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A REVISION OF THE NEARCTIC *AULACIGASTER* MACQUART WITH NOTES ON *A. LEUCOPEZA* (MEIGEN) FROM THE PALEARCTIC REGION (DIPTERA: AULACIGASTRIDAE)

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Abstract.—The three Nearctic species of *Aulacigaster* are described. All Nearctic specimens previously reported were misidentified as *A. leucopeza*, which is now known to occur only in the Palearctic Region. The three species described herein are (type locality in parentheses): *Aulacigaster mcalpinei* (Maryland. Montgomery Co., Potomac), *A. neoleucopeza* (Maryland. Montgomery Co., Potomac), and *A. sabroskyi* (Arizona. Cochise Co., Portal). A key to the Nearctic species of *Aulacigaster*, illustrations of male terminalia, known distributions, and comments on biology and systematics are included. A lectotype for *Sephanilla sertulata* Rondani, type species of the genus *Sephanilla* Rondani, is designated. This lectotype is conspecific with *A. leucopeza* and the synonymy of Rondani's names at the generic and species levels is proposed.

Key Words: Diptera, Aulacigastridae, *Aulacigaster*, Nearctic region

Better sampling of Neotropical Diptera has revealed the genus *Aulacigaster* Macquart to be far richer in species than was previously indicated from temperate (Wirth 1965, Papp 1984, Teskey 1987) and tropical regions (Hennig 1956, Papavero 1967). On a single, three-week field trip to Peru, for example, we collected nearly 20 species within a five-kilometer radius of Pakitza (11°56.75′S, 71°17′W), a remote ranger station on the Manu River (Erwin 1991). The richness of these collections and our subsequent attempts to identify them eventually prompted a revisionary study of the genus on a worldwide basis. We soon discovered many more species and forms than were realized previously, nearly all undescribed (over 40 species thus far).

Although comparatively depauperate, with only one species reported previously (Wirth 1965, Teskey 1987), the Nearctic fauna also comprises at least three species. The purpose of this paper is to present a review of the Nearctic fauna, somewhat within the context of our forthcoming revision, so that names and distributions of the Nearctic taxa will be available for a checklist of North American Diptera that is being prepared by the U.S. Department of Agriculture.

Flies of the genus *Aulacigaster* are peculiar to weeping wounds and sap fluxes of deciduous trees (Robinson 1953, Teskey 1976). Near or within these habitats, the species breed and undergo most of their life cycle. Eggs are laid singly or in small groups of two or three, usually directly in or on the flux, which apparently is the primary source of larval food. Larvae have three instars, the first being metapneustic, the second and third being amphipneustic. The third-instar larva, which along with the puparium was

first described by Dufour (1846), is quite distinctive, with a long respiratory tube and a long, filamentous, prothoracic spiracle. Adults frequently occur on or near the flux or they hover within centimeters of its surface.

During 1989 and 1990 we collected specifically at tree wounds and fluxes in the area of Washington, D.C., and discovered two species of *Aulacigaster*, *A. neoleucopeza*, new species, and *A. mcalpinei*, new species, that occur sympatrically, frequently at the same flux. This discovery confirms information J. F. McAlpine (per. comm.) provided in a preliminary key that he sent to us, although only one species was then known to be undescribed. The specimens McAlpine studied, and which we borrowed and examined as part of this study, came largely from the province of Ontario, Canada. We have since found numerous other specimens of these new species in museums from several localities in eastern North America. One of these species, *A. neoleucopeza*, is broadly sympatric with *A. mcalpinei* in the East (from the Great Plains eastward between 71° and 93° north latitude) and partially sympatric with *A. sabroskyi* in the Southwest (Arizona).

Most specimens examined as part of this study are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). Other specimens were borrowed from the following institutions (acronyms used elsewhere in the text are given in parentheses): American Museum of Natural History, New York (AMNH); California Academy of Sciences, San Francisco, California (CAS); Canadian National Collection, Ottawa, Canada (CNC); Museo Zoologico "La Specola," Florence, Italy (MZUF); private collection of Dr. Norman E. Woodley (NEW), Pennsylvania Department of Agriculture, Harrisonburg, Pennsylvania (PDA), and Tel Aviv University, Tel Aviv, Israel (TAU).

Several ratios used in the descriptions are defined here. Anterior head ratio: head height/head width. Lateral head ratio: head length/head height. Frontal ratio: length (dorsal margin of ptilinal suture to level at posterior margin of posterior ocelli)/width (at level of anterior ocellus; measurements taken from anterodorsal view). Facial ratio: facial width (narrowest distance)/head width. Eye ratio: eye length/eye height. Eye-to-gena ratio: genal height/eye height. Wing ratio: wing width/wing length (base of cell bm to apex). Costal vein ratio: the straight line distance between the apices of R_{2+3} and R_{4+5}/distance between the apices of R_1 and R_{2+3}. Vein M ratio: the straight line distance along M between crossvein dm-cu and r-m/distance apicad of crossvein dm-cu.

Genus *Aulacigaster* Macquart

Aulacigaster Macquart, 1835: 579. Type species: *Aulacigaster rufitarsis* Macquart, 1835 (= *Diastata leucopeza* Meigen), by monotypy.—Wirth, 1965: 823 [Nearctic catalog].—Teskey, 1976: 12 [Diptera associated with trees]; 1987: 891–894 [manual of Nearctic Diptera].

Diagnosis.—*Head:* Frons lacking intrafrontal setae; postvertical seta lacking; arista unsegmented, straight or often zigzag, bare basally; if rayed, the common condition, rays on distal ⅔ of arista biseriate, the dorsal and ventral rays alternate.

Thorax: Apical pair of scutellar setae nearly straight, at most very shallowly arched laterally, oriented posteriorly; anepisternum bearing setae and/or setulae; anepimeron lacking setae; prosternum wider than long. Sclerotized portion of subcosta extended much more than halfway from humeral crossvein to costal break; crossvein r-m situated basal to middle of combined cell dm + bm; combined cell dm + bm narrow, width less than ½ that of cell r_{4+5} near level of crossvein dm-cu; cell dm plain, flat, lacking a longitudinal crease or fold. Terminal tarsomere cylindrical.

Abdomen: Female: preabdomen with 6 segments; postabdomen short, when ex-

tended distinctly shorter than preabdomen. Male: cerci weakly to moderately sclerotized, sometimes indicated mostly by setulae; surstylus fused with ventral margin of epandrium; subepandrial sclerite present as a bridge between gonites behind cerci; aedeagus short, not extensively spinulose, almost symmetrical; ejaculatory apodeme of sperm pump large.

Discussion.—*Aulacigaster,* which was described from specimens collected in Europe, has a few synonyms that were proposed by Old-World workers during the 19th century. Genus-group names that are junior synonyms of *Aulacigaster* were listed in a recent catalog (Papp 1984). The following genus-group name and its type species, both described by Rondani, are synonyms of *Aulacigaster* and *Diastata leucopeza* respectively.

Sephanilla Rondani, 1874: 267 [type species: *Sephanilla sertulata* Rondani, 1874 (= *Diastata leucopeza* Meigen), by original designation (p. 246)]. **NEW SYNONYM** of *Aulacigaster* Macquart.

Sephanilla sertulata Rondani, 1874: 268. **NEW SYNONYM** of *Diastata leucopeza* Meigen. The lectotype male, designated here, is labeled "1804 [red, oval label]/ LECTOTYPE Sephanilla sertulata Rondani ♂ By W. N. Mathis, 1994 [species name and gender, designator and year handwritten, black submargin]." The lectotype is directly pinned, is in poor condition, and is deposited in the MZUF. Two female paralectotypes bearing the same first label are also designated.

Systematics

In our forthcoming revision of *Aulacigaster,* we will recognize several species groups. The three Nearctic species belong to the *leucopeza* group, which includes 10 species (of these only *A. leucopeza, A. africana* Barraclough, and *A. perata* Barraclough have been described) and is characterized here.

