

# A Revision of the American Species of *Mycodrosophila* (Diptera; Drosophilidae)<sup>1</sup>

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## ABSTRACT

General descriptions, including detailed figures of the male genitalia and wing photographs, are presented for the two described American species of *Mycodrosophila*, *dimidiata* (Loew) and *projectans* (Sturtevant), and for two new Nearctic and five new Neotropical species of this genus. New species are: *claytonae* (Florida to Ontario,

west to Montana, Colorado, and Texas); *stalker* (Florida to Ontario, west to Texas); *elegans* (Panama to Brazil); *brunnescens* (Brazil); *pseudoprojectans* (Nicaragua to Colombia); *neoprojectans* (Honduras to Ecuador); and *nigropleura* (Greater Antilles, El Salvador, and Honduras).

The genus *Mycodrosophila* Oldenberg 1914 was based on the European *Amiota poccilogastra* Loew. The genus is worldwide with nearly 40 described species, mostly from the tropics. The species all appear to be frequenters of fungi, principally of the shelflike *Polyporus* types. Relatively few specimens are taken at the yeasted banana baits commonly used for *Drosophila*.

Species of *Mycodrosophila* are readily recognized by the following combination of characters: distal costal incision of the wing exceptionally deep, the apex of the first costal section forming a thickened, protruding, black lappet; mesonotum arched dorsally, giving a "humped-back" appearance, shiny, and with only a single pair of dorsocentral bristles; scutellum dull and velvety, the basal scutellar bristles short, convergent; arista with a single ventral branch basal to the terminal fork. Most species are dark brown to black above, contrastingly pale whitish below, but there are some exceptions and, in addition, there are species of *Drosophila* (subgenus *Hirtodrosophila*) and *Zygothrica* with a similar color pattern.

Sturtevant (1918) first referred the North American species, *Drosophila dimidiata* Loew, to this genus, as well as *Drosophila projectans* Sturtevant and *Drosophila thoracis* Williston, both from the Antilles. He later (Sturtevant 1921) transferred *Drosophila pleuralis* Williston, also from the Antilles, to *Mycodrosophila*. Duda (1927), however, suggested that *pleuralis* probably belonged to the subgenus *Hirtodrosophila* of *Drosophila*, a disposition agreed to by Wheeler (1954) who similarly transferred *thoracis* to this subgenus. As a result, only two species remain as valid members of *Mycodrosophila*: *dimidiata* (Loew) of North America and the Neotropical *projectans* (Sturtevant).

Three Nearctic and six Neotropical species of the genus are reported here. Our study was based upon more than 500 preserved specimens, and included material from the collection of the U. S. National Museum (loan arranged by Dr. W. W. Wirth), the Canadian National Collection (loan arranged

by Dr. J. F. McAlpine), the private collections of Mr. George Steyskal, Grosse Ile, Mich., Dr. A. H. Sturtevant, Pasadena, Calif., and recently collected specimens sent to us by Dr. Frances Clayton of The University of Arkansas, Dr. Harrison Stalker of Washington University, St. Louis, Mo., and Dr. Sarah Pipkin, who is presently working in the Canal Zone. Most of the material, however, was collected by members of the Genetics Foundation of The University of Texas, the principal collectors being Drs. W. B. Heed, H. L. Carson, M. Wasserman, and the senior author. The figures were prepared for publication by Mrs. Linda Kuich.

A part of the paratype series of each new species is being placed in the collection of the U. S. National Museum and (except for *M. brunnescens*) in the Canadian National Collection; holotypes, allotypes, and the remaining paratypes are located in the *Drosophila* Type and Reference Collection of the Genetics Foundation, The University of Texas.

## *Mycodrosophila* Oldenberg

1914. Archiv f. Naturgesch. 80 (A2): 4. Type species: *Amiota poccilogastra* Loew 1874. Zeitschr. ges. Naturwiss., N.F., 9: 419.

## Nearctic Species

It has recently been found that what has been called *dimidiata* in the U. S. is, in fact, a mixture of three species. This was discovered simultaneously during the summer of 1961 by Dr. Clayton, collecting on the campus of The University of Arkansas, Fayetteville, and by Dr. Stalker, collecting near Navasota, Texas. It was also suspected by dipterists working with the Canadian National Collection, judging from labels ("*n. sp.?*") on some of their material. The known distributions of the three species, as shown in figure 1, indicate that all three are extensively sympatric throughout most of the Eastern and Central States. The absence of *stalker* from the eastern seaboard (except Florida) is probably real, in view of the relatively extensive collection records from that area. Only *claytonae* appears to have penetrated the eastern ranges of the Rocky Mountains; we have a definite identification from Antlers, Garfield Co., Colorado. Other western records, shown on the figure as open circles and probably referable to *claytonae*, are: New Meadows, Idaho; Hamilton and Carbondale, Colorado; and Chama, New Mexico.

