2× as long as wide at apex; color grayish hyaline, but a couple of species show brownish infuscations around crossveins; stigma pale brown. Legs. — Fore coxa with 2 or 3 apical setae on anterior surface; middle coxa has whitish pile on posterior surface; 6–8 rather stout anteroventral setae over entire length of hind femur.

Abdomen. — Moderately broadly built, gradually tapering from segment 2 to apex, not telescoped; dorsum somewhat

flattened in both sexes; dorsum of male entirely tomentose and pilose, these being silvery white to gray; dorsum of female in most species has dark anterior bands on at least tergites 2–4, but a couple of species have tergites entirely tomentose, tomentum gray.

MALE TERMINALIA (Fig. 101–106). — Tergite 8 (Fig. 105) large, wider than epandrium, and medially constricted for a long distance; sternite 8 (Fig. 106) trapezoidal, its lateral margins straight or concave; posterior margin of sternite 8 has semicircular incision; epandrium (Fig. 103) large, markedly convex, as long medially as, or longer than, wide; posterolateral corners of epandrium truncate in type-species (Fig. 103), more sharply pointed in North American species; cerci free, ventral epandrial sclerite well sclerotized below cerci, continuing anteriorly into a weak, narrow membrane, often loosely attached to anterior margin of aedeagus; some species have a strong, narrow attachment between lateral edge of epandrium/ventral epandrial sclerite and midsection of paramere; parameral apodeme without attachment to aedeagus; distiphallus (Fig. 102) slender, in lateral view (Fig. 104) more or

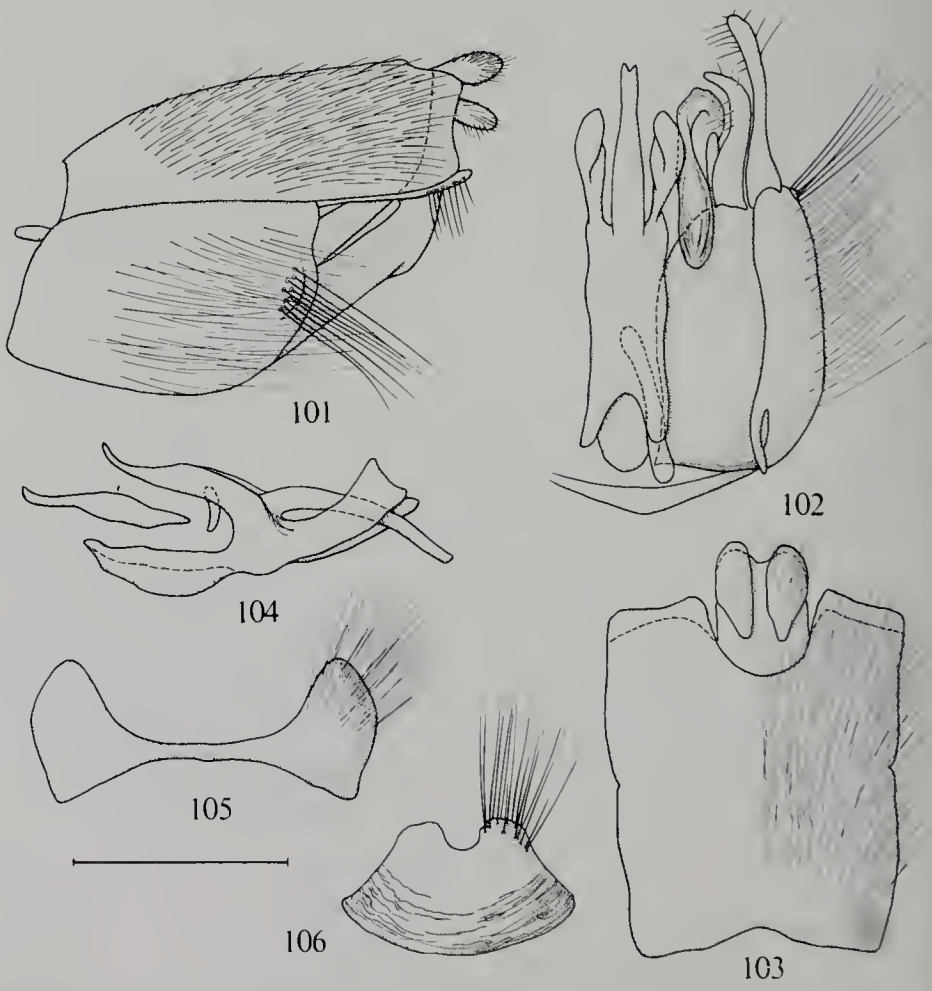

Fig. 101–106. — *Acrosathe annulata* (F.) male terminalia. 101. — Genitalia in lateral view. 102. — Left ganacaxite with appendages and aedeagus in dorsal view. 103. — Epandrium with appendages in dorsal view. 104. — Aedeagus in lateral view. 105. — Tergite 8. 106. — Sternite 8. Scale: 0.5 mm.

less downcurved; dorsal apodeme short; ventral apodeme large, forming a narrow, deep trough; 2 anterior processes arise from base of distiphallus; these processes either shorter than or as long as distiphallus; they are distinct at species level; ejaculatory apodeme simple, stick shaped; ventral lobes of gonocoxites, as in *Psilocephala* (Fig. 110), large, heavily sclerotized, and suddenly curved, forming a dorsal, anteriorly directed, distal portion strongly attached to midlateral section of aedeagus; parameral process large, free; gonocoxites free ventrally, but attached by a membrane; hypandrium (Fig. 102) narrow, comparatively large.

Habitat

The type-species is widespread in Europe, occurring mainly on coastal dunes. Most of the North American species are found in coastal dunes, but *A. vialis* inhabits mountainous areas and is often found on lake beaches.

Distribution

The genus *Acrosathe* is Holarctic, with about 10 species occurring in the Palearctic Region. Within the Nearctic Region, one species, *A. bimaculata,* is found in North Carolina; the other species are confined to western North America (British Columbia, Washington, Oregon, Idaho, California, Baja California).

Included Species

bimaculata (Cole) 1923*a*:98 ♀ (*Thereva*), new combination. Distribution. — North Carolina.

novella (Coquillett) 1893*a*:200 ♂, ♀ (*Thereva*), new combination. Distribution. — Southern California.

otiosa (Coquillett) 1893*a*:199 ♂ (*Thereva*), new combination. Distribution. — Coastal area of California.

pacifica (Cole) 1923*a*:103 ♂, ♀ (*Thereva*), new combination. Distribution. — Coastal area of central California.

vanduzeei (Cole) 1923*a*:105 ♂, ♀ (*Thereva*), new combination. Distribution. — Coastal area of north-central and northern California.

vialis (Osten Sacken) 1877:274 ♂ (*Thereva*), new combination. Distribution. — Sierra Nevada Mountains, California.

There are a number of undescribed species from the inland parts of western North America.

Genus **Psilocephala** Zetterstedt
(Fig. 10, 11, and 107–114)

Feminine

Psilocephala Zetterstedt 1838:525. Type-species: *Bibio imberbis* Fallén 1814:5; subsequent designation (Coquillett 1910:597). Type-locality: Sweden.

Diagnosis

Medium- to large-sized, thin to moderately broad species.

Head. — Frons of male at its narrowest distinctly narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 1.8–1.9× as wide as ocellar tubercle; male frons tomentose and without pile, tomentum silvery gray; female frons tomentose anteriorly, upper three-quarters shiny blackish with a circular, depressed, wrinkled area medially, tomentum silvery gray; blackish part of frons has short, black pile; head only very slightly protrudes at antennal level; lateral portion of face without pile; gena has whitish pile similar to, but shorter than, lower occipital pile; head depth 1.3–1.6× antennal length; scape slender, 0.4–0.5× as long as flagellum; flagellar style apical, two segmented, with a small terminal spine; palps one segmented.

Thorax. — np 3, sa 2, pa 1, dc 2, sc 2; mesonotal pile of male long, erect and uniform, composed of pale and darker hairs, which are distinctly longer than width of scape; mesonotal pile of female much shorter, entirely dark, partly erect, partly semi-appressed; prosternum bare in and around central depression. Wing. — Cell m_3 usually closed, rarely open, and common vein usually short; veins R_4 and R_5 about equal in length; cell r_4 about 2.5× as long as wide at apex; color hyaline with faint brownish tinge;

stigma pale brown; no other markings on wing. LEGS. — Fore coxa has 2 or 3 apical setae on anterior surface; middle coxa without pile on posterior surface; hind femur has 3–4, rather slender, anteroventral setae.

ABDOMEN. — Rather broadly built, in male gradually tapering from segment 3 to apex; in female tapering from segment 5 to apex; abdomen not telescoped; dorsum convex in male, more flattened in female; male dorsum entirely tomen-

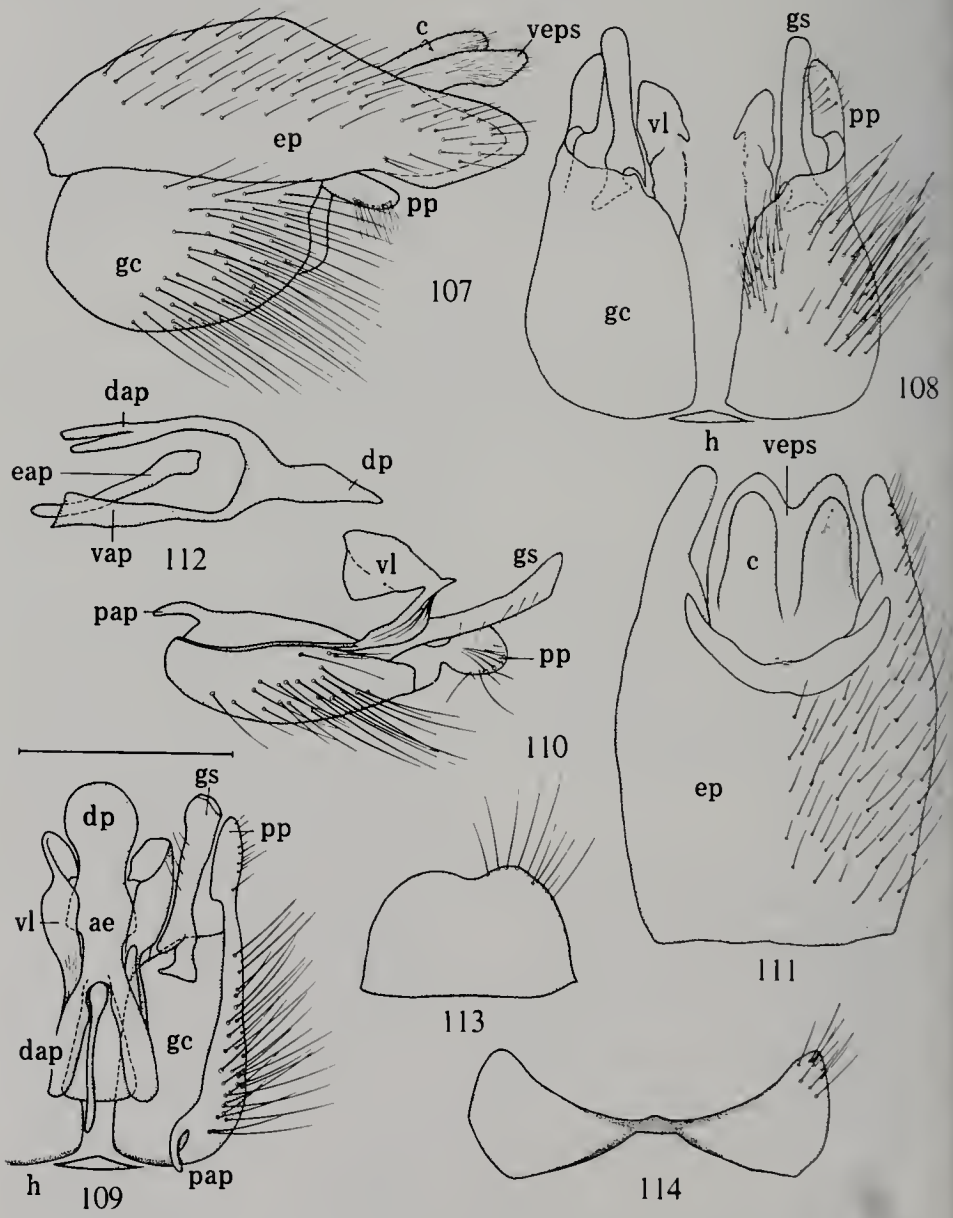

Fig. 107–114. — *Psilocephala imberbis* Fall. male terminalia. 107. — Genitalia in lateral view. 108. — Gonocoxites with appendages and hypandrium in ventral view. 109. — Left gonocoxite with appendages and aedeagus in dorsal view. 110. — Right ganacoxite with appendages in ventral view. 111. — Epandrium with appendages in dorsal view. 112. — Aedeagus in lateral view. 113. — Sternite 8. 114. — Tergite 8. Scale: 0.5 mm. List af abbreviations appears an pages 194 and 195.

tose except for polished black terminalia, tomentum silvery gray; female dorsum mostly shining black, but with marked pattern of silvery gray tomentum on segments 1–3 and 5–6.

Male Terminalia (Fig. 107–114). — Tergite 8 (Fig. 114) wide, greatly constricted for a short distance medially; sternite 8 (Fig. 113) nearly semicircular, only slightly incised along posterior margin; epandrium (Fig. 107 and 111) noticeably convex, shorter in midline than wide, but has prominently projecting posterolateral corners, which are broadly lamellate; cerci free, well sclerotized, not projecting beyond ventral epandrial sclerite; ventral epandrial sclerite strongly reduced, restricted to a distinctly bilobed sclerite lying below and similar in size to cerci; apparently membrane lacking beneath epandrium; parameral apodeme without attachment to aedeagus; distiphallus (Fig. 109) in dorsal view nearly circular, in lateral view (Fig. 112) quite flat and straight; dorsal apodeme narrow proximally, but gradually wider toward apex; ejaculatory apodeme very slender; ventral lobes of gonocoxites (Fig. 110) large and strongly sclerotized, rising first in a vertical position, then suddenly curving anteriorly and terminating distally in a section firmly attached to midlateral part of aedeagus; ventral lobes not, or at most very weakly, attached along midline (Fig. 108); parameral process strongly sclerotized and rather broad; parameral apodeme long, narrow; gonocoxites not united ventrally, not even by a distinct membrane; gonocoxites truncate in lateral view (Fig. 107); hypandrium present as a small, triangular sclerite (Fig. 108).

Habitat

Specimens in this genus occupy forested zones. Very little is known of specific habitats.

Distribution

The genus *Psilocephala* is Holarctic. Within the Nearctic Region, specimens at hand are from these areas: Canada (Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, Yukon Territory, District of Mackenzie, and British Columbia); United States of America (Alaska, Washington, Oregon, northern California, Utah, Wyoming, Colorado, Montana, Wisconsin, Minnesota, Michigan, Pennsylvania). One male specimen is labeled from Douglas, Arizona. This specimen appears to be from outside the normal range of the genus, or it might be mislabeled.

Included Species

conspicua (Walker) 1848:223 ♀ (*Thereva*). Distribution. — Nova Scotia.

munda Loew 1869*a*:9 ♀. Distribution. — Great Lakes Region of North America.

melanoprocta Loew 1869*a*:11 ♂, subsequent synonymy (Kröber 1912:239).

vicina (Walker) 1848:222 ♂ (*Thereva*). Distribution. — Nova Scotia.

P. conspicua (Walker) and *munda* (Loew) may well prove to be synonymous with *vicina* (Walker).

The western specimens have not been studied closely; they could represent one or more distinct, undescribed species, or they could prove to be western populations of *vicina* (Walker) or *munda* (Loew).

Genus **Penniverpa** Irwin & Lyneborg, new genus (Fig. 25 and 115–121)

Feminine

Derivation of name: *penna* (Latin) = feather; *verpa* (Latin) = penis.

Type-species: *Psilocephala festina* Coquillett 1893*b*:225 by present designation. Type-locality: Florida.

Diagnosis

Small- to medium-sized flies of very slender build.

Head. — Frons of male at its narrowest narrower than half width of anterior ocellus; frons of female narrow, at level of anterior ocellus 1.0–1.3× as wide as ocellar tubercle; male frons high, narrow, entirely tomentose and without pile, tomentum silvery (one species from Peru has a silvery golden tomentose frons

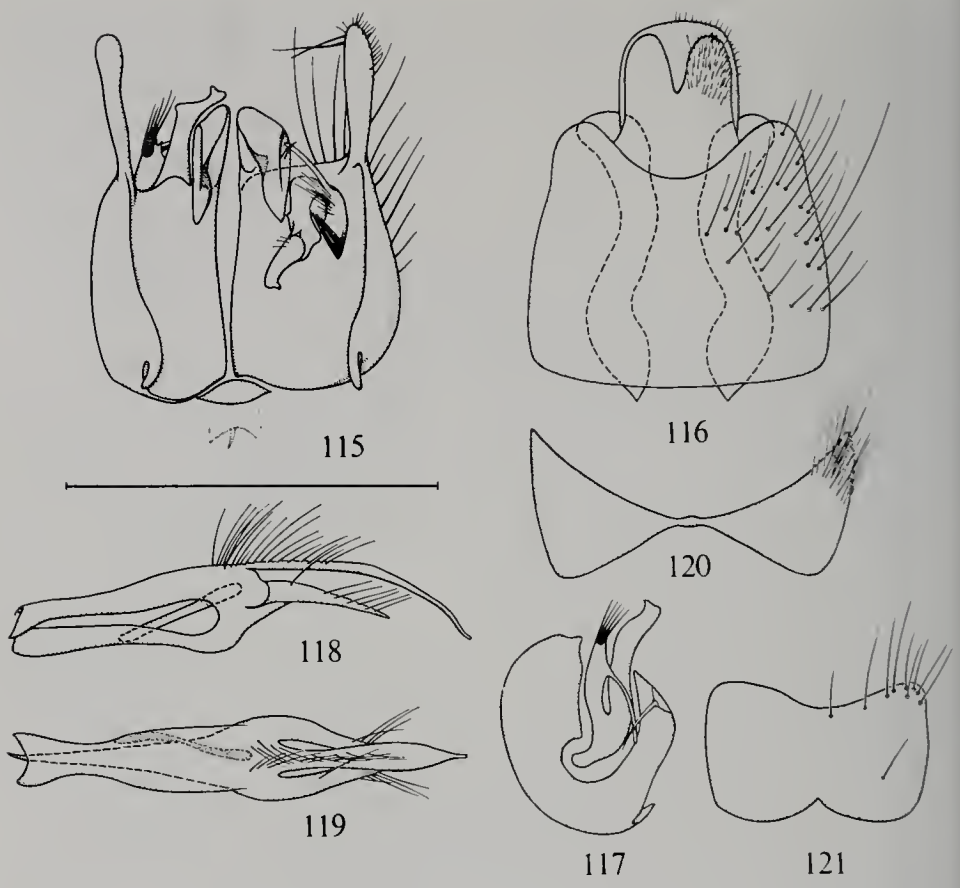

Fig. 115–121. — *Penniverpa festina* (Coq.) male terminalia. 115. — Ganacaxites with appendages and hypandrium in dorsal view; the natural positions of the anterior and posterior ends of aedeagus are shown. 116. — Epandrium with appendages in dorsal view. 117. — Left ganacaxite with ventral lobe and ganostylus in caudal view. 118. — Aedeagus in lateral view. 119. — Aedeagus in dorsal view. 120. — Tergite 8. 121. — Sternite 8. Scale: 0.5 mm.

with a few stout hairs on its lower half); female frons entirely tomentose, either uniformly silvery or upper part darker than lower part; female frons has short, sparse black pile on upper half; head moderately protrudes anteriorly; lateral portion of face without pile; gena bare or with sparse white pile; head depth 1.5–1.8× antennal length; scape slender, 0.3–0.5× as long as flagellum; flagellar style apical, two segmented, with a small terminal spine; palps one segmented.

THORAX. — np 3–4, sa 2, pa 1, dc 0, sc 1–2 (usually 1); mesonotal pile of two kinds: the first semi-appressed, pale, and the other erect, black, usually shorter than scape; mesonotal pile of male generally longer and denser than that of female; prosternum has pile in and around central depression. WING. — Cell m_3 broadly open; vein R_4 slightly longer than R_5; cell r_4 about 2.6–2.8× as long as wide at apex; color hyaline with pale brownish stigma. LEGS. — Fore coxa has 2 strong apical setae on anterior surface; middle coxa without pile on posterior surface or with a little pile in that position in one South American species; hind femur has at most 3–4 short, slender anteroventral setae. Foreleg (Fig. 25) exceptionally long.

ABDOMEN. — Slender in both sexes, entirely cylindrical in male, dorsum more flattened in female, tapering from seg-

ment 2 to apex; male dorsum entirely covered by silver tomentum and whitish pile; female dorsum has pattern of blackish bands and whitish tomentose areas.

Male Terminalia (Fig. 115–121). — Tergite 8 (Fig. 120) about as wide as epandrium and greatly constricted medially; sternite 8 (Fig. 121) rectangular, with incisions in both anterior and posterior margins; epandrium (Fig. 116) shorter in midline than wide, its posterolateral corners broadly rounded; cerci (Fig. 116) rather weakly sclerotized and finely haired, fused along basal part; ventral epandrial sclerite projects slightly more than cerci; posterior section of ventral epandrial sclerite rounded; a setose pair of S-curved sclerites attached by membranes to posterior edge of epandrium; these sclerites not attached over midline by a distinct membrane, but their anteriormost corners are loosely attached by weak membranes to anterior margin of aedeagus; parameral apodeme without attachment to aedeagus; aedeagus (Fig. 118 and 119) long and slender; distiphallus in lateral view (Fig. 118) very flat and gently downcurved, a double row of long setae on proximal part; dorsal apodeme (Fig. 119) long and slender; ventral apodeme (Fig. 119) as long as or longer than dorsal apodeme, in dorsal view gradually tapering; 2 processes arise from midsection of aedeagus, nearly parallel to distiphallus and pointed apically; these processes converge, and the usually setose apices meet either above or below the distiphallus in lateral view; ejaculatory apodeme very slender and short, completely contained between dorsal and ventral apodemes in dorsal view; aedeagus loosely attached to ventral lobes of gonocoxites; ventral lobes (Fig. 115 and 117) complicated, rising dorsally, forming a lamellate structure, and often having a spine on exterior surface not far from the distal, dorsal edge; the gonostylus (Fig. 115 and 117) remarkably complicated, showing many modifications in several undescribed species; gonostylus more or less U shaped, composed of exterior and interior ventrally united sections; interior section relatively consistent in shape; exterior section with strong modifications, from a simple tooth, or a long process with a group of distal spines and a narrow projection stretching toward the ventral lobe (as in the type-species), to the distal spines being absent and the narrow projection being replaced by strong setae; many more modifications will certainly emerge when the numerous species are described; parameral process long, free; gonocoxites free ventrally, attached by a weak membrane; a distinct, free hypandrium present, but not always as large as illustrated (Fig. 115).