The *leucopeza* Group

Diagnosis.—*Head:* Posterior fronto-orbital seta inserted distinctly more mesad than anterior fronto-orbital seta; ventral portion of face protrudent and usually bearing a discrete, transverse, white band; frons with a distinct, narrow, transverse, white or silver band; arista straight or nearly so, and bare or with rays; palpus often triangular. *Thorax:* hind femur of ♂ usually plain, without a lobe.

Discussion.—Within the *leucopeza* group, the three North American species are distinguished by the following combination of characters: *Head:* Frons with transverse yellowish orange band posteriad of white band, more or less separated from the latter by a narrow black band (black band sometimes interrupted medially); fronto-orbital setae about ½ as long as diameter of eye and 2–3 times length of ocellar seta; arista bearing short rays, arista appearing straight (zigzags and rays of arista closely approximate); face with distinct, transverse, white band. Thorax: postpronotum brown to black; halter variable in color; vein R_{2+3} bowed; hind femur of ♂ lacking a lobe. Abdomen: entirely black or dark colored.

We compared Nearctic specimens with numerous specimens of *A. leucopeza* from the Old World. Locality data for the latter are: ENGLAND. Birkshire: Windsor Forest, 15–27 May 1988, 1989, P. J. Chandler (3 ♂; USNM). FRANCE. Versailles S.-et-O., 4 Jun 1945, J. d'Aguilar (1 ex; USNM). GERMANY. Cuxhaven, 21 Aug 1984, W. N. Mathis (1 ♂, 1 ♀; USNM). HUNGARY. Matra Mountains (400–1000 m), 24 Aug 1986, A. Freidberg (1 ♀; TAU). ISRAEL. Panyas (Baniass), 2 Aug–9 Sep 1981, 1982, A. Freidberg, F. Kaplan (3 ♂, 1 ♀; TAU); Herzliyya, 21 Jun 1986, A. Freidberg (1 ♂, 1 ♀; TAU); Pa'ar Cave, 7–8 Aug 1986, A. Freidberg, W. N. Mathis (5 ♂, 1 ♀; TAU, USNM); Tel Aviv (wound on *Ficus sycomorus*), 17 Feb–17 Dec 1977, 1978, A. Freidberg (3 ♂, 2 ♀; TAU). ITALY. M. Bezzi

(4 ♂; USNM). Sicily: Erice, 29 Aug 1982, A. Freidberg (1 ♀; TAU). POLAND. Wroclaw District: Wroclaw, 5 Apr 1982, T Zatwarnicki (1 ♂, 2 ♀; CAS, TAU). SPAIN. Canary Islands: La Palma, Cubo de la Galga (laurel forest), 27 May–2 Jun 1976, P. J. Chandler (2 ♂, 1 ♀; USNM). SWEDEN. Skåne: Lund, 29 Oct 1957, J. R. Vockeroth (1 ♂, 1 ♀; CNC).

Barraclough (1993) recently described two Afrotropical species of *Aulacigaster*, *A. africana* and *A. perata*, and compared them with *A. leucopeza*. Barraclough included the latter species in the diagnosis, discussion, key, and illustrations to facilitate identification and comparison, and thus, we have not included that species here.

Key to the Nearctic Species of *Aulacigaster*

1. Larger (wing length averaging 2.6 mm), darker, and shinier species; shiny spot on vertex small, at most extended from ocellus half way to eye margin, sometimes indistinct; anepisternum with ventral ⅓ shiny, bare of microtomentum, bordered dorsally by dense gray microtomentum; katepisternum, coxae, femora, and abdomen strongly shiny, lacking microtomentum, although fore femur sparsely microtomentose anteriorly; acrostichal setulae in two rows along entire length; 1st flagellomere usually blackened on dorsal ⅔; male terminalia: surstylus broad, wider than width of apical portion of aedeagal apodeme . . . . *A. mcalpinei*, new species
– Smaller (wing length averaging 2.35 mm) and duller species; shiny spot on vertex larger and distinct, extended from ocellus ⅔ distance to eye margin; anepisternum usually entirely microtomentose, rarely with a bare, shiny stripe ventrally; katepisternum, coxae, femora, and abdomen not strongly shiny, at least partially covered with microtomentum; acrostichal setulae in a single median row anteriorly, row bifurcated at posterior ½–⅔; 1st flagellomere with only dorsal ¼ darkened; male terminalia: surstylus narrow, narrower than width of apical portion of aedeagal apodeme 2
2. Surstylus moderately long (Fig. 7); gonite in lateral view with posterodorsal portion rounded (Fig. 8) . . . . . *A. neoleucopeza*, new species
– Surstylus short (Fig. 11); gonite in lateral view with a distinctly pointed process posterodorsally (Fig. 12) . . . . . *A. sabroskyi*, new species

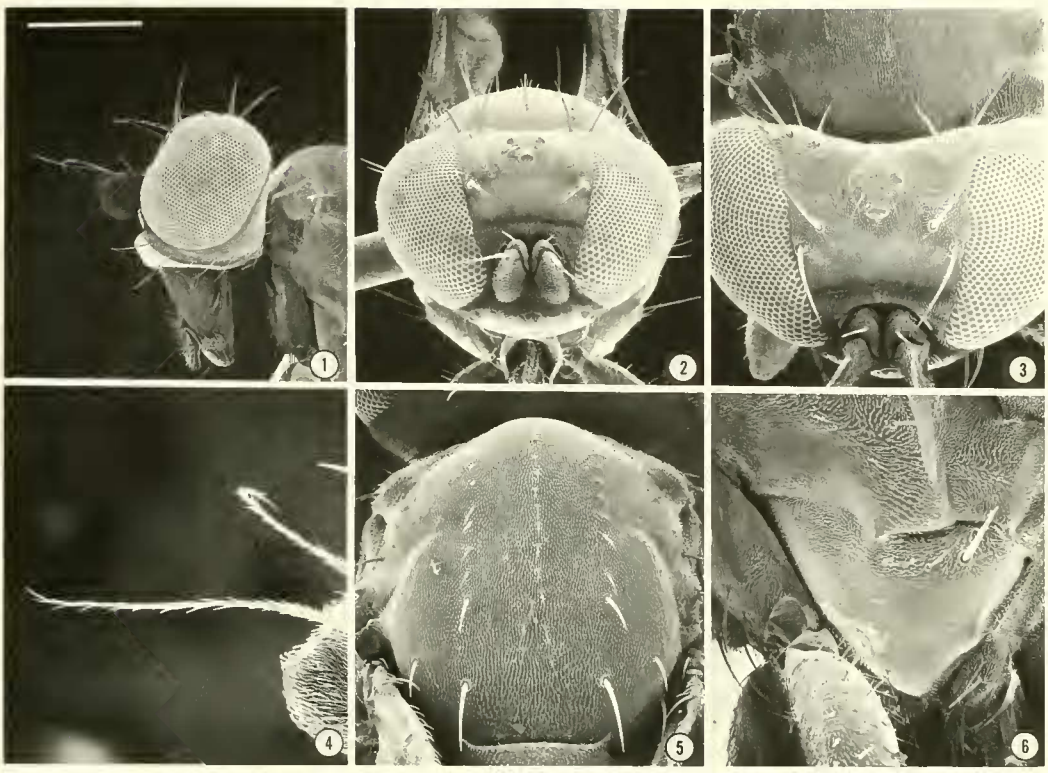
Aulacigaster neoleucopeza Mathis and Freidberg, New Species
Figs. 1–10

Aulacigaster leucopeza of authors, not Meigen, 1830: 100.—Christianson and Ryckman, 1955: 17 [list].—Wirth, 1965: 823 [Nearctic catalog].—Davis and Zack, 1978: 129–130 [host records, natural history, rearing from Douglas fir in Oregon].—Teskey, 1987: 891–894 [manual of Nearctic Diptera].

Description.—Small and generally dull species, wing length averaging 2.35 mm.