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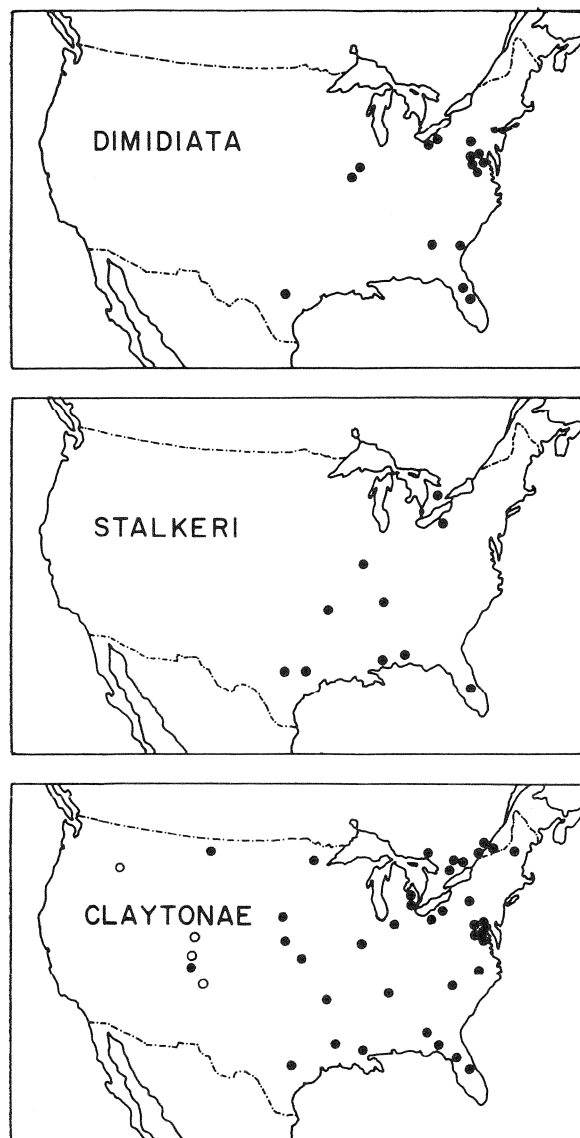


FIG. 1.—Known distributions of the Nearctic species of *Mycodrosophila*. Open circles show the westernmost records for the genus; these specimens cannot be located, but probably represented *claytonae*.

*Mycodrosophila dimidiata* (Loew)

(Figures 1-6; 35)

*Drosophila dimidiata* Loew 1862. Berlin. ent. Zeit. 6: 230 (Cent. 2, No. 95). *Mycodrosophila dimidiata*, Sturtevant 1918. Jour. New York Entomol. Soc. 26:38.

The type locality was given as "Ill." The holotype female, in the Museum of Comparative Zoology, Harvard University, has been re-examined. The distinctive abdominal pattern, present on both sexes, provides a rapid and reliable means of separating *dimidiata* from the other Nearctic species (fig. 2). The male genitalia are shown in figures 3-6, and the wing in figure 35.

*Distribution*.—Forty-five specimens have been seen, from the following localities: NEW YORK: Staten Island; PENNSYLVANIA: Overbrook; DISTRICT OF COLUMBIA; MARYLAND: Glen Echo, Plummers Island; NEW JERSEY: Ft. Lee; VIRGINIA: Falls Church, Dead Run; ALABAMA: Kushla; GEORGIA: Savannah, Pine Mountain; FLORIDA: Orlando, Gainesville; OHIO: Wooster, North Chagrin; ILLINOIS: Carlinville; MISSOURI: St. Louis; TEXAS: Austin.

*Mycodrosophila stalker*, new species

(Figures 1-2; 7-10; 35)

Body length about 2.5 mm. Antennae brown; ocellar triangle and orbits black; frons dull brownish black; palpi dark brown; clypeus blackish brown; proboscis yellow; carina high and narrow, dark brown; cheeks yellowish; proclinate orbital bristle five-sixths length posterior reclinate; anterior reclinate minute.

Mesonotum blackish brown; acrostichal hairs in 10 or more irregular rows; scutellum velvety black; sterno-index about 0.6; pleura and legs yellow; halteres black. Abdominal pattern as shown in figure 2; male genitalia as shown in figures 7-10. Wings (fig. 35) pale except for the blackened lappet at the apex of the first costal section. Wing vein indices as given in table 1.

*M. stalker* is more easily raised in laboratory culture on standard *Drosophila* media than are the other Nearctic species. (None of the Neotropical species has so far been successfully kept in culture.)

*Distribution*.—In addition to cultures from Texas, Arkansas, and Florida, we have seen 23 preserved specimens, as follows: ONTARIO: Marmora; OHIO: Wooster; KENTUCKY: Louisville; ILLINOIS: Carlinville; ARKANSAS: Fayetteville; TEXAS: Georgetown, Navasota; LOUISIANA: Ville Platte; MISSISSIPPI: Oxford; FLORIDA: Orlando.

*Types*.—Holotype ♂ and allotype ♀, Navasota, Texas, August 1961, collected by Dr. Harrison Stalker. Paratypes from all localities listed above.

Table 1.—Wing indices of the American species of *Mycodrosophila*. For a description of the traits used see Sturtevant (1942: 13) and Stalker (1953: 345).