Habitat

We have only encountered a few species in nature. All have been found in very sandy areas or in dry sandy washes. A species from Lima, Peru (probably *gracilis* Kröber 1911:507) was captured abundantly in a sandy cornfield.

Distribution

Judging from the material at hand, we conclude that this genus occurs in the southern United States (Arizona, Texas, Florida, and Georgia) and southward through Mexico, the West Indies (Cuba, Jamaica, and Trinidad), Central America (Panama, Honduras, and Guatemala), and portions of South America (British Guiana, Venezuela, Brazil, Ecuador, Peru, and Bolivia).

Included Species

festina (Coquillett) 1893*b*:225 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Georgia, Florida. (Other literature records probably refer to other, closely related, mostly undescribed species.)

At least four additional species, all from South America, can be placed in the genus *Penniverpa,* including *senilis* (Fabricius) (1805:68), new combination, which was reported by Lyneborg (1969: 390) probably to be from northeastern South America. Several undescribed species are mainly from the West Indies and Central and South America, but at least one undescribed species occurs in Texas, Arizona, and northeastern Mexico.

Genus Lysilinga Irwin & Lyneborg, new genus (Fig. 122–127)

Feminine

Derivation of name: *lysis* (Greek) = free, loose; *linga* (Sanskrit) = penis.

Type-species: *Psilocephala aurantiaca* Coquillett 1904*b*:177 by present designation. Type-locality: Claremont, California.

Diagnosis

Medium-sized, slender-bodied species with little pile on body.

HEAD. — Compound eyes of male nearly touch for a considerable distance; eyes of male not divided into two distinct facet sizes. Frons of female narrow, upper half only slightly wider than ocellar tubercle, with lower half expanded to slightly more than twice width of upper half. Head about 1.2–1.4× wider than high; ratio of the distance between the lower, inner corners of compound eyes and head height 0.5–0.6; antennae rather low on head, inserted at three-fifths of head height; width of head 2.6–3.0× that of frons at antennal insertion; genae small, rounded, tomentum undifferentiated from that of face. Head hypognathous; proboscis small, fitting into subcranial cavity and not reaching antennal base; palps one segmented, slender, rodlike, usually pale colored, thinly pilose, shorter than proboscis. Head depth 1.2–1.4× antennal length; scape 0.4–0.6× as long as flagellum; flagellum laterally compressed, pear shaped, wider (dorsoventrally) than scape; flagellar style short, of apparently two segments plus terminal spine. Short, sparse, appressed pile on upper frons of female. Frons and face of male usually without pile or setae (in *L. occipitalis* occasional specimens have a few setae on lower central frons), covered with dense, silvery tomentum. Lower frons and face of female and genae and occiput of both sexes also densely tomentose, tomentum silvery. Upper frons of female usually has silvery to brown tomentum and a pair of usually large, brown velvety spots tangential to each compound eye at division of brown and silvery tomentum. (In an undescribed

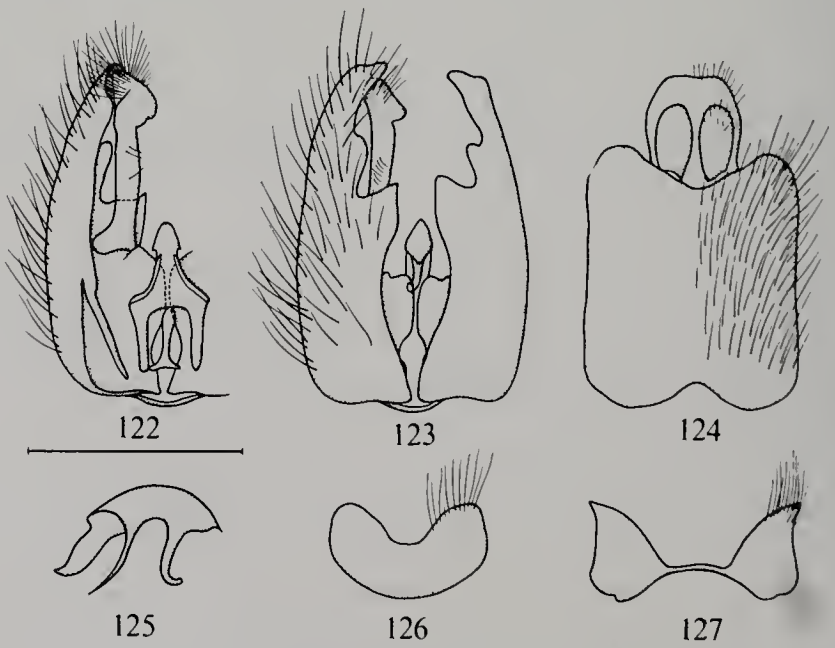

Fig. 122–127. — *Lysilinga aurantiaca* (Coq.) male terminalia. 122. — Right gonocoxite with appendages and aedeagus in dorsal view. 123. — Gonocoxites, hypandrium, and aedeagus in ventral view. 124. — Epandrium with appendages in dorsal view. 125. — Aedeagus in lateral view. 126. — Sternite 8. 127. — Tergite 8. Scale: 0.5 mm.

species from Mexico, the velvet spots are very small.) Head deeper ventrally than dorsally, giving the appearance, when viewed laterally, of a rounded isosceles triangle, the ocelli forming a point and the lengths of occiput and frons forming the long sides. The side from the antennae to the lower genae appears rounded. Ocellar tubercle has sparse, short setae in some species, lacks setae in others.

Thorax. — np 3, sa 2, pa 1, dc 0, sc 1–2; thoracic setae from dark brown to black (*L. aurantiaca,* undescribed species from Mexico) to yellowish white (*L. occipitalis, L. subrufa*). Mesonotal pile short, sparse, appressed, yellow-metallic scalelike, more abundant on males. Mesonotal tomentum grayish to brown with no discernable pattern of vittae. Prosternum has elongate white pile in and around central depression. Wing. — Cell m_3 widely to narrowly open; ratio of lengths R_4/R_5, 1.0–1.1; cell r_4 2.2–2.6× longer than wide at apex; wings hyaline with a darkened area around stigma (and cell r_1 darkened in males of an undescribed species from Mexico). Legs. — Fore coxa has 2 large setae on apical half of anterior surface; middle coxa has pale, sparse, scalelike pile on posterior surface; fore femur has a single seta in the av position; middle femur without setae; hind femur has a row of av and pv setae, av setae fewer but stouter than pv setae. All femora have scalelike pile, especially along dorsal margin.

Abdomen. — Slender, tapering toward apex, cylindrical in cross section; abdominal segments not telescoped; pile sparse, appressed, usually short. Tomentum of both sexes silvery, generally restricted to posterior margins of tergites 1, 2, 3 and often 5 and 6 (except in male of undescribed species from Mexico that has silvery tomentum covering abdomen). Ground color often red, orange, yellow, or light brown.

Male Terminalia (Fig. 122–127). — Tergite 8 elongate, bilobate at lateral margins, very thin medially (Fig. 127); sternite 8 a small bilobate sclerite (Fig. 126). Epandrium large (Fig. 124), slightly wider than long measured along midline; posterolateral margins not modified. Cerci elongate, shorter than ventral epandrial sclerite, separate from one another; ventral epandrial sclerite simple elongate, not keeled, not deeply cleft; intersegmental membrane basad of ventral epandrial sclerite weakly sclerotized laterally, connecting to sclerite and anterior margin of aedeagus (this connection not obvious because of transparent membrane); this membrane also attached to posterolateral portion of epandrium. Gonocoxites (Fig. 122 and 123) free for their entire length; hypandrium narrow, bridgelike, connecting gonocoxites; parameral process absent although gonocoxites project posteriorly and greatly enlarged; parameral apodeme attached to lateral margin of dorsal apodeme by thin, transparent membrane. Ventral lobes of moderate size, dentate, not upright, weakly attached to center of aedeagus, free from one another (Fig. 123); gonostylus elongate, reaching apex of expanded gonocoxite, twisted dorsally like a large hook; ratio of aedeagus basad of center/distad of center about 1/1; ratio of width of phallus base/width of dorsal apodeme, 4/1. Aedeagus (Fig. 122 and 125) of moderate size; distiphallus short, strongly curved, with a peculiar hoodlike appendage above and projecting posteriorly; ventral apodeme short, narrow, about as long as ejaculatory apodeme; dorsal apodeme heavily sclerotized laterally into two parallel bars; distal end of ejaculatory apodeme slightly enlarged laterally, dorsoventrally flattened.

Habitat

Little is known about the habitat of various species of *Lysilinga*. In Riverside, southern California, a malaise trap set in a small wash on a sparsely vegetated hillside yielded several specimens of *L. aurantiaca* over a period of several months.

Distribution

Lysilinga is, judging from specimens examined, confined to western North

America: southern California, Arizona, and New Mexico in the United States; Sonora, Chihuahua, Oaxaca, and Guerrero in Mexico.

Included Species

aurantiaca (Coquillett) 1904*b*:177 ♂ (*Psilocephala*), new combination. Distribution. — Southern California, Arizona, and New Mexico; Sonora, Mexico.

occipitalis (Adams) 1904:443 ♂ (*Psilocephala*), new combination. Distribution. — Southern California, Arizona, and New Mexico; Sonora and Chihuahua, Mexico.

subrufa (Cole) 1923*a*:68 ♀ (*Psilocephala*), new combination. Distribution. — Arizona and southern California. (This species may be conspecific with *L. occipitalis*.)

There is one undescribed species from Guerrero and Oaxaca in southwestern Mexico.

Genus **Brachylinga** Irwin & Lyneborg, new genus (Fig. 18 and 128–135)

Feminine

Derivation of name: *brachys* (Greek) = short; *linga* (Sanskrit) = penis.

Type-species: *Psilocephala baccata* Coquillett 1893*b*:226 by present designation. Type-locality: Los Angeles and San Bernardino counties, California.

Diagnosis

Small- to medium-sized, often slender species.

HEAD. — Compound eyes of male touch to nearly touch for a short distance; eyes of male not divided into two distinct facet sizes. Frons of female (Fig. 18) rather narrow in most species, upper half only slightly wider than ocellar tubercle, lower half expanded to 2–3× width of ocellar tubercle. In an undescribed species from San Blas, Nayarit, Mexico, female frons very wide, 2.3× width of ocellar tubercle at level of anterior ocellus, 4× width at antennal insertion. Head squat, 1.2–1.6× wider than high; distance between lower, inner corners of compound eyes 0.6–0.8× head height; antennae about midway or slightly lower on head, between 40 and 70 percent of head height above antennal insertion; genae small, rounded, tomentum usually undifferentiated from that of face (small group of species along Pacific Coast from Sonora, Mexico, to Panama has differentiated tomentum on genae). Head slightly prognathous in most species, hypognathous in others; proboscis relatively large, reaching to or slightly beyond base of antennae in most species; palps ½–¾ length of proboscis, often yellowish to yellowish-brown. Head depth 1.2–1.4× antennal length; scape 0.5–0.8× as long as flagellum; first flagellomere pear shaped to elongate; dorsal portion of scape sparsely to densely covered with thickened, dark setae; antennae covered with a fine tomentum; flagellar style short, of apparently two segments plus terminal spine. Pile on frons of male variable, from absent to abundant, from erect to appressed, from short to long; pile on female also variable although never entirely absent. Frons, face, genae, and occiput clothed in coarse to fine pruinose tomentum, often brown, gray, or silvery; upper and lower frons not differentiated by pattern or color of tomentum; frons of female (Fig. 18) often has a velvety brown spot tangential to each compound eye; this spot large and round or small and flattened against eye margin; in some species no spot is evident. Frons of male either with or without small spot; if spots exist, they are flattened against each compound eye. Ocellar tubercle has few to several setae.

THORAX. — np 3, sa 1–2 (usually 2), pa 1, dc 0–2 (usually 2), sc 2; thoracic setae dark brown to black. Mesonotal pile generally sparse, thin, erect, with scalelike, bronze-colored appressed pile; pile generally denser on males than on females. Mesonotal tomentum usually grayish to brown without discernible pattern of vittae. WING. — Cell m_3 from widely open to closed; ratio of lengths R_4/R_5 about 1.0–1.1; cell r_4 2.0–3.2× longer than wide at apex; wings hyaline

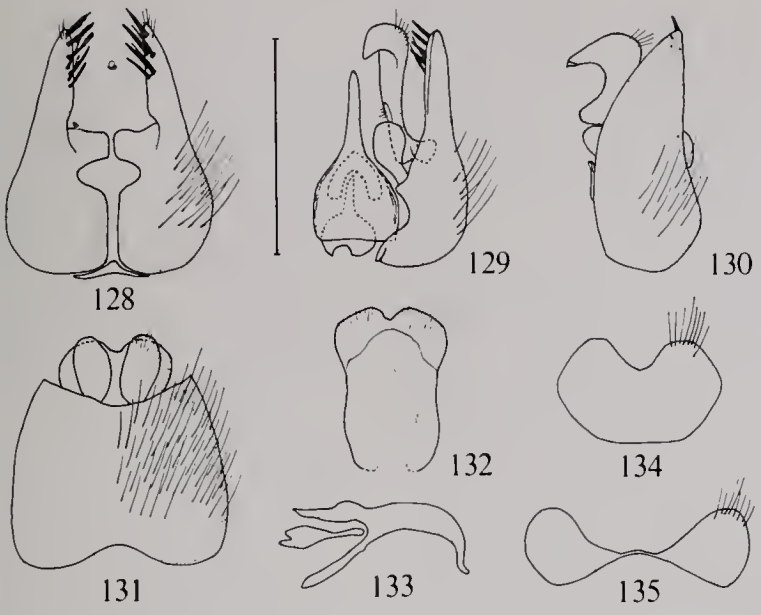

Fig. 128–135.— *Brachylinga baccata* (Cag.) male terminalia. 128. — Gonocoxites and hypandrium in ventral view. 129. — Left gonocoxite with appendages and aedeagus in dorsal view. 130. — Left gonocoxite and gonostylus in lateral view. 131. — Epandrium with appendages in dorsal view. 132. — Ventral epandrial sclerite. 133. — Aedeagus in lateral view. 134. — Sternite 8. 135. — Tergite 8. Scale: 0.5 mm.

with a darkened area around stigma in some species and darkened areas surrounding the veins in a few species. Legs. — Fore femur has 0–1 av setae (usually 1); middle femur has no setae; hind femur has a sparse row of av and pv setae; scalelike, appressed as well as thin, erect pile on all femora.

Abdomen. — Slender (especially in male), tapering toward apex, cylindrical in cross section; pile sparse, semi-appressed in most species; tomentum sparse, usually silvery along sides of females, covering all of dorsum in males of most species (*B. pavida* males lack this feature). Ground color often dark brown or black.

Male Terminalia (Fig. 128–135). — Segment 8 from slightly to greatly reduced; sternite 8 (Fig. 134) a rounded sclerite, notched on the posterior margin; tergite 8 from narrowly constricted (as in *B. pavida*) to broadly constricted (as in *B. baccata* (Fig. 135) and *B. abdominalis*). Epandrium (Fig. 131) of moderate size, usually wider than long, ratio of length/width along midlines from 0.7 to 1.0; posterolateral margins not modified; cerci as long as to considerably shorter than ventral epandrial sclerite and usually free from one another; ventral epandrial sclerite (Fig. 132) simple, often notched apically, usually relatively large with respect to cerci; intersegmental membrane basad of ventral epandrial sclerite weakly sclerotized, with small, lateral shields fitted into posteroventral portion of epandrium in some species and not, or at most very weakly, connected to anterior margin of aedeagus. Gonocoxites (Fig. 128) free over entire length, usually simple in form, but in some species elongate posteriorly; hypandrium small, thin, free, bridgelike, attached to both gonocoxites by membranes; aedeagus attached to ventral lobes of gonocoxites; parameral process absent or very minute; parameral apodeme attached to lateral margin of aedeagus by a thin, transparent membrane; ventral lobes of moderate size (small in a few West Indian species),

weakly attached to center of aedeagus; gonostylus usually elongate, curved dorsad, and with a tuft of setae on extreme posteroventral portion in a few species; gonostylus reaches beyond (posteriorly) distiphallus and, in most species, beyond gonocoxite extensions; ratio of aedeagus basad of center/distad of center, usually 0.67–0.80, in a few cases 1.0–1.4 (e.g., *B. abdominalis*); ratio of width of phallus base/width of dorsal apodeme, 0.15–0.44, most North American species ranging between 0.3 and 0.4. Aedeagus variable, usually of moderate size; distiphallus short (as in *B. abdominalis*) to long [as in *B. sericeifrons* (Kröber 1928*a*:34) from Chile], with those of most North American species of moderate length; distiphallus simple, downcurved apically; ventral apodeme short, broader at base than at apex, shorter than dorsal apodeme, and usually shorter than ejaculatory apodeme, in *B. abdominalis* very broad and forked apically; dorsal apodeme shieldlike, broader apically than basally, generally more heavily sclerotized along lateral margins; distal end of ejaculatory apodeme club shaped, in *B. abdominalis* very large, triangular.

Habitat

Many of the species inhabit dry canyons in Mediterranean zone vegetation; others are found along beach areas in and amongst dune vegetation. Species of *Brachylinga* are not found in extreme deserts but are often associated with marginal desert habitats.

Distribution

Brachylinga occurs throughout much of the drier zones of the Nearctic and Neotropical regions. One group is found in the southwestern USA and western Mexico, another in Chile, Peru, and Ecuador; yet another is found in the West Indies and Florida.

Included Species

abdominalis (Fabricius) 1805:12 (*Bibio*), new combination. Distribution. — Puerto Rico, West Indies.

vexans (Curran) 1926:2 ♂, ♀ (*Psilocephala*), new synonym.

baccata (Coquillett) 1893*b*:226 ♂, ♀ (*Psilocephala*), new combination. Distribution. — California.

cinerea (Cole) 1923*a*:65 ♂, ♀ (*Psilocephala*), new combination. Distribution. — New Mexico.

monensis (Curran) 1926:2 ♀ (*Psilocephala*), new combination. Distribution. — Mona Island, West Indies.

morata (Coquillett) 1893*b*:225 ♂, ♀ (*Psilocephala*), new combination. Distribution. — New York, New Jersey, Florida.

obscura (Coquillett) 1893*b*:229 ♀ (*Psilocephala*), new combination. Distribution. — Jamaica, West Indies.

pavida (Coquillett) 1893*b*:226 ♂ (*Psilocephala*), new combination. Distribution. — Arizona, California; Baja California, Mexico.

pilosa (Kröber) 1914:47 ♂ (*Psilocephala*), new combination. Distribution. — Arizona.

platycera (Loew) 1872:114 ♀ (*Psilocephala*), new combination. Distribution. — Cuba, West Indies.

laticornis (Loew) 1869*a*:10 ♀ (*Psilocephala*), not Loew 1856.

? *slossonae* (Coquillett) 1893*b*:227 ♀ (*Psilocephala slossoni*) emendation, new combination. Distribution. — New Hampshire.

slossoni (Coquillett), improper original spelling.

squamosa (Hardy) 1943:24 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Key West, Florida.

tepocae (Cole) 1923*b*:461 ♀ (*Psilocephala*), new combination. Distribution. — Sonora, Mexico.

More than 10 species of *Brachylinga* are undescribed, and several species are described from South America.

Genus **Litolinga** Irwin & Lyneborg, new genus (Fig. 16, 17, and 136–141)

Feminine

Derivation of name: *litos* (Greek) = simple; *linga* (Sanskrit) = penis.

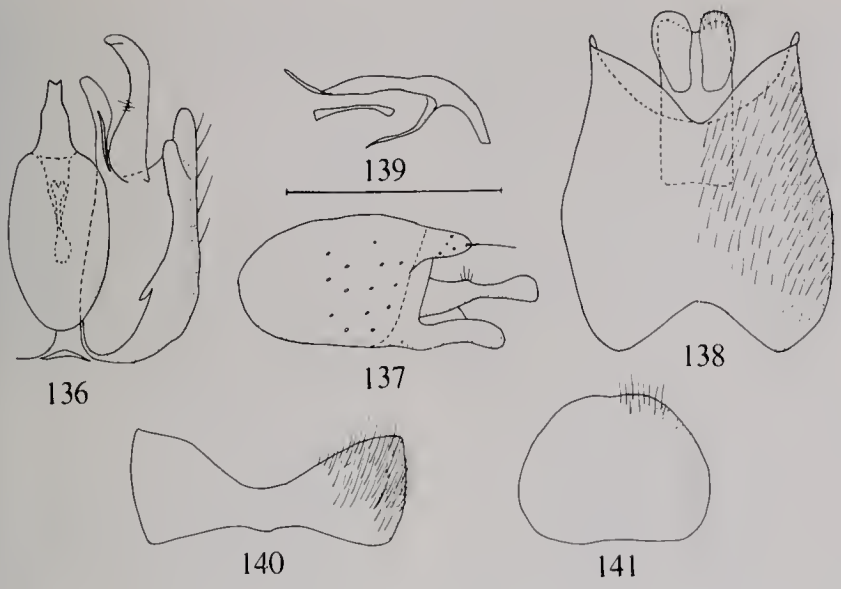

Fig. 136–141. — *Litolinga acuta* (Adams) male terminalia. 136. — Left ganocaxite with appendages and aedeagus in dorsal view. 137. — Left ganocaxite with appendages in ventralateral view. 138. — Epandrium with appendages in dorsal view. 139. — Aedeagus in lateral view. 140. — Tergite 8. 141. — Sternite 8. Scale: 0.5 mm.

Type-species: *Psilocephala acuta* Adams 1903:222 by present designation. Type-locality: Englewood, Clark County, Kansas.

Diagnosis

Small- to medium-sized, usually slender species.