Head (Figs. 1–4): Anterior head ratio 0.6; lateral head ratio 0.9; frontal ratio 0.78; facial ratio 0.3; eye ratio 1.0; eye-to-gena ratio 0.1; inner vertical seta subequal to outer seta; frons with a sharply defined, transverse, white band; ocellar seta minute; anterior fronto-orbital seta inserted distinctly laterad, almost aligned transversely with posterior seta; 1 proclinate setula between fronto-orbital setae; face with a sharply defined transverse band on protrudent, ventral part; facial shape with dorsal half concave, ventral portion projected; shiny spot on vertex large and distinct, extended from ocellus ⅔ distance to eye margin; 1st flagellomere barely to partially darkened dorsally.

Thorax (Figs. 5, 6): Color and density of microtomentum of mesonotum mostly uniform and even; anepisternum usually entirely microtomentose, rarely with a bare, shiny stripe ventrally; katepisternum, coxae, femora, and abdomen not strongly shiny, at least partially microtomentose; acrostichal setulae mostly in one row, row bifurcated posteriorly, bifurcation beginning at level between anterior and posterior dorsocentral setae. Wing ratio 0.51; ratio of costal sections 4 to 3 averaging 1.48 (range 1.26–1.79); vein CuA_1/dm-cu ratio averaging 3.0 (range 2.67–3.4); costal vein ratio 0.23; vein M ratio 0.5. Halter with knob

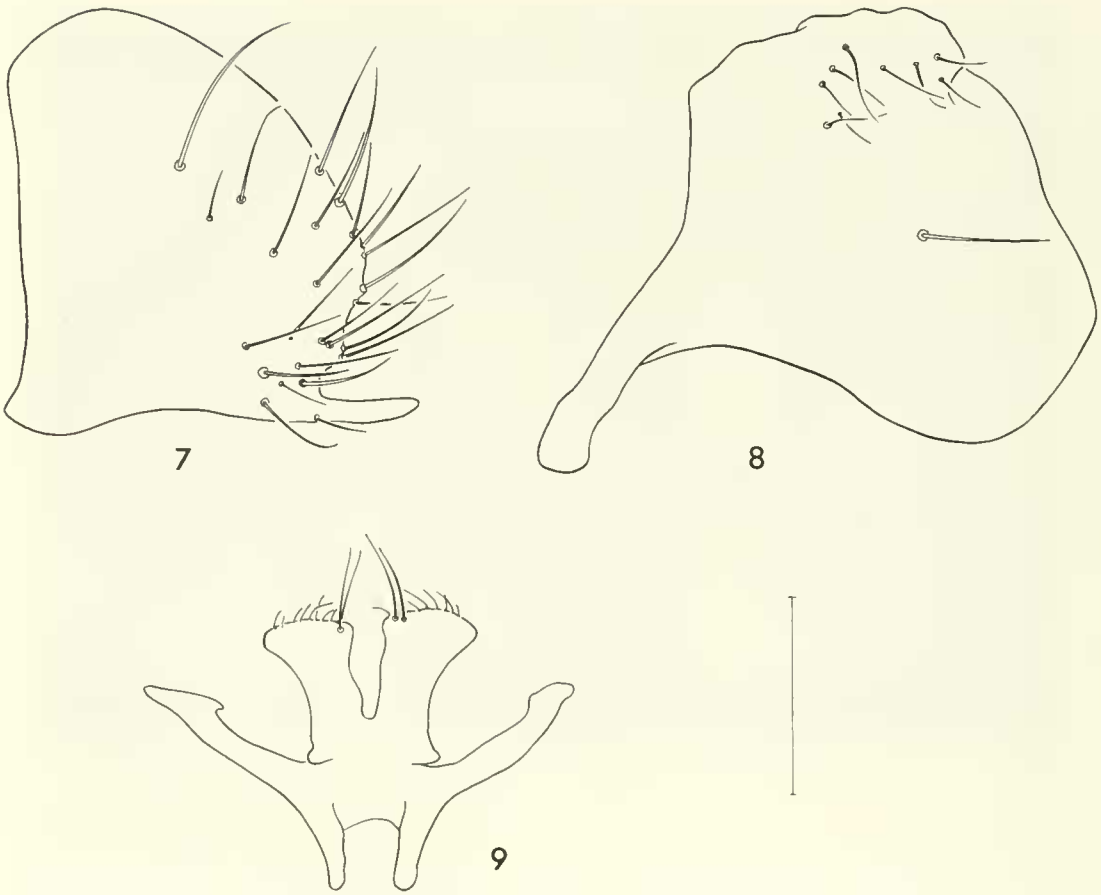


Figs. 1–6. Scanning electron micrographs of *Aulacigaster neoleucopeza* (scale length in parentheses; bar scale for all photographs = Fig. 1). 1, Head, lateral view (0.38 mm). 2, Same, anterodorsal view (0.30 mm). 3, Frons, anterodorsal view (231 μm). 4, Antenna, lateral view (120 μm). 5, Scutum, dorsal view (231 μm). 6, Katepisternum, lateral view (150 μm).

mostly dark brown anteriorly, but with some whitish coloration dorsally, to mostly pale, with only anterior spot dark.

Abdomen: Abdomen subshiny, at least partially covered with microtomentum. Male terminalia (Figs. 7–9): surstylus (Fig. 7) narrow, width about ½ that of anterodorsal process of gonite; subepandrial sclerite (Fig. 9) with 4 mostly posteriorly directed processes, lateral arms better sclerotized, curved posterolaterally, with slight recurved apices; median processes with deep, narrow cleft between them, fused only on basal ¼; gonite (Fig. 8) lacking pointed projection posterodorsally, more broadly developed ventrally, abruptly narrowed at ventral gonal bridge; ventral gonal bridge straight or slightly indented posteriorly; ejaculatory apodeme mostly straight, except at base, nearly as well developed as the apex of the aedeagal apodeme.

Type material.—The holotype ♂ is labeled "USA. MD:Montgomery Co., Potomac[,] 23 July–23 Aug 1989[,] Amnon Freidberg[,] slime flux on oak/HOLOTYPE ♂ Aulacigaster neoleucopeza W.N.Mathis & Freidberg USNM [gender symbol, species name, and "& Freidberg" handwritten; red]." The holotype is double mounted (minuten in a plastic block), is in excellent condition, and is deposited in the USNM. The allotype female and 31 other paratypes (22 ♂, 9 ♀; TAU, USNM) bear the same locality label data as the holotype. Other paratypes are as follows: *MARYLAND.* Prince Georges Co., Camp Springs, 1 Apr 1979, G. F. Hevel (16



Figs. 7–9. Male terminalia of *Aulacigaster neoleucopeza*. 7, Epandrium and surstylus, lateral view. 8, Gonite, lateral view. 9, Subepandrial sclerite, ventral view. Scales = 0.1 mm.

♂, 7 ♀; USNM). *VIRGINIA*. Stafford Co., Stafford (4 mi N), 14 Aug 1990, W. N. Mathis (3 ♂; USNM).

Other specimens examined.—CANADA. *ALBERTA*. Edmonton, 29 Apr 1924, O. Bryant (6 ♂, 4 ♀; CAS, USNM); Elkwater (49°42'N, 110°16'W), 29 May 1955, J. R. Vockeroth (1 ♀; CNC). *BRITISH COLUMBIA*. Remo (7 mi SW Terrace, flowers of *Heracleum*), 6–13 Jun 1960, J. G. Chillcott (1 ♂, 1 ♀; CNC). *MANITOBA*. Minette (flood plain community, bleeding stumps of *Acer negundo*), 5 May 1958, J. F. McAlpine (2 ♂, 2 ♀; CNC). *NEW BRUNSWICK*. Kouchibouguac National Park, 17 May 1977, B. Cooper (1 ♀; CNC). *ONTARIO*. Carp (bleeding maple stump), 22 Apr 1954, J. F. McAlpine (2 ♂; CNC); Maynooth, 22 Jun 1953, J. F. McAlpine (1 ♂, 1 ♀; CNC); Midland, 20 Aug 1955, J. G. Chillcott (1 ♀; CNC); Ottawa, 18 Apr–18 Jun 1951, 1983, D. G. F. Cobb, J. F. McAlpine, J. R. Vockeroth (4 ♂, 4 ♀; CNC). *QUEBEC*. Duncan Lake near Rupert, 31 Jul 1971, J. F. McAlpine (1 ♀; CNC); La Ferme, 11 Jul 1913, A. Robert (1 ♀; CNC); Old Chelsea, 16 Apr–3 May 1939, 1958, G. S. Walley, G. E. Shewell, J. R. Vockeroth (1 ♂, 2 ♀; CNC). *SASKATCHEWAN*. Maple Creek, 28 May 1955, J. R. Vockeroth (1 ♂; CNC). MEXICO. *BAJA CALIFORNIA NORTE*. San José (reared from ooze from cottonwood), 6 Nov 1953.