Species	Costal index	Fourth vein index	Fifth vein-Px index	Apical index	Third costal bristles
Neotropical					
<i>elegans</i>	0.8	2.0	1.3	4.0	2/3
<i>nigropleura</i>	0.8	2.4	2.5	5.5	2/3
<i>brunnescens</i>	0.8	2.1	2.2	5.8	2/3
<i>neoprojectans</i>	0.9	2.4	1.8	5.0	3/5
<i>projectans</i>	1.1	2.2	2.0	5.0	2/3
<i>pseudoprojectans</i>	1.1	2.1	2.0	6.0	2/3
Nearctic					
<i>dimidiata</i>	1.3	2.3	1.7	4.0	2/3
<i>claytonae</i>	1.7	1.7	1.3	4.0	2/3
<i>stalker</i>	2.0	1.6	1.5	3.3	3/5

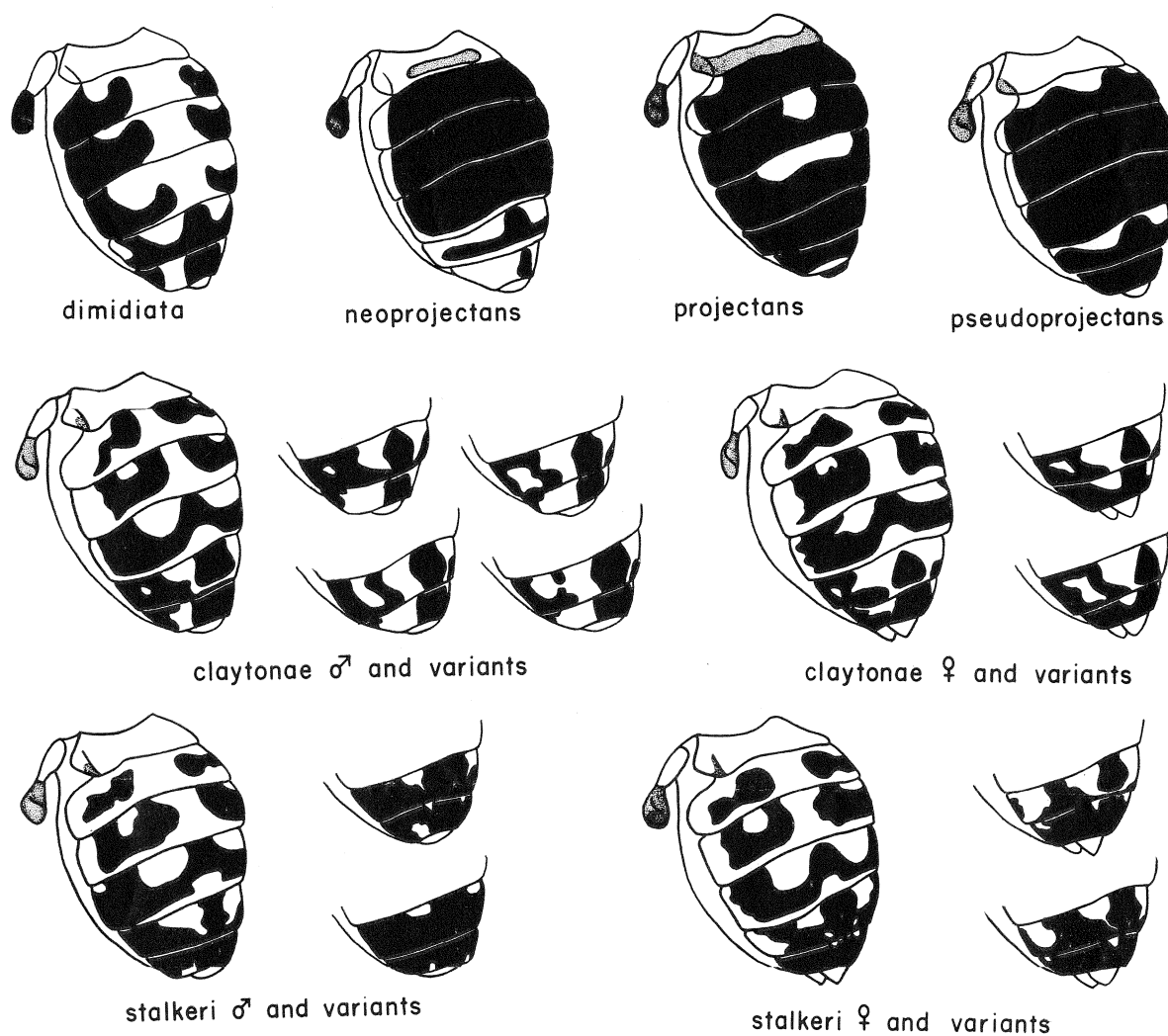


FIG. 2.—Abdominal patterns of species of *Mycodrosophila*. The abdomen is wholly black in *elegans*, *brunnescens*, and *nigropleura*.

*Mycodrosophila claytonae*, new species

(Figures 1-2; 11-14; 35)

Body length about 2.8 mm. Antennae blackish brown; ocellar triangle and orbits black; frons black posteriorly; palpi dark brown; clypeus blackish; proboscis pale; carina high and narrow, blackish brown; cheeks pale yellow; proclinate orbital bristle five-sixths length posterior reclinate; anterior reclinate minute.