Head. — Compound eyes of male almost touching for a considerable distance; eyes of male of two distinct facet sizes, with a linear indentation on eye surface where different facet sizes meet. Frons of female (Fig. 17) extremely wide, more than 3× width of ocellar tubercle at level of antennal insertion and more than 2× width of ocellar tubercle at vertex. Frons of male has light to dark brown velvety patch contiguous with each compound eye; frons of female usually has distinct rounded, dark brown velvety spot contiguous with each compound eye (one undescribed species from Texas has minute crescent-shaped velvety patches). Frons and face of both sexes completely tomentose; tomentum buff to brown; frons and upper face of male without pile or setae; frons of female has scattered, sparse, short setae above velvety spots, otherwise upper face and frons without pile or setae. Genae protrude as lobes below compound eyes (Fig. 16), always with a patch of darker brown tomentum running to subcranial cavity. Head triangular in shape when viewed from side, with ocelli forming upper point, base of genae a second and antennal insertion a third, with antennae placed very low on head. Ocellar tubercle has many short setae angled forward, originating mainly from posterior portion. Head 0.6–0.8× as deep as antennal length; scape of male 0.4–0.5× as long as flagellum; scape of female 0.5–0.6× as long as flagellum. Scape stout; first flagellomere exaggeratedly pear shaped with a longer terminal style composed of a single segment plus a blunted apical spine. Palps one segmented although on some specimens they may appear to be two segmented.

Thorax. — np 3, sa 1–2 (usually 2), pa 1, dc 0, sc 1–2; all thoracic setae dark brown to black; mesonotal pile of both sexes pale, mostly silvery, appressed, sparse in general; prosternum with elon-

gate white pile in and around central depression. WING. — Cell m_3 widely open; ratio of lengths R_4/R_5 0.93–1.05; cell r_4 2.0–2.8× longer than wide at apex; wings generally have mottled brown patches between veins, amount of darkened area differs between species. LEGS. — Fore coxa has 2 large, black setae on anterior surface, 1 apical, the other about midway between apex and base of coxa; hind femur has 3–7 anteroventral setae.

ABDOMEN. — Rather slender, gradually tapering from segment 2 toward apex; abdominal segments not telescoped; male dorsum flattened, most species have a patina of fine silvery tomentum; ground color dark to light brown.

MALE TERMINALIA (Fig. 136–141). — Tergite 8 only moderately constricted in middle (Fig. 140); sternite 8 a small, nearly circular sclerite (Fig. 141). Epandrium (Fig. 138) about ⅔ as long as wide along midline, with sharp posterolateral corners extending nearly to level of posterior margin of ventral epandrial sclerite; cerci extend slightly beyond ventral epandrial sclerite; ventral epandrial sclerite simple, about 2× as long as cerci, posterior margin incised in several species; sclerotization of intersegmental membrane anterior of ventral epandrial sclerite weak, connecting this sclerite with anterior margin of aedeagus; sclerotization of intersegmental membrane does not reach posterolateral portion of epandrium. Gonocoxites (Fig. 136) free for their entire distance; hypandrium free, small, bridgelike, connecting gonocoxites; parameral process present as a short finger; parameral apodeme weak, not attached to aedeagus; ventral lobes of gonocoxites relatively large, lightly sclerotized, and weakly attached to ventral center of aedeagus; gonostylus elongate, twisted toward distiphallus, usually blunt; ratio of aedeagus basad of center/distad of center about 2/1; ratio of width of phallus base/width of dorsal apodeme 1/4. Aedeagus (Fig. 136 and 139) large, distiphallus simple, short, downward curved; ventral apodeme thin, short, bladelike, about ⅔ as long as dorsal apodeme, not entirely covering ejaculatory apodeme; dorsal apodeme generally covers ejaculatory apodeme; anterior end of ejaculatory apodeme clublike, enlarged, though dorsoventrally flattened.

Habitat

Specimens of *Litolinga* have been collected in the beach sands of the Gulf of Mexico and inland in sand dunes of Kansas and Texas. Larvae of one species, *L. acuta* (Adams), are known predators of *Elasmopalpus lignosellus* (Zeller), the lesser corn stalk borer, on peanuts in Texas (Johnson 1978).

Distribution

Litolinga is restricted to the southeastern and south-central United States (Florida, Kansas, Texas) and along the eastern coast of Mexico (Tamaulipas, Vera Cruz).

Included Species

acuta (Adams) 1903:222 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Kansas, Texas.

pallida (Kröber) 1914:45 ♂ (*Psilocephala*), new combination, new synonym.

? *bolbocera* (Osten Sacken) 1887:162 ♀ (*Thereva*), new combination. Distribution. — Presidio, Mexico. (From the description, the species seems to belong within *Litolinga*.)

bolboceras, Kröber 1914:64, error in spelling.

tergisa (Say) 1823:39 ♂ (*Thereva*), new combination. Distribution. — Florida.

tergissa, LeConte 1859:57, unjustified emendation.

corusca (Wiedemann) 1828:232 ♂ (*Thereva*) Cole 1923*a*:71.

There are about three undescribed species.

Genus **Rhagioforma** Irwin & Lyneborg, new genus (Fig. 23 and 142–147)

Feminine

Derivation of name: *Rhagio*, a genus of flies; *forma* (Latin) = shape, form.

Type-species: *Psilocephala maculipennis*

Kröber 1914:45 by present designation. Type-locality: San José del Cabo, Baja California, Mexico.

Diagnosis

Moderately large-sized, slender species.

Head. — Frons of male at its narrowest much narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 2.0–2.2× as wide as ocellar tubercle; male frons raised, with brownish-gray tomentum and long, black pile over entire surface; female frons has brownish-gray tomentum, unpatterned, slightly concave in middle, and has short, appressed pile on upper two-thirds; head rather prominently protrudes anteriorly at antennal level; head depth 1.2–1.4× antennal length (Fig. 23); scape slender, 0.6–0.8× as long as flagellum; first flagellomere constricted at base; flagellar style long, slender, two segmented, with a distinct, terminal spine; palps one segmented.

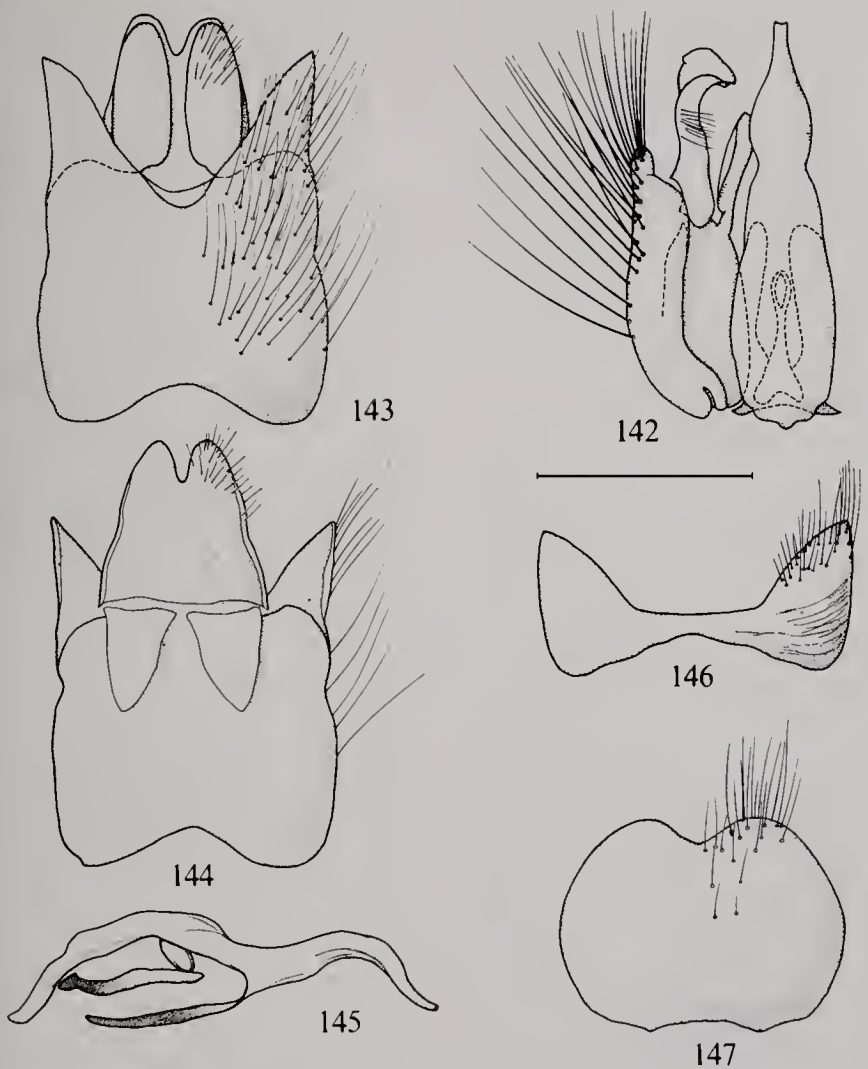

Fig. 142–147. — *Rhagiaforma maculipennis* (Kräb.) male terminalia. 142. — Right gonocaxite with appendoges and aedeagus in dorsal view. 143. — Epandrium with appendages in dorsal view. 144. — Epandrium with appendages in ventral view. 145. — Aedeagus in lateral view. 146. — Tergite 8. 147. — Sternite 8. Scale: 0.5 mm.

THORAX. — np 3–4, sa 2, pa 1, dc 2, sc 2; mesonotal pile of male long, dense, erect, that of female much shorter and more appressed; prosternum has long pale pile in and around central depression. WING. — Cell m_3 open or closed at wing margin; vein R_4 much longer than vein R_5; cell r_4 about 2× longer than wide at apex; wing grayish-brown with pattern formed by dark shadows around crossvein and distal portion of longitudinal veins; stigma dark brown. LEGS. — Fore coxa has 2 strong black setae: 1 apical on anterior surface and 1 subapical on exteroanterior margin; hind femur has 5–7 anteroventral setae, a few posteroventral setae.

ABDOMEN. — Rather slender and gradually tapering from base toward apex; dorsum noticeably convex in both sexes; dorsum of male entirely tomentose and pilose; tomentum silvery gray, pile white; dorsum of female yellowish brown, with black spots in midline, pile sparse and very short, strongly resembling the abdominal pattern found in many species of *Rhagio* F.

MALE TERMINALIA (Fig. 142–147). — Tergite 8 (Fig. 146) large and strongly constricted along middle; sternite 8 (Fig. 147) very large, broadly oval, with semicircular incision posteriorly; epandrium (Fig. 143) shorter in midline than wide, with pointed, projecting, posterolateral corners; cerci free (Fig. 143), well separated and sclerotized, sparsely haired, large; ventral epandrial sclerite (Fig. 144) extends slightly beyond cerci, posterior margin cleft, anteriorly reaching only to level of middle of epandrium, the anterior part separated along midline and from part below cerci; parameral apodeme without attachment to aedeagus; distiphallus (Fig. 142) wide proximally and gradually tapering, in lateral view (Fig. 145) only slightly curved; dorsal apodeme (Fig. 142) long, oval; ventral apodeme shaped like a very narrow spoon; ejaculatory apodeme (Fig. 142) small, with distal part expanded; ventral lobes of gonocoxite (Fig. 142) large, lamellate, loosely attached to ventral surface of aedeagus; parameral process absent, but parameral apodeme well developed, short and thick; gonocoxites not united ventrally, only attached by a weak membrane anteriorly; hypandrium (Fig. 142) present, free.

Habitat

Unknown. One female was taken drinking from a small stream in an otherwise dry area in northern Baja California.

Distribution

The genus *Rhagioforma* is apparently restricted to Baja California, Mexico.

Included Species

maculipennis (Kröber) 1914:45 ♂ (*Psilocephala*), new combination. Distribution. — Baja California, Mexico.

No undescribed species of this genus are known.

Genus Arenigena Irwin & Lyneborg, new genus (Fig. 19, 21, and 148–156)

Feminine

Derivation of name: *arena* (Latin) = sand; *gena* (Latin) = born in.

Type-species: *Thereva semitaria* Coquillett 1893*a*:198 by present designation. Type-locality: Southern California.

Diagnosis

Medium-sized, slender to moderately broad species.

HEAD. — Eyes in male (Fig. 19) absolutely touch for a rather long distance; frons of female at level of anterior ocellus about twice as wide as ocellar tubercle and only slightly widens toward bottom of eyes; frons in both sexes entirely tomentose, not patterned, with at most a few hairs on the upper frons of female; head only very slightly protrudes anteriorly; gena has very short, pale pile; head depth 1.5–1.7× antennal length (Fig. 21); scape slender, 0.5–0.9× as long as flagellum; flagellar style two segmented, with a distinct terminal spine; palps one segmented.

Thorax. — np 3, sa 2, pa 1, dc 1–2, sc 2; all thoracic setae pale; mesonotal pile in both sexes of two types: one is long, appressed, pale, scalelike, and the other is short, erect and pale or dark; prosternum has long, whitish pile in and around central depression. Wing. — Cell m_3 closed; veins R_4 and R_5 equal in length; cell r_4 1.9–2.1× as long as wide at apex. Legs. — Fore coxa usually has 3 setae on anterior surface: 2 on apical half and 1 on basal half of anteroexterior margin, the latter rarely missing; hind femur has 6–8 anteroventral setae.

Abdomen. — Rather slender, gradually tapering posteriorly from segment 2; male dorsum convex or somewhat flattened, densely covered with whitish-gray tomentum and whitish pile; female dorsum yellowish, subshiny, frequently with

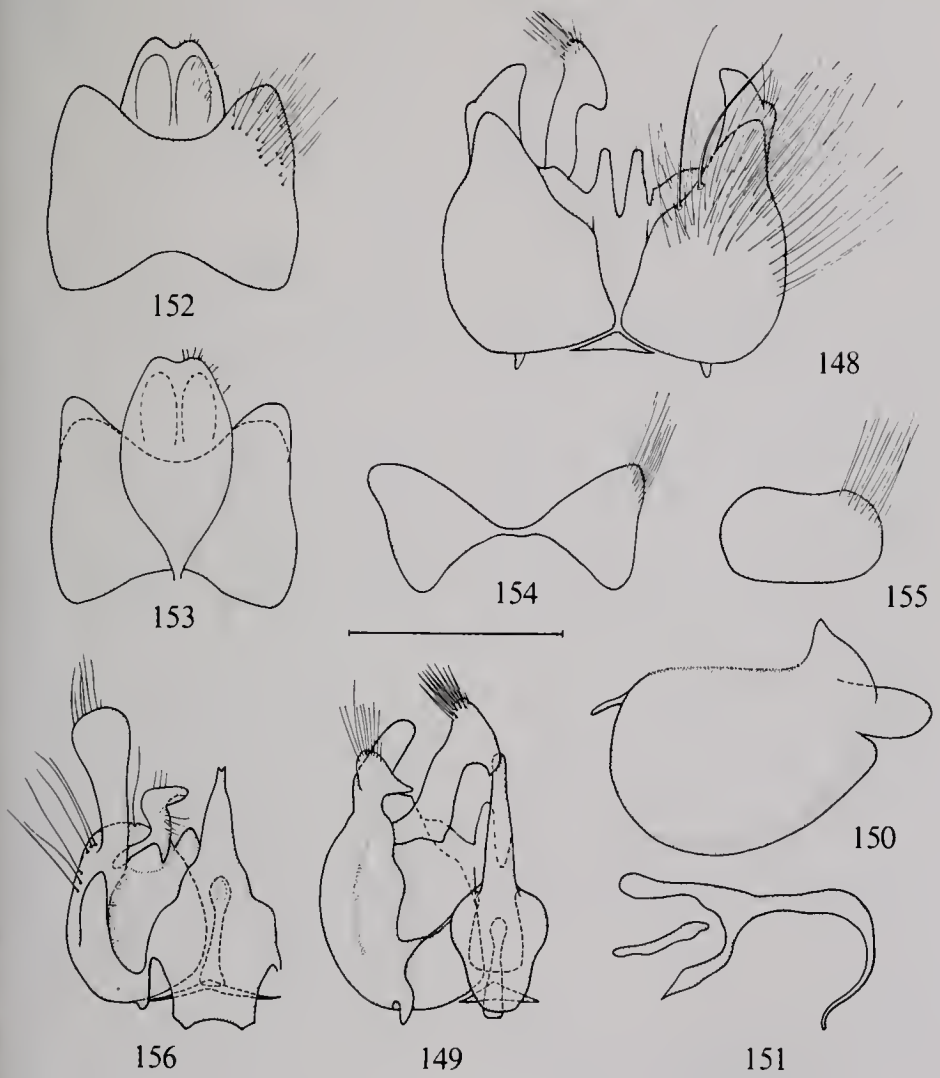

Fig. 148–156. — *Arenigena* spp. 148–155. — *A. semitaria* (Coq.) mole terminalia. 148. — Gonocoxites with appendages (left gonostylus omitted) and hypandrium in ventrol view. 149. — Right gonocoxite with appendages and aedeagus in dorsol view. 150. — Left gonocoxite in lateral view. 151. — Aedeagus in lateral view. 152. — Epandrium with appendages in dorsal view. 153. — Epandrium with appendages in ventral view. 154. — Tergite 8. 155. — Sternite 8. 156. — *A. morcida*-group right gonocoxite with appendages and aedeagus in dorsal view. Scale: 0.5 mm.

grayish to grayish-brown anterior bands on anterior segments.

MALE TERMINALIA (Fig. 148–156). — Tergite 8 (Fig. 154) comparatively large and constricted for rather a short distance in middle; sternite 8 (Fig. 155) also rather large, oval, in some species with a low, wide incision along midpoint of posterior margin; epandrium (Fig. 152) shorter in midline than wide, with short, rounded posterolateral corners; cerci free, rather weakly sclerotized; ventral epandrial sclerite (Fig. 153) large, often extending beyond cerci, tapering anteriorly and reaching to anterior margin of epandrium, where folded 180° and attached to anterior margin of aedeagus, this attachment markedly well sclerotized; parameral apodeme has a weak, membranous attachment to aedeagus in *semitaria* (Fig. 149), a more sclerotized attachment in the *marcida* group (Fig. 156); aedeagus (Fig. 151) has gradually tapering, curving distiphallus, broad, rectangular to ovoid dorsal apodeme, short, simple ventral apodeme, and short ejaculatory apodeme that widens slightly distally; ventral lobes of gonocoxites (Fig. 148) weakly sclerotized, without a distinct attachment to ventral surface of aedeagus; parameral process (Fig. 149 and 156) present and variously modified distally; parameral apodeme short; gonostylus hook shaped, sometimes with an apical comb of setae; gonocoxites (Fig. 148) in ventral view attached by a rather wide membrane in midline, this membrane continuing posteriorly into weakly sclerotized ventral lobes, each gonocoxite being clearly demarcated; hypandrium (Fig. 148) free as a narrow, well-marked sclerite along the anteroventral corners of the gonocoxites.

Habitat

Species of *Arenigena* are found in desert habitats with sparse vegetation and sandy substrates; specimens have been taken from desert washes.

Distribution

Arenigena is a desert genus, found from Idaho into Mexico and from California eastward to Colorado, New Mexico, and Texas.

Included Species

brunnea (Kröber) 1914:46 ♀ (*Psilocephala*), new combination. Distribution. — Arizona.

marcida (Coquillett) 1893*b*:228 ♂ (*Psilocephala*), new combination. Distribution. — Southern California.

semitaria (Coquillett) 1893*a*:198 ♂, ♀ (*Thereva*), new combination. Distribution. — Southern California.

Several undescribed species occur in this genus.

Genus Ammonaios Irwin & Lyneborg, new genus (Fig. 20, 22, and 157–161)

Masculine

Derivation of name: *ammos* (Greek) = sand; *naio* (Greek) = to dwell.

Type-species: *Thereva nivea* Kröber 1914:64 by present designation. Type-locality: Mesilla Valley, New Mexico.

Diagnosis

Moderately large, heavy-bodied species.

HEAD. — Frons of male (Fig. 20) at its narrowest distinctly narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 2.1–2.4× as wide as ocellar tubercle; male frons has whitish tomentum and whitish, scaly pile; female frons has entirely pale tomentum, not markedly patterned, and like male has appressed, pale, scaly pile; head only slightly protrudes at antennal level; lateral portion of face and gena has scaly pile; facial and genal calli absent; head depth 1.4–1.8× antennal length (Fig. 22); scape slender, 0.3–0.6× as long as flagellum; flagellar style apical, two segmented, with a distinct terminal spine; palps one segmented.

THORAX. — np 3–5, sa 1–2, pa 1, dc 1–2, sc 2; all setae slender and pale; mesonotal pile in both sexes dense, uniform, pale, mostly scaly, and semi-appressed to appressed; prosternum has long, whitish pile in and around central depression. WING. — Cell m_3 closed; vein

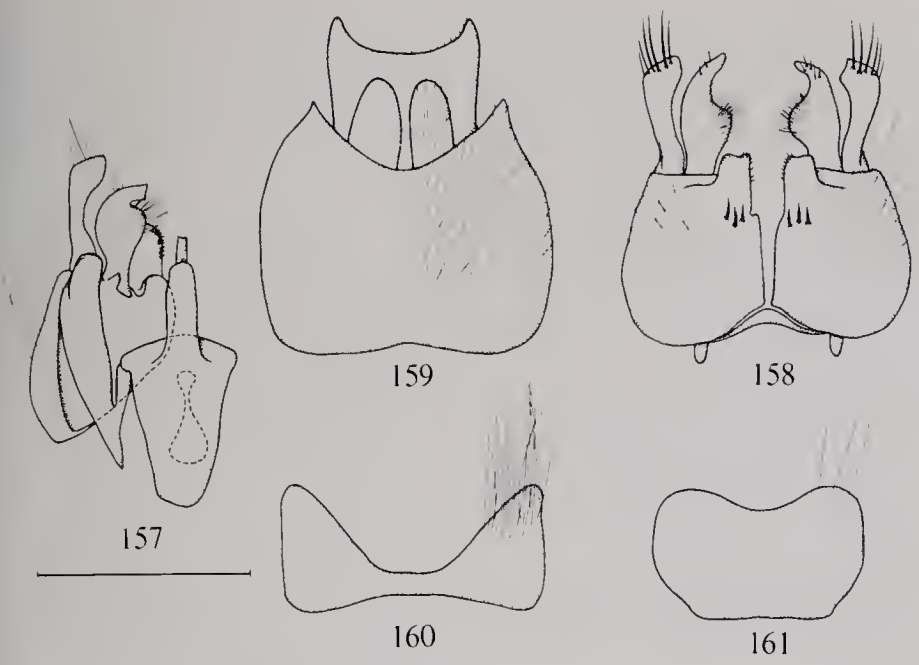

Fig. 157–161. — *Ammanaios niveus* (Kräb.) male terminalia. 157. — Right gonocoxite with appendages and aedeagus in dorsal view. 158. — Ganocaxites with appendages and hypandrium in ventral view. 159. — Epandrium with appendages in darsal view. 160. — Tergite 8. 161. — Sternite 8. Scale: 0.5 mm.