R. E. Ryckman, C. C. Lindt (4 ♂, 1 ♀; USNM); Tecate (ex *Populus* ooze), 16 Jun 1964, R. Duke (1 ♂, 1 ♀; USNM). UNITED STATES. *CALIFORNIA*. Kern Co., Kern Canyon, Apr 1934, A. H. Sturtevant (1 ♂, 2 ♀; USNM); Rosamond, 17 Oct 1956, A. H. Sturtevant (2 ♀; USNM); Tupman (4 mi E), Kern River (*Populus* slime flux), 1 Jul 1984, E. M. Fisher (1 ♂, 1 ♀; CAS). Los Angeles Co., Glendora, 15 Mar 1929, A. H. Sturtevant (1 ♀; USNM). Napa Co., Moskowite Corner (5.5 km NW, 200 m), Capell Creek, 4 Sep 1977, P. H. Arnaud, Jr. (1 ♂, 1 ♀; CAS). Riverside Co., Mecca, Cottonwood Spring, May 1939, A. H. Sturtevant (2 ♀; USNM); San Juan Canyon, 22 Jul 1953, A. H. Sturtevant (2 ♀; USNM). San Bernardino Co., Redlands, 27 May 1923, F. R. Cole (1 ♂, 1 ♀; USNM); south fork Santa Ana River near Melander cabin, 2 Jul 1968, P. H. Arnaud, Jr. (1 ♀; CAS); 29 Palms (Oasis Nature Area), 13 Jan 1953, P. H. Arnaud, Jr. (1 ex; USNM). San Diego Co., Alpine (ex. *Rhus ovata*), 12 May 1959, Moffet (1 ♀; USNM); Palomar Mountain (5300 ft), 23 Jul 1953, A. H. Sturtevant (3 ♂, 1 ♀; USNM). Santa Clara Co., Palo Alto, 14 Jun–17 Jul 1921, A. H. Sturtevant (4 ♂; USNM); Stanford University, 7 May 1961, P. H. Arnaud, Jr. (1 ♀; CAS). *CONNECTICUT*. Fairfield Co., Redding, 31 Mar 1929, A. L. Melander (1 ♀; USNM). *IDAHO*. Bear Lake Co., Montpelier (3.2 km E), 15 Aug 1981, P. H. Arnaud, Jr. (1 ♂; CAS). *ILLINOIS*. Champaign Co., Champaign (bleeding elm), 14 Oct 1956, J. F. McAlpine (2 ♂; CNC); Urbana (at light), 20 Apr 1957, J. F. McAlpine (1 ♂; CNC). Flat Rock, 1915 (1 ♂, 3 ♀; USNM). *INDIANA*. Tippecanoe Co., Lafayette, 26 Jul 1916, J. M. Aldrich (1 ♀; USNM). *IOWA*. Story Co., Ames, 1 Apr 1918 (1 ♀; USNM). Webster Co., Lehigh, 15 Apr 1955, D. M. Norris (1 ♀; USNM). *KANSAS*. Douglas Co., Lawrence, 22 Jun 1922, C. H. Curran (1 ♂, 2 ♀; CNC). *MARYLAND*. Montgomery Co., Bethesda, 27 Jul 1965, G. C. Steyskal (4 ♂, 3 ♀; USNM); Colesville, 14 Jun 1977, W. W. Wirth (1 ♀; USNM); Glen Echo, 6 Aug 1922, J. R. Malloch (1 ♂; USNM); Plummers Island, 3 Aug 1912 (8 ♂, 5 ♀; USNM). Prince Georges Co., Marlboro, May 1913, H. S. Barber (1 ♀; USNM). *MASSACHUSETTS*. Barnstable Co., Naushon Island, 30 Jul 1922, A. H. Sturtevant (1 ♀; USNM); Woods Hole, Jul–20 Sept 1922, A. H. Sturtevant (7 ♂, 8 ♀; USNM). Middlesex Co., Cambridge, 15 Jul 1981, N. E. Woodley (1 ♀; NEW). *MICHIGAN*. Wayne Co., Detroit, 13 Apr–18 Jul 1938, 1942, 1943, G. C. Steyskal (4 ♂, 2 ♀; USNM); Grosse Isle, 11 Jul 1948, G. C. Steyskal (1 ♀; USNM). *MINNESOTA*. Mahnomen Co., Itasca State Park, 15 Jul 1952 (♂, 1 ♀; AMNH). *NEVADA*. Storey Co., Verdi, Crystal Peak Park (1480 m), 28 Jul 1973, P. H. Arnaud, Jr. (1 ♂; CAS). *NEW HAMPSHIRE*. Grafton Co., Hanover, 31 Aug 1916, A. H. Sturtevant (1 ♂; USNM). *NEW JERSEY*. Morris Co., Morristown, 9 Apr 1922, A. H. Sturtevant (2 ♀; USNM). *NEW MEXICO*. Otero Co., Cloudcraft (*Pinus ponderosa*), E. J. Hay (1 ♂; USNM). *NEW YORK*. Broome Co., Chenango Valley State Park, 15 Apr–6 May 1982, D. A. Grimaldi (1 ♂, 2 ♀; AMNH). Tompkins Co., Brown Farm, Caroline Center (1 km S, at maple sap flux), 19 Apr 1986 (1 ♀; AMNH); Ithaca, 15 Apr 1913, H. Morrison (2 ♀; USNM); Trumansburg (at maple sap flux), 16–22 Jun 1983, D. A. Grimaldi (1 ♂; AMNH). Vestal (banana bait), 1 Jun 1981, D. A. Grimaldi (1 ♀; AMNH). *OREGON*. Jackson Co., Trail, 20 Aug 1951, A. H. Sturtevant (2 ♂; USNM). Union Co., U. Lick Creek (28 mi SE Union, 4280 ft, sap flow), 23 Apr 1977, R. S. Zack (1 ♂; USNM). Wallowa Co., Elgin (22 mi N, *Alnus* seep), 20 May 1977, E. S. Davis (1 ♀; USNM). *PENNSYLVANIA*. Dauphin Co., Harrisburg (sap flux on *Ulmus*; slime flux on oak tree), 15 Apr–19 Jul, K. R. Valley (3 ♂; PDA); Philadelphia Co., Roxborough, 30 Apr 1910 (2 ♂; USNM). *SOUTH DAKOTA*. Brule Co., Chamberlain, 25 Jun 1948, A. H. Sturtevant (1 ♂, 3 ♀; USNM). *UTAH*. Washington Co., Zion National Park, 7 Jun 1934, A. H. Sturtevant (3 ♂, 1 ♀, 1 ex; USNM). *VER-*