Mesonotum blackish brown; acrostichals in 10 or more irregular rows; scutellum velvety black; sterno-index about 0.6; pleura and legs yellow; halteres black. Abdominal pattern variable as shown in figure 2. Most males show considerable pale regions laterally on the sixth tergite, this region being mostly dark in *stalkerī*. The presence of a pale area laterally on the fifth tergite, variable in degree, characterizes all southern populations of *claytonae*, but this

pale area is absent on most northern specimens (e.g., from Ontario or Montana); this variant is not illustrated. The male genitalia are shown in figures 11-14. Wings (fig. 35) pale except for the blackened lappet at the apex of the first costal section. Wing vein indices as given in table 1.

It is fairly certain that this is the species which was figured in color, as *dimidiata*, by Patterson (1943, Plate I); it also appears to be the species for which the internal reproductive structures, eggs, puparia, and chromosomes were described and figured (Patterson, 1943: 41-43). The egg filaments of *claytonae* are rather short while those of *stalkerī* are much longer. The spermatogonial metaphase chromosomes of *claytonae* have been checked by Dr. Clayton (personal communication), and consist of one pair of rods, two pairs of V's and one pair of dots. Her chromosome preparations from *stalkerī* males have not been satisfactory, but appear to

show a V-shaped chromosome pairing with a J-shaped chromosome, plus a pair of V's, a pair of rods, and a pair of dots.

*Distribution*.—More than 200 preserved specimens have been studied, from: QUEBEC: La Trappe, Gatineau, Beechgrove, Old Chelsea, La Ferme; ONTARIO: Ottawa, Bell's Corner, Marmora, Mer Bleue, Guelph, Scotia; NEW HAMPSHIRE: Franconia; DISTRICT OF COLUMBIA; MARYLAND: Glen Echo, Plummers Island, College Park; VIRGINIA: Falls Church, Chain Bridge, Mount Solon; NORTH CAROLINA: Highlands; GEORGIA; FLORIDA: Tallahassee, Gainesville, Orlando; PENNSYLVANIA: Overbrook; OHIO: Wooster, North Chagrin; INDIANA: Lafayette; TENNESSEE: Jefferson City; MINNESOTA: Bemidji; MICHIGAN: Lapeer Co., Detroit; ILLINOIS: Carlinville; MONTANA: Poplar; COLORADO: Antlers; NEBRASKA: Oakdale, Hastings; KANSAS: Manhattan; ARKANSAS: Fayetteville; TEXAS: Navasota; LOUISIANA: Logansport, Krotz Springs.

*Types*.—Holotype ♂ and allotype ♀, Fayetteville, Arkansas, August 1961, collected by Dr. Frances Clayton. Twenty paratypes from assorted localities from the above list.

#### NEOTROPICAL SPECIES

The three Nearctic species discussed above seem to form a triad of sibling species belonging to a different evolutionary line than that containing the Neotropical representatives. The latter differ from the Nearctic series in having a lower costal index, a higher fourth vein index (except for *dimidiata*), a higher apical index (except for *elegans*, which has aberrant venation), the dark area of the costal lappet continued across the wing as a diagonal basal band, the apex of the second vein (usually) enclosed in a dark cloud, and the frons with silvery pruinose areas when viewed from certain angles.

#### *Mycodrosophila projectans* (Sturtevant)

(Figures 2; 15-18; 35)

*Drosophila projectans* Sturtevant 1916. Ann. Entomol. Soc. Amer. 9: 342. *Mycodrosophila projectans*, Sturtevant 1918. Jour. New York Entomol. Soc. 26: 38.

The type, in the U. S. National Museum, was collected by A. Busck and is labelled "San Francisco Mts., St. Domingo, 4.9.05." The type locality is not certain, "Santo Domingo" having been applied in those days to the entire island of Hispaniola, to the present Dominican Republic, to the State, and to the capital city of Dominica. Sturtevant (1921) gave the locality as Haiti, but workers at the U. S. National Museum believe that the specimen came from eastern Dominican Republic, judging from Busck's field notes and from statements concerning Busck's collections, in the introduction to Howard, Dyar, and Knab's *Mosquitoes of the Americas*.

The abdominal pattern, found on both sexes, is shown in figure 2; the pale areas are sometimes largely obscured due to telescoping of the segments. The male genitalia are illustrated in figures 15-18 and a photograph of the wing is shown in figure 35.

This is the most widespread Neotropical species. We have collected hundreds of specimens, from Jamaica, Puerto Rico, St. Lucia, St. Vincent, Grenada, Mexico, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Canal Zone, Colombia, Trinidad, Ecuador, Bolivia, and Brazil.

#### *Mycodrosophila neoprojectans*, new species

(Figures 2; 19-22; 35)

Body length about 2.0 mm. Antennae dark brown; ocellar triangle black, the orbits blackish brown; frons black, rather velvety, with silvery pruinosity at middle; palpi yellow, slightly browned along outer margin; proboscis yellow; clypeus dark brown; carina brown, high and narrow; cheeks whitish yellow; proclinate orbital as long as posterior reclinate; anterior reclinate minute.