R_4 longer than vein R_5; cell r_4 1.9–2.0× as long as wide at apex; color uniformly hyaline, pale brownish, or with a whitish tinge; stigma pale or dark brownish, or costal margin more extensively darkened. Legs. — Fore coxa with 2 pale, slender apical setae on anterior surface, sometimes an additional seta more basally; middle coxa has whitish scaly pile on posterior surface; hind femur has 2–8 pale to dark anteroventral setae.

Abdomen. — Rather broadly built, in both sexes gradually tapering from segment 3 to apex; dorsum flattened in both sexes; male dorsum entirely covered with thick, long, appressed, scaly whitish pile that completely covers integumental surface; female dorsum yellowish brown to grayish yellow, with ill-defined, darker anterior bands on anterior segments; pile much sparser and shorter than on male.

Male Terminalia (Fig. 157–161). — Tergite 8 (Fig. 160) and sternite 8 (Fig. 161) large. Epandrium (Fig. 159) shorter in midline than wide, posterolateral corners rather sharply pointed; cerci free, rather weakly sclerotized, never extending beyond ventral epandrial sclerite; ventral epandrial sclerite (Fig. 159) very wide, more or less strongly extending beyond cerci, and more or less ventrally directed; ventral epandrial sclerite reaches anterior margin of epandrium and has a membranous attachment to aedeagus; parameral apodeme has a more or less distinctly sclerotized bridge to dorsal apodeme of aedeagus; aedeagus has a long, narrow, downcurved distiphallus; dorsal apodeme tapers distally; ventral and ejaculatory apodemes small; ventral lobes of gonocoxites short and weak, not attached to aedeagus; parameral process large and stout, often slightly spoon shaped; parameral apodeme stout; gonostylus variously shaped; gonocoxites short, truncate distally, ventrally (Fig. 158) attached by a membrane; hypandrium narrow and laterally fused to gonocoxites.

Habitat

Species in the genus *Ammonaios* are inhabitants of very xeric zones and can be found as adults on and near shifting

sand dunes. Larvae have been reared from sand taken from areas near vegetation in shifting dunes. This genus is not known to occur in coastal areas and seems restricted to inland dune systems.

Distribution

Southwestern United States (Oregon, California, Idaho, Utah, Nevada, Arizona, New Mexico, Texas) and northern Mexico (Baja California, Sonora, Chihuahua, Coahuila).

Included Species

niveus (Kröber) 1914:64 ♂ (*Thereva nivea*), new combination. Distribution. — New Mexico.

At least four additional, unnamed species are at hand.

Genus **Megalinga** Irwin & Lyneborg, new genus (Fig. 3 and 162–168)

Feminine

Derivation of name: *megas* (Greek) = large; *linga* (Sanskrit) = penis.

Type-species: *Megalinga insignata* Irwin & Lyneborg, herein described, by present designation. Type-locality: Death Valley, California.

Diagnosis

Medium- to large-sized, slender to moderately broad species.

HEAD. — Frons of male at its narrowest narrower than half width of anterior ocellus, or eyes tangential; frons of female at level of anterior ocellus from 2 to nearly 3× as wide as ocellar tubercle, gradually widening downward to bottom of eyes; frons has entirely grayish tomentum, either without distinct pattern or with two small, dark tomentose, circular areas on lower frons at eye margin; male frons without pile; female frons has sparse, short, black, semi-appressed pile on upper two-thirds; head moderately protrudes anteriorly; face without pile; genae ridge shaped, with darker tomentum than rest of head and short, black pile; head depth 1.4–1.7× antennal length; scape slender, 0.4–0.6× as long as flagellum; flagellar style two segmented with a distinct terminal spine; palps one segmented.

THORAX. — np 3, sa 2, pa 1, dc 1–3, sc 2; mesonotal pile mostly short, semi-appressed to appressed, pale; additional sparse pile of very short, black, erect hairs sometimes occurs on midanterior portion; prosternum has long whitish pile in and around central depression; each cervical lobe anterior to prosternum has a strong, black seta (Fig. 3). WING. — Cell m_3 open; vein R_{2+3} has a deep curve apically; vein R_4 longer than vein R_5; cell r_4 1.6–1.8× as long as wide at apex; whitish-hyaline, with strongly marked pattern of dark brownish patches. LEGS. — Fore coxa has 2 stout setae on apical half of anterior surface and an additional stout seta near base on anteroexterior margin; hind femur has 5–6 anteroventral setae, some shorter posteroventral setae, often arranged in a close group near apex.

ABDOMEN. — Rather narrow, gradually tapering from base to apex; dorsum convex, especially in male; dorsum of male has pale grayish tomentum; dorsum of female yellowish to brownish, due to thinner tomentum, and not distinctly patterned.

MALE TERMINALIA (Fig. 162–168). — Tergite 8 (Fig. 167) about as wide as epandrium and greatly constricted in middle; sternite 8 (Fig. 168) rather large, with broad incision in posterior margin; epandrium (Fig. 162) shorter in midline than wide, its posterolateral corners broadly rounded, with a broad, infolded margin; cerci (Fig. 162) free, strongly sclerotized, not extending beyond ventral epandrial sclerite; this sclerite large, reaching to anterior margin of epandrium, not attached to anterior margin of aedeagus, entirely membranous, only a horseshoe shaped sclerotized area (Fig. 166) below cerci; aedeagus has two attachments (Fig. 164) to parameres and gonocoxites: a long, weak, membranous bridge stretching from distal corners of dorsal apodeme to midsection of paramere, and a stronger attachment between ventral lobes of gonocoxites and ventral

surface of aedeagus; aedeagus (Fig. 164 and 165) of a very remarkable shape; distiphallus forms a right angle with the heavily sclerotized, rectangular dorsal apodeme and curves downward for about 270°, its apex being deeply cleft; ventral apodeme arises at a right angle from base of distiphallus, extending parallel to dorsal apodeme, but much narrower and shorter; ejaculatory apodeme about as

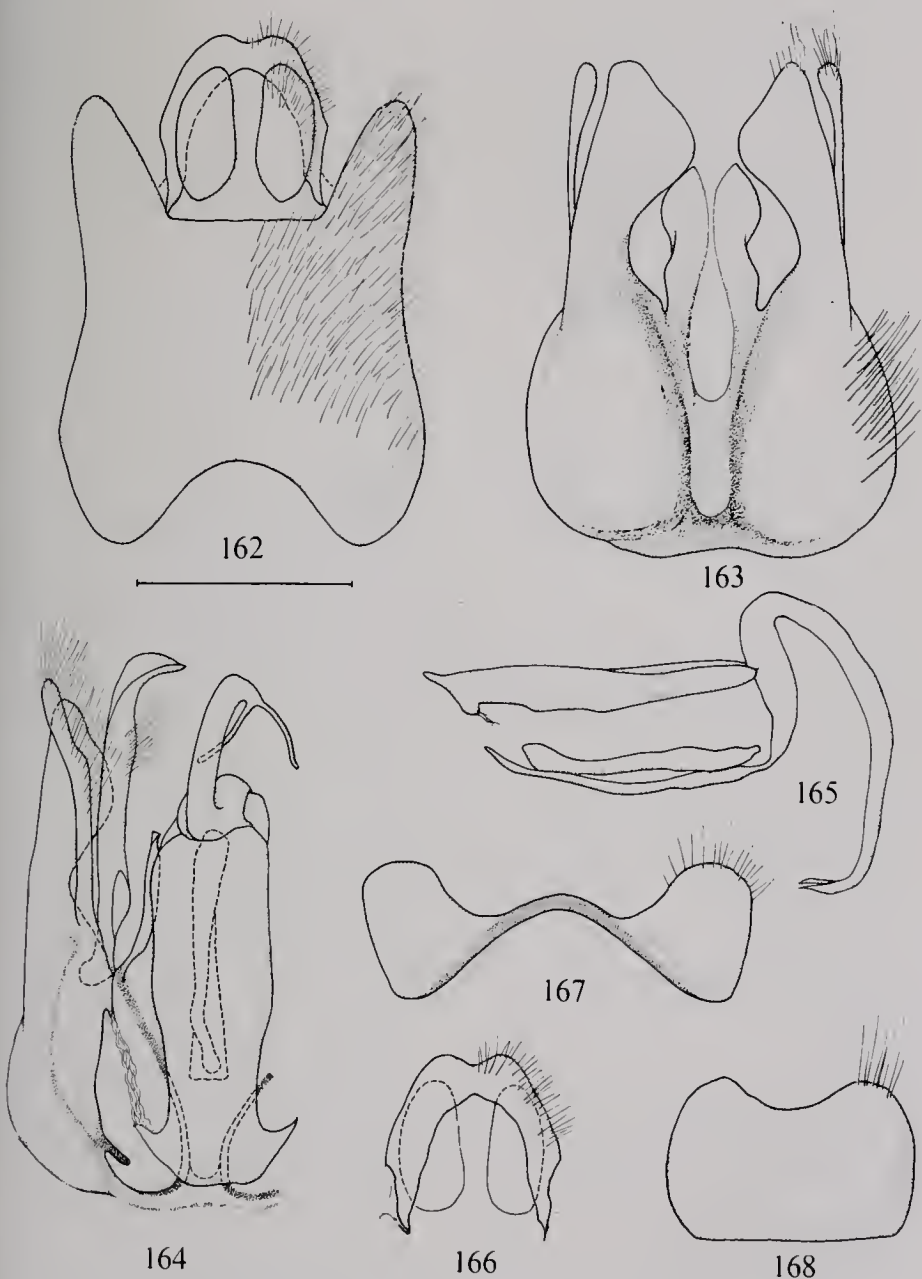

Fig. 162–168. — *Megalinga insignata* Irw. & Lyn. male terminalia. 162. — Epondrium with appendages in dorsal view. 163. — Gonocoxites with appendages in ventral view. 164. — Right gonocoxite with appendages and aedeagus in dorsal view. 165. — Aedeagus in lateral view. 166. — Ventral epandrial sclerite and cerci in ventral view. 167. — Tergite 8. 168. — Sternite 8. Scale: 0.5 mm.

long as ventral apodeme and very slender. Ventral lobes of gonocoxites (Fig. 163) very large, attached in midline for a long distance, and also attached to body of aedeagus; parameral process very long and slender, but its apodeme very reduced; gonocoxites (Fig. 163) in ventral view attached by a strong membrane over midline but a ventral synsclerite is not formed, as each gonocoxite is clearly demarcated by a strongly sclerotized and pigmented inner margin; a similar strong membrane attaches the ventral lobes for a long distance; a free hypandrium is not present, but a hypandrial element may enter into the fusion of the anteroventral corners of the gonocoxites.

Habitat

The two species listed below occupy distinct habitats, one in the deserts of the southwestern United States, the other in the coastal dunes and beaches of southern Mexico, Guatemala, and El Salvador along the Pacific Ocean.

Distribution

This genus is apparently restricted to the deserts of the southwestern United States and the coastline of Sinaloa, Mexico, southward to El Salvador.

Included Species

insignata Irwin & Lyneborg, described below. Distribution.—Southern California, Arizona, and northern Baja California.

One undescribed species of *Megalinga* is known from Sinaloa, Nayarit, and Guerrero, Mexico, and Ahuachapan, El Salvador.

Megalinga insignata Irwin & Lyneborg, new species

Derivation of name: *in* (Latin) = not; *signatus* (Latin) = mark.

Description

See Table 1 for selected measurements of the holotype and most paratype material.

Male, holotype, specimen number *5144*[1], 8.96 mm in length, excluding antennae. Ground color pale tan overall; pile generally short, but longer on genae, lower occiput, and laterally on abdomen; all pile whitish to pale yellow; tomentum silver to golden, moderately dense.

HEAD. — Frons narrow, the eyes large, diverging only slightly from middle of frons toward genae; eyes at their closest separated by about half the width of the anterior ocellus. Pile lacking on frons and face, long on occiput and rather dense on lower occiput; genae flanged, enlarged, with short dark brown hairs on ventral surface. Ocellar triangle prominent, with about 12 short, blackish bristles; occiput has a single row of postocular setae, 11 on each hemisphere. Tomentum very fine, brownish golden centrally and grayish silver laterally on frons and face; genae have dark brown tomentum; occiput has white tomentum; frons has two minute, crescent shaped marks of brown tomentum, one tangential to each eye. Antennae tan to yellowish-tan; scape has a single large black seta projecting anterodorsally from dorsal surface and 2 such setae projecting anteroventrally from ventral surface; pile whitish, rather short on scape and pedicel, black, very short on basal third of flagellum; tomentum fine, whitish on scape and pedicel, thinner on flagellum; scape slightly longer than wide; pedicel about half as long as wide; flagellum about 2.5× longer than wide, exaggeratedly pear shaped; style composed of two subsegments plus terminal spine, basal subsegment short, apical subsegment about 2× as long as basal subsegment, terminal spine short, blunt. Proboscis brown, large, reaching almost to base of antennae; palps yellowish, reach about three-fourths distance to apex of proboscis, one segmented though with a deep constriction about one-fourth distance from base to apex.

[1] Each specimen has been assigned a unique number to facilitate the association of data. This number appears below the specimen on a separate yellow label bearing, besides the number, the words, THEREVIDAE/M.E. IRWIN/SPECIMEN #.

Table 1. — Measurements (in mm) of various morphological attributes of *Megolinga insignata* Irwin & Lyneborg, new species.

Morphological Attribute	Sex	♂	♂	♂	♂	♂	♀	♀	♀	♀	♀	Mean ± Standard Deviation	
	Specimen No.[a]	5144	5134	5143	5148	5150	5137	5140	5141	5145	5151	Males	Females
	Type	Holo	Para	Para	Para	Para	Para	Para	Para	Para	Para		
Total length (excluding antennae)		8.96	9.30	9.55	8.72	9.13	11.79	9.79	10.87	11.54	12.53	9.13 ± 0.28	11.30 ± 0.92**[b]
Head width		2.04	1.98	2.06	2.00	2.08	2.22	2.04	2.20	2.34	2.32	2.03 ± 0.04	2.22 ± 0.11**
Head height		1.58	1.58	1.60	1.50	1.60	1.68	1.54	1.66	1.74	1.78	1.57 ± 0.04	1.68 ± 0.08*
Head depth		1.14	1.10	1.16	1.12	1.12	1.28	1.14	1.20	1.30	1.32	1.13 ± 0.02	1.25 ± 0.07**
Distance between eyes at vertex		0.26	0.24	0.26	0.24	0.22	0.42	0.36	0.36	0.40	0.42	0.24 ± 0.02	0.39 ± 0.03**
Frontal width at anterior ocellus		0.14	0.14	0.14	0.16	0.14	0.50	0.42	0.44	0.50	0.48	0.14 ± 0.01	0.47 ± 0.03**
Frontal width at antennae		0.68	0.68	0.70	0.68	0.72	0.90	0.82	0.90	0.96	0.96	0.69 ± 0.02	0.91 ± 0.05**
Facial width at lower eye margin		0.86	0.92	0.90	0.90	0.88	1.06	0.94	1.10	1.12	1.10	0.89 ± 0.02	1.06 ± 0.07**
Eye height		1.44	1.40	1.46	1.38	1.50	1.50	1.38	1.48	1.50	1.56	1.44 ± 0.04	1.48 ± 0.06
Eye depth		0.86	0.80	0.84	0.86	0.82	0.90	0.78	0.80	0.86	0.98	0.84 ± 0.02	0.86 ± 0.07
Frontal protuberance depth		0.10	0.10	0.12	0.12	0.10	0.14	0.10	0.10	0.10	0.14	0.11 ± 0.01	0.12 ± 0.02
Antennal scape length		0.18	0.18	0.20	0.20	0.20	0.22	0.18	0.20	0.22	0.22	0.19 ± 0.01	0.21 ± 0.02
Antennal flagellum length		0.50	0.42	...	0.50	0.44	0.52	0.48	0.48	0.56	0.54	0.47 ± 0.04	0.52 ± 0.03
Wing length (humeral crossvein to apex)		5.81	5.81	6.06	5.81	6.06	6.56	5.98	6.39	6.81	6.81	5.91 ± 0.12	6.51 ± 0.31**
Wing width, maximum		2.68	2.36	2.56	2.64	2.70	2.70	2.44	2.64	2.64	2.76	2.59 ± 0.12	2.64 ± 0.11
Distance fork R_{4+5} to outrun R_4		1.46	1.36	1.60	1.54	1.56	1.60	1.62	1.56	1.74	1.52	1.50 ± 0.09	1.61 ± 0.07
Distance fork R_{4+5} to outrun R_5		1.34	1.22	1.42	1.28	1.40	1.54	1.48	1.40	1.52	1.48	1.33 ± 0.07	1.48 ± 0.05**
Distance outruns R_4 to R_5		0.96	0.94	0.90	1.04	0.98	1.20	1.00	1.14	1.16	1.18	0.96 ± 0.05	1.14 ± 0.07**
Distance fork R_{4+5} to apex		1.72	1.60	1.84	1.76	1.78	1.90	1.84	1.74	1.94	1.88	1.74 ± 0.08	1.86 ± 0.07
Fore tibia length		1.84	1.90	2.00	1.84	1.94	2.28	1.94	2.22	2.24	2.22	1.92 ± 0.05	2.18 ± 0.12**
Hind tibia length		2.90	2.96	3.04	3.00	3.02	3.60	3.12	3.50	3.66	3.50	2.98 ± 0.05	3.48 ± 0.19**
Fore basitarsus length		0.90	0.90	1.00	0.90	0.94	1.06	0.96	1.18	1.16	1.16	0.93 ± 0.04	1.10 ± 0.08**
Hind basitarsus length		1.28	1.22	1.24	1.24	1.26	1.50	1.26	1.48	1.60	1.50	1.25 ± 0.02	1.47 ± 0.11**

[a] Each specimen has been assigned a unique number to facilitate the association of data. The number appears below the specimen on a separate yellow label, bearing, besides the number, the words, THEREVIDAE/M.E. IRWIN/SPECIMEN #.

[b] Means of males and females significantly different from one another at the 5-percent (*) or 1-percent (**) levels, analysis of variance, completely randomized design.

THORAX. — Mesonotal vittae rather indistinct; tomentum silver grayish, rather dense, covering all of mesonotum, scutellum, and pleural areas; pile short, appressed, dense on and near scutellum, white with a few golden tan patches along anterior part of faint narrow vittae on mesonotum. Mesonotal macrosetal pattern: np 3, sa 2, pa 1, dc 2, sc 2, black. Pile thin, white, elongate, confined for the most part to anepisternum, pleurotergite, and coxae. WING. — Veins yellowish brown with darker patches in several areas: at fork R_{4+5}, along veins R_4 and R_5, near tip of R_{2+3}, along vein R_{2+3} below darkened stigma, along most crossveins (not humeral crossvein), and thinly along veins M_1, M_2, and M_3. Veins M_3 and M_4 do not meet, distance between them at wing margin 0.16 mm; vein R_{2+3} curves dorsally at tip; vein R_4 exaggeratedly sinuate; halter very pale tan overall. LEGS. — Legs yellowish brown; femora have white, mostly appressed pile, scalelike dorsally; femoral setal pattern: f_1 3 av; f_2 2 av, 1 pv; f_3 4 av, 11pv. Tibial setal pattern: t_1 3 ad, 4 pd, 4 pv; t_2 2 ad, 4 av, 3 pd, 3 pv; t_3 7 ad, 6 av, 4 pd, 4 pv. Fore coxa has 3 prominent, black setae, 1 basal and 2 apical.

ABDOMEN. — Yellowish brown with silver gray tomentum and white pile; fascia slightly differentiated by a more tanish tomentum.

MALE TERMINALIA. — Very large, darker brown than abdomen. See generic description for description of male terminalia.

VARIATION OF MALES IN PARATYPE SERIES. — Mean length, excluding antennae, 9.13 mm ± standard deviation of 0.28 mm. Measurement differences are presented in Table 1. Femoral setal pattern: f_1 av 3–4, pv 0–1; f_2 av 1–4, pv 1–3; f_3 av 4–6, pv 7–11. Tibial setal pattern: t_1 ad 3–5, av 0, pd 3–4, pv 2–4; t_2 ad 2–4, av 2–4, pd 3–4, pv 3–5; t_3 ad 4–9, av 4–8, pd 3–8, pv 2–6.

VARIATION OF FEMALES IN PARATYPE SERIES. — Mean length, excluding antennae, is 11.30 mm ± standard deviation of 0.92 mm. Females are significantly (at 1-percent level) larger than males. Table 1 presents selective measurements of female paratypes. Females are similar to males except as follows: females have less dense tomentum and less dense pile overall. Frontal differences are great, as can be seen from Table 1; upper frons has sparse, short, black setae; a pair of small half crescent dark brown spots, one tangential to each eye, occur at the junction of upper and lower frons; a slightly darker tan strip of tomentum connects eye margin and antennal insertion. Femoral setal pattern: f_1 av 2–6, pv 0–2 (*5151* has pd 1); f_2 av 3–5, pv 2–5; f_3 av 4–8, pv 6–9. Tibial setal pattern: t_1 ad 3–4, av 0, pd 2–5, pv 4; t_2 ad 3–4, av 2–3, pd 3–4, pv 3–4; t_3 ad 6–10, av 6–9, pd 4–7, pv 4–7.

FEMALE TERMINALIA. — Tergite 8 rather large, squarish, with a transverse band of black setae about midway from anterior to posterior ends; sternite 8 elongate, a similar band of black setae about one-third distance from base to apex, with a small central hump covered with small setae centrally along posterior margin, without any incisions on posterior margin; vaginal apodeme (sternite 9) a complete sclerotized, elongate ring, taking up most of space above sternite 8, with a thin sclerotized connection posteriorly to tergite 9 and an extraordinary sclerotized structure involving the sclerotization of the spermathecal duct and a triangular sclerotized apparent apex of the duct that might represent a united spermathecae (Irwin 1976); intersegmental membrane connecting sternite 8 and vaginal apodeme heavily sclerotized, containing 2 sclerites united along midline of sternite 8 and connected to lateral portion of sclerotized ring of vaginal apodeme. Tergite 10 has about 8 thickened spines in the posterodorsal position, and tergite 9 has about 6 thinner, longer spines in the posteroventral position; some finer setae anterior of posterodorsal spines on tergite 10; cerci widely separated, have a dense patch of

black setae, connected to one another by a transparent membrane; subanal plate pointed apically, fitted beneath tergites 9 and 10 and does not extend posteriorly beyond cerci.