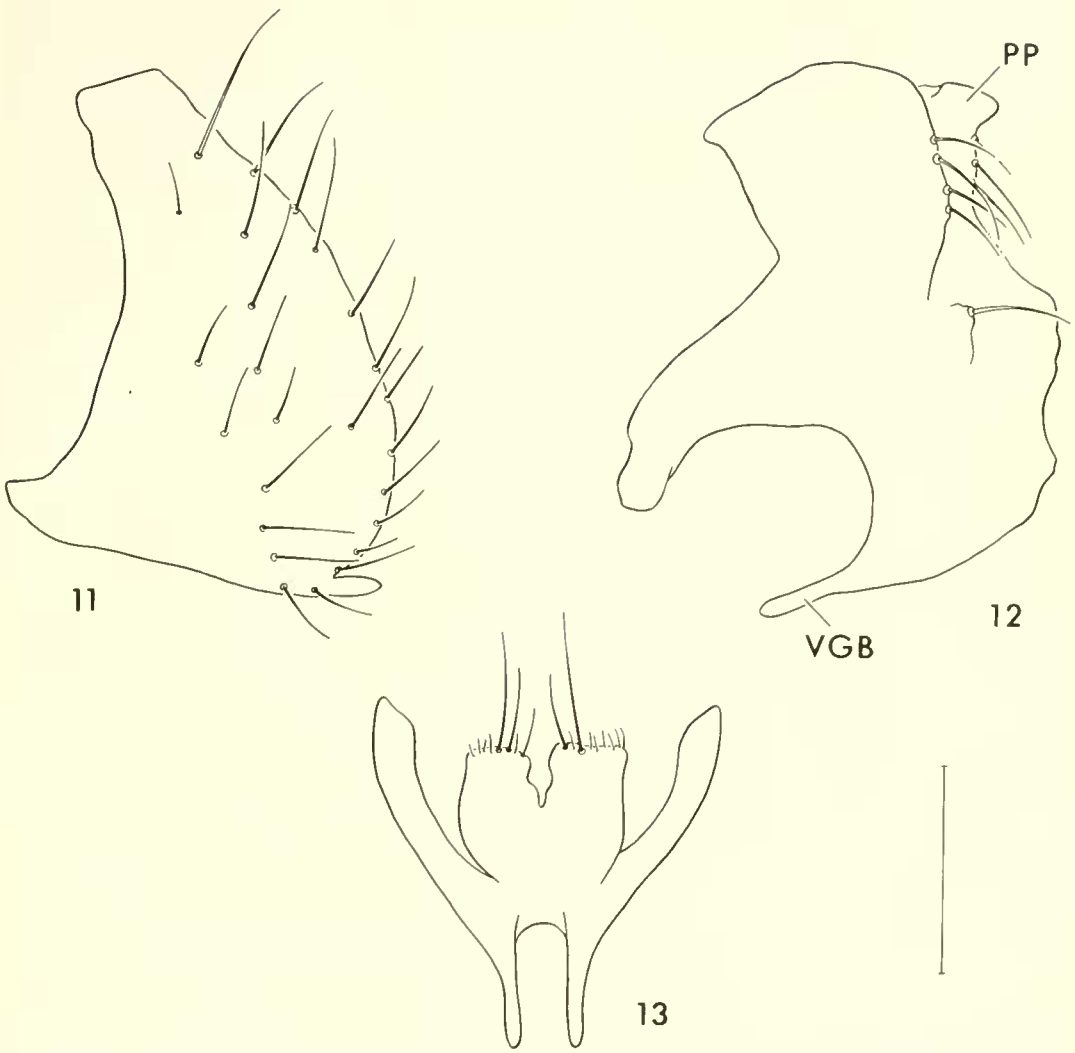
Fig. 10. Distribution map for *Aulacigaster neoleucopeza*.

MONT. Orange Co., Fairlee, 5 Aug 1956, A. H. Sturtevant (1 ♂; USNM). Windsor Co., Mad Brook Farm, E. Charleston, New Hampshire, 15–25 Jul 1982, D. A. Grimaldi (2 ♂; AMNH). *VIRGINIA*. Fairfax Co., Dead Run, R. C. Shannon (8 ♂, 9 ♀; USNM); Mt. Vernon (on tree trunk), 22 Aug 1976, P. H. Arnaud, Jr. (1 ♀; CAS). *WASHINGTON*. Walla Walla Co., Walla Walla, Mill Creek, 2–6 Jul 1922, V. N. Argo, A. L. Melander (16 ♂, 8 ♀; USNM). *WASHINGTON, D.C.* 19 Jun–17 Aug 1913, 1944 (2 ♂, 1 ♀; USNM). *WISCONSIN*. Dane Co., 29 Apr 1951, R. H. Jones (1 ♂; USNM).

Distribution (Fig. 10).—Nearctic: Canada (AB, BC, MN, NB, ON, PQ, SK), Mexico (BCN), United States (AZ, CA, CT, IA, ID, IL, IN, KS, MA, MD, MI, MN, NH, NJ, NM, NV, NY, OR, PA, SD, UT, VA, VT, WA).

Natural history.—This species has been collected on wounds and fluxes from the following genera of deciduous trees: *Acer, Alnus, Pinus, Platanus, Populus, Quercus,* and *Salix*. Davis and Zack (1978) reared adults from larvae that were in seeps of a wounded Douglas fir (*Pseudotsuga menziesii* (Mirbel) Franco).

Diagnosis.—This species is most readily distinguished from *A. mcalpinei* by the mostly to entirely microtomentose anepisternum. Several other characters are noted in the key. This species is also very similar to *A. leucopeza* (Meigen) from the Palearctic



Figs. 11–13. Male terminalia of *Aulacigaster sabroskyi*. 11, Epandrium and surstylus, lateral view, 12, Gonite, lateral view (VGB = ventral gonal bridge; PP = posterodorsal process). 13, Subepandrial sclerite, ventral view. Scales = 0.1 mm.

Region and *A. sabroskyi* from Arizona and New Mexico. It differs from either of the latter two species by characters of the male terminalia, specifically the weakly developed cerci (prominent, broadly developed, parallel-sided processes in *A. leucopeza*), the length of the surstylus, which is moderate long (intermediate to the length of *A. leucopeza* and *A. sabroskyi*), and the rounded posterodorsal portion of the gonite (males of *A. sabroskyi* have a pointed process at this position).

Aulacigaster sabroskyi
Mathis and Freidberg,
NEW SPECIES
Figs. 11–14

Description.—Smaller and generally duller species, wing length 2.00–2.20 mm.

Head: Anterior head ratio 0.61; lateral

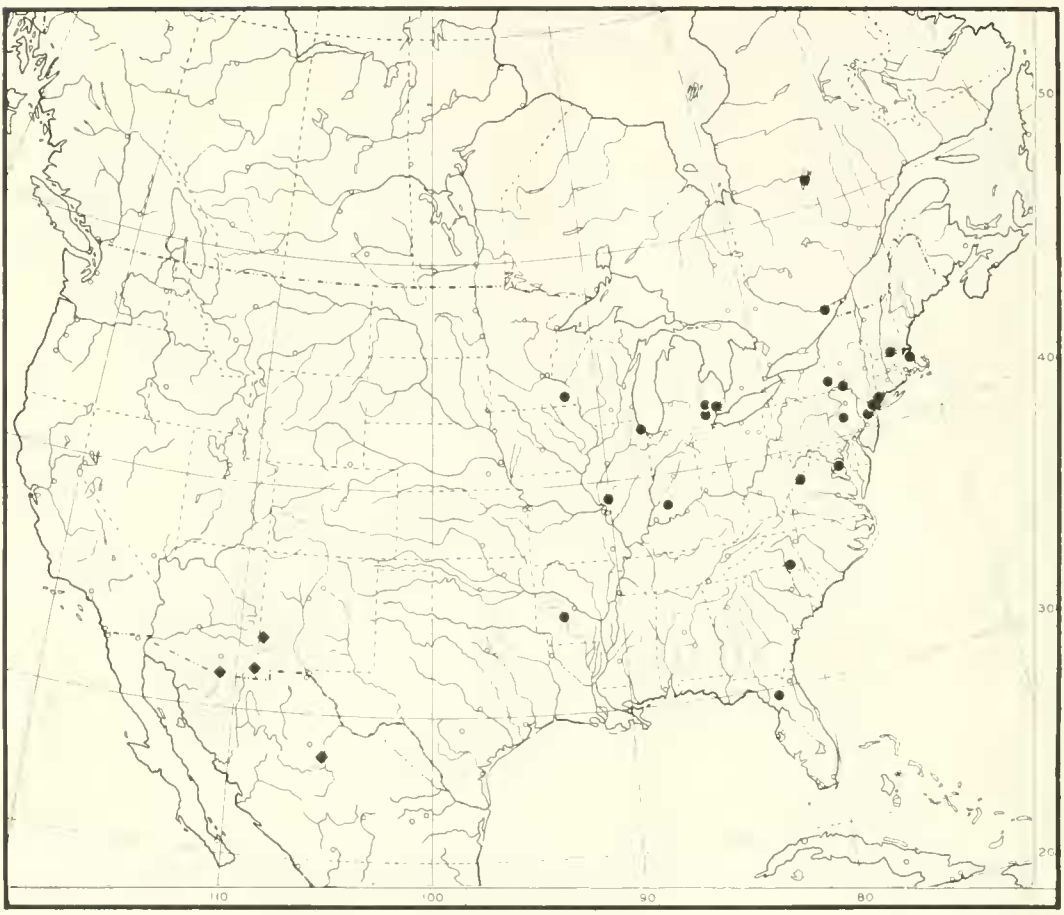


Fig. 14. Distribution map for *Aulacigaster mcalpinei* (dots) and *A. sabroskyi* (diamonds).