Mesonotum black, shiny; acrostichal hairs in about eight irregular rows; scutellum velvety black; sterno-index about 0.5; pleura and legs pale yellow; halteres black. The abdominal pattern, characteristic of both sexes, is shown in figure 2; the male genitalia are shown in figures 19-22. Basal wing darkening similar to that of *projectans* (fig. 35); apex of second vein usually unclouded, rarely with a trace of brownish discoloration. Wing vein indices as in table 1.

*Distribution*.—We have seen 57 specimens, from the following localities: CANAL ZONE: Las Cruces Trail (Madden Forest), Barro Colorado Island, Erwin Island, Mojinga Swamp (Ft. Sherman), Loma Borracha, Piña; PANAMA: Almirante, La Jolla; NICARAGUA: El Recreo; HONDURAS: Lantilla; COSTA RICA: La Lola; TRINIDAD: Port of Spain; ECUADOR: Santo Domingo de los Colorados.

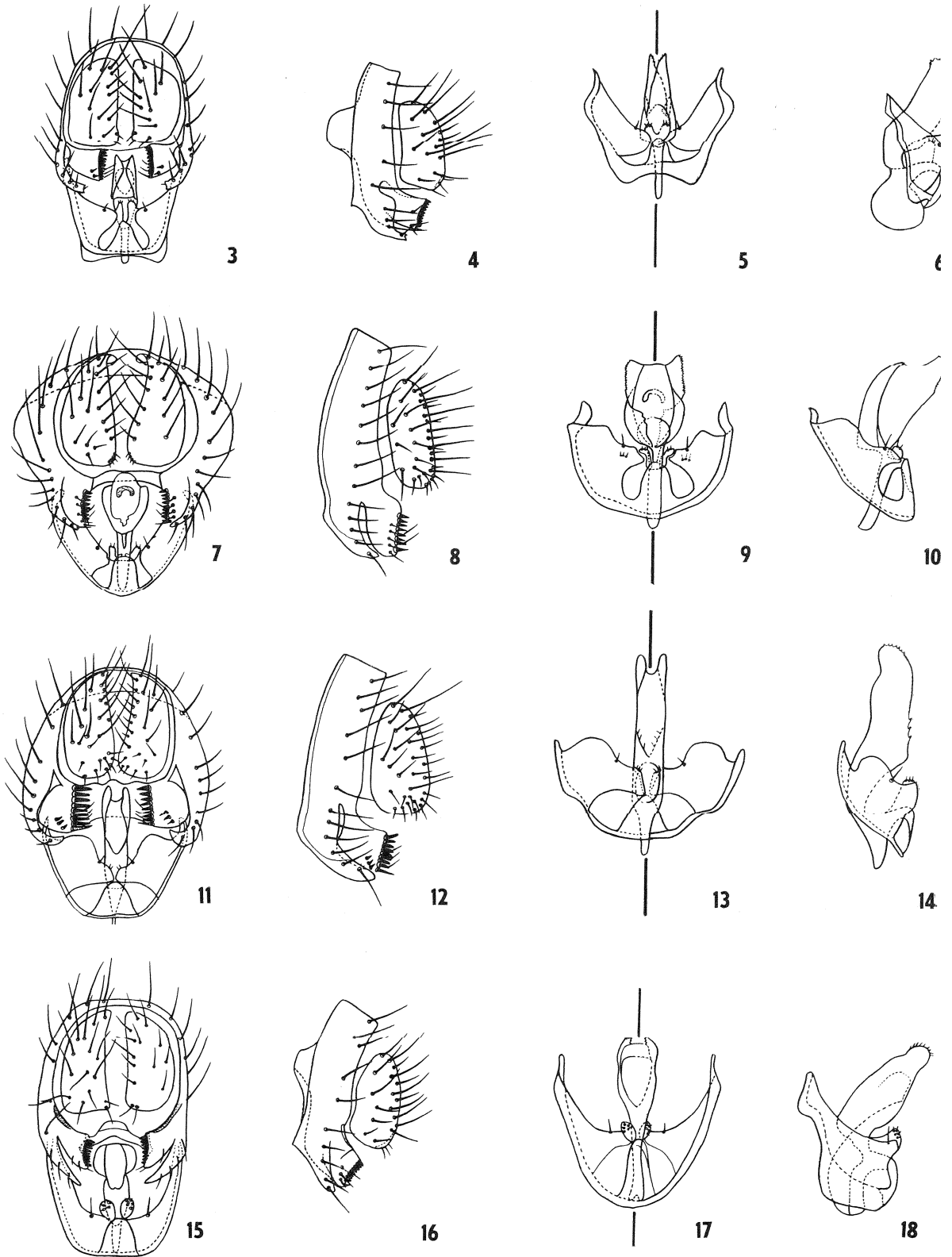
*Types*.—Holotype ♂, allotype ♀ and 18 paratypes, Las Cruces Trail, Madden Forest, Canal Zone; Feb. 1958, M. R. Wheeler. Eight paratypes, Barro Colorado Island, Canal Zone, Aug. 1956, W. B. Heed, H. L. Carson and M. Wasserman.