Specimens Examined

Holotype: ♂, *5144*, California Academy of Sciences type number *13670;* Bennetts Well, Inyo County, California; 30 March 1952; on indefinite loan from the California Insect Survey, University of California, Berkeley; A. E. Michelbacher, collector. Paratypes: 5 males, 12 females from these localities:

MEXICO: Baja California Norte: Bahia de los Angeles, 1 April 1973, J. T. Doyen & J. A. Powell, ♀, *5151* (CIS to CIS).[1]

UNITED STATES: Arizona: Maricopa County: Tempe, 8 May 1964, F. F. Hasbrouch, ♂, *5150* (ASU to ASU). California: Imperial County: Brawley, 14 April 1959, E. I. Schlinger, ♀, *5146* (EIS to UCR). Riverside County: Coachella, 25 May 1938, E. C. VanDyke, ♀, *5147* (CAS to CAS). San Bernardino County: Needles, 3 May 1964, P. Torchio & G. Bohart, ♂, *5149* (USU to USU); 9 air miles south of Baker at Zzyzx Springs, 24 April 1977, C. T. Kitayama (malaise trap), ♂, *5134* (CIS to MEI), ♀, *5135* (CIS to CIS), *5136* (CIS to UCD); same data, 25 April 1977, ♀, *5137* (CIS to MEI); same data as last except, G. W. Ulrich, ♀, *5138* (CIS to USNM); same data, 26 April 1977, M. E. Buegler (hand netted), ♀, *5139* (CIS to CNC); same data, 27 April 1977, ♀, *5140* (CIS to INHS). Inyo County: Furnace Creek, Death Valley, 27 March 1961, M. E. Irwin, ♀, *5141* (MEI to ZMC); same data, D. R. Miller, ♀, *5142* (UCD to MEI); same data, 8 April 1939, E. G. Linsley, ♂, *5143* (CIS to CIS); Bennetts Well, Death Valley National Monument, 15 April 1968, J. Bigelow & M. A. Cazier, ♀, *5145* (ASU to ASU); Tecopa, 30 May 1955, J. Belkin, ♂, *5148* (UCR to UCR).

Genus Breviperna Irwin
(Fig. 169–175)

Feminine

Breviperna Irwin 1977*b*:288. Type-species: *Psilocephala placida* Coquillett 1894:99 by original designation. Type-locality: Listed as "Florida," apparently in error (Irwin 1977*b*:293).

Reference: Irwin 1977*b*.

Diagnosis

Large, robust species.

Head. — Frons of male at its narrowest about as wide as anterior ocellus; frons of female at level of anterior ocellus nearly twice as wide as ocellar tubercle; frons without distinct pattern of tomentum; pile on lower frons moderately dense, sparse on upper frons, composed of rather long, black hairs; antennae set on low protuberance; facial and genal calli absent; lateral portion of face and gena bare; antennae 0.6–0.8× as long as depth of head; scape 0.8–0.9× as long as flagellum; flagellar style apical with two segments and a terminal spine; palps one segmented.

Thorax. — np 3–5 (usually 4), sa 2, pa 1–2 (usually 1), dc 0–1, sc 1–3 (usually 2); mesonotal pile of two types: one is long, scalelike, sparse, semi-appressed, and the other is short, thin, erect, sparse; prosternum has pile in and around central depression. Wing. — Cell m_3 open or closed; vein R_4 longer than vein R_5; cell r_4 about 2× as long as wide

[1] Specimen loan institutions and depositories (abbreviations in parentheses): Arizona State University, Tempe (ASU); California Academy of Sciences, San Francisco (CAS); California Insect Survey, University of California, Berkeley (CIS); Canadian National Collection, Ottawa (CNC); Illinois Natural History Survey, Urbana (INHS); M. E. Irwin Collection (MEI); Evert I. Schlinger Collection (EIS); University of California, Davis (UCD); University of California, Riverside (UCR); United States National Museum of Natural History, Washington, D.C. (USNM); Utah State University, Provo (USU); Zoological Museum, Copenhagen, Denmark (ZMC).

at apex; color hyaline with dark brown stigma. LEGS. — Fore coxa has 2 apical setae on anterior surface; middle coxa without pile posteriorly; hind femur has 7–9 anteroventral setae.

ABDOMEN. — Broad, nearly parallel sided from segments 1 through 3, thereafter, abdomen tapers sharply to apex; segments 5–8 telescoped within segments 3–4 in males; female segments not telescoped; dorsum of abdomen flattened, more so in males than in females; male dorsum densely clothed in silver tomentum; female dorsum lacks silver tomentum.

MALE TERMINALIA. — Tergite 8 (Fig. 175) small and narrowly constricted medially; sternite 8 (Fig. 174) small and broadly bilobate; epandrium (Fig. 172) large, covering most of terminalia, distinctly shorter than wide, with posterolateral margins bidentate; cerci free, extending slightly beyond ventral epandrial sclerites; ventral epandrial sclerite (Fig. 172) not keeled, not united to anterior margin of aedeagus; parameral apodeme attached by a thickened, wide, nonsclerotized membrane to dorsal apodeme of aedeagus and ventral lobes broadly attached by a nonsclerotized membrane to

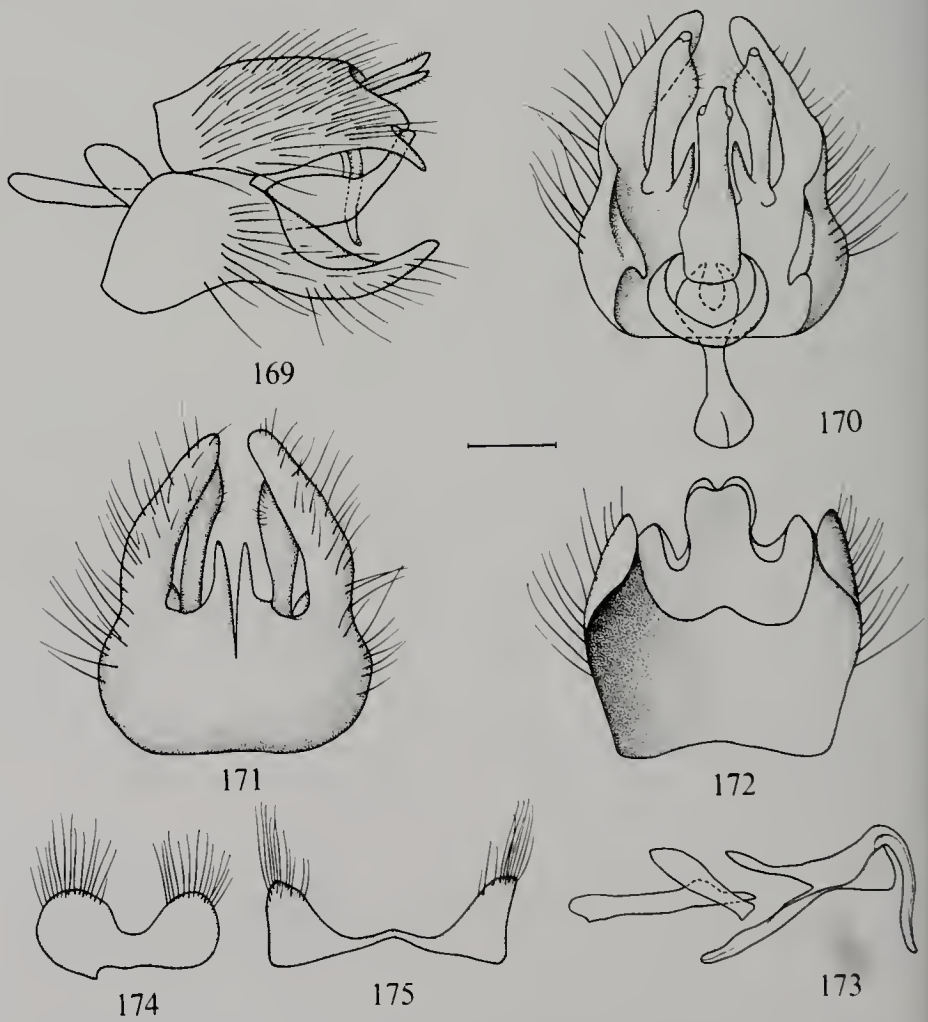

Fig. 169–175. — *Breviperna placida* (Caq.) male terminalia. 169. — Genitalia in lateral view. 170. — Gonocoxites with appendages and aedeagus in dorsal view. 171. — Gonocoxites with appendages in ventral view. 172. — Epandrium with appendages in ventral view. 173. — Aedeagus in lateral view. 174. — Sternite 8. 175. — Tergite 8. Scale: 0.5 mm.

center of aedeagus; distiphallus (Fig. 173) elongate, slender, with an asymetrically twisted tip; a nearly closed, sclerotized ring surrounding proximal portion of ejaculatory apodeme is loosely attached to ventral lobe; ventral apodeme short and narrow; ventral lobes fused basally, elongate, forming a posteriorly directed continuation to central portion of gonocoxites; distal parameral process reduced, only a basal apodeme existing; gonocoxites (Fig. 171) broadly fused ventrally and flattened; hypandrium absent or completely fused with gonocoxites, not identifiable.

Habitat

Breviperna placida inhabits forested mountainous zones, but specific habitats are unknown.

Distribution

The genus *Breviperna* is found predominantly in southeastern Arizona.

Included Species

placida (Coquillett) 1894:99 ♀ (*Psilocephala*). Distribution. — Southeastern Arizona.

No undescribed species are known to us. *Breviperna milleri* Irwin (1977*b*:294, ♀) was found to belong to the genus *Ozodiceromya* Bigot, based on subsequent material containing a male.

Genus **Nebritus** Coquillett
(Fig. 2 and 176–181)

Nebritus Coquillett 1894:98. Type-species: *N. pellucidus* Coquillett 1894:98 by original monotypy. Type-locality: Southern California.

Zionea Hardy 1938:144 new synonym. Type-species: *Z. tanneri* Hardy 1938: 144 by original monotypy. Type-locality: North Fork, Provo Canyon, Utah.

Diagnosis

Large- to medium-sized, slender bodied species.

Head (Fig. 2). — Frons of male wide, at level of anterior ocellus 1.6–2.0× as wide as width of ocellar tubercle; frons of female at level of anterior ocellus 2.5–3.0× as wide as width of ocellar tubercle; frons strongly patterned: lower part raised, forming a polished black callus, upper part with brownish to brownish-gray tomentum surrounding the polished black ocellar tubercle; frontal pile very long and erect, extending below level of antennal bases; head prominently protruding anteriorly; antennae set on distinct protuberance; lower frontal callus extends between antennal bases and forms an upper midfacial callus below antennae; a polished black callus also located ventrally on face; upper postocular margin thickened and polished black; lateral portion of face without pile; gena has long pile; antennae 1.0–1.3× as long as depth of head; scape 1.2–1.5× as long as flagellum, slender or thickened; flagellar style subapical, placed in a groove on exterior surface of first flagellomere a considerable distance basad of apex; number of segments in flagellar style not discernable without dissection; palps one segmented.

Thorax.— np 3–4, sa 2, pa 1, dc 0–1, sc 2; mesonotal pile in both sexes of two types: one is long, erect, black, rich, and the other is moderately long, semi-appressed to appressed, pale, rich, but largely restricted to lateral parts of mesonotum and to two bands on middorsum; prosternum has long pile in and around central depression. Wing. — Cell m_3 open; veins R_4 and R_5 about equal in length or R_5 slightly longer; cell r_4 2.5–3.2× as long as wide at apex; grayish brown to brown, frequently most intensively pigmented along anterior margin or pigment arranged in broad streaks along veins; veins coarse; stigma distinct. Legs. — Fore coxa has 2–3 apical setae on anterior surface; middle coxa has whitish pile on posterior surface; hind femur has 4–12 anteroventral setae.

Abdomen. — Broad at base, gradually tapering from base or from segment 2 to apex, not telescoped; dorsum flattened, in both sexes dull, with grayish to brownish tomentum, or dorsum subshiny, without any marked pattern.

Male Terminalia (Fig. 176–181). — Tergite 8 variable, in the type-species

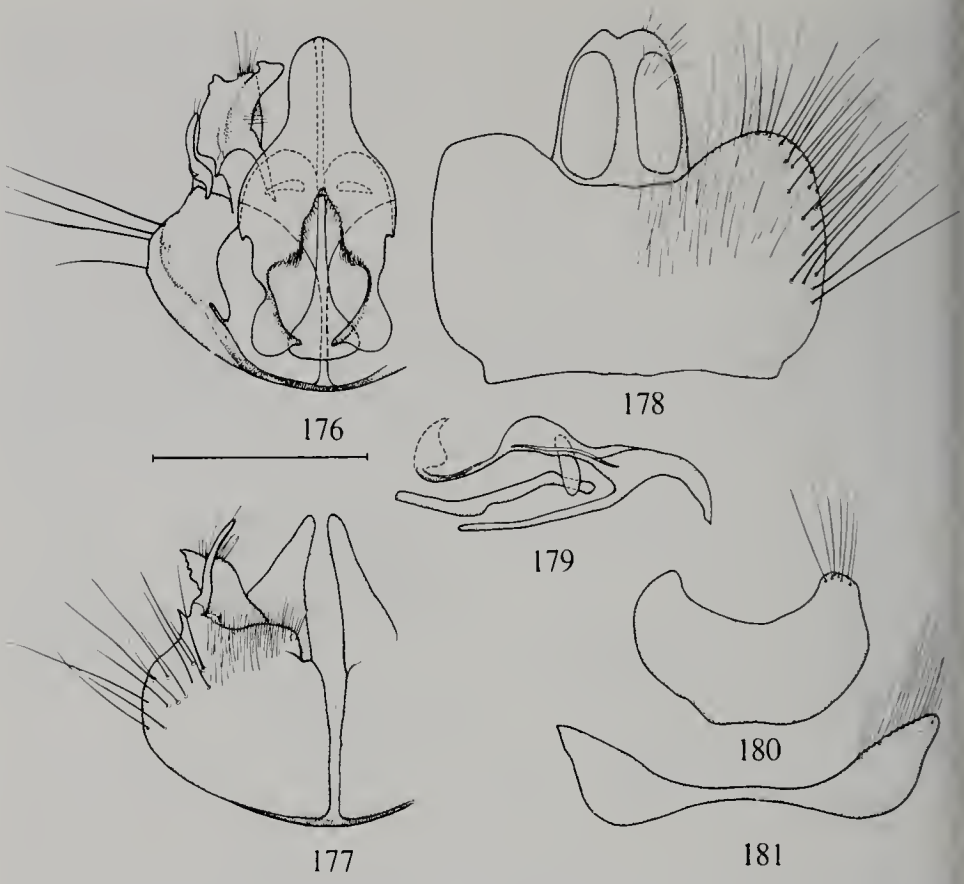

Fig. 176–181. — *Nebritus pellucidus* Coq. male terminalia. 176. — Right gonocoxite with appendages and aedeagus in dorsal view. 177. — Ganocoxites with appendages in ventral view. 178. — Epondrium with appendages in dorsal view. 179. — Aedeagus in lateral view. 180. — Sternite 8. 181. — Tergite 8. Scale: 0.5 mm.

(Fig. 181) small and strongly constricted medially; sternite 8 (Fig. 180) rectangular to bilobate; epandrium (Fig. 178) only about half as long medially as wide, its posterolateral corners infolded; cerci rather large, free, well sclerotized, not extending beyond level of ventral epandrial sclerite; ventral epandrial sclerite large, extending to or nearly to anterior margin of epandrium, with a membranous attachment to anterior margin of aedeagus; ventral epandrial sclerite as a whole well sclerotized, keel shaped apically below cerci; parameral apodeme not attached to aedeagus; distiphallus rather long compared with rest of aedeagus, downcurved; dorsal apodeme semicircular, its distal margin with two lateral projections; ventral and ejaculatory apodemes small, weakly sclerotized; ventral lobes of gonocoxites large, spoon shaped, directed obliquely upward, with distinct attachment to ventral surface of aedeagus; parameral process long and slender, noticeably projecting beyond posterior margin of gonocoxite; parameral apodeme short; gonocoxites (Fig. 177) not united ventrally except by a membrane; gonocoxite in lateral view broadly rounded posteriorly; hypandrium broad throughout, united with anterior margin of gonocoxites for a rather long distance.

Habitat

The two described species are found in montane habitats; the one undescribed

species seems confined to coastal sand dunes.

Distribution

Western North America.

Included Species

pellucidus Coquillett 1894:98 ♂, ♀. Distribution. — Southern California (Monterey, San Luis Obispo, Kern, San Bernardino, Riverside, Los Angeles, and San Diego counties) and Mexico (Baja California Norte).

tanneri (Hardy) 1938:144 ♀ (*Zionea*), new combination. Distribution. — Western United States (Utah, Nevada, and California) and northwestern Mexico (Baja California Norte).

One undescribed species is at hand from the coastal dunes of California (Monterey, San Luis Obispo, Ventura counties).

Note

In all basic respects of male terminalia and other obvious synapomorphies, *tanneri* conforms to the ground plan of *pellucidus*. These two species are, in our judgment, closely related. Therefore, we have synonymized *Zionea* with *Nebritus*.

Genus Cyclotelus Walker
(Fig. 24, 26, 27, 30, and 182–187)

Masculine

Cyclotelus Walker 1850:4. Type-species: *pruinosus* Walker; subsequent designation (Becker 1912:315). Type-locality: South America.

Furcifera Kröber 1911:524, new synonym. Type-species: *fascipennis* (Cole) by subsequent designation (Cole 1960*a*: 165) (= *Cyclotelus socius* Walker 1850: 6, new synonym). Type-locality: Brazil.

Epomyia Cole 1923*a*:26. Type-species: *Thereva pictipennis* Wiedemann by original designation. Type-locality: Savannah, Georgia.

Reference: Cole 1960*a* (as *Furcifera*).

Diagnosis

Small to rather large species (4.5–13 mm), moderately slender.

Head. — Frons of male at its narrowest much less than half width of anterior ocellus; female frons (Fig. 30) at level of anterior ocellus 1.5× as wide as ocellar tubercle; head 0.6–0.9× as high as wide, slightly more circular in males; compound eyes of female of uniform facet size, of male divided (e.g., *pictipennis* (Wied.) and *rufiventris* (Loew)) or at least with smaller facets ventrally; antennal insertion 0.6–0.7× distance from vertex to genae; frons at antennal insertion 0.3–0.4× (females) or 0.2–0.3× (males) as wide as head; genae slightly flanged, dark tomentum contrasting with silvery tomentum of lower face; head hypognathous; proboscis does not reach antennal base; palps one segmented, 0.7–1.0× as long as proboscis, thin basally, thicker distally, incurved toward tip, densely covered with thick hairs, especially basodorsally and distoventrally; head 0.5–1.1× as deep as antennal length (Fig. 26 and 27) (North American species tend to have antennal length about equal to head depth); scape 0.5–2.0× as long as flagellum (though in the North American species the range is 0.5–0.7×), 0.1–0.4× as wide as long (range 0.3–0.4× in North American species); scape sparsely covered with thin to mediumly thick hairs; dorsobasal surface of first flagellomere has a few short hairs, basal third more or less constricted, more so in South American species; flagellar style often not entirely terminal, either subterminal (i.e., set on outer lateral portion of apex — usually the North American species) or distinctly aterminal (Fig. 26) (i.e., set on outer lateral portion about two-thirds from base of first flagellomere — usually South American species including the type-species); style of 1–2 visible segments plus spine, approximately one-tenth as long as first flagellomere; frons lacks (male) or at most has a few short, inconspicuous setae on upper portion (females); 10–25 stout, usually darkly colored occipital setae per side in a single row paralleling eye margin from vertex to about one-third distance to bottom of eye, then incurving sharply around a stripe of silvery tomen-

tum tangential to lower eye margin, and then downcurving for a short distance; pile lacking on frons, face, lateral areas of face and genae, moderately dense, elongate on ventral occiput, generally absent on ventral occipital tomentose stripe tangential to eye margin; tomentum fine, powdery, covering most of frons (male) or mainly lower part of frons (female) (Fig. 30), entire face and ventral occiput; gena has dark tomentum; upper frons of male has triangle of dark, velvety tomentum; frons of female has a well-defined central patch and often two smaller patches tangential to compound eyes of dark, velvety tomentum; usually area between female velvety tomentose patch and ocellar tubercle shiny, lacks tomentum.