head ratio 0.77; frontal ratio 0.81; facial ratio 0.31; eye ratio 0.96; eye-to-gena ratio 0.15; inner vertical seta subequal to outer seta; frons with a sharply defined, transverse, white band; ocellar setae minute; anterior fronto-orbital seta distinctly laterad and almost aligned transversely with posterior seta; 1 proclinate setula between fronto-orbital setae; face with a sharply defined transverse band on protrudent, ventral part; facial shape with dorsal half concave, ventral portion projected; shiny spot on vertex large and distinct, extended from ocellus ⅔ distance to eye margin. 1st flagellomere barely to partially darkened dorsally.

Thorax: Color and density of microtomentum of mesonotum mostly uniform and even; anepisternum usually entirely microtomentose, rarely with a bare, shiny stripe ventrally; katepisternum, coxae, femora, and abdomen not strongly shiny, at least partially microtomentose; acrostichal setulae mostly in one row, row bifurcated posteriorly, bifurcation beginning at level between anterior and posterior dorsocentral setae. Wing ratio 0.43; ratio of costal sections 4 to 3 averaging 1.67 (range 1.46–1.78); vein CuA_1/dm-cu ratio averaging 2.28 (range 2.17–2.47); costal vein ratio 0.25; M vein ratio 0.52. Halter mostly pale, whitish to yellowish, but with some dark brown coloration ventrally.

Abdomen: Abdomen subshiny, at least partially covered with microtomentum.

Male terminalia (Figs. 11–13): surstylus (Fig. 11) narrow and short, width about ½ that of anterodorsal process of gonite; subepandrial sclerite (Fig. 13) with lateral arms narrow, well sclerotized, more or less parallel sided, curved evenly posteriorly; median 2 processes fused on basal ½; gonite (Fig. 12) with a small pointed projection posterodorsally, more broadly developed ventrally, gradually narrowed at ventral gonal bridge; ventral gonal bridge arched anteriorly; ejaculatory apodeme mostly straight, except at base, and nearly as well developed as the apex of the aedeagal apodeme.

Type material.—The holotype male is labeled "ARIZ[ONA].:Portal 4800 Ft.VI-5-1967/CWSabrosky collector/At bleeding sap, cottonwood/HOLOTYPE ♂ Aulacigaster sabroskyi W.N.Mathis & Freidberg USNM [gender symbol, species name, and "& Freidberg" handwritten; red]." The holotype is double mounted (minuten in a polyporus block), is in excellent condition, and is deposited in the USNM. The allotype female and 10 other paratypes (8 ♂, 2 ♀; USNM, TAU) bear the same locality label data as the holotype. Other paratypes are as follows: MEXICO. *CHIHUAHUA*. Camargo (wound in popular tree), 30 May 1964, J. F. McAlpine (1 ♀; CNC). UNITED STATES. *ARIZONA*. Cochise Co., Portal (slime flux on tree), 17 May 1973, C. W. Sabrosky (5 ♂, 2 ♀; USNM); Portal, Turkey Creek (6400 ft), 18 May 1973, C. W. Sabrosky (1 ♂; USNM); Southwest Research Station (5 mi W Portal, 5400 ft, ex *Salix*), 15 Feb 1961, M. Mortenson (1 ♀; AMNH). Santa Cruz Co., Patagonia, Sonoita Creek, 14 Oct 1927, J. A. Kusche (1 ♂; CAS). Carrizo, 26 Sep 1954, A. H. Sturtevant (1 ♂; USNM). *NEW MEXICO*. Catron Co., Whitewater Canyon (ulcer on Sycamore tree), 1 Jun 1972, W. W. Wirth (3 ♂, 3 ♀; USNM).

Distribution (Fig. 14).—Nearctic. Mexico (CHI), USA (AZ, NM).

Natural history.—This species has been collected on wounds and fluxes from the following genera of deciduous trees: *Platanus*, *Populus*, and *Salix*.

Etymology.—The specific epithet, *sabroskyi*, honors Curtis W. Sabrosky, who collected the primary type series and who has contributed substantially to the study of Diptera.

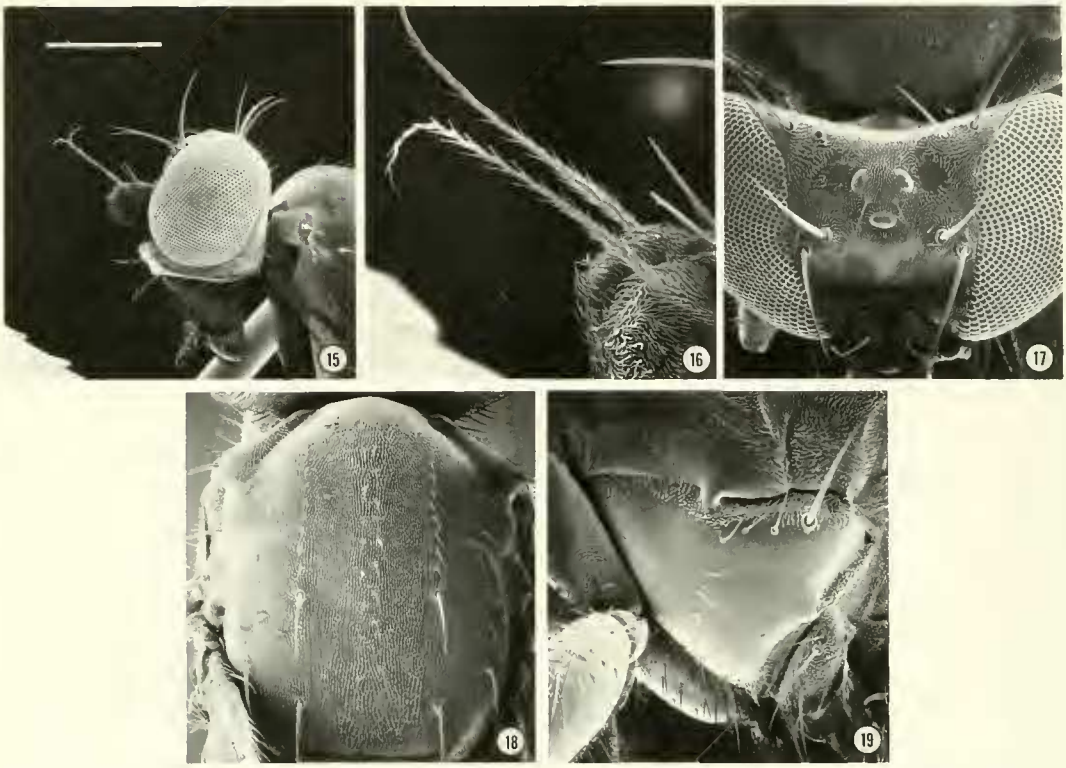
Remarks.—This species is very similar to *A. neoleucopeza* but is distinguished from the latter by the lighter colored halter and by structures of the male terminalia, specifically the short surstylus and small, pointed process of the gonite.

Aulacigaster mcalpinei
Mathis and Freidberg, New Species
Figs. 14–23

Description.—Large, dark, and shiny species, wing length averaging 2.6 mm; setae generally black.

