

# THE ANTHOMYIIDAE OF CALIFORNIA

## Exclusive of the Subfamily Scatophaginae

BY

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### INTRODUCTION

THE ANTHOMYIIDAE of California, a major segment of the Calyptrate Diptera, has received little attention by authors, although the family forms a significant and integral part of the insect fauna in this region. A vast amount of material has been preserved in the collections of the various institutions within the state as well as elsewhere, representing accessions dating from the beginning of the century to the present time. Woodworth (1913) and Essig (1947) have given a few anthomyiid examples in their manuals. Aldrich (1918), Malloch (1918, 1919, 1920, 1923), and Stein (1920), have recorded a limited number of species in papers that, with little exception, dealt with a fauna of wider range. Certain species of economic importance have been investigated by workers interested in problems of plant protection or matters of public health. But, in sum, the literature cited is notably inadequate for meeting the current needs of classification and identification.

In this present work I hope to indicate more clearly the richness of the anthomyiid fauna in California, and to provide keys and illustrations that will aid in the recognition of the various taxa. The family, known generally by the adult flies, is allied to the Muscidae, from which it may be separated by the extension of the sixth long vein ( $Cu_2+1st A$ ) to the wing margin. Both families have the postscutellum absent and the mouth parts fully developed. They may be distinguished readily from the Calliphoridae, Sarcophagidae,

and Tachinidae, by the absence of strong bristles on the hypopleura.

The Anthomyiidae, exclusive of the Scatophaginae, is represented in North America by the subfamilies Fucelliinae and Anthomyiinae, the former as found in California containing the single genus *Fucellia* Robineau-Desvoidy, and the latter a composite of thirty genera and subgenera. A total of 205 species and subspecies have been recorded in this preliminary survey.

### HABITS

Although adults of the Anthomyiidae have been studied extensively for purposes of classification, there is little known concerning the life history of most of the species. The few observations that have been made have shown that habits vary widely and in interesting detail. Species belonging to the genus *Fucellia* are inhabitants of the seashore and offshore islands of California, living on kelp, seaweed, *Fucus*, and marine organisms washed up or dependent on the tides for their survival. A few have been seen also on the margins of inland ponds and lakes. Species comprising the large complex genus *Hylemya sens. lat.* are of wide geographical range and modes of behavior. They may occur in gardens, woods, open fields, alpine meadows and at elevations above the timber line. Adults are anthophilous, the larvae mainly phytophagous and

saprophagous, becoming in certain instances injurious to cultivated crops and flowering plants, or possibly considered as benefactors in aiding in the pollination of plants and as scavengers in the breaking down of animal and crop refuse. Only a few species are found to cohabit the dunes and sands by the seashore with adults of *Fucellia*. The large genus *Pegomya* likewise contains species of wide distribution and variable habits. Adults are met with usually in surroundings favorable to vegetation. Many species are regarded as phytophagous; the larvae mine foliage of various plants and in a few cases become injurious to commercial crops such as spinach and beets. Other species are known to breed in mushrooms of the field and woods, such as *Agaricus* and *Boletus*. In the *affinis*-group, adults frequent, and larvae inhabit, burrows of rodents and land turtles. Species belonging to the genus *Hydrophoria sens. lat.*, with few exceptions, are mainly boreal in their distribution, inhabiting the environment around lakes and streams, swamps and tundra. Larvae, where known, are regarded as aquatic or semiaquatic in habits, or may be coprophagous. Adults of *Alliopsis* frequent the margins and rocks of running streams, and those of *Paraprosalpia*, in addition, the vicinity of stagnant pools and boggy areas. There adults of both genera prey on nematoceros flies common to their habitat. The genus *Anthomyia*, of which one species is recorded from California, is of wide geographical distribution. Larvae of *A. pluvialis*\* have been bred from nests of several species of birds, including song sparrow, eastern blue bird and the American robin. Adults belonging to the genus *Leucophora*, particularly the females, have been recorded as active near sites of burrows of solitary bees and wasps for purposes of oviposition in the burrows. Larvae are known to inhabit the nests or brood chambers in such tunnels, feeding on the food contents as inquilines or commensals. Larvae of the genus *Eustalomyia* are also found to inhabit nests of crabronine wasps built in herbs, shrubs, and trees.

#### DISTRIBUTION

It is not the intention of the present work to discuss the topic of distribution concerning the local fauna other than to indicate the known geographical range of the various species in North America and adjoining territories. A few have so far been known to occur only in California, but a greater number occur both in California and bordering states. Many boreal species in the Sierra Nevada and San Bernardino Mountains are found as far north as central Alaska, the Yukon Territory and Mackenzie River Basin of the Northwest

Territories, and to the east in the Rocky Mountains of Colorado and New Mexico. The geographical range of the maritime species *Fucellia thinobia* (Thomson) apparently follows a course parallel to that of fur seal migration along the Pacific coast, specimens having been taken as far south as the waters near San Diego and on islands off the California mainland, and to the north at Anchorage and the Commander Islands bordering the Bering Sea.

Full collection data are given for most of the species which have been taken in California. In cases where species are represented by a large number of specimens and records (usually more than 100 localities), the California records, for the sake of brevity, have been restricted to a listing of the localities, accompanied by a paragraph summarizing seasonal flight information. The flight period summaries and distribution maps were prepared by J. A. Powell, University of California, Berkeley.

I have mentioned a few species not yet known to occur in California in order to facilitate the purposes of diagnosis and comparison, to indicate close relationships, and, as in keys, to include any that are considered of possible or likely future occurrence. Such names have been marked by an asterisk (\*).

#### ACKNOWLEDGMENTS

The survey has been based mainly on material in collections of the University of California at Berkeley, at Davis, at Los Angeles, at Riverside, the California Academy of Sciences at San Francisco, California Department of Agriculture, Bureau of Vector Control, California Department of Public Health, United States National Museum, Canadian National Collection, American Museum of Natural History, Cornell University, Michigan State University, and the personal collections of Dr. P. H. Arnaud, Jr., the late Mr. J. D. Birchim, and of the writer. I am deeply indebted to the curators of insect collections at the above institutions for their generous assistance and cooperation, which alone made such a project feasible and as comprehensive as working conditions permitted.

The following abbreviations have been adopted to indicate the probable source for locating types, and of specimens taken in California that through the years have been included in collections submitted for purposes of identification:

- AMNH American Museum of Natural History
- ANSP Academy of Natural Sciences, Philadelphia
- BMNH British Museum (Natural History), London

BVC	Bureau of Vector Control, California Department of Public Health	ZIL	Zoologiska Institutionem, Lund, Sweden
BYU	Brigham Young University, Provo, Utah	ZMUB	Zoologisches Museum der Universität, Berlin
CAS	California Academy of Sciences, San Francisco		
CDA	California Department of Agriculture, Sacramento		
CIS	California Insect Survey, Berkeley		
CNC	Canadian National Collection, Ottawa		
CU	Cornell University, Ithaca, New York		
FMNH	Field Museum of Natural History, Chicago		
HCH	Collection of H. C. Huckett		
IllNHS	Illinois Natural History Survey, Urbana		
JDB	Collection of the late J. D. Birchim		
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts		
MNHP	Muséum National d'Histoire Naturelle, Paris		
MNHS	Naturhistoriska Riksmuseet, Stockholm		
MNHW	Naturhistorisches Museum, Wien		
MSUM	Michigan State University, East Lansing		
OSUM	Ohio State University Museum, Columbus		
UCB	University of California, Berkeley		
UCD	University of California, Davis		
UCLA	University of California, Los Angeles		
UCR	University of California, Riverside		
UK	University of Kansas, Lawrence		
USNM	United States National Museum		
USU	Utah State University, Logan		
WSU	Washington State University, Pullman		

## TERMINOLOGY

Legs are assumed to lie on the substrata in one plane at right angles to the body. A cross section of any part of a leg in this position would reveal the various surfaces thus exposed in their relation to position of an insect's body as follows: dorsal (d.), ventral (v.), anterior (ant.), posterior (post.), and intermediate surfaces as anterodorsal (ad.), posterodorsal (pd.), anteroventral (av.), posteroventral (pv.) (see fig. 4).

The first visible abdominal tergum is regarded as composed of two connate sclerites, and is referred to as terga 1+2, the second visible as tergum 3, the third visible as tergum 4, and the fourth as tergum 5. The anal sclerite is regarded as tergum 9.

The term hypopygium as used comprises the anal segment, cephalad of which is the basal plate, and also when present the prebasal (tergum 6) as in *Botanophila* Lioy. Caudad of the anal segment are the cerci and gonostyli, and ventrad the genital pouch, in which are secluded the aedeagus and its appendages, flanked on either side by two paralobes or parameres, an anterior and posterior pair, or outer and inner.

The terminal sclerites of the ovipositor comprise the suranal and subanal plates, laterad of which are the anal palpi (see figs. 48 to 55).

# SYSTEMATICS

## KEY TO SUBFAMILIES OF ANTHOMYIIDAE IN CALIFORNIA

1. Vein  $Cu_2$  + 1st A (sixth long vein) continuous or traceable to wing margin, or almost so.....2  
     Vein  $Cu_2$  + 1st A not continuous nor traceable to wing margin .....Family Muscidae
2. Abdomen proper usually with 5 visible or exposed segments, frons broad in both sexes and without cruciate bristles, hind tibia with clothing setulae on dorsal surface scattered and in no serial alignment...Scatophaginae  
     Abdomen usually with 4 visible or exposed segments, frons, if broad and nearly equally so in both sexes, with cruciate bristles, hind tibia with clothing setulae on dorsal surface in serial alignment.....3
3. Costa with widely set spinular setae on under surface distad of costal thorns, scutellum usually with hairs absent on ventral surface.....Fucelliinae  
     Costa without spinular setae on under surface distad of costal thorns, scutellum usually with hairs present on ventral surface except in *Myopinini* .....Anthomyiinae

### Subfamily FUCELLIINAE Genus *Fucellia* Robineau-Desvoidy

*Fucellia* Robineau-Desvoidy. 1842, Soc. Ent. de France, Ann. (1841) (ser. 1), 10:269.

Type-species: *Fucellia arenaria* Robineau-Desvoidy, monobasic, = *Halithea maritima* Haliday, 1838.

Species belonging to *Fucellia* are nearly all inhabitants of the seashore. Larvae, so far as is known, feed on the decomposing tidal seaweeds and associated kelp and *Fucus*. Adults of the eastern species, *intermedia* Lundbeck (*maritima* of authors), have also

been taken several miles inland from salt water, on margins of lakes and ponds. The life history of the European species *maritima* has been recorded by Egglisshaw (1960:225-231), with illustrations of immature stages.<sup>1</sup>

The adults are known for their general resemblance to certain species of *Scatophaginae*, having frons in male and female similarly broad throughout and so bristled, cruciate bristles well developed, cheeks broad and bare, proboscis stocky and labellum enlarged, scutellum usually but not invariably without hairs on ventral surface, lower calyptal scale reduced to strip-like proportions, costa with an extended series of sparse or more numerous weak, small or long spinules on under surface.

### KEYS TO SPECIES OF FUCELLIA IN CALIFORNIA MALES

1. Hind femur with wartlike swelling at base of ventral surface .....2  
     Hind femur without such basal outgrowth.....3
2. Tibiae and palpi fulvous.....*pacifica* Malloch  
     Tibiae and palpi blackish.....*fulcorum* (Fallén)
3. Mid and hind tibiae fulvous.....4  
     Mid and hind tibiae rufous or blackish.....6

<sup>1</sup> Hennig (1966. In Lindner, Die Fliegen der Palaearktischen Region. VII-1 63a Anthomyiidae [Lief. 262], pp. 18, 19) considers the name here for the species has been misapplied, and is synonymous with the names *Fucellia tergina* (Zetterstedt) and *F. intermedia* Lundbeck.

4. Palpi rufous to blackish, femora black except at apex. . . . .  
*rufitibia* Stein  
 Palpi yellow . . . . . 5
5. Cheek as high as average width of interfrontalia, processes  
 with long bristles, mid and hind femora mostly ful-  
 vous . . . . . *rejecta* Aldrich  
 Cheek less in height than width of interfrontalia, processes  
 with short bristles, mid and hind femora mostly black-  
 ish . . . . . *assimilis* Malloch
6. Eyes longer than high, elliptical, cheek slightly higher  
 than mid height of eye. . . . . *separata* Stein  
 Eyes as high as long, spherical, cheek usually not higher  
 than height of eye. . . . . 7
7. Haustellum polished, prealar bristle absent. . . . .  
*thinobia* (Thomson)  
 Haustellum dulled, prealar bristle usually present. . . . . 8
8. Mid femur with series of coarse spinose posteroventral  
 bristles . . . . . *costalis* Stein  
 Mid femur with slender posteroventral bristles. . . . . 9
9. Hind tibia with preapical mid dorsal bristle set transverse-  
 ly distinctly basad of preapical anterodorsal, hind femur  
 with 10 to 12 straight, slanting anteroventral bristles on  
 distal half. . . . . *antennata* Stein  
 Hind tibia with preapical dorsal bristles set on transverse  
 planes closely approximate, hind femur with fewer, nor-  
 mal anteroventral bristles on distal half. . . . . *aestuum* Aldrich

FEMALES

1. Tibiae fulvous . . . . . 2  
 Tibiae rufous or blackish. . . . . 5
2. Palpi rufous or blackish, caudal border of tergum 5 with  
 a median cleft. . . . . *rufitibia* Stein  
 Palpi yellowish, caudal border of tergum 5 without median  
 cleft . . . . . 3
3. Mid tibia with median anteroventral bristle. . . . . *pacifica* Malloch  
 Mid tibia without anteroventral bristle, vibrissal margins  
 strongly convergent dorsocephalad. . . . . 4
4. Frons at level of anterior ocellus wider than its length  
 from anterior ocellus to base of antennae, femora most-  
 ly blackish. . . . . *assimilis* Malloch  
 Frons as delimited not wider than its length, femora most-  
 ly fulvous. . . . . *rejecta* Aldrich
5. Eyes longer than high, elliptical, cheek higher than mid  
 height of eye. . . . . *separata* Stein  
 Eyes as high as long, spherical, cheek usually not higher  
 than height of eye. . . . . 6
6. Haustellum polished, prealar bristle absent. . . . .  
*thinobia* (Thomson)  
 Haustellum dulled, prealar bristle usually present. . . . . 7
7. Hind tibia with preapical mid dorsal bristle set transverse-  
 ly distinctly basad of preapical anterodorsal, hind femur  
 with 6 or 7 slanting anteroventral bristles on distal  
 half . . . . . *antennata* Stein  
 Hind tibia with preapical dorsal bristles set on transverse  
 planes closely approximate, hind femur with fewer,  
 normal anteroventral bristles on distal half. . . . . 8
8. Mid femur with coarse stiffish posteroventral bristles, ter-  
 gum 5 with strong marginal bristles. . . . . *costalis* Stein  
 Mid femur with sparse slender posteroventral bristles, ter-  
 gum 5 with weak marginal bristles. . . . . 9
9. Palpi clavate, slender. . . . . *aestuum* Aldrich  
 Palpi flattened and with several black minute setulae. . . . .  
*fuorum* (Fallén)

*Fucellia aestuum* Aldrich

*Fucellia aestuum* Aldrich. 1918, Calif. Acad. Sci. Proc., ser. 4, 8:178.

Holotype: ♂, Ilwaco, Washington (USNM).

Geographic range. — British Columbia, California, Oregon, Washington.

California record. — DEL NORTE Co.: Smith River, 2♂, 1♀, VII-8-30, 2♂, VII-12-30 (J. M. Aldrich, USNM).

Females of *F. aestuum* are not readily distinguishable by keys from those of *fuorum*. Males of the two species may be separated by the presence of a basal swelling on the ventral surface of hind femur in *fuorum*.

*Fucellia antennata* Stein

*Fucellia antennata* Stein. 1910, Wien. Ent. Ztg., 29:23.

Syntypes: ♂♂, ♀♀, Sitka, Karluk and St. Paul Island, Alaska (1♀, USNM).

Geographic range. — Alaska, Manitoba, Northwest Territories, California, Oregon, Quebec, Washington.

California records.—HUMBOLDT Co.: Samoa Beach and dunes, 1♂, VI-18-07 (J. C. Bradley, CU). LOS ANGELES Co.: Hermosa Beach, 1♀, IV-14-38 (K. D. Snyder, CIS). MONTEREY Co.: Carmel, 1♀, II-19-27 (E. P. Van Duzee, CAS). SAN FRANCISCO Co.: San Francisco, 3♂, V-8-60 (H. B. Leech, CAS), Bakers Beach, San Francisco, 1♀, VIII-29-53 (P. H. Arnaud, CAS).

The numerous straight slanting anteroventral bristles on hind femur and the lengthened antennae may serve to distinguish *F. antennata* from its relatives.

*Fucellia assimilis* Malloch

*Fucellia assimilis* Malloch. 1918, Amer. Ent. Soc. Trans., 44:317.

Holotype: ♂, San Francisco, California (ANSP).

Geographic range.—California, Baja California.

California records. — DEL NORTE Co.: Crescent City, 1♀, VII-6-25 (H. A. Scullen, CU); 3♂, 7♀, VII-10-30, 1♀, VII-11-30, 15♂, 14♀, VII-12-30 (J. M. Aldrich, USNM). Smith River, 5♂, 2♀, VII-8-30, 1♀, VII-12-30, 10♂, 13♀, VII-17-30 (J. M. Aldrich, USNM). Smith River Valley, 6♀, VII-17-34 (E. P. Van Duzee, CAS). HUMBOLDT Co.: Samoa Beach and dunes, 1♀, VI-18-07 (J. C. Bradley, CU). LOS ANGELES Co.: San Nicolas Id., 1♂, 1♀, VII-8-38 (T. D. A. Cockerell, CAS). Los Angeles Co., 1♂, II-28-15 (M. C. Van Duzee, CAS). MARIN Co.: Duxberry Point, 1♂, XII-17-60 (C. A. Toschi, CIS). Muir Beach, 8♂, 8♀, V-30-46 (E. L. Kessel, CAS). Muir Woods, 1♀, VIII-6-50 (A. L. Melander, USNM). Stinson Beach, 2♀, V-6-51 (E. I. Schlinger, UCD). MONTEREY Co.: Asilomar, 1♂, VIII-31-45, 1♀, IX-1-34, 2♂, IX-3-45 (A. L. Melander, USNM); 1♀, V-17-59 (G. I. Stage, CIS); 1♂, V-23-59 (J. A. Chemsak, CIS). Carmel, 1♀, V-18-13 (E. C. Van Dyke, CAS). Monterey, 1♀, IX-25-34 (A. L. Melander, USNM). Pfeiffer Beach, Big Sur, 1♀, IX-5-49 (G. Heid, UCLA). Point Pines, Pacific Grove, 1♂, 2♀, V-23-52 (P. H. Arnaud,

CAS). ORANGE Co.: Laguna Beach, 1♂, 1♀, V-22-44 (A. L. Melander, USNM). San Clemente, 1♂, III-26-46, 1♀, II-4-47, 1♂, XI-5-47 (A. L. Melander, USNM). SAN DIEGO Co.: La Jolla, 1♀, I-1-35 (A. L. Melander, USNM). San Diego, 1♀, II-1-13 (E. P. Van Duzee, CAS), 1♀, VI-29-50, bait trap (CDA). San Diego Co., 1♀, VI-8-50, citronella bait trap (CDA). SAN FRANCISCO Co.: San Francisco, 1♂, VIII-7-08, type, 1♀, V-27-08, allotype (F. E. Blaisdell, ANSP); 1♂, IX-18-10 (J. C. Bridwell, USNM); 3♀, VII-7-17 (J. M. Aldrich, USNM); 3♂, 5♀, X-10-20 (E. P. Van Duzee, CAS). San Francisco Beach, 1♀, II-15-51 (E. I. Schlinger, UCD). SAN LUIS OBISPO Co.: Morro Bay, 1♂, VI-16-47 (A. L. Melander, USNM); 1♀, IV-30-62 (C. A. Toschi, CIS). Morro Dunes, 1♀, VI-9-45 (A. L. Melander, USNM). Shell Beach, 3♂, II-15-54 (P. H. Arnaud, CAS). SAN MATEO Co.: Moss Beach, 1♀, VI-21-54, stored in wasp's nest (W. E. Ferguson, CIS). SANTA BARBARA Co.: Carpinteria, 1♀, XII-23-52 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Santa Cruz, 1♂, 1♀, VI-15-17-48 (M. T. James, CIS); 2♀, IX-1-3-53 (P. H. Arnaud, CAS).

*F. assimilis* is related to *rejecta*, from which it differs in having frons wider than long. Both species have yellow palpi, as in *pacifica*.

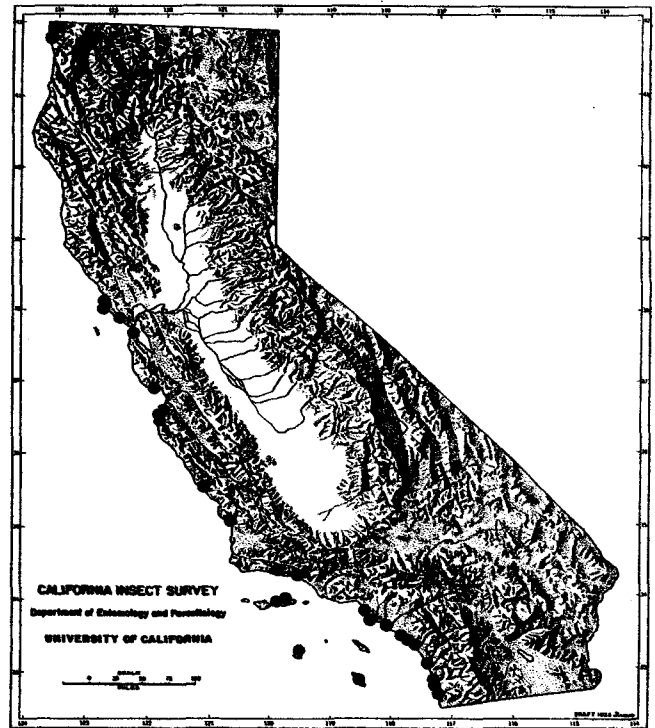
*Fucellia costalis* Stein  
(Map 1)

*Fucellia costalis* Stein, 1910, Wien. Ent. Ztg., 29:21.

Syntypes: ♂♂, ♀♀, Monterey County, California (ZMUB, AMNH).

*Geographic range.* — California, Baja California.

*California records.* — DEL NORTE Co.: Crescent City, 6♂, 14♀, VII-10-30 (J. M. Aldrich, USNM). Smith River, 1♂, VII-12-30, 1♂, 1♀, VII-17-30, 2♂, VII-21-32, 5♂, 2♀, VII-22-32 (J. M. Aldrich, USNM). LOS ANGELES Co.: Hermosa Beach, 1♀, VI-1938 (K. S. Snyder, CIS). Palos Verdes, 10♂, 17♀, X-15-44, 8♂, 2♀, XII-24-44, 1♂, VII-15-45 (A. L. Melander, USNM); 1♂, 1♀, VI-3-49 (R. Sanders, HCH). San Clemente Id., Wilson's Cove, 3♀, VI-21-38 (J. T. Scott, CAS). San Nicolas Id., 1♀, III-15-32 (M. Willows, CAS); 1♂, VII-12-38 (T. D. A. Cockerall, CAS). MARIN Co.: Bolinas, 1♀, III-21-61 (D. Q. Cavagnaro, UCD). Duxberry Point, 1♂, XII-17-60 (C. A. Toschi, CIS). Duxberry Reef, 6♀, XII-17-60 (C. N. Slobodchikoff, CAS). McClure's Beach, 1♀, VII-29-61 (C. A. Toschi, CIS). Point Reyes, 1♀, V-7-36 (CAS). MONTEREY Co.: Asilomar, 1♀, IX-2-45, 1♀, IX-28-46 (A. L. Melander, USNM); 2♂, 4♀, V-22-59 (D. D. Linsdale, BVC; J. Powell, CIS); 1♀, V-23-59 (J. Powell, CIS); 1♂, IX-25-59 (C. W. O'Brien, CIS). Carmel, 1♂, XI-19-35 (L. S. Slevin, CAS). Carmel Beach, 1♀, XI-5-57 (A. C. Smith, BVC). Monterey, 9♂, 12♀, IX-25-34 (A. L. Melander, USNM); 1♀, IX-24-38 (M. Cazier, AMNH); 1♀, IX-1-57 (D. Rentz, CAS). Monterey Bay, 1♀, VI-24-31, dunes (HCH). Pacific Grove, 1♂, 2♀, V-23-63 (R. E. Doty, BVC). Point Pines, 3♀, V-23-52, 4♀, VIII-18-19-57 (P. H. Arnaud, CAS). Monterey Co., 5♂, 2♀, VII-5-96, type series (W. M. Wheeler, AMNH); 1♂, 6♀, VII-5-96, type series (W. M. Wheeler, ZMUB). ORANGE Co.: Corona Del Mar, 1♀, V-22-44, 1♀, VI-5-45, 1♀, VIII-13-49 (A. L. Melander, USNM). Doheny Park, 3♀, VII-18-43, 6♂, 6♀, X-12-51 (A. L. Melander, USNM). Huntington Beach, 1♀, VII-10-29 (L. D.



Map. 1. Locality records in California for *Fucellia costalis* Stein. This distribution pattern, or a portion thereof, is typical for most of the *Fucellia* species in California.

Anderson, UK). Laguna Beach, 1♀, VIII-1911 (USNM); 3♂, 2♀, VIII-17-17 (CU); 1♂, VIII-1-32 (J. M. Aldrich, USNM); 1♀, I-25-35, 2♂, 1♀, V-22-44, 1♂, 1♀, X-24-51 (A. L. Melander, USNM). San Clemente, 1♂, X-18-44, 1♀, X-5-50 (A. L. Melander, USNM). Orange Co., 1♀, no date (F. R. Cole, CAS). SAN DIEGO Co.: Balboa, 2♂, 1♀, VII-13-40 (A. L. Melander, USNM). Carlsbad, 6♀, VII-21-51 (T. R. Haig, UCD). La Jolla, 5♀, VII-2-34 (A. J. Basinger, CAS); 1♀, VI-20-63, 6♀, VII-9-63 (J. Powell, CIS). Laguna, 1♂, VIII-17-17 (CU), 1♀, VII-19-40 (R. H. Beamer, L. C. Kuitert, UK). San Diego, 1♀, III-31-16, 2♀, XII-10-16 (H. G. Dyar, USNM); 1♀, VI-28-17, 1♂, 1♀, V-1-21 (CAS); 1♂, 2♀, VIII-3-32 (J. M. Aldrich, USNM). Torrey Pines, 3♂, 12♀, V-28-35 (A. J. Basinger, CAS; HCH). SAN FRANCISCO Co.: San Francisco, 1♀, VI-18-24 (J. M. Aldrich, USNM). SAN LUIS OBISPO Co.: Pico Creek, 3♂, 4♀, VIII-6-62 (E. I. Schlinger, UCR). San Simeon, 3♀, VIII-31-45 (A. L. Melander, USNM); 3♂, 13♀, VIII-22-61 (L. D. Anderson, UCR). Shell Beach, 1♀, II-15-54 (P. H. Arnaud, CAS). SANTA BARBARA Co.: Carpinteria, 2♀, XII-23-52 (P. H. Arnaud, CAS). Prisoners Harbor, Santa Cruz Id., 1♂, VI-10-66 (J. Powell, CIS). Christi Ranch, Santa Cruz Id., 1♂, 2♀, IX-14-64 (M. E. Irwin, UCR). Goleta, 4♂, 7♀, VI-22-59 (A. E. Menke, F. D. Parker, UCD; J. L. Barth, UCR). SANTA CRUZ Co.: Santa Cruz, 1♀, I-1-50 (D. Wilde, UCD), 1♂, II-26 (CIS).

*F. costalis* is the largest species of *Fucellia* occurring in California. It can usually be recognized by the strong costal spinules and broad silvery cheeks.

*Fucellia fucorum* (Fallén)

*Scatomyza fucorum* Fallén. 1819, *Scatomyzides Sveciae*, p. 5.

Types: ♂, ♀, Baltic coast, Sweden (MNHS).

**Geographic range.** — Alaska, British Columbia, California, Oregon, Commander Islands, and Greenland.

**California records.** — DEL NORTE Co.: Crescent City, 1 ♂, 1 ♀, VII-10-30 (J. M. Aldrich, USNM). Smith River, 2 ♂, VII-17-30, 2 ♂, VII-22-23-32 (J. M. Aldrich, USNM). SONOMA Co.: Stillwater Cove, 10 ♂, 8 ♀, V-23-54 (E. I. Schlinger, UCD).

*F. fucorum* is a northern species, which evidently reaches the southern limits of its range on the coast of counties in northern California, coexisting with the dark-legged form *aestuum*. The females of the two species are much alike, but may be distinguished by the character of the palpi as indicated in the key.

*Fucellia pacifica* Malloch

*Fucellia maritima pacifica* Malloch. 1923, *Calif. Acad. Sci. Proc.*, ser. 4, 12:427.

Holotype: ♂, San Esteban Island, Gulf of California (CAS).

**Geographic range.** — California, Washington, Baja California, Sonora.

**California records.** — ALAMEDA Co.: Albany, 17 ♂, 4 ♀, IX-26-47, mud flats Salicornia (W. W. Wirth, USNM). Berkeley, 4 ♂, 1 ♀, VIII-31-49 (L. W. Quate, CIS). Oakland, 1 ♀, VI-9-21 (CAS); 1 ♂, 1 ♀, VII-7-49, 7 ♂, 2 ♀, VIII-15-49 (L. W. Quate, CIS); 2 ♂, 2 ♀, IX-14-49, at citronella bait trap (L. W. Quate, USNM). LOS ANGELES Co.: Long Beach, 2 ♂, 2 ♀, V-21-44 (A. L. Melander, USNM); 1 ♂, VIII-25-50 (O. Meyers, BVC). Los Angeles Co., 2 ♂, II-28-15 (M. C. Van Duzee, CAS). MARIN Co.: Mill Valley, 1 ♀, IV-17-26 (CAS); 1 ♂, VIII-22-52 (P. H. Arnaud, CAS). Muir Beach, 2 ♀, V-30-46 (E. L. Kessel, CAS). Tomales Bay, 1 ♂, III-13-53 (A. A. Grigarick, UCD). MONTEREY Co.: Seaside, 3 ♀, V-22-59 (D. D. Linsdale, CIS). ORANGE Co.: Corona Del Mar, 1 ♀, V-22-44 (A. L. Melander, USNM). Laguna Beach, 1 ♀, VII-8-19 (E. O. Essig, CIS), 1 ♀, VIII-15-49 (A. L. Melander, USNM). Seal Beach, 1 ♂, 2 ♀, V-17-42 (A. L. Melander, USNM). RIVERSIDE Co.: Desert Spring, 1 ♀, V-19-54 (J. C. Hall, UCD). Salton Sea, 1 ♂, III-23-51 (A. L. Melander, USNM). SAN DIEGO Co.: La Jolla, 1 ♂, I-1-35 (A. L. Melander, USNM). San Diego, 1 ♂, VI-30-13 (E. P. Van Duzee, CAS). SAN LUIS OBISPO Co.: Morro Bay, 5 ♂, VIII-29-30-45, 1 ♂, VIII-3-50 (A. L. Melander, USNM); 1 ♂, 3 ♀, IV-30-62 (R. W. Thorp, CIS). SAN MATEO Co.: Beach S. of Pescadero, 1 ♀, XII-15-51 (P. H. Arnaud, CAS). VENTURA Co.: Mugu, lagoon, 2 ♂, 1 ♀, VI-26-62, 1 ♂, 2 ♀, VII-10-62, 1 ♂, VIII-1962 (R. R. Sanders, USNM).

In *F. pacifica* the apical region of mid and hind femora is more broadly yellowish than in *intermedia* or *maritima* (Haliday)\*, its nearest relatives.

*Fucellia rejecta* Aldrich

*Fucellia rejecta* Aldrich. 1918, *Calif. Acad. Sci. Proc.*, ser. 4, 8:171.

Holotype: ♀, San Diego, California (USNM).

**Geographic range.** — California, Baja California, Sonora.

**California records.** — LOS ANGELES Co.: Long Beach, 2 ♀, V-21-44 (A. L. Melander, USNM). San Pedro, 1 ♂, VII-8 (Cockerell, USNM). ORANGE Co.: Corona Del Mar, 2 ♀, VIII-27-42, 3 ♀, V-22-44, 3 ♂, 3 ♀, VI-11-44, 2 ♂, 4 ♀, VI-5-45 (A. L. Melander, USNM). Huntington Beach, ♂, VI-4-45 (A. L. Melander, USNM). Doheny Park, 1 ♀, VII-18-43 (A. L. Melander, USNM). Laguna Beach, 3 ♂, 6 ♀, VIII-18-43, 2 ♂, 1 ♀, V-22-44, 1 ♀, VI-21-50 (A. L. Melander, USNM). San Clemente, 1 ♀, X-18-44 (A. L. Melander, USNM). SAN DIEGO Co.: La Jolla, 1 ♂, 1 ♀, VII-13-41 (R. H. Beamer, UK; L. H. Banker). Palm City, 2 ♂, 3 ♀, VII-19-40 (R. H. Beamer, D. E. Hardy, L. C. Kuitert, UK). San Diego, 1 ♀, VI-28-17, holotype (J. M. Aldrich, USNM); 2 ♀, VI-8-50, 1 ♂, VI-30-50, 2 ♂, 3 ♀, VII-12-50, 3 ♂, 8 ♀, VII-26-27-50, bait traps (CDA). San Diego Port, 4 ♂, 4 ♀, VI-1-50, 1 ♂, 3 ♀, VI-23-50, bait traps (CDA). San Diego Co., 1 ♀, VI-1-50, 2 ♂, 9 ♀, VI-8-50.

The species *F. rejecta* and *assimilis* resemble one another in many respects; the former having narrower frons and fulvous mid and hind femora. Malloch (1923:428) has cited the species as reared from larvae found feeding on eggs of Grunion, *Leuresthes tenuis* (Ayres).

*Fucellia rufitibia* Stein

*Fucellia rufitibia* Stein. 1910, *Wein. Ent. Ztg.*, 29:25.

Syntypes: ♂ ♂, ♀ ♀, Monterey County, California (AMNH).

**Geographic range.** — British Columbia, California, Oregon, Washington, Baja California.

**California records.** — DEL NORTE Co.: Crescent City, 4 ♂, 6 ♀, VII-10-30 (J. M. Aldrich, USNM). Smith River, 1 ♂, VII-7-8-30, 1 ♀, VII-22-32 (J. M. Aldrich, USNM). HUMBOLDT Co.: Trinidad, 1 ♂, 3 ♀, IX-18-34 (A. L. Melander, USNM). LOS ANGELES Co.: Hermosa Beach, 1 ♂, XII-22-37. Long Beach, 3 ♂, 1 ♀, VIII-4-11 (USNM), 4 ♂, III-28-35, 4 ♂, X-21-35 (A. L. Melander, USNM). Los Angeles, 2 ♂, VI-3-49 (R. Sanders, HCH). Palos Verdes, 4 ♂, 2 ♀, X-15-44, 1 ♂, X-18-44, 1 ♂, XII-24-44 (A. L. Melander, USNM); 1 ♀, VI-3-49 (R. Sanders, HCH). Santa Catalina Id., salt water pool, 3 ♂, 2 ♀, no date (R. Ryckman, R. Lee, C. Christianson, USNM). Santa Monica, 1 ♂, VII-31-11 (USNM). Los Angeles Co., 1 ♂, XII-23-96 (W. M. Wheeler, AMNH); 3 ♂, II-28-15, 1 ♂, III-7-15 (M. C. Van Duzee, CAS). MARIN Co.: Duxberry Point, 1 ♂, XII-17-60 (C. A. Toschi, CIS). Duxberry Reef, 2 ♂, 3 ♀, XII-17-60 (C. N. Slobodchikoff, CAS). MONTEREY Co.: Carmel, 18 ♂, 3 ♀, III-24-25-19 (E. P. Van Duzee, CAS). Lucia, 1 ♀, IV-25-50 (L. W. Quate, CIS). Monterey, 11 ♂, 9 ♀, IX-25-34 (A. L. Melander, USNM). Pacific Grove, 2 ♂, 5 ♀, V-1906 (USNM); 1 ♂, II-1921 (CU); 1 ♀, V-23-63 (R. E. Doty, BVC). Beach near Pfeiffer Big Sur State Park, 1 ♂, 1 ♀, VI-17-49 (P. H. Arnaud, CAS). Point Pines, Pacific Grove, 2 ♂, 2 ♀, V-24-52 (P. H. Arnaud, CAS). Monterey Co., 1 ♂, 5 ♀, VII-5-96, type series (W. M. Wheeler, AMNH). ORANGE Co.: Corona Del Mar, 1 ♂, VII-25-42, 1 ♂, V-22-44 (A. L. Melander, USNM). Cypress, 1 ♀, IV-15-64 (BVC). Doheny Park, 2 ♂, 2 ♀, V-22-44 (A. L. Melander, USNM). Huntington Beach, 1 ♀,

1909 (HCH); 17♂, 22♀, VII-10-29 (L. D. Anderson, UK). Laguna Beach, 1♂, 1♀, VIII-1911 (F. R. Cole, USNM); 4♂, 5♀, VII-8-19 (E. O. Essig, CIS); 1♂, VII-3-21 (C. T. Dodds, CIS); 3♂, 3♀, I-25-35, 4♂, III-28-35, 2♂, 3♀, VIII-18-43, 2♂, 1♀, VIII-27-43, 6♂, 4♀, V-22-44, 1♀, VI-5-45, 2♂, VIII-15-49, 2♂, X-24-51 (A. L. Melander, USNM). Los Cerritos, 1♀, IV-3-15 (M. C. Van Duzee, CAS). San Clemente, 2♂, X-5-50, 2♂, 2♀, X-13-50 (A. L. Melander, USNM). Seal Beach, 1♀, VII-26-42 (A. L. Melander, USNM). Orange Co., 5♂, 4♀, VII-14-29 (R. H. Beamer, UK). SAN BERNARDINO Co.: Goleta, 1♂, VI-22-59 (W. A. Steffan, CIS). Redlands, 1♀, 1913. SAN DIEGO Co.: Carlsbad, 2♂, 3♀, VI-22-50 (A. L. Melander, USNM); 2♀, VI-21-51 (T. R. Haig, UCD). La Jolla, 1♂, XII-29-34 (A. L. Melander, USNM); 2♂, 2♀, VI-16-17-63 (I. H. Pogojeff, UCD); 7♂, 6♀, VI-18-63 (T. Bolton, UCD, R. L. Langston, CIS); 1♂, 1♀, VI-20-63 (J. Powell, CIS); J. D. Birchim, JDB; 2♂, 2♀, VI-24-63, 2♂, VI-29-63 (H. L. Griffin, CIS); 3♂, VII-9-63 (J. Powell, CIS); 1♂, VII-14-63 (D. Wustner, CIS). Laguna, 20♂, 10♀, VIII-17-17 (R. C. Shannon, CU); 4♂, 5♀, VIII-1-32 (J. M. Aldrich, USNM). Lakeside, 2♀, VIII-4-32 (J. M. Aldrich, USNM). San Diego, 6♂, III-31-16, 50♂, 35♀, XII-10-16 (H. G. Dyar, USNM); 2♂, 2♀, VI-28-17 (J. M. Aldrich, USNM, CAS); 1♂, 2♀, V-16-21, 1♀, VI-2-21, 1♂, 1♀, VIII-3-32 (J. M. Aldrich, USNM); 1♀, V-26-50, bait trap (CDA). San Diego Co., 1♀, VI-8-50, bait trap (CDA). SAN FRANCISCO Co.: San Francisco, 1♀, XI-1910 (F. E. Blaisdell, CAS). SAN LUIS OBISPO Co.: Atascadero, 1♂, 2♀, X-23-30 (E. P. Van Duzee, CAS). Muir Beach, 3♂, 2♀, V-30-46 (E. L. Kessel, CAS). Pismo Beach, 8♂, 4♀, XII-24-59 (G. E. Eickwort, MSUM). San Simeon, 1♂, 2♀, VIII-31-45 (A. L. Melander, USNM). Shell Beach, 1♂, 5♀, II-15-54 (P. H. Arnaud, CAS). SAN MATEO Co.: Beach S. of Pescadero, 1♀, XII-15-51 (P. H. Arnaud, CAS). SANTA BARBARA Co.: Carpinteria, 18♂, 15♀, VI-20-49 (L. W. Isaak, CIS); 3♂, VIII-11-50 (A. L. Melander, USNM), 62♂, 29♀, XII-23-52 (P. H. Arnaud, CAS). Christi Ranch, Santa Cruz Id., 12♂, 16♀, IX-14-64 (E. I. Schlinger, UCR). Goleta, 6♂, 15♀, VI-22-59 (R. D. Gehring, C. A. Campbell, CIS; R. W. Spore, J. L. Barth, UCR); 79♂, 36♀, VI-22-59 (A. E. Menke, F. D. Parker, M. Bruck, P. E. Paige, UCD). Santa Barbara, 2♂, 1♀, VII-6-17 (J. M. Aldrich, USNM), CAS), 8♂, 6♀, V-21-19 (E. P. Van Duzee, CAS). SANTA CRUZ Co.: Santa Cruz, 6♂, 9♀, VI-3-8-19 (E. P. Van Duzee, CAS); 2♀, VI-15-17-50 (M. T. James, HCH), 1♂, 1♀, IV-31-53 (A. E. Gray); 62♂, 83♀, IX-3-53 (P. H. Arnaud, CAS). Santa Cruz Co., 1♂, 2♀, IV-26-62, on seaweed (R. Doty, BVC). VENTURA Co.: Hueneme, 1♀, VI-2-50, bait trap (CDA). Pt. Mugu, lagoon, 3♂, 3♀, VII-16-62 (R. R. Sanders, USNM). Rincon Beach, Ventura, 2♂, VIII-28-45 (A. L. Melander, USNM).

*F. rufitibia* is the most abundant species of *Fucellia* on the seashore in California. The female may be distinguished from its congeners by the median cleft on caudal margin of tergum 5.

#### *Fucellia separata* Stein

*Fucellia separata* Stein. 1910, Wien. Ent. Ztg., 29:24.

Syntypes: ♂, Monterey County, California; ♂ ♀, Seattle, Washington.

Geographic range. — British Columbia, California, Oregon, Washington, Baja California.

California records. — DEL NORTE Co.: Crescent City, 1♂, III-8-61 (BVC). Smith River, 1♂, VII-17-30, 4♂, 1♀, VII-25-32, on dry beach sand (J. M. Aldrich, USNM). Smith River Valley, 1♀, VII-17-34 (E. P. Van Duzee, CAS). HUMBOLDT Co.: Samoa Beach and dunes, 1♀, VI-18-07, 1♂, 1♀, VI-28-07 (J. C. Bradley, CU). Trinidad, 5♂, IX-18-34 (A. L. Melander, USNM). LOS ANGELES Co.: Castellammare, 3♂, X-21-34 (A. L. Melander, USNM). Long Beach, 1♂, 1♀, VIII-4-11 (USNM). Palos Verdes, 7♂, 4♀, X-18-44 (A. L. Melander, USNM). San Nicolas Island, 1♂, VII-7-38 (T. D. A. Cockerell, CAS). MARIN Co.: Stinson Beach, 1♂, 2♀, V-6-51 (E. I. Schlinger, UCD, HCH). MONTEREY Co.: Carmel, 1♀, III-24-19 (E. P. Van Duzee, CAS). Castroville, Monterey Bay, 2♀, VI-24-31, near dunes (HCH). Pacific Grove, 1♂, 2♀, V-9-06 (USNM). ORANGE Co.: Corona Del Mar, 1♂, 1♀, V-22-44 (A. L. Melander, USNM). Doheny Park, 3♂, VII-18-43 (A. L. Melander, USNM). Huntington Beach, 16♂, 3♀, VII-10-29 (L. D. Anderson, UK); 2♂, VI-4-45 (A. L. Melander, USNM). Laguna Beach, 1♂, VIII-1911 (Baker); 2♂, 1♀, VIII-1911 (CAS); 1♀, IX-8-17 (CU); 2♂, 3♀, I-25-35, 2♂, VIII-18-43, 1♂, X-24-51 (A. L. Melander, USNM). San Clemente, 3♂, VI-5-45, 1♂, 1♀, VI-21-50, 2♂, 2♀, X-5-50, 4♂, 2♀, X-13-51 (A. L. Melander, USNM). Seal Beach, 13♂, 1♀, VII-26-42 (A. L. Melander, USNM). Orange Co., 8♂, 5♀, VII-14-29 (R. H. Beamer, UK). SAN DIEGO Co.: Balboa, 4♂, 7♀, VII-13-40 (A. L. Melander, USNM). Jacumba Spring, 1♂, VI-28-17 (USNM) [?]. La Jolla, 1♂, VII-9-63 (J. Powell, CIS). Palm City, 1♂, 1♀, VII-19-40 (R. H. Beamer, L. J. Lipovsky, UK). San Diego, 2♂, 7♀, XII-10-16 (H. G. Dyar, USNM); 14♂, VI-28-17 (J. M. Aldrich, USNM); 2♂, VI-28-17 (CAS). San Diego Co., 1♂, VI-25-13 (E. P. Van Duzee, CAS). SAN FRANCISCO Co.: San Francisco, 1♂, 1♀, XI-10 (F. E. Blaisdell, CAS); 4♂, 7♀, VI-18-24 (J. M. Aldrich, CAS). San Francisco Beach, 5♂, 2♂, II-15-51 (E. I. Schlinger, UCD). SAN LUIS OBISPO Co.: Atascadero, 4♂, 4♀, X-23-30 (E. P. Van Duzee, CAS). Morro Bay, 5♂, 3♀, VIII-9-50 (A. L. Melander, USNM). Pismo Beach, 1♂, VIII-9-45 (A. L. Melander, USNM). San Simeon, 1♀, VIII-31-45 (A. L. Melander, USNM). SAN MATEO Co.: Moss Beach, 1♂, 1♀, XII-25-26 (E. C. Van Dyke, CAS). SANTA BARBARA Co.: Carpinteria, 9♂, 5♀, VI-20-49 (L. W. Isaak, UCD); 1♂, 2♀, VIII-11-50 (A. L. Melander, USNM); 3♀, XII-23-52 (P. H. Arnaud, CAS). Christi Ranch, Santa Cruz Id., 4♂, 4♀, IX-14-64 (M. E. Irwin, E. I. Schlinger, UCR). Goleta, 23♂, 11♀, VI-22-59 (A. E. Menke, P. E. Paige, UCD; J. L. Barth, UCR). Santa Barbara, 4♂, VII-6-17 (J. M. Aldrich, USNM), 5♂, 1♀, V-21-19 (E. P. Van Duzee, CAS). SANTA CRUZ Co.: Santa Cruz, 7♂, 2♀, VI-3-19 (E. P. Van Duzee, CAS); 1♂, IV-31-53 (A. E. Gray, CIS). Santa Cruz Co., 1♀, IV-26-62, on seaweed (R. Doty, BVC). SONOMA Co.: Stillwater Cove, 1♀, V-23-54 (E. I. Schlinger, UCD).

*F. separata* may be recognized by the elliptical eyes, which are longer than high. Along with *rufitibia* it is evidently one of the more populous species on the shores of California. Aldrich (1918:164) doubts the validity of the Jacumba Spring record for *separata*, and also that of the Summit, Sierra Nevada, for *thino-bia* (= *evermanni* Aldrich). I have cited both cases tentatively, with a doubt.



*Fucellia thinobia* (Thomson)

*Scatophaga thinobia* Thomson. 1869, In K. Svenska Vetenskaps-Akademien, Kongliga svenska fregatten Eugénies resa omkring jorden. Pt. 2: Zoologie, [Sec.] I: Insekter, p. 563.  
*Fucellia bicrucata* Stein. 1910, Wien. Ent. Ztg., 29:20.  
*Fucellia evermanni* Aldrich. 1918, Calif. Acad. Sci. Proc., ser. 4, 8:173.  
 Type: ♂, California (MNHS).

*Geographic range.* — Alaska, California, Oregon, Baja California, Commander Islands, Kamchatka Peninsula.

*California records.* — DEL NORTE CO.: Prince(s) Island, 1 ♀, V-19-19 (E. P. Van Duzee, CAS). Requa, 1 ♂, 1 ♀, IX-12-20 (C. D. Duncan, CAS). LOS ANGELES CO.: Hermosa Beach, 1 ♀, XII-25-37, 2 ♀, III-18-41. MARIN CO.: Stinson Beach, 1 ♂, VI-2-51 (W. C. Bentinck, CIS). Tomales, 1 ♂, IX-9-12 (E. C. Van Dyke, CAS). PLACER CO.: Summit, Sierra Nevada, 1 ♀, VII-17 (Osten Sacken, USNM) [?]. SAN DIEGO CO.: San Diego, 1 ♀, VIII-16-99, "at sea off S[an] D[iego]" (Snodgrass, USNM); 1 ♂, 1 ♀, VIII-6-32, on boat (J. M. Aldrich, USNM). SAN FRANCISCO CO.: Farallone Islands, 10 ♂, 2 ♀, VII-6-17 (B. W. Evermann, CAS, USNM); 15 ♂, 1 ♀, V-8-49 (G. D. Hanna, A. G. Smith, CAS); 22 ♂, 15 ♀, IX-18-49 (E. S. Ross, CAS); 21 ♂, 3 ♀, X-23-51 (W. C. Bentinck, W. E. Hazeltine, CIS). Farallons, 1 ♂, 1 ♀, X-12-60 (G. Grodhaus, BVC). S.E. Farallon Island, 2 ♀, X-15-26 (H. H. Keifer, CAS). San Francisco, 1 ♀, May (F. E. Blaisdell, CAS); 1 ♀, III-27, 10 ♂, 2 ♀, VII-12-27 (J. M. Aldrich, CAS, USNM); 3 ♂, 6 ♀, VIII-18-51 (A. L. Melander, USNM). VENTURA CO.: Anacapa Island, 1 ♂, V-15-19 (E. P. Van Duzee, CAS).

*F. thinobia* has a polished shiny haustellum and usually more than one pair of cruciate bristles, thereby differing from other species of *Fucellia* occurring in California. It has an extended distribution, from the latitudes of southern Alaska to as far south as the waters off San Diego.

Subfamily ANTHOMYIINAE

KEY TO TRIBES OF ANTHOMYIINAE IN CALIFORNIA

1. Sternopleural bristles arranged to form an equilateral triangle, wings paler and narrowing basad (as in *Coenosia*), usually stained or darkened on apical half in male ..... *Chelisiini*  
 Sternopleural bristles not arranged to form an equilateral triangle ..... 2
2. Scutellum usually without hairs on ventral surface, if haired then frons in male and female similarly broad and similarly bristled, width of frons at vertex exceeding distance between first pair of dorsocentral bristles. . . . . *Myopinini*  
 Scutellum usually with hairs on ventral surface, if hairless, frons in male and female usually dissimilar in breadth and bristling, but if similar, width of frons at vertex usually not more than distance between first pair of dorsocentral bristles ..... *Anthomyiini*

I. TRIBE MYOPININI

KEY TO GENERA OF MYOPININI IN CALIFORNIA

- Hind tibia with robust apical posteroventral bristle.....  
*Chirosia* Rondani  
 Hind tibia without apical posteroventral bristle.....  
*Chiastocheta* Pokorny

Genus *Chiastocheta* Pokorny

*Chiastocheta* Pokorny. 1889, K.-k. Zool.-Bot. Gesell. Wien. Verhandl., 39 (Abhandl.):568.  
*Chiastochaeta* Hennig. 1953, Beitr. z. Ent. (Berlin), 3:655-668.  
 Type-species: *Aricia trollii* Zetterstedt, original designation, = *Anthomyza inermella* Zetterstedt, 1838.

Species belonging to the genus *Chiastocheta* are much alike except for the male genitalia and the copulatory appendages. They may be described as small, stout, drab, gray flies, with squarish heads, short antennae and face, partly bulging occiput. The frons in both sexes is similarly broad and is bristled as in the female, abdomen of the male is considerably swollen caudad and ovipositor of the female is stoutly extended as broad black plates or sclerites, figure 46. The species lack an apical posteroventral bristle on hind tibia, as is present in *Chirosia* and *Chelisia*. The adults are commonly found hidden in the flower heads of *Trollius* (Zetterstedt, 1845:1609; Collin, 1954), in which the larvae are known to breed (Mik, 1895).

KEY TO SPECIES OF CHIASTOCHETA IN CALIFORNIA

- Legs stout, hind tibia with short coarse and depressed anteroventral bristles, except for the strong curved apical.....  
*glauca* (Coquillett)  
 Legs normal and hind tibia with 2 or 3 normal anteroventral bristles ..... *solidiceps* Huckett

*Chiastocheta glauca* (Coquillett)

*Chirosia glauca* Coquillett. 1900, Wash. Acad. Sci. Proc., 2:452.  
 Holotype: ♂, Farragut Bay, Southeastern Alaska (USNM).

*Geographic range.* — Alaska, California, Oregon.

*California records.* — CONTRA COSTA CO.: Antioch, 2 ♂, 1 ♀, III-16-51 (E. I. Schlinger, UCD); 3 ♂, 1 ♀, III-6-53 (J. G. Rozen, CIS); 1 ♀, IV-12-55 (M. Wasbauer, CIS); 2 ♀, III-18-57 (J. Powell, CIS); 1 ♀, IV-9-49. HUMBOLDT CO.: 2 ♂, 1 ♀, "IV or V" 1911, 1 ♀, no date (F. W. Nunnenmacher, HCH). MARIN CO.: Point Reyes, 1 ♂, V-3-36 (CAS); 1 ♂, 1 ♀, V-24-56 (J. Powell, CIS). MONTEREY CO.: Asilomar, 1 ♂, VI-18-47 (A. L. Melander, USNM). SAN FRANCISCO CO.: Twin Peaks, 1 ♀, III-19-55 (J. C. Downey, UCD). SAN LUIS OBISPO CO.: Grover City, 1 ♀, VII-4-56 (E. G. Linsley, CIS). SAN MATEO CO.: Halfmoon Bay, 2 ♀, VII-11-50 (E. C. Carlson, UCD).

*C. glauca* is notable for its short stout legs and coarse appressed bristling on anteroventral surface of hind tibia.

*Chiastocheta solidiceps* Hockett

*Chiastocheta solidiceps* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:254.

Holotype: ♂, Roberts, Marion County, Oregon (CAS).

**Geographic range.** — California, Montana, Oregon, Washington.

**California records.** — ALAMEDA Co.: Berkeley, 1 ♂, IV-8-54, 1 ♀, IV-19-54 (P. D. Hurd, CIS). LOS ANGELES Co.: Mountains near Claremont, 1 ♂, no date (Baker, USNM). MARIN Co.: Point Reyes, 1 ♂, IV-10-60 (R. W. Thorp, CIS). SAN BENITO Co.: 5 mi. S. of Bitterwater, 1 ♂, III-31-59 (C. W. O'Brien, CIS). SOLANO Co.: Jenner, 1 ♀, IV-6-57 (P. A. Opler, CIS).

*C. solidiceps* has the habitus of *glauca* (Coquillett), from which it may be distinguished by the more slender legs and normal bristling on anteroventral surface of hind tibia.

Genus *Chirosia* Rondani

*Chirosia* Rondani. 1856, Dipt. Ital. prod., I:102.

Type-species: *Aricia albitarsis* Zetterstedt, original designation.

The genus *Chirosia* may be separated from other genera belonging to the tribe *Myoptinini* by presence of a robust apical posteroventral bristle on the hind tibia. There are two species recorded from North America that may be distinguished by characters given in the following key. In Europe the larvae have been found to mine the fronds and stems of ferns, and notably the bracken (de Meijere, 1911; Cameron, 1930; Séguy, 1934).

## KEY TO SPECIES OF CHIROSIA IN CALIFORNIA

Preapical posterodorsal bristle on hind tibia long, species 4 to 5 mm in length, male with slender abdomen, mid tibia without longish setulae on ventral surface. . . . *idahensis* Stein  
Preapical posterodorsal bristle on hind tibia weak or setulose, species 3 mm in length, male with abdomen much deepened caudad, mid tibia with several longish setulae on ventral surface. . . . . *hirticeps* Stein

*Chirosia hirticeps* Stein

*Chirosia hirticeps* Stein. 1907, Acad. Imp. des Sci. de St. Pétersbourg, Zool. Mus. Ann., 12:368.

Syntypes: ♂♂, ♀, northeastern Tibet.

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Labrador, Manitoba, Northwest Territories, Oregon, Utah, Washington, Wyoming, Yukon Territory.

**California records.** — FRESNO Co.: Marie Lake, 10,500 ft., 2 ♂, 2 ♀, VIII-30-52 (E. I. Schlinger, UCD). INYO Co.: Mono Pass, 3 ♂, VIII-13-57 (D. D. Linsdale, J. Powell, CIS). Ruby Lake, 2 ♂, 4 ♀, VIII-13-57 (D. D. Linsdale, J. Powell, CIS). MONO Co.: Mammoth Lakes, 1 ♀, VII-29-40 (R. H. Beamer, UK). SHASTA Co.: 3 mi. SE. of Mt. Lassen, 1 ♀, VII-8-55 (D. L. Dahlsten, UCD). TULARE Co.: Crabtree Meadow, 10,550 ft., 1 ♀, VII-29-15. TUOLUMNE Co.: Tioga Pass, 1 ♂, 1 ♀, VII-31-40

(R. H. Beamer, UK). Tuolumne Meadows, Soda Springs 8,600 ft., 3 ♂, VIII-8-16 (G. R. Pilate, USNM). Tuolumne Meadows, 2 ♂, VIII-1-40 (R. H. Beamer, UK).

*Chirosia idahensis* Stein

*Chirosia idahensis* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42: 251.

Syntypes: ♂♂, Juliaetta, Idaho (FMNH, USNM).

**Geographic range.** — British Columbia, California, Idaho, Oregon, Washington.

**California records.** — EL DORADO Co.: Fallen Leaf Lake, Tahoe, 2 ♂, VI-12-16 (H. G. Dyar, USNM). HUMBOLDT Co.: Eureka, 3 ♂, 2 ♀, V-22, 1 ♂, VI-5 (H. S. Barber, USNM); 1 ♀, IV-28-52 (L. A. Ruud, CAS). Fairfax, 1 ♀, V-9-20 (E. P. Van Duzee, CAS). Humboldt Co., 1 ♀, V-1911 (HCH). MARIN Co.: Mill Valley, 1 ♀, IV-16-50 (H. B. Leech, CAS). PLACER Co.: Baxters, 1 ♂, V-20-52 (A. T. McClay, UCD). Lake Tahoe, 1 ♀, VI-20-15 (A. K. Fisher, USNM). SANTA CRUZ Co.: Felton, Santa Cruz Mts., 1 ♀, V-15-19-07 (J. C. Bradley, CAS). SONOMA Co.: Cazadero, 1 ♂, 1 ♀, IV-12-14-18 (J. C. Bradley, CAS).

## 2. TRIBE CHELISIINI

Genus *Chelisia* Rondani

*Chelisia* Rondani. 1856, Dipterologiae Italicae prodromus, I:101.

Type-species: *Coenosia monilis* Meigen, original designation.

The genus *Chelisia*, as represented by the slender gray species *elegans* Stein, has frons broad in both sexes and bristled as in the female, with cruciate bristles present and mid pair of parafrontals proclinate, thorax vittate, scutellum with few fine hairs on ventral surface, sternopleural bristles arranged in an equilateral triangle, wings narrowing basad and vein  $Cu_2 + 1st A$  (sixth long vein) evanescent near or traceable to wing margin, under calyptal scale striplike, hind tibia with a robust apical posteroventral bristle.

*Chelisia elegans* Stein

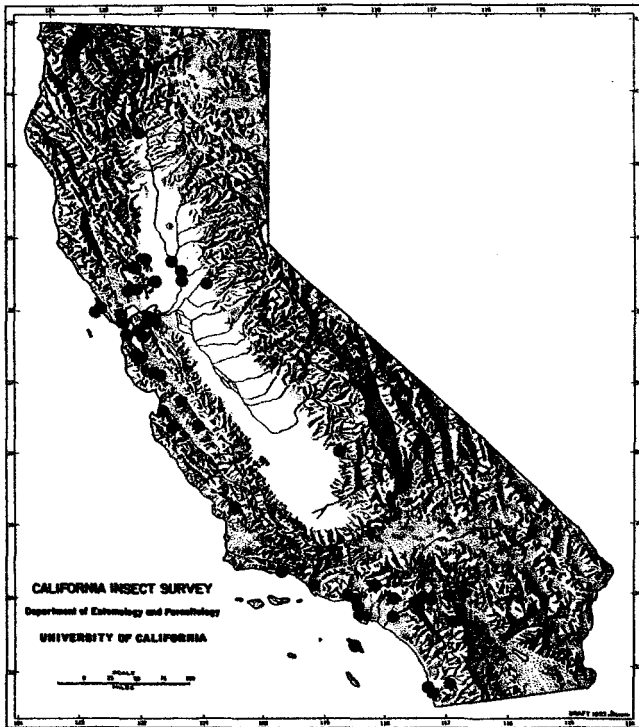
(Map 2)

*Chelisia elegans* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):62.

Syntypes: ♂♂, ♀♀, Monterey County, San Diego County, Santa Clara County, Stanford University, Palo Alto, and Claremont, California (USNM).

**Geographic range.** — California, Baja California.

**California records.** — ALAMEDA Co.: Berkeley, 1 ♂, VII-1-33 (CAS); 1 ♀, III-21-37 (N. W. Frazier, CIS); 1 ♂, IV-30-37 (G. E. and R. M. Bohart, CAS); 1 ♂, III-7-54 (J. W. MacSwain, CIS); 7 ♀, V-4-62 (T. M. Street, BVC). Berkeley Hills, 1 ♂, II-23-08 (HCH); 1 ♀, IX-6-58 (J. R. Powers, CIS). East Oakland, 1 ♂, II-22-36 (P. W. McKinstry, CAS). CONTRA COSTA Co.: Concord, 1 ♂, I-28-61 (R. Brown, CAS). El Cerrito, 1 ♂, V-27-60, 1 ♂, VI-2-60 (C. D. MacNeill, CAS). Lafayette, 1 ♂, VII-14-33 (R. H. Beamer, UK). Russelmann Park, east slope of Mt. Diablo, 1 ♂, IV-19-31 (E. C. Van Dyke, CAS). Walnut



Map 2. Locality records in California for *Chelisia elegans* Stein.

Creek, foot of Shell Ridge, 1♂, XI-10-63 (J. Powell, CIS). KERN Co.: Indian Wells, 1♀, IV-18-62 (C. A. Toschi, CIS). LOS ANGELES Co.: Beverly Glen, 1♂, no date (UCLA). Claremont, 9♂, 6♀, no date, type series (Baker, USNM). Glendale, 1♂, IV-11-51, 1♂, 5♀, VIII-25-54 (E. I. Schlinger, UCD). Los Angeles, 1♀, II-16 (Osten Sacken, USNM); 1♂, XII-22-50, bait trap (USNM). Mountains near Claremont, 2♀, no date (Baker, USNM). Pacific Palisades, 1♀, X-6-51, 1♀, IX-18-51, 1♀, XI-19-51 (UCLA). Pasadena, 1♀, no date (USNM); 1♂, IV-2-09 (F. Grinnell, HCH). Redondo Beach, 1♀, II-13-38. Santa Catalina Id., Middle Ranch, 1♂, III-26-38 (T. D. A. Cockerell, CAS). Tanbark Flat, 3♂, VII-15-56 (E. I. Schlinger, UCD); 1♀, III-29-57 (D. D. Linsdale, CIS). MARIN Co.: Inverness, 1♀, II-10-62 (J. S. Buckett, CIS). Mill Valley, 1♂, III-14-25 (H. H. Keifer, CAS). Novato, 1♂, XI-7-62 (D. C. Rentz, CAS). Point Reyes, 1♀, IX-10-06 (J. C. Bradley, CAS). MONTEREY Co.: Hastings Reservation near Jamesburg, 1♂, XI-22-56 (D. D. Linsdale, CIS). Salinas, 1♀, XI-22-62 (D. D. Linsdale, BVC). Monterey Co., 1♂, VII-1-96, type series (USNM). NAPA Co.: 6 mi. W. of Oakville, 1♂, II-13-61 (M. E. Irwin, UCD). Walter Spring, 1♀, V-26-51 (E. I. Schlinger, UCD). ORANGE Co.: Green River Camp, Lower Santa Ana Canyon, 1♂, V-11-33 (E. P. Van Duzee, CAS). RIVERSIDE Co.: Box Springs Mts., 1♂, III-7-64 (P. Rauch, UCR); 1♀, VII-25-64 (G. E. Wallace, UCR). Deep Canyon, 2♀, IX-24-63, 2♀, XI-11-63, 1♀, XII-17-63, at light (M. E. Irwin, E. I. Schlinger, UCR). Idyllwild, San Jacinto Mts., 1♀, V-22-40 (C. D. Michener, CIS). Riverside, 2♀, II-23-35 (A. L. Melander, USNM). Tahquitz Valley, San Jacinto Mts., 1♀, VII-6-50 (W. A. MacDonald, UCLA). Whitewater Canyon, 1♀, IV-8-49 (W. W. Wirth, USNM). Snow Creek at Whitewater, 1,500 ft., 1♀, III-

7-55 (W. R. Richards, CNC); 1♂, III-8-55, 1♀, III-29-55 (W. R. M. Mason, CNC). SACRAMENTO Co.: Michigan Bar, 1♂, IV-19-61 (D. Q. Cavagnaro, UCD). Rio Linda, 1♂, V-15-30 (A. C. Browne, CDA). Sacramento, 1♀, III-15-31 (H. H. Keifer, CDA). SAN BENITO Co.: Pinnacles National Monument, 1♀, IV-24-48 (J. W. MacSwain, CIS). 5 mi. w. of San Juan Bautista, 1♀, IV-6-60 (T. R. Haig, UCD). SAN BERNARDINO Co.: Loma Linda, 1♀, III-20-33 (A. J. Basinger, HCH). Mountain Home, 1♀, IX-12-53 (E. I. Schlinger, UCD). Redlands, 1♂, 1913 (USNM); 1♀, III (F. R. Cole, CIS); 1♀, II-17-28 (Ingles, CIS); 1♂, III-20-36 (L. Miller, HCH). Upper Santa Ana River, 1♂, IX-5-46 (J. L. Sperry, USNM). SAN DIEGO Co.: La Jolla, 1♂, I-7-14 (E. P. Van Duzee, CAS). 2 mi. NE. of Lakeside, 1♀, III-29-61 (W. A. Steffan, CIS). San Diego, 2♀, I-18-13 (E. P. Van Duzee, CAS). San Diego Co., 1♂, III-5-97, 1♀, III-12-97, type series (USNM); 10♂, 2♀, II-22 to III-26-97, type series (W. M. Wheeler, AMNH). SAN FRANCISCO Co.: San Francisco, 1♂, X-6-30 (H. H. Keifer, CDA). San Miguel Hills, San Francisco, 2♂, III-13-60 (D. C. Rentz, CAS). SAN LUIS OBISPO Co.: Pozo, 1♂, V-1-62 (C. A. Toschi, CIS). SAN MATEO Co.: Woodside, 1♂, XI-11-57 (P. H. Arnaud, CAS). San Mateo Co., 2♂, 2♀, no date (Baker, USNM). SANTA BARBARA Co.: Santa Barbara, 1♀, no date (Osten Sacken, USNM). SANTA CLARA Co.: Almaden, 1♂, IV-25-55 (B. Keh, BVC). Los Gatos, 1♂, I-4-55, ex dog manure (B. Keh, BVC). Palo Alto, 1♀, I-7-95, 1♀, II-9-95 (R. W. Doane, CU). Stanford University, 1♂, II-22-06 (USNM). Santa Clara Co., 1♀, March 1902, type series (Coleman, USNM). SHASTA Co.: 6 mi. NW. of Whiskeytown, 1♀, V-9-61 (R. L. Langston, CIS). SONOMA Co.: Trinita, 1♀, III-26-37 (N. W. Frazier, CIS). TULARE Co.: 5 mi. NE. of Springville, 1♂, V-14-63 (C. A. Toschi, CIS). VENTURA Co.: Oxnard, 1♂, V-20-63 (J. Hall, UCR). YOLO Co.: 5 mi. E. of Guinda, 1♂, VI-3-60 (R. O. Schuster, UCD). Knights Landing, 1♂, V-25-53, light trap (J. Fowler, UCD). YOLO-SOLANO Co.: Putah Canyon, 1♂, IV-25-48 (E. I. Schlinger, UCD).

3. TRIBE ANTHOMYIINI

KEY TO GENERA AND SUBGENERA OF ANTHOMYIINI IN CALIFORNIA

1. Propleura with hairs ..... 2  
    Propleura without hairs ..... 3
2. Pteropleura, hypopleura and prosternum with hairs....  
    *Eremomyioides* Malloch  
    Pteropleura, hypopleura and prosternum hairless.....  
    *Anthomyia* Meigen
3. Hypopleura with hairs on upper border of hypopleura... 4  
    Hypopleura without hairs on upper border of hypopleura ..... 5
4. Prosternum bare..... *Hydrophoria* Robineau-Desvoidy p.  
    Prosternum haired ..... *Calythea* Schnabl and Dzeidzicki
5. Mesonotum with 4 pairs of postsutural dorsocentral bristles ..... *Egle* Robineau-Desvoidy p.  
    Mesonotum with 3 pairs of postsutural dorsocentral bristles ..... 6
6. Lower calyptal scale distinctly protruded beyond margin of upper ..... 7  
    Lower calyptal scale not distinctly protruded beyond

- margin of upper ..... 10
7. Diminutive pale gray species with dark central blotch on male mesonotum, abdominal terga trimaculate, fore tibia with long strong dorsal bristle, hind tibia with mid dorsal bristle and without posterodorsals.....  
*Anthomyiella* Malloch  
Larger species and without foregoing characters..... 8
8. Hind tibia with 2 posterodorsal bristles, mid tibia without anteroventral.....*Pegomya* Robineau-Desvoidy *p.*  
Hind tibia with 3 or more posterodorsal bristles, if 2 then mid tibia with anteroventral bristle or arista plumose ..... 9
9. Oral margin distinctly protruded cephalad, to level beyond tip of profrons.....*Paregle* Schnabl *p.*  
Oral margin not protruded distinctly cephalad to level beyond tip of profrons.....  
*Hydrophoria* Robineau-Desvoidy *p.*
10. Head, thorax and abdomen whitish gray, with 3 contrasting black vittae on mesonotum and black incisures and vitta on abdomen, cruciate setae lacking in both sexes .....*Eustalomyia* Kowarz  
Head, thorax and abdomen not so distinctly marked, or if apparently similar then cruciate setae present.... 11
11. Eyes haired.....*Alliopsis* Schnabl and Dzierdzicki  
Eyes bare, or nearly so..... 12
12. Longer arisal hairs in both sexes longer than width of third antennal segment, pectinate..... 13  
Longer arisal hairs in both sexes not longer than width of third antennal segment ..... 15
13. Hind tibia with apical posteroventral bristle short and distinctive.....*Hylemyza* Schnabl and Dzierdzicki  
Hind tibia without short distinctive apical posteroventral bristle ..... 14
14. Sternopleural bristles arranged 1:1 or 2, male head dichoptic .....*Ganperdea* Aldrich  
Sternopleural bristles arranged 2:2, male head holoptic .....*Hylemya* Robineau-Desvoidy
15. Hind tibia with 2 posterodorsal bristles and males without posteroventral setulae on hind tibia..... 16  
Hind tibia with 3 or more posterodorsal bristles..... 20
16. Mid tibia with mid anteroventral bristle..... 17  
Mid tibia without mid anteroventral bristle..... 18
17. Oral margin protruded cephalad to level beyond tip of profrons, legs blackish.....*Paregle cinerella* (Fallén)  
Oral margin not protruded cephalad to level beyond tip of profrons, tibiae usually not blackish.....  
*Pegomya* Robineau-Desvoidy *p.*
18. Costa setulose on under surface.....  
*Pegomya* Robineau-Desvoidy *p.*  
Costa bare on under surface, or nearly so..... 19
19. Haustellum polished, apical setulae on scutellum as coarse as those on declivities, not hairlike, male with processes of sternum 5 weak, horny and bare.....  
*Pseudonupedia* Ringdahl  
Haustellum dulled, apical setulae of scutellum pilose, as ventral hairs, fig. 19, male with several bristles and setulae on processes of sternum 5....*Nupedia* Karl
20. Males ..... 21  
Females ..... 37
21. Hind tibia without posteroventral setulae..... 22  
Hind tibia with 1 or more posteroventral setulae.... 26
22. Cruciate setulae absent ..... 23
- Cruciate setulae present ..... 24
23. Notopleural depression with setulae, legs black.....  
*Eremomyia* Stein *p.*  
Notopleural depression without setulae, legs partly yellow .....*Pegomya* Robineau-Desvoidy *p.*
24. Processes of sternum 5 as large, mostly bare bladelike plates, shiny and lying lengthwise and in a vertical plane to abdomen, haustellum polished, firmly chitinised, narrow.....*Paraprosalpia* Villeneuve  
Males not having above combination of characters.... 25
25. Dorsal bristle of mesopleural series long and strong, fig. 15.....*Hydrophoria* Robineau-Desvoidy *p.*  
Dorsal bristle(s) of mesopleural series fine, slender or weak ..... 36
26. Processes of sternum 5 with submarginal series of spinules or spines, prebasal sclerite of hypopygium (tergum 6) conspicuous and with numerous bristles, fig. 22.....*Botanophila* Lioy  
Processes without submarginal series of spinules, prebasal sclerite bare, fig. 21, and largely occluded, exception *Pegohylemyia discreta* (Meigen)..... 27
27. Hind tibia with apical posteroventral bristle present... 28  
Hind tibia with apical posteroventral bristle absent... 30
28. Processes of sternum 5 as thin horny plates and nearly devoid of bristles on outer border.....  
*Craspedochoeta* Macquart  
Processes with several bristles on outer border..... 29
29. Abdomen conical, haustellum slender.....  
*Acrostilpna* Ringdahl\*  
Abdomen depressed, haustellum nonslender.....  
*Lasiomma* Stein
30. Processes lengthy, notched or indented distad on inner margin, and with marginal fringe or mat of minute setulae, fig. 28 (abdomen stout, hypopygium enlarged and well bristled dorsad, prealar bristle long, proboscis subnormal in size).....  
*Phorbia* Robineau-Desvoidy  
Males without above combination of characters..... 31
31. Basal sclerite of hypopygium polished and jet black... 29  
Basal sclerite of hypopygium dullish and unpolished... 32
32. Small diminutive species, 3 to 4 mm in length, with fine slender bristles, third antennal segment subquadrate, processes short, shiny and attenuated, widely set apart at base, cerci extended at apex as a pronglike process, figs. 69, 70.....*Egle* Robineau-Desvoidy *p.*  
Males not having above combination of characters.... 33
33. Cheeks and parafacials broad or buccate, occipital region swollen, abdomen conical, scarcely longer than robust thorax, legs stout, postocular series of setulae discontinued along ventral half of eye, fig. 14..... 33a  
Cheeks and/or parafacials less prominent, or if both parts are broad then postocular series of setulae continued or traceable along ventral half of eye..... 34
- 33a. Proboscis (haustellum + labellum) slim, tubular, greatly lengthened .....*Proboscimyia* Bigot  
Proboscis proportionately normal in length.....  
*Leucophora* Robineau-Desvoidy
34. Sternum 4 of abdomen with pronounced sunken membranous emargination across caudal margin and as strongly bristled lobes is extended laterad, fig. 34....  
*Delta setiventris* complex  
Sternum 4 not thus strikingly sculptured or bristled... 35

35. Maximum diameter of head from oral margin to occipital foramen fully as long or longer than its height, hind tibia usually with short spurlike apical anteroventral bristle(s), not longer than apical diameter of tibia, proboscis slim, hypopygium patterned after *Pegohylemyia* Schnabl, fig. 21. . . . . *Macateeia* Malloch  
Species without foregoing combination of characters in male . . . . . 36
36. Basal sclerite of hypopygium clothed evenly with slender bristles from margin to margin; anal sclerite largely eclipsed in prominence by basal sclerite, the anal sclerite being bluntly ovoid or roundish in outline when viewed from above (from below when in repose), viewed in profile the anal sclerite recedes in prominence dorsad, conforming to adjacent sclerites and is weakly bristled, fig. 21; mid tibia usually with 2 posterodorsal bristles, dorsal region of occiput usually setulose below postocular series of setulae. . . . .  
*Pegohylemyia* Schnabl  
Basal sclerite of hypopygium with bristles diverse and in irregular transverse series across posterior half, becoming devoid of bristles anteriorly; anal sclerite conical in outline and not gradually appressed dorsad, with stronger bristles dorsad (cephalad), fig. 20; mid tibia usually with 1 posterodorsal bristle, if 2 present then dorsal area of occiput below postocular series of setulae usually bare, or nearly so. . . . .  
*Delia* Robineau-Desvoidy *p.*
37. Hind tibia with apical posteroventral bristle. . . . . 38  
Hind tibia without apical posteroventral bristle. . . . . 40
38. Acrosticals fine and setulose, prealar bristle as long as anterior notopleural bristle. . . . . *Botanophila* Lioy *p.*  
Acrosticals slender and bristlelike, prealar bristle usually shorter than anterior notopleural. . . . . 39
39. Cross-veins usually clouded, profrons with a clearly etched fascial marking. . . . . *Craspedochoeta* Macquart  
Cross-veins unclouded, profrons with or without a weak fascia . . . . . *Lasiomma* Stein *p.*
40. Caudal segments of ovipositor sharply flattened vertically, sheathlike, and mainly bare. . . . . 41  
Caudal segments of ovipositor not extensively compressed vertically . . . . . 42
41. Maximum diameter of head from oral margin to occipital foramen fully as long or longer than its height, haustellum long and slender, ovipositor becoming pointed toward apex, fig. 43 . . . . . *Macateeia* Malloch *p.*  
Head in profile not as long as high thus measured, haustellum nonslender, ovipositor blunt at apex when view in profile, fig. 44. . . . . *Phorbia* Robineau-Desvoidy
42. Terminal sclerites of ovipositor usually with recurrent spinules, figs. 54-55 . . . . . 43  
Terminal sclerites of ovipositor without recurrent spinules, setulae if stiffish or spinular are erect or straightened, figs. 48-53. . . . . 45
43. Dorsal bristle of mesopleural series strong and bristlelike, fig. 15, haustellum robust and polished. . . . .  
*Hydrophoria* Robineau-Desvoidy *p.*  
Dorsal bristle(s) of mesopleural series fine and slender, weak . . . . . 44
44. Cheeks and parafacials broad and buccate, postocular series of setulae discontinued along ventral half of eye, fig. 14 . . . . . 44a  
Cheeks and/or parafacials less prominent, or if both parts are broad then postocular series of setulae continued or traceable along ventral half of eye. . . . .  
*Delia* Robineau-Desvoidy *p.*
- 44a. Proboscis (haustellum + labellum) slim, tubular, abnormally long . . . . . *Proboscimyia* Bigot  
Proboscis proportionately normal . . . . .  
*Leucophora* Robineau-Desvoidy
45. Diminutive species, 2 to 3 mm, third antennal segment quadrate, arista nude, haustellum lengthy and fleshy, palpi extra slender, flattish at apex, legs weakly bristled. . . . . *Egle* Robineau-Desvoidy *p.*  
Females not having all the above characteristics. . . . . 46
46. Apical setulae of scutellum fine and pilose, haustellum polished, firmly chitinised and slightly narrow, segment 5 of abdomen relatively short. . . . .  
*Paraprosalpia* Villeneuve  
Apical setulae of scutellum as coarse as those on declivities, or otherwise not as above characters. . . . . 47
47. Cruciate bristles absent . . . . . 48  
Cruciate bristles present . . . . . 50
48. Mid tibia with mid anteroventral bristle, segments 3 and 4 of fore tarsus wider than segment 5. . . . .  
*Eremomyia* Stein *p.*  
Mid tibia without mid anteroventral bristle, and/or segments 3 and 4 of fore tarsus not wider than segment 5 . . . . . 49
49. Femora and tibiae mainly fulvous. . . . .  
*Pegomya* Robineau-Desvoidy *p.*  
Femora and tibiae blackish. . . . . *Eremomyia* Stein *p.*
50. Tergum 5 with upright discal bristles, mesopleura with short bristle on upper border below anterior notopleural bristle, sternopleurals usually arranged 2:2, mid tibia with 2 posterodorsal bristles. . . . . 51  
Females without above combination of characters. . . . . 52
51. Maximum diameter of head from oral margin to occipital foramen fully as long or longer than its height, haustellum slender, ovipositor when extended pointed at apex, fig. 43. . . . . *Macateeia* Malloch *p.*  
Head in profile not as long as high thus measured, haustellum nonslender, ovipositor with slender tactile anal palpi at apex, fig. 49, e.g., *fugax*-group. . . . .  
*Pegohylemyia* Schnabl *p.*
52. Mid tibia with 2 or 3 posterodorsal bristles, dorsal region of occiput below postocular series of setulae with numerous setulae, fig. 11 ♀ . . . . . 53  
Mid tibia with 1 posterodorsal bristle, if 2 present dorsal region of occiput below postocular series of setulae sparsely setulose or mainly bare, fig. 10 ♀, exception *Delia vesicata* . . . . . 54
53. Costa with numerous fine setulae on under surface. . . . .  
*Botanophila* Lioy *p.*  
Costa with few setulae on under surface. . . . .  
*Pegohylemyia* Schnabl *p.*
54. Mesopleura usually without short bristle on upper border below anterior notopleural bristle. . . . .  
*Delia* Robineau-Desvoidy *p.*  
Mesopleura usually with short bristle on upper border below anterior notopleural bristle, fig. 18. . . . . 55
55. Tibiae mainly yellowish. . . . . *Pegomya* Robineau-Desvoidy *p.*  
Tibiae blackish. . . . . *Lasiomma* Stein *p.*

Genus *Hylemya* Robineau-Desvoidy

*Hylemya* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:550.

Type-species: *Hylemya strenua* Robineau-Desvoidy; designation Rondani 1866, = *Musca strigosa* Fabricus, 1794.

Subgenus *Hylemya* Robineau-Desvoidy

*Hylemya* (*Hylemya*) Schnabl and Dziedzicki, 1911, K. Leopold.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:94.

## KEY TO SPECIES OF HYLEMYA

Palpi yellow ..... *alcathoe* (Walker)  
Palpi fuscous ..... *latifrons* Schnabl

*Hylemya* (*Hylemya*) *alcathoe* (Walker)

(Map 3)

*Anthomyia alcathoe* Walker. 1849, List Dipt. Brit. Mus., 4:937.

*Hylemya flavicaudata* Bigot. 1885, Soc. Ent. de France Ann., (1884) sér. 6, 4:299.

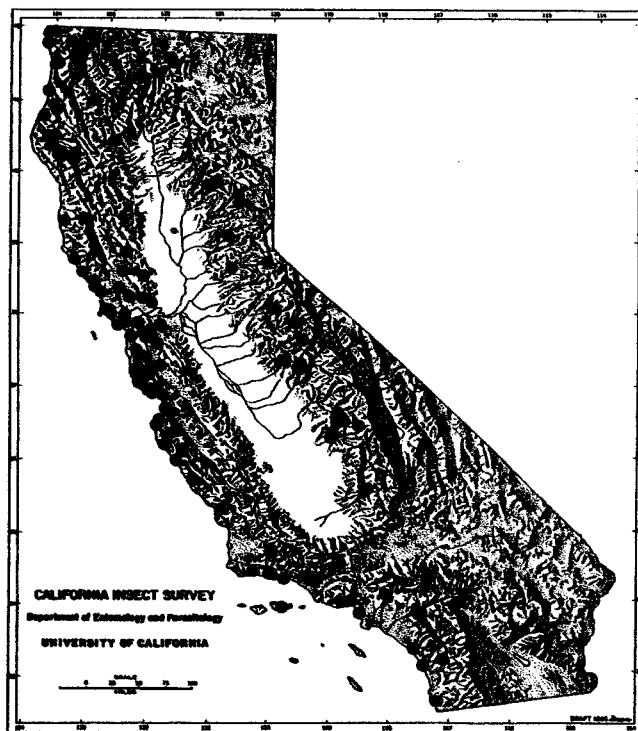
*Hylemya strigata* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42: 211.

*Hylemya tenax* Johannsen. 1916, Amer. Ent. Soc. Trans., 42: 388.

Type: ♂, Nova Scotia (BMNH).

**Geographic range.** — Widely distributed in continental North America where woodlands abound. Known from southeastern Alaska eastward to Nova Scotia and southward to Georgia, Colorado, and southern California.

**California records.** — ALAMEDA CO.: Berkeley, Dublin, Oakland, Oakland Hills, Strawberry Canyons at Berkeley and Oakland, Sunol, Tilden Park. CONTRA COSTA CO.: El Cerrito, El Sobrante, Moraga Valley, Mt. Diablo, Orinda, Tilden Park. DEL NORTE CO.: Crescent City, Klamath River, Patrick Creek, Rowdy Creek, Smith River. EL DORADO CO.: Camino, Wright's Lake. FRESNO CO.: Eckerts Resort. FRESNO-TULARE CO.: General Grant National Park. HUMBOLDT CO.: Blair's Ranch at Redwood Creek, Blocksburg, Blue Lake, Dyerville, Eureka, Fieldbrook, Fort Seward, Grizzly Creek, Myers Flat, Pepperwood, Scotia, Trinidad, Van Duzen Forest Service Campground. KERN CO.: Onyx. LOS ANGELES CO.: Arcadia, Los Angeles, Malibu, Pacific Palisades, Santa Monica Mts., Topanga Canyon. MADERA CO.: Bass Lake, Chilkoot Lake, Miami. MARIN CO.: Alpine Dam, Alto, Black Point, Bolinas, Cypress Ridge, Inverness, Lagunitas, Lake Lagunitas, Mill Valley, Mt. Tamalpais, Muir Woods, Novato, Paradise Cove, Phoenix Lake, San Anselmo, San Rafael, Stinson Beach, Taylor State Park, Tocaloma. MARIPOSA CO.: Miami Ranger Station, Yosemite, Yosemite Valley. MARIPOSA-TUOLUMNE CO.: Yosemite National Park. MENDOCINO CO.: Gualala (reared from sheep feces, CDA), Hopland, 9 mi. E. of Mendocino, Ryan Creek, Willits. MONTE-REY CO.: Arroyo Seco, Arroyo Seco Camp, Big Sur, Bixby Creek, Carmel, Carmel to Paraiso Springs, Corralitos, Hastings Reservation near Jamesburg, Jamesburg, near Lucia, Monterey, Pacific Grove, Paradise Canyon, Pfeiffer Big Sur State Park, Redwood Gulch near Salmon Creek, Salinas. NAPA CO.: Mt. St. Helena, 8 mi. NW. of Napa, Samuel Spring. ORANGE CO.: San Clemente. PLACER CO.: Dutch Flat. PLUMAS CO.: Buck's Lake,



Map 3. Locality records in California for *Hylemya* (*H.*) *alcathoe* (Walker). This distribution pattern is representative for many of the widespread but less well recorded species of *Hylemya* in California.

Meadow Valley, Johnsville, Quincy, Silver Lake. RIVERSIDE CO.: Riverside. SAN BERNARDINO CO.: Mill Creek Canyon, Oak Glen. SAN DIEGO CO.: Balboa Park, Rincon, San Diego, San Luis Rey Camp. SAN FRANCISCO CO.: Lake Merced, San Francisco. SAN LUIS OBISPO CO.: 5 mi. W. of Cayucos Creek. SAN MATEO CO.: Corte de Madera Creek, headwaters of Pescadero Creek at State Park, La Honda, Memorial Park, Pescadero, Portola State Park, Redwood City, San Bruno, Skyline Boulevard, Twin Valley Lakes. SANTA BARBARA CO.: Canon del Refugio, Cascada Dam on Stanton Ranch Santa Cruz Id., Figueroa Mt., Gaviota Pass, Santa Barbara. SANTA CLARA CO.: Alum Rock State Park, Palo Alto, Richmond, San Jose, University College Ranch at San Jose, Stanford University, Stevens Creek. SANTA CRUZ CO.: Big Basin, Big Basin Park, Bonny Doon, Brookdale, Capitola, Felton, Greyhound Rock, Santa Cruz, Santa Cruz beach, Santa Cruz Mts., Soquel. SIERRA CO.: Gold Lake. SISKIYOU CO.: Bray. SOLANO CO.: Green Valley. SONOMA CO.: Cazadero, Jenner, Lower Lake, Monte Rio, Occidental, 4 mi. W. of Plantation, Santa Rosa, Stillwater Cove, Trinita. TRINITY CO.: Eagle Creek. TULARE CO.: Alta, Ash Mountain, Giant Forest, Sequoia National Park, Three Rivers. TUOLUMNE CO.: Pinecrest, Strawberry, Yosemite at 3,880–4,000 ft. VENTURA CO.: Foster Park, 2 mi. SW. of Ojai.

Flight records range from January to December in the San Francisco-Monterey Bay areas and from February to December in coastal southern California. Northward, available data suggest that the species becomes active later in the spring, March in interior

Mendocino County, and May in Humboldt and Trinity counties. Inland, *H. alcaethoe* has been taken as early as April and May in the foothills of the Sierra Nevada and from June to August at montane localities of moderate elevations.

*H. alcaethoe* is notable in the genus due to its long pectinate arista hairs, yellow palpi, normally yellow legs and partly reddish abdomen. The female abdomen may occasionally be wholly gray. The records are taken from 34 counties and approximately 166 localities, and based on 852 specimens, 531 males and 321 females.

#### *Hylemya latifrons* Schnabl

*Hylemya (Hylemyza) latifrons* Schnabl. 1911, K. Leopold.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:242, fig. 111, 112, 705.

*Hylemya variabilis* Stein. 1916, Arch. f. Naturgesch. (1915) Abt. A, 81(10):155.

*Hylemya variata* Huckett not Fallén. 1924, N.Y. (Cornell) Agr. Expt. Sta. Mem. 77, p. 36, figs. 17, 68, 114.

*Hylemya variabilis* Ackland. 1967, Brit. Mus. (Nat. Hist.) Bull., Ent., 20:120; Huckett. 1968, Ent. Soc. Wash. Proc., 70:346-347.

*Hylemya latifrons* Hennig. 1969, In Lindner, Die Fliegen der Palaearktischen Region, Band VII-1, 63a Anthomyiidae (Lief. 278), pp. 243-244.

Type: ♂, near Cracow, Poland.

**Geographic range.**—Widely distributed throughout Canada and the United States, extending as far north as subarctic Alaska, Aleutians, Pribilof Islands, Yukon Territory, eastward through the Canadian provinces to Quebec, to as far south as Illinois and Louisiana, Arizona and California in the west, West Virginia and Virginia in the east.

**California records.** — ALAMEDA Co.: Berkeley, Berkeley Hills 1,400 ft., Berkeley Hills NE. of Oakland, Strawberry Canyon at Berkeley, Oakland, East Oakland, Redwood Regional Park. ALPINE Co.: Markleville. BUTTE Co.: Oroville. CONTRA COSTA Co.: El Sobrante, Moraga, Mt. Diablo, Orinda Crossroad, 1 mi. E. of Pinole, Tilden Park. DEL NORTE Co.: Smith River. EL DORADO Co.: 3 mi. S. of Camino, Cool, 5 mi. S. of Placerville. FRESNO Co.: Boon Lake. GLENN Co.: Plaskett Meadows 6,200 ft. LAKE Co.: Borax Lake, Lower Lake near Clear Lake. LOS ANGELES Co.: Beverly Glen. MADERA Co.: Bass Lake. MARIN Co.: Bolinas, Fairfax, Lake Lagunitas, Mill Valley, Stinson Beach, Woodacre. MARIPOSA Co.: Yosemite. MENDOCINO Co.: Hopland, Ukiah, Willits. MERCED Co.: G. J. Hatfield State Park. MODOC Co.: Cedar Pass. MONO Co.: Sardine Creek 8,500 ft. MONTEREY Co.: ¾ mi. S. of Asilomar, Monterey. NAPA Co.: Calistoga, 8 mi. NW. of Napa. NEVADA Co.: Prosser Creek 6,300 ft. near Hobart Mills, Sagehen Creek 6,500 ft., Sagehen Creek near Hobart Mills. ORANGE Co.: Irvine Lake at Limestone Canyon. PLACER Co.: Auburn. PLUMAS Co.: 4 mi. W. of Quincy. RIVERSIDE Co.: Deep Canyon, Herkey Creek in San Jacinto Mts., Lake Mathews, Temecula River. SACRAMENTO Co.: Elk Grove, Fair Oaks, Sacramento. SAN BERNARDINO Co.: Lake Gregory. SAN DIEGO Co.: Laguna Mts., San Diego. SAN FRANCISCO Co.: San Francisco. SAN LUIS OBISPO Co.: Har-

mony, San Luis Obispo. SAN MATEO Co.: Crystal Lake, Half-moon Bay, Junipero Serra Park, Memorial Park, Redwood City, San Andreas Lake. SANTA CLARA Co.: Mountain View, Palo Alto, Stanford University. SANTA CRUZ Co.: Felton 300-500 ft., Santa Cruz, 15 mi. N. of Santa Cruz. SIERRA Co.: 1 mi. W. of Sierraville, Webber Lake, Yuba Pass. SOLANO Co.: Summit Mix, Vallejo. SONOMA Co.: 1.5 mi. S. of Asti, Occidental. STANISLAUS Co.: Oakdale. TRINITY Co.: Caitville. TULARE Co.: Giant Forest, Sequoia National Park, Terminus Reservoir. TUOLUMNE Co.: Pinecrest, Sonora, Strawberry, Yosemite 3,880-4,000 ft. VENTURA Co.: Sherwood Lake. YOLO Co.: Davis, Putah Canyon, Woodland.

*H. latifrons* differs from *variata* (Fallén), under which name it has until recently been recorded, in the shape of the male copulatory appendages, the cerci being cordate, as wide as long, and with shorter marginal bristles, the gonostyli curved cephalad when viewed laterad; whereas in *variata* the cerci is longer than wide and has longer marginal bristles, the gonostyli curved caudad at apex (Huckett, 1968). *H. latifrons* may be readily separated from *alcaethoe* by its drab color, having the femora black and tibiae infuscated. In the female the mid and hind femora may be brownish and tibiae brownish or yellowish. I have taken the two species together, *latifrons* and *variata*, in England, from which I presume that their habits may be similar. The collections in California were made in 41 counties and 95 localities. The records are based on 452 specimens, 244 males and 208 females.

#### Subgenus *Hylemyza* Schnabl and Dziedzicki

*Hylemya (Hylemyza)* Schnabl and Dziedzicki. 1911, K. Leop.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:94.

Type-species: *Anthomyza lasciva* Zetterstedt, 1838; designation Séguin, 1937. (= *Anthomyia partita* Meigen, 1826.)

#### *Hylemya (Hylemyza) partita* (Meigen)

*Anthomyia partita* Meigen. 1826, Syst. Besch., 5:100.

*Anthomyza lasciva* Zetterstedt. 1838, Insecta Lapponica, p. 666.

*Hylemya partita* Hennig. 1969, In Lindner, Die Fliegen der Palaearktischen Region, Band VII-1 63a Anthomyiidae (Lief. 278), p. 245.

Type: ♂, Germany (MNHP).

**Geographic range.**—Widely distributed throughout the north-temperate regions of the continent, from central Alaska, British Columbia eastward to Quebec, southward to New York and Pennsylvania, Colorado, and California.

**California records.** — HUMBOLDT Co.: Eureka, 1♀, VII-15-35 (R. H. Beamer, UK). LASSEN Co.: Susan River Camp, 1♀, VII-10-49 (B. Keh, BVC). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♀, VII-7-64, 3♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: 1 mi. NE. of Elephant Butte, 1♂, VI-30-59 (J. S. Buckett, UCD). SAN MATEO Co.: Corte de Madera Creek, Portola, 1♂, 1♀, VI-3-54 (P. H. Arnaud, CAS). TRINITY Co.: Scott Mt., 5,350 ft., 1♂, VII-14-48 (A. T. McClay, UCD).

The sole species *partita* of the subgenus *Hylemyza* is smaller than species belonging to the subgenus *Hylemya*, and although possessing the same type of arisal hairing may be recognized by its darker, blackish color, and distinguished by the apical bristle on posteroventral surface of hind tibia.

#### Subgenus *Phorbia* Robineau-Desvoidy

*Phorbia* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:559.

Type-species: *Phorbia musca* Robineau-Desvoidy; designation Coquillett, 1910.

Females of the subgenus *Phorbia* are notable for the strongly chitinised and laterally compressed or flattened ovipositor, deeply sheathlike and bristleless caudad. The males have the processes of sternum 5 emarginate or notched on the distal half of inner margin, and with a fringe or mat of minute blackish setulae on the inner border, figures 28, 29, 44.

The species are dull gray or blackish, the male with abdomen subcylindrical and truncate, more strongly bristled caudad and with bulging or swollen hypopygium. The proboscis is rather reduced in size except for labellum, the legs nonslender and well bristled.

The larvae are reported in Europe to feed in the stems of cereals and grasses, to such a degree in some instances as to cause injury of economic importance (Schiner, 1865:999; Mesnil and Pétré 1932:217-222).

#### KEY TO FEMALES OF HYLEMYA (PHORBIA) IN CALIFORNIA

1. Thorax and abdomen dull gray, concolorous and without luster ..... *sombrosa* Huckett  
Thorax and abdomen brownish black, abdomen shiny and with scant pruinescence ..... 2
2. Wings brownish tinged, densely infuscated basad, costa with series of fine semierect setulae. . . *nitidula* (Coquillett)  
Wings clear, slightly tinged basad, costal setulae non-erect ..... *lobata* Huckett

#### *Hylemya (Phorbia) lobata* Huckett

*Hylemya lobata* Huckett. 1929, Canad. Ent., 61:137.

Holotype: ♂, Banff, Alberta (CNC).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Colorado, Utah, Washington, Wyoming, Yukon Territory.

*California record.* — EL DORADO Co.: Luther Pass, Grass Lake, 1 ♂, VII-24-55 (J. C. Downey, UCD).

The male of *H. lobata* has the inner margins of processes of sternum 5 fringed with setulae for nearly their entire length, and the cerci are divided longitudinally into two hairy lobes, figure 29.

#### *Hylemya (Phorbia) nitidula* (Coquillett)

*Pegomyia nitidula* Coquillett. 1903, Amer. Ent. Soc. Trans., 29: 103.

*Hylemya (Phorbia) conicans* Hockett. 1948, Brooklyn Ent. Soc. Bull., (1947) 42:116.

Holotype: ♂, Beulah, New Mexico (ANSP).

*Geographic range.* — Alaska, Arizona, California, Colorado, Quebec, New Mexico.

*California record.* — SAN MATEO Co.: San Andreas Lake, 1 ♀, II-4-61 (C. A. Toschi, CIS).

The male of *H. nitidula* has a small patch or mat of fine black setulae immediately basad of the notched apical region of processes, and the cerci are undivided, figure 28. The female has a black and shiny abdomen as in *lobata*, from which it may be separated by the dense infuscation of wings and more upright costal setulae.

#### *Hylemya (Phorbia) sombrosa* Hockett

*Hylemya (Phorbia) sombrosa* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:250.

Holotype: ♀, Topanga Canyon, California (UCLA).

*Geographic range.* — California.

*California records.* — LOS ANGELES Co.: Santa Monica Mts., 1 ♀, IV-20-52 (E. Smith, UCLA). Topanga Canyon, 1 ♀, III-28-52, holotype (D. Covey, UCLA).

The male of *H. sombrosa* is unknown to me. The female has dull gray thorax and abdomen.

#### Subgenus *Delia* Robineau-Desvoidy

*Delia* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:571.

Type-species: *Delia floricola* Robineau-Desvoidy; designation Coquillett, 1910 = *Anthomyia cardui* Meigen, 1826.

The subgenus *Delia* comprises a heterogeneous grouping of species which may be recognized mainly in the conformation and bristling of the hypopygium common to several of the males (see couplet 36 of generic key), in the simple or slender form of its appendages, and in the general pattern of parts or elements constituting the genitalia, in which the filaments are fine or weak, figures 20, 56-59, 71, 72. Females of *Delia*, with few exceptions, lack discal bristles on tergum 5 and the short upper bristle on border of mesopleura near anterior notopleural bristle, and may have only one posterodorsal bristle on mid tibia, if two are present the dorsal area of occiput below postocular series of setulae is usually bare, or nearly so, figure 10.

A few of the species are known in the larval stage to feed on cultivated plants, *H. antiqua* on onions, *H.*



*brassicae* and *H. planipalpis* on cruciferous plants, *echinata* on carnation buds, *lupini* on foliage of lupines, *platura* on seeds and seedlings of beans, sweet corn, conifers, apical shoots of spinach and cucurbits, and in transference of disease organisms to tubers of Irish potato. But of the great majority of species little if anything is known of their habits or economy.

KEYS TO SPECIES OF HYLEMYA (DELIA)  
IN CALIFORNIA  
MALES

1. Abdominal sternum 4 bilobed caudad and having very long bristles, e.g., *H. setiventris* Stein..... 2  
Abdominal sternum 4 not bilobed caudad..... 8
2. Frons broad and bristled as in female, arista subplumose, hind tibia with robust preapical posterodorsal bristle..... 3  
Frons not bristled nor as wide as in female, arista pubescent hind tibia with weak preapical posterodorsal bristle..... 4
3. Lobes of sternum 4 with caudal tuft of long bristles, flagellate at tips, hind tibia without robust apical posteroventral bristle..... *ineptifrons* Huckett\*  
Lobes of sternum 4 with long marginal bristles directed ventrad, hind tibia with robust apical posteroventral bristle..... *setifirma* Huckett
4. Sternum 4 deeply lobed, lateral processes overlapping sternum 5..... 5  
Sternum 4 with shallow caudal emargination, lateral lobes undeveloped and not partly overlapping sternum 5..... 7
5. Lobes of sternum 4 with long marginal bristles from base to apex and directed ventrad..... *rainieri* Huckett  
Lobes of sternum 4 with weaker bristles proximad and much longer caudally directed bristles toward apex... 6
6. Lobes extended caudad to level with or beyond caudal margin of tergum 4, bristles flagellate at tips and reaching beyond apex of abdomen..... 6a  
Lobes not extended caudad to level with caudal margin of tergum 4, bristles curving mesad at tips and not reaching beyond apex of abdomen..... *setiventris* Stein
- 6a. Hind tibia with long preapical posterodorsal bristle, mid tarsus with long dorsal bristles from segment 1 to 4..... *sequoiae* Huckett  
Hind tibia with weak preapical posterodorsal bristle, mid tarsus without long bristles from segment 1 to 4..... *extensa* Huckett
7. Sternum 4 with longer bristles grouped laterad, median area weakly bristled..... *alternata* Huckett  
Sternum 4 with slender bristles throughout..... *sobrians* Huckett
8. Second fore tarsal segment swollen on anterior surface, fifth fore tarsal segment with 2 or 3 stiff strong apical bristles, robust species..... *vesicata* Huckett  
Second fore tarsal segment not swollen on anterior surface..... 9
9. Cerci with cluster of extra long flaccid bristles, tip of some reaching prebasal region of abdomen, haustellum rather slender and usually polished.... *longicauda* (Strobl)  
Cerci without such extra long bristles..... 10
10. Fore femur with matlike clothing of setulae on posterior surface, mid metatarsus without dorsal bristles..... 11  
Fore femur without such clothing setulae on posterior surface..... 12
11. Cerci ovoid and with several slender setulae on apical region, fig. 110..... *tenuis* Drew  
Cerci slender and tapering, devoid of slender setulae on apical region, fig. 109..... *pilitarsis* Stein
12. Mid tibia with 1 or 2 strong posterodorsal bristles on distal third, stouter than hind tibial bristles, fig. 107, arista with distinct pubescence..... 13  
Mid tibia without such strong posterodorsal bristles on distal third..... 15
13. Hind tibia with sharply slanting recurrent bristles at apical border of anterior surface..... 14  
Hind tibia without such bristles at apical border of anterior surface..... *normalis* Malloch
14. Hind tibia with long curly bristles on anterodorsal surface, longest over half as long as tibia and situated on proximal half..... *extremitata* Malloch  
Hind tibia without such bristles, longest shorter than half length of tibia and not situated on proximal half..... *recurva* Malloch
15. Third or fourth abdominal sternum, or both, dilated and with long marginal bristles, stronger than bristles on processes..... 16  
Third and fourth abdominal sterna without such strong marginal bristles..... 17
16. Such marginal bristles restricted mainly to sternum 4, interfrontalia uninterrupted caudad.....  
*angustiventralis* Huckett  
Such marginal bristles usually present on sterna 3 and 4, interfrontalia obscured caudad.... *echinata* (Séguy)
17. Mid metatarsus with slender dorsal bristles..... 18  
Mid metatarsus without dorsal bristles..... 26
18. Cerci widening towards apex and extending over gonostyli, apical margin profusely fringed, fig. 111.....  
*lamellicauda* Huckett  
Cerci narrowing towards apex and not obscuring gonostyli..... 19
19. Arisal hairs as long as width of third antennal segment, or nearly so, processes with coarse setulae on inner margin, fig. 93..... *concorda* Huckett  
Arisal hairs shorter than half width of third antennal segment, processes without an extensive series of coarse setulae on inner margin..... 20
20. Haustellum polished, glossy..... 21  
Haustellum partly dull..... 22
21. Mesonotum and scutellum lustrous, abdominal terga with silky sheen, m-cu cross-vein oblique.....  
*armata* (Stein)  
Mesonotum, scutellum and abdominal terga partly dull, subshining, m-cu cross-vein erect. *montivagans* Huckett
22. Abdominal terga 1+2 and 3 each longer than maximum width as seen from above..... 23  
Abdominal terga 1+2 and 3 each not longer than maximum width as seen from above..... 24
23. Mid tarsal segments 2 and 3 dilated and with posterior apical thorns, fig. 99, prealar bristle present, apical bristles of processes not extending caudad beyond apex of abdomen, parafacials wider than width of third antennal segment..... *attenuata* Malloch

- Mid tarsal segments 2 and 3 not dilated and without lengthy posterior apical thorns, prealar bristle absent, apical bristles of processes extending caudad beyond apex of abdomen, narrower part of parafacials less than width of third antennal segment. *extenuata* Hockett
24. Posterior apical thorns of mid tarsal segments 3 and 4 coarse, fig. 101, spinules at apex of inner margin of processes as long or longer than width of processes where situated, figs. 25, 26. . . . . 25
- Posterior apical thorns of mid tarsal segments 3 and 4 not coarsened, setulae at apex of inner margin of processes fine and shorter than width of processes where situated. . . . . *simulata* Hockett
25. Processes usually with 2 or more blunt spinules at apex of inner margin, fig. 26, cerci small, cordate. . . . . *garretti* Hockett
- Processes usually with 1 blunt spinule at apex of inner margin, fig. 25, cerci oblong or sagittate. . . . . *propinqua* Hockett
26. Cerci with cluster of longish flaccid bristles, presutural acrosticals uniserial, costal thorn as long as humeral cross-vein, haustellum rather short. . . . . 27
- Cerci not clustered with longish bristles on apical region . . . . . 28
27. Narrower part of frons and parafacials as wide as or wider than breadth of third antennal segment. . . . . *frontulenta* Hockett
- Narrower part of frons less and of parafacials not wider than breadth of third antennal segment. . . . . *canadensis* Hockett
28. Prealar bristle as long as posterior notopleural bristle . . . . . 29
- Prealar bristle shorter than posterior notopleural bristle, or absent . . . . . 33
29. Abdominal vitta broad, narrowest width on terga 3 and 4 equal to length of respective segments, cheeks narrowed. . . . . *pratensis* (Meigen)
- Abdominal vitta on terga 3 and 4 less in average width than length of respective segments. . . . . 30
30. Mid tibia with preapical posterodorsal bristle depressed and lengthened, fig. 108, hind tibia with preapical posterodorsal bristle fully as long as preapical mid dorsal . . . . . *bucculenta* (Coquillett)
- Mid tibia with preapical posterodorsal bristle shorter than preapical mid dorsal, or is absent, hind tibia with preapical posterodorsal shorter than preapical mid dorsal bristle . . . . . 31
31. Grayish or brownish species, anteroventral bristles on proximal third of hind femur as long as height of femur thereat, ventral bristle of caudal pair of sternopleurals long. . . . . *deviata* Hockett and *lupini* var.
- Blackish species, anteroventral bristles on proximal half of hind femur shorter than height of femur thereat, ventral bristle of caudal pair of sternopleurals usually weak . . . . . 32
32. Hind femur with a clump of fine bristles at base of anterior-anteroventral surface. . . . . *brassicae* (Bouché)
- Hind femur without clump of fine bristles at base of anteroventral surface. . . . . *planipalpis* (Stein)
33. Pale, whitish gray species, wings hyaline, hind tibia with full series of anteroventral and posteroventral setulae . . . . . *albula* (Fallén)
- Species not having foregoing combination of characters. 34
34. Processes of sternum 5 with inner marginal series of stiffish coarse setulae, figs. 93, 94. . . . . 35
- Processes without an inner marginal series of coarse setulae . . . . . 36
35. Longer arisal hairs shorter than half width of third antennal segment, hind tibia with extensive series of anteroventral bristles and posteroventral setulae, fore tibia with weak short apical posteroventral bristle. . . . . *neomexicana* Malloch
- Longer arisal hairs longer than half width of third antennal segment, hind tibia with 2 to 5 anteroventral bristles and restricted or partial series of posteroventral setulae, fore tibia with coarse blunt apical posteroventral bristle. . . . . *concorda* Hockett
36. Hind tibiae yellow or fulvous. . . . . 37
- Hind tibiae blackish, brownish or rufous. . . . . 44
37. Hind tibia with full series of posteroventral setulae, extending to preapical region . . . . . *lupini* (Coquillett)
- Hind tibia with partial series of posteroventral setulae, restricted to proximal half. . . . . 38
38. Fore tibia with stout coarse apical posteroventral bristle, usually blunt at apex. . . . . 39
- Fore tibia with weak fine apical posteroventral bristle, usually pointed at apex. . . . . 41
39. Hind femur with full series of longish anteroventral bristles continuous to basal region, and with series of fine posteroventral bristles. . . . . *montana* Malloch
- Hind femur with anteroventral bristles becoming shorter on proximal half and series discontinued before attaining basal region, posteroventral bristles absent. . . . . 40
40. Mid and hind femora, palpi, second and base of third antennal segment, all fulvous. . . . . *fulvescens* Hockett
- Mid and hind femora and antennae blackish, palpi fuscous . . . . . *gracilipes* Malloch\*
41. Third antennal segment entirely blackish. . . . . 42
- Antennae partly yellowish at base of third and at apex of second segments . . . . . 43
42. Mid and hind femora broadly fulvous on distal half, prealar bristle absent or pilose. . . . . *suburbana* Hockett
- Mid and hind femora mainly blackish on distal half, prealar bristle present. . . . . *lupini* var.
43. Thorax and abdomen extensively yellowish. . . . . *aemene* (Walker)
- Thorax and abdomen mainly grayish. . . . . *depressa* Stein
44. Hind tibia with extensive series of posteroventral setulae, extending to preapical region. . . . . 45
- Hind tibia with or without restricted series of posteroventral setulae on proximal two-thirds of tibia. . . . . 49
45. Hind femur typically without posteroventral bristles, apical posteroventral bristle of fore tibia coarse and usually blunt at apex. . . . . *platura* (Meigen)
- Hind femur with posteroventral bristles, apical posteroventral bristle on fore tibia weak. . . . . 46
46. Anteroventral bristles of hind femur increasing in length proximad, series extended to basal region of femur, fig. 105, gonostyli (inferior forceps) each nearly three-fourths as long as hind tibia. . . . . *seriata* Stein
- Anteroventral bristles on proximal half of hind femur scarcely as long as those on distal half, gonostyli each shorter than one-third length of hind tibia. . . . . 47
47. Profrons wider and cheeks as high as breadth of third antennal segment . . . . . 48
- Profrons not wider than breadth of third antennal segment viewed in profile. . . . . *lupini* (Coquillett)

48. Haustellum polished.....*glabritheca* Huckett  
 Haustellum dull.....*triseriata* Malloch
49. Abdomen attenuated, linear, terga 1+2 longer and tergum 3 fully as long as width of segment as seen from above, profrons and cheeks as long as and nearly as high respectively as breadth of third antennal segment.....50  
 Abdomen not attenuated and linear, terga 1+2 as wide as long, or nearly so, tergum 3 wider than long.....51
50. Presutural acrosticals irregularly uniserial, hind femur with longish anteroventral bristles continuing in series to basal region of femur.....*attenuata* var.  
 Presutural region of mesonotum with closely set pair of acrosticals, hind femur without longish anteroventral bristles on proximal third.....*intimata* Huckett
51. Anteroventral bristles of hind femur slightly increasing in length proximad, the series extended to basal region of femur, fig. 105, gonostyli (inferior forceps) each nearly three-fourths as long as length of hind tibia.....*seriata* Stein  
 Anteroventral bristles on proximal half of hind femur scarcely longer than longer bristles on distal half, or are shorter, gonostyli about as long as one-third length of hind tibia.....52
52. Hind femur with posteroventral bristles and full series of anteroventrals.....53  
 Hind femur without posteroventral bristles.....54
53. Hind femur with posteroventral bristles short, not equal in length to height of femur where situated, outer marginal bristles of sternum 4 and processes of sternum 5 long, slender and semierect....*nubilalis* Huckett  
 Hind femur with posteroventral bristles longer than height of femur where situated, outer marginal bristles on sternum 4 and on processes of sternum 5 not notably lengthy.....*deviata* Huckett
54. Mid tarsal segments 3 and 4 with coarse long apical thorns on posterior surface, about as long as segment 3, fig. 102, processes with stiff blunt spinules at apex of inner margin.....*gracilipes* Malloch\*  
 Mid tarsal segments 3 and 4 with weak short apical thorns on posterior surface, processes with short or weak fine setulae at apex of inner margin.....55
55. Slender blackish species, with long slender legs, hind femur with anteroventral series of bristles extended to basal region of femur, mid femur with preapical anterior bristle absent or setulose....*angustitarsis* Malloch  
 Nonslender cinereous gray species, hind femur with series of anteroventral bristles not extended to basal region of femur, mid femur with preapical anterior bristle present.....*antiqua* (Meigen)
- FEMALES
1. Terminal sclerites of ovipositor with recurved spinules on dorsum, fig. 54.....2  
 Terminal sclerites of ovipositor without recurved spinules, setae sometimes stubby and erect, stiff and straight, figs. 50-53.....10
2. Hind tibia with robust preapical posterodorsal and apical posteroventral bristles.....*setifirma* Huckett  
 Hind tibia with robust preapical posterodorsal and weak apical posteroventral bristles.....*ineptifrons* Huckett\*  
 Hind tibia with weak preapical posterodorsal and apical posteroventral bristles.....3
3. Prealar bristle as long as posterior notopleural bristle...4  
 Prealar bristle shorter than posterior notopleural bristle..6
4. Fore tibia usually with only one median posteroventral bristle.....*alternata* Huckett  
 Fore tibia usually with two posteroventral bristles on middle half.....5
5. Notopleural depression usually with one or more setulae.....*rainieri* Huckett  
 Notopleural depression usually without setulae.....*setiventris* Stein and *sobrians* Huckett
6. Arista hairs as long as or longer than half width of third antennal segment.....7  
 Arista hairs shorter than half width of third antennal segment.....8
7. Humeral callosities and/or scutellum more or less yellowish testaceous.....*montana* Malloch  
 Humeral callosities and scutellum gray..*concorda* Huckett
8. Mid and hind femora mainly or partly blackish.....9  
 Mid and hind femora mainly fulvous.....*lamellicauda* Huckett
9. Fore femur with clothing setulae on posterior surface appressed, median posterior series of setulae obliterated on proximal half of femur, or ending thereat in 1 or 2 lengthy prebasal bristles.....*tenuis* Drew, *garretti* Huckett, and *propinquina* Huckett  
 Fore femur with median posterior series of setulae continuous to prebasal region.....*neomexicana* Malloch
10. Haustellum entirely polished, glossy.....11  
 Haustellum more or less dulled.....15
11. Mid tibia with weak anteroventral bristle, hind tibia usually with 2 anterodorsal bristles..*longicauda* (Strobl)  
 Mid tibia without anteroventral bristle, but with or without weak anterior bristle, hind tibia usually with 3 or more anterodorsal bristles.....12
12. Profrons and cheeks broader and higher respectively than width of third antennal segment, hind femur with posteroventral bristles.....*glabritheca* Huckett  
 Profrons and cheeks not broader and higher respectively than width of third antennal segment, hind femur without posteroventral bristles.....13
13. Mid and hind tibiae rufous, mesonotum and scutellum evenly yellowish gray, unmarked....*nigrithorax* Stein\*  
 Mid and hind tibiae blackish.....14
14. Prealar bristle absent.....*armata* (Stein)  
 Prealar bristle present.....*montivagans* Huckett
15. Proboscis enlarged and fleshy, thicker than fore femur, hind tibia with preapical posterodorsal bristle as long as preapical mid dorsal.....*bucculenta* (Coquillett)  
 Proboscis normal, not enlarged, hind tibia with preapical posterodorsal bristle shorter than preapical mid dorsal.....16
16. Presutural acrosticals uniserial and not weak.....17  
 Presutural acrosticals paired, or if uniserial weak and hairlike.....19
17. Tibiae reddish or rufous, mid tibia with 1 posterodorsal bristle.....*extenuata* Huckett  
 Tibiae blackish, mid tibia with 2 posterodorsal bristles.....18
18. Oral margin of face about as wide as width of frontal vitta at middle of frons.....*frontulenta* Huckett  
 Oral margin of face slightly wider than width of frontal vitta at middle of frons.....*canadensis* Huckett
19. Prealar bristle about as long as anterior notopleural bristle.....20

- Prealar bristle usually shorter than anterior notopleural bristle, or is absent..... 26
20. Fore tibia with 2 posteroventral bristles, mid tibia with 2 anterodorsal and 2 posterodorsal bristles, species 8 to 10 mm in length..... 21  
Fore tibia usually with 1 posteroventral bristle, mid tibia seldom with 2 anterodorsal and 2 posterodorsal bristles, 5 to 6 mm in length..... 22
21. Tibiae black..... *vesticata* Hockett  
Tibiae fulvous..... 21a  
21a. Hind tibia with preapical posterodorsal bristle longer than apical diameter of tibia..... *sequoiae* Hockett  
Hind tibia with preapical posterodorsal bristle shorter than apical diameter of tibia, or setulose.....  
*extensa* Hockett
22. Mid tibia with anteroventral bristle, cheeks narrowed  
*pratensis* (Meigen)  
Mid tibia without anteroventral bristle..... 23
23. Mid and hind tibiae fulvous, tergum 5 with upright slender discal bristles, veins brown basad, mesonotum and scutellum shiny..... *lupini* var.  
Species without foregoing combination of characters... 24
24. Densely whitish gray species, mid and hind tibiae usually partly rufous or infuscated, hind femur with anteroventral bristles on proximal third..... *deviata* Hockett  
Dull grayish or brownish species, mid and hind tibiae normally dark brown, hind femur with anteroventral and posteroventral bristles absent on proximal third... 25
25. Palpi slender..... *brassicae* (Bouché)  
Palpi gradually dilated and flattish on distal half.....  
*plantipalpis* (Stein)
26. Pale whitish gray species, wings hyaline, tibiae yellowish and lightly dusted, terminal sclerites of ovipositor with stiffened setulae, fig. 51..... *albula* (Fallén)  
Species not having foregoing combination of characters..... 27
27. Mid and hind tibiae yellow or fulvous..... 28  
Mid and hind tibiae blackish..... 36
28. Longer arisal hairs as long or longer than half width of third antennal segment..... 29  
Arisal hairs shorter than half width of third antennal segment..... 33
29. Humeral callosities and/or scutellum more or less yellowish testaceous, third antennal segment reddish basad on inner surface..... 30  
Humeral callosities and scutellum not partly yellowish testaceous, third antennal segment entirely blackish... 31
30. Abdomen mainly testaceous, yellowish... *aemene* (Walker)  
Abdomen mainly gray..... *depressa* Stein
31. Hind tibia with 3 well developed anterodorsal bristles, arisal hairs not longer than half width of third antennal segment..... *extremitata* Malloch  
Hind tibia with 2 well developed anterodorsal bristles, arisal hairs longer than half width of third antennal segment..... 32
32. Longer arisal hairs nearly as long as width of third antennal segment..... *normalis* Malloch  
Longer arisal hairs slightly longer than half width of third antennal segment..... *recurva* Malloch
33. Thorax and abdomen mainly fulvous, palpi yellow....  
*fulvescens* Hockett  
Thorax and abdomen not largely fulvous, palpi fuscous or blackish..... 34
34. Terminal sclerites of ovipositor with short stiff upright spinules, mid and hind femora largely fulvous on distal half..... *suburbana* Hockett  
Terminal sclerites of ovipositor with slender setulae, mid and hind femora largely blackish on distal half.... 35
35. Parafacials brownish tinged and noticeably receding ventrad, width of cheeks tapering caudad, commencing at middle below eye..... *lupini* (Coquillett)  
Parafacials pale gray and not noticeably receding ventrad, cheeks well maintained in width caudad.....  
*deviata* Hockett
36. Prealar bristle absent, profrons and cheeks extra broad.  
*attenuata* Malloch  
Prealar bristle usually present..... 37
37. Mid tibia with anteroventral bristle..... 38  
Mid tibia without anteroventral bristle..... 40
38. Longer arisal hairs 2 to 3 times as long as basal diameter of arista, hind femur with proximal bristles of anteroventral series but little if any weaker than those distad, fig. 106, costa with longish costal thorn and proximal series of longish semierect setulae.....  
*seriata* Stein  
Arisal hairs scarcely longer than basal diameter of arista..... 39
39. Brownish species, mesonotum without median stripe, mid tibia with 2 posterodorsal bristles... *nubilalis* Hockett  
Grayish species, mesonotum with stripes, mid tibia with 1 posterodorsal bristle..... *intimata* Hockett
40. Hind femur with 1 or more posteroventral bristles.... 35  
Hind femur usually without posteroventral bristles... 41
41. Arisal hairs fully as long as twice basal diameter of arista, mesonotum with two pronounced brownish stripes, each along planes of dorsocentral bristles...  
*angustitarsis* Malloch  
Arisal hairs scarcely longer than basal diameter of arista..... 42
42. Mid tibia usually with 2 posterodorsal bristles..... 43  
Mid tibia usually with 1 posterodorsal bristle..... 44
43. Paler cinereous gray species, fore tibia occasionally with a mid posterior bristle..... *antiqua* (Meigen)  
Darker gray species with brownish infuscation on parafrontals and parafacials..... *triseriata* Malloch
44. Hind tibiae partly reddish translucent, hind femur with anteroventral bristles extended in series to prebasal region of femur..... *lupini* (Coquillett)  
Hind tibiae blackish or brownish..... 45
45. Fore tarsal segments 2 to 4 dilated, fig. 98.....  
*simulata* Hockett  
Fore tarsal segments not dilated..... 46
46. Fore tibia with preapical posterodorsal bristle well developed, fore femur without semierect setulae on median plane of anterior surface, hind tibia often with a fine preapical hair in evidence on posteroventral surface..... *platura* (Meigen)  
Fore tibia with preapical posterodorsal bristle absent or setulose, fore femur with semierect setulae on median plane of anterior surface, costal thorn as long as r-m cross-vein..... 47
47. Abdomen gray and dull, costal setulae bounding cell 2 C weak, depressed..... *echinata* (Séguy)  
Abdomen blackish and shiny, costal setulae bounding cell 2 C semierect, fully as long as depth of costa...  
*angustioventralis* Hockett

*Hylemya (Delia) aemene* (Walker)

*Anthomyia aemene* Walker. 1849, List Dipt. Brit. Mus., 4:937.  
*Hylemyia testacea* Stein. 1898, Berlin. Ent. Ztschr. (1897), 42:208.

Type: ♀, Nova Scotia (BMNH).

**Geographic range.** — Alberta, British Columbia, California, Colorado, Indiana, Manitoba, Montana, North Dakota, New Hampshire, Nova Scotia, New York, Nebraska, Oregon, South Dakota, Saskatchewan, Utah, Washington, Wyoming.

**California records.** — MONO Co.: Leavitt Meadow, 7,200 ft., 1 ♀, VIII-13-63, flight trap (H. B. Leech, CAS). MONO Lake, 1 ♀, VI-27-49 (J. L. and G. H. Sperry, USNM). NEVADA Co.: Truckee, 1 ♀, VII-14-61 (B. H. Poole, CNC). SAN BERNARDINO Co.: One Thousand Springs, San Bernardino Mts., 1 ♀, IX-16-46 (J. L. Sperry, USNM).

The species *H. aemene* is closely allied to *depressa* in structure and bristling, differences between the two species being dependent mainly on coloration. In *aemene* the abdomen is yellowish in male, and thorax and abdomen in female more extensively reddish than in *depressa*.

*Hylemya (Delia) albula* (Fallén)

*Musca albula* Fallén. 1825, Monographia Muscidum Sveciae, p. 74.

Types: ♂ ♀, Southern Sweden.

**Geographic range.** — Alaska, California, Illinois, Michigan, Quebec, Oregon, Utah, Washington.

**California record.** — HUMBOLDT Co.: Samoa Beach and dunes, 1 ♂, 1 ♀, VI-18-07 (J. C. Bradley, CAS).

The pale whitish gray thorax and abdomen and hyaline wings should suffice to distinguish *H. albula* from its congeners. In addition the male has the prealar bristles usually absent or pilose, and the hind tibiae with extensive series of weak bristles on anteroventral and posteroventral surfaces.

*Hylemya (Delia) alternata* Huckett, new status

*Hylemya (Delia) setioventris alternata* Huckett. 1951, Ent. Soc. Wash. Proc., 53:255.

Holotype: ♂, Silverton Hills, Marion County, Oregon (USNM).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Saskatchewan, South Dakota, Oregon, Utah, Wyoming.

**California records.** — LOS ANGELES Co.: Crystal Lake, 1 ♀, VI-29-50 (T. R. Haig, UCD). RIVERSIDE Co.: Santa Rosa Spring Camp, 1 ♀, IX-10-64 (M. E. Irwin, UCR).

The males of *H. alternata* and *sobriana* have a shallow caudal emargination on sternum 4, with lateral lobes weakly developed. In *alternata* the long bristles on sternum 4 are grouped laterad, many of which curve mesad at tips.

*Hylemya (Delia) angustitarsis* Malloch

*Hylemyia angustitarsis* Malloch. 1920, Ohio Jour. Sci., 20:277.  
 Holotype: ♂, Katmai, Alaska (OSUM).

**Geographic range.** — Alaska, California, Labrador, Manitoba, Michigan, Northwest Territories, Yukon Territory, Kamchatka Peninsula.

**California records.** — TUOLUMNE Co.: Budd Lake, 10,000 ft., Yosemite National Park, 1 ♂, VIII-26-61 (W. E. Ferguson, CIS).

*H. angustitarsis* has notably long slender legs in male, increasingly so from fore to hind pairs, and fore tibia with robust blunt tipped apical posteroventral bristle. In both sexes the arista is distinctly haired. The female has pronounced brown vittae along the series of dorsocentral bristles.

*Hylemya (Delia) angustiventris* Huckett  
(Map 4)

*Hylemyia angustiventris* Malloch. 1918, Amer. Ent. Soc. Trans., 44:315. Name preoc. Zetterstedt, 1845.

*Hylemya (Delia) angustiventris* Huckett. 1965, Cat. Dipt. North America, p. 847. New name for *angustiventris* Malloch. Holotype: ♂, Cloudcroft, New Mexico (ANSP).

**Geographic range.**—California, Colorado, New Mexico, Utah.

**California records.** — ALPINE Co.: Hope Valley, 1 ♂, VII-9-48 (L. W. Quate, CIS); 3 ♂, 9 ♀, VII-18-48 (D. Carter, L. W. Quate, CIS). AMADOR Co.: 4 mi. N. of Silver Lake, 2 ♀, VII-25-55 (J. C. Downey, UCD). EL DORADO Co.: Echo Lake, 1 ♀, VII-23-55 (J. C. Downey, UCD). Grass Lake, Luther Pass, 1 ♂, VII-24-55 (E. I. Schlinger, UCD). Meyers, 1 ♀, VII-24-55 (J. C. Downey, UCD). 2 mi. S. of Meyers, 1 ♂, 1 ♀, VII-24-55 (J. C. Downey, UCD). Pinecrest, 1 ♀, VII-12-47, 1 ♀, VII-25-47, 1 ♀, VII-5-48, 1 ♀, VII-20-48 (P. H. Arnaud, CAS). Wright's Lake, 1 ♀, VII-2-48 (K. W. Tucker, CIS). FRESNO Co.: Huntington Lake, 7,000 ft., 1 ♀, VII-3-19 (F. C. Clark, CAS); 1 ♂, VII-16-19 (E. P. Van Duzee, CAS). Mono Hot Springs, 2 ♂, VIII-8-56 (R. O. Schuster, CIS). Shaver Lake, 3 ♂, 1 ♀, VII-19-19 (CAS). INYO Co.: Ruby Lake, 1 ♂, VIII-13-57 (D. D. Linsdale, CIS). LASSEN Co.: Bridge Creek Camp, 2 ♀, VII-9-49 (E. L. Atkinson, CIS). Summit Camp, 6 ♂, 7 ♀, VI-28-49 (E. L. Atkinson, J. W. MacSwain, W. H. Wade, CIS; H. A. Hunt, UCD); 2 ♂, 2 ♀, VI-28-49 (B. Keh, BVC). Susan River Camp, 2 ♂, VII-9-49 (A. T. McClay, UCD). LOS ANGELES Co.: Green Valley, 2 ♂, VII-26-44 (A. L. Melander, USNM). MODOC Co.: Cedar Pass, 2 ♂, 5 ♀, VI-29-55 (J. W. MacSwain, CIS; D. L. Dahlsten, K. Bowers, UCD). MONO Co.: Bridgeport, 1 ♀, VI-23-29 (E. P. Van Duzee, CAS). Crooked Creek, 10,150 ft., White Mts., 8 ♂, VI-20-53 (J. W. MacSwain, CIS), 1 ♀, VI-28-61 (G. I. Stage, CIS). Leavitt Meadows, 1 ♂, 2 ♀, VI-28-51 (T. R. Haig, CIS); 1 ♂, VIII-14-63, flight trap (H. B. Leech, CAS). Sardine Creek, 8,500 ft., 11 ♂, 5 ♀, VI-28-51 (C. A. Downing, S. M. Kappos, A. T. McClay, UCD; E. L. Silver, UCLA); 12 ♂, 7 ♀, VII-6-18-51 (A. T. McClay, UCD). Tioga Crest, 1 ♀, VII-27-56 (J. Powell, CIS). Tioga Lodge, Mono Lake, 1 ♀, VI-22-29 (E. P. Van Duzee, CAS). Virginia Lakes, 9,750 ft., 1 ♀, VIII-17-63 (H. B. Leech, CAS). NEVADA Co.: Boca, 1 ♂, VI-23-61 (F. D. Parker, UCD). Near Hobart Mills, 1 ♂, VII-1964 (M. E. Irwin, UCR). Jackson Lake, 1 ♀,



Map 4. Locality records in California for *Hylemya (Delia) angustiventralis* Huckett.

VII-15-61 (L. A. Stange, UCD). Prosser Creek, 6,300 ft., near Hobart Mills, 1♂, VII-13-61 (J. C. Chillcott, CNC). Sagehen, near Hobart Mills, 1♂, 2♀, VI-21-54 (P. D. Hurd, CIS); 1♂, 4♀, VI-25-54 (G. Schaefer, J. R. Powell, CIS; R. C. Blaylock, UCD); 3♂, 5♀, VII-2-54 (J. C. Downey, UCD); 1♂, 1♀, VII-4-54 (P. D. Hurd, CIS); 2♂, 1♀, VII-4-62, 1♂, VII-5-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 2♂, VII-13-61 (J. C. Chillcott, CNC); 1♂, 1♀, VI-17-64 (C. N. Slobodchikoff, CAS; M. E. Irwin, UCR); 68♂, 52♀, VII-6-16-64, in malaise trap, 5♂, 2♀, VII-15-64, by sweeping (M. E. Irwin, UCR). Truckee, 2♂, VI-20-27 (E. P. Van Duzee, CAS). PLUMAS Co.: Buck's Lake, 2♂, 2♀, VI-23-49 (P. D. Hurd, CIS), 2♂, 3♀, VII-1-49 (J. W. MacSwain, W. H. Wade, CIS). 8 mi. NW. of Chester, 1♀, VIII-18-56 (E. E. Lindquist, CIS). 4 mi. W. of Quincy, 1♂, VI-25-49 (J. W. MacSwain, CIS). RIVERSIDE Co.: Deep Canyon, 4♀, IX-2-64 (P. A. Rauch, UCR). SAN BERNARDINO Co.: Cienega, Upper Santa Ana River, 3♂, V-28-48 (A. L. Melander, USNM). Fawnskin, 1♂, VII-30-61 (G. C. Eickwort, MSUM). South Fork Meadow, Upper Santa Ana River, 1♀, VI-25-48 (G. H. and J. L. Sperry, USNM). Sugar Loaf Mountain, Cienega, 1♀, V-11-47 (J. L. Sperry, USNM). Sugar Loaf Mt., San Bernardino Mts., 1♂, VII-15-46 (A. L. Melander, USNM). SAN DIEGO Co. [P]: Pine Lake, 1♂, no date (Johnson, HCH). SANTA CRUZ Co.: Felton, Santa Cruz Mts., 300-500 ft., 1♂, V-20-25-07 (J. C. Bradley, CU). SHASTA Co.: 3 mi. SE. of Mt. Lassen, 2♂, VII-8-55 (J. W. MacSwain, CIS). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1♂, 3♀, VII-4-60 (F. D. Parker, UCD). Webber Lake, 12♂, 3♀, VII-3-64 (C. N. Slobodchikoff, CAS), 1♂, VII-4-65 (P. H. Arnaud, CAS). TULARE Co.: Alta, Giant Forest, 6,500-9,500 ft., Sequoia National Park, 1♀, VII-18-07

(J. C. Bradley, CU). TUOLUMNE Co.: Bumble Bee, 1♀, VI-23-51 (A. T. McClay, UCD). Dardanelles, 3♂, 1♀, VI-26-51 (W. H. Lange, S. M. Kappos, UCD), 1♀, VII-13-51 (W. H. Lange, UCD). Kennedy Meadow, 1♀, VII-9-51 (A. T. McClay, UCD). Pinecrest, 31♂, 26♀, VII-3-51 (A. T. McClay, UCD). Sonora Pass, 9,624 ft., 1♀, VII-17-51 (A. T. McClay, UCD). Strawberry, 1♂, VI-25-51, 2♂, 1♀, VII-15-51 (A. T. McClay, UCD). 11 mi. N. of Strawberry, 1♂, VI-24-51 (S. M. Kappos, UCD). Tioga Pass, 1♀, VII-8-46. Tuolumne Meadows, Soda Springs, 8,600 ft., 1♂, VIII-8-16 (G. R. Pilate, USNM). Warner Creek below Tioga Pass, 1♀, VII-7-53 (J. C. Downey, UCD). Yosemite, 4,000 ft., 1♂, V-20-34 (O. Bryant, CAS).

*H. angustiventralis* is linked to *echinata* in the possession of distinctive long marginal bristles on dilated sternal sclerites of the male abdomen. In *angustiventralis* such bristles occur on sternum 4. The male may further be distinguished from that of *echinata* by the uninterrupted interfrontalia. In the series taken in a malaise trap at Sagehen Creek I find one male with prealar bristles absent and one female with an anteroventral bristle on mid tibiae.

#### *Hylemya (Delia) antiqua* (Meigen)

*Anthomyia antiqua* Meigen. 1826, Syst. Besch., 5:166.

*Anthomyia ceparum* Meigen. 1830, Syst. Besch., 6:376.

*Phorbia cepetorum* Meade. 1883, Ent. Monthly Mag., 19:218.

Types: ♂, ♀, Germany.

**Geographic range.** — Widely distributed throughout the more temperate regions of continental North America, from British Columbia and Alberta eastward to Quebec and the Maritime Provinces, thence southward to as far as North Carolina, Kansas, Colorado, Utah, and California.

**California records.** — ALAMEDA Co.: Berkeley, 1♂, VII-3-17 (H. H. Severin, CIS), 1♂, 4♀, VI-5-49, ex onions (W. W. Middlekauff, CIS); 1♂, VI-5-49, variant, (W. W. Middlekauff, BVC); 1♀, V-6-64 (J. M. Ross, BVC). MONTEREY Co.: Salinas, 2♂, 2♀, XI-6-43, 1♂, 1♀, XI-18-43, 3♀, V-10-11-44, ex onions (W. H. Lange, UCD). SACRAMENTO Co.: Sacramento, 8♀, VI-10-16-48, ex onions, 2♂, VI-16-17-48, ex onions (CDA). SAN BERNARDINO Co.: Upper Santa Ana River, 1♂, VI-21-48 (G. H. and J. L. Sperry, USNM). SAN FRANCISCO Co.: San Francisco, 1♀, V-10-15 (C. L. Fox, CAS); 1♂, 1♀, IX-1916, ex green onions (L. A. Whitney, USNM); 3♂, 2♀, V-12-45, ex onions (C. M. Cunha, CDA); 1♂, 1♀, IV-28-50, 1♀, V-12-50, both ex chives (W. H. Lange, UCD); 1♀, V-14-64 (P. H. Arnaud, CAS). SAN MATEO Co.: South San Francisco, 1♂, VII-16-17 (H. H. Severin, CIS).

*H. antiqua* is a major economic pest of onions and related plants. It is closely allied to *platura*, which also may be found to infest onions. Males of *antiqua* differ from those of *platura* in having only a partial series of setulose hairs on posteroventral surface of hind tibia. Females of *antiqua* average slightly larger than those of *platura*, having fuller (wider) parafacials. Occasional specimens may possess a mid posterior bristle on fore tibia and 2 posterodorsal bristles on mid tibia. Hennig (1952:388-189) has given a

key and illustrations for distinguishing larvae of *antiqua* from those of related species.

*Hylemya (Delia) armata* (Stein)

*Chortophila armata* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A, 84(9):86.

Holotype: ♂, Mount Constitution, Orcas Island, Washington (ZMUB).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Washington, Yukon Territory.

**California records.** — DEL NORTE CO.: Rowdy Creek, Smith River, 1♂, VII-8-30, 6♂, 1♀, VII-11-30 (J. M. Aldrich, USNM).

The male of *H. armata* has a dark brown lustrous appearance, with polished haustellum, dorsal bristles on mid metatarsus, and robust blunt apical posteroventral bristle on fore tibia. The female also has haustellum polished and prealar bristle typically absent.

*Hylemya (Delia) attenuata* Malloch

*Hylemya attenuata* Malloch. 1920, Amer. Ent. Soc. Trans., 46:188.

Holotype: ♂, Claremont, California (IHNS).

**Geographic range.**—Alberta, California, Oregon, Washington.

**California records.** — LOS ANGELES CO.: Claremont, 2♂, 1♀, no date (Baker IHNS, USNM). MONTEREY CO.: Hastings Reservation near Jamesburg, 1♂, XI-22-56 (D. D. Linsdale, CIS).

The slender brownish species *H. attenuata* is notable for the broad parafacials and cheeks, and in the male for its slender attenuated abdomen. Typically segment 1 of the male mid tarsus has dorsal bristles and segments 2, 3 and 4 dilated, each having a prominent curved bristle at apex of posterior surface, figure 99.

*Hylemya (Delia) brassicae* (Bouché)

(Map 5)

*Anthomyia brassicae* Bouché. 1833, Naturgeschichte der schädlichen und nützlichen Garten-Insecten, p. 131.

*Anthomyia raphani* Harris. 1841, Rept. Ins. Mass. injurious to vegetation, p. 415.

Types: ♂, ♀, Germany.

**Geographic range.** — Occurs throughout North America, from British Columbia and Alberta eastward to Newfoundland and southern Labrador, southward to as far as North Carolina and westward to include most of the states in the southern tier.

**California records.** — DEL NORTE CO.: Crescent City, 1♂, VII-1-51 (M. F. McClay, UCD). HUMBOLDT CO.: McKinleyville, 1♂, 1♀, VI-18-60 (T. R. Haig, UCD). Pepperwood, 1♂, VI-18-58 (T. R. Haig, UCR). Rio Dell, 3♀, VIII-24-62 (R. W. Matthews, MSUM). Shively, 3♂, VIII-21-56 (P. D. Hurd, CIS). MARIN CO.: Mill Valley, 1♂, V-2-62 (R. Reynolds, CAS). San Anselmo, 1♂, VI-6-53 (H. L. Mathis, UCD). MONTEREY CO.: Moss Landing, 1♀, VIII-1-53, on turnip (W. H. Lange, USNM).



Map 5. Locality records in California for *Hylemya (Delia) brassicae* (Bouché).

Salinas, 1♀, II-24-50, 1♂, II-26-50, both on brussels sprouts (W. H. Lange, USNM). SAN BENITO CO.: San Juan [Bautista], 1♀, V-5-50, ex yellow mustard (W. H. Lange, UCD). SAN FRANCISCO CO.: Laguna Puerca, 1♂, V-6-60 (J. Powell, CIS); 1♂, V-16-60 (J. F. Lawrence, CIS); 1♂, IX-2-63 (P. H. Arnaud, CAS). San Francisco, 1♀, IX-1-51 (B. Keh, BVC); 1♂, V-17-52 (C. E. Kaufeldt, CAS); 4♂, 3♀, VIII-11-57 (P. H. Arnaud, CAS). San Francisco, San Miguel Hills, 1♂, V-26-60 (D. C. Rentz, CAS). SAN MATEO CO.: Colma, 1♂, 1♀, emerged V-21-49, ex beans, 4♂, 2♀, IV-10-53, on *Raphanus sativus*, 1♀, III-29-53, 1♂, IV-1-53, both ex wild radish, *Raphanus* sp. (W. H. Lange, USNM). Halfmoon Bay, 6♀, IV-4-49, 13♂, III-11-50, 1♂, VII-11-50 (E. C. Carlson, W. H. Lange, UCD). 12 mi. N. of Halfmoon Bay, 1♂, VI-18-59 (T. R. Haig, UCD). Pescadero, 1♀, V-1-49 (W. W. Middlekauff, CIS); 4♂, 11♀, IV-21-50, 3♂, V-5-50, ex yellow mustard (W. H. Lange, UCD). Redwood City, 1♂, VI-15-46 (P. H. Arnaud, CAS). San Bruno Mts., 1♀, VI-4-63 (J. Powell, CIS). South San Francisco, 1♀, V-2-23 (F. H. Wymore, UCD). SANTA CLARA CO.: San Jose, 2♀, VII-18-50, ex turnip (UCD). Sunnysvale, 1♀, III-28-50 (W. H. Lange, UCD). SANTA CRUZ CO.: Davenport, 1♀, I-17-50, ex cabbage, 2♀, I-30-50, ex broccoli (W. H. Lange, UCD). Santa Cruz, 1♂, II-11-50, 1♂, 3♀, II-16-50 (E. C. Carlson, UCD); 1♂, III-29-61 (R. Brown, CAS). SHASTA CO.: Hat Creek P. O., 1♂, VI-27-55 (J. R. Jessen, UCD). SONOMA CO.: Healdsburg, 1♂, IV-3-57 (S. M. Fidel, UCD).

The species *H. brassicae* is a common economic pest of cultivated cruciferous crops, and is closely related to *planipalpis*, the latter referred to as the radish maggot. Adults of *brassicae* may be distinguished from

those of *planipalpis* by presence of cluster of short bristles near the base of the hind femur in the males and by the slender palpi in the females. Brooks (1951: 113-116) and Hennig (1952:388-389) have given keys and illustrations for distinguishing the larvae of *brassicæ* from those of associated economic species.

*Hylemya (Delia) bucculenta* (Coquillett)

*Pegomya bucculenta* Coquillett. 1904, Wash. Ent. Soc. Proc., 6:188.

*Hylemya occidentalis* Malloch. 1920, Amer. Ent. Soc. Trans., 46:191.

Holotype: ♂, mountains near Claremont, California (USNM).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Connecticut, Labrador, Manitoba, Michigan, Northwest Territories, Ontario, Quebec, Utah, Washington, Wisconsin, Yukon Territory.

**California records.** — ALAMEDA Co.: Berkeley, 1 ♀, III-2-39 (B. Brookman, CAS); 1 ♀, III-4-39 (W. Finfrock, CIS); 1 ♀, V-28-47 (R. L. Usinger, CIS); 1 ♂, III-19-49 (L. W. Quate, CIS); 3 ♂, 1 ♀, III-10-50 (C. A. Downing, UCD); 1 ♂, III-1-52 (J. W. Hineman, CIS); 1 ♂, IV-29-57 (L. A. Sanchez, CIS); 1 ♂, V-6-57 (D. D. Linsdale, CIS). Fish Ranch Road, 1 ♂, III-4-49 (P. D. Hurd, CIS). Oakland, 1 ♀, IV-8-37 (E. S. Ross, CAS). Strawberry Canyon, 3 ♂, III-5-50, 1 ♂, 1 ♀, III-12-50 (L. W. Quate, CIS). Strawberry Canyon, Berkeley Hills, 1 ♀, IV-10-54, 3 ♂, 4 ♀, III-24-56, 7 ♂, III-13-60 (J. Powell, CIS); 1 ♀, III-23-62, 3 ♀, IV-4-62 (C. A. Toschi, CIS). EL DORADO Co.: 3 mi. S. of Camino, 1 ♀, VI-23-48 (J. W. MacSwain, CIS). 5 mi. S. of Placerville, 1 ♀, VIII-25-48 (CIS). LASSEN Co.: Hallelujah Junction, 1 ♀, VI-27-49 (C. I. Smith, CIS). LOS ANGELES Co.: Monrovia Canyon, 1 ♂, II-27-32 (C. H. Martin, HCH). Mountains near Claremont, 2 ♂, no date, type and paratype (Baker, USNM). MARIN Co.: Alpine Lake, 2 ♂, III-23-56 (A. M. Barnes, CIS). Inverness, 1 ♀, III-25-62 (C. A. Toschi, CIS). Mill Valley, 1 ♀, III-16-19 (E. P. Van Duzee, CAS). Taylor State Park, 1 ♀, V-8-49 (P. H. Arnaud, CAS). MODOC Co.: Cedar Pass, 1 ♀, VI-29-55 (D. L. Dahlsten, UCD). SAN MATEO Co.: La Honda, 2 ♂, IV-3-49, 1 ♂, 1 ♀, III-8-64 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Santa Cruz, 1 ♀, II-26 (R. Latta, HCH). TUOLUMNE Co.: Yosemite, 3,880-4,000 ft., 1 ♀, VI-10-28, 1 ♀, VI-17-28, 2 ♀, VI-11-12-31, 2 ♀, VI-17-31 (E. O. Essig, CIS).

The blackish species *H. bucculenta* resembles a small *brassicæ* in its markings, but it is more profusely bristled. The mid tibia has 2 posterodorsal bristles, in the male a depressed lengthy preapical posterodorsal bristle, figure 108, and in the female a well developed mid anterior bristle. Hind tibia has a longish preapical posterodorsal bristle. Proboscis of female is enlarged and fleshy.

*Hylemya (Delia) canadensis* Huckett

*Hylemya canadensis* Huckett. 1929, Canad. Ent., 61:162.

Holotype: ♂, Banff, Alberta (CNC).

**Geographic range.**—Alaska, Alberta, British Columbia, Cali-



Map 6. Locality records in California for *Hylemya (Delia) concorda* Huckett. This distribution pattern is typical of several high montane species of *Hylemya* in California.

fornia, Northwest Territories, Quebec, Yukon Territory.

**California records.** — LOS ANGELES Co.: 1 ♂, V-10-52 (J. Redmond, UCLA). NEVADA Co.: Boca, 1 ♀, VI-28-54 (R. H. Goodwin, CIS). Sagehorn Creek, near Hobart Mills, 1 ♂, VII-6-64, 1 ♂, VII-9-64, 1 ♂, VII-15-64, 1 ♀, VII-16-64, in malaise trap (M. E. Irwin, UCR). TUOLUMNE Co.: Ellery Lake, Tioga Pass, 9,400 ft., 2 ♂, VII-3-27 (J. M. Aldrich, USNM). Blue Canyon, Sonora Pass, 1 ♀, VIII-30-60 (P. D. Hurd, CIS).

Males of *canadensis* and *frontulenta* have a cluster of longish slender bristles on the cerci, and in both sexes the presutural acrostical bristles are irregularly uniserial, and the mid tibia usually has 2 posterodorsal bristles. In *canadensis* the parafacials and cheeks are not as broad as in *frontulenta*, and the frons in the male narrower caudad.

*Hylemya (Delia) concorda* Huckett

(Map 6)

*Hylemya (Delia) concorda* Huckett. 1966, Calif. Acad. Sci. Proc., Ser. 4, 34:235.

Holotype: ♂, Silverton Hills, Oregon (CAS).

**Geographic range.**—Alberta, British Columbia, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington.

**California records.**—ALPINE Co.: Carson Pass, 1 ♀, VII-28-30 (H. H. Keifer, CDA). 1.5 mi. NE. of Red Lake, 1 ♂, VII-25-55 (E. I. Schlinger, UCD). EL DORADO Co.: Snowline Camp, 1 ♀,



VII-4-48 (P. D. Hurd, CIS). FRESNO Co.: Kaiser Pass, 1 ♀, VIII-30-60 (J. F. Lawrence, CIS). LASSEN Co.: Bridge Creek Camp, 1 ♂, VII-9-49 (E. L. Atkinson, CIS). South end of Eagle Lake, 1 ♀, VIII-26-63 (H. B. Leech, CAS). MONO Co.: Leavitt Meadow, 7,200 ft., 13 ♂, 3 ♀, VIII-12-14-63, flight trap (H. B. Leech, CAS). Mammoth Lakes, 1 ♂, 2 ♀, VII-29-40 (R. H. Beamer, D. E. Hardy, HCH). 4 mi. SW. of Tom's Place, 2 ♀, VII-13-61 (H. V. Daly, CIS). Virginia Lakes, 9,750 ft., 27 ♂, 5 ♀, VIII-17-63 (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 15 ♂, 5 ♀, VIII-20-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 3 ♂, 1 ♀, VII-15-64, 1 ♂, VII-16-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: 8 mi. NW. of Chester, 1 ♀, VIII-18-58 (E. E. Lindquist, CIS). SIERRA Co.: Webber Lake, 1 ♀, IX-3-39 (B. Brookman, CAS). SISKIYOU Co.: McBride Campground, 4 road mi. E. of Shasta City, 1 ♂, VII-23-62 (D. C. Rentz, C. D. MacNeill, CAS). TUOLUMNE Co.: Sonora Pass, 1 ♂, VIII-18-56 (E. E. Lindquist, CIS). Strawberry, 2 ♂, VII-8-51 (A. T. McClay, UCD). Tuolumne Meadows, 1 ♂, VIII-19-55 (J. W. MacSwain, CIS).

The males of *H. concorda* and *neomexicana* have several stiffish setulae on inner margin of processes, in *concorda* largely confined to distal half. The females of both species have recurrent spinules on terminal sclerites of ovipositor. *Concorda* may be distinguished from *neomexicana* by the much longer arisal hairs, and by the blunt coarse apical posteroventral bristle on male fore tibia.

### *Hylemya (Delia) depressa* Stein

*Hylemya depressa* Stein. 1898, Berlin. Ent. Ztschr., (1897) 42:214.

Holotype: ♂, Natrona, Pennsylvania (FMNH).

**Geographic range.** — Widely distributed in North America, occurring as far north as regions in Alaska, Yukon and Northwest Territories and eastward across the provinces to Labrador, the Maritime Provinces and New England states, southward to New York, Pennsylvania, Ohio and North Central and Rocky Mountain states, to as far south as New Mexico, Arizona and California.

**California records.** — EL DORADO Co.: 1.5 mi. W. of Camp Richardson, 1 ♀, VII-24-55 (E. I. Schlinger, UCD). MONO Co.: Mono Lake, 2 ♂, VII-23-11 (USNM). PLUMAS Co.: Graeagle, 1 ♂, VI-18-49 (E. I. Schlinger, UCD). SAN BERNARDINO Co.: Round Cienega, 1 ♂, IX-1-23 (CAS).

*H. depressa* is closely allied to *aemene*, of which it might be considered the darker phase. In both taxa the arista has longish hairs, and in the female the mid and hind femora are fulvous and humeral callosities or scutellum, or both, are partly or entirely reddish.

### *Hylemya (Delia) deviata* Huckett

*Hylemya (Delia) deviata* Huckett. 1965, Ent. Soc. Canada, Mem. 42, p. 55.

Holotype: ♂, Whitehorse, Yukon Territory (CNC).

**Geographic range.** — Alaska, Alberta, British Columbia, Cali-

fornia, Colorado, Montana, Oregon, Washington, Wyoming, Yukon Territory.

**California records.** — ALAMEDA Co.: Altamont, 1 ♀, III-26-37 (R. C. Dickson, UCR). Berkeley, 1 ♀, IV-8-54, 5 ♂, 7 ♀, IV-14-16-54 (P. D. Hurd, CIS). ALPINE Co.: 2 mi. N. of Blue Lakes, 9,000 ft., 1 ♂, VII-17-60 (C. G. Moore, CIS). Carson Pass, 1 ♀, VII-28-30 (H. H. Keifer, CDA). 5 mi. NE. of Lake Alpine, 1 ♂, VI-25-60 (R. W. Thorp, CIS). Woods Lake, 1 ♀, VII-16-60 (C. G. Moore, CIS). EL DORADO Co.: Echo Lake, 7,500 ft., 1 ♀, VII-13-61 (J. G. Chillcott, CNC). Fallen Leaf, 6,500 ft., 1 ♂, VII-13-61 (J. G. Chillcott, CNC). FRESNO Co.: Huntington Lake, 7,000 ft., 1 ♀, VII-7-19, 2 ♀, VII-10-19, 1 ♀, VII-26-19 (E. P. Van Duzee, CAS). HUMBOLDT Co.: Fieldbrook, 1 ♂, no date (H. S. Barber, CAS). INYO Co.: Bishop, 1 ♀, V-20-51 (E. I. Schlinger, UCD). Lone Pine, 1 ♂, VII-28-40 (L. J. Lipovsky, UK). Lone Pine Creek, 10,250 ft., 3 ♂, VII-7-61 (H. V. Daly, CIS). Whitney Trail, 9,000 ft., 1 ♂, 2 ♀, VII-7-61 (J. Powell, CIS). LASSEN Co.: Snag Lake, 1 ♀, VII-5-57 (R. F. Schoepner). LOS ANGELES Co.: Claremont, 1 ♀, no date (Baker, USNM). MARIN Co.: North end of Golden Gate Bridge, 1 ♂, 1 ♀, IV-12-53 (H. B. Leech, CAS). Point Reyes, 1 ♀, V-15-37 (R. C. Dickson, UCR); 1 ♂, III-30-56 (W. H. Lange, UCD). MARIPOSA Co.: Paradise Valley, Yosemite National Park, 1 ♀, VII-24-38 (P. D. Hurd, CIS). Tiltill Valley, Yosemite National Park, 1 ♀, V-1-38 (CIS). MENDOCINO Co.: 5 mi. W. of Coulterville, 1 ♂, V-5-59 (G. I. Stage, CIS). MODOC Co.: Canby, 1 ♀, VII-8-46 (P. D. Hurd, CIS). Cedar Pass, 2 ♀, VI-29-55 (R. D. Browning, J. C. Wells, UCD). 6 mi. NW. of Cedarville, 1 ♀, VII-4-62 (J. S. Buckett, UCD). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 5 ♂, 13 ♀, VII-16-53 (E. I. Schlinger, UCD). Cottonwood Creek, 9,300 ft., 2 ♀, VII-10-61 (D. R. Miller, UCD; H. V. Daly, CIS). Crooked Creek, 9,500 ft., White Mts., 1 ♀, VI-20-61 (D. R. Miller, UCD). Crooked Creek Lab., 10,150 ft., White Mts., 4 ♀, VII-21-61 (H. V. Daly, CIS). Lake Mary, Mammoth Lakes, 1 ♀, VII-14-61 (J. S. Buckett, UCD). Virginia Lakes, 9,750 ft., 3 ♂, VIII-17-63 (H. B. Leech, CAS). White Mts., 10,000 ft., 1 ♂, VI-28-61 (J. S. Buckett, UCD). Wyman Canyon, 10,000 ft., White Mts., 1 ♀, VII-11-62 (W. H. Lange, UCD). MONTEREY Co.: Asilomar, 1 ♂, VI-18-47 (A. L. Melander, USNM). Pacific Grove, 2 ♂, 2 ♀, V-29-54 (M. Wasbauer, CIS). ORANGE Co.: San Clemente, 1 ♂, III-26-46 (A. L. Melander, USNM). PLACER Co.: Clobins, Lake Tahoe, 2 ♀, VII-16-55 (E. A. Kurtz, UCD). RIVERSIDE Co.: Idyllwild, San Jacinto Mts., 1 ♀, VI-10-39 (B. Brookman, CAS). SAN BENITO Co.: 5 mi. W. of San Juan Bautista, 1 ♂, IV-6-60 (T. R. Haig, UCD). SAN BERNARDINO Co.: Big Bear Lake, 7,000 ft., 1 ♀, no date, (R. H. Beamer, UK). Dollar Lake Trail, San Bernardino Mts., 1 ♀, VII-10-56 (G. I. Stage, CIS). SAN DIEGO Co.: Pine Valley, 1 ♀, VI-21-63 (T. Bolton, UCD). SAN FRANCISCO Co.: Golden Gate dunes, 1 ♀, VI-22-31 (C. and D. Martin, CU). Lobos Creek, San Francisco, 1 ♂, 1 ♀, V-16-60 (J. F. Lawrence, CIS). San Francisco, 1 ♂, VI-18-22 (C. L. Fox, CAS); 1 ♀, IV-28-50, ex chives (W. H. Lange, UCD); 1 ♀, IV-19-52, 1 ♂, IV-23-52, 3 ♂, V-3-52, 2 ♂, 1 ♀, V-5-6-52, 1 ♂, V-10-52, 1 ♂, 1 ♀, V-24-52, 1 ♀, VI-13-52, 1 ♀, VII-1-52 (C. E. Kaufeldt, CAS). SAN LUIS OBISPO Co.: Grover City, 8 ♂, 8 ♀, VII-4-56 (E. G. Linsley, CIS). Morro Bay, 1 ♂, 1 ♀, IV-30-62 (R. L. Langston, C. A. Toschi, CIS). SAN MATEO Co.: Halfmoon Bay, 2 ♀, VII-11-50 (E. C. Carlson, UCD). Redwood City, 4 ♀, IV-24-48 (P. H. Arnaud, CAS). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1 ♀, VII-4-60 (F. D. Parker, UCD). 5 mi. E. of Webber

Lake, 1♀, VII-29-55 (H. R. Moffitt, UCD). SHASTA Co.: Hat Lake, Lassen National Park, 1♀, VII-13-50 (P. H. Arnaud, CDA). SISKIYOU Co.: Weed, 1♀, VIII-10-40, light trap (R. L. Post, B. Allgaier, CU). SONOMA Co.: Dillon Beach, 1♂, V-18-63 (J. Powell, CIS). Stillwater Cove, 1♂, V-7-55 (J. C. Downey, UCD). Vacaville, 12♂, 9♀, II-26-53 (J. C. Hall, UCD). TUOLUMNE Co.: Belle Meadows, 1♀, VIII-18-48 (P. H. Arnaud, CAS). Blue Canyon, Sonora Pass, 1♂, VIII-10-60 (D. Q. Cavagnaro, UCD). Chipmunk Flat, 1♀, VIII-9-60 (A. S. Menke, UCD). Sonora Pass, 2♂, 1♀, VII-11-51, 1♀, VII-17-51 at 9-10,000 ft. (A. T. McClay, UCD); 1♂, VII-10-57 at 8-9,000 ft. (W. T. Crites, UCD). Tilden Camp, Yosemite National Park, 1♀, VII-30-38 (CIS). YOLO Co.: Davis, 1♀, III-11-61 (M. E. Irwin, UCD); 3♂, 1♀, I-30-67, ex seedpods of *Astragalus* (D. S. Horning, UCD).

The male of *H. deviata* has a full series of longish anteroventral bristles and proximal series of posteroventrals on hind femur, resembling in this respect the males of *lupini* (Coquillett). The male of *deviata* differs in having very few if any posteroventral setulae on the hind tibia. Females of *deviata* are paler gray than the males, with or without a median stripe on mesonotum and abdomen, parafrontals rather broad and interfrontalia reddish or ochreous, abdomen with clothing setulae on terga relatively long, and increasingly so caudad. I have before me two males and two females of this species reared from "lupin" at Cloverdale, British Columbia, and one male from Pullman, Washington, dated April 1895, and bearing the label "reared from larvae in seeds of *Lupinus sericeus*."

### *Hylemya (Delia) echinata* (Séguy)

(Map 7)

*Phorbia florilega* Meade not Zetterstedt. 1893, Ent. monthly Mag., 19:217.

*Chortophila echinata* Séguy. 1923, Soc. Ent. de France, Ann., 91:360.

*Hylemya abdena* Hall. 1937, U. S. Natl. Mus. Proc. 84:201.

Holotype: ♂, near Paris, France (MNHP).

**Geographic range.** — Alaska, California, Connecticut, Idaho, Nevada, Newfoundland, New Hampshire, New York, Northwest Territories, Ontario, Oregon, Utah, Washington, Yukon Territory, Greenland.

**California records.** — ALAMEDA Co.: Moraga Ridge, 1♂, VI-11-26 (H. H. Keifer, CAS). Oakland, 1♀, III-17-56 (B. J. Adelson, CIS). EL DORADO Co.: Pyramid R(anger) S(tation), 1♀, VII-12-48 (C. Chan, CIS). Strawberry, 1♂, V-22-55 (D. J. Burdick, CIS). GLENN Co.: Plaskett Meadows, 6,200 ft., 1♂, VII-3-60 (J. Powell, CIS). LOS ANGELES Co.: Big Pines, 1♂, V-23-45 (A. L. Melander, USNM). Glendale, 2♂, VI-3-56 (E. I. Schlinger, UCD); 1♂, VII-11-52, 1♀, IX-1952 (W. M. Schlinger, UCD). Los Angeles, 1♂, no date (UCLA). Santa Monica, 1♀, IV-26-50 (T. P. Kinsella, UCLA). Westwood Hills, 1♂, V-19-50 (UCLA). MARIN Co.: Bolinas, 1♀, III-10-50 (E. I. Schlinger, UCD). MARIPOSA Co.: Miami Ranger Station, 1♂, V-22-42 (CIS). MONO Co.: Mammoth Lake, 1♀, VII-11-33 (CAS). MONTEREY Co.: Bradley, 1♂, IV-20-19 (E. P. Van Duzee, CAS). Carmel, 1♀, III-25-19 (E. P. Van Duzee,



Map 7. Locality records in California for *Hylemya (Delia) echinata* (Séguy).

CAS). ORANGE Co.: Anaheim, 1♂, V-11-56, light trap (E. M. Evans, UCD). PLACER Co.: Auburn, 3♂, IV-11-51 (E. I. Schlinger, UCD). Dutch Flat, 1♂, V-20-52 (A. T. McClay, UCD); 1♂, V-2-54 (E. I. Schlinger, UCD). RIVERSIDE Co.: Ripley, 1♂, III-7-47 (CIS). Tahquitz Valley, San Jacinto Mts., 1♂, VI-3-40 (F. H. Rindge, CIS); 1♂, VIII-6-50 (W. A. McDonald, UCLA). Thousand Palms, 1♂, IV-4-55 (J. E. H. Martin, CNC). SACRAMENTO Co.: Perkins, 1♀, IV-30-58, ex *Dianthus caryophyllus* (L. Houts, B. Irvine, CDA). Sacramento, 3♂, III-28-27 (C. C. Wilson, USNM); 1♂, V-9-31, 1♀, III-15-37 (H. H. Keifer, CDA); 1♀, V-13-37 (A. C. Browne, CDA). SAN BERNARDINO Co.: Redlands, 2♂, III-20-36 (L. Miller, BYU). SAN DIEGO Co.: Balboa Park, San Diego, 4♂, 2♀, IV-27-51 (J. I. Madigan, UCD). La Jolla, 1♂, I-1-35 (A. L. Melander, USNM). San Diego, 2♂, IV-6-16 (H. G. Dyar, USNM); 1♂, IV-11-16 (L. A. Titus, USU); 1♂, IV-23-20 (E. P. Van Duzee, CAS). SAN FRANCISCO Co.: Farallon Islands, 2♂, 5♀, V-8-49 (G. D. Hanna, A. G. Smith, CAS). San Francisco, 1♂, V-19-63 (P. H. Arnaud, CAS). SAN JOAQUIN Co.: Manteca, 1♀, IV-29-52 (W. H. Lange, UCD). SAN MATEO Co.: Halfmoon Bay, 2♂, III-11-50 (E. C. Carlson, W. H. Lange, UCD); 1♀, IV-4-49 (E. C. Carlson, UCD). Redwood City, 1♀, IV-5-43, 2♀, II-16-47, 1♀, V-3-47, 1♂, 2♀, III-17-48, 1♂, IV-30-48, 2♀, V-6-48, 1♂, V-19-48 (P. H. Arnaud, CAS). SANTA CLARA Co.: Palo Alto, 1♂, V-2-96, 1♂, 1893 (CU). Stanford University, 1♂, XII-8-00 (CU). SANTA CRUZ Co.: Felton, 300-500 ft., Santa Cruz Mts., 2♂, V-15-19-07 (J. C. Bradley, CU). Watsonville, 1♂, V-15-42 (L. C. Huston, USNM). SHASTA Co.: 3 mi. SE. of Mt. Lassen, 1♂, VII-8-55 (J. W. MacSwain, CIS). Viola, 1♂, V-19-41 (C. W. Anderson, CIS). SOLANO Co.: Mix Canyon, 1♀, IV-1-51 (E. M. Hall, UCD).

TRINITY Co.: Fawn Lodge, 1 ♀, V-28-55 (E. I. Schlinger, UCD). TULARE Co.: Lemoncove, 1 ♂, III-29-51 (P. D. Hurd, CIS). LINDSAY, 1 ♂, V-17-11 (USNM). TUOLUMNE Co.: Belle Meadows, 2 ♀, VIII-18-48 (P. H. Arnaud, CAS). Bumble Bee, 1 ♀, VI-25-51 (A. T. McClay, UCD). Chipmunk Flat, 1 ♂, VI-17-61 (C. A. Toschi, CIS). Cow Creek, 1 ♂, VI-25-51 (A. T. McClay, UCD). Sonora Pass, 8,000 ft., 1 ♂, 1 ♀, VII-21-51 (W. C. Bentinck, CIS). YOLO Co.: Esparto, 1 ♂, II-24-52 (K. W. Tucker, UCD).

The male of *H. echinata* differs from that of *angustiventralis* in having long marginal bristles on sternum 3 of abdomen as well as on sternum 4, and the interfrontalia obscured caudad by the contiguous parafrontals. The female of *echinata* resembles that of *platura*, from which it may be separated by the weak or absent preapical posterodorsal bristle on fore tibia and by the presence of a few semierect setulae on median plane of anterior surface of fore femur. The larvae are known to feed on buds of carnations (Doucette, 1941:472) and buds and foliage of spinach (Miles, 1953b:591-596). Spencer (1933:22) had earlier drawn attention to the species under the name *Hylemyia florilega* as partly the cause for injury to carnations in the Vancouver District of British Columbia.

#### *Hylemyia (Delia) extensa* Huckett, new status

*Hylemyia (Delia) setiventris extensa* Huckett. 1951, Ent. Soc. Wash. Proc., 53:257.

Holotype: ♂, Anchorage, Alaska (USNM).

*Geographic range*.—Alaska, California, Idaho, Montana, Oregon, Washington.

*California records*. — ALPINE Co.: Winnemucca Lake, 1 ♂, VII-30-59 (P. M. Marsh, UCD). FRESNO Co.: Huntington Lake, 7,000 ft., 1 ♂, VII-20-19, 1 ♂, 2 ♀, VII-26-19 (E. P. Van Duzee, USNM). INYO Co.: Bishop, 1 ♂, VII-28-40 (R. H. Beamer, UK). LOS ANGELES Co.: Big Pines, 1 ♀, VI-29-48 (A. L. Melander, USNM). MARIPOSA-TUOLUMNE Co.: Yosemite National Park, 1 ♀, VIII-1-40 (R. H. Beamer, UK). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 1 ♂, VIII-25-60 (M. E. Irwin, UCD). White Mts., 10,150 ft., 3 mi. N. of Inyo Co., 1 ♀, VIII-19-63, 1 ♂, VIII-20-63, flight trap (H. B. Leech, CAS). PLACER Co.: Lake Forest, Lake Tahoe, 1 ♂, VIII-7-49 (E. G. Linsley, CIS). SAN DIEGO Co.: Oak Grove, 1 ♂, V-8-45 (A. L. Melander, USNM). SISKIYOU Co.: Mt. Shasta City, 1 ♂, VI-20-58 (J. Powell, CIS). TUOLUMNE Co.: Saucer Meadows, 1 ♂, 2 ♀, X-13-63 (R. E. Doty, BVC). Strawberry, 2 ♂, VII-14-57 (D. Burdick, CIS). Tuolumne Meadows, 1 ♂, VIII-1-15, copulatory appendages missing, (C. L. Fox, USNM).

Males of *H. extensa* differ from those of *setiventris* in having the long apical bristles on lobes of sternum 4 flagellate at tips and reaching caudad beyond apex of abdomen.

#### *Hylemyia (Delia) extenuata* Huckett

*Hylemyia (Delia) extenuata* Huckett. 1952, Brooklyn Ent. Soc. Bull., 47:118.

Holotype: ♂, Chehalis, Washington (USNM).

*Geographic range*. — California, Oregon, Washington.

*California record*.—SISKIYOU Co.: Mt. Shasta City, 1 ♂, VIII-26-58 (J. Powell, CIS).

The male of *H. extenuata* has the abdomen slender and attenuated, as in *attenuata*, from which it differs in the normal development of mid tarsal segments 2 to 4, and in having longer bristles on processes of sternum 5, the tips of which extend caudad beyond the apex of abdomen. In males of both species the mid metatarsus typically has dorsal bristles. The female of *extenuata* has presutural acrosticals bristlelike and uniserial, tibiae rufous.

#### *Hylemyia (Delia) extremitata* Malloch

*Hylemyia extremitata* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:309.

Holotype: ♂, Gallatin County, Montana (Mont. Agr. Exp. Sta.).

*Geographic range*.—Alaska, Alberta, Arizona, California, Colorado, Idaho, Montana, Nevada, Northwest Territories, Utah, Wyoming, Yukon Territory.

*California record*. — LASSEN Co.: South end of Eagle Lake, 1 ♀, VIII-26-63 (H. B. Leech, CAS).

Males of *H. extremitata*, *recurva* and *normalis* have narrow evenly slender abdomens and one or two unusually stout posterodorsal bristles on distal half of the mid tibia, figure 107. In *extremitata* and *recurva* the hind tibia possesses a few sharply recurrent preapical bristles on the anterior surface. The male of *extremitata* may be recognized by the long curly anterodorsal bristles on hind tibia, the longest being set proximad of middle of tibia, and by the extensive series of slender anteroventral bristles on hind tibia. Females of the above three species are not readily separable. In *extremitata* the arisal hairs are no longer than half the width of third antennal segment.

#### *Hylemyia (Delia) frontulenta* Huckett

*Hylemyia frontulenta* Huckett. 1929, Canad. Ent., 61:161.

Holotype: ♂, Coaldale, Alberta (CNC).

*Geographic range*. — Alberta, British Columbia, California, Colorado, New Mexico.

*California records*. — ALPINE Co.: Hope Valley, 1 ♂, VII-9-48 (C. D. MacNeill, CIS). LOS ANGELES Co.: Beverly Glen Canyon, 1 ♂, 1 ♀, III-22-52 (D. Shepherd, UCLA). Monrovia Canyon, 1 ♀, III-15-31, 1 ♂, III-13-32 (C. H. Martin, CU). Whittier Hills, 2 ♂, II-19-32 (C. H. Martin, CU). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 2 ♀, VI-20-53 (J. W. MacSwain, CIS); 1 ♀, VI-20-61 (J. Powell, CIS). White Mts., 10,000 ft., 1 ♀, VI-23-61 (J. S. Buckett, UCD). SAN DIEGO Co.: Descanso, 1 ♀, III-30-61 (W. A. Steffan, CIS).

The species *H. frontulenta* and *canadensis* have a uniserial series of presutural acrostical bristles on mesonotum and in the males a cluster of longish bristles on the apical region of cerci. In both sexes of *frontulenta* the parafacials and cheeks are usually broader than in *canadensis*, and the frons of the male is more widely maintained caudad.

*Hylemya (Delia) fulvescens* Huckett

*Hylemya (Delia) fulvescens* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:327.

Holotype: ♂, Marion Mountain Camp, San Jacinto Mountains, California (UCD).

*Geographic range.* — California.

*California records.* — MONO Co.: Leavitt Meadow, 7,200 ft., 1 ♂, 1 ♀, VIII-12-13-63, flight trap (H. B. Leech, CAS). RIVERSIDE Co.: Marion Mountain Camp, San Jacinto Mts., 1 ♂, VII-1-52, holotype (J. K. Hester, UCD). SAN BENITO Co.: 1 ♀, VI-15-55 (M. Wasbauer, UCD).

The species *H. fulvescens* possesses the habitus of *depressa* and *aemene*, from both of which it differs in having shorter haired arista, and in the male by the strong curved apical posteroventral bristle on fore tibia. The species as represented by the type series has antennae and palpi mainly fulvous, the third antennal segment being partly tinged.

*Hylemya (Delia) garretti* Huckett

(Map 8)

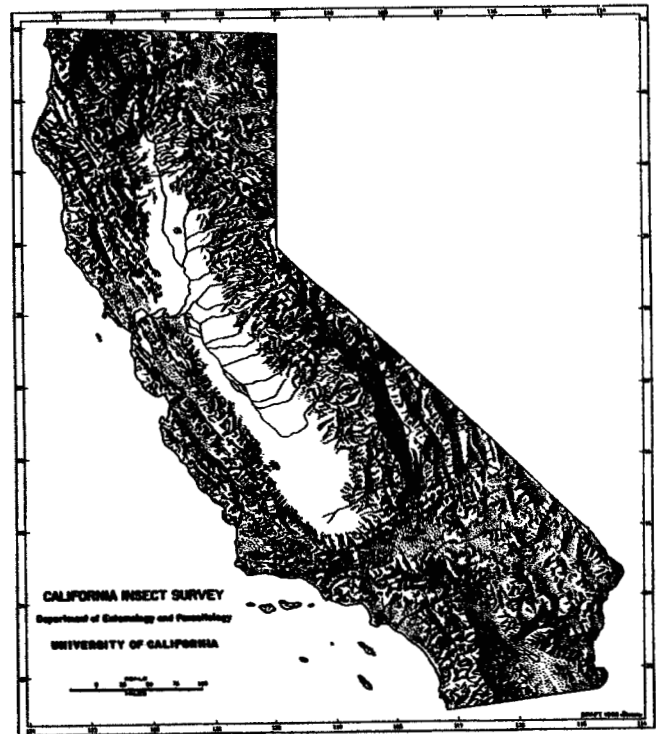
*Hylemya garretti* Huckett. 1929, Canad. Ent., 61:117.

Holotype: ♂, Keremeos, British Columbia (CNC).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Colorado, Labrador, Manitoba, Northwest Territories, Washington, Yukon Territory.

*California records.* — ALPINE Co.: Hope Valley, 1 ♂, 1 ♀, VII-9-48 (K. W. Tucker, UCD). INYO Co.: Bishop, 1 ♀, VII-28-40 (L. J. Lipovsky, HCH). RUBY LAKE, 6 ♂, 1 ♀, VIII-13-57 (D. D. Linsdale, J. Powell, CIS). MADERA Co.: Lyell Canyon, 1 ♀, VII-8-35 (E. C. Zimmerman, CAS). MODOC Co.: Cedar Pass, 1 ♀, VI-29-55 (K. Bowers, UCR). MONO Co.: Leavitt Meadow, 7,200 ft., 4 ♀, VIII-13-14-63, flight trap (H. B. Leech, CAS). 1 mi. W. of Tom's Place, 1 ♀, VIII-13-57 (D. D. Linsdale, CIS). VIRGINIA LAKES, 9,750 ft., 12 ♂, 15 ♀, VIII-17-63 (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 8 ♂, VIII-20-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen, near Hobart Mills, 1 ♀, VII-2-54 (J. C. Downey, UCD). Sagehen Creek, near Hobart Mills, 23 ♂, 21 ♀, VII-6-16-64, in malaise trap (M. E. Irwin, UCR). TUOLUMNE Co.: Tuolumne Meadow, 1 ♂, VIII-1-40 (R. H. Beamer, UK).

The species *H. garretti* and *propinquina* are closely related, females being scarcely distinguishable from one another, and the males in common having dorsal bristles on mid metatarsus and coarsened apical bristles on posterior surface of mid tarsal segments 3 and 4. The male of *garretti* may be separated from



Map 8. Locality records in California for *Hylemya (Delia) garretti* Huckett.

that of *propinquina* by the smaller, more rounded and more densely bristled cerci, and by the possession of more than one long apical spinule at apex of inner margin of processes, figures 25, 26.

*Hylemya (Delia) glabritheca* Huckett

*Hylemya (Delia) glabritheca* Huckett. 1966, Pan-Pacific Ent., 42:33.

Holotype: ♂, Redwood City, San Mateo County, California (CAS).

*Geographic range.* — California.

*California records.* — ALAMEDA Co.: Oakland, 1 ♀, III-19-57 (J. F. Lawrence, HCH). Tesla, 1 ♂, III-22-53 (J. G. Rozen, CIS). SAN MATEO Co.: Redwood City, 1 ♀, III-27-48, 1 ♂, III-29-48, holotype, 5 ♀, IV-24-48 (P. H. Arnaud, CAS).

*H. glabritheca* is allied to *triseriata* Malloch, from which it may be distinguished by the polished haustellum, and by the posteroventral bristles on hind femur of the female.

*Hylemya (Delia) intimata* Huckett

*Hylemya (Delia) intimata* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:239.

Holotype: ♂, Rincon, San Diego County, California (CAS).

*Geographic range.* — California.

*California records.* — LOS ANGELES Co.: Claremont, 2 ♂, no date (Baker, USNM). Mountains, near Claremont, 1 ♀, no

date (Baker, USNM). Glendale, 1 ♀, XII-29-52 (E. I. Schlinger, UCD). NAPA Co.: Mt. St. Helena, 1 ♀, II-22-53 (J. C. Hall, UCD). RIVERSIDE Co.: Gavillan Hills, 6 mi. W. of Perris, 1 ♀, III-24-61 (R. L. Langston, CIS). SAN DIEGO Co.: Rincon, 1 ♀, XII-7-35, 1 ♂, 1 ♀, XII-13-35, types (A. J. Basinger, CAS). San Diego, 1 ♀, I-18-13 (E. P. Van Duzee, CAS).

*H. intimata* is related to *attenuata*, from typical specimens of which it differs in the absence of dorsal bristles on mid metatarsus and in the normal development of mid tarsal segments 2 to 4 in the male, and by the narrower parafacials in both sexes.

#### *Hylemya (Delia) lamellicauda* Huckett

*Hylemya (Delia) lamellicauda* Huckett. 1952. Brooklyn Ent. Soc. Bull., 47:119.

Holotype: ♂, Williams, Arizona (USNM).

**Geographic range.** — Alberta, Arizona, California, Colorado, Idaho, Nevada, Oregon, Utah, Washington, Wyoming.

**California range.**—FRESNO Co.: 1 ♂, 2 ♀, III-20-28. Mendota, 1 ♀, IV-25-32 (E. P. Van Duzee, CAS). INYO Co.: Bishop, 2 ♂, VII-28-40 (R. H. Beamer, L. J. Lipovsky, UK). Lone Pine, 1 ♂, VII-28-40 (R. H. Beamer, UK). LASSEN Co.: 2.75 mi. E. of Litchfield, 1 ♀, VIII-25-63 (H. B. Leech, CAS). MONO Co.: Coleville, 1 ♀, V-28-39 (P. C. Ting, J. A. Downes, T. Aitken, CAS). Leavitt Meadow, 7,200 ft., 1 ♀, VIII-13-63, flight trap (H. B. Leech, CAS). The Hot Springs, 2.5 mi. S. of Bridgeport, 1 ♀, VIII-15-63, flight trap (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1 ♂, 1 ♀, VIII-19-20-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♂, VII-9-64, 1 ♀, VII-16-46, in malaise trap (M. E. Irwin, UCR). RIVERSIDE Co.: Mt. San Jacinto, 1 ♂, V-10-35 (A. L. Melander, USNM). SAN BERNARDINO Co.: Victorville, 1 ♀, XII-13-17 (J. C. Bradley, CU). TUOLUMNE Co.: Strawberry, 1 ♀, VI-29-51 (A. T. McClay, UCD).

The male of *H. lamellicauda* may be distinguished from its relatives by the peculiar conformation and bristling of the cerci, figure 111. The female, as in the male, has the arista short haired, the ovipositor with recurrent spinules on terminal sclerites, and the mid and hind femora extensively fulvous.

#### *Hylemya (Delia) longicauda* (Strobl) (Map 9)

*Anthomyia longicauda* Strobl. 1898, Naturw. Ver. f. Steiermark, Mitt. (1897), 34:245.

*Hylemya seamansi* Huckett. 1929, Canad. Ent., 61:143.

Type: ♂, Tyrol, Austria.

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Connecticut, Labrador, Manitoba, New Mexico, Northwest Territories, Ontario, Oregon, Quebec, Utah, Yukon Territory.

**California records.** — ALPINE Co.: Hope Valley, 2 ♀, VII-9-48 (K. W. Tucker, CIS); 1 ♀, VII-18-48 (L. W. Quate, CIS). FRESNO Co.: Huntington Lake, 7,000 ft., 2 ♀, VII-16-19 (E. P. Van Duzee, CAS). MODOC Co.: Plum Valley Campground, 1 ♀, VI-20-60 (D. C. Rentz, CAS). MONO Co.: Crooked Creek,

9,000 ft., White Mts., 1 ♀, VI-20-53 (J. W. MacSwain, CIS). Sardine Creek, 1 ♀, VII-6-51 (A. T. McClay, UCD). White Mts., 10,000 ft., 1 ♀, VI-22-61 (J. S. Buckett, UCD). NEVADA Co.: Sagehen near Hobart Mills, 1 ♂, VI-21-54 (P. D. Hurd, CIS). Sagehorn Creek, near Hobart Mills, 5 ♂, 13 ♀, VII-6-16-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: Buck's Lake, 1 ♂, 1 ♀, VI-23-49 (P. D. Hurd, J. W. MacSwain, CIS); 1 ♀, VII-1-49 (W. H. Wade, CIS). Meadow Valley, Plumas Valley, 3,500-4,000 ft., 1 ♀, VII-1-49 (W. H. Wade, CIS). Meadow Valley, Plumas Valley, 3,500-4,000 ft., 1 ♀, VI-11-24 (E. C. Van Dyke, CAS). RIVERSIDE Co.: Deep Canyon, 1 ♀, IX-2-64 (P. A. Rauch, UCR). SEASTA Co.: 3 mi. SE. of Mt. Lassen, 1 ♂, VII-8-55 (R. D. Browning, UCD). Old Station, 1 ♀, VI-22-55 (J. C. Wells, UCD). SIERRA Co.: Webber Lake, 1 ♂, 3 ♀, VII-3-64 (C. N. Slobodchikoff, CAS; M. E. Irwin, UCR). TUOLUMNE Co.: Dardanelles, 1 ♀, VI-17-61 (J. S. Buckett, UCD).

The male of *H. longicauda* may be recognized readily by the long slender bristles of the cerci, tips of which reach cephalad to the basal region of abdomen. The female has haustellum glossy, hind tibia with 2 anterodorsal bristles. In both sexes the prealar bristle is usually absent.

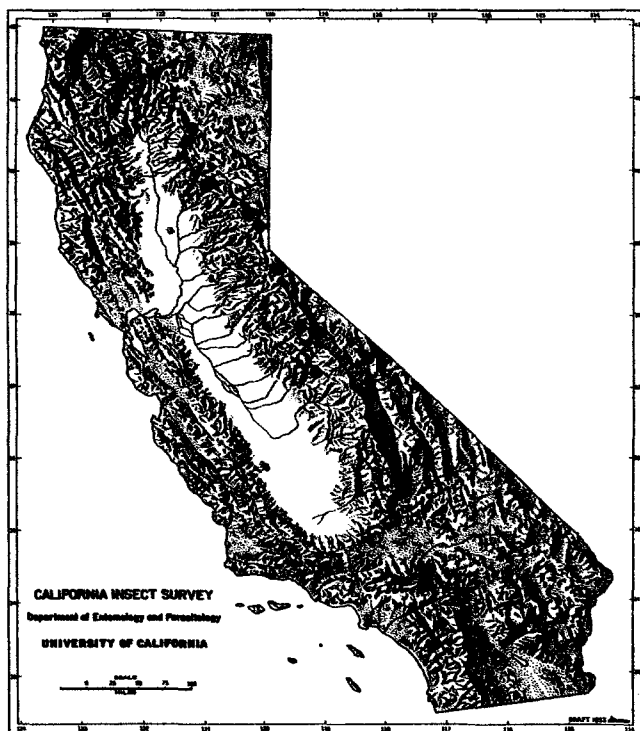
#### *Hylemya (Delia) lupini* (Coquillett) (Map 10)

*Phorbia lupini* Coquillett. 1901, Ent. News, 12:206.

Holotype: ♂, Los Angeles, California (USNM).

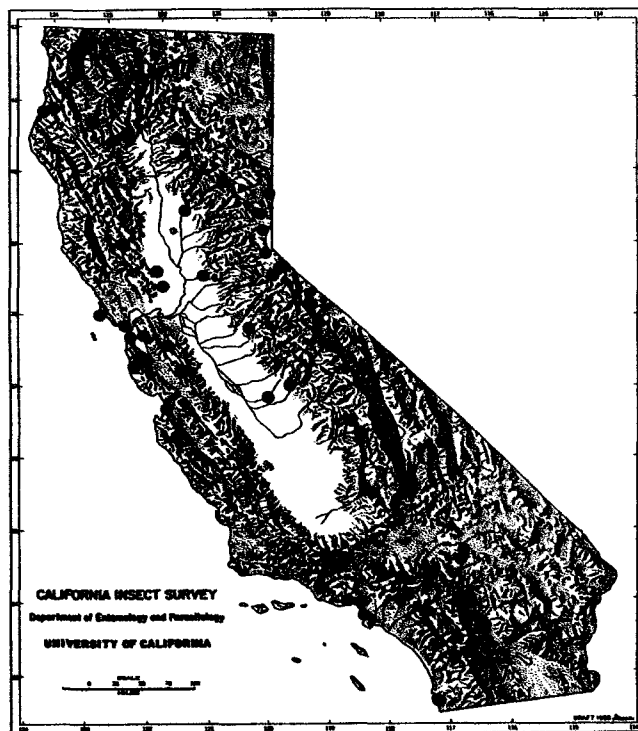
**Geographic range.** — Arizona, California, Florida, Oregon.

**California range.** — ALAMEDA Co.: Berkeley, 1 ♂, III-11-24, ex *Lupinus* (W. W. Jones, USNM); 1 ♂, IV-14-54 (P. D. Hurd, CIS). Berkeley Hills, 2 ♂, 2 ♀, III-26-54 (R. F. Smith, E. G. Linnsley, CIS). 5 mi. E. of Livermore, 1 ♂, V-15-55 (M. Wasbauer, CIS). ALPINE Co.: Carson Pass, 1 ♂, VII-28-30 (H. H. Keifer, CDA). Hope Valley, 1 ♀, VII-9-48 (K. W. Tucker, CIS). BUTTE Co.: Oroville, 1 ♀, IV-30-27 (H. H. Keifer, CAS). EL DORADO Co.: Echo Lake, 1 ♂, VII-23-55 (E. I. Schlinger, UCD). HUMBOLDT Co.: Blue Lake, 2 ♂, 3 ♀, VI-20-27-07 (J. C. Bradley, CU). Samoa Beach and dunes, 1 ♂, 1 ♀, VI-18-07 (J. C. Bradley, CU). INYO Co.: Bishop, 1 ♂, VII-28-40 (L. J. Lipovsky, UK); 1 ♀, V-20-51 (E. I. Schlinger, UCD). Surprise Canyon, Panamint Mts., 3 ♀, IV-24-57 (G. I. Stage, CIS). KERN Co.: Isabella, 1 ♀, IV-25-52 (P. D. Hurd, CIS). 16 mi. S. of Weldon, 1 ♂, IV-26-64 (J. Powell, CIS). LAKE Co.: Borax Lake, 1 ♀, VI-1-63 (D. R. Miller, UCD). LASSEN Co.: Hallelujah Junction, 1 ♀, VII-4-49 (P. D. Hurd, CIS). LOS ANGELES Co.: Beverly Glen, 1 ♂, II-22-52 (D. Shepherd, UCLA). Elizabeth Canyon, 1 ♂, IV-12-52 (D. Shepherd, UCLA). Llano, Mojave Desert, 1 ♂, III-13-35 (A. L. Melander, USNM). Los Angeles, 3 ♂, no date, ex leaves of *Lupinus albus*, type series (Fowler, USNM); 1 ♂, no date, ex stems of *Lupinus albus* (USNM). Mountains near Claremont, 1 ♀, no date (Baker, USNM). Palmdale, 1 ♂, III-26-47 (A. L. Melander, USNM). Santa Monica Mts., 1 ♂, VII-3-50 (UCLA). Tanbark Flat, 1 ♂, VI-24-52, aberrant (A. T. McClay, UCD). MADERA Co.: Madera, 2 ♂, 2 ♀, I-28-41 (CIS). San Joaquin Experiment Station, 1 ♂, II-22-53 (P. D. Hurd, CIS); 1 ♀, III-24-53 (H. E. Childs, CIS). MARIN Co.: Muir Woods, 1 ♂, VIII-30-08 (J. C. Bradley, CU). Point Reyes, 1 ♀, V-15-37 (R.



Map 9. Locality records in California for *Hylemya (Delia) longicauda* (Strobl).

C. Dickson, UCR); 1 ♂, III-30-56 (W. H. Lange, UCD). MONO Co.: Bridgeport, 1 ♂, VI-23-29 (E. P. Van Duzee, CAS). Mammoth Lakes, 1 ♂, 1 ♀, VII-29-40 (D. E. Hardy, L. J. Lipovsky, UK). Mono Lake, 1 ♂, VI-7-48 (W. W. Wirth, USNM); 1 ♂, VI-19-50 (G. Sperry, USNM). MONTEREY Co.: Castroville, 1 ♂, 1 ♀, V-11-44, ex *Lupinus arboreus* (W. H. Lange, UCD). Hastings Reservation near Jamesburg, 1 ♀, V-3-58 (J. Powell, CIS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♂, VII-7-64, in malaise trap (M. E. Irwin, UCR). PLACER Co.: Tahoe City, 1 ♀, no date (H. G. Dyar, USNM). Placer Co., 2 ♀, I-19-01 (Fowler, USNM). PLUMAS Co.: 4 mi. W. of Quincy, 1 ♀, VII-2-49 (L. W. Quate, CIS). RIVERSIDE Co.: Deep Canyon, 1 ♀, XI-12-63 (E. I. Schlinger, UCR); 1 ♀, XII-2-63, at light, 1 ♂, II-23-64 (M. E. Irwin, UCR). Top of Palm Canyon, 1 ♂, V-31-63 (E. I. Schlinger, UCR). Palm Springs, 1 ♂, III-9-49 (A. L. Melander, USNM). Riverside, 1 ♀, III-21-55 (J. C. Hall, UCD). 5 mi. W. of Sage, 1 ♀, VII-3-63 (E. I. Schlinger, UCR). San Jacinto Mts., 1 ♀, VII-21-29 (R. H. Beamer, UK). Tahquitz Valley, San Jacinto Mts., 1 ♂, VII-6-50 (K. G. Whitesell, UCD). Whitewater, 1 ♀, III-15-55, 1 ♂, III-17-55, 1 ♀, IV-14-55 (W. R. M. Mason, CNC). SACRAMENTO Co.: Orangevale, 1 ♀, V-24-30 (H. H. Keifer, CDA). SAN BERNARDINO Co.: Baldy Grade Falls, San Gabriel Mts., 1 ♀, IX-25-35 (A. J. Basinger, CAS). Barton Flat, South Fork Camp, 2 ♂, VIII-31-44 (A. L. Melander, USNM). Forest Home, San Bernardino Mts., 2 ♂, V-25-35 (A. L. Melander, USNM). Morongo Valley, 1 ♀, IV-20-44 (A. L. Melander, USNM). Newberry, 1 ♂, IV-14-55 (W. R. M. Mason, CNC). Ord Mountain, 1 ♂, IV-19-60 (J. Powell, CIS). South of K. S. Meadows, San Bernardino Mts., 1 ♀, VI-1-47 (A. L. Melander, USNM). Victorville, 1 ♀, V-2-53 (G. A. Marsh, CIS). San Bernardino Co., 1 ♀, III-29-52 (E. I. Schlinger, UCD). SAN DIEGO Co.: Borrego,



Map 10. Locality records in California for *Hylemya (Delia) lupini* (Coquillett).

Tub Canyon, 3 ♂, IV-2-49 (G. H. and J. L. Sperry, USNM). Lake Henshaw, 2 ♂, 7 ♀, IV-10-50 (P. D. Hurd, CIS). Oak Grove, 1 ♂, V-8-45 (A. L. Melander, USNM). Rincon, 1 ♀, XII-7-35 (A. J. Basinger, CAS). San Diego, 1 ♀, XII-12-10, 2 ♀, V-1-2-13 (E. P. Van Duzee, CAS). SAN FRANCISCO Co.: Golden Gate Bridge, San Francisco, 1 ♀, IV-21-12, variant (J. C. Thompson, CAS). San Miguel Hills, San Francisco, 1 ♂, III-13-60 (D. C. Rentz, CAS). San Francisco, 1 ♂, IV-8-08, 1 ♀, IV-21-08, 1 ♂, IV-30-08, all ex lupine (E. M. Ehrhorn, USNM); 1 ♀, X-12-19, 1 ♂, X-20-19, 1 ♂, X-10-20 (E. P. Van Duzee, CAS); 1 ♂, XI-21-25, ex *Lupinus arboreus* with *Epinotia infuscana* (H. H. Keifer, CAS); 1 ♂, XI-1-25, 2 ♂, 3 ♀, XI-23-24-25, 4 ♂, 3 ♀, XII-1-5-25, 3 ♀, XII-7-11-25, 1 ♀, II-15-26, 1 ♂, 3 ♀, III-9-12-26, 1 ♀, III-31-26, 1 ♀, IV-6-26, all ex *Lupinus arboreus* galls (H. H. Keifer, CAS). SAN LUIS OBISPO Co.: Cholame Creek, 1 mi. S. of Cholame, 1 ♀, V-1-63 (P. H. Arnaud, CAS). SAN MATEO Co.: Redwood City, 2 ♂, 4 ♀, III-29-48, 4 ♂, 10 ♀, IV-24-48 (P. H. Arnaud, CAS). Tunitas Creek at Highway, 1 ♂, 1 ♀, II-17-65, 3 ♂, II-23-65, 1 ♂, III-1-65, emerged from dead flowerhead stems of *Lupinus arboreus* (H. B. Leech, CAS). SANTA CLARA Co.: San Antonio Ranger Station, 3 ♂, 1 ♀, III-19-51 (P. D. Hurd, CIS). Stanford University, 1 ♀, III-9-51, 1 ♀, II-26-53 (P. H. Arnaud, UCD). SHASTA Co.: 4 mi. W. of Viola, 1 ♀, V-27-47 (T. F. Leigh, CIS). TRINITY Co.: Trinity River Camp, 1 ♂, VI-2-51 (A. T. McClay, UCD). TULARE Co.: Alta, Sequoia National Park, 1 ♂, VI-25-33 (CAS). Mineralking, 1 ♀, VIII-11-25 (CAS). TUOLUMNE Co.: Jamestown, 1 ♂, IV-26-51 (P. D. Hurd, CIS). VENTURA Co.: Lockwood Creek, near Stauffer P. O., 1 ♂, V-7-59 (J. Powell, CIS). Saticoy, 1 ♂, V-2-36, 1 ♀, V-3-36 (S. E. Flanders, CU, USNM). YOLO Co.: Esparto, 1 ♀, II-24-52 (K. W. Tucker, UCD). Putah Canyon, 1 ♀, III-26-53 (D. E. Barcus, UCD).

*H. lupini* typically has one or more tibiae fulvous, the male with mesonotum and scutellum brown, atypically gray, hind femora with full anteroventral and extensive posteroventral series of bristles, the respective series continuing as finer anteroventral bristles and posteroventral setulae on hind tibiae. The female may be compared to that of *deviata*, from which it differs in having parafrontals, parafacials, thorax and abdomen partly brownish tinged, parafacials notably receding ventrad and cheeks commencing at mid point below eye to taper caudad. Larvae of *lupini* are recorded as injuring stems and foliage of *Lupinus* in California and Florida (Coquillett, 1901: 207; Guthrie, 1954:103).

*Hylemya (Delia) montana* Malloch

*Hylemya montana* Malloch. 1919, Biol. Soc. Wash. Proc., 32: 134.

Holotype: ♂, Denver, Colorado (USNM).

**Geographic range.** — Alberta, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, South Dakota, Utah, Washington, Wyoming, Yukon Territory.

**California records.** — INYO Co.: Bishop, 1 ♂, VII-28-40 (R. H. Beamer, UK). LASSEN Co.: Hallelujah Junction, 3 ♂, VII-18-53, 2 ♂, VII-16-53 (E. I. Schlinger, UCD); 1 ♂, VI-28-62, 2 ♂, VII-12-62 (M. E. Irwin, UCD); 1 ♂, VII-6-62 (J. Powell, CIS). MODOC Co.: Buck Creek, 1 ♀, VII-24-22 (C. L. Fox, CAS). Lake City, 1 ♂, VIII-1-22 (C. L. Fox, CAS). MONO Co.: Cottonwood Creek, 9,300 ft., 1 ♂, VII-10-61 (H. V. Daly, CIS). Fales Hot Springs, 1 ♂, VIII-18-60 (G. W. Colliver, CIS). Leavitt Meadow, 2 ♂, 3 ♀, VII-6-51 (A. T. McClay, UCD); 1 ♀, VIII-12-63, flight trap (H. B. Leech, CAS). Mono Canyon Creek, 1 ♂, VII-25-50 (M. J. Stebbins, CIS). 4 mi. SW. of Tom's Place, 2 ♂, VII-13-61 (H. V. Daly, CIS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1 ♂, VIII-20-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Boca, 2 ♂, 1 ♀, VII-3-54 (R. H. Goodwin, CIS). Prosser Creek, north side, 2 mi. S. of Hobart Mills, 1 ♀, VIII-28-56 (E. G. Linsley, CIS). Sagehen Creek, near Hobart Mills, 1 ♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). RIVERSIDE Co.: Idyllwild, San Jacinto Mts., 1 ♀, V-22-40 (C. D. Michener, CIS). SAN BERNARDINO Co.: Highway 38 at Little Cienega, 2 ♀, IX-20-65 (M. E. Irwin, R. E. Orth, UCR).

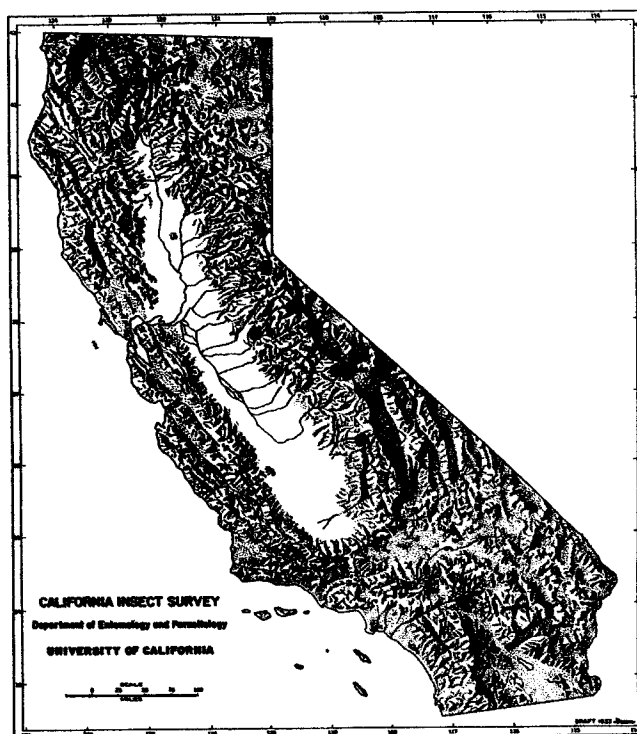
*H. montana* has tibiae fulvous and arisal hairs of rather long pubescence. The male has a series of fine posteroventral bristles on hind femur and a notably strong apical posteroventral bristle on fore tibia. The female has mid and hind femora and all tibiae fulvous, ovipositor with recurrent spinules on terminal sclerites, and humeral callosities or scutellum, or both, with trace of reddish tinge.

*Hylemya (Delia) montivagans* Huckett

*Hylemya (Delia) montivagans* Huckett. 1952, Brooklyn Ent. Soc. Bull., 47:121.

Holotype: ♂, Tennessee Pass, Colorado (USNM).

**Geographic range.** — California, Colorado, Montana, Washington.



Map 11. Locality records in California for *Hylemya (Delia) neomexicana* Malloch.

**California records.** — MONO Co.: Cottonwood Creek, 9,300 ft., 1 ♂, VII-10-61 (J. S. Buckett, UCD). Poison Creek, 10,000 ft., White Mts., 4 ♀, VI-26-61 (J. Powell, CIS). White Mts., 10,000 ft., 1 ♀, VI-20-61 (J. S. Buckett, UCD). TUOLUMNE Co.: Tioga Pass, 1 ♂, VII-8-46 (H. Chandler, CAS).

*H. montivagans* is closely related to *armata* (Stein), and has a paler, duller aspect, with wings less conspicuously infuscated basad in male, abdomen with denser pruinescence, parafacials and cheeks more broadly maintained. In both sexes the prealar bristle is present.

*Hylemya (Delia) neomexicana* Malloch

(Map 11)

*Hylemya neomexicana* Malloch. 1918, Amer. Ent. Soc. Trans., 44:310.

Holotype: ♂, Las Vegas Range above Beulah, New Mexico (ANSP).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Montana, New Mexico, Northwest Territories, Nevada, Oregon, Utah, Washington, Wyoming.

**California records.** — EL DORADO Co.: Echo [Lake], 1 ♂, VIII-10-40 (L. J. Lipovsky, HCH). FRESNO Co.: Pioneer Basin, 10-11,000 ft., 1 ♂, VIII-19-56 (E. I. Schlinger, UCD). INYO Co.: Bishop, 1 ♂, 1 ♀, VII-28-40 (R. H. Beamer, L. J. Lipovsky, UK). Mono Pass, 1 ♂, VIII-13-57, legs black (D. D. Linsdale, CIS). Ruby Lake, 2 ♂, VIII-13-57 (D. D. Linsdale, CIS). Upper Rock Creek, 10,000 ft., 1 ♂, VIII-14-63 (M. J. Tauber,

CIS). MODOC Co.: Lily Lake, 3♀, VII-11-57 (J. Powell, CIS). 8 mi. E. of New Pine Creek, 1♂, VII-29-52 (W. C. Bentinck, CIS). MONO Co.: Blanco's Corral, 10,150 ft., White Mts., 1♀, VIII-25-60 (P. D. Hurd, CIS). Leavitt Meadow, 7,200 ft., 4♀, VIII-13-14-63, flight trap (H. B. Leech, CAS). Mammoth Lakes, 7♂, 2♀, VII-29-40 (R. H. Beamer, D. E. Hardy, L. C. Kuitert, UK). Mono, 1♀, VII-13-50, banana trap (A. Sokoloff, USNM). Mt. Barcroft, 13,000 ft., White Mts., 2♂, VII-21-61, legs black (J. Powell, CIS). Sonora Bridge Camp near Sonora Junction, 1♀, VII-28-62 (D. C. Rentz, C. D. MacNeill, CAS). "Timberline," 1♂, VIII-1950, banana trap (A. Sokoloff, USNM). Tioga Crest, 1♂, VII-22-56 (J. Powell, CIS). Virginia Lakes, 9,750 ft., 22♂, 25♀, VIII-17-63 (H. B. Leech, CAS). White Mts., 10,150 ft., 3 mi. N. of Inyo Co., 6♂, 8♀, VIII-19-63, 20♂, 11♀, VIII-20-63, flight traps (H. B. Leech, CAS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 21♂, 8♀, VII-7-16-64, 5♂ with black legs, in malaise trap (M. E. Irwin, UCR); 1♀, VII-8-64 (R. E. Scott, UCR). SAN BERNARDINO Co.: Upper Santa Ana River, 1♀, X-21-48 (G. H. and J. L. Sperry, USNM); 1♀, VI-30-49 (A. L. Melander, USNM). SAN DIEGO Co.: Laguna Mts., 1♂, VII-6-29 (P. W. Oman, UK). TULARE Co.: Rattlesnake Creek, 9,000 ft., 1♂, VIII-2-15 (HCH). TUOLUMNE Co.: Sonora Pass, 9,624 ft., 1♂, 2♀, VIII-21-59 (D. D. Linsdale, J. Powell, CIS); 1♂, VIII-20-60 (A. E. Menke, UCD). Tioga Pass, 1♀, VIII-24-51 (A. L. Melander, USNM). Yosemite, 3,880-4,000 ft., 1♀, V-21-31, 6♂, 5♀, V-25-31, 2♂, 1♀, V-26-31, 3♀, V-27-31, 1♂, V-30-31, 1♀, VI-17-31 (E. O. Essig, CIS); 1♂, -25-31 (BVC).

I have included within the species *H. neomexicana* a number of specimens having a wide range in color and in chaetotaxy, notably pertaining to the tibiae from fulvous to black, in bristling of hind femora and hind tibiae of male as to length and density of bristles in respective series on anteroventral and posteroventral surfaces, with regard to degree of development of setulae on inner margins of processes, and in the shape of the gonostyli, figures 59, 94. In general the tibiae of specimens taken at higher altitudes are increasingly infuscated or blackish. The inner marginal setulae of processes vary from slender to strong and blunt, the series in either case occupying the greater part of the inner margin. The species *neomexicana* is closely related to *cerealis* (Gillette)\*, originally recorded as a pest of wheat in Colorado. The processes in topotypical specimens of *cerealis* have an entire series of weak short setulae on inner margin, the gonostyli hairy and awlshaped toward apex, figures 56, 95, and bristles on anteroventral and posteroventral surfaces of hind legs longish. I regard *cerealis* as distinguishable from *neomexicana sens. lat.* despite their apparent affinities.

#### *Hylemya (Delia) normalis* Malloch

*Hylemya normalis* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:309.

Holotype: ♂, Armstead, Montana (IllNHS).

Geographic range. — Alberta, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Wyoming.

*California records.*—INYO Co.: Big Pine, 1♂, VI-17-29 (E. P. Van Duzee, CAS). Bishop, 2♀, VI-21-29 (E. P. Van Duzee, CAS). Lone Pine, 1♀, VI-10-29 (E. P. Van Duzee, CAS). Owens River, 3♀, no date (CAS). LASSEN Co.: Hallelujah Junction, 1♀, VII-4-49 (A. S. Deal, UCD). MONO Co.: White Mts., 10,150 ft., 3 mi. N. of Inyo Co., 1♀, VIII-20-63, flight trap (H. B. Leech, CAS).

The male of *H. normalis* differs from those of the related species *extremitata* and *recurva* in the absence of recurrent bristles near apex of anterior surface of hind tibia, and in both sexes by the slightly longer arisal hairs, the longer being about equal to width of third antennal segment.

#### *Hylemya (Delia) nubialis* Huckett

*Hylemya (Delia) nubialis* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:240.

Holotype: ♂, Sardine Creek, Mono County, California (UCD).

Geographic range. — California.

*California records.* — MARIPOSA Co.: Pothole Meadows, 7,750 ft., 1♂, VII-3-46 (H. Chandler, CAS). MONO Co.: Sardine Creek, 1♂, VII-6-51, 1♀, VII-11-51, 7♂, VII-3-18-51 (A. T. McClay, UCD, HCH); 1♀, VII-29-54 (J. C. Downey, UCD). NEVADA Co.: Sagehen, near Hobart Mills, 1♂, VII-2-54 (J. C. Downey, UCD). TUOLUMNE Co.: Tuolumne Meadows, 8,600 ft., 2♂, VIII-15-16 (G. R. Pilate, USNM).

The male of *H. nubialis* has profuse and lengthy bristling on outer borders of sternum 4 and on processes of sternum 5, resembling in this respect the male of *seriata*. The species has a shorter haired arista than in *seriata*, and in the male shorter bristles on proximal half of anteroventral surface of hind femur.

#### *Hylemya (Delia) pilitarsis* Stein

*Hylemya pilitarsis* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):76.

Holotype: ♂, "2019," Colorado (ZMUB).

Geographic range. — Arizona, California, Colorado.

*California records.* — NEVADA Co.: Sagehen Creek, near Hobart Mills, 2♂, 2♀, VII-15-16-64, in malaise trap (M. E. Irwin, UCR). Truckee, 6,500 ft., 1♂, VII-14-61 (B. H. Poole, CNC). SAN BERNARDINO Co.: Fawnskin, San Bernardino Mts., 1♂, VII-28-61 (R. Tuck, MSUM). Highway 38 at Little Cienega, 1♀, IX-20-65 (R. E. Orth, UCR).

The male of *H. pilitarsis* differs from those of *tenuis* Drew and *garretti* in having the cerci narrowly tapering on distal half and with sparse minute hairs, figure 109. The males of *pilitarsis* and *tenuis* may be distinguished from those of *garretti* and related species by the dense matlike clothing of short setulae on posterior surface of fore femora. I have examined the types of *pilitarsis* and *pilimana* Stein and consider the broader distance between the eyes at the narrower part of the



frons in *pilitarsis* as unusual and in part due to the general condition of the specimen.

*Hylemya (Delia) planipalpis* (Stein)

*Chortophila planipalpis* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42:234.

*Hylemya anthracina* Malloch. 1918, Amer. Ent. Soc. Trans., 44:314. Name preoc. Czerny, 1906.

*Chortophila vilis* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):91.

*Hylemya anthracodes* Malloch. 1920, Amer. Ent. Soc. Trans., 46:194. New name for *anthracina* Malloch.

Syntypes: ♂, ♀, Moscow, Idaho (USNM).

**Geographic range.** — Alaska, Alberta, California, Colorado, Idaho, Montana, Northwest Territories, Oregon, Washington, Yukon Territory, Mexico D. F.

**California records.** — ALAMEDA Co.: 1♂, 1♀, Oct. (CAS); 1♂, Febr. 1912 (C. L. Fox, CAS). HUMBOLDT Co.: Eureka, 1♀, X-8-14, ex turnip (E. O. Essig, CIS). Mad River, near Arcata, 1♀, VI-24 (J. M. Aldrich, USNM). MENDOCINO Co.: Point Arena, 1♀, no date; 1♂, 1♀, VII-27-10 (Moulton, CAS). MONTEREY Co.: Moss Beach, 1♂, 1♀, VII-4-37, ex cauliflower. Salinas, 1♂, XI-6-43, *Brassica campestris*, 1♀, II-26-50, ex brussels sprouts, (W. H. Lange, UCD). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♀, VII-16-64, in malaise trap (M. E. Irwin, UCR). SACRAMENTO Co.: Sacramento, 2♀, XI-2-3-35, ex rutabaga (CDA). SAN FRANCISCO Co.: 1♂, IX-3-07, 3♂, IX-9-07, 1♀, IX-20-07, 1♂, XI-1-07, 1♀, XI-21-07, all ex radish (E. R. Ehrhorn, USNM); 4♂, 2♀, X-15-11, ex radish (CAS, USNM); 1♂, VIII-1-15 (A. L. Melander, USNM); 1♂, IX-5-17, ex radish (E. M. Ehrhorn, CAS); 2♀, no date (USNM). SAN LUIS OBISPO Co.: Grover City, 1♂, VII-4-56 (E. G. Linsley, CIS). San Luis Obispo, 1♂, IV-24-19 (E. P. Van Duzee, USNM). SAN MATEO Co.: Colma, 10♂, 4♀, IV-12-32, 2♂, 4♀, IV-20-32, ex turnips (CDA). South San Francisco, 1♂, 2♀, VII-23-24-17, 1♀, VIII-4-17 (H. H. P. Severin, CIS). SANTA CRUZ Co.: Davenport, 1♀, VIII-19-29, ex mustard (CDA); 1♀, IX-6-29, ex brussels sprouts (CDA). SHASTA Co.: McArthur, 1♀, VI-22-30, 1♂, VI-25-30, 1♀, VII-14-30, all ex turnips (CDA). SONOMA Co.: Sebastopol, 1♀, V-20-38 (O. E. Bremner, CDA).

*H. planipalpis* is related to *brassicae* (Bouché), and larvae of the two species are known to infest roots and stems of cruciferous crops. The adult male of *planipalpis* lacks the cluster of short bristles at base of hind femur that is present in males of *brassicae*. The female of *planipalpis* has slightly broader palpi than in female of *brassicae*.

*Hylemya (Delia) platura* (Meigen)

(Map 12)

*Anthomyia platura* Meigen p. 1826, Syst. Besch., 5:171; Karl. 1934, Zool. Anz., 107:91.

*Chortophila cilicrura* Rondani. 1866, Soc. Ital. di Sci. Nat. Atti, 9:165.

Type: ♂, locality not stated (MNHP).

**Geographic range.** — Cosmopolitan.

**California records.** — ALAMEDA Co.: Alameda, Albany, Alta-



Map 12. Locality records in California for *Hylemya (Delia) platura* (Meigen). This general distribution is representative for the few most widely ecologically tolerant species of *Hylemya* in California.

mont, Alvarado, Arroyo Moncho, Arroyo Moncho 20 mi. S. of Livermore, Berkeley, Berkeley Hills, campus at University of California, East Oakland, Emeryville, Hayward, Lake Chabot at Oakland, 5 mi. E. of Livermore, Niles, Oakland, Pleasanton, San Lorenzo, Strawberry Canyon at Berkeley Hills, Sunol, Tesla, Tilden Park on Berkeley Hills. ALPINE Co.: Carson Pass, Fredericksburg, Hope Valley, Winnemucca Lake. AMADOR Co.: Peddler Hill, Silver Lake, 2 mi. E. of Sutter Creek. BUTTE Co.: Oroville. CALAVERAS Co.: Angels Camp, Milton, Mokelumne Hill, West Point. CONTRA COSTA Co.: Brentwood, Concord, Danville, Diablo, Lafayette, 1 mi. S. of Lafayette, Marsh Creek, Moraga, Mt. Diablo, Mt. Diablo State Park, Oakley, Pittsburg, 2 mi. W. of Pittsburg, Point Richmond, Richmond, St. Marys College, Walnut Creek, Walnut Creek at foot of Shell Ridge, West Pittsburg. DEL NORTE Co.: Elk Valley, Little Grayback Pass in NE. Del Norte County. EL DORADO Co.: Bijou on Lake Tahoe, Bliss State Park, Camino, China Flat, Echo Lake, Echo Portals, Fallen Leaf, Fallen Leaf Lake, Glen Alpine, Lake Tahoe, Placerville, Pollock Pines, Pyramid Ranger Station, Riverton, Snowline Camp, Tamarack Lake, Wright's Lake. FRESNO Co.: Auberry, Bluffs at Fresno, Coalinga, Firebaugh, Fresno, Huntington Lake, 1 mi. W. of Kerman, Lake Sequoia, Lost Lake at 1 mi. W. of Friant, Mendota, Mercy Hot Springs, Panoche Creek, Panoche Pass, Paradise Valley-Kings River, Sanger, San Joaquin River. FRESNO-TULARE Co.: General Grant National Park. GLENN Co.: Alder Spring, Artois, Plaskett Meadows. HUMBOLDT Co.: Blue Lake, Fieldbrook, Grizzly Creek State Park, Samoa Beach and dunes. IMPERIAL Co.: Brawley, 1 mi. W. of Glamis, Holtville, 3 mi. S. of Palo Verde, 15 mi. W. of Plaster City, Truckhaven. INYO Co.: Antelope Springs, Big Pine,

Bishop, Deep Springs, Furnace Creek, Goodale Creek, Independence, Little Lake, Lone Pine, North Lake near Camp Sabrina, Owens River, Panamint Valley, Ruby Lake, Shoshone, Silver Canyon in White Mts., Surprise Canyon in Panamint Mts., Telescope Peak. KERN CO.: Arvin, 18 mi. E. of Bakersfield, Bodfish, Cache Creek, Democrat Springs, Havilah, Kern River, Kernville, Lebec, 15 mi. W. of Lost Hills, Maricopa, Onyx, Red Rock Canyon, Ridgecrest, Shafter ex cotton seedling, Tehachapi, Walker Pass. LAKE CO.: Lower Lake, Putah Creek, Seigler Springs. LASSEN CO.: Black's Mountain, Bridge Creek Camp, Burt Lake, S. end of Eagle Lake, Standish, Summit Camp, Susan River Camp, Susanville, Wendell. LOS ANGELES CO.: Alhambra, Alpine Inn on Mt. Lowe, Arroyo Seco, Avalon, Beverly Glen, Beverly Glen Canyon, Camp Baldy, Claremont, Compton, Crystal Lake, Dominguez, Elizabeth Lake Canyon, Glendale, Glendora, Gorman, Lancaster, Long Beach, Los Angeles, Malibu, Monrovia, Montebello, Mt. Lowe, mountains near Claremont, Pacific Palisades, Pasadena, Placerita Canyon, Pomona, Redondo Beach, Santa Monica Mts., Sawtelle, Tanbark Flat, Topanga Canyon, Westwood Hills, Whittier. MADERA CO.: Lyell Canyon, Oakhurst, San Joaquin Experiment Station, Sugar Pine. MARIN CO.: Alpine Lake, Fairfax, Inverness, Mill Valley, Phoenix Lake, Point Reyes, San Quentin Point, San Rafael, Taylor State Park. MARIPOSA CO.: Bear Valley, Miami Ranger Station, Wawona, Yosemite, Yosemite Falls Trail, Yosemite Valley. MENDOCINO CO.: Hopland, 16 mi. E. of Manchester. MERCED CO.: 2.5 mi. S. of Livingston, Los Banos, 10 mi. E. of Los Banos, Merced, Pacheco Pass. MODOC CO.: Alturas, 20 mi. N. of Canby, Cedar Pass, Cedarville, Lily Lake. MONO CO.: Blanco's Corral in White Mts., Bridgeport, Cottonwood Creek, Crooked Creek Laboratory in White Mts., Leavitt Meadow(s), 2 mi. W. of Leavitt Meadow(s), Leavitt Creek, Mammoth Lakes, near Monitor Pass, Poison Creek in White Mts., Rock Creek 1 mi. W. of Tom's Place, Sardine Creek, Sonora Pass, 9 mi. SW. of Tom's Place, Virginia Lakes, White Mts. MONTEREY CO.: Arroyo Seco, Bradley, Bryson, Hastings Reservation near Jamesburg, Junipero Serra Park, King City, 3 mi. E. of King City, Monterey, Moss Landing, Paradise Canyon near Prunedale, Pfeiffer Big Sur State Park, Pleyto, Point Pinos, Salinas, San Ardo, Soledad, Stone Canyon. NAPA CO.: Calistoga, Putah Canyon, 1.5 mi. E. of Rutherford. NEVADA CO.: Near Hobart Mills, Sagehen and Sagehen Creek near Hobart Mills, Soda Spring, Truckee. ORANGE CO.: Arkansas? ex strawberry roots, Buena Park, Corona Del Mar, El Toro, Green River Camp, Santa Ana, Silverado Creek. PLACER CO.: Auburn, 10 mi. E. of Auburn, Baxters, Cisco, Lake Tahoe, Lakeside at Lake Tahoe, Tahoe City. PLUMAS CO.: Buck's Lake, 8 mi. NW. of Chester, Clio, Gold Lake Camp, Portola, 4 mi. W. of Quincy. RIVERSIDE CO.: Anza, Beaumont, Box Springs Mountains, Blythe, Boyd Desert Research Center 4 mi. S. of Palm Desert, Cabazon, Cathedral Canyon, Cathedral City, Chino Canyon near Palm Springs, Coachella, Cottonwood Spring, Coyote Creek, Dark Canyon, Deep Canyon, Desert Center, Desert Hot Springs, Elsinore Lake, Fairmont Park, Fan Hill Canyon, Hemet, Hemet Reservoir, Hemet Valley, Herkey Creek, Hinda, Hopkins Well, Hunter's Spring, Idyllwild, Indio, 6 mi. W. of Indio, Aqueduct Road at Indio, Joshua Tree National Monument, Keen Camp at San Jacinto Mts., 4 mi. E. of Keen Camp, La Quinta, Lake Mathews, Long Canyon at Desert Hot Springs, Magnesia Canyon, Marchfield, Marion Mountain Camp, Massacre Canyon, Mecca, 1 mi. NW. of Mira Loma sand dunes, North Palm Springs, Oasis Nature Area at Twentynine Palms, Palm Canyon, top of Palm Canyon, Palm Desert, Palm Springs, 2 mi. N. of

Perris, Pinon Flat, Quail Spring, Riverside, 4 mi. S. of Riverside, 5 mi. W. of Sage, San Andreas Canyon, San Jacinto, San Jacinto Mountain Trail, San Jacinto Mts., Santa Rosa Mountain, Santa Rosa Springs, Snow Creek at Whitewater, 8 mi. E. of Sunnymead, Tahquitz Canyon, Tahquitz Valley, Temecula, Thermal, Thousand Palms, Thousand Palms Canyon, Thousand Palms Oasis, Twentynine Palms, Upper Deep Canyon near Horsethief Creek and at Summit 14 mi. SE. of Keen Camp, Whitewater, Whitewater Canyon, Whitewater Fish Hatchery, Willis Palms Oasis. SACRAMENTO CO.: Andrus Island, Elk Grove, Fair Oaks, Florin, Isleton, Orangevale, Rio Linda, Sacramento. SAN BENITO CO.: 15 mi. SE. of Bitterwater, Hollister, Idria Gem Mine, 2 mi. NE. of New Idria, Pinnacles National Monument. SAN BERNARDINO CO.: 8 mi. S. of Adelanto, Apple Valley, Baldwin Lake, Baldy Grade Falls, Banning Canyon, Barton Flats, Bear Valley, Big Bear Lake, Cajon Pass, Camp Baldy, Cashenberry Springs, Chino, Colton, Cottonwood Spring, Cup Plug at Barton Flat, Daggett, East Highlands, 1 mi. E. of East Highlands, Falls Public Campground San Bernardino Mts., Fawnskin, Granite Cove at Granite Mts. 15.8 mi. SW. of Kelso, 20 mi. S. of Hemet Highway 79, Highway 38 at Little Cienega, 12 mi. SE. of Ivanpah, Jenks Lake, 2 mi. E. of Mentone, Mill Creek Canyon, Mojave Desert, Morongo Valley, Mt. Home Canyon, Mule Canyon, Needles, New York Mts. 6 mi. S. of Ivanpah, Newberry, Oak Glen, on Ontario Golf Course San Bernardino Co., Ord Mountain, Phelan, Providence Mts. 7 mi. S. of Kelso, Quail Spring, Redlands, Round Cienega, Running Springs, San Antonio Canyons, San Bernardino, Santa Ana River, South Fork Camp Barton Flat, South Fork Meadows Upper Santa Ana River, Snow Crest Camp, Upper Santa Ana River, Victorville, Wildwood Canyon 5 mi. E. of Calimesa, Yucca Valley. SAN DIEGO CO.: Alpine, Balboa Park at San Diego, Borrego, Coronado, Cuyamaca, Cuyamaca Lake, Descanso, Descanso Ranger Station, El Cajon, La Jolla, Laguna Mts., Lake Henshaw, 2 mi. NE. of Lakeside, Mt. Laguna, 6 mi. S. of Mt. Laguna P. O., Oak Grove, Palm Canyon at Borrego, Pine Valley, San Diego, Split Mt. at Anza Desert State Park, 2 mi. W. of The Narrows, Tub Canyon at Borrego. SAN FRANCISCO CO.: Laguna Puerca at San Francisco, San Francisco, San Francisco beach, San Francisco sand dunes. SAN JOAQUIN CO.: Linden, Lockeford, Lodi, Manteca, Stockton, Tracy, 4 mi. N. of Tracy, 6.5 mi. SE. of Tracy, Vernalis. SAN LUIS OBISPO CO.: Arroyo Grande, Cholame, 1.8 mi. SW. of Cholame (on St. 160B), 2 mi. NE. of Cholame Creek, Cliente Mountain, La Panza Camp 12 mi. NE. of Pozo, Pozo, 4 mi. SE. of Santa Margarita, 6.8 and 7 mi. SW. of Shandon, Temblor Range 12 mi. E. of Simmler. SAN MATEO CO.: Calma, Corte de Madera Creek, Halfmoon Bay, La Hondna Road-Skyline Boulevard, Mortara, Pescadero, Portola State Park, Redwood City, San Bruno Mts., Sandhill Road, Westridge. SANTA BARBARA CO.: Lompoc, Santa Barbara, Santa Maria ex carrots, Santa Ynez River. SANTA CLARA CO.: Alum Rock Park, Coyote, Mt. Hamilton, 1 mi. E. of Mt. Hamilton, Pacheco Creek, Palo Alto, San Antonio Valley, San Jose, Santa Clara, Saratoga, Stanford University. SANTA CRUZ CO.: 4 mi. S. of Boulder Creek, Capitola Park, Davenport, Felton, Santa Cruz, Santa Cruz Mts., Soquel, Watsonville. SHASTA CO.: Hat Creek, 9 mi. W. of Hat Creek P. O., Kings Creek Meadow, Manzanita Lake, Old Station, Round Mountain, Shingletown, Viola, 4 mi. W. of Viola. SIERRA CO.: Webber Lake. SISKIYOU CO.: Bray, Etna, Gazelle, Granada, McBride Campground, Mt. Shasta 5,000 ft., Mt. Shasta City, Panther Meadows at Mt. Shasta, Sisson. SOLANO CO.: Vacaville. SONOMA CO.: Cloverdale, Santa Rosa,

SONOMA. STANISLAUS CO.: Adobe Creek 22 mi. W. of Patterson, Crows Landing, Westley. SUTTER CO.: Nicolaus. TEHAMA CO.: Red Bluff, Saddle Camp Meadow. TRINITY CO.: Trinity River Camp. TULARE CO.: Alta, Ash Mountain, Giant Forest, Ivanhoe, Lemoncove, Lindsay, Sequoia National Park, Wood Lake. TUOLUMNE CO.: Belle Meadows, Bumble Bee, Cow Creek, Dardanelles, Ellery Lake, Kennedy Meadow(s), Oakland Camp, Pinecrest, Pinecrest Lookout, Sonora Pass, Strawberry, Tilden, Tuolumne City, Tuolumne Meadow(s), Yosemite 3,880-4,000 ft. TUOLUMNE-MARIPOSA CO.: Yosemite National Park. VENTURA CO.: Camarillo, Chochopate Ranger Station at base of Frazier Mts., Happy Camp Canyon, Lockwood Creek near Stauffer P. O., Santa Paula, 1 mi. W. of Santa Susana, Saticoy ex Zinnia stalk. YOLO CO.: Bryte, Davis, Elkhorn Ferry, Esparto, Putah Canyon, West Sacramento, Woodland, ex alfalfa seedlings. YUBA CO.: Arboga.

*H. platūra* flies throughout the year in cismontane, low elevation parts of central and southern California. Northward, along the coast it has been taken from June to December, while in the Central Valley records are available from March to October in the Sacramento Valley and February to November in the San Joaquin. At higher elevations, the flight period is shorter, most Sierran records being June to September, but the species has been collected as late as November in Siskiyou and Plumas counties.

*H. platūra*, a cosmopolitan species, known as the seed-corn maggot or bean maggot, is one of the most prevalent in California. Specimens have been taken in 56 of the state's 58 counties and at approximately 566 localities from records based on an examination of 792 males and 370 females. The species is closely related to *florilega* (Zetterstedt)\* (= *trichodactyla* Rondani), which so far I am unable to record from California.

Larvae of *platūra* have been known to infest a number of cultivated vegetable crops, notably beans, corn, onions, peas, potatoes, cruciferous plants, cucurbits, lettuce, spinach, sugar beets, grains and leguminous field crops, particularly in certain instances where seed or stems have commenced to decay; and are reported as carriers of plant disease organisms (Leach, 1926:149). Larvae have also been known to attack seedlings of certain conifers and to feed on eggs of grasshoppers. Keys and illustrations to aid in the recognition of adults and larvae of *platūra* and associated economic species have been furnished by Brooks (1951:113-114).

#### *Hylemya (Delia) pratensis* (Meigen)

*Anthomyia pratensis* Meigen. 1826, Syst. Besch., 5:158.

Types: ♂, ♀, Germany (MNHP).

*Geographic range.* — California, Colorado, Idaho, Northwest Territories, Oregon.

*California records.* — EL DORADO CO.: Echo Lake, 7,500 ft., 3♂, VII-23-55 (J. G. Downey, UCD); 1♂, VII-13-61 (J. G.

Chillcott, CNC). MARIPOSA CO.: Yosemite Park, Glacier Point Road, 1♂, VII-6-47 (A. L. Melander, USNM). TUOLUMNE CO.: Tuolumne Meadows, Yosemite National Park, 5♂, 1♀, VII-4-27 (J. M. Aldrich, USNM).

The small blackish male of *H. pratensis* differs from its relatives in having an extra broad abdominal vitta, whose average width on terga 3 and 4 equals length of respective segments. The female has an anteroventral bristle on mid tibia. In both sexes the cheeks are notably narrow, oral margin flexed forward, wings blackish basad and in contrast the calyptrae white.

#### *Hylemya (Delia) propinquina* Huckett

*Hylemya propinquina* Huckett. 1929, Canad. Ent., 61:118.

Holotype: ♂, Banff, Alberta (CNC).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Idaho, Labrador, Montana, Oregon, Quebec, Yukon Territory.

*California records.* — INYO CO.: Ruby Lake, 4♂, VIII-13-57 (D. D. Linsdale, J. Powell, CIS).

*H. propinquina* closely resembles *garretti*, differing mainly in the male sex. The cerci are more elongate and less densely bristled on apical region than in *garretti*, the processes usually have but one strong apical spinule on inner margin, figure 25.

#### *Hylemya (Delia) rainieri* Huckett, new status

*Hylemya (Delia) setiventris rainieri* Huckett. 1951, Ent. Soc. Wash. Proc., 53:256.

Holotype: ♂, Mt. Rainier, Summerland Trail, Washington (USNM).

*Geographic range.* — Alaska, British Columbia, California, Montana, Northwest Territories, Oregon, Washington, Wyoming, Yukon Territory.

*California records.* — INYO CO.: near Mono Pass, 12,000 ft., 1♀, VIII-11-57 (C. D. MacNeill, CAS). MONO CO.: Fern Lake, 1♀, VIII-19-48 (W. E. Kelson, CIS). SAN BERNARDINO CO.: Upper Santa Ana River, 1♀, X-11-46 (J. L. Sperry, USNM). Upper Santa Ana River, South Fork Meadows, 1♂, VII-27-48 (J. L. Sperry, USNM). TULARE CO.: Giant Forest, 6,800 ft., Sequoia National Park, 1♂, VII-1-28 (E. A. McGregor, USNM). TUOLUMNE CO.: near Sonora Peak, 11,000 ft., 1♀, VIII-10-57 (C. D. MacNeill, CAS).

The male of *rainieri* has caudal margin of tergum 4 deeply emarginate and the lateral lobes well developed, as in *setiventris* Stein, but differing from the latter in that the lobes are clothed from base to apex with long slender erect bristles.

#### *Hylemya (Delia) recurva* Malloch

*Hylemya recurva* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:308.

Holotype: ♂, Huntington Lake, California (CAS).

*Geographic range.* — California, Colorado, Oregon.

*California records.* — FRESNO Co.: Huntington Lake, 7,000 ft., 1 ♂, VII-10-19 (F. C. Clark, CAS); 1 ♂, VII-27-19, holotype (E. P. Van Duzee, CAS). MONO Co.: Mono Lake, 1 ♂, VI-27-49 (G. H. and J. L. Sperry, USNM). 4 mi. SW. of Tom's Place, 1 ♂, 1 ♀, VII-13-61 (H. V. Daly, CIS). PLUMAS Co.: Clio, 2 ♂, VII-9-16 (H. G. Dyar, USNM).

The male of *H. recurva* differs from that of *extremistata* in having shorter and straighter anterodorsal bristles on hind tibia, longest being situated distad of middle of tibia, and by the shorter anteroventrals. The female has arisal hairs slightly longer than half the width of third antennal segment, being thus slightly shorter than those of *normalis*.

*Hylemya (Delia) sequoiae* Hockett, new status

*Hylemya (Delia) setiventris sequoiae* Hockett. 1967, Pan-Pacific Ent., 43:53.

Holotype: ♂, Sequoia National Park, California (UCR).

*Geographic range and California record.* — TULARE Co.: 2 mi. SSW. of Little 5 Lakes, Sequoia National Park, 1 ♂, 1 ♀, VII-14-64 (A. A. Lee, UCR).

The male of *H. sequoiae* differs notably from its relatives in having a series of dorsal bristles on segments 1 to 4 of mid tarsus. In both sexes the preapical posterodorsal bristle on hind tibia is well developed and lengthened.

*Hylemya (Delia) seriata* Stein  
(Map 13)

*Hylemya seriata* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):80.

*Hylemya setifer* Malloch. 1920, Amer. Ent. Soc. Trans., 46:192.

*Hylemya pentaformis* Hockett. 1929, Canad. Ent., 61:110.

Syntypes: ♂ ♂, ♀ ♀, Marshall Pass and North Park, Colorado (ZMUB, USNM).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Manitoba, Montana, Nevada, Northwest Territories, Oregon, Utah, Washington, Wyoming, Yukon Territory.

*California records.* — ALPINE Co.: Hope Valley, 1 ♂, VII-9-48 (D. Carter, UCD); 4 ♀, VII-18-48 (D. Carter, L. W. Quate, S. A. Sher, UCD). WINNEMUCCA Lake, 1 ♀, VII-30-59 (L. E. Campos, UCD). FRESNO Co.: Double Meadow, 8,000 ft., 1 ♂, 1 ♀, IX-1-52 (E. I. Schlinger, UCD). INYO Co.: North Lake, 1 ♂, VI-30-61 (J. S. Buckett, UCD). MONO Co.: Crooked Creek Lab., 10,150 ft., White Mts., 1 ♂, 2 ♀, VII-19-61, 1 ♀, VII-21-61 (H. V. Daly, CIS). Leavitt Meadow, 2 ♂, 1 ♀, VI-28-51 (T. R. Haig, CIS); 5 ♂, 4 ♀, VII-6-51 (A. T. McClay, S. M. Kappos, E. L. Silver, UCD). White Mts., 10,000 ft., 1 ♂, VII-17-61 (J. S. Buckett, UCD). NEVADA Co.: Boca, 1 ♀, VI-23-61 (F. D. Parker, UCD). Prosser Creek, 6,300 ft., near Hobart Mills, 2 ♂, 1 ♀, VII-13-61 (J. G. Chillcott, CNC). Sagehen, near Hobart Mills, 1 ♂, VII-2-54 (J. C. Downey, UCD); 1 ♂, VII-21-54 (R. M. Bohart, UCD); 1 ♂, VII-4-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 5 ♂, VII-13-61 (J. G. Chillcott, B. H. Poole, CNC); 7 ♂, 6 ♀, VII-14-62 (C.



Map 13. Locality records in California for *Hylemya (Delia) seriata* Stein.

G. Moore, UCD); 129 ♂, 35 ♀, VII-6-16-64, in malaise trap, 1 ♂, 2 ♀, VII-15-64, sweeping (M. E. Irwin, UCR). 7 mi. SE. of Truckee, 1 ♂, VI-24-54 (R. C. Blaylock, UCD). PLUMAS Co.: Buck's Lake, 1 ♂, VII-1-49 (D. Cox, CIS). RIVERSIDE Co.: Deep Canyon, 3 ♂, IX-2-64 (P. A. Rauch, UCR). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1 ♂, 2 ♀, VII-4-60 (F. D. Parker, UCD). 5 mi. E. of Webber Lake, 1 ♂, VII-29-55 (H. R. Moffitt, UCD). TUOLUMNE Co.: Porcupine Flat, Yosemite National Park, 1 ♂, 1 ♀, VIII-2-62 (R. and K. Dreisbach, HCH). Sonora Pass, 1 ♀, VIII-21-59 (D. D. Linsdale, CIS). Tuolumne Meadows, 1 ♂, VII-22-36, 1 ♂, VIII-1-40 (R. H. Beamer, UK); 3 ♂, 2 ♀, VIII-19-55 (J. W. MacSwain, CIS). Tuolumne Meadows, Soda Springs, 8,600 ft., 1 ♂, 3 ♀, VIII-8-16 (G. R. Pilate, USNM).

*H. seriata* possesses the habitus of *nubilalis*, from which it differs in having longer arisal hairs. The male of *seriata* has bristles of anteroventral series on hind femur gradually increasing in length toward proximal region of femur, and in the female the proximal bristles of such series are nearly as strong as those distad, figure 106. The female has, and male may or may not have, an anteroventral bristle on mid tibia.

*Hylemya (Delia) setifirma* Hockett

*Hylemya (Delia) setifirma* Hockett. 1951, Ent. Soc. Wash. Proc., 53:259.

Holotype: ♂, Wallowalk, Oregon (USNM).

*Geographic range.* — California, Colorado, Idaho, Montana,

Nevada, Oregon, Utah, Wyoming.

*California record*.—MONO Co.: Virginia Lakes, 9,750 ft., 1 ♀, VIII-17-63 (H. B. Leech, CAS).

*H. setifirma* belongs to the *setiventris* grouping in that the caudal margin of sternum 4 of the abdomen in the male is emarginate and further is armed with long bristles. In *setifirma* and *ineptifrons*\* the frons in the male is similar to that of the female, and from the latter species *setifirma* differs in having a robust apical posteroventral bristle on hind tibia.

#### *Hylemya (Delia) setiventris* Stein

*Hylemya setiventris* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42:216.

Syntypes: ♂ ♂, ♀ ♀, Moscow, Idaho (FMNH, USNM).

*Geographic range*. — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Montana, Oregon, Utah, Washington.

*California records*. — ALPINE Co.: Ebbetts Pass, 1 ♀, VIII-23-59 (E. Mezger, UCD). Marshall Meadow, Ebbetts Pass, 1 ♀, VIII-24-57 (E. Mezger, UCD). EL DORADO Co.: 3 mi. S. of Camino, 1 ♀, VI-26-48 (L. W. Quate, CIS). SAN DIEGO Co.: Laguna Mts., 1 ♂, 2 ♀, VII-6-29 (P. W. Oman, UK). SAN MATEO Co.: Skyline Boulevard, near Skylonda, 1 ♀, IX-21-48 (P. H. Arnaud, CAS). TUOLUMNE Co.: Pinecrest, 1 ♂, VI-30-48, 1 ♂, VIII-16-48 (P. H. Arnaud, CAS). Strawberry, 1 ♂, VIII-13-60 (D. Q. Cavagnaro, UCD). Tuolumne Meadows, 1 ♀, VII-16-49 (L. L. Jensen, CIS).

Males of *H. setiventris*, *extensa* and *sequoiae* differ from those of related species in having lobes of sternum 4 furnished with much longer bristles on apical region than proximad. In *setiventris* the tips of these bristles curve mesad and do not extend beyond apex of abdomen. Females of *setiventris* usually lack setulae on notopleural depression.

#### *Hylemya (Delia) simulata* Huckett

*Hylemya (Delia) simulata* Huckett. 1953, Brooklyn Ent. Soc. Bull., 48:11.

Holotype: ♂, West Yellowstone, Montana (USNM).

*Geographic range*. — Alberta, California, Idaho, Montana, New Mexico.

*California records*. — EL DORADO Co.: Pollock Pines, 1 ♀, V-3-52 (E. I. Schlinger, CIS). MONO Co.: Lake Ellery, 1 ♀, IX-9-63 (T. W. Fisher, UCR). Virginia Lakes, 9,750 ft., 3 ♂, 1 ♀, VIII-17-63 (H. B. Leech, CAS). SAN BERNARDINO Co.: 12 mi. SE. of Ivanpah, 2 ♀, V-1-56 (W. Wasbauer, CIS). South Fork, Santa Ana River, 1 ♂, VII-29-42 (A. L. Melander, USNM). Victorville, 1 ♀, IV-28-56 (J. Powell, CIS). SANTA CLARA Co.: Saratoga, 1 ♀, VI-6-54 (P. H. Arnaud, CAS).

The male of *H. simulata* resembles that of *platura* (Meigen), from which it differs in having dorsal bristles on mid metatarsus. The males of both species differ from that of *florilega* (Zetterstedt)\* in the absence of a continuous series of erect fine posteroventral bristles on distal half of hind femur. The female of

*simulata* may be separated from those of related species by the dilated fore tarsal segments 3 and 4, figure 98.

#### *Hylemya (Delia) sobrians* Huckett, new status

*Hylemya (Delia) setiventris sobrians* Huckett. 1951, Ent. Soc. Wash. Proc., 53:256.

Holotype: ♂, Mount Moscow, Idaho (USNM).

*Geographic range*. — California, Colorado, Idaho, Utah, Washington, Yukon Territory.

*California records*. — MODOC Co.: Lily Lake, 5 ♂, VII-11-57 (J. Powell, CIS). NAPA Co.: Napa, 1 ♂, III-28-54 (J. Powell, CIS). PLUMAS Co.: 4 mi. W. of Quincy, 1 ♂, VI-19-49 (B. Keh, BVC).

The male of *H. sobrians* has a shallow caudal emargination on sternum 4, and lateral lobes weakly developed, as in males of *alternata*. From the latter, males of *sobrians* differ in having sternum 4 profusely bristled throughout.

#### *Hylemya (Delia) suburbana* Huckett

*Hylemya (Delia) suburbana* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:241.

Holotype: ♂, San Francisco, California (CAS).

*Geographic range and California records*. — SAN FRANCISCO Co.: San Francisco, sand dunes, 1 ♂, V-13-27 (C. L. Fox, CAS). Ingleside, 1 ♀, VIII-26-08 (J. C. Bradley, CAS).

The male of *H. suburbana* has mid and hind femora broadly fulvous on distal half, and fore tibia with a fine pointed apical posteroventral bristle. It differs from similar species in having the arista shorter haired and hind femur with stronger anteroventral and posteroventral bristles. The female may be separated from its relatives by the upright spinules on terminal sclerites of ovipositor.

#### *Hylemya (Delia) tenuis* Drew

*Hylemya angusta* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42:218. Name preoc. Macquart, 1835.

*Hylemya pilimana* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):80. Name preoc. Ringdahl, 1918.

*Hylemya tenuis* Drew. 1963, Mich. State Univ., Mus. Pubs., Biol. Ser. 2:248. New name for *angusta* Stein.

Type: ♂, "1581," Colorado (FMNH).

*Geographic range*. — Alaska, Alberta, California, Colorado, Idaho, Labrador, Manitoba, Montana, New Mexico, Northwest Territories, Oregon, Quebec, Washington, Yukon Territory.

*California records*. — ALPINE Co.: Ebbetts Pass, 1 ♀, VIII-23-59 (E. Mezger, UCD). Hope Valley, 3 ♀, VII-9-48 (D. Carver, CIS). FRESNO Co.: Pioneer Basin, 10-11,000 ft., 1 ♀, VIII-19-53 (E. I. Schlinger, UCD). INYO Co.: Bishop, 1 ♂, VII-28-40 (L. J. Lipovsky, UK). Ruby Lake, 1 ♂, VIII-13-57 (D. D. Linsdale, CIS). LASSEN Co.: Susan River Camp, 1 ♂, 3 ♀, VII-9-10-49 (A. T. McClay, UCD). MODOC Co.: Cedar Pass, 2 ♂,

VI-29-55 (D. L. Dahlsten, UCD). 6 mi. NW. of Cedarville, 1♂, VII-4-62 (J. S. Buckett, UCD). Lily Lake, 1♂, VII-11-57 (J. Powell, CIS). 8 mi. E. of New Pine Creek, 1♂, VII-29-52 (W. C. Bentinck, CIS). MONO Co.: Leavitt Meadow, 1♂, 1♀, VII-6-51 (A. T. McClay, UCD). 1 mi. W. of Tom's Place, 1♂, VIII-13-57, at sugar bait (J. Powell, CIS). 4 mi. SW. of Tom's Place, 2♀, VII-13-61 (H. V. Daly, CIS). Tioga Lodge, Mono Lake, 1♂, VI-22-29 (E. P. Van Duzee, CAS). Virginia Lakes, 9,750 ft., 2♂, 5♀, VIII-17-63 (H. B. Leech, CAS). Walker River, 1♀, X-5-35 (A. J. Basinger, CAS). White Mts., 10,150 ft., 3 mi. N. of Inyo Co., 1♀, VIII-19-63, 9♂, 1♀, VIII-20-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♂, 1♀, VII-10-64, in malaise trap (M. E. Irwin, UCR). SHASTA Co.: Old Station, 1♂, VI-24-55 (J. C. Wells, UCD). TUOLUMNE Co.: Porcupine Flat, Yosemite National Park, 1♀, VIII-2-62 (R. and K. Dreisbach, HCH). Sonora Pass, 4♂, 9♀, VIII-21-59 (D. D. Linsdale, J. Powell, CIS).

Males of *H. tenuis* and *pilitarsis* may be distinguished from their congeners by the dense matlike clothing of setulae on posterior surface of fore femur, and from males of related species by the absence of dorsal bristles on mid metatarsus. The cerci of *tenuis* is less narrowly tapering towards apex and more profusely bristled on apical region than in *pilitarsis*, figure 110. Females of the two species and those of related taxa are scarcely separable from one another.

#### *Hylemya (Delia) triseriata* Malloch

*Hylemya triseriata* Malloch. 1920, Ohio Jour. Sci., 20:276.

Holotype: ♂, Katmai, Alaska (OSUM).

*Geographic range.* — Alaska, California.

*California records.* — ALPINE Co.: Ebbetts Pass, 8,730 ft., 1♀, VI-30-60 (J. F. Lawrence, CIS). Woods Lake, 1♀, VII-16-60 (C. G. Moore, UCD). AMADOR Co.: 4 mi. N. of Silver Lake, 1♀, VII-25-55 (J. C. Downey, UCD). EL DORADO Co.: Echo Lake, 1♀, VII-27-55 (W. W. Middlekauff, CIS). 3 mi. W. of Fallen Leaf, 6,500 ft., 1♀, VII-13-61 (J. G. Chillcott, CNC). INYO Co.: Bishop, 1♀, VII-28-40 (L. J. Lipovsky, UK). Lone Pine Creek, 10,250 ft., 1♀, VII-7-61 (H. V. Daly, CIS). SAN BERNARDINO Co.: Upper Santa Ana River, South Fork Meadow, 1♀, VI-25-18 (G. H. and J. L. Sperry, USNM). SHASTA Co.: 3 mi. SE. of Mt. Lassen, 1♂, VII-8-55 (J. W. MacSwain, CIS). TULARE Co.: Alta Meadows, Giant Forest, 9,100 ft., 1♂, VII-16-23 (C. L. Fox, CAS). TUOLUMNE Co.: Tioga Pass, 1♀, VII-8-46 (H. P. Chandler, CAS). Tuolumne Meadow, 8,600 ft., 1♀, VIII-15-16 (G. R. Pilate, USNM).

The male of *H. triseriata* has an extensive series of bristles on anteroventral and posteroventral surfaces of hind femora and hind tibiae, much as in certain specimens of *lupini*. In both sexes of *triseriata* the tibiae are blackish, parafacials and cheeks moderately broad. The species is more closely related to *glabritheca*, from which it differs in having haustellum dulled, and in the female by the absence of posteroventral bristles on hind femur.

#### *Hylemya (Delia) vesicata* Huckett

*Hylemya (Delia) vesicata* Huckett. 1953, Brooklyn Ent. Soc. Bull., 48:115.

Holotype: ♂, Dana Meadows, California (USNM).

*Geographic range.* — California, Oregon.

*California records.* — EL DORADO Co.: Fallen Leaf Lake, 1♂, IX-1-50 (H. H. Keifer, CDA). Glenn Alpine, Lake Tahoe, 1♂, IX-1-30 (CDA). FRESNO Co.: Heart Lake, 10,500 ft., 1♀, IX-1-52 (E. I. Schlinger, UCD). INYO Co.: Mono Pass, 4♂, 7♀, VIII-13-57 (D. D. Linsdale, J. Powell, CIS). Near Mono Pass, 12,000 ft., NW. Inyo Co., 1♂, VIII-12-57 (C. D. MacNeill, CAS); 1♂, VIII-8-61 (C. D. MacNeill, D. C. Rentz, M. R. Lundgren, CAS). Ruby Lake, 1♂, 2♀, VIII-13-57 (J. Powell, CIS). SISKIYOU Co.: Panther Meadows, Mt. Shasta, 1♂, VIII-4-63 (P. H. Arnaud, CAS). TULARE Co.: Mineralking, 2♂, VIII-5-35 (CAS). TUOLUMNE Co.: Dana Meadows, 5♂, 2♀, VII-17-49, type series (L. L. Jensen, CIS). Tuolumne Meadows, 1♂, VIII-1-40 (R. H. Beamer, UK).

*H. vesicata* is one of the larger species of the subgenus *Delia*, averaging 10 mm in length. The male may be recognized readily by the swelling on anterior surface of fore tarsal segment 2, and by the long spreading bristles on cerci, the tips of which reach the basal region of abdomen. In both sexes the legs are strongly bristled, and in male specimens the dorsal surface of mid metatarsus may be bristly. The female has two bristles respectively on anterodorsal and posteroventral surfaces of fore tibia, and on anterodorsal and posterodorsal surfaces of mid tibia.

#### Subgenus *Botanophila* Lioy

*Botanophila* Lioy. 1864, I. R. Ist. Veneto di Sci., Let. ed Arti, Atti, ser. 3, 9:990.

Type-species: *Anthomyia varicolor* Meigen, monobasic.

Species belonging to the subgenus *Botanophila* are of robust habitus, legs being well or strongly bristled. Males are characterized by having basal and prebasal sclerites of hypopygium prominently developed and well bristled on dorsum, anal sclerite largely secluded when in repose and usually with weak bristles, processes of sternum 5 with submarginal series of spinules, and outer or anterior pair of parameres of male genitalia *sens. str.* much reduced, each bearing 2 coarsened flagellate filaments, figures 79, 80, 81.

#### KEYS TO SPECIES OF HYLEMYA (BOTANOPHILA) IN CALIFORNIA MALES

1. Processes of sternum 5 armed with series of robust spines from basal to preapical regions . . . . . 2
- Processes without series of robust spines from basal to preapical regions . . . . . 3
2. Longer spines of processes longer than height of hind femur at middle, outer series of bristles on processes confined mainly to distal half of process . . . . .

*spiniventris* Coquillett

- Longer spines not longer than height of hind femur at middle, outer series of bristles of processes extending to basal region ..... *subspinata* Huckett
3. Longer arisal hairs scarcely longer than basal diameter of arista ..... 4  
 Longer arisal hairs as long or longer than half width of third antennal segment ..... 11
4. Processes viewed laterad and in profile proportionately broad and stout, figure 36a ..... 5  
 Processes viewed laterad not stout, narrowing distad and longer than twice its width near middle, figs. 31a, 42a. 10
5. Hind tibia with robust apical posteroventral bristle ..... 6  
 Hind tibia usually with apical posteroventral bristle weakly developed or setulose, epistoma not extended cephalad to level with tip of profrons, cerci and gonostyli simple, rodlike, fig. 38 ..... *fibulans* Huckett
6. Proboscis not slender nor lengthy, mesonotum with bristlelike presutural acrosticals, copulatory appendages as in *fibulans* ..... *consolata* Huckett  
 Proboscis slender or narrow, mesonotum with fine non-bristly presutural acrosticals, cerci extended to apex as a needlelike process, gonostyli sculptured and incised on apical region, forming inner and outer digits, figs. 35-37, 39-42 ..... 7
7. Narrower part of parafacials not as broad as width of third antennal segment, cheeks tapering to narrow proportions below eye, cerci foreshortened and with 3 apical processes, fig. 40 ..... *trifurcata* Huckett  
 Narrower part of parafacials slightly broader than width of third antennal segment, breadth of cheeks well maintained caudad below eye, as high thereat as width of third antennal segment, cerci extended distad as a single process, figs. 36-37, 39 ..... 8
8. Cerci angulate in outline dorsad (cephalad), apex sharply formed, fig. 39 ..... *acuticauda* Huckett  
 Cerci broadly transverse along dorsal (cephalic) margin, figs. 36, 37 ..... 9
9. Inner margin of outer digit of gonostyli armed with a sharp firm tooth, fig. 37, mid and hind femora with extensive series of strong anteroventral and posteroventral bristles, becoming almost straight and stiffened proximad, costal thorn as long as humeral cross-vein ..... *piloseta* Malloch  
 Inner margin of outer digit of gonostyli with stumpy short tooth, or only trace of such, mid and hind femora with normal bristles ..... *varicolor* (Meigen)\*
10. Processes with submarginal spinules longer than costal setulae opposite cell 2 C, cerci and gonostyli as in fig. 60 ..... *sperata* Huckett  
 Processes with submarginal spinules minute, shorter than costal setulae opposite cell 2 C, cerci and gonostyli as in fig. 41 ..... *marginella* Malloch
11. Cheek broad, as high as one-third height of eye, epistoma not extended cephalad to level with tip of profrons, proboscis not lengthy nor slender ..... *formiceps* Huckett  
 Cheek scarcely as high as one-third height of eye, or if so epistoma extended cephalad to level with tip of profrons, proboscis slender ..... 12
12. Processes fringed along inner margin with fine long hairs, as long or longer than adjacent submarginal spinules, distal hairs of series directed basad, cerci and gonostyli as in fig. 35 ..... *emarginalis* Huckett  
 Processes with fringe of minute hairs or setulae along in-

- ner margin, much shorter than adjacent submarginal spinules ..... 13
13. Antennae separated by a facial bulge or elevation, epistoma extended to level below apices of antennae, length of head from oral margin to occipital foramen about equal to height of head, cerci and gonostyli as in fig. 42 ..... *spinidens* Malloch  
 Antennae inconspicuously separated at base, face not notably inflated on median plane, head higher than long at maximum diameters, cerci and gonostyli as in fig. 62 ..... *pseudospinidens* Huckett

FEMALES

1. Arisal hairs not much longer at most than basal diameter of arista ..... 2  
 Arisal hairs as long or longer than half width of third antennal segment ..... 6
2. Hind tibia with long preapical posterodorsal bristle ..... 3  
 Hind tibia with weak preapical posterodorsal bristle, usually not longer than apical width of tibia ..... 5
3. Epistoma in profile extended cephalad to level with tip of profrons, proboscis rather flattish laterally ..... 4  
 Epistoma suppressed, not extended to level with tip of profrons, proboscis rather shortened and thickish, not narrow ..... *fibulans* Huckett
4. Parafacials for greater part narrower than width of third antennal segment ..... *trifurcata* Huckett  
 Parafacials for greater part wider than breadth of third antennal segment ..... *piloseta* Malloch, *acuticauda* Huckett, and *varicolor* (Meigen)\*<sup>2</sup>
5. Mid femur with 2 anteroventral bristles on middle third of femur ..... *marginella* Malloch  
 Mid femur with 1 or 2 anteroventral bristles set one-third length of femur from its base ..... *sperata* Huckett
6. Epistoma (vibrissal angle) extended cephalad to level with tip of profrons ..... 7  
 Epistoma suppressed, not extended to level with tip of profrons, proboscis not long, thickish. *formiceps* Huckett
7. Face with pronounced bulge or elevation, thus broadly separating antennae from each other, epistoma and oral margin notably extended cephalad. *spinidens* Malloch  
 Facial elevation less pronounced in separating antennae. . 8
8. Arisal pubescence diverse, with alternating long and short hairs, longer hairs as long as width of third antennal segment, fig. 8 ..... 9  
 Arisal pubescence evenly haired, longer hairs shorter than width of third antennal segment, fig. 9 ..... *spiniventris* Coquillett and *subspinata* Huckett
9. Cheek usually as high as one-third height of eye, mid femur with or without a weak prebasal anteroventral bristle ..... *pseudospinidens* Huckett  
 Cheek usually not as high as one third height of eye, mid femur with well developed prebasal anteroventral bristle ..... *emarginalis* Huckett

<sup>2</sup> Stein (1920:93) recorded the species *Hylemya varicolor* (Meigen) from "Sierra Morena Mts., California," a locality I have been unable to find. The male specimen on which this record is based has been examined but I am unable to verify Stein's determination.

*Hylemya (Botanophila) acuticauda* Hockett

*Hylemya (Botanophila) acuticauda* Hockett. 1947, N. Y. Ent. Soc. Jour., 55:17.

Holotype: ♂, Rainier National Forest, Washington (USNM).

**Geographic range.** — Alberta, British Columbia, California, Colorado, Montana, New Mexico, Oregon, Saskatchewan, Utah, Washington, Wyoming.

**California records.** — EL DORADO CO.: Fallen Leaf Lake, 1 ♂, VI-21-15 (A. K. Fisher, HCH). TUOLUMNE CO.: Porcupine Flat, Yosemite National Park, 1 ♀, VIII-2-62 (R. and K. Dreisbach, HCH). Tuolumne Meadows, 3 ♂, VII-4-5-27 (J. M. Aldrich, USNM). Tuolumne Meadows, Soda Springs, 8,600 ft., 1 ♀, VIII-8-16 (C. R. Pilate, USNM).

Males of *H. acuticauda* may be separated from those of its nearest allies by the angular extension of cerci cephalad (dorsad), figure 39.

*Hylemya (Botanophila) consolata* Hockett

*Hylemya (Botanophila) consolata* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:244.

Holotype: ♂, Echo Lake, El Dorado County, California (UCB).

**Geographic range.** — California.

**California records.** — EL DORADO CO.: Echo Lake, 1 ♂, VII-19-55, holotype, 1 ♂, VII-27-55 (W. W. Middlekauff, CIS). MONO CO.: Sardine Creek, 8,500 ft., 1 ♂, VII-11-51 (A. T. McClay, UCD).

The male of *H. consolata* closely resembles that of *fibulans* in structure and bristling of copulatory appendages. From the specimens on hand it may be separated from males of the latter by the long apical posteroventral bristle on hind tibia, broader cheeks and less receding profile of parafacials and epistoma.

*Hylemya (Botanophila) emarginalis* Hockett

(Map 14)

*Hylemya marginata* Stein. 1898, Berlin. Ent. Ztschr. (1897), 42:221. Name preoc. Walker, 1849.

*Hylemya (Botanophila) emarginalis* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:305. New name for *marginata* Stein.

Syntypes: ♂ ♂, ♀ ♀, Nos. "1581" "1582," Colorado (ZMUB, FMNH).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming.

**California records.** — ALPINE CO.: Ebbetts Pass, 1 ♂, VII-30-59 (L. E. Campos, UCD); 1 ♂, VIII-29-57 (E. Mezger, UCD). AMADOR CO.: 4 mi. N. of Silver Lake, 1 ♀, VII-25-55 (J. C. Downey, UCD). EL DORADO CO.: Echo Lake, 1 ♀, VII-23-55 (E. I. Schlinger, UCD). Grass Lake, Luther Pass, 1 ♀, VII-24-55 (J. C. Downey, UCD). FRESNO CO.: Heart Lake, 10,500 ft., 1 ♀, IX-1-52 (E. I. Schlinger, UCD). Pioneer Basin, 10-11,000 ft., 1 ♀, VIII-19-56 (E. I. Schlinger, UCD). INYO CO.: Bishop, 2 ♂, VII-28-40 (L. J. Lipovsky, UK). Lone Pine, 2 ♂, 1 ♀, VII-28-40 (D. E. Hardy, HCH). Ruby Lake, 1 ♂, VIII-13-



Map 14. Locality records in California for *Hylemya (Botanophila) emarginalis* Hockett.

57 (D. D. Linsdale, CIS). MADERA CO.: Lyell Canyon, 1 ♂, VII-8-35 (E. C. Zimmerman, CAS). MARIPOSA CO.: 2 mi. ESE. of Mariposa Grove, 1 ♀, VII-27-46 (H. P. Chandler, CAS). MODOC CO.: Lily Lake, 1 ♂, VII-11-57 (J. Powell, CIS). MONO CO.: Sardine Creek, 8,500 ft., 2 ♂, VII-13-51 (A. T. McClay, UCD); 1 ♂, VII-29-54 (J. C. Downey, UCD). SONORA PASS, 9,024 ft., 3 ♂, VIII-26-62 (R. Montanucci, UCD). NEVADA CO.: Sagehen, near Hobart Mills, 1 ♀, VII-21-54 (J. Powell, CIS). SAN BERNARDINO CO.: Big Meadow, San Bernardino Mts., 1 ♀, VII-8-50 (UCLA). SAN MATEO CO.: Memorial Park, 1 ♂, 1 ♀, VII-19-64 (P. H. Arnaud, CAS). Pescadero, 1 ♀, VI-4-22 (E. P. Van Duzee, CAS). SANTA CRUZ CO.: Santa Cruz Mts., 1 ♂, 3 ♀, VI-8-40 (M. T. James, HCH). Soquel, 3 ♂, 2 ♀, VI-18-20-50, 1 ♂, VI-20-24-50 (M. T. James, HCH). TUOLUMNE CO.: Blue Canyon, Sonora Pass, 1 ♂, 3 ♀, VIII-30-60 (M. E. Irwin, A. S. Menke, UCD); 1 ♂, VIII-18-60 (A. S. Menke, UCD). Chipmunk Flat, 1 ♂, 1 ♀, VIII-9-60 (A. S. Menke, UCD). Sonora Pass, 1 ♀, VII-10-57 (W. T. Crites, UCD); 2 ♀, VIII-21-59 (D. D. Linsdale, CIS).

*H. emarginalis* has arisal hairs of diverse lengths, the longer being as long as width of third antennal segment, and in this respect resembling the arista of *pseudospinidens*. In male *emarginalis* the inner margins of processes have a prominent series of fine lengthy hairs, those distad being directed slightly basad, figure 30. In both sexes the cheeks are slightly narrower than in related species and bristles along ventral border of cheeks and on vibrissal margin more slender.



*Hylemya (Botanophila) fibulans* Huckett

*Hylemya (Botanophila) fibulans* Huckett. 1947, N. Y. Ent. Soc. Jour., 55:20.

Holotype: ♂, Moscow Mountain, Idaho (USNM).

**Geographic range.**—Alberta, California, Idaho, Oregon, Wyoming.

**California records.**—EL DORADO Co.: Echo Lake, 1♂, VII-19-55 (W. W. Middlekauff, CIS). MONO Co.: Sardine Creek, 8,500 ft., 1♂, VII-11-51 (A. T. McClay, UCD). PLUMAS Co.: Buck's Lake, 1♀, VII-1-49 (L. W. Quate, BVC).

In male and female *H. fibulans* the arisal hairs are short, and in comparison with other species having this character the epistoma in *fibulans* is quite suppressed and the proboscis rather shortened. The male is notable for the rodlike form of the cerci and gonostyli, figure 38.

*Hylemya (Botanophila) formiceps* Huckett

*Hylemya (Botanophila) formiceps* Huckett. 1947, N. Y. Ent. Soc. Jour., 55:27.

Holotype: ♂, Mt. Home Canyon, California (USNM).

**Geographic range.**—California.

**California records.**—ALAMEDA Co.: Berkeley, 1♂, IX-10-58 (R. W. Thorp, CIS). INYO Co.: Lone Pine, 1♂, 3♀, VII-28-40 (R. H. Beamer, L. C. Kuitert, UK, HCH). North Lake, 2♀, VI-30-61 (J. S. Buckett, UCD). MARIN Co.: Mill Valley, 1♂, X-20-23 (F. R. Cole, CAS). PLUMAS Co.: Blairsden, 2♀, VI-14-59 (J. S. Buckett, UCD). Buck's Lake, 1♂, VII-1-49 (L. W. Quate, CIS). SAN BERNARDINO Co.: Mill Creek Canyon, 3♂, IX-25-23 (F. R. Cole, CAS). Mountain Home, 1♂, VIII-24-44 (A. L. Melander, USNM). Mt. Home Canyon, 1♂, VII-1-23, 2♂, IX-20-23, 9♂, 3♀, IX-22-23 (F. R. Cole, CAS, USNM). Round Cienega, 1♀, VIII-30-23, 1♂, IX-1-23 (F. R. Cole, CAS). SAN MATEO Co.: Corte de Madera Creek, near Portola, 1♂, X-17-57 (P. H. Arnaud, CAS). Skyline Boulevard, near Skylonda, 1♂, 1♀, X-4-57 (P. H. Arnaud, CAS). TULARE Co.: Giant Forest Camp, Sequoia National Park, 1♀, VII-21-53 (R. and H. Dietrich, HCH).

*H. formiceps* is similar to *fibulans* in the character of epistoma and proboscis, differing notably however in the longer arisal hairs, and in the male by the pattern of cerci and gonostyli, figure 61.

*Hylemya (Botanophila) marginella* Malloch

*Hylemya marginella* Malloch. 1918, Amer. Ent. Soc. Trans., 44:311.

*Hylemya nigribasis* Stein p. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):78.

Holotype: ♂, Tennessee Pass, Colorado (IILNHS).

**Geographic range.**—Alberta, British Columbia, California, Colorado, Montana, New Mexico, Oregon, Washington, Wyoming, Yukon Territory.

**California records.**—ALPINE Co.: Carson Pass, 1♀, VII-17-62 (E. J. Montgomery, UCD). Winnemucca Lake, 1♂, VII-14-64 (M. E. Irwin, UCR). Woods Lake, 1♀, VII-6-60 (R. E.



Map 15. Locality records in California for *Hylemya (Botanophila) piloseta* Malloch.

Rice, UCD). EL DORADO Co.: Echo Lake, 7,400 ft., 1♀, VII-8-38 (E. O. Essig, CIS); 1♀, VII-6-53 (W. W. Middlekauff, CIS). MONO Co.: Leavitt Meadow, 1♀, VII-6-51 (A. T. McClay, UCD). Sardine Creek, 8,500 ft., 3♂, 2♀, VII-12-51 (A. T. McClay, UCD). MARIPOSA Co.: Yosemite Park, Glacier Point Road, 1♀, VII-1-47 (A. L. Melander, USNM). SHASTA Co.: Kings Creek Meadow, Lassen National Park, 1♂, VII-23-50 (P. H. Arnaud, CDA). TUOLUMNE Co.: Dana Meadows, 1♂, VII-17-49. Dardanelles, 1♂, VI-26-51 (A. T. McClay, UCD). Sonora Pass, 3♀, VIII-15-59 (G. I. Stage, R. R. Snelling, CIS).

The male of *H. marginella* is notable for the fine short submarginal spinules on processes, figure 31, whereby it may be distinguished from *sperata*. The female differs from that of *sperata* in the more medial position of anteroventral bristles on mid femur.

*Hylemya (Botanophila) piloseta* Malloch

(Map 15)

*Hylemya piloseta* Malloch. 1918, Amer. Ent. Soc. Trans., 44:313.

Holotype: ♂, Corvallis, Oregon (IILNHS).

**Geographic range.**—California, Colorado, Oregon, Washington, Wyoming.

**California records.**—ALAMEDA Co.: Berkeley, 1♂, III-22-97 (ZMUB); 1♂, IV-27-38 (R. M. and G. E. Bohart, CAS). Berkeley Hills, 4♂, 3♀, III-26-54 (R. F. Smith, E. G. Linsley, CIS); 1♂, III-29-56 (J. W. MacSwain, CIS). Oakland, 1♀, III-19-36 (E. S. Ross, CAS). Tilden Park, Berkeley Hills, 1♂,

II-30-62 (J. Powell, CIS). DEL NORTE Co.: 1 ♂, IV-4-09 (Nunnenmacher, CAS). Gasquet, 1 ♂, IV-28-39 (A. T. McClay, UCD). EL DORADO Co.: Pollock Pines, 1 ♂, IV-22-56 (E. I. Schlinger, UCD). MARIN Co.: Alpine Lake, 1 ♀, VII-3-39 (R. P. Allen, CAS). North end of Golden Gate Bridge, 1 ♂, IV-12-53 (H. B. Leech, CAS). McClure's Beach, 1 ♀, III-31-62 (D. H. Janzen, CIS). Novato, 1 ♀, V-6-62 (D. C. Rentz, CAS). Point Reyes, 1 ♂, 2 ♀, III-30-56 (E. A. Kurtz, UCD); 1 ♀, IV-19-58 (D. D. Linsdale, CIS). San Anselmo, 1 ♂, IV-16-22 (E. P. Van Duzee, CAS). Marin Co., 1 ♀, IV-4-09 (Nunnenmacher, CAS). MONTEREY Co.: Arroyo Seco Camp, 1 ♀, V-1-60 (F. D. Parker, UCD). Carmel, 1 ♀, III-25-19 (E. P. Van Duzee, CAS). NAPA Co.: Calistoga, 1 ♂, III-16-97 (R. M. Bohart, CAS). PLACER Co.: Dutch Flat, 6 ♂, 2 ♀, V-2-54 (E. I. Schlinger, W. H. Lange, UCD). SAN DIEGO Co.: Cuyamaca Lake, 5 ♂, V-5-45 (A. L. Melander, USNM); 2 ♂, IV-21-55, at 4,600 ft. (W. R. M. Mason, W. R. Richards, CNC). Descanso, 1 ♂, 2 ♀, III-30-61 (W. A. Steffan, CIS). Descanso Ranger Station, 1 ♂, 2 ♀, III-31-61 (W. A. Steffan, CIS). Julian, 1 ♂, V-5-45 (A. L. Melander, USNM). SAN FRANCISCO Co.: San Francisco, 6 ♂, III-16-13 (Bridwell, USNM); 1 ♂, III-20-20 (A. J. Basinger, CIS); 1 ♂, IV-2-22 (C. L. Fox, CAS). SANTA CLARA Co.: Mt. Hamilton, 1 ♂, V-6-57 (D. Burdick, CIS). SOLANO Co.: Green Valley, 1 ♂, 1 ♀, III-24-54 (E. I. Schlinger, CIS). TEHAMA Co.: Saddle Camp Meadow, 1 ♀, V-15-51 (H. H. Keifer, CDA).

The male of *H. piloseta* possesses notably strong stiffish bristles on proximal half of anteroventral and posteroventral surfaces of mid and hind femora, and may further be distinguished from males of allied species by the firm sharp tooth on inner margin of outer digit of gonostyli, figure 37.

#### *Hylemya (Botanophila) pseudospinidens* Huckett

*Hylemya (Botanophila) pseudospinidens* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:245.

Holotype: ♂, Lone Pine, Inyo County, California (HCH).

*Geographic range.* — California.

*California records.* — INYO Co.: Lone Pine, 1 ♂, 3 ♀, VII-28-40, type series (R. H. Beamer, L. C. Kuitert, HCH). Whitney Portal, 3 ♂, VII-3-53 (W. D. McLellan, UCD). SIERRA Co.: Yuba Pass, 1 ♂, 1 ♀, VII-30-58 (A. A. Grigarick, UCR); 2 ♂, VII-7-64 (C. N. Slobodchikoff, CAS). TUOLUMNE Co.: Saucer Meadow(s), 3 ♂, VII-28-62 (R. E. Doty, BVC).

The species *H. pseudospinidens* differs from *spinidens* both in the absence of a marked facial bulge separating the antennae and of a marked extension cephalad of vibrissal angle, the head being higher than long at maximum diameters. Copulatory appendages as in figures 62, 81, 88.

#### *Hylemya (Botanophila) sperata* Huckett

*Hylemya (Botanophila) sperata* Huckett. Calif. Acad. Sci. Proc., ser. 4, 34:247.

Holotype: ♂, 4 miles north of Silver Lake, Amador County, California (UCD).

*Geographic range.* — California.

*California records.* — ALPINE Co.: Carson Pass, 2 ♂, VI-29-57

(J. Powell, CIS). Forestdale Meadow, 1 ♂, VII-17-60 (C. G. Moore, UCD). Hope Valley, 2 ♂, VII-9-48 (C. D. MacNeill, CAS); 1 ♀, VI-29-57 (J. Powell, CIS). AMADOR Co.: 4 mi. N. of Silver Lake, 1 ♂, 3 ♀, VII-25-55, type series (J. C. Downey, UCD). EL DORADO Co.: 2 mi. S. of Meyers, 1 ♀, VII-24-55 (J. C. Downey, UCD). MONO Co.: Leavitt Meadow, 2 ♀, VI-28-51 (T. R. Haig, UCD); 1 ♂, 7 ♀, VII-6-51 (S. M. Kappos, UCD, HCH). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♂, VI-17-64 (C. N. Slobodchikoff, CAS); 2 ♂, 3 ♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). Truckee, 2 ♂, 2 ♀, VI-25-43 (P. H. Arnaud, CAS). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1 ♂, 2 ♀, VII-4-60 (F. D. Parker, CAS). TUOLUMNE Co.: Chipmunk Flat, 1 ♂, VI-13-62 (J. Powell, CIS). Kennedy Meadows, 1 ♀, VII-9-51 (A. T. McClay, UCD). Near Sonora Peak, 11,000 ft., 1 ♀, VIII-10-57 (C. D. MacNeill, CAS).

*H. sperata*, as *marginella*, lacks the usually well developed preapical posterodorsal bristle on hind tibia common to species having a short haired arista, and in the male the processes are more slender than in such forms. The species *sperata* may be distinguished from *marginella* by the longer submarginal spinules on processes of male, figure 89, and by the more proximal position of anteroventral bristles on mid femur of the female.

#### *Hylemya (Botanophila) spinidens* Malloch

(Map 16)

*Hylemya spinilamellata* Malloch. 1918, Amer. Ent. Soc. Trans., 44:312. Name prec. Stein, 1904.

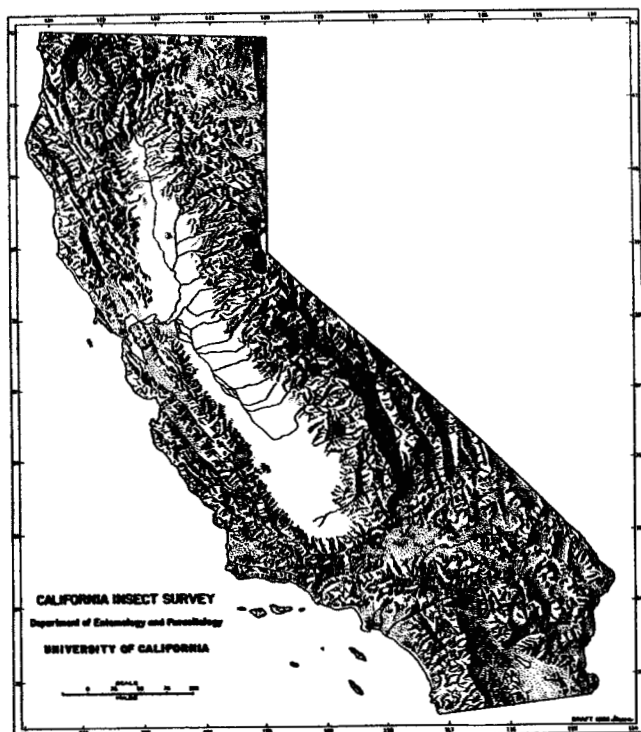
*Hylemya nigribasis* Stein p. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):78.

*Hylemya spinidens* Malloch. 1920, Amer. Ent. Soc. Trans., 46:194. New name for *spinilamellata* Malloch.

Holotype: ♂, Silver Lake, Utah (IINHS).

*Geographic range.* — Alaska, Alberta, Arizona, British Columbia, California, Colorado, Idaho, Montana, New Mexico, Nevada, Northwest Territories, Oregon, Utah, Washington, Wyoming, Yukon Territory.

*California records.* — EL DORADO Co.: Echo Lake, 2 ♂, VII-12-46, at 7,300 ft., (P. H. Arnaud, CAS); 2 ♂, VII-21-48 (S. A. Sher, CIS); 1 ♂, VI-25-54, 1 ♂, VI-30-55, 1 ♀, VII-30-55 (W. W. Middlekauff, CIS). Fallen Leaf, 6,500 ft., 1 ♂, VII-15-17 (USNM). FRESNO Co.: Huntington Lake, 7,000 ft., 3 ♂, 1 ♀, VII-7-19, 1 ♀, VII-16-19, 1 ♂, 1 ♀, VII-28-19 (E. P. Van Duzee, CAS). INYO Co.: Bishop, 1 ♂, VII-28-40 (L. J. Lipovsky, UK). Ruby Lake, 1 ♂, VIII-13-57 (D. D. Linsdale, CIS). MARIPOSA Co.: Glacier Point Road, Yosemite National Park, 1 ♂, 4 ♀, VII-1-47 (A. L. Melander, USNM). MARIPOSA-TUOLUMNE Co.: Yosemite National Park, 1 ♂, VIII-1-40 (L. J. Lipovsky, UK). MODOC Co.: Lily Lake, 1 ♂, 1 ♀, VII-11-57 (J. Powell, CIS). MONO Co.: Mammoth Lakes, 1 ♀, VII-27-36, 1 ♂, VIII-3-36 (C. E. and R. M. Bohart, CAS). Sardine Creek, 8,500 ft., 1 ♂, VI-28-51 (S. M. Kappos, UCD). Sonora Pass, 9,624 ft., 1 ♂, VII-29-54 (W. H. Lange, UCD). 2 mi. E. of Sonora Pass, 1 ♀, VI-22-60 (C. E. Wemmer, CAS). PLACER Co.: Sugar Bowl Lodge, near Norden, 1 ♂, VII-2-55 (J. Linsley, CIS). Summit, Sierra Nevada, 1 ♂, VII-17 (O. Sacken, USNM). SIERRA Co.: 5 mi. E. of Webber Lake, 1 ♀, VII-30-53 (E. A. Kurtz,



Map 16. Locality records in California for *Hylemya (Botanophila) spinidens* Malloch.

UCD). TULARE Co.: Alta Meadows, 9,000 ft., Sequoia National Park, 3♂, VII-19-07 (J. C. Bradley, CU). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 1♂, VIII-18-60 (A. S. Menke, UCD); 1♀, VIII-10-60 (D. Q. Cavagnaro, UCD). Chipmunk Flat, 1♂, VIII-9-60 (A. S. Menke, UCD). Near Sonora Peak, 11,000 ft., 1♂, VIII-10-57 (C. D. MacNeill, CAS). Strawberry, 2♂, VII-20-51 (W. C. Bentinck, CIS). Tioga Pass, 1♂, VII-8-46. Tuolumne Meadows, 4♂, VII-4-27 (J. M. Aldrich, USNM).

*H. spinidens* is notable for the pronounced elevation of the face separating the antennae, and for the projection of vibrissal angle cephalad. The head from tip of oral margin to occipital foramen is about as long as high.

#### *Hylemya (Botanophila) spiniventris* Coquillett

*Hylemya spiniventris* Coquillett. 1900, Wash. Acad. Sci. Proc., 2:449.

*Hylemya spinilamellata* Stein. 1904, Budapest Magyar Nemzeti Muz., Ann. Hist. Nat., 2:476.

Holotype: ♂, Popoff Island, Alaska (USNM).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Montana, New Mexico, Northwest Territories, Oregon, Utah, Washington, Wyoming, Yukon Territory.

**California records.** — ALPINE Co.: Ebbetts Pass, 1♀, VII-30-59 (L. E. Campos, UCD). EL DORADO Co.: Echo Lake, 2♀, VII-23-55 (J. C. Downey, UCD). Fallen Leaf, 6,500 ft., 1♂, VII-15-17, 1♂, VII-17-17 (J. M. Aldrich, USNM). MODOC Co.:

Cedar Pass, 2♂, VI-29-55 (J. W. MacSwain, CIS; J. C. Wells, UCD). MONO Co.: Dead Man's Creek, 1♀, VII-28-36 (CAS). Mammoth Lakes, 2♂, VII-29-40 (R. H. Beamer, UK). Sardine Creek, 8,500 ft., 1♂, VII-11-51 (A. T. McClay, UCD); 3♂, VII-29-54 (J. C. Downey, UCD). Sonora Pass, 9,624 ft., 1♂, VII-29-54 (W. H. Lange, UCD); 1♀, VII-11-57 (D. L. Flaherty, UCR). SHASTA Co.: Summit Lake, Lassen National Park, 1♀, VII-23-50 (L. W. Quate, CIS). TRINITY Co.: Big Flat, Coffee Creek, 1♂, VI-20-34 (CAS). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 1♂, VIII-16-60 (D. Q. Cavagnaro, UCD). Chipmunk Flat, 1♂, VIII-9-60 (J. W. MacSwain, CIS). 11 mi. W. of Sonora Pass, 1♀, VIII-8-59 (G. I. Stage, CIS). Tuolumne Meadows, 1♂, VII-4-27 (J. M. Aldrich, USNM).

The long series of extra long submarginal spines on processes should be sufficient to confirm the identity of the male of *H. spiniventris*, the spines often terminating in a fine filament, when not damaged. The outer bristles on processes are confined mostly to distal half of process.

#### *Hylemya (Botanophila) subspinata* Huckett

*Hylemya (Botanophila) subspinata* Huckett. 1947, N. Y. Ent. Soc. Jour., 55:10.

Holotype: ♂, Siberian Outpost, Tulare County, California (USNM).

**Geographic range.** — California, Montana, Utah.

**California records.** — ALPINE Co.: Hope Valley, 1♂, VII-9-48 (L. W. Quate, CIS). EL DORADO Co.: Luther Pass, 2♂, 2♀, VII-8-59 (P. H. Arnaud, CAS). MONO Co.: Cottonwood Creek, 4♂, VII-14-53 (W. D. McLellan, UCD; D. D. Linsdale, CIS). Mammoth Lakes, 1♂, VII-29-40 (R. H. Beamer, HCH). Sardine Creek, 1♂, VI-28-51, 1♀, VII-17-51 (A. T. McClay, UCD). TULARE Co.: Siberian Outpost, 9,500–10,500 ft., 2♂, 1♀, VII-31-15, type series (USNM). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 3♂, 1♀, VIII-30-60 (P. D. Hurd, CIS). Sonora Pass, 1♂, 1♀, VIII-18-56 (E. E. Lindquist, CIS); 2♀, VIII-16-59 (G. I. Stage, R. R. Snelling, CIS); 1♂, VIII-21-59 (D. D. Linsdale, CIS); 1♂, VIII-10-60 (J. W. MacSwain, CIS). Tuolumne Meadows, 1♂, VII-4-27 (J. M. Aldrich, USNM). Tuolumne Meadows, Soda Springs, 8,600 ft., 1♀, VIII-8-16 (G. R. Pilate, USNM).

The species *H. subspinata* is allied to *spiniventris*, differing in the male by having the submarginal spines on processes shorter and the outer series of bristles extended to basal region.

#### *Hylemya (Botanophila) trifurcata* Huckett

*Hylemya (Botanophila) trifurcata* Huckett. 1947, N. Y. Ent. Soc. Jour., 55:14.

Holotype: ♂, Nahcotta, Washington (USNM).

**Geographic range.** — Alberta, California, Idaho, Oregon, Utah, Washington.

**California records.** — HUMBOLDT Co.: 1♂, 1♀, V-10-11 (Nunnenmacher, HCH). SOLANO Co.: Green Valley, 2♂, III-24-54 (E. I. Schlinger, UCD).

*H. trifurcata* has parafacials less prominent than in

related species, becoming narrower ventrad, and in the male the cerci are foreshortened, not extending to incised apical region of gonostyli, and further are three-pronged, figure 40.

### Subgenus *Pegohylemyia* Schnabl

*Hylemyia* (*Pegohylemyia*) Schnabl. 1911, Deut. Ent. Ztschr. hft. 6 p. 75; Schnabl and Dziedzicki. 1911, K. Leopold.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:98.  
Type-species: *Musca cinerea* Fallén, designation Hockett, 1965.

The subgenus *Pegohylemyia* possesses many of the characteristics common to subgenera *Delia* and *Botanophila*. In the male the chief distinctions are to be found in the conformation and bristling of the hypopygium and copulatory appendages as mentioned in the key to genera and subgenera of Anthomyiini, couplet 36, and as illustrated in figure 21. The outer pair of parameres in the male genitalia *sens. str.* is reduced, each part bearing one or two coarsened filaments, figures 75, 76. In many females, as in *fugax*, the mid tibia has two posterodorsal bristles, dorsal area of occiput below postocular series of setulae is setulose, fifth abdominal tergum with upright discal bristles, and mesopleura with a weak bristle on upper border below the anterior notopleural bristle. Larvae have been reared in the flower heads of *Senecio* and *Lactuca* belonging to the family *Compositae* (Meade, 1892; Hockett, 1929; Séguy, 1934; Collin, 1936).

### KEYS TO SPECIES OF HYLEMYA (PEGOHYLEMYIA) IN CALIFORNIA

#### MALES

1. Frons at vertex as wide as distance between first pair of dorsocentral bristles, and is bristled as in female. . . . .  
*praefecta* Hockett  
Frons at vertex narrower than distance between first pair of dorsocentral bristles, and is not bristled as in female . . . . . 2
2. Mid tibia with anteroventral bristle. . . . . 3  
Mid tibia without anteroventral bristle, or with a weak anterior bristle near base of anterodorsal. . . . . 5
3. Prealar bristle long . . . . . 4  
Prealar bristle short . . . . . *relatioa* Hockett
4. Hind femur with 1 or 2 longish posteroventral bristles, longer than height of femur where situated, processes with fringe of fine hairs on inner margin. . . . . *ringdahli* Drew  
Hind femur with proximal series of weak short posteroventral bristles, not longer than height of femur where situated, processes fringeless on inner margin. . . . .  
*salutaris* Hockett
5. Mesonotum and scutellum pale drab gray, dull, oral margin extended cephalad to beneath antennae, hypopy-

- gium enlarged, bulbous . . . . . *laxifrons* Hockett  
Mesonotum and scutellum blackish or brownish and with dark reflections, hypopygium not enlarged and bulbous . . . . . 6
6. Prebasal sclerite (tergum 6) of hypopygium with marginal series of bristles . . . . . *discreta* (Meigen)  
Prebasal sclerite of hypopygium bare, bristleless. . . . . 7
  7. Inner border of processes rimmed by a glossy bare margin . . . . . *fugax* (Meigen)  
Inner border of processes not thus demarcated. . . . . 8
  8. Prealar bristle usually nearly as long as anterior notopleural bristle, abdominal stripe broad. . . . . 9  
Prealar bristle shorter than anterior notopleural bristle, abdominal stripe linear . . . . . 10
  9. Profrons and parafacials narrower than width of third antennal segment, haustellum polished, glossy. . . . .  
*alligata* Hockett  
Profrons and parafacials as wide or wider than breadth of third antennal segment. . . . . *impersonata* Hockett
  10. Cerci extended at apex as a single slender rod or style to near level with apex of gonostylus, fig. 66. . . . .  
*sodalis* Hockett  
Cerci bifid at apex and not styliform, and not extended to level with apex of gonostylus, fig. 68. . . . . *vallaris* Hockett

#### FEMALES

1. Prealar bristle usually about as long as anterior notopleural bristle . . . . . 2  
Prealar bristle shorter than anterior notopleural bristle. . . . . 7
2. Robust species, 10 to 11 mm in length, costal setulae coarse and spinulose, fore tibia with 5 or 6 strong bristles excluding apicals and preapicals. . . . .  
*praefecta* Hockett  
Smaller species, 4 to 6 mm in length, costal setulae not notably coarsened or robust, fore tibia with 2 or 3 such bristles . . . . . 3
3. Oral margin extended cephalad beyond level with tip of profrons to beneath apices of antennae, mesonotum and scutellum drab gray, m-cu cross-vein oblique. . . . .  
*laxifrons* Hockett  
Oral margin at most curved cephalad to level with tip of profrons . . . . . 4
4. Haustellum entirely polished, tergum 5 with rather coarse setulae . . . . . *alligata* Hockett  
Haustellum at least partly dulled; if shining, tergum 5 with fine setulae . . . . . 5
5. Tergum 5 with semierect discal bristles. . . . . *ringdahli* Drew  
Tergum 5 without semierect discal bristles. . . . . 6
6. Mid tibia usually with 1 anterodorsal bristle, anal palpi stumpy and terminal sclerites blunt in profile as viewed from above, palpi with minute hairs, fig. 48. . . . .  
*impersonata* Hockett  
Mid tibia usually with 2 anterodorsal bristles, anal palpi slender and prolonged caudad, with fine setulae, fig. 49 . . . . . *discreta* (Meigen)
7. Mid tibia with anteroventral bristle. . . . . *relatioa* Hockett  
Mid tibia without anteroventral bristle. . . . . 8
8. Blackish species, ovipositor terminating in 2 slender tactile anal palpi, fig. 49. . . . . *fugax* (Meigen)  
Brownish species, terminal sclerites of ovipositor polished, compressed laterad, and tapering sharply to a point, fig. 45 . . . . . *vallaris* Hockett

*Hylemya (Pegohylemyia) alligata* Huckett

*Hylemya (Pegohylemyia) alligata* Huckett. 1965, Ent. Soc. Canada Mem., 42, p. 81.

Holotype: ♂, Firth River, Yukon Territory (CNC).

**Geographic range.** — California, Labrador, Northwest Territories, Quebec, Yukon Territory.

**California records.** — MONO Co.: Sonora Pass, 9–10,000 ft., 1 ♀, VII-11-57 (A. E. Pritchard, CIS).

The species *H. alligata* is related to *impersonata* and *discreta*, from both of which it may be separated by the entirely polished haustellum, and coarser setulae on tergum 5 in the female.

*Hylemya (Pegohylemyia) discreta* (Meigen)

*Anthomyia discreta* Meigen. 1826, Syst. Besch., 5:172.

Type: ♂, Germany? (MNHP).

**Geographic range.** — California, Colorado, Indiana, Michigan, Washington.

**California records.** — ALPINE Co.: Hope Valley, 1 ♂, VI-9-48 (L. W. Quate, CIS); 1 ♀, VI-29-57 (J. Powell, CIS). 3.5 mi. SW. of Lake Alpine Lodge, 1 ♀, VI-8-60 (G. I. Stage, CIS). EL DORADO Co.: Echo Lake, 1 ♀, VIII-10-52 (S. B. Freeborn, CIS). Wright's Lake, 8 ♂, 10 ♀, VII-2-48 (P. D. Hurd, K. W. Tucker, D. Carter, CIS, HCH); 4 ♂, 2 ♀, same date (P. H. Arnaud, CAS). MONO Co.: Sardine Creek, 8,500 ft., 2 ♂, VI-28-51 (S. M. Kappos, E. L. Silver, UCD); 3 ♂, VII-11-17-51, 1 ♂, VII-18-51 (A. T. McClay, UCD). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♀, VII-10-64, in malaise trap (M. E. Irwin, UCR). Truckee, 1 ♂, VII-5-36 (A. E. Pritchard, CU). PLUMAS Co.: Buck's Lake, 1 ♂, VI-23-49 (D. Cox, CIS); 12 ♂, 6 ♀, VII-1-49 (E. I. Schlinger, W. H. Wade, UCD). 4 mi. W. of Quincy, 1 ♂, VI-25-49 (CIS). TUOLUMNE Co.: Dardanelles, 6 ♂, 2 ♀, VI-26-51 (A. T. McClay, UCD). Sonora Pass, 9,624 ft., 1 ♂, VI-27-51 (C. A. Downing, UCD). Strawberry, 1 ♂, VI-23-51 (A. T. McClay, UCD).

The male of *H. discreta* may be distinguished from those of allied species by the presence of bristles on prebasal sclerite (tergum 6) of hypopygium. The female has the habitus of that of *impersonata*, from which it may be separated by the usual presence of 2 bristles on anterodorsal surface of mid tibia and by the slender anal palpi at apex of ovipositor, figure 49.

*Hylemya (Pegohylemyia) fugax* (Meigen)

*Anthomyia fugax* Meigen. 1826, Syst. Besch., 5:174.

*Hylemya denticauda* Malloch. 1920, Ohio Jour. Sci., 20:281.

Type: ♂, ♀, Germany? (MNHP).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Idaho, Massachusetts, Michigan, New York, Nova Scotia, Ontario, Oregon, Quebec, Utah, Washington, Wisconsin.

**California records.** — ALAMEDA Co.: Albany, 1 ♀, VI-23-57, at light trap (J. Powell, CIS). Castro Valley, 1 ♀, III-12-61 (R. Brown, CAS). Golden Gate Park, 1 ♂, III-9-61 (P. H. Arnaud, CAS). CONTRA COSTA Co.: Orinda, 1 ♀, IV-10-55 (R. H. Good-

win, CIS). DEL NORTE Co.: Smith River, 1 ♂, VII-8-30 (J. M. Aldrich, USNM). HUMBOLDT Co.: Eureka, 1 ♂, VII-30-52 (C. Hector, L. A. Ruud, CIS). MARIN Co.: Bolinas, 1 ♀, III-4-64 (R. E. Doty, BVC). SAN FRANCISCO Co.: San Francisco, 1 ♂, 1 ♀, I-22-61 (C. N. Slobodchikoff, CAS). SAN MATEO Co.: Colma, 2 ♂, II-23-51 (E. I. Schlinger, UCD); 1 ♂, II-1-56 (S. M. Fidel, UCD). Halfmoon Bay, 7 ♂, 8 ♀, III-11-50 (W. H. Lange, UCD). Pescadero, 7 ♂, 1 ♀, IV-21-50 (W. H. Lange, UCD). SANTA CLARA Co.: Stanford University, 1 ♂, 1 ♀, V-27-29-53, 1 ♂, 1 ♀, III-22-31-54 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Watsonville, 1 ♀, V-15-48 (L. C. Huston, CDA). SONOMA Co.: Fulton, 1 ♂, VI-2-50, bait trap (CDA).

The male of *H. fugax* may be distinguished from those of allied species by the bare glossy border on inner margin of processes. The blackish female has one or two pairs of presutural acrostical bristles, a short bristle on upper border of mesopleura below the anterior notopleural bristle, and semierect discal bristles on tergum 5.

Larvae have been found to injure roots, stems, leaves and heads of cruciferous crops, and in England the heads of lettuce, frequently following commencement of plant tissue decay (Miles, 1951:343). Brooks (1951:114-116) has given keys and illustrations, and Miles (1953a:83-90) comparative data, for distinguishing eggs and larvae of *fugax* from those of related economic species.

*Hylemya (Pegohylemyia) impersonata* Huckett

*Hylemyia impersonata* Huckett. 1929, Canad. Ent., 61:114.

Holotype: ♂, Manitoba (CNC).

**Geographic range.** — Alberta, California, Manitoba, Oregon, South Dakota, Utah, Washington.

**California records.** — DEL NORTE Co.: Smith River, Rowdy Creek, 1 ♂, VII-11-30, variant (J. M. Aldrich, USNM). EL DORADO Co.: Echo Lake, 4 ♂, 7 ♀, VII-23-55 (J. C. Downey, UCD). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 2 ♂, VII-16-53 (E. I. Schlinger, UCD). Sonora Pass, 9,624 ft., 2 ♂, VIII-20-60 (A. S. Menke, UCD). NEVADA Co.: Russell Valley, near Boca Reservoir, 1 ♂, VI-20-64 (M. E. Irwin, UCR). Sagehen Creek, near Hobart Mills, 1 ♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: 4 mi. N. of Quincy, 1 ♂, VI-21-49 (C. Hector, CIS; H. A. Hunt, UCD). SAN MATEO Co.: Redwood City, 1 ♂, V-3-59 (P. H. Arnaud, CAS). SIERRA Co.: Webber Lake, 1 ♂, VII-3-64, abdomen excised (M. E. Irwin, UCR). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 1 ♂, VIII-18-60 (A. S. Menke, UCD). Sonora Pass, 1 ♂, VIII-16-59 (G. I. Stage, R. R. Snelling, CIS); 2 ♀, VIII-21-59 (G. I. Stage, CIS).

The species *H. impersonata* is closely allied to *discreta*, differing in the absence of bristles on the prebasal sclerite of hypopygium in male, and in the blunt apical outline of terminal sclerites of ovipositor as viewed from above, figure 48. The female may or may not have an anteroventral bristle on mid tibia.

*Hylemya (Pegohylemyia) laxifrons* Hockett

*Hylemya (Pegohylemyia) laxifrons* Hockett. 1965, Ent. Soc. Canada Mem., 42, p. 86.

Holotype: ♂, London Hill Mine, Bear Lake, British Columbia (USNM).

**Geographic range.** — Alaska, British Columbia, California, Northwest Territories.

**California records.** — FRESNO Co.: Pioneer Basin, 10–11,000 ft., 1 ♀, VIII-19-56 (E. I. Schlinger, UCD). MONO Co.: Mt. Barcroft, 12,500 ft., White Mts., 1 ♂, 3 ♀, VII-12-61 (H. V. Daly, CIS).

The male of *H. laxifrons* may readily be recognized by the enlarged hypopygium. In both sexes the mesonotum and scutellum are a drab gray, with oral margin projected cephalad to beneath apices of antennae.

*Hylemya (Pegohylemyia) praefecta* Hockett

*Hylemya (Pegohylemyia) praefecta* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:250.

Holotype: ♂, Lake Agnus, Colorado (CAS).

**Geographic range.** — British Columbia, California, Colorado, Utah.

**California records.** — INYO Co.: Ruby Lake, 11,500 ft., NW. of Inyo Co., 1 ♀, VIII-13-57 (C. D. MacNeill, CIS). MONO Co.: White Mts., 1 ♀, VII-21-53 (H. Nakakihara, UCR).

The male of *H. praefecta* has frons broad and bristled as in female. Costa of wings is coarsely setulose, and may become spinulose.

*Hylemya (Pegohylemyia) relativa* Hockett

*Hylemya (Pegohylemyia) relativa* Hockett. 1965, Ent. Soc. Canada Mem., 42, p. 90.

Holotype: ♂, Richardson Highway mi. 213, Alaska (CNC).

**Geographic range.** — Alaska, California, Labrador, Northwest Territories, Quebec, Yukon Territory.

**California records.** — MONO Co.: Cottonwood Creek, 2 ♀, VII-14-53 (H. Nakakihara, UCR); 1 ♀, VII-10-61, at 9,300 ft. (H. V. Daly, CIS). Sardine Creek, 8,500 ft., 1 ♀, VI-28-51, 2 ♀, VII-11-51, 1 ♂, VII-12-51, 2 ♂, VII-18-51 (A. T. McClay, UCD). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♂, 1 ♀, VII-15-16-64, in malaise trap (M. E. Irwin, UCR). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 1 ♂, VIII-18-60 (J. W. MacSwain, CIS). Sonora Pass, 1 ♂, 2 ♀, VIII-21-59 (D. D. Linsdale, CIS).

*H. relativa* differs from related taxa with presutural acrostical bristles and a short prealar bristle by having an anteroventral bristle on mid tibia.

*Hylemya (Pegohylemyia) ringdahli* Drew

*Hylemya appendiculata* Malloch. 1920, Ohio Jour. Sci., 20:281. Name preoc. Bigot, 1885.

*Hylemya ringdahli* Drew. 1963, Mich. State Univ., Mus. Pubs., Biol. Ser., 2:247. New name for *appendiculata* Malloch.

Holotype: ♂, Savonoski, Naknek Lake, Alaska (OSUM).

**Geographic range.** — Alaska, Alberta, California, Labrador, Montana, New Hampshire, Ontario, Oregon, Quebec, Wyoming, Yukon Territory.

**California records.** — NEVADA Co.: Prosser Creek, 6,300 ft., near Hobart Mills, 1 ♀, VII-13-61 (J. G. Chillcott, CNC). Sagehen, near Hobart Mills, 1 ♀, VII-2-54 (J. C. Downey, UCD). Sagehen Creek, near Hobart Mills, 20 ♂, 7 ♀, VII-16-64, in malaise trap (M. E. Irwin, UCR). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1 ♀, VII-4-60 (F. D. Parker, UCD).

*H. ringdahli* has an anteroventral bristle on distal third of mid tibia, and may be distinguished in the male by the fringe of slender hairs on inner margin of processes. The female has semierect discal bristles on tergum 5.

*Hylemya (Pegohylemyia) salutaris* Hockett

*Hylemya (Pegohylemyia) salutaris* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:252.

Holotype: ♂, Red Mountain, Colorado (HCH).

**Geographic range.** — California, Colorado.

**California record.** — TUOLUMNE Co.: Tuolumne Meadows, Soda Springs, 8,600 ft., 1 ♂, VIII-8-16 (G. R. Pilate, USNM).

The male of *H. salutaris* possesses the habitus of *ringdahli*, from the male of which it differs in the shorter posteroventral bristles of hind femur, and the absence of a fringe of hairs along inner margin of processes.

*Hylemya (Pegohylemyia) sodalis* Hockett

*Hylemya (Pegohylemyia) sodalis* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:253.

Holotype: ♂, Soda Springs, Tuolumne Meadows, California (USNM).

**Geographic range and California record.** — TUOLUMNE Co.: Soda Springs, 8,600 ft., Tuolumne Meadows, 1 ♂, VIII-8-16, holotype (G. R. Pilate, USNM).

The male of *H. sodalis* may be associated with that of *vallaris*, from which it differs in the structure of the copulatory appendages, figure 66.

*Hylemya (Pegohylemyia) vallaris* Hockett

*Hylemya (Pegohylemyia) vallaris* Hockett. 1965, Ent. Soc. Canada Mem., 42, p. 91.

Holotype: ♂, Rampart House, Yukon Territory (CNC).

**Geographic range.** — California, Yukon Territory.

**California records.** — TUOLUMNE Co.: Tioga Pass, 1 ♂, VII-31-40 (R. H. Beamer, UK). Tuolumne Meadows, Soda Springs, 8,600 ft., 1 ♂, VIII-8-16 (G. R. Pilate, USNM).

The male of *H. vallaris* differs from that of *sodalis* in having the cerci bifid at apex, figure 68. The female has terminal sclerites of ovipositor compressed laterad, bare and polished, sharply pointed at apex, figure 45.

Subgenus *Macateeia* Malloch

*Macateeia* Malloch. 1919, Biol. Soc. Wash. Proc., 32:1.

Type-species: *Macateeia protuberans* Malloch, original designation.

The subgenus *Macateeia* finds its closest affinities with *Pegohylemyia*. It differs chiefly in the conformation of the caudal segments of ovipositor, which are flattened vertically as in *Phorbia* and are sparsely bristled, figure 43. The head in male and female at its maximum diameters is as long or longer than its height. The eye in the male is tall, and in both sexes the cheeks narrow and extended, face notably flexed forward at oral margin, haustellum lengthy and slim or slender, and hind tibia with usually 2 stubby apical bristles toward the anteroventral surface.

*Hylemya (Macateeia) atra* Malloch

*Macateeia atra* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:305.

Holotype: ♂, Salada Beach, San Mateo County, California (CAS).

Geographic range and California record. — SAN MATEO CO.: Salada Beach, 1 ♂, IV-21-18, type (E. P. Van Duzee, CAS).

Subgenus *Egle* Robineau-Desvoidy\*

*Egle* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci. Mém. présentés par divers Savans [Ser. 2], 2:584.

*Xenophorbia* Malloch. 1920, Amer. Ent. Soc. Trans., 46:175.

Type-species: *Egle parva* Robineau-Desvoidy; designation Coquillett, 1910.

The subgenus *Egle* comprises several diminutive species having face shortened in height, oral margin curved forward, third antennal segment subquadrate, arista naked and slightly swollen at base, haustellum lengthy or thickening proximad, palpi slender and slightly flattish at apex, legs with slender bristles. Adults usually occur on willow catkins when in bloom. Larvae of *Egle muscaria* and *E. parva*\* are cited as having been found in catkins of willow (Séguy, 1934: 236; Hennig, 1952:395).

\*A recent paper on the palaeartic species of *Egle* by D. M. Ackland (1970, Ent. Monthly Mag. [1969] 105:185-192, 23 figs.) should not be overlooked as an aid to the recognition of several species of *Egle* occurring in California.

KEYS TO SPECIES OF HYLEMYA (EGLE)  
IN CALIFORNIA

## MALES

1. Thorax with usually 4 pairs of postsutural dorsocentral bristles .....2  
Thorax with 3 pairs of postsutural dorsocentral bristles...3
2. Mid and hind femora with multiple confused series of bristles proximad on ventral surface . . . *muscaria* (Fabricius)  
Mid and hind femora with bristles on proximal half of

- ventral surfaces restricted to anteroventral and posteroventral series .....*brevicornis* (Zetterstedt)
3. Hind femur with profuse long and stronger bristles on anterior and posterior surfaces. . . . .*longipalpis* (Malloch)  
Hind femur with bristling on posterior surface weak and sparse, on anterior surface fine and not robust. . . . .4
4. Sternum 5 with slender bristles at base of each process, figs. 91, 92 .....5  
Sternum 5 bristleless at base of each process, weakly setulose thereat .....*minuta* (Meigen)
5. Sternum 5 with 2 to 4 adjacent bristles at base of each process .....*parvaeformis* Schnabl  
Sternum 5 with a screen of several bristles across base of each process .....*steini* Schnabl

## FEMALES

1. Proboscis slender, nonwidened proximad, with 4 pairs of postsutural dorsocentral bristles .....2  
Proboscis fleshy, widening proximad, with 3 pairs of postsutural dorsocentral bristles .....3
2. Head much longer than high at maximum diameters. . . . .  
*muscaria* (Fabricius)  
Head not much longer than high at maximum diameters .....*brevicornis* (Zetterstedt)
3. Haustellum polished and shiny. . . . .*longipalpis* Malloch  
Haustellum at least partly dull. . . . .4
4. Sternopleura sparsely bristled on ventral surface. . . . .  
*parvaeformis* Schnabl and *steini* Schnabl  
Sternopleura with rather dense fine bristles on ventral surface, usually harboring pollen grains. . . . .*minuta* (Meigen)

*Hylemya (Egle) brevicornis* (Zetterstedt)

*Anthomyza brevicornis* Zetterstedt. 1838, Insecta Lapponica, p. 683; Ringdahl. 1933, Ent. Tidskr., 54:29.

Type: ♂, Swedish Lapland (ZIL).

Geographic range. — Alaska, California, Manitoba, Oregon.

California records. — CONTRA COSTA CO.: Orinda Cross Road, 3 ♂, 1 ♀, III-4-49 (P. D. Hurd, CIS). Point Molate, Richmond, 2 ♀, III-23-62 (D. H. Janzen, CIS). MARIN CO.: Muir Woods, 1 ♀, II-23-47 (U. N. Lanham, WSU). MENDOCINO CO.: 3 mi. W. of Philo, 5 ♂, II-1-62 (J. Powell, CIS). SAN MATEO CO.: San Andreas Lake, 2 ♂, II-5-60 (C. A. Toschi, CIS).

*H. brevicornis* and *muscaria* (Fabricius) are closely allied, both having 4 pairs of postsutural dorsocentral bristles. In the male of *brevicornis* the series of anteroventral and posteroventral bristles on proximal half of mid and hind femora are more distinctive, and in both sexes the head is usually about as high as long at maximum diameters. In males of *muscaria* the femoral bristles on ventral surfaces of mid and hind femora are profuse and ill-arranged, and the head in both sexes is usually longer than high at maximum diameters.

*Hylemya (Egle) longipalpis* Malloch

*Hylemyia longipalpis* Malloch. 1924, Psyche, 21:197.

Holotype: ♂, Waterville, Maine (MCZ).

*Geographic range*.—Alaska, Alberta, California, Maine, Manitoba, Michigan, Northwest Territories, New York, Washington.

*California records*. — LAKE CO.: Lake Pillsbury, 1 ♀, IV-4-62 (J. Powell, CIS). RIVERSIDE CO.: Riverside, 1 ♂, II-24-36 (A. L. Melander, USNM).

The male of *H. longipalpis* is notable for the bristly character of hind femora, on both anterior and posterior surfaces. The female has haustellum polished.

### *Hylemya (Egle) minuta* (Meigen)

*Anthomyia minuta* Meigen. 1826, Syst. Besch., 5:177.

*Egle minuta* Lyneborg. 1965, Opusc. Ent., 30:220-224, figs. 26-28; Hennig. 1967, In Lindner, Die Fliegen der Palaearktischen Region, Band VII-1 63a Anthomyiidae (Lief. 271), p. 140.

*Egle atomaria* of authors, not Zetterstedt.

Type: ♂, Germany? (MNHP).

*Geographic range*. — Alaska, Alberta, California, Manitoba, Michigan, Northwest Territories, Oregon, Quebec, Washington, Wisconsin, Yukon Territory, Greenland.

*California records*. — ALAMEDA CO.: Fish Ranch Road, 1 ♀, III-4-49 (P. D. Hurd, CIS). OAKLAND, 4 ♂, II-22-52 (R. Schuster, CIS). STRAWBERRY CANYON, 1 ♂, III-12-50 (L. W. Quate, CIS). AMADOR CO.: 5 mi. N. of Plymouth, 1 ♂, III-21-62 (J. Powell, CIS). CONTRA COSTA CO.: Bollinger Canyon Road, 1 ♀, II-14-60 (J. Powell, CIS). POINT MOLATE, RICHMOND, 5 ♀, III-18-62 (D. H. Janzen, CIS). EL DORADO CO.: Coloma, 1 ♂, III-12-62 (J. Powell, CIS). INYO CO.: Bishop, 1 ♀, IV-20-51 (E. I. Schlinger, UCD). KERN CO.: Walker Pass, 1 ♀, IV-26-49 (E. G. Linsley, J. W. MacSwain, R. F. Smith, CIS). LOS ANGELES CO.: Los Angeles, 1 ♀, I-31-15. ORANGE CO.: Capistrano Hot Spring, 1 ♂, 2 ♀, I-25-35 (A. L. Melander, USNM). RIVERSIDE CO.: Indio, 1 ♂, III-6-55 (W. R. M. Mason, CNC). RIVERSIDE, 1 ♂, II-22-35 (A. L. Melander, USNM). SAN BERNARDINO CO.: East Highlands, 1 ♂, I-7-14 (F. R. Cole, CIS). SAN DIEGO CO.: Descanso, 9 ♀, III-30-61 (P. D. Hurd, CIS). Descanso Ranger Station, 4 ♀, III-27-61 (P. D. Hurd, CIS). 2 mi. NE. of Lakeside, 7 ♀, III-29-61 (P. D. Hurd, CIS). SAN MATEO CO.: Crystal Lake, 1 ♀, III-19-60 (C. A. Toschi, CIS). LA HONDA, 1 ♀, III-8-64 (P. H. Arnaud, CAS). REDWOOD CITY, 3 ♂, 3 ♀, II-1-53 (P. H. Arnaud, CAS). SANTA CLARA CO.: Stanford University, 2 ♂, I-26-06, 1 ♀, I-27-06 (USNM). SONOMA CO.: Glen Ellen, 4 ♀, IV-29-50 (H. B. Leech, CAS). TUOLUMNE CO.: Chipmunk Flat, 1 ♀, VI-17-61 (C. A. Toschi, CIS); 3 ♂, VI-13-62 (J. Powell, CIS).

Males of *H. minuta* and *atomaria* (Zetterstedt)\* (= *salicola* Huck.) may be separated from their nearest relatives by the absence of bristles at base of each process. In *minuta* the prealar bristle is not as short and stubby as in *atomaria*, and the female has rather denser and finer bristles on ventral region of the sternopleura, that serve to harbor pollen grains.

### *Hylemya (Egle) muscaria* (Fabricius)

*Stomoxys muscaria* Fabricius. 1794, Entomologia systematica emendata et aucta., 4:395.

*Eriphia ciliata* Walker. 1849, List Dipt. Brit. Mus., 4:961.

*Anthomyia determinata* Walker. 1849, List Dipt. Brit. Mus., 4:954.

Type: ♂, Denmark.

*Geographic range*. — Alaska, Alberta, British Columbia, California, Colorado, Labrador, Massachusetts, Michigan, New Hampshire, New York, Northwest Territories, Ontario, Oregon, Washington, Yukon Territory.

*California record*. — TULARE CO.: 9 Lakes Basin, Sequoia National Park, 1 ♀, VII-16-64 (A. A. Lee, CAS).

*H. muscaria* is closely akin to *brevicornis*, with which it has been compared for diagnostic purposes.

### *Hylemya (Egle) parvaeformis* (Schnabl)

*Egle steini* var. *parvaeformis* Schnabl. In Schnabl and Dziedzicki. 1911, K. Leop.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:105.

Type: ♂, locality not stated.

*Geographic range*. — Alaska, California, Labrador, Manitoba, Michigan, Northwest Territories, Yukon Territory.

*California records*. — INYO CO.: Goodale Creek, N. of Lone Pine, 4 ♂, IV-3-53 (H. B. Leech, CAS). RIVERSIDE CO.: 2 ♂, 1 ♀, II-24-35, 1 ♂, 1 ♀, III-10-35 (A. L. Melander, USNM).

The male of *H. parvaeformis* differs from that of *steini* in that the bristles at base of processes are reduced to a cluster of 2 to 4, figure 91.

### *Hylemya (Egle) steini* Schnabl

*Egle steini* Schnabl. In Schnabl and Dziedzicki. 1911, K. Leop.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:105.

Type: ♂, locality not stated.

*Geographic range*. — Alaska, California, Labrador, Manitoba, Northwest Territories, Yukon Territory.

*California records*. — LAKE CO.: Lake Pillsbury, 1 ♂, 2 ♀, IV-4-62 (J. Powell, CIS). RIVERSIDE CO.: Riverside, 3 ♂, II-24-35 (A. L. Melander, USNM). SAN DIEGO CO.: Descanso, 6 ♀, III-30-61 (P. D. Hurd, CIS). 2 mi. NE. of Lakeside, 1 ♂, III-13-63 (J. A. Chemsak, CIS). SAN MATEO CO.: La Honda, 1 ♀, III-8-64 (P. H. Arnaud, CAS). San Bruno Mts., 1 ♀, III-14-62 (J. Powell, CIS).

Males of *H. steini* are unlike those of *parvaeformis* in having a screen of several bristles across base of each process, figure 92. The female of the species differs from that of *minuta* in the fewer and rather stronger bristles on ventral region of sternopleura.

### Subgenus *Paregle* Schnabl

*Hylemyia (Paregle)* Schnabl. 1911, Deut. Ent. Ztschr., heft 6:71. Schnabl and Dziedzicki. 1911, K. Leop.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:95.

Type-species: *Musca radicum* Linnaeus; designation Hockett, 1924.

The subgenus *Paregle* has oral margin protruded cephalad, mid tibia with a medial anteroventral bristle in both sexes, dorsal bristle of mesopleural series long,



lower scale of calyptrae usually extended slightly beyond margin of upper, hind tibia in the male without posteroventral setulae, and tergum 5 of the female with discal bristles.

KEY TO SPECIES OF HYLEMYA (PAREGLE)  
IN CALIFORNIA

- Gray species, acrostical bristles in 2 regular continuous series caudad and without setulae between series, hind tibia normally with 2 or 3 anterodorsal and 2 posterodorsal bristles ..... *cinerella* (Fallén)  
Blackish species, acrostical bristles setulose except medial presutural and caudal postsutural pairs, with several interserial setulae, hind tibia usually with 4 or more anterodorsal and 3 posterodorsal bristles ..... *radicum* (Linnaeus)

*Hylemya (Paregle) cinerella* (Fallén)

*Musca cinerella* Fallén. 1825, Monographia Muscidum Sveciae, p. 77.

Types: ♂, ♀. Southern Sweden.

**Geographic range.**—Widely distributed throughout the provinces and states of North America, reaching a northern limit in southwestern region of the Northwest Territories, eastward to central Quebec and Labrador, and west coast of Greenland, southward to as far as Georgia, Tennessee, New Mexico, Arizona, and California.

**California records.**—ALAMEDA Co.: Albany, Alvarado, Berkeley, Berkeley Hills, Irvington, Livermore, 5 mi. E. of Livermore, 1 mi. E. of Mission Peak, Niles, Oakland, Pleasanton, Sunol, Tesla Road, 10 mi. E. of Livermore, Tilden Park at Berkeley. ALPINE Co.: 1.5 mi. SW. of Alpine Lodge, Ebbetts Pass 8,730 ft., Hope Valley. AMADOR Co.: Silver Lake. CALAVERAS Co.: Milton. CONTRA COSTA Co.: Antioch, Brentwood, near Clayton, El Sobrante, Fairfax, Lafayette, 1 mi. S. of Lafayette, Marsh Creek Springs, Mt. Diablo, east side of Mt. Diablo, Orinda, Pittsburg, 2 mi. W. of Pittsburg, Point Richmond, Reliez Valley, Russelmann Park, Walnut Creek, 5 mi. SE. of Walnut Creek, Walnut Creek at foot of Shell Ridge, Wild Cat Canyon. DEL NORTE Co.: Crescent City. EL DORADO Co.: Bliss State Park, China Flat, Clarksville, Cool, Echo, Echo Lake, Echo Portals, 3 mi. W. of Fallen Leaf, Glenn Alpine, Lake Tahoe, Lakeside, Pacific, Placerville, Pollack Pines, Riverton, 1 mi. E. of Shingle Springs, Snowline Camp, Strawberry, Wright's Lake. FRESNO Co.: Auberry, Coalinga, 15 mi. W. of Coalinga, Fresno, Lakeshore, Los Gatos Canyon, Mendota, Mercy Hot Springs, Panchoe Creek. FRESNO-TULARE Co.: General Grant National Park. GLENN Co.: 7 mi. E. of Alder Spring, Artois, Black Butts Telephone Campground, Black Butts, 5 mi. N. and 3 mi. SW. of Elk Creek, Plaskett Meadows 6,200 ft. HUMBOLDT Co.: Ben Bow Club. IMPERIAL Co.: 3 mi. W. of Coyote Wells, Holtville, Painted Gorge at Coyote Mountain, Palo Verde, 3 mi. S. of Palo Verde, 15 mi. N. of Plaster City, Potholes. INYO Co.: Antelope Spring 8 mi. SW. of Deep Spring, Antelope Springs, Badwater D. V. —280 ft., Bishop, Bradbury Wells D. V., Deep Springs, Deep Springs Lake, Gooddale Creek N. of Lone Pine, Independence, Independence Canyon, Little Lake, Lone Pine, near Mono Pass, North Lake near Camp Sabrina, Shoshone, Silver Canyon in White Mts., Stovepipe Wells D. V., Surprise

Canyon at Panamint Mts., Texas Creek D. V. JOAQUIN Co.: Tracy. KERN Co.: Arvin, Cuyama Valley, 5 mi. S. of Democrat Springs, Dove Well, Frazier Park, 4 mi. W. of Frazier Park, Glennville, Indian Wells, Indian Wells Canyon, W. off Highway 6 and 2 mi. N. of Inyo-Kern turnoff, Isabella, Mill Potrero, Kramer Hills, Lebec, Mt. Pinos Campground 7,800 ft., Onyx, Red Mountain, Red Rock Canyon, Red Rock Canyon 1 mi. S. of Ricardo, Ridgecrest, Walker Pass, 7 mi. E. of Walker Pass, 16 mi. S. of Weldon, Woody, 1 mi. E. of Woody. KINGS Co.: Lemoore, Tulare Lake. LAKE Co.: 15 mi. E. of Clear Lake, Kelseyville, Lower Lake, Seigler Springs, 2 mi. SE. of Upper Lake. LASSEN Co.: Black's Mountain, Bridge Creek Camp, S. end of Eagle Lake, Hallelujah Junction, Pine Creek, Summit Camp at Lassen National Park. LOS ANGELES Co.: Avalon on Santa Catalina Id., Beverly Glen, Big Pines, Big Tujunga Canyon, Camp Baldy, Chatsworth, Crystal Lake, Desert Springs, El Monte, Elizabeth Lake Canyon, Fisherman's Cove on Santa Catalina Id., Glendale, Glendora, Green Valley, Gorman, 6 mi. E. of Gorman, Mint Canyon, Mint Canyon 6 mi. W. of Palmdale, Pacific Palisades, Pasadena, Rancho Escondido on Santa Catalina Id., Rancho Santa Ana, San Clemente Id., San Nicolas Id., Santa Monica Mts., Stanton, Tanbark Flat, Topanga Canyon, Westwood Hills, Whittier, Whittier Narrows, Valyermo. MADERA Co.: Madera, 14 mi. N. of Madera, Oakhurst, San Joaquin Experiment Station. MARIN Co.: Alpine Lake, 1 mi. N. of Alpine Lake, Alto, Fairfax, Mill Valley, Muir Woods, Novato, Point Reyes, San Rafael, Stinson. MARIPOSA Co.: 5 mi. W. of Coulterville, Glacier Point Road at Yosemite National Park, Miami Ranger Station, Snow Creek at Yosemite, Wawona, Yosemite. MENDOCINO Co.: 5 mi. N. of Hopland, Hopland Field Station, 8 mi. W. of Navarro at Navarro River, 5 mi. SW. and 9 mi. SW. of Ukiah. MERCED Co.: Pacheco Pass. MODOC Co.: 15 mi. S. of Cedar Lake Oaks, Cedar Pass, Cedarville, 2 mi. S. of Cedarville. MONO Co.: Blanco's Corral in White Mts., Bridgeport, Crooked Creek Laboratory 10,150 ft., Lake Mary at Mammoth Lakes, Leavitt Creek, Leavitt Meadow, 2 mi. W. of Leavitt Meadow, near Monitor Pass, Rock Creek 1 mi. SW. of Tom's Place, 1 mi. S. of Saddlebag Lake, Sardine Creek, Sonora Pass, 4 mi. SW. of Tom's Place, Virginia Lakes 10,150 ft. at 3 mi. N. of Inyo County. MONTEREY Co.: Asilomar, Bradley, Bryson, Castroville, Hastings Reservation near Jamesburg, Jamesburg, Junipero Serra Park, King City, 9 mi. E. of King City, Lockwood, Pleyto, Point Pinos, Salinas, San Ardo. NAPA Co.: Calistoga, 5 mi. N. of Valleja. NEVADA Co.: Donner Pass, Nevada City, Prosser Creek near Hobart Mills, Sagehen and Sagehen Creek near Hobart Mills, Soda Springs, Truckee. ORANGE Co.: Irvine Lake, Limestone Canyon at Irvine Lake, Westminster. PLACER Co.: Auburn, 5 mi. N. of Auburn, Baxters, Colfax, Dutch Flat, Emigrant Gap, Lake Tahoe, Lakeside. PLUMAS Co.: Buck's Lake, 8 mi. NW. of Chester, Onion Valley, Quincy, 4 mi. W. of Quincy. RIVERSIDE Co.: Aguanga, Banning, Cathedral City, Chino Canyon near Palm Springs, Corona, Cottonwood Spring, Deep Canyon, 2 mi. N. of Dos Palmas, El Cariso Camp on Ortego Highway, Elsinore Lake, Fan Hill Canyon, Fern Valley near Idyllwild, Hemet Lake, Hemet Reservoir at San Jacinto Mts., Hemet Valley, Herkey Camp at San Jacinto Mts., Herkey Creek, Hopkins Well, Hunter's Spring, Idyllwild, Indio, 6 mi. W. of Indio, Keen Camp at San Jacinto Mts., Lake Mathews, Marion Mt. Camp at San Jacinto Mts., 1 mi. NW. of Mira Loma sand dunes, Mt. San Jacinto, 6 mi. W. of Mur, Palm Canyon, Palm Springs, Palms to Pines Highway, Pine Cove at San Jacinto Mts., Pinon Flat at San Jacinto Mts., Riverside, 5 mi. W. of Sage, San Andreas Canyon,

San Jacinto Mts., San Jacinto Mountain Trail, Spring Mountains, Tahquitz Valley in San Jacinto Mts., Temecula, Thousand Palms, Thousand Palms Canyon, Thousand Palms Oasis, Upper Deep Canyon at Horsethief Creek, Whitewater, Snow Creek at Whitewater, Willis Palms Oasis. SACRAMENTO Co.: Elk Grove, Fair Oaks, Isleton, Orangeville, Rio Linda, Sacramento. SAN BENITO Co.: 5 mi. S. and 15 mi. SE. of Bitterwater, Gem Mine at Idria, 2 mi. NE. of New Idria, 12 mi. S. of Paicines, Pinnacles. SAN BERNARDINO Co.: 8 mi. S. of Adelanto, Amboy Crater, Apple Valley, Atolia, Baldwin Lake, Barton Flats, Barton Flat East, South Fork Camp at Barton Flat, Bear Valley, Big Bear Lake, Big Pines, Boulder Bay at Big Bear Lake, Boulder Bay Camp at Big Bear Lake, Cajon Pass West, Camp Baldy, Colton, Cottonwood Spring, Daggett, Fawnskin, Highway 38 at Little Cienega, 12 mi. SE. of Ivanpah, Jenks Lake, 7 mi. S. of Kelso Providence Mts., Kramer Hills, 11 mi. SE. of Lucerne Valley, Mint Canyon at Solemint, Morongo Valley, Newberry, Ontario, Ord Mountain, 1 mi. W. of Parker Dam, Phelan, 6 mi. N. of Pioneer Town, Quail Spring, Redlands, Round Cienega, San Antonia Canyons, Snow Crest Camp, Sugar Loaf Mountain, Upper Santa Ana River, South Fork Meadow on Upper Santa Ana River, Victorville. SAN DIEGO Co.: Alpine, Borrego, Borrego-Palm Canyon, 4 mi. E. of Campo, Cuyamaca, Cuyamaca Lake, Descanso, 6 mi. E. of Descanso, Doan Pond at Palomar Mountain, El Cajon, Escondido East, La Jolla, Laguna Mts., Lake Henshaw, 2 mi. NE. of Lakeside, Mount Laguna, Mount Palomar, Pine Valley, Rincon, San Diego, San Pasqual Creek, Scissors Crossing, Warner Spring, 3 mi. SE. of Warner Springs, Yaqui Well. SAN FRANCISCO Co.: Farallone Islands, Laguna Puerca, San Francisco, San Francisco beach, San Francisco sand dunes. SAN JOAQUIN Co.: Manteca, Tracy, Vernalis. SAN LUIS OBISPO Co.: Arroyo Grande, Black Mts. 33-3600 ft., 6 airline mi. NE. of Pozo, California State Polytechnic College, 5 mi. W. of Cayucos Creek, Cholame, 1.8 mi. SW. of Cholame, 1 mi. S. of Cholame at Cholame Creek, 10 mi. S. of Creston, Cuesta, La Panza Camp 12 mi. NE. of Pozo, La Panza Campground, Morro Bay, Pozo, 3 mi. E. of Pozo, San Luis Obispo, Santa Lucia Range, 4 mi. SE. of Santa Margarita, 6.8 and 7 mi. SW. of Shandon, 10 mi. W. of Simmler, Tumbler Range at 3,200 ft., 12 mi. NE. of Simmler. SAN MATEO Co.: Halfmoon Bay, Jasper Ridge, Pescadero, Pigeon Point, Redwood City, Woodside Road at Redwood City, San Carlos, San Gregorio, Sandhill Road. SANTA BARBARA Co.: 3 mi. W. of Cachuma Lake, Cuyama, Cuyama Valley, Honda, Lompoc. SANTA CLARA Co.: Alma, Isabel Creek on Mt. Hamilton, Mountain View, Mt. Hamilton, Pacheco Creek, Palo Alto, San Antonio Ranger Station, 7 mi. S. of San Antonio Ranger Station, San Antonio Valley, San Jose, Silver Creek Area, Stanford University. SANTA CRUZ Co.: 4 mi. S. of Boulder Dam, Felton, Santa Cruz, Santa Cruz Mts. SHASTA Co.: Big Spring, Cassel, Hat Creek in Lassen National Park, Hat Creek P. O., Hat Lake, Kings Creek Meadow, 3 mi. E. of Lake Eiler, Lassen Park Trail, Manzanita Lake, 6 mi. E. of Millville, 3 mi. SE. of Mt. Lassen, Old Station, Round Mountain, Summit Lake, Viola, 2 mi. and 4 mi. W. of Viola, 6 mi. NW. of Whiskeytown. SIERRA Co.: 1 mi. W. of Sierraville, Webber Lake, Yuba Pass. SISKIYOU Co.: Castle Lake, Copco, Gazelle, Granada, Mt. Shasta at 6 and 7,000 ft., Mt. Shasta City, Panther Meadows on Mt. Shasta, 4 mi. S. of Weed, Yreka. SOLANO Co.: Rio Vista, Vacaville, Vallejo. SONOMA Co.: Boyes Spring, Eldridge, Mesa Grande, Mesa Grande Russian River, Occidental, 1 mi. NE. of Occidental, 4 mi. W. of Plantation. STANISLAUS Co.: Newman. SUTTER Co.: Sutter Buttes. TEHAMA Co.: Saddle Camp Mea-

dow. TRINITY Co.: Carrville. TULARE Co.: E. Success Reservoir, Giant Forest, 11 mi. NW. of Hot Spring, 4 to 5 mi. N. of Kaweah, 4 mi. NE. of Lemoncove, Lindsay ex *Nemophila*, Sequoia National Park, Terra Belle ex citrus, Tulare Lake, Wood Lake. TUOLUMNE Co.: Belle Meadows, Beehive, Blue Canyon at Sonora Pass, Bumble Bee, Chipmunk Flat, 7 mi. E. and 8 mi. SW. of Dardanelle(s), Kennedy Meadow, Leland Meadow, Mt. Conness, Pinecrest, Sonora Pass 9,624 ft., 2 mi. W. of Sonora Pass, Strawberry, North Fork of Tuolumne River, Yosemite. TUOLUMNE-MARIPOSA Co.: Yosemite National Park. VENTURA Co.: Chuchupate Ranger Station at base of Frazier Mountain, Foster Park, Happy Camp Canyon at Moorpark, Hungry Valley 2 mi. W. of Gorman, Lockwood Creek near Stauffer P. O., Lockwood Valley near Stauffer P. O., 2 mi. SW. of Ojai, Quatal Canyon in NW. corner of Ventura County, Sherwood Lake, Tapo Canyon at Santa Susana, Ventura. YOLO Co.: Bryte, Davis, Putah Canyon, 2 mi. NW. of Rumsey, West Sacramento, Winters, Woodland. YUBA Co.: Arboga.

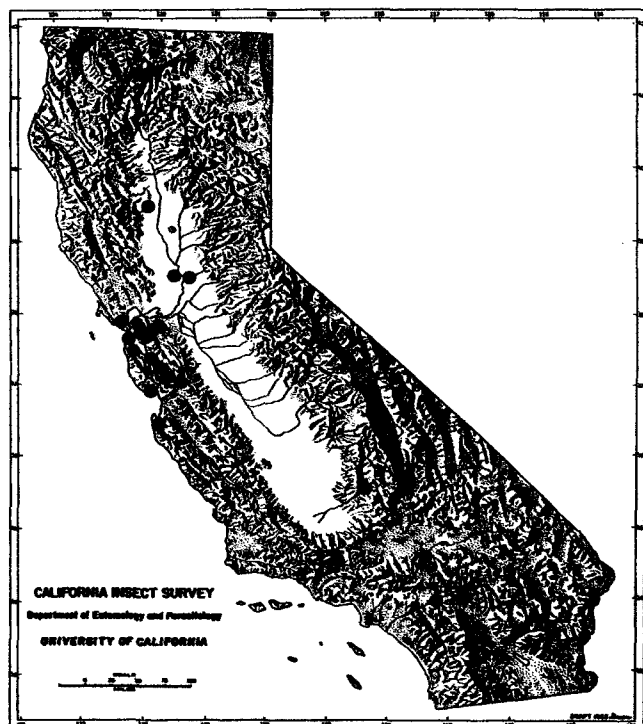
*H. cinerella* flies throughout the warmer months, from February through November at coastal stations, with a few records in January and December. Along the north coast and in the inland valleys its season is shorter, from March to October, according to available records. At elevations above the foothills of the Sierra Nevada the adults have been taken mostly from May to September, and as late as October in Siskiyou County and mid November in Shasta County.

One of the most numerous and widely distributed species of Anthomyiidae in California, being recorded in 56 of the state's 58 counties and from approximately 537 localities. The survey is based on an examination of 1,864 males and 2,119 females. Leech (1957:50) has drawn attention to the swarming behavior of adults at Junipero Serra Park in the Santa Lucia Mountains. The small cinereous adult may be distinguished from many dark-legged species belonging to the genus *Hylemya*, occurring under open field conditions, by the presence of only two posterodorsal bristles on hind tibia and an anteroventral bristle on mid tibia. Larvae of *cinerella* have been reared from human excrement (Howard, 1900:583), and experimentally from the excreta of several domestic animals (Mohr, 1934; Thomsen and Hammer, 1936:582; Coffey, 1966:216).

*Hylemya (Paregle) radicum* (Linnaeus)  
(Map 17)

*Musca radicum* Linnaeus. 1758, *Systema naturae per regna tria naturae*. Ed. 10, 1:596.  
Type: ♂? Scandinavia.

*Geographic range*. — Widely distributed throughout North America with exclusion of southern parts of the United States, extending northward to central Alaska and coastal regions of the Yukon and Northwest Territories, Quebec, Labrador and west and east coasts of Greenland; southward as far as New Jersey, Illinois, Utah, and western California.



Map 17. Locality records in California for *Hylemya (Paregle) radicum* (Linnaeus).

**California records.** — ALAMEDA Co.: Albany, 1♂, 1♀, VI-16-57, light trap (J. Powell, CIS); 1♀, VI-23-58 (A. D. Telford, UCD). Berkeley, 1♂, III-26-33, 2♂, III-21-37 (N. W. Frazier, CIS); 1♀, V-6-48 (P. D. Hurd, CIS); 1♂, III-19-49 (L. W. Quate, CIS); 1♀, V-31-53, 1♀, VI-1-53 (H. Nakahihara, UCR); 10♂, 1♀, IV-12-13-54 (P. D. Hurd, CIS); 1♂, IV-14-57 (D. D. Linsdale, CIS); 2♀, IV-4-58 (CIS); 1♂, III-6-60, at light trap (J. Powell, CIS); 3♂, 3♀, II-19-61, 6♂, 8♀, III-12-61, 4♂, 2♀, IV-15-61, 1♀, V-14-61 (D. D. Linsdale, CIS); 2♂, VIII-6-61 (R. W. Thorp, CIS); 1♀, IV-15-62 (D. D. Linsdale, CIS). Berkeley, University of California Campus, 3♂, II-8-54 (P. D. Hurd, CIS). Berkeley Hills, 7♂, III-26-54 (R. F. Smith, E. G. Linsley, CIS). Berkeley Hills, 1,400 ft., NE. Oakland, 1♀, IX-26-63 (J. Powell, CIS). Emeryville, 1♂, IV-2-62 (J. M. Ross, BVC). Hills back of Oakland, 1♀, V-23-51 (W. C. Bentinck, CIS). Oakland, 1♂, 1♀, V-14-21-37 (E. S. Ross, CAS); 3♀, V-27-28-51 (B. Adelson, CIS); 1♀, III-19-56 (J. F. Lawrence, CIS); 1♂, IV-29-58 (H. J. Adelson, CIS). CONTRA COSTA Co.: El Cerrito, 1♂, V-24-60, 2♂, 1♀, VI-18-60 (C. D. MacNeill, CAS). 1 mi. S. of Lafayette, 1♀, V-10-52 (R. A. Stirton, CIS). Orinda, 3♂, 1♀, V-2-54 (R. H. Goodwin, CIS). Walnut Creek at foot of Shell Ridge, 1♂, 1♀, II-22-63, 3♂, 5♀, XI-10-63, 2♀, XI-16-63, 1♂, III-14-64, 1♂, IV-12-64, 3♂, 1♀, IV-15-64 (J. Powell, CIS). GLENN Co.: Artois, 1♂, V-23-52 (J. W. MacSwain, CIS). KERN Co.: Isabella, 1♀, V-25-52 (P. D. Hurd, CIS). MARIN Co.: Alto, 1♀, V-9-62 (R. Reynolds, CAS). Fairfax, 1♀, VII-15-53 (H. L. Mathis, UCD). Mill Valley, 1♀, X-3-26 (E. P. Van Duzee, CAS); 3♂, V-14-61 (D. Q. Cavagnaro, UCD). Mt. Tamalpais, 2♀, VI-5-49 (R. E. Ryckman, USNM). MONTEREY Co.: Carmel, 1♀, IX-5-56 (I. A. Rammer, UCD). SACRAMENTO Co.:

Sacramento, 1♂, IV-5-16 (CDA). SAN BERNARDINO Co.: Redlands, 1♀, V-15 (F. R. Cole, CIS). Victorville, 1♀, V-2-53 (G. A. Marsh, CIS). SAN FRANCISCO Co.: Lake Merced, 1♂, 1♀, VIII-25-63, 1♂, VIII-30-63 (P. H. Arnaud, CAS). Laguna Puerca, 4♂, V-6-60 (J. Powell, CIS); 1♂, V-14-60 (G. I. Stage, CIS); 1♂, 4♀, V-16-60 (J. R. Powers, CIS); 3♂, II-26-61 (R. L. Lawrence, CIS); 3♀, IX-2-63 (P. H. Arnaud, CAS). Lobos Creek, 1♂, V-6-60, 1♀, V-16-60 (J. Powell, CIS). San Francisco, 1♀, VIII-27-22 (E. P. Van Duzee, CAS); 1♀, X-20-25 (H. H. Keifer, CAS); 1♀, VIII-24-42, 1♂, 2♀, IV-14-17-52 (C. E. Kaufeldt, WSU); 1♀, XI-20-57 (D. C. Rentz, CAS); 1♀, IX-30-59 (P. H. Arnaud, CAS); 1♂, III-18-60 (G. I. Stage, CIS); 1♂, 3♀, IV-20-60, 8♂, 2♀, V-8-14-60, 1♂, 1♀, VI-7-60 (H. B. Leech, CAS); 3♂, II-26-61 (C. N. Slobochikoff, CAS); 1♂, II-3-61, 1♀, IV-18-61 (R. Brown, CAS); 34♂, 95♀, IV-6-64, 9♂, 24♀, IV-7-64, flight traps, 21♂, 32♀, V-14-64 (P. H. Arnaud, CAS). SAN MATEO Co.: Junipero Serra Park, 1♀, IV-4-64 (P. H. Arnaud, CAS). Redwood City, 1♀, V-12-53, 1♂, 1♀, VI-29-53, 1♀, V-9-54 (P. H. Arnaud, CAS). SANTA CLARA Co.: Alviso, 1♂, 2♀, VIII-2-55 (B. Keh, BVC). Anderson Reservoir, 4♂, V-17-55 (B. Keh, BVC). Robertsville, 2♂, 3♀, VIII-3-55 (B. Keh, BVC). San Jose, 1♂, VIII-11-55 (B. Keh, BVC). SANTA CRUZ Co.: Santa Cruz, 2♂, VI-15-17-50 (M. T. James). SISKIYOU Co.: Mt. Shasta City, 1♀, VI-30-58 (J. Powell, CIS). YOLO Co.: Davis, 1♀, V-1-61 (T. Bolton, UCD); 1♂, V-2-63 (F. D. Parker, UCD).

*H. radicum* is known as a minor pest of cruciferous crops in Europe, and larvae have been reared from decomposing vegetable and animal matter (Séguy 1923:108; 1934:237). Hennig (1952:388, 505) includes the species in a key to larvae of the more important economic species belonging to the genus *Hylemya* that injure vegetables.

#### Subgenus *Craspedochoeta* Macquart

*Craspedochoeta* Macquart. 1851, Soc. Natl. des Sci., de l'Agr. et des Arts, Lille, Mém. 1850:241.

Type-species: *Anthomyia punctipennis* Wiedemann, monobasic.

*Craspedochoeta* possesses many of diagnostic characters pertaining to *Lasiomma*, namely in the male the basal sclerite of hypopygium is shining black except in *ochripes* (Thomson), and in both sexes there is a weak bristle on upper border of mesopleura adjacent to anterior notopleural bristle and a short apical posteroventral bristle on hind tibia. In the male however the processes of sternum 5 are typically patterned after the structure in *Anthomyia*, being pendent (in dead specimens), horny, nearly bristleless plates that at apex are caudally extended. In both sexes there are notable fascial marks on profrons and again on postvibrissal area, 2 anterior and 2 posterior sternopleural bristles and 2 posterodorsals on mid tibia.

#### KEY TO SPECIES OF HYLEMYA (CRASPEDOCHOETA) IN CALIFORNIA

1. Clouding of m-cu cross-vein restricted to dotlike marks

*Eremomyia humeralis* Stein

*Eremomyia humeralis* Stein. 1898, Berlin. Ent. Ztschr. (1897), 42:224.

Syntypes: ♂, ♀♀, Moscow, Idaho (FMNH, USNM).

*Geographic range.*—British Columbia, California, Idaho, Oregon, Utah, Washington.

*California records.* — NEVADA Co.: Boca, 2♂, IV-29-61 (F. D. Parker, UCD). TUOLUMNE Co.: Mt. Conness, Yosemite National Park, 1♀, VII-23-36 (CIS).

*Eremomyia impolita* Hockett

*Eremomyia impolita* Hockett. 1951, N. Y. Ent. Soc. Jour., 59:81.

Holotype: ♂, Rainier, Oregon (USNM).

*Geographic range.* — British Columbia, California, New Mexico, Oregon, Utah.

*California records.* — CALAVERAS Co.: Dorrington, 1♂, II-11-62 (Wismar, CIS). EL DORADO Co.: Pollock Pines, 1♀, IV-22-56 (E. I. Schlinger, UCD). MARIN Co.: Alpine Lake, 1♀, III-31-56 (J. L. Herring, CIS). MARIPOSA Co.: Miami Ranger Station, 1♀, V-13-42 (A. J. Walz, CIS). MENDOCINO Co.: Boonville, 1♀, IV-10-53 (W. J. Graef, USNM). SAN DIEGO Co.: 3 mi. S. of Mt. Laguna P. O., 1♀, III-27-61 (W. A. Steffan, CIS). SAN MATEO Co.: 1♀, II-22-20 (L. A. Whitney, CU). VENTURA Co.: Mt. Pinos, 8,000 ft., 1♀, V-8-59 (J. Powell, CIS).

Genus *Eremomyioides* Malloch

*Eremomyioides* Malloch. 1918, Biol. Soc. Wash. Proc., 31:67.

Type-species: *Eremomyia cylindrica* Stein, original designation.

The nearctic genus *Eremomyioides* may readily be recognised by presence of setulae on all pleural and sternal sclerites of thorax, including propleura, pteropleura, hypopleura, prosternum, and metasternum. In other respects the genus finds its closest affinities with the *major*-group of *Pegomya* and in *Eremomyia*.

*Eremomyioides conscripta* Hockett

*Eremomyioides conscripta* Hockett. 1944, N. Y. Ent. Soc. Jour., 52:366.

Holotype: ♂, Copper Mountain, British Columbia (CNC).

*Geographic range.* — British Columbia, California.

*California records.* — EL DORADO Co.: Echo, Lake Tahoe, 1♀, VI-2-40 (T. G. H. Aitken, CAS). Echo Lake, 1♀, VI-19-57, 1♀, VI-13-59 (W. W. Middlekauff, CIS). Fallen Leaf Lake, 1♀, V-26-16 (H. G. Dyar, USNM). Heather Lake, 8,500 ft., 1♀, VI-25-53 (E. I. Schlinger, UCD). TUOLUMNE Co.: Chipmunk Flat, 1♀, VI-13-62 (C. A. Toschi, CIS).

*E. conscripta*, as in *setosa* (Stein)\*, has 3 or 4 anterodorsal and posterodorsal bristles respectively on hind tibia. *Conscripta* differs from *setosa* in having a less notably large hypopygium, and narrower frons caudad in the male; and by the weaker inconspicuous setulae on costa of the female.

Genus *Pegomya* Robineau-Desvoidy

*Pegomya* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:598.

Type-species: *Musca hyoscyami* Panzer; designation Coquillett, 1901.

The genus *Pegomya* represents an aggregate of several diverse groups (Hockett, 1941:12), some of which are distinctive not only by characters possessed by adults but also according to what is known of the habits of the larvae. Many of the species belonging to the *hyoscyami*-group are regarded in larval stage as leaf miners (Séguy, 1937:50), and a few of these are of economic importance due to injury to certain cultivated vegetable and canning crops. By contrast larvae of the *affinis*-group are regarded as inhabitants of burrows of certain rodents and land turtles (Young and Goff, 1939:58). In the *rubivora*-group adults have been reared from larvae infesting stems of *Rubus* and *Equisetum*, and still others, such as *geniculata* and *winthemi*, from larvae feeding on *Agaricus* and *Boletus*. Adults belonging to the prevalent *lipsia*-group are usually taken on foliage of shrubs and undergrowth in woods, males of *duplicata* and its counterpart in the east, *lipsia*, together with *Hylemya alcatheae*, being particularly evident and abundant on occasion. So far as I am aware nothing as yet is known of the habits of their larvae. Many species need further study on their relationships and group status.

The genus *Pegomya* has been subdivided for the purpose of this survey into three subgenera, namely, *Pegomya* Robineau-Desvoidy, *Nupedia* Karl, *Pseudonupedia* Ringdahl. The genus itself may be separated from related genera occurring in California by possession of 2 posterodorsal bristles on hind tibia and in male by the lack of posteroventral setulae thereon, or if 3 posterodorsal bristles are present, as in certain species belonging to subgenus *Pegomya*, the legs are partly fulvous.

Subgenus *Pegomya* Robineau-Desvoidy

The subgenus *Pegomya* differs from *Nupedia* and *Pseudonupedia* in having cruciate setae on interfrontalia rarely present in both sexes of the same species, and usually absent. Costa is usually hairy on under surface. The subgenus *Pegomya* differs further from *Nupedia* in having the apical setulae on scutellum coarser than ventral hairs, and males do not possess the typical pattern of processes on sternum 5 that is so characteristic of all males belonging to *Nupedia*, e.g., *acutipennis*. From *Pseudonupedia* the subgenus *Pegomya* differs further in structure and bristling of the terminal segments of male abdomen, the anal segment

being less acutely formed and extended caudad *in situ*, sternum 5 not having processes almost completely bare, and of a horny pliant nature, and in both sexes tergum 5 is not so shortened or relatively reduced in area.

KEYS TO SPECIES OF PEGOMYA (PEGOMYA)  
IN CALIFORNIA

MALES

1. Posterior notopleural bristle with setulae at base, mesopleura with hairs on declivity dorsad of mesothoracic spiracle .....2  
Posterior notopleural bristle without setulae at base, mesopleura without hairs on declivity dorsad of mesothoracic spiracle .....5
2. Second antennal segment extensively fulvous.....  
*major* (Malloch)  
Second antennal segment extensively blackish.....3
3. Mid femur without bristle on distal half of anteroventral surface .....*assimilis* Huckett  
Mid femur with anteroventral bristle on distal half.....4
4. Parafacials with brownish pruinescence, mid femur with 3 or more anteroventral bristles on proximal half.....  
*valida* Huckett  
Parafacials with whitish pruinescence, mid femur with 1 prebasal anteroventral bristle.....*incompleta* (Stein)
5. Mid femur with anteroventral bristle on distal half.....6  
Mid femur without anteroventral bristle on distal half...10
6. Mid and hind femora blackish on proximal half.....  
*apicalis* (Stein)  
Mid and hind femora fulvous.....7
7. Hypopygium, processes and fore coxae largely fulvous..  
*anorufa* Stein  
Hypopygium, processes and fore coxae black.....8
8. Fore femora infuscated or darkened throughout proximal half .....9  
Fore femora infuscated along dorsal half, fulvous along ventral .....*caduca* Huckett
9. Hypopygium with basal sclerite black and shiny, frons at narrower part less than width of third antennal segment, parafrontals contiguous thereat, calyptrae and basal region of wings densely yellowish.....  
*frigida* (Zetterstedt)  
Basal sclerite of hypopygium gray pruinose, frons at narrower part as wide as breadth of third antennal segment, wings yellowish tinged basad.....  
*quadrispinosa* Malloch
10. Prebasal sclerite (tergum 6) of hypopygium prominent and bristled .....11  
Prebasal sclerite of hypopygium normally bare, or nearly so, and partly retracted below margin of tergum 5...12
11. Legs black, processes of sternum 5 often pendent when collapsed, tapering distad and with inner marginal series of lengthy setulae.....*rubivora* (Coquillett)  
Legs fulvous in part, processes short and broad, and with inner marginal series of short setulae.....*glabra* (Stein)
12. Prealar bristle as long as anterior notopleural bristle, m-cu cross-vein usually oblique, mid tibia with strong mid anterodorsal and hind femur with full series of strong anteroventral bristles, abdomen conical, with strong marginal bristles on dorsum, processes patterned after those of *duplicata* (Malloch).....13  
Species not having above combination of characters....22
13. Mid and hind femora black, except at apices.....  
*nigrifemoralis* Huckett  
Mid and hind femora at least partly fulvous on proximal half .....14
14. Abdomen and humeral callosities more or less reddish testaceous, not concolorous with remainder of thorax..  
*lividiventris* Huckett  
Abdomen and humeral callosities grayish black, concolorous with thorax .....15
15. Hypopygium blackish, subshining, not concolorous with grayish terga .....16  
Hypopygium grayish, nonshiny, concolorous with terga...17
16. Fore and hind tibiae with robust or lengthy preapical posterodorsal bristle, narrowest part of frons at least usually equal to distance between posterior ocelli.....  
*setiformis* Huckett  
Hind tibia with preapical posterodorsal bristle weak, narrowest width of frons about equal to diameter of anterior ocellus .....*fuscicauda* Huckett
17. Second antennal segment entirely yellow or fulvous.....18  
Second antennal segment largely fuscous or blackish, any reddish part restricted to distal border.....20
18. Fore tibia with preapical posterodorsal bristle well developed .....*cresca* Huckett  
Fore tibia with preapical posterodorsal bristle setulose...19
19. Mesonotum seen from behind blackish along lateral declivities, wings and calyptrae yellowish, cross-veins unclouded .....*lipsia* (Walker)\*  
Mesonotum seen from behind gray along lateral declivities, wings and calyptrae clear, cross-veins clouded...  
*chrysidea* Huckett
20. Fore tibia with well developed preapical posterodorsal bristle .....*duplicata* (Malloch)  
Fore tibia with preapical posterodorsal bristle setulose or absent .....21
21. Mid and hind femora broadly infuscated on distal half..  
*orbata* Huckett  
Mid and hind femora fulvous on distal half.....  
*longimana* (Pokorny)
22. Abdominal sternum 3 with clumps of long bristles laterad  
*setiventris flavivaria* Huckett  
Abdominal sternum 3 not thus bristled.....23
23. Lower calyptal scale widely protruded beyond margin of upper, scutellum setulose on dorsum.....  
*winthemi* (Meigen)  
Lower calyptal scale subequal with upper, its border not widely extended beyond margin of upper scale...24
24. Prealar bristle absent.....25  
Prealar bristle usually present.....33
25. Costal thorn and costal setulae black and rather coarse or stubby, under surface of basal node to veins R<sub>2+3</sub> and R<sub>4+5</sub> usually with 1 or more weak hairs, e.g., *affinis fuscopunctata* .....26  
Costal thorn and costal setulae weak or fine, under surface of basal node to veins R<sub>2+3</sub> and R<sub>4+5</sub> bare....30
26. Frons and interfrontalia uniformly broad caudad and bristled as in female, frons at vertex as wide as distance between first pair of dorsocentral bristles.....  
*melanderi* Huckett  
Frons constricted caudad and at vertex much narrower

- than distance between first pair of dorsocentral bristles, frontal bristling dissimilar to that of female. . . . . 27
27. Third antennal segment entirely black, abdomen with brownish spotlike marks laterad on dorsum of terga. . . . .  
*affinis fuscopunctata* Huckett  
 Third antennal segment yellowish or reddish basad on inner surface, abdomen without brownish spots laterad on dorsum . . . . . 23
28. Occiput gray dorsad below vertex. . . . . *finitima* Stein  
 Occiput yellowish dorsad below vertex . . . . . 29
29. Notopleural depression and propleura gray, wings faintly tinged . . . . . *diffinis* Huckett  
 Notopleural depression and propleura yellowish, wings clear and whitish. . . . . *arenosa* Huckett
30. Palpi and tarsi entirely yellow. . . . . 31  
 Palpi and tarsi partly or entirely brownish. . . . . 32
31. Third antennal segment entirely black. . . . . *minuta* Malloch  
 Third antennal segment partly yellowish. . . . . *dissidens* Huckett
32. Haustellum rather narrow or slender, processes of sternum 5 tapering distad. . . . . *cognata* Stein  
 Haustellum not narrow or slender, processes short broad and polished, truncated at apex and inner margins adjacent to one another. . . . . *canyonensis* Huckett
33. Palpi normally entirely yellow. . . . . 34  
 Palpi infuscated at apex or partly brownish or reddish, or entirely darkened . . . . . 40
34. Thorax mainly black. . . . . 35  
 Thorax mainly yellowish. . . . . 39
35. Scutellum partly reddish. . . . . *triseta* Malloch  
 Scutellum entirely blackish. . . . . 36
36. Hind tibia with 2 anterodorsal and 2 posterodorsal bristles, processes widely spaced apart at base and with clumps of setulae at apices. . . . . 37  
 Hind tibia, with 3 or more anterodorsal and 3 posterodorsal bristles, processes bare at apex. . . . . 38
37. Third antennal segment entirely black, mid and hind femora black, abdomen drab and grayish, with darkened dorsocentral vitta. . . . . *vanduzeei* Malloch  
 Third antennal segment partly reddish, mid and hind femora and abdomen fulvous, latter with reddish dorsocentral stripe . . . . . *rubrivaria* Huckett
38. Wings largely clear, tinged basad, calypterae clear. . . . .  
*bicolor* (Wiedemann)  
 Wings and calypterae nigrescent. . . . . *defecta* Huckett
39. Thoracic pleura extensively suffused with cuticular brown-ing, caudal margins of abdominal terga blackish. . . . .  
*univittata* (von Roser)  
 Thoracic pleura largely pale yellow, caudal margins of terga pale, yellowish. . . . . *geniculata* (Bouché)
40. Basal sclerite of hypopygium polished, shining black, haustellum polished. . . . . *Pseudonupedia intersecta* (Meigen)  
 Basal sclerite of hypopygium dull or partly so, not shining black . . . . . 41
41. Mesonotum viewed from behind with 4 short interserial stripes, inner pair between respective series of acrostical and dorsocentral bristles, outer pair between respective series of dorsocentral and intraalar bristles, parafacials slim . . . . . 42  
 Postsutural region of mesonotum without such stripes, if stripes evident they are situated on median plane between acrostical series and/or in planes of dorsocentral bristles . . . . . 43
42. Processes largely bare distad and angularly protruded mesad at apex of inner margin, abdomen gray-black. . . . .  
*flavifrons* (Walker)  
 Processes with series of slender hairs on distal half of inner margin, abdomen brownish and slightly testaceous . . . . . *casualis* Huckett
43. Abdominal segments reddish, partly or entirely so. . . . . 44  
 Abdominal segments not reddish. . . . . 46
44. Narrower part of frons as wide as distance between posterior ocelli inclusive, interfrontalia uninterrupted caudad, processes as in *bicolor*, knobby and bare at apex . . . . . *defecta* Huckett  
 Narrower part of frons barely wider than diameter of anterior ocellus, parafrontals contiguous thereat, interfrontalia interrupted caudad, processes laminate. . . . . 45
45. Mesonotum and scutellum bluish black, calypterae whitish . . . . . *caesia* Stein  
 Mesonotum and scutellum brownish, calypterae tinged. . . . .  
*tinctisquama* Huckett
46. Acrostical series of bristles wider apart than distance of either from nearer series of dorsocentral bristles, third antennal segment pale gray and yellowish tinged or pallid at base. . . . . *silvicola* Huckett  
 Acrostical series of bristles not wider apart than distance of either from nearer series of dorsocentral bristles, third antennal segment blackish . . . . . 47
47. Processes mainly bare and bristleless on apical half, e.g., *hyoscyami* (Panzer). . . . . 50  
 Processes not mainly bare on apical half. . . . . 48
48. Processes narrow or slender and having shiny polished plate or flange extending mesad at base and at apex of inner margin, knobs of halteres purplish tinged. . . . .  
*umbripennis* Huckett  
 Processes not narrow nor slender, broadly maintained and without flangelike extensions on inner margin, knobs of halteres yellow . . . . . 49
49. Mesonotum and scutellum deep seal brown and shiny when seen from above, without marking or pruinescence, third antennal segment about 1.5 times as long as wide, processes with clump of weak bristles at base and at apex of inner border. . . . . *polygonorum* Huckett  
 Mesonotum and scutellum gray and dullish, with brownish pruinescence and dark reflections or brownish stripes on mesonotum, third antennal segment about twice as long as wide, processes with profuse slender bristles from base to near apex, fig. 86. . . . .  
*hirticauda* Huckett
50. Prealar bristle about as long as anterior notopleural bristle, hind tibia with preapical anterodorsal bristle setulose and apical anterior robust . . . . . *sombriana* Huckett  
 Prealar bristle shorter than anterior notopleural bristle, hind tibia with preapical anterodorsal bristle bristle-like and apical anterior setulose. . . . . 51
51. Palpi dark brown or fuscous, antennae black. . . . .  
*sagehenensis* Huckett  
 Palpi and/or antennae partly yellowish or reddish. . . . . 52
52. Processes truncated across apex, calypterae distinctly yellowish . . . . . *carduorum* Huckett  
 Processes tapering distad, calypterae hyaline or faintly yellowish tinged . . . . . 53
53. Narrower part of frons as wide as distance between posterior ocelli, interfrontalia unobscured caudad, anal segment notably swollen. . . . . *betae* (Curtis)  
 Narrower part of frons not much wider than diameter of

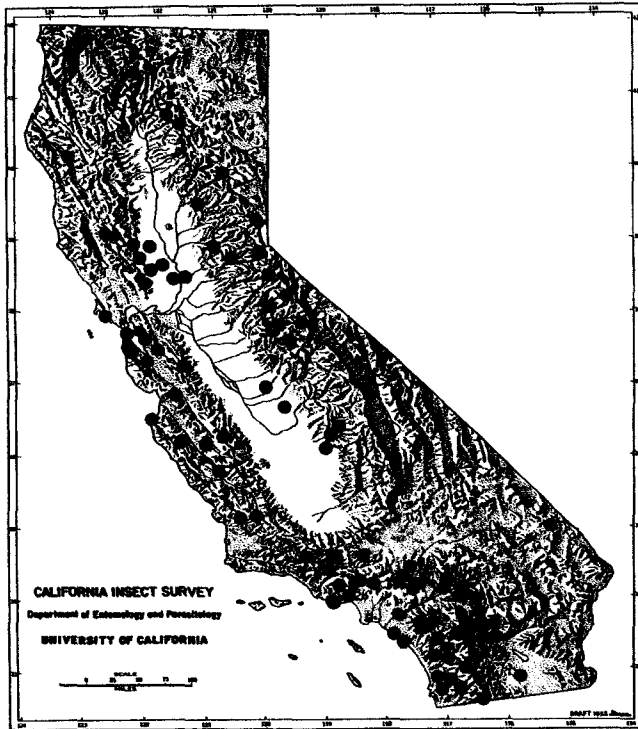
anterior ocellus, interfrontalia thereat obscured or nearly so.....*hyoscyami* (Panzer)

## FEMALES

1. Posterior notopleural bristle with setulae at base, mesopleura with hairs on declivity dorsad of mesothoracic spiracle ..... 2  
Posterior notopleural bristle without setulae at base, mesopleura without hairs on declivity dorsad of mesothoracic spiracle ..... 5
2. Mid femur with anteroventral bristle on distal half..... 3  
Mid femur without anteroventral bristle on distal half... 4
3. Anterior margin of parafacials straight and sloping in profile, mid femur with 3 or more anteroventral bristles on proximal half, calyptal hairs brownish. *valida* Huckett  
Anterior margin of parafacials dished or concave in profile, mid femur with 1 prebasal anteroventral bristle, calyptal hairs whitish..... *incompleta* (Stein)
4. Second antennal segment reddish or fulvous.....  
*major* (Malloch)  
Second antennal segment rufous or blackish.....  
*assimilis* Huckett
5. Mid femur with anteroventral bristle on distal half..... 6  
Mid femur without anteroventral bristle on distal half... 10
6. Fore tarsal segments 3 and 4 broader than those of mid tarsus ..... 7  
Fore tarsal segments 3 and 4 not broader than those of mid tarsus ..... 8
7. Abdomen black and glossy, sparsely dusted, calyptae yellowish, posteroventral bristles on mid and hind femora weak, fine or setulose..... *frigida* (Zetterstedt)  
Abdomen gray and densely pruinose, calyptae whitish, posteroventral bristles on mid and hind femora normal, bristlelike ..... *caduca* Huckett
8. Fore coxae yellow, third antennal segment reddish based on inner surface, costal setulae adjacent costal thorn as long as humeral cross-vein..... *anorufa* Stein  
Fore coxae largely black, third antennal segment black, costal setulae adjacent costal thorn shorter than humeral cross-vein ..... 9
9. Veins of wings brownish, calyptae whitish. *apicalis* (Stein)  
Veins of wings yellowish proximad, calyptae yellowish ..... *quadrspinosa* Malloch
10. Prealar bristle as long as anterior notopleural bristle, costal thorn long and robust, m-cu cross-vein oblique, abdomen with strong marginal bristles on dorsum, hind tibia usually with 2 long anterodorsal and 2 long posterodorsal bristles, e.g., *duplicata* (Malloch)..... 11  
Species without foregoing combination of characters... 20
11. Fore tarsal segments 3 and 4 at least slightly broader than those of mid tarsus..... 12  
Fore tarsal segments 3 and 4 not broader than those of mid tarsus ..... 18
12. Second antennal segment reddish or fulvous..... 13  
Second antennal segment blackish or fuscous, at most reddish along distal border..... 15
13. Fore tibia with preapical posterodorsal bristle well developed ..... *crezca* Huckett  
Fore tibia with preapical posterodorsal bristle weak or setulose ..... 14
14. Fore tarsal segments 3 and 4 conspicuously broadened and flattened, each segment being nearly as wide as long at maximum diameters, cross-veins clear, wings densely yellowish basad..... *lipsia* (Walker)\*  
Fore tarsal segments 3 and 4 each much longer than wide, cross-veins clouded, wings mostly hyaline basad ..... *chrysidea* Huckett
15. Fore femur extensively infuscated on dorsal and ventral surfaces proximad ..... 16  
Fore femur with infuscation restricted to dorsal half of femur ..... *fuscicauda* Huckett
16. Fore tibia with preapical posterodorsal bristle well developed ..... *setiformis* Huckett  
Fore tibia with preapical posterodorsal bristle weak, setulose ..... 17
17. Mid and hind femora broadly infuscated on distal half, hind tibia with weak setulose preapical posterodorsal bristle, abdomen whitish gray..... *orbata* Huckett  
Mid and hind femora fulvous on distal half, hind tibia with preapical posterodorsal bristle as long as apical diameter of tibia, abdomen yellowish gray.....  
*nigrifemoralis* Huckett
18. Abdomen and humeral callosities reddish testaceous, not concolorous with remainder of thorax.....  
*lividiventris* Huckett  
Abdomen and humeral callosities grayish black, concolorous with thorax ..... 19
19. Fore tibia with preapical posterodorsal bristle well developed ..... *duplicata* (Malloch)  
Fore tibia with preapical posterodorsal bristle setulose or absent ..... *longimana* (Pokorny)
20. Lower calyptal scale widely protruded beyond margin of upper, mid and hind tarsal segments 4 and 5 expanded broadly, discoid, palpi yellow, scutellum setulose on dorsum..... *winthemi* (Meigen)  
Species without foregoing combination of characters... 21
21. Prealar bristle absent..... 22  
Prealar bristle usually present..... 28
22. Costal thorn strong, costal setulae coarse and stubby, under surface of basal node to veins R<sub>2+3</sub> and R<sub>4+5</sub> usually with 1 or more hairs..... 23  
Costal thorn weak, costal setulae fine, under surface of basal node to veins R<sub>2+3</sub> and R<sub>4+5</sub> bare..... 26
23. Abdomen with brownish spotlike marks laterad on dorsum of terga 3 and 4..... *affinis fuscopunctata* Huckett  
Abdomen without brownish spots laterad on dorsum... 24
24. Abdomen unbroken gray across anterior half of terga 1+2, and 3, and usually so on tergum 4. *diffinis* Huckett  
Abdomen partly or mostly yellowish on anterior half of terga 1+2, 3 and 4..... 25
25. Notopleural depression yellowish, wings clear and hyaline ..... *arenosa* Huckett  
Notopleural depression gray, wings faintly tinged.....  
*finitima* Stein
26. Palpi and tarsi entirely yellow..... *minuta* Malloch  
Palpi and tarsi not entirely yellow..... 27
27. Mid and hind femora fulvous, abdomen dull and yellowish or brownish gray..... *cognata* Stein  
Mid and hind femora browned or blackish, abdomen subshining and dark gray..... *canyonensis* Huckett
28. Palpi entirely yellow or fulvous tinged..... 29  
Palpi entirely or partly infuscated, brownish or reddish, or fuscous at apex ..... 35
29. Thorax mainly blackish or gray..... 30  
Thorax mainly yellowish..... 34
30. Scutellum partly reddish..... *triseta* Malloch

- Scutellum entirely blackish .....31
31. Hind tibia with 3 anterodorsal or posterodorsal bristles..32  
Hind tibia usually with 2 anterodorsal and 2 posterodorsal bristles .....33
32. Calyptrae clear, wings clear or not smoky.....  
*bicolor* (Wiedemann)  
Calyptrae brownish tinged and wings smoky.....  
*defecta* Hockett
33. Third antennal segment entirely black.. *vanduzeei* Malloch  
Third antennal segment partly or mostly fulvous.....  
*rubriovaria* Hockett
34. Interfrontalia largely blackened on caudal half, caudal margins of terga with dark incisures.....  
*univittata* (von Roser)  
Interfrontalia largely yellow on caudal half, sometimes purplish, abdominal terga pale along caudal margin..  
*geniculata* (Bouché)
35. Legs entirely blackish .....36  
One or more tibiae yellowish .....37
36. Cruciate bristles well developed, caudal pair of ocellar bristles directed outward, longer than postvertical bristles, ventral bristle of caudal pair of sternopleurals short and weak.... *Pseudonupedia intersecta* (Meigen)  
Cruciate bristles weak or absent, caudal pair of ocellar bristles directed forward, shorter than postvertical bristles, ventral bristle of caudal pair of sternopleurals long, robust .....*rubivora* (Coquillett)
37. Palpi spatulate .....38  
Palpi slender or clavate .....39
38. Third antennal segment entirely black, palpi largely infuscated .....*tinctisquama* Hockett  
Third antennal segment reddish basad, palpi mainly yellowish .....*setioventris flavivaria* Hockett
39. Abdominal tergum 5 much longer than tergum 4, ovipositor strongly appressed and when fully extended terminating in 2 bayonetshaped processes, haustellum polished .....*glabra* (Stein)  
Tergum 5 not longer than tergum 4, ovipositor not terminating in 2 bayonetshaped processes.....40
40. Prealar bristle as long as anterior notopleural bristle, third antennal segment reddish at base of inner surface .....*sombrina* Hockett  
Prealar bristle shorter than anterior notopleural bristle, third antennal segment entirely blackish.....41
41. Tarsal segments 4 and 5 dilated, the latter discoid.....  
*hirticauda* Hockett  
Tarsal segments 4 and 5 normal.....42
42. Abdomen largely or basically reddish, with or without darkened areas .....43  
Abdomen dull gray, drab, with or without pinkish border along caudal margin of terga.....45
43. Cruciate bristles well developed, caudal sclerites of ovipositor blackish and shiny, calyptrae clear, whitish...  
*caesia* Stein  
Cruciate bristles absent or vestigial, caudal sclerites of ovipositor concolorous with abdomen, yellowish, calyptrae tinged .....44
44. Hind tibia usually with 3 posterodorsal bristles, profrons in profile as wide as width of third antennal segment, thorax blue-black .....*defecta* Hockett  
Hind tibia with 2 posterodorsal bristles, profrons narrower than width of third antennal segment, thorax gray-black .....*casualis* Hockett
45. Mid and hind femora blackish.....*flavifrons* (Walker)  
Mid and hind femora fulvous.....46
46. Fore femur extensively blackish on dorsal and ventral surfaces, second antennal segment blackish or rufous, veins of wings brown basad.....*umbripennis* Hockett  
Fore femur fulvous, with or without blackish infuscation on dorsal half, veins of wings yellowish basad.....47
47. Marginal bristles of tergum 5 as strongly developed as those on tergum 4.....  
*betae* (Curtis) and *hyoscyami* (Panzer)  
Marginal bristles of tergum 5 weaker than those on tergum 4 .....*carduorum* Hockett
- Pegomya (Pegomya) affinis fuscopunctata* Hockett  
(Map 19)
- Pegomya affinis fuscopunctata* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:271.  
Holotype: ♂, Palm Springs, Riverside County, California (CAS).
- Geographic range.* — California, Oregon, Washington.
- California records.* — ALAMEDA CO.: Berkeley, Oakland Hills, Sunol. ALPINE CO.: Hope Valley. BUTTE CO.: Enterprise. COLUSA CO.: Arbuckle, 9 mi. NW. of Rumsey. EL DORADO CO.: Pacific, Pyramid Ranger Station, Snowline Camp. FRESNO CO.: Boon Lake, Fresno. HUMBOLDT CO.: Fort Seward, Lane's Redwood Camp. IMPERIAL CO.: 15 mi. N. of Plaster City. LAKE CO.: Clear Lake, Clear Lake Oaks, Upper Lake. LOS ANGELES CO.: Claremont, Glendale, Lancaster, Malibu, mountains near Claremont, Santa Monica Mts., Tanbark Flat, Topanga Canyon. MADERA CO.: Coarsegold. MARIN CO.: Stinson Beach. MARIPOSA CO.: Pohono