THORAX. — np 2–4 (usually 3), sa usually 2 (North American species) or 1 (South American species), pa 1, dc 0, sc usually 2 (North American species) or 1–3 (usually 1, South American species); mesonotal pile sparse, moderately short (male) or very short (female), erect,

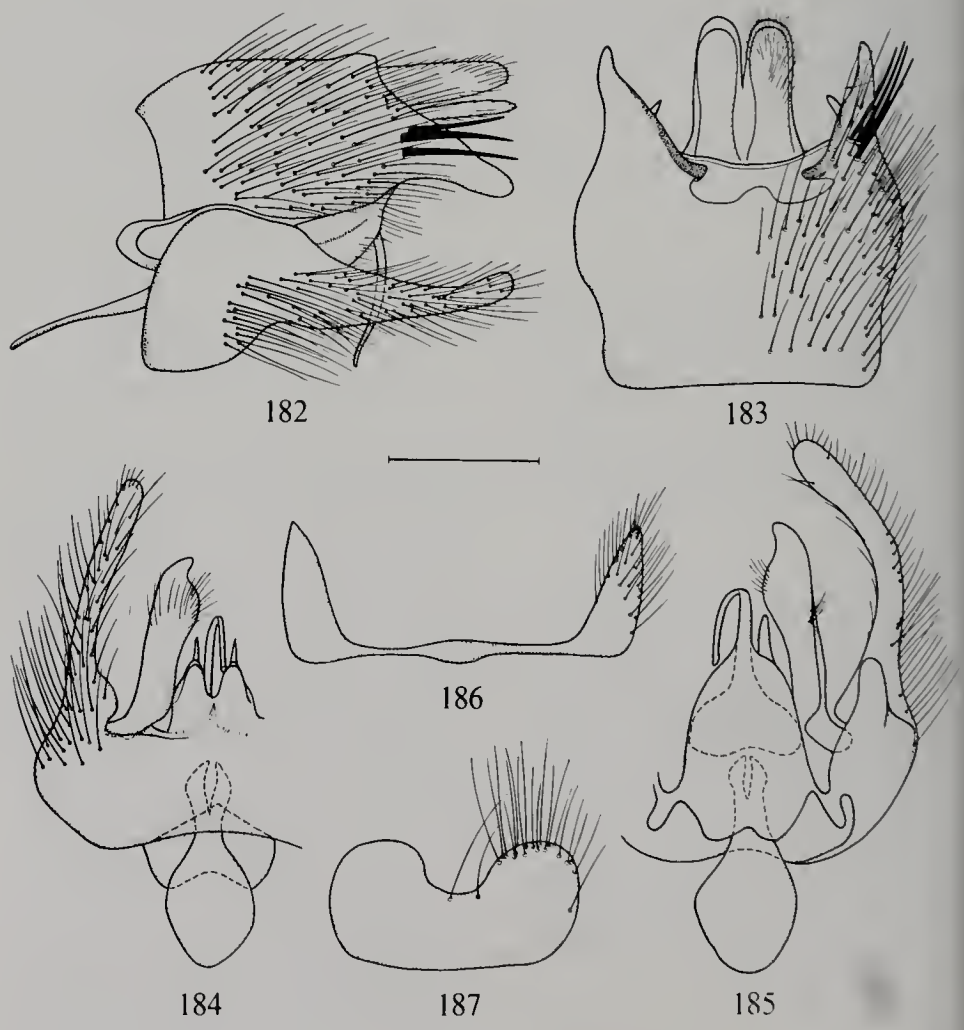

Fig. 182–187. — *Cyclotelus pruinosus* Wlk. male terminalia, holotype. 182. — Genitalia in lateral view. 183. — Epandrium with appendages in dorsol view. 184. — Gonocoxites with appendages and aedeagal parts in ventral view. 185. — Left gonocoxite with oppendages and aedeagus in dorsol view. 186. — Tergite 8. 187. — Sternite 8. Scale: 0.5 mm.

occurring over entire surface except scutellum; mesonotal tomentum of two types: one is long, scalelike, semi-appressed, sparse, and the other is pollinose, dense, forming vittae and patterns; scutellum has velvety tomentum and often a marginal row of dense, enlarged scalelike tomentum — or pile — in an erect, vertical position; scutellar setae also assume erect position; pile lacking on most of pleurae, sparse on anepisternum and upper, lateral portions of prosternum, dense in a longitudinal row on pleurotergite; pollinose tomentum relatively sparsely covers most of pleural region, lacking on anepimeron. Wing. — Hyaline to infuscate with various, usually transverse, patterns in browns, yellows, and/or grays; vein R_4 shallowly S curved; R_4 usually longer than R_5. Legs. — Anterior surface of coxa 1 has 2 apical setae; posterior surfaces of coxae 1 and 2 shiny, not pilose, and at most very sparsely tomentose; femora have small, slender, almost exclusively av or pv setae; setae on femur 3 from occupying distinctly av and pv positions (mostly North American species) to scattered over ventral surface (mostly South American species); pile on anterior and dorsal surfaces of femur 3 scalelike, appressed; on ventral surface short, sparse, thin; tibia 1 relatively straight, elongate to stout, with dorsal setae lacking or at least shorter than width of tibia 1; basitarsus 1 (Fig. 24) swollen, enlarged.

Abdomen. — Narrow, nearly parallel sided from segment 1 through 4; thereafter abdomen tapers rapidly; segments 6–8 of males telescoped within segment 5 and taper is cut to blunt point; segments of females not telescoped and taper is long and pointed; dorsum of abdomen flattened, more so in males; tergites generally not fasciate, though tergite 2 is brown or gray fasciate in a few species; pile pattern variable, never dense; dorsum of males and, to a lesser degree of females of a few species, densely silver.

Male Terminalia (Fig. 182–187). — Sternite 8 (Fig. 187) shallowly to deeply bilobate; tergite 8 (Fig. 186) narrowly constricted medially; epandrium (Fig. 183) large, covering most of terminalia, 1.3–1.8× (the higher values occurring in North American species) wider than long (bisected medially longitudinally and latitudinally), with outer posterior margins extended hindward to about level of apex of cerci and ventral epandrial sclerite, almost always bidentate; cerci (Fig. 183) slightly shorter than ventral epandrial sclerite; cerci joined only basally; ventral epandrial sclerite not keeled, usually incised; intersegmental membrane basad of this sclerite weakly to heavily sclerotized, strongly attached to sclerite base with 2 arms firmly attached to posterolateral projections of epandrium, and weakly to firmly attached to anterior margin of aedeagus; gonocoxites (Fig. 184) solidly fused along ventral margin, with an elongate, posterior projection (Fig. 182) extending beyond apex of gonostylus (South American species) or not (common North American species). According to Lyneborg (1969:407), *sumichrasti* (Bellardi) has a broader projection, but clearly this species falls within the concept limits of *Cyclotelus*. Hypandrium lacking or completely fused with gonocoxites, not identifiable; aedeagus not attached to ventral lobes, but attached to parameral apodeme (Fig. 185) by a heavily sclerotized rod, which bows anteriorly beyond gonocoxal cavity and sharply hindward and forms a firm connection to the posterolateral edge of the aedeagal dorsal apodeme; parameral process (Fig. 185) free, very reduced, knoblike; ventral lobes fused basally, elongate, probably function as a guide for the thin, elongate distiphallus; length of aedeagus basad of center 1.5–2.0× length distad of center (Fig. 185); aedeagal dorsal apodeme and inner dorsal shield each more than twice as wide as base of distiphallus; this curved slightly upward, outward, arching downward and inward, and slightly outward at tip; aedeagal ventral apodeme usually narrow (usually less than half as wide as inner shield, but nearly as wide

in one South American species), elongate (slightly longer than inner dorsal shield), not forked; inner dorsal shield shallowly bilobate; ejaculatory apodeme large to mediumly small, the distal end expanded, usually horizontally flattened.

Habitat

E. I. Schlinger (personal communication) has collected specimens in Peru alighting on sunlit paths in otherwise dense, dank tropical forests. R. H. Painter (Cole 1960*a*:168) has collected specimens of *rufiventris* (Loew) in "sand dunes" at Medora, Kansas. Three species, *rufiventris, pictipennis,* and *colei,* have been abundantly collected at Sand Ridge State Forest, Mason County, Illinois, on oak forested expanses of sand.

Distribution

Members of the genus *Cyclotelus* have been found throughout the New World tropics of Argentina, Brazil, Paraguay, Uruguay, Bolivia, and Peru and in southern, eastern, and central Mexico, through the eastern portion of the United States, and westward to the Rocky Mountains (e.g., Texas and Montana) and northward into Canada (Manitoba).

Included Species

bellus (Cole) 1923*a*:32 ♂, ♀ (*Epomyia bella*), new combination. Distribution. — Texas: Macdona, Hidalgo County; Laguna Madre, 25 miles southwest of Harlingen; Padilla, Tamaulipas, Mexico.

colei Irwin & Lyneborg, new name for *scutellaris* Loew 1869*b,* not Walker 1857. Distribution. — Central and eastern United States.

scutellaris Loew 1869*b*:171 ♀ (*Psilocephala*), not *Cyclotelus* Walker 1857:133 (Brazil, Uruguay, Paraguay).

hardyi (Cole) 1960*a*:167 (*Furcifera*), new combination. Distribution. — Brownsville and Los Borregos, Texas.

flavipes Hardy 1943:26 ♂ (*Epomyia*), not Kröber 1928*b*:113.

pictipennis (Wiedemann) 1821:63 ♀ (*Thereva*), new combination. Distribution. — Eastern North America to Michigan and Texas.

erythrura Loew 1869*b*:172 ♂ (*Psilocephala*).

rufiventris (Loew) 1869*a*:126 ♀ (*Psilocephala*), new combination. Distribution. — Ontario, Canada: Rhode Island, Massachusetts, New Jersey, Virginia, Maryland, Florida, Washington, D.C., Ohio, Indiana, Illinois, Michigan, Montana, Nebraska, Kansas, Texas, New Mexico, and Arizona.

lacteipennis Kröber 1914:53 ♂ (*Psilocephala*). Cole 1960*a*:168.

sumichrasti (Bellardi) 1861:91 ♂ (*Psilocephala*), new combination. Distribution. — Tuxpango, Orizaba, and Tabasco, Mexico.

All of the species from America north of Mexico have probably been described. There are 14 apparently valid species described from South America. Probably a few species remain undescribed from Mexico and Central America, and undoubtedly there are several undescribed species from the Amazon Basin northward to Panama.

Genus Ozodiceromya Bigot
(Fig. 5, 28, 29, and 188–193)

Feminine

Ozodiceromya Bigot 1889:321. Type-species: *mexicana* Bigot 1889:321 by original monotypy. Type-locality: Mexico.

Ozodiceromyia Bigot, error (Bigot 1889: 323).

Ozodiceronyma, error (Wulp 1898).

Diagnosis

Small and slender to large and robust species.

HEAD. — Frons of male at its narrowest narrower than half width of anterior ocellus; frons of female at level of anterior ocellus 1.3–2.3× as wide as ocellar tubercle; frons of female at level of antenna 2.8–4.6× as wide as ocellar tubercle; male frons from slightly raised in some species (e.g., *californica*) to flat-

tened, narrow in most species, but broad in *nanella* and closely related species, triangular shaped and with some shiny bare area, usually central; male frons has some tomentose areas in most species; female frons broad, with shiny bare callus of various sizes and shapes, usually surrounded by fine tomentum; frons, face, and genae of both sexes with or without pile; pile usually short and concentrated on upper frons of female; tomentum on frons, face, and occiput usually silvery; genae usually enlarged, tomentum darker; head greatly (e.g., *mexicana*) to slightly protruding anteriorly at antennal level; head depth 0.4–1.4× antennal length (Fig. 28 and 29); scape usually slender, 0.5–1.3× as long as flagellum; first flagellomere variously shaped from elongate to pear shaped, with setae restricted to basal third; flagellar style usually apical, from long to short, usually two segmented, with a distinct, terminal spine (although *mexicana* (Fig. 28) and *argentifera* have style subapical, and spine of female *californica* not distinct); palps one segmented.

Thorax. — np 3–4 (usually 3), sa 1–2 (usually 2), pa 1, dc 0–2 (usually 0–1), sc 1–2 (usually 2); mesonotal pile of one

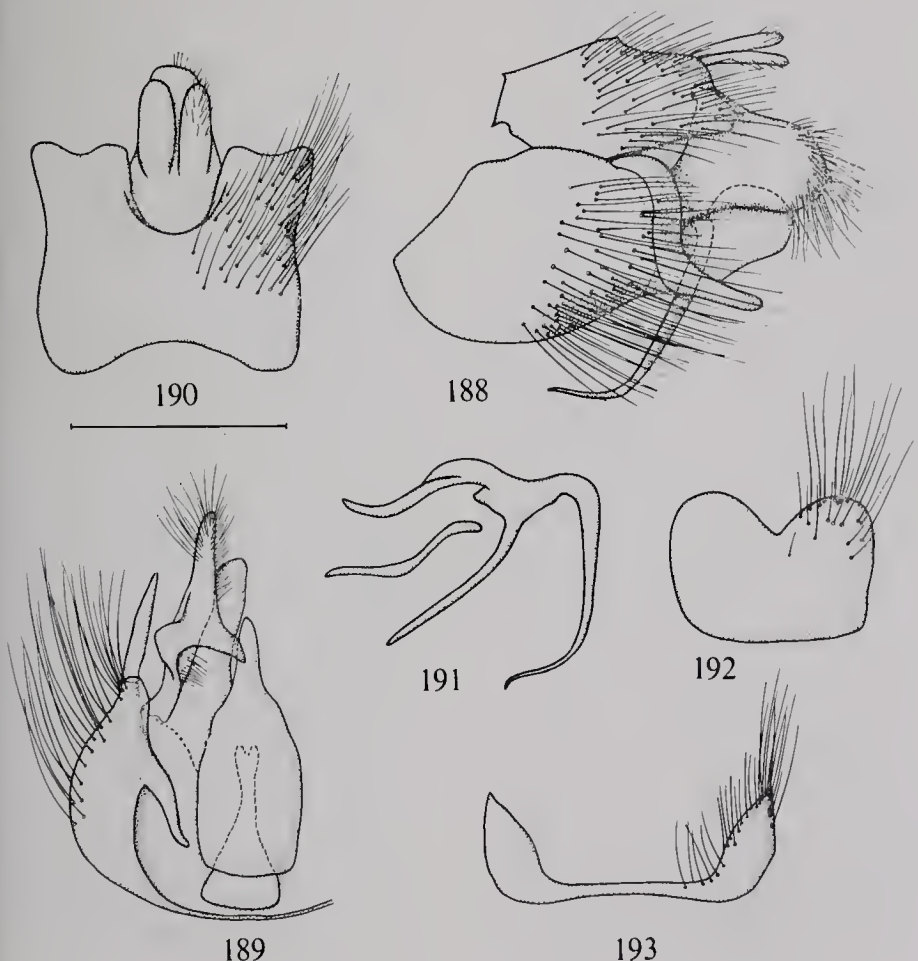

Fig. 188–193. — *Ozodiceromya mexicana* Big. male terminalia. 188. — Genitalia in lateral view. 189. — Right ganacoxite with appendages and aedeagus in dorsal view. 190. — Epandrium with appendages in dorsal view. 191. — Aedeagus in lateral view. 192. — Sternite 8. 193. — Tergite 8. Scale: 0.5 mm.

or two types, either simple, erect, relatively long or simple, long, erect and scalelike, appressed to semi-appressed, usually bronze to copper colored; prosternum has pile in and around central depression. WING. — Cell m_3 closed at wing margin; vein R_4 slightly longer than vein R_5; cell r_4 about 2.3 (range 1.6–2.9) × longer than wide at apex; color hyaline with darkened areas on some species but not highly mottled; stigma usually dark brown; costal cell darkened in some species. LEGS. — Fore coxa has 2 strong, apical setae; fore femur has 0–12 (usually 2–4) setae; hind femur has 4–20 anteroventral plus posteroventral setae (most are anteroventral); basitarsus of foreleg often swollen (cf. Fig. 24).

ABDOMEN. — Moderately slender to broad, gradually tapering from segment 2 to apex; segments 5–8 often telescoped within segments 2–5 of male; abdominal segments not telescoped in female; dorsum flattened in both sexes, dorsum of male usually has dense silvery tomentum; both sexes moderately pilose; female abdomen has grayish silvery tomentum along posterolateral corners of segments.

MALE TERMINALIA (Fig. 188–193). — Tergite 8 (Fig. 193) rather large, strongly constricted for most of medial portion; sternite 8 (Fig. 192) ovoid to rectangular, with a deep to shallow notch medially in posterior margin; epandrium (Fig. 190) shorter in midline than wide, ratio of medial length to width 1.7–4.0; posterolateral corners from greatly flanged (as in some species near *nanella*) to squarish, from extending posteriorly beyond cerci to not, from dentate to blunt or smooth, variable; cerci (Fig. 190) free, well separated and moderately to weakly sclerotized; posterior margins of cerci and ventral epandrial sclerites subequal, cerci longer in some species, shorter in others; ventral epandrial sclerite thinly to moderately sclerotized, with 1 sclerotized island beneath cerci posteriorly rounded or notched and 2 elongate islands attached to posterolateral margins of epandrium, usually united along midline of epandrium and extending anteriorly usually to or nearly to anterior margin of epandrium, sometimes extending anteriorly beyond epandrium; these anterior sclerites usually thinly, often membranously, attached to anterior margin of aedeagus; aedeagus relatively large; distiphallus variously shaped, from thin, tubelike to flattened, from long, sinuate, sometimes recurved beneath gonocoxites to short; tip of distiphallus usually thin, sometimes bulbous, swollen, some species (e.g., *anomala*) having a hooklike projection ventrally at base of distiphallus; dorsal apodeme from triangular to rectangular and sometimes truncate, the lateral margins often more heavily sclerotized, usually as long as or longer and much wider than ventral apodeme; ventral apodeme thin, scoop shaped, longer than dorsal apodeme in a few species; ejaculatory apodeme usually simple, sticklike, large and club shaped in a few species; center of aedeagus has a variously modified receptacle for proximal end of ejaculatory apodeme; ventral lobes well-developed, project dorsally and anteriorly and cradle distiphallus, usually rounded, not connected to aedeagus; parameral apodeme has occasionally a sclerotized and more commonly a membranous connection to lateral portion of aedeagus, this connection seems lacking in a few species (as in Fig. 189); parameral process usually vestigial or knoblike, present in the type-species (Fig. 188) as an S-curved sclerotization closely adjoining posterior margin of gonocoxite, not pilose; parameral apodeme heavily sclerotized, situated far from anterior margin of gonocoxite; gonocoxites solidly united ventromedially over entire length in most species, over anterior third in a few; posterior margin of gonocoxites has 1 or 2 (sometimes none) posteriorly directed protuberances, either pointed or flangelike; the dorsal portion of these protuberances may represent the parameral process, as in *mexicana* (Fig. 188); hypandrium absent or completely fused with gonocoxites, not discernible.

Habitat

Specimens can be encountered in mountainous environments and in des-

erts; adults at times can be found on shrubs containing aphid honey dew. Larvae of one species were found in mounds of dirt pushed up by gophers, while larvae of a different species were collected in sandy soils beneath sagebrush. *Ozodiceromya* is a diverse genus, and the habitats occupied by its various species are also diverse.

Distribution

The genus *Ozodiceromya* is found throughout the Nearctic Region southward into Ecuador and Venezuela in the Neotropical Region. The southwestern United States and northwestern Mexico seem particularly rich in species.

Included Species

albertensis (Cole) 1925:86 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Alberta, Canada.

aldrichi (Coquillett) 1893*b*:227 ♂ (*Psilocephala*), new combination. Distribution. — Southern California.

anomala (Adams) 1904:444 ♂, ♀ (*Thereva*), new combination. Distribution. — Arizona, New Mexico, and north-central Mexico.

argentata (Bellardi) 1861:89 ♂ (*Thereva*), new combination. Distribution. — Cordova, Mexico.

argentifera (Kröber) 1929:418 ♂ (*Phycus*). Distribution. — Vera Cruz, Mexico. (This species name has been associated with specimens of *Ozodiceromya* with very long antennae from southern Arizona. Whether the specimens from southern Arizona are conspecific with the holotype from Vera Cruz is not known though an assumption of conspecificity seems unwarranted.)

arizonensis (Cole) 1923*a*:45 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Arizona.

californica (Kröber) 1912:259 ♂ (*Thereva*), new combination. Distribution. — California.

coloradensis (James) 1936:341 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Colorado.

costalis (Loew) 1869*a*:11 ♀ (*Psilocephala*), new combination. Distribution. — California and Nevada.

crassicornis (Bellardi) 1861:88 ♂ (*Thereva*), new combination. Distribution. — Truqui, Mexico.

davisi (Johnson) 1926:300 ♂ (*Psilocephala*), new combination. Distribution. — Southport, North Carolina.

flavipennis (Cole) 1923*a*:42 ♂, ♀ (*Psilocephala*), new combination. Distribution. — East-central United States.

frommeri Irwin & Lyneborg, new name for *Psilocephala lateralis* Adams 1904. Distribution. — Southern California, Arizona, and northwestern Mexico.

lateralis (Adams) 1904:444 ♂ (*Psilocephala*), new combination, not Eschscholtz 1822.

frontalis (Cole) 1923*a*:40 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Northeastern United States.

germana (Walker) 1848:222 ♂ (*Thereva*), new combination. Distribution. — Southeastern United States.

hoemorrhoidalis (Macquart) 1840:26 ♂ (*Thereva*), new combination. Distribution. — Southeastern United States.

haemorrhoidalis, unjustified emendation.

johnsoni (Coquillett) 1893*b*:228 ♀ (*Psilocephala*), new combination. Distribution. — Southeastern United States.

levigata (Loew) 1876:319 ♀ (*Psilocephala*), new combination. Distribution. — Central California.

laevigata, unjustified emendation.

melanoneura (Loew) 1872:74 ♂ (*Thereva*), new combination. Distribution. — California.

metallica (Kröber) 1914:68 ♂ (*Thereva*), new combination. Distribution. — New Mexico.

mexicana Bigot 1889:321 ♀. Distribution. — Mexico.

setosa (Kröber) 1912:211 ♂, ♀ (*Euphycus setosus*), new combination, new synonym.

milleri (Irwin) 1977*b*:294 ♀ (*Breviperna*), new combination. Distribution. — Puebla, Oaxaca, Mexico.

montiradicis (James) 1949:10 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Colorado.

nanella (Cole) 1960*b*:118 ♂, ♀ (*Thereva*), new combination for *nana* Cole 1959, not Fallén 1820.

nana Cole 1959:148 (*Thereva*), not Fallén 1820 for *pygmaea* Cole 1923*a*, not Fallén 1820.

pygmaea Cole 1923*a*:89 (*Thereva*), not Fallén 1820.

nigra (Say) 1823:40 ♀ (*Thereva*), new combination. Distribution. — Pennsylvania.

nigrimana (Kröber) 1912:238 ♀ (*Psilocephala*), new combination. Distribution. — Colorado.

notata (Wiedemann) 1821:114 ♂ (*Thereva*), new combination. Distribution. — Georgia.

obliquefasciata (Kröber) 1911:504 ♂, ♀ (*Psilocephala*), new combination. Distribution. — Costa Rica (this species may also be found in parts of Mexico and in other parts of Central America).

platancala (Loew) 1876:321 ♀ (*Psilocephala*), new combination. Distribution. — Texas.

? *ruficornis* (Macquart) 1840:25 ♂ (*Thereva*), new combination. Distribution. — Carolina.

rugifrons (Kröber) 1914:54 ♀ (*Psilocephala*), new combination. Distribution. — Chihuahua, Mexico.

schroedcri (Kröber) 1911:503 ♀ (*Psilocephala*), new combination. Distribution. — Costa Rica (this species may also occur farther north in Central America).

signatipennis (Cole) 1923*a*:47 ♂, ♀ (*Psilocephala*), new combination. Distribution.—Northwestern United States.

subnotata (Johnson) 1926:299 ♂, ♀ (*Psilocephala*), new combination. Distribution. — St. Augustine, Florida.

univittata (Bellardi) 1861:90 ♀ (*Psilocephala*), new combination. Distribution. — Puebla, Mexico.

xanthobasis (James) 1949:12 ♂ (*Thereva*), new combination. Distribution. — Colorado.