Head (Figs. 15–17): Anterior head ratio 0.55; lateral head ratio 0.89; frontal ratio 19.5–17.5/49; facial ratio 0.24; eye ratio 0.92; eye-to-gena ratio 0.08; vertical setal ratio 0.88; frons with a sharply defined, transverse, white band, bordered posteriorly by a relatively well-developed black band, subequal to white band, usually not interrupted medially; ocellar setae minute; anterior fronto-orbital seta distinctly laterad and almost aligned transversely with posterior seta; 1 proclinate setula between fronto-orbital setae; face with a sharply defined transverse band on protrudent, ventral part; facial shape with dorsal half concave, ventral portion projected; shiny spot on vertex small, at most extended from ocellus half way to eye margin, sometimes indistinct. Scape and pedicel blackish brown; 1st flagellomere short and rounded, usually blackish brown on dorsal ⅗ and basally, anteroventral ⅖ yellow; arista short and bearing rays. Palpus white.

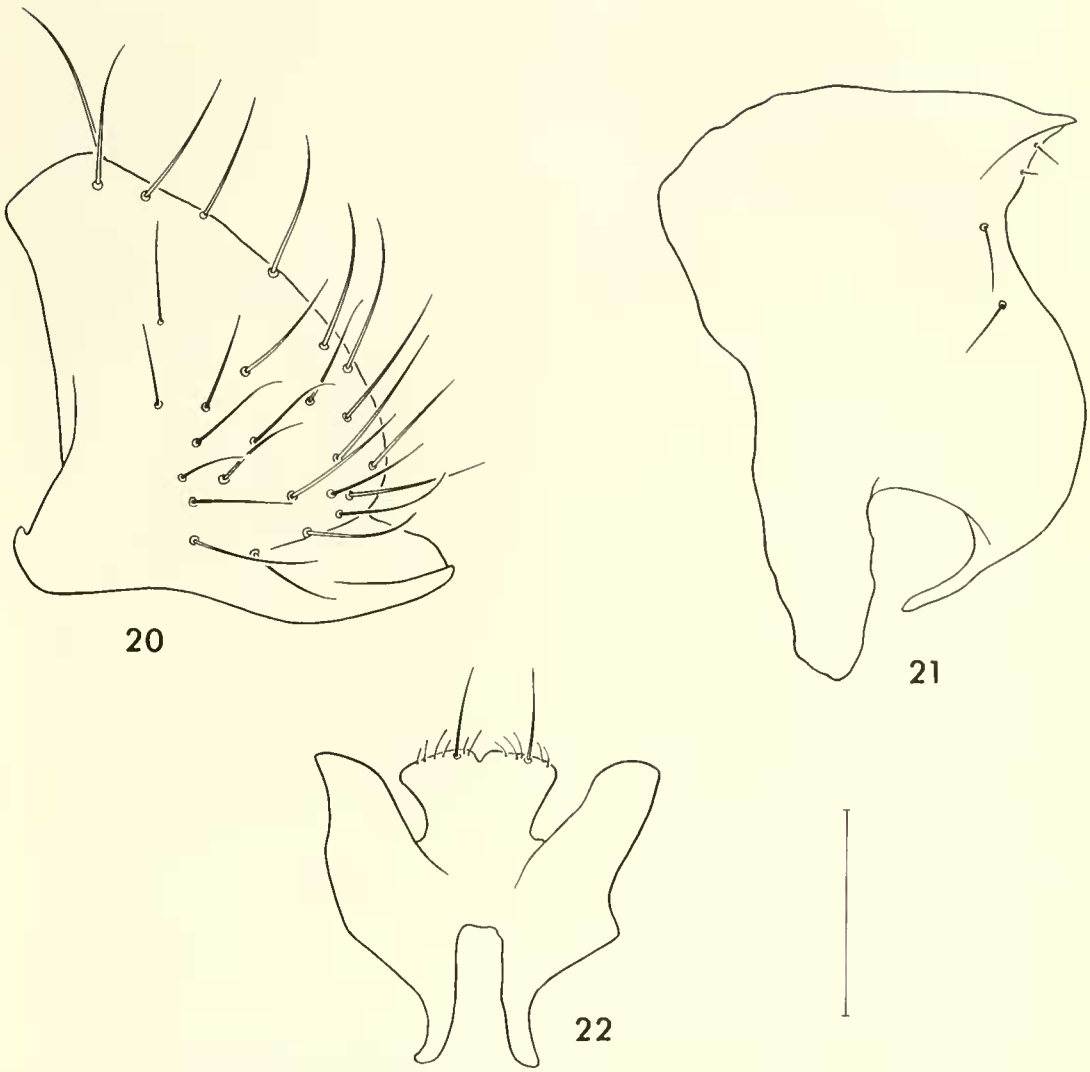
Thorax (Figs. 18, 19): Mesonotum usually appearing striped; scutum with an anterior gray stripe just lateral of the acrostichal setulae and a posterior shape between



Figs. 15–19. Scanning electron micrographs of *Aulacigaster mcalpinei* (scale length in parentheses; bar scale for all photographs = Fig. 15). 15, Head, lateral view (0.38 mm). 16, Antenna, lateral view (86 μm). 17, Frons, anterodorsal view (200 μm). 18, Scutum, dorsal view (231 μm). 19, Katepisternum, lateral view (150 μm).

the dorsocentral and supra-alar setae; scutum about as wide as long; scutellum about twice as wide as long; scutal microtomentum overall usually slightly bicolorous and striated; scutellum semicircular and slightly convex; anterior dorsocentral setae about ½ length of posterior seta, both setae easily distinguished from setulae; acrostichal setulae in two rows, almost regular. Pleural coloration: Anepisternum in lateral view with ventral ⅓ shiny, black, bare of microtomentum; katepisternum largely bare, shiny black, with sparse microtomentum at suture with anepisternum and along anterior margin. Legs: hind leg unmodified; fore coxa mostly shiny black, fore femur black, sparsely microtomentose anteriorly, mostly shiny posteriorly; femoral-tibial articulation yellow; fore tibia mostly dark brown with mid portion slightly lighter; fore tarsus with basal 3 tarsomeres yellow, apical 2 blackish; mid and hind legs similar to foreleg. Wing: slightly smokey; wing ratio 0.40; costal ratio 19/36/5/4.5; ratio of costal section 4 to 3 averaging 1.1 (range 0.92–1.22); cell dm ratio 24.5/3; costa not spinose; vein R_{2+3} distinctly bowed anteriorly; veins R_{4+5} and M slightly convergent; crossvein r-m perpendicular; vein Cu/dm-cu ratio averaging 2.6 (range 2.30–2.65). Halter with knob mostly blackish brown.

Abdomen: Abdomen strongly shiny, generally lacking microtomentum. Male terminalia (Figs. 20–22): surstylus (Fig. 20) in lateral view broad, as wide or wider than anterodorsal process of gonite (Fig. 21), pointed apically; subepandrial sclerite (Fig. 22) in dorsal view with lateral arms and



Figs. 20–22. Male terminalia of *Aulacigaster mcalpinei*. 20, Epandrium and surstylus, lateral view. 21, Gonite, lateral view. 22, Subepandrial sclerite, ventral view. Scales = 0.1 mm.

median processes fused basally, median arms fused to form a single process that is enlarged apically and bears 2 apical setulae, lateral arms curved laterally and pointed apically; gonite (Fig. 21) in lateral view with pointed process posterodorsally, gradually narrowed ventrally to ventral gonal bridge; ventral gonal bridge directed anteriorly; ejaculatory apodeme gracile, irregularly arched over most of length, markedly more slender than apical portion of aedeagal apodeme. Female: spermathecae (Fig. 23) 3; barrel shaped, lateral margins arched slightly outwardly; ducts of 2 spermathecae merged, forming a common duct shortly after exiting spermathecae.