#### *Mycodrosophila pseudoprojectans*, new species

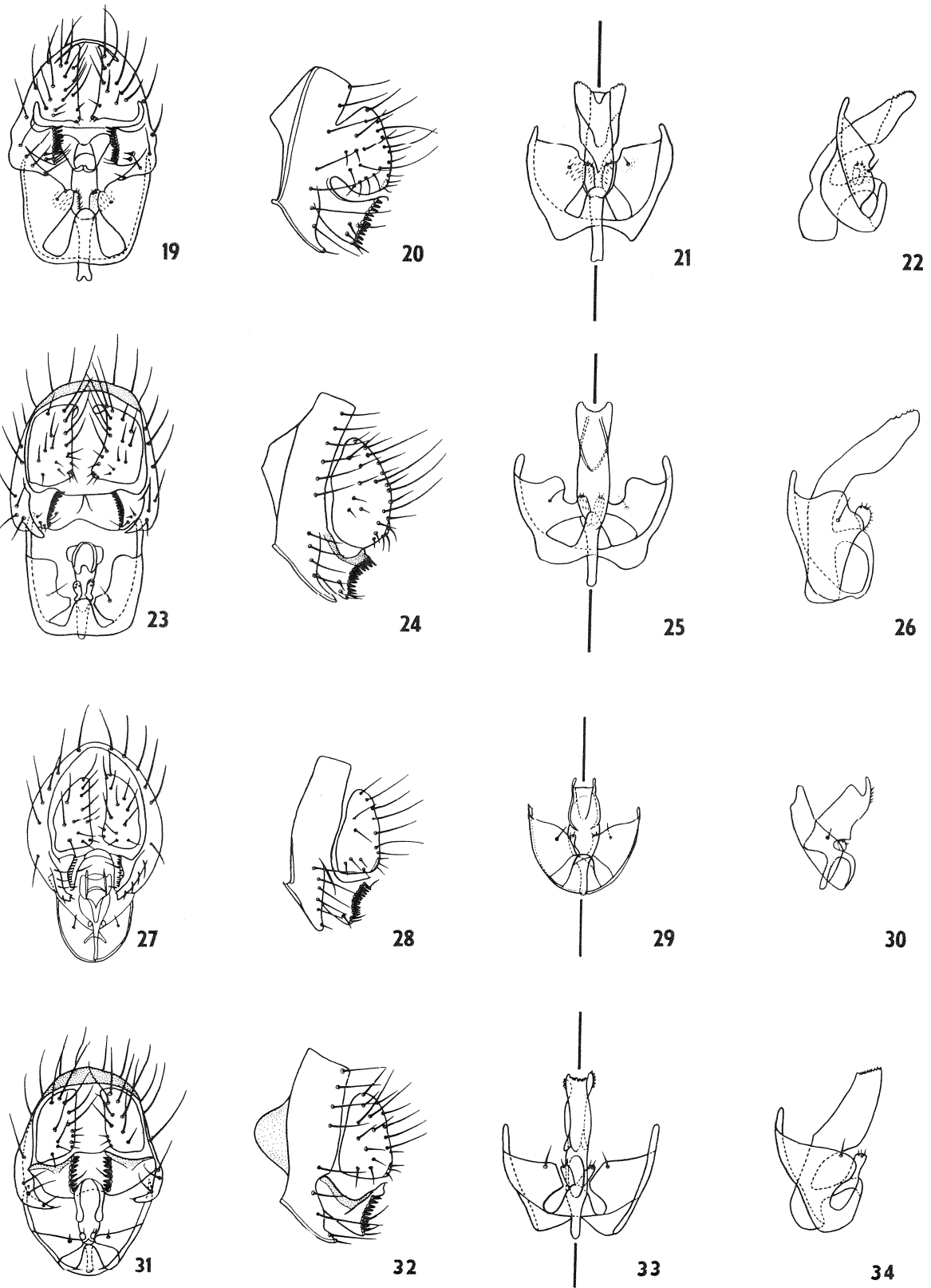
(Figures 2; 23-26; 35)

Body length about 2.5 mm. Antennae tan; ocellar triangle and orbits blackish brown; frons pale in center, black posteriorly, the pale portion silvery pollinose when viewed from most angles; palpi brownish yellow; clypeus brown; carina dark tan, high and narrow; cheeks whitish; proclinate orbital as long as posterior reclinate; anterior reclinate minute.

Mesonotum blackish brown, shiny; acrostichal hairs in about 10 irregular rows; scutellum velvety black; sterno index about 0.6; halteres blackish brown. The abdominal pattern, applicable to both sexes, is shown in figure 2; the male genitalia are illustrated in figures 23-26. The wing indices are given in table 1; the basal dark band is not as strong as in *projectans*, and the costal incision is weaker, as is the lappet. There is no discoloration at the apex of the second vein (fig. 35).



FIGS. 3-18.—Male genitalia of: 3-6, *Mycodrosophila dimidiata*; 7-10, *M. stalkerii*; 11-14, *M. claytonae*; 15-18, *M. projectans*. For each is shown the entire copulatory apparatus in semi-ventral view, the genital arch and clasper in lateral view, and the inner copulatory apparatus (hypandrium, penis, gonapophyses) in ventral (left half of figure), dorsal (right half), and in lateral views.



FIGS. 19-34.—Male genitalia of: 19-22, *Mycodrosophila neoprojectans*; 23-26, *M. pseudoprojectans*; 27-30, *M. nigropleura*; 31-34, *M. elegans*.

*Distribution and Types.*—The species is known from five specimens, as follows: holotype ♂ and paratype ♂, El Recreo, NICARAGUA, June 1954, W. B. Heed; allotype ♀, El Valle, PANAMA, Feb. 1958, M. R. Wheeler; paratype ♂, Bluefields, Nicaragua, June 1954, W. B. Heed; paratype ♂, Leticia, COLOMBIA, Aug. 1960, W. B. Heed and H. L. Carson.

*Mycodrosophila nigropleura*, new species

(Figures 27-30; 35)

Body length about 2.3 mm. Antennae brown; terminal fork of arista large; ocellar triangle blackish brown; orbits brown, rather polished; frons brown, with silvery pruinosity at middle; proclinate orbital as long as posterior reclinate; anterior reclinate minute; palpus pale brown, rather broad; clypeus brown; carina brown, high and narrow; cheeks yellow.

Mesonotum blackish brown, shiny; acrostichal hairs in eight irregular rows; scutellum blackish brown, velvety; sterno-index about 0.5; pleura mostly pale, but with an oblique brown stripe across pteropleura from metanotum; legs pale; halteres blackish brown on basal half.

Abdomen shining black. Male genitalia as shown in figures 27-30. Wings (fig. 35) with the dark band below costal lappet stronger than in *projectans*, and the brown cloud over the apex of the second vein much stronger than in that species. Wing vein indices as given in table 1.

*Distribution.*—Known from 28 specimens, from: PUERTO RICO: Rio Piedras (Agricultural Experi-

ment Station), El Yunque; JAMAICA: Bath; HONDURAS: Lancetilla, La Lima; EL SALVADOR: Izalco, Lago de Coatepeque.

*Types.*—Holotype ♂, allotype ♀ and 13 paratypes, Rio Piedras, Puerto Rico, Feb. 1956, W. B. Heed; eight additional paratypes, Bath, Jamaica, Feb. 1956, W. B. Heed.

*Mycodrosophila elegans*, new species

(Figures 31-35)

Body length about 2.8 mm. Antennae brown; ocellar triangle black; orbits dark brown, polished; frons dull brownish black posteriorly, the anterior half and middle paler, with strong silvery pollinosity; palpi pale brown; clypeus pale brown, rather shiny; carina brownish yellow, high and narrow; cheeks whitish; proclinate orbital as long as posterior reclinate; anterior reclinate minute.

Mesonotum black, shining; acrostichal hairs in about six irregular rows; scutellum black, velvety; sterno-index about 0.5; pleura pale yellow; legs mostly tan to light brown, the first femora paler; halteres pale apically, black basally.

Abdominal tergites wholly shining black. Male genitalia as shown in figures 31-34. Wings strikingly marked as shown in figure 35; second vein suddenly bent to costa near middle of wing, the bent portion included within a black cloud; posterior crossvein heavily clouded. Wing vein indices as given in table 1.

*Distribution and Types.*—Known from 12 specimens. Holotype ♂, allotype ♀ and 4 paratypes, Las

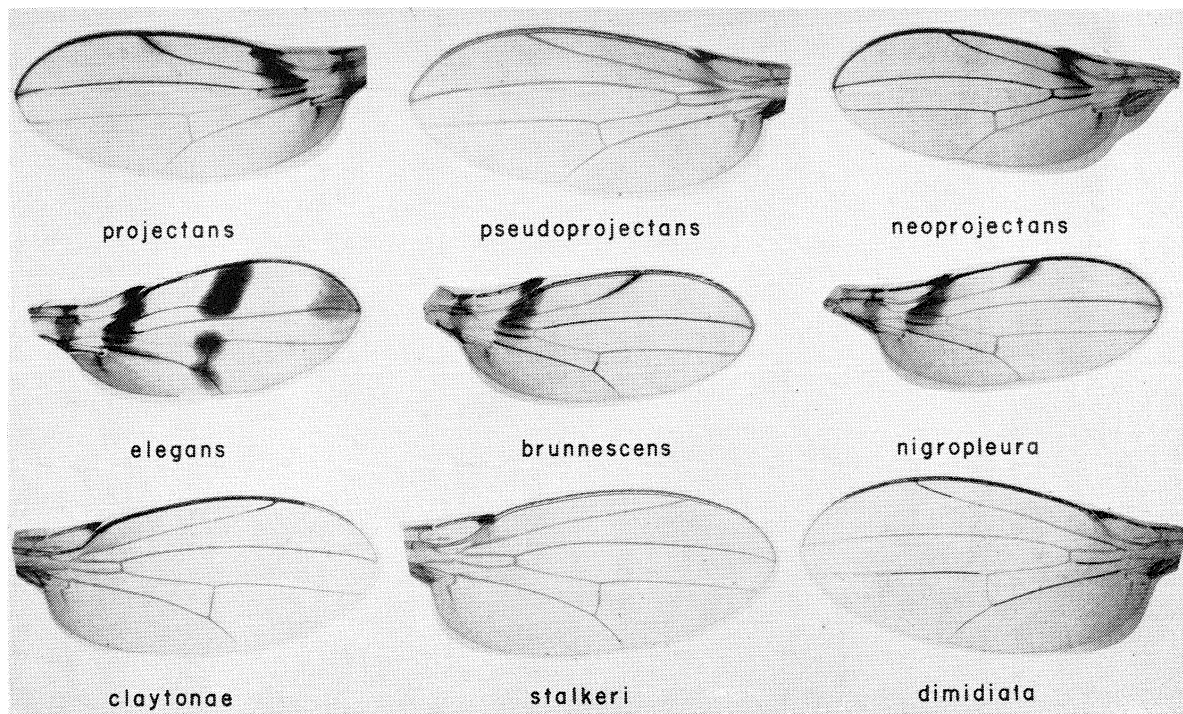


FIG. 35.—Wing photographs of the American species of *Mycodrosophila*.

Cruces Trail, Madden Forest, CANAL ZONE, Feb. 1958, M. R. Wheeler. Additional paratypes as follows: 1, Almirante, PANAMA; 1, Piña, Canal Zone; 2, Palmar del Norte, COSTA RICA; 1, Leticia, COLOMBIA; 1, Castanhal (Pará), BRAZIL.

*Mycodrosophila brunescens*, new species

(Figure 35)

Body length about 2.2 mm. Antennae brown; ocellar triangle black; orbits brown, somewhat polished; frons velvety brown, with silvery pruinosity at middle and anteriorly; palpi brown; clypeus brown; carina brown, high and narrow; cheeks yellow; proclinate orbital about four-fifths length of posterior reclinate; anterior reclinate minute.

Mesonotum blackish brown, shiny; acrostichal hairs in eight somewhat irregular rows; scutellum velvety blackish brown; pleura mostly brown, with a whitish irregular area extending obliquely from near wing base to prosternum; legs pale brown; halteres dark basally, paler apically.

Abdomen wholly blackish brown, shining. Wings (fig. 35) with strong dark band running posteriorly from lappet, a relatively strong cloud at apex of second vein, a slight cloud at apex of third vein, and the costa narrowly tinged with brown along its course. Wing vein indices as given in table 1.

*Distribution and Types.*—Known only from two females. Holotype ♀ and paratype ♀, Belem, Pará, BRAZIL, Sept. 1952, Th. Dobzhansky, collector.

KEY TO AMERICAN SPECIES OF *Mycodrosophila*

- |  |                           |
|--|---------------------------|
| 1. Dark bands of tergites 2 and 3 broadly interrupted medianly; frons not silvery pruinose; Nearctic species .....                               | 2                         |
| Dark bands of tergites 2 and 3 without broad median interruption; frons silvery pruinose when viewed from some angles; Neotropical species ..... | 4                         |
| 2. Dark band of tergite 4 broadly interrupted medianly, thus appearing like preceding tergites .....   |                           |
| ..... <i>dimidiata</i> (Loew)  |                           |
| Dark band of tergite 4 not interrupted, medianly shaped like an inverted V .....   | 3                         |
| 3. Abdominal pattern as shown in fig. 2; costal index about 2.0 .....  | <i>stalkerii</i> , n. sp. |

- |  |                                  |
|--|----------------------------------|
| Abdominal pattern as shown in fig. 2; costal index about 1.7 .....   | <i>claytonae</i> , n. sp.        |
| 4. Wing with five prominent black clouds, including one over posterior crossvein; 2nd vein bent abruptly to costa .....                    | <i>elegans</i> , n. sp.          |
| Wings less heavily clouded, the posterior crossvein never in a cloud; 2nd vein approaching costa gradually .....                           | 5                                |
| 5. Pleura largely brown, with a whitish area extending obliquely from wing base to prosternum; legs brown .....                            | <i>brunescens</i> , n. sp.       |
| Pleura pale yellowish, at most the pteropleura dark; legs mostly pale .....  | 6                                |
| 6. Pteropleura dark, forming a short oblique band from haltere base to sternopleural corner; abdomen black .....                           | <i>nigropleura</i> , n. sp.      |
| Pteropleura pale; some tergites with pale areas .....  | 7                                |
| 7. Tergite 6 wholly shining black .....  | 8                                |
| Tergite 6 yellow with an elongate, narrow, median black stripe; tergite 5 with an apical dark band expanded basally in midline .....       | <i>neoprojectans</i> , n. sp.    |
| 8. Tergites 3 and 4 with some pale areas; tergites 5 and 6 shining black; costal lappet large and black .....                              | <i>projectans</i> (Sturtevant)   |
| Tergites 3, 4 and 6 shining black, tergite 5 with paramedian pale areas basally; costal incision weak, the lappet scarcely developed ..... | <i>pseudoprojectans</i> , n. sp. |

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