There are several as yet undescribed species of *Ozodiceromya,* especially from western North America and Mexico. Many of the listed species, especially those from the eastern part of North America, are probably synonyms.

Note

We place species from several genera into *Ozodiceromya* primarily on the basis of male terminalia. As it stands, we believe the genus is monophyletic, but it might profitably be divided into three or more genera at a later date, once the species have been properly sorted out.

Genus **Chromolepida** Cole
(Fig. 31 and 194–199)

Feminine

Chromolepida Cole 1923*a*:23. Type-species: *Psilocephala pruinosa* Coquillett 1904*a*:91 by original designation. Type-locality: Granada, Nicaragua.

Diagnosis

Small, slender species.

HEAD (Fig. 31). — Compound eyes of male almost touch for a considerable distance; eyes of male of two distinct facet sizes, different facets either meeting along a line across the eye or grading gradually with no sharp line of differentiation. Frons of female exceptionally wide at level of anterior ocellus, slightly wider than twice width of ocellar tubercle, widening to about 3.5× width of ocellar tubercle at level of antennal insertion. Frons of both sexes has a rounded to oblong, shining callosity above antennal bases and silvery and velvety tomentum. Velvety tomentum in the form of two rounded patches, each adjacent to a compound eye of female, usually as a V-shaped wedge on the frons above the shining center callosity of the male. Remainder of frons of both sexes has silvery

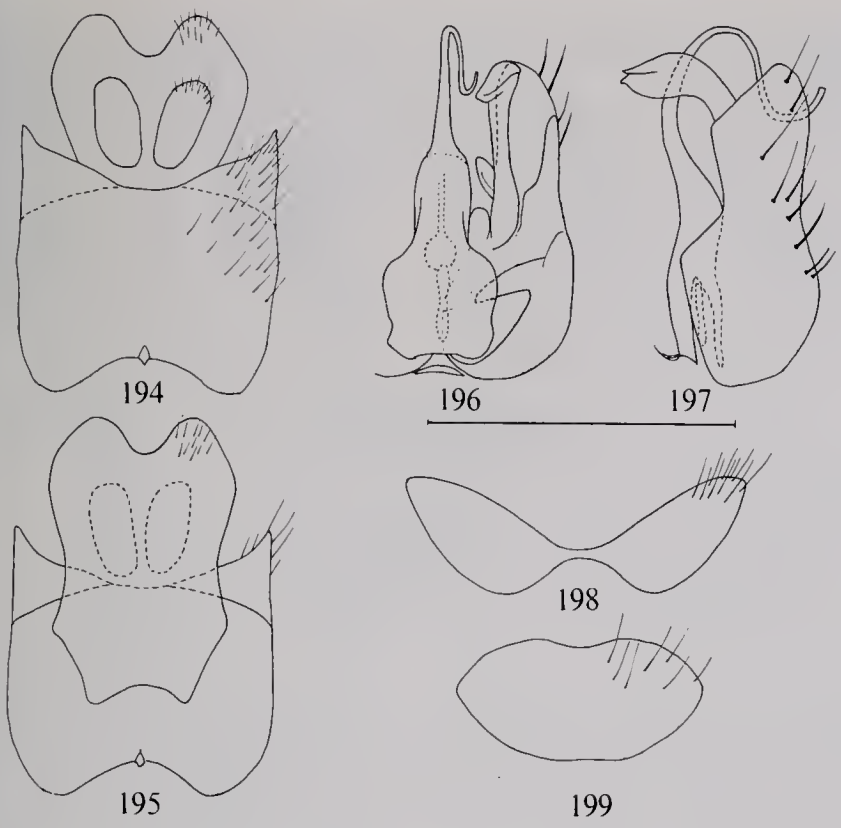

Fig. 194–199. — *Chromalepida bella* Cole male terminalia. 194. — Epandrium with appendages in dorsal view. 195. — Epandrium with appendages and aedeagus in ventral view. 196. — Left gonocoxite with appendages and aedeagus in dorsal view. 197. — Left gonocoxite with appendages and aedeagus in lateral view. 198. — Tergite 8. 199. — Sternite 8. Scale: 0.5 mm.

tomentum, except for a bare, shiny area near the vertex of female. Head slightly protrudes anteriorly. Two prominent facial calli below antennal bases and slightly offset to the sides (Fig. 31). Gena usually has a darkened tomentose area. Lateral portions of face without pile. Antenna (Fig. 31) 130–160 percent as long as head depth; scape 1.6–2.4× as long as flagellum, slender; flagellar style subapical, located in a laterally directed cavity, apparently one segmented with a distinct apical spine. Palps one segmented.

Thorax. — np 2–4 (usually 3), sa 1, pa 1, dc 0, sc 1–2 (usually 1); all thoracic setae dark brown to black; mesonotal pile of both sexes pale, of two types: one is appressed, silvery to metallic golden scalelike, and the other semi- to fully erect, the latter very short on female, much longer on male; prosternum usually without pile in and around central depression; a few sparse hairs can be found in prosternum of some males. Wing. — Cell m_3 closed; veins R_4 and R_5 about the same length, or R_5 slightly longer; cell r_4 1.8–2.2× longer than wide at apex. Legs. — Fore coxa has 2 subapical setae on anterior surface; middle coxa lacks pile on posterior surface; hind femur has 1–5 anteroventral setae.

Abdomen. — Rather slender, gradually tapering from segment 2 toward apex; segment 7 of male is sometimes partially telescoped into segment 6; male dorsum flattened, densely covered with

appressed, elongate silvery scales; dorsum of both sexes often partially orange and dark brown.

MALE TERMINALIA (Fig. 194–199). — Tergite 8 (Fig. 198) relatively large, strongly constricted in middle; sternite 8 (Fig. 199) also large, oval, very slightly incised posteriorly; epandrium (Fig. 194) about 1.5× as wide as long along midline, otherwise as long as wide; posterolateral corners of epandrium flanged, sharpened; cerci free, moderately sclerotized; ventral epandrial sclerite (Fig. 195) large, extends beyond cerci, sclerotized to level of posterior margin of epandrium, anteriorly becoming more membranous and weakly attached to anterior margin of aedeagus; aedeagus (Fig. 197) has very large, S-curved distiphallus; dorsal apodeme broad, rectangular; ventral apodeme long, thin; ejaculatory apodeme short, weak; ventral lobes of gonocoxite short, supporting the base of the phallus but not attached to the aedeagus; parameral apodeme (Fig. 196) large, directed inward, apex situated below lateral margin of dorsal apodeme, but without a strongly sclerotized connection to the dorsal apodeme; parameral process lacking; gonocoxites (Fig. 196) separated, attached anteriorly by a narrow, crescent-shaped hypandrium; posteriorly directed scoop-shaped portion ventrally on each gonocoxite; gonostylus usually long, curved dorsally at apex.

Habitat

Species in *Chromolepida* occupy rather diverse habitats. *C. bella* occurs in the coastal dunes near San Francisco, California. Undescribed species were collected in the Sierra Nevada Mountains, Sierra County, California, in a meadow on *Daucus pusillus* flowers. Another undescribed species was collected on tropical roadside vegetation near Mazatlán, Mexico.

Distribution

Species in this genus are confined to the western portion of North America from Oregon, Idaho, Utah, and Colorado southward through New Mexico, Arizona, and California to Mexico, Central America, and northern South America, at least Venezuela and Colombia. It has not been recorded from the West Indies.

Included Species

bella Cole 1923*a*:24 ♂, ♀. Distribution. — West coast of California.

mexicana Cole 1923*b*:460 ♀. Distribution. — Sonora, Mexico.

pruinosa (Coquillett) 1904*a*:91 ♂ (*Psilocephala*). Distribution. — Nicaragua, Central America.

There are several undescribed species in this genus.

Subfamily Phycinae

These attributes characterize the subfamily Phycinae.

1. Dorsal sclerotized bridge present between dorsal apodeme of aedeagus and parameral apodeme, or if absent (*Henicomyia*), the hypandrium very large and haired, and dorsal apodeme of aedeagus reduced.
2. Ventral apodeme of aedeagus deeply forked or vestigial.
3. Tergite 9+10 of female slenderly and sparsely spinose, the spines of only one kind.
4. Intersegmental membrane between sternite 8 and sternite 9 (furca) of female membranose, not sclerotized.
5. Pregenital abdominal segments have spiracles incorporated in the tergal sclerites.
6. Vein R_1 often setose, though not setose in *Schlingeria*.

Genus Phycus Walker
(Fig. 33, 34, 36, and 200–207)

Masculine

Phycus Walker 1850:2. Type-species: *Xylophagus canescens* Walker 1848 (= *Xylophagus brunneus* Wiedemann 1824) by original monotypy. Type-locality: North Bengal, India.

Reference: Lyneborg 1978.

Diagnosis

Moderately sized, slender species.

HEAD (Fig. 33). — Frons of both sexes

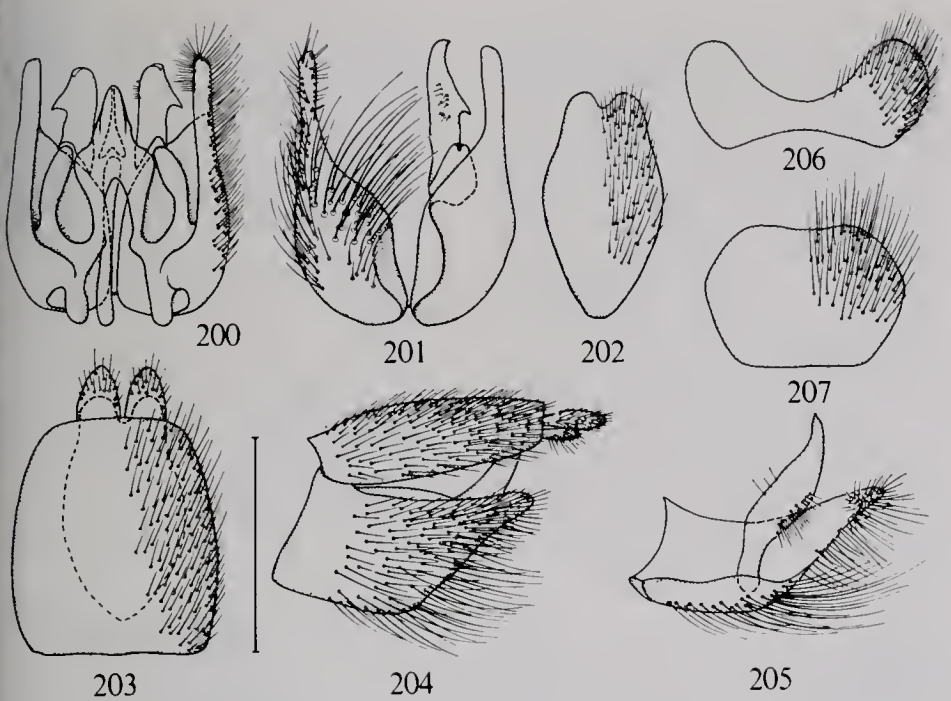

Fig. 200–207. — *Phycus brunneus* (Wied.) male terminalia. 200. — Gonocoxites with appendages and aedeagus in dorsal view. 201. — Gonocoxites and right gonastylus in ventral view. 202. — Ventral epandrial sclerite. 203. — Epandrium with appendages in dorsal view. 204. — Genitalia in lateral view. 205. — Right ganocoxite and gonostylus in internal view. 206. — Tergite 8. 207. — Sternite 8. Scale: 0.5 mm.

at its narrowest from as wide as to more than twice as wide as ocellar tubercle, wider in female than in male of same species; eye margins only slightly diverge from level of ocellar tubercle toward genae; frons bare or with sparse, scanty pile, its pattern composed of shining black areas and tomentose areas; face and gena without pile; head slightly to distinctly protrudes at antennal level; facial and genal calli absent; head depth 0.7–0.9× antennal length; ratio of lengths of scape and flagellum differs greatly among species, in the unnamed North American species (Fig. 36) scape about 0.6× as long as flagellum; flagellar style terminal, two segmented, with a very small terminal spine; palps two segmented (Fig. 34).

Thorax. — np 1–2, sa 1, pa 1, dc 0–1, sc 1; mesonotal pile short, uniform, erect, pale or blackish; prosternum bare in and around central depression; pleural pile very short and sparse. Wing. — Cell m_3 usually closed and petiolate, rarely open; veins R_4 and R_5 about same length; cell r_4 2.2–2.6× as long as wide at apex; ground color hyaline to rather intensively brown, clouding very apparent near apex of wing. Legs. — Fore coxa moderately long, sparsely haired, and with 1 or 2 slender apical setae; middle coxae bare on posterior surface; all femora without setae; tibiae have very short setae.

Abdomen. — Slender, especially in male, as wide as long, laterally compressed toward apex; dorsum convex, shining black or reddish brown; pile sparse and short.

Male Terminalia (Fig. 200–207). — Tergite 8 (Fig. 206) comparatively wide and only moderately constricted medially; sternite 8 (Fig. 207) large and simple; epandrium (Fig. 202) very simple, without incisions or other modifications, may be shorter or longer in midline than maximum width; cerci free, well sclerotized, extending posteriorly beyond mar-

gin of ventral epandrial sclerite. This sclerite (Fig. 202) large, well sclerotized, setose, extending to anterior margin of epandrium, but without attachment to aedeagus; aedeagus (Fig. 200) laterally attached by a strongly sclerotized bridge to midsection of paramere; distiphallus forms a fine, downwardly directed tube; ventral apodeme shaped as two narrow, widely separated sticks; ejaculatory apodeme large; paramere composed of a distal process, which curves inward and downward approaching base of gonostylus, and a stout basal apodeme; gonocoxites (Fig. 201) not united ventrally, attached only anteriorly by a very narrow membrane; a minute remnant of a hypandrium exists at anterior margin of gonocoxites in some species; gonocoxite without a ventral lobe (Fig. 205).

Habitat

In Africa *Phycus* species are often found running along dead or dying tree trunks in riverine habitats. In southern California, an undescribed species can be encountered running (a fast walk) on rock faces directly below *Washingtonia* palms in desert canyon bottoms.

Distribution

The genus is represented in North America by a single undescribed species occurring in southern California and northwestern Mexico. There are about 20 species of *Phycus* in the Old World distributed throughout the Afrotropical Region, the Middle East, the Indian subcontinent, and eastward to China and the Philippines. The Afrotropical species were revised by Lyneborg (1978).

Note

The genus *Ataenogera* (Kröber 1914), with several species in Central and South America, is extremely similar in general appearance to certain species of *Phycus*. However, the two genera are quite distinct, the best distinguishing characters being: (a) palps two segmented in *Phycus,* one segmented in *Ataenogera;* (b) fore coxae have 1–2 apical setae in *Phycus,* but 4–6 setae in *Ataenogera;* (c) ventral epandrial sclerite large and free in *Phycus,* smaller and fused laterally with epandrium in *Ataenogera;* (d) hypandrium extremely small, or even absent, in *Phycus,* but large in *Ataenogera;* (e) ventral apodeme of aedeagus composed of two long, narrow rods in *Phycus,* but totally absent in *Ataenogera.*

Genus **Henicomyia** Coquillett
(Fig. 35 and 208–214)

Feminine

Henicomyia Coquillett 1898:187. Type-species: *hubbardii* Coquillett 1898 by original monotypy. Type-locality: Fort Grant, Arizona.

Reference: Lyneborg 1972.

Diagnosis

Long, slender species.

HEAD (Fig. 35). — Frons of both sexes at its narrowest wider than ocellar tubercle, slightly wider in female than in male; eye margins gradually but consistently diverge from ocellar tubercle downward to ventral aspect of head; frons bare and with pattern of grayish tomentum and shining black areas; face and genae bare; lower occiput has short, sparse pilosity; head distinctly protrudes at antennal level; facial and genal calli absent; head depth 0.4–0.8× antennal length; scape very short haired, 0.3–0.6× as long as, and often distinctly narrower than, flagellum; flagellum very short haired; flagellar style terminal, obviously one segmented, very short compared with first flagellomere; a terminal spine is not discernible; palps two segmented.

THORAX. — np 1–2, sa 1, pa 1, dc 0, sc 0–1; mesonotal pile very short, uniform, erect; prosternum has short, sparse pile in and around central depression; pleura practically bare. WING. — Cell m_3 closed and petiolate; veins R_4 and R_5 about the same length; cell r_4 3.8–5.3× as long as wide at apex; ground color hyaline, with a brownish band from outrun of R_{2+3} to region apical of discal cell; apex of second basal cell may be clouded. LEGS. — Fore coxae very long, sparsely haired, and with 1 or 2 short

apical setae; middle coxae bare on posterior surface; all femora long, slender, and extremely short haired; appressed, scalelike pile lacking; setae absent.

Abdomen. — Long, slender in both sexes, nearly cylindrical or slightly laterally compressed, not markedly tapering toward apex; dorsum generally dark, mostly shining black, with at most small, inconspicuous areas of pale tomentum; pattern similar in both sexes; abdominal pilosity very short, sparse.

Male Terminalia (Fig. 208–214). — Tergite 8 (Fig. 213) large, rhomboid, with dense, uniform pilosity; sternite 8 (Fig. 214) large, uniformly pilose; epandrium (Fig. 210) about as long in midline as maximum width, its shape simple; cerci free (Fig. 210), rather small, well sclerotized; ventral epandrial sclerite (Fig. 210) distinctly extends posteriorly beyond cerci; sclerotized part of ventral epandrial sclerite small, restricted to the portion below cerci; anterior part of ventral epandrial sclerite membranous, not attached to anterior margin of aedeagus (cf. *Phycus*, Fig. 200); aedeagus completely free, without marked attachments dorsally (to parameral apodeme) or ventrally; distiphallus broad and wide, upright, terminates in two processes (Fig. 209), of complicated structure; dorsal apodeme vestigial, rudimentary; ventral apodeme forked, composed of two widely spaced, stout arms; ejaculatory apodeme large; dorsal margins of gonocoxites connected over midline by a weakly sclerotized membrane

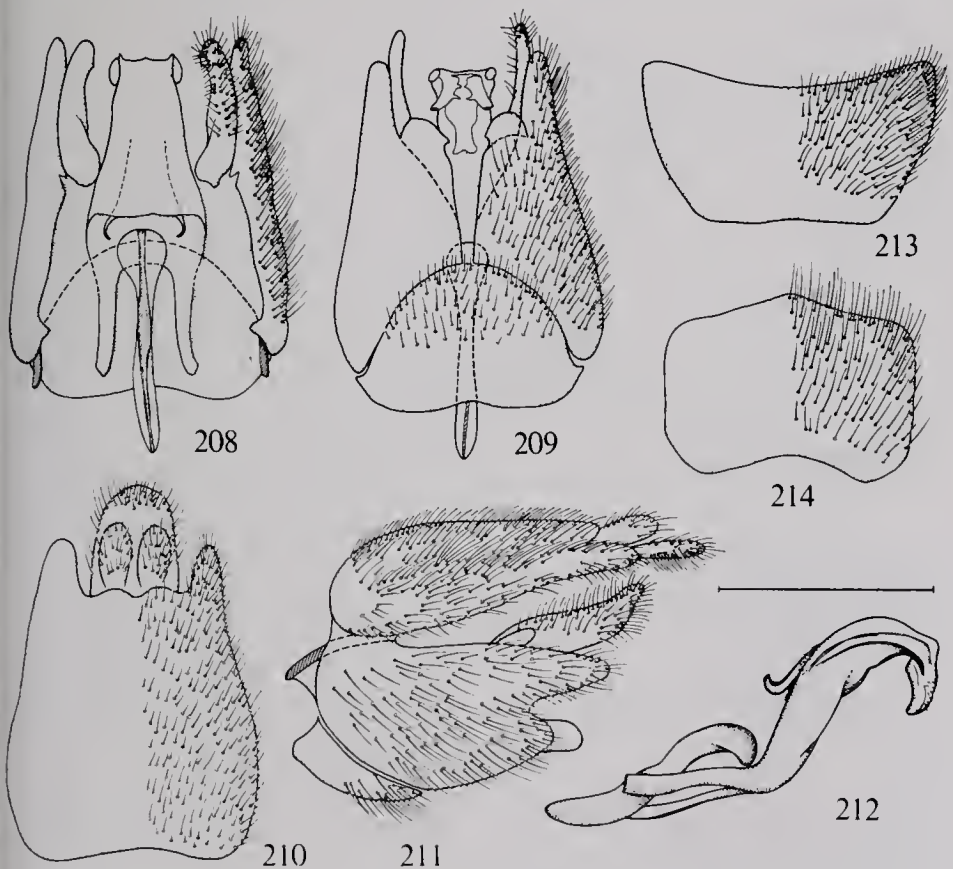

Fig. 208–214. — *Henicomyia hubbardii* Cag. male terminalia. 208. — Ganacaxites with appendages and aedeagus in dorsal view. 209. — Gonacaxites with appendages, hypandrium, and distiphallus in ventral view. 210. — Epandrium with appendages in dorsal view. 211. — Genitalia in lateral view, aedeagus amitted. 212. — Aedeagus in lateral view. 213. — Tergite 8. 214. — Sternite 8. Scale: 0.5 mm.

attached to triangular outshoots (= parameral apodeme) (Fig. 208); this connection not attached to aedeagus; distal parameral process not developed; gonocoxite in lateral view (Fig. 211) has an incision posteriorly; gonostylus a simple staff; gonocoxites (Fig. 209) not united ventrally; however, attached by a membrane; a membrane also attaches the enormous triangular hypandrium with the anterior, ventral edges of the gonocoxites.

Habitat

Henicomyia hubbardii has been collected inside of houses at windows in Portal, Arizona. Virtually nothing is known of the habitat of *Henicomyia* species.

Distribution

Species of *Henicomyia* range from the southwestern United States (Arizona and Colorado) through Mexico, Costa Rica, and Amazonian Peru to Brazil.

Included Species

hubbardii Coquillett 1898:187 ♂. Distribution. — Arizona, New Mexico, possibly southward to Mexico City, Mexico if *varipes* is a synonym, as suggested by Lyneborg (1972:367).

hubbardi Cole 1923*a*:17, unjustified emendation.

? *varipes* Kröber 1912:213 ♀ (Lyneborg 1972:364). Distribution. — Mexico City, Mexico.

Five described species occur in the Neotropical Region, one from Costa Rica, one from Peru, and three from Brazil (Lyneborg 1972).

Genus Parapherocera Irwin
(Fig. 37, 40, and 215–221)

Feminine

Parapherocera Irwin 1977*a*:438. Type-species: *montana* Irwin 1977*a*:442. Type-locality: 6 km south of La Rumorosa, Baja California Norte, Mexico.

Reference: Irwin 1977*a*.

Diagnosis

Small, slender species; length, excluding antennae, 4–5 mm; males and females about the same size.

HEAD. — Frons of male (Fig. 40) at its narrowest wider than ocellar tubercle; frons of female at level of anterior ocellus about twice as wide as ocellar tubercle; eyes of both sexes of uniform facet size; frons of both sexes mostly shining, bare, with a few patches of tomentum along eye margins; antennal insertion about midway between ventral portion of genae and vertex; antennae as long as or longer than depth of head (except in *P. macswaini* females, which have antennae slightly shorter than head depth); face below antennae protrudes anteriorly farther than frons above antennae; scape (Fig. 37) 0.5–0.8× as long as flagellum; flagellar style terminal, two segmented with an apical spine; palps one segmented, very large.

THORAX. — np 2–4 (usually 3), sa 1, pa 1, dc 0–1, sc 1; mesonotal pile sparse, short, uniform, erect, some black and some white; prosternum bare in and around central depression; pleural area without pile; anepisternum, pleurotergite, and pteropleurite without tomentum; rest of pleural region and coxae have silver tomentum. WING. — Vein R_1 setose; cell m_3 closed; veins R_4 and R_5 about equal in length; cell r_4 about 2–3× as long as wide at apex; ground color hyaline. LEGS. — Fore coxa moderately long, with 2 apical, black setae and erect, thickened pile over anterior surface; fore and middle coxae bare or very sparsely tomentose on posterior surface, not pilose; femora without setae; fore tibia lacks setae or has at most a single seta in the anterodorsal position; hind tibia without setae in posteroventral position, but has 0–7 setae each in other three positions.

ABDOMEN. — Slender, cylindrical, tapered posteriorly in both sexes; dorsum strongly convex, shining; pile sparse, short.

MALE TERMINALIA (Fig. 215–221). — Tergite 8 (Fig. 220) large, only slightly

constricted medially; sternite 8 (Fig. 221) large, rectangular; epandrium (Fig. 217) about as long as wide measured medially; cerci slightly bilobate, fused to one another, extending posteriorly slightly beyond ventral epandrial sclerite; ventral epandrial sclerite (Fig. 215) elongate, shield shaped, covering mid-posterior portion of epandrium, tapering anteriorly, and strongly attached to posterior edge of the broad and strongly sclerotized parameral bridge (Fig. 215); aedeagus rather large (Fig. 218); ventral apodeme (Fig. 216) has strong, diverging arms; dorsal apodeme short, narrower than base of distiphallus, distally sharply curved dorsally where it attaches to anterior margin of parameral bridge; ejaculatory apodeme (Fig. 216 and 218) very large, extending anteriorly well beyond gonocoxites, anterior end triangular, wedge shaped; distiphallus (Fig. 218) short, thick, with a short, sharp, apical section; gonocoxites (Fig. 219) have 2 posteroventral projections, not united ventrally; parameres very broad and heavily sclerotized, strongly connected by a bridge over midline and attached to ventral epandrial sclerite at posterior edge, while aedeagus hangs on under-

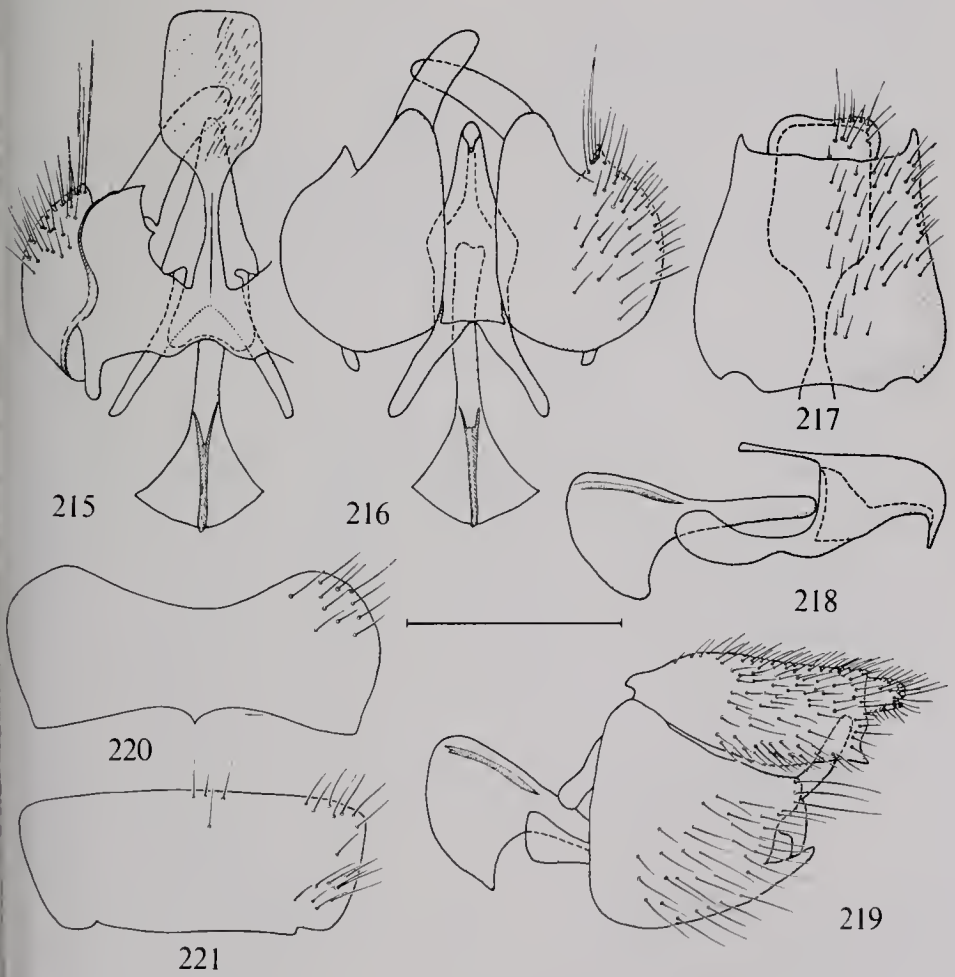

Fig. 215–221. — *Parapherocera montana* Irw. male terminalia. 215. — Right gonocaxite with appendages, ventral epondrial sclerite, and oedeagus in dorsal view. 216. — Gonocoxites with appendoges and aedeagus in ventral view. 217. — Epandrium with appendages in dorsal view. 218. — Aedeagus in lateral view. 219. — Genitalia in lateral view. 220. — Tergite 8. 221. — Sternite 8. Scale: 0.5 mm.

side of anterior edge; distal portion of paramere slightly exceeds posterior margin of gonocoxite; parameral apodeme bulbous, enlarged; gonostylus elongate, projecting posteriorly beyond distiphallus; ventral lobes lacking; hypandrium lacking.

Habitat

Species in the genus *Parapherocera* can be found in mountainous regions, usually between 900 and 2,300 m above sea level. Most species have been encountered in sandy washes in pine-sagebrush woodland.

Distribution

Parapherocera seems confined to the western United States (Oregon and California) and the extreme northwestern part of Mexico (Baja California Norte).

Included Species

macswaini Irwin 1977*a*:448 ♂, ♀. Distribution.—Southeastern portion of the Sierra Nevada mountain range of southern California.

montana Irwin 1977*a*:442 ♂, ♀. Distribution.—Southern California and northern Baja California in these mountain ranges: San Jacinto, Santa Rosa, Laguna, and Sierra Juarez.

wilcoxi Irwin 1977*a*:446 ♂, ♀. Distribution.—San Bernardino Mountains, southern California.

One undescribed species has been discovered in Lake County, Oregon.

Genus **Pherocera** Cole
(Fig. 38, 41, and 222–227)

Feminine

Pherocera Cole 1923*a*:20. Type-species: *signatifrons* Cole 1923*a*:21 by original designation. Type-locality: Alamogordo, New Mexico.

Diagnosis

Small, generally slender species; length, excluding antennae, 2.7–7.4 mm; male usually slightly smaller than female.

HEAD (Fig. 41).—Frons of male at its narrowest much narrower than width

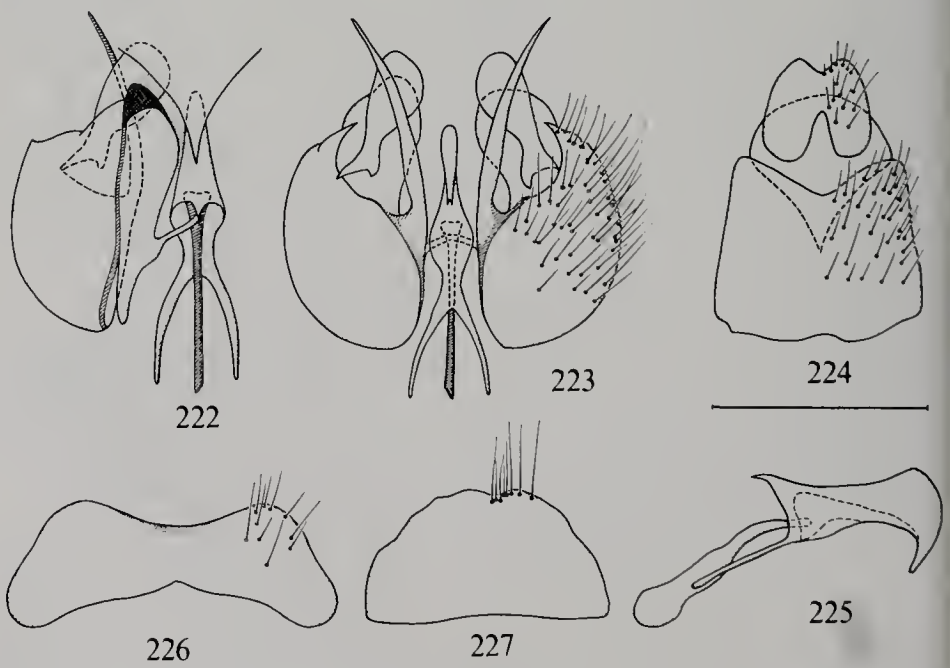

Fig. 222–227.—*Pherocera* sp., new species closely related to *signatifrons* Cole, male terminalia. 222.—Right gonocoxite with appendages and aedeagus in dorsal view. 223.—Gonocoxite with appendages and aedeagus in ventral view. 224.—Epandrium with appendages in dorsal view. 225.—Aedeagus in lateral view. 226.—Tergite 8. 227.—Sternite 8. Scale: 0.5 mm.

of anterior ocellus (except in one undescribed species from Mexico, which has frons wider than ocellar tubercle); frons of female at level of anterior ocellus 1–2× as wide as ocellar tubercle; eyes of female small, of uniform facet size; those of male larger, having smaller facets ventrally and often a definite line of demarcation between lower and upper facets; frons of male small, triangular, often completely tomentose, sometimes thinly pilose; frons of female almost always has species-characteristic calli of various shapes and sizes, usually surrounded by tomentum and, in some species, by thin pilosity; antennal insertion about midway between ventral portion of genae and vertex, sometimes a little lower; antennae (Fig. 38) slightly shorter than depth of head, sparsely tomentose; head often protrudes anteriorly at level of antennae; scape 0.3–0.5× as long as flagellum; flagellar style terminal, one or two segmented, with an apical spine; palps one segmented, slightly shorter than proboscis.

Thorax. — np 2–4 (usually 3), sa 1, pa 1, dc 0–1 (usually 1), sc 1–2 (usually 1); setae from black to pale; mesonotal pile thin to moderately dense, covering mesonotum, scutellum, and pleural area; tomentum dense to sparse, covering mesonotum, scutellum, and most of pleural region, with some bare areas in some species; coxae tomentose. Wing. — Vein R_1 setose; cell m_3 closed, with vein $M_3 + CuA_1$ extending or not extending to wing margin; veins R_4 and R_5 about equal in length; cell r_4 about 2–4× as long as wide at apex; ground color hyaline or translucent, pale yellow to white. Legs. — Fore coxa moderately long with 2 (infrequently 3) apical, black setae and erect, thickened pile over anterior surface; fore and middle coxae tomentose on posterior surface, not pilose; femora without setae; fore tibia lacks setae or has at most a few setae in the posteroventral position.

Abdomen. — Slender, cylindrical, tapered posteriorly in both sexes; dorsum flattened to convex, often shining, with tomentum or bare, and often posterior margin of tergites fasciate.

Male Terminalia (Fig. 222–227). — Tergite 8 (Fig. 226) only slightly constricted medially; sternite 8 (Fig. 227) shield shaped, rounded posteriorly; epandrium (Fig. 224) squarish, slightly wider than long along midline, posterolateral margins not greatly modified; cerci (Fig. 224) generally bilobate, fused to one another, extending posteriorly beyond ventral epandrial sclerite; ventral epandrial sclerite of various shapes, usually well sclerotized, wider distally and tapering anteriorly, not obviously united to epandrium, but anterior margin united to aedeagus in a few species; aedeagus (Fig. 225) moderately small in most species; ventral apodeme elongate, forked, always extends anteriorly beyond nearly vestigial dorsal apodeme, always extends anteriorly slightly less than ejaculatory apodeme; ejaculatory apodeme rod shaped, proximally fitting into a pocket in middle of aedeagus; distiphallus usually blunt, straight, in most species curved ventrally at apex, thinner, variously curved in some species; gonocoxite (Fig. 223) has an inner posteroventral projection of different shapes characteristic of distinct species; gonocoxites not united ventrally; paramere heavily sclerotized, large, both halves connected to one another by a sclerotized bar formed dorsad of aedeagus; parameral process slightly exceeds posterior margin of gonocoxite (excluding ventral posteriorly projecting process), usually bulbous; parameral apodeme somewhat pointed, heavily sclerotized; gonostylus projects posteriorly beyond distiphallus, pointed club shaped in most species; ventral lobes lacking; hypandrium lacking.

Habitat

Species within this genus occupy a wide variety of habitats from very xeric inland shifting dunes to coastal dunes, dry washes, and montane environments. These habitats are discussed in detail by Irwin (1971).

Distribution

Members of the genus *Pherocera* are found throughout a large portion of western North America from Oregon through Utah southward through Texas and California and into western Mexico and southward as far as Puebla.

Included Species

albihalteralis Cole 1923*a*:22 ♀. Distribution. — Southwestern United States and northwestern Mexico, including Arizona, Nevada, Texas, New Mexico, extreme eastern California, and Sinaloa, Mexico.

flavipes Cole 1923*a*:22 ♀. Distribution. — Western North America, including Idaho, Utah, New Mexico, Nevada, Arizona, and California in the United States, and Baja California Norte and Baja California Sur in Mexico.

nigripes Cole 1923*b*:459 ♀. Distribution. — Ildefonso and San Pedro Nolasco islands in the Gulf of California, Mexico.

signatifrons Cole 1923*a*:21 ♀. Distribution. — New Mexico.

Thirty species in the genus *Pherocera* have been described but not formally published (Irwin 1971). One further undescribed species has been collected since that date.

Genus **Schlingeria** Irwin
(Fig. 39 and 228–234)

Feminine

Schlingeria Irwin 1977*a*:424. Type-species: *ammobata* Irwin 1977*a*:427. Type-locality: Algadones Sand Dunes, 10 km north of Glamis, Imperial County, California.

Reference: Irwin 1977*a*.

Diagnosis

Small, squat species; length, excluding antennae, 4.5–7.5 mm; female larger and heavier than male.

HEAD (Fig. 39). — Frons of male at its narrowest much narrower than width of anterior ocellus; frons of female at level of anterior ocellus about 2× as wide as ocellar tubercle; eyes of female small, of uniform facet size; those of male large, have lower facets smaller than upper facets and a distinct demarcation line separating facet sizes; lower frons of female has a large shiny callus; rest of frons has powdery white tomentum; frons of male lacks callus or callus very small; antennal insertion low on male, about two-thirds of distance from vertex to genae; antennal insertion about midway between vertex and genae on female; head depth about 1.3× antennal length (Fig. 39); face below antennae does not protrude beyond frons; scape 0.4–0.7× (male) or 0.6–0.8× (female) as long as flagellum; flagellar style terminal, one segmented, with a partially recessed terminal spine; lower face and genae have sparse white pile; palps one segmented; mouthparts very small.

THORAX. — np 3–4 (usually 3), sa 1, pa 1, dc 0–1, sc 0; mesonotal setae pale; mesonotal pile whitish, sparse, thin, erect, on male long, on female short; prosternum bare in and around central depression; pteropleurite bare of tomentum; sternopleurite and pleurotergite sparsely tomentose; rest of pleural area and coxae have dense silvery tomentum. WING. — Vein R_1 not setose; cell m_3 closed; R_4 slightly longer than R_5; cell r_4 about 2× as long as wide at apex; ground color translucent white, veins pale whitish yellow. LEGS. — Fore coxae short, with short, thin pile over entire anterior surface; fore and middle coxae very sparsely tomentose, not pilose; femora without setae; fore tibia lacks setae; middle tibia lacks setae in the posterodorsal and posteroventral positions, has none to a few in the anteroventral position and none to many (15) in the anterodorsal position; hind tibia lacks setae in the anterodorsal, posterodorsal, and posteroventral positions, has 4–8 setae in the anteroventral position; males have more tibial setae than females.

ABDOMEN. — Swollen, wider than high,

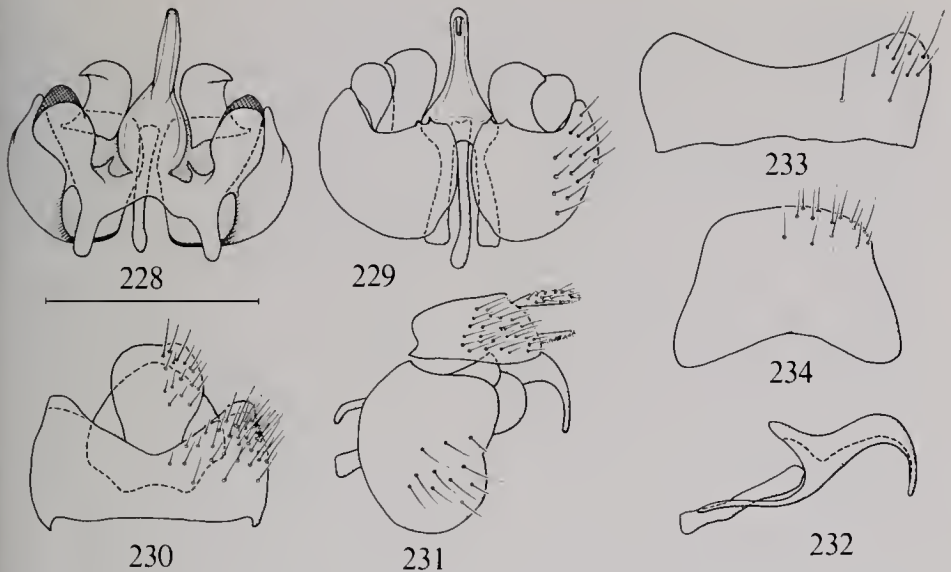

Fig. 228–234. — *Schlingeria ammabata* Irw. male terminalia. 228. — Gonacaxites with appendages and aedeagus in dorsal view. 229. — Gonacoxites with appendages and aedeagus in ventral view. 230. — Epandrium with appendages in dorsal view. 231. — Genitalia in lateral view. 232. — Aedeagus in lateral view. 233. — Tergite 8. 234. — Sternite 8. Scale: 0.5 mm.

tapers sharply at apex in female; smaller, cylindrically shaped, and gradually tapering to apex in male; male abdomen has sparse, erect, elongate pile; female abdomen has sparser, shorter pile; dorsum of both sexes tomentose, that of male less densely than that of female.

Male Terminalia (Fig. 228–234). — Tergite 8 (Fig. 233) only slightly constricted; sternite 8 (Fig. 234) rhomboid; epandrium (Fig. 230) much wider than long; cercus (Fig. 230) slightly bilobate, both halves solidly fused along midline, extends posteriorly slightly beyond ventral epandrial sclerite; ventral epandrial sclerite shield shaped, does not extend to anterior margin of epandrium, and is not attached to parameral bridge or aedeagus; aedeagus (Fig. 232) rather short; ventral apodeme elongate, reaching anteriorly almost to apex of ejaculatory apodeme; dorsal apodeme very short, solidly attached to posterior edge of parameral bridge; ejaculatory apodeme moderately long, rod shaped; distiphallus slender, curved downward; gonocoxites (Fig. 229) rounded, not united ventrally, with two posteriorly directed spinose projections at the inner lateral posterior margin of each gonocoxite; parameres form a large, hood shaped lobe distally; midsections of parameres strongly united to one another by a sclerotized bridge; parameral apodeme strong; gonostylus short, squat, with sharp point projecting outward and upward, not extending to tip of distiphallus; hypandrium lacking; ventral lobe lacking.

Habitat

The one known species, *ammobata,* has been collected in inland deserts, always associated with sand dune environments.

Distribution

Schlingeria occurs throughout most of the Colorado and the southern portions of the Mojave deserts of California and Arizona, extending southward into the Sonora Desert of northwestern Mexico.

Included Species

ammobata Irwin 1977*a*:427 ♂, ♀.
Distribution. — Los Angeles, San

Bernardino, Riverside, and Imperial counties, California, and Sonora, Mexico.

At present no undescribed species of *Schlingeria* are known.

Unplaced Species of Therevidae

aurata Harris 1835:596 (*Thereva*), nomina nuda.

plagiata Harris 1835:596 (*Thereva*), nomina nuda. This name was later referred to *Stichopogon trifasciatus* (Say) (Diptera: Asilidae) by Osten Sacken (1887:170).

pygmaea Kröber 1911:515 ♀ (*Psilocephala*). Distribution. — Saint Thomas Island, West Indies.

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INDEX

Page entries in **boldface** type refer to the principal treatment of the subjects; however, references to the illustrations are not given. Italicized names are currently in synonymy.

Some Publications of the ILLINOIS NATURAL HISTORY SURVEY

BULLETIN

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