Type material.—The holotype male is labeled "USA. MD:Montgomery Co., Potomac 23 Jul–23 Aug 1989 Amnon Freidberg slime flux on oak/HOLOTYPE ♂ Aulacigaster mcalpinei W.N.Mathis & Freidberg USNM [gender symbol, species name, and

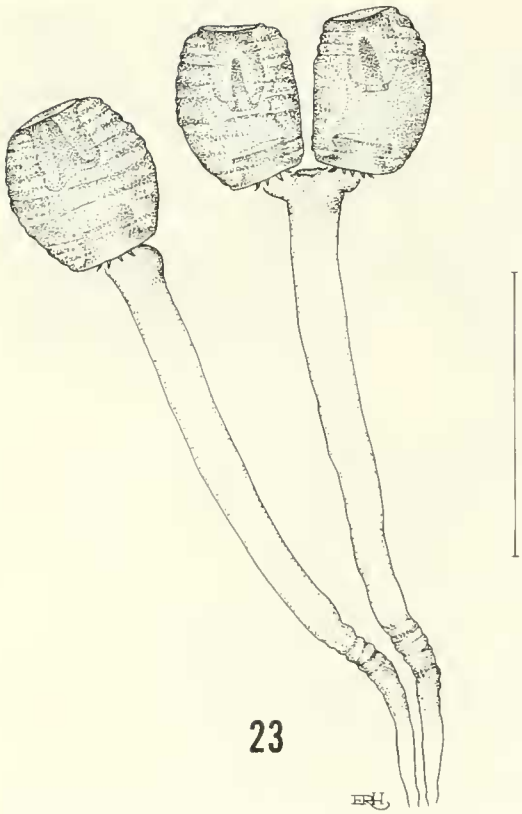


Fig. 23. Spermathecae of *Aulacigaster mcalpinei*. Scale = 100 μm.

"& Freidberg" handwritten; red]." The holotype is double mounted (minuten in plastic elastomer block), is in excellent condition, and is deposited in the USNM. The female allotype and 32 other paratypes (17 ♂, 15 ♀; TAU, USNM) bear the same label data as the holotype. Other paratypes are as follows: CANADA. *ONTARIO*. Ottawa, 27 Apr–1 May 1955, 1983, D. G. F. Cobb, J. R. Vockeroth (3 ♂, 2 ♀; CNC); Ottawa, McKay Lake, 27–28 Apr 1983, J. F. McAlpine (2 ♂, 1 ♀; CNC); Ottawa, Rockcliffe, McKay Lake, 27–28 Apr 1955, D. G. F. Cobb, J. F. McAlpine (4 ♀; CNC). UNITED STATES. *ARKANSAS*. Logan Co., Magazine Mountains (oak sap flux), 6 Jul 1992, D. Grimaldi (10 ♂, 6 ♀; AMNH, USNM). *CONNECTICUT*. Fairfield Co., Redding, 31 Mar 1929, A. L. Melander (4 ♂, 4 ♀; USNM). *NEW HAMPSHIRE*. Hillsboro Co., Hollis (Beaver Brook Association), 20 Apr 1980, N. E. Woodley (14 ♂, 8 ♀; NEW, USNM). *VIRGINIA*. Fairfax Co., Dead Run (at sap tree, at sap sugar maple), 8 Mar–28 Jul 1914, 1915, 1916, 1925, R. C. & E. M. Shannon (17 ♂, 21 ♀; USNM).

Other specimens examined.—CANADA. *ONTARIO*. Endymion Island, St. Lawrence Island National Park, 24 Aug 1976, A. Carter (1 ♀; CNC). *QUEBEC*. Mistassini, 4 Jul 1944, A. Robert (1 ♀; CNC). UNITED STATES. *ARKANSAS*. Garland Co., Hot Springs National Park, 29 Aug–13 Sep 1943, B. C. Marshall (2 ♀; USNM). *FLORIDA*. Alachua Co., Gainesville, 22 May 1957, H. V. Weems (3 ♂; USNM). *ILLINOIS*. Cook Co., Chicago (1 ♀; USNM). Macoupin Co., Carlinville, Robertson (1 ♂; USNM). *INDIANA*. Dubois Co., Ireland (in trap), 17 Jul 1965, O. Mund (1 ♂; USNM). *MARYLAND*. Montgomery Co., Colesville (Malaise trap), 26 Jun 1977, W. W. Wirth (1 ♀; USNM); Glen Echo, 23 Jul–6 Aug 1922, J. R. Malloch (1 ♂, 2 ♀; USNM); Plummers Island, 25 Mar–18 Aug, 1912, 1914, 1916, W. L. McAtee, R. C. Shannon (5 ♂, 3 ♀; USNM). Prince Georges Co., College Park, 29 Jun 1933, C. T. Greene (1 ♂; USNM). *MASSACHUSETTS*. Middlesex Co., Cambridge, 7–16 Jul 1981, N. E. Woodley (3 ♀; NEW). Suffolk Co., Boston (Arnold Arboretum), 18 Apr 1980, N. E. Woodley (3 ♂, 1 ♀; NEW). *MICHIGAN*. Livingston Co., Es. George Reserve, 16 Apr 1950, K. Bohnsack (1 ♀; USNM). Washtenaw Co., Ann Arbor, 30 Apr 1936, G. C. Steyskal (1 ♀; USNM). Wayne Co., Detroit, 29 Aug 1943, G. C. Steyskal (1 ♀; USNM); Grosse Isle, 2 Apr 1957, G. C. Steyskal (1 ♀; USNM). *MINNESOTA*. Olmsted Co., C. Ainslio (1 ♀; CNC). *NEW JERSEY*. Bergen Co., Ridgewood (bred spadices), Apr 1987, A. Soll (2 ♀; AMNH). Mercer Co., Princeton, 14 Mar 1916 (1 ♀; USNM). *NEW YORK*. Broome Co., Chenango Valley State Park, 15 Apr–16 May 1982, D. A. Grimaldi (1 ♂; AMNH). Tomkins Co., Ithaca, 15 Apr 1913,

H. Morrison (2 ♀; USNM). *PENNSYLVANIA*. Dauphin Co., Harrisburg (sap flux on *Ulmus*; slime flux on oak tree), 15 Apr–19 Jul 1982, 1985, K. R. Valley (2 ♂, 1 ♀; PDA). Mecklenburg Co., Highway 51 (1 mi W of Rt. 16 near Matthews; Magnolia cone and flower of *Magnolia grandiflora*), 12–23 May 1979, 1981, A. G. Wheeler, Jr. (1 ♂; PDA). Schuylkill Co., Highway 1-81 (2.6 mi S, at exit 31, Rt. 433; sap flux on *Betula*), 29 Apr 1986, K. R. Valley (1 ♂; PDA). *VIRGINIA*. Fairfax Co., Mt. Vernon, 8 Jul–22 Aug 1956, 1976, P. H. Arnaud, Jr. (2 ♂; CAS, USNM). Alexandria, Maywood (at oak sap), 4 May 1916, W. L. McAtee (1 ♂; USNM). Falls Church, Holmes Run (light trap), 14 Jun–23 Aug 1961, W. W. Wirth (1 ♂, 1 ♀; USNM). Scotts Run, Stubblefield Falls (on *Pinus virginiana*), J. R. Malloch (1 ♂, 1 ♀; USNM). Shenandoah Co., Big Meadows, 15 Jun 1941, A. L. Melander (1 ♀; USNM). *WASHINGTON, D.C.* 3 Mar–4 Aug 1927, H. S. Barber (1 ♂, 1 ♀; USNM).

Distribution (Fig. 14).—Eastern North America: Canada (ON, PQ). United States (AR, CT, DC, IL, IN, MA, MD, MI, MN, NH, NJ, NY, PA, VA).

Natural history.—This species has been collected on tree wounds and fluxes of the following genera of deciduous trees; *Acer*, *Pinus*, and *Quercus*.

Etymology.—We are pleased to name this species after J. Frank McAlpine, who first discovered this species and has contributed much to the study of Diptera.

Diagnosis.—This species is the most easily distinguished of the Nearctic species and can be readily identified on external characters (see key). Structures of the male terminalia are also diagnostic, especially the broadly developed surstylus and large pointed posterodorsal process of the gonite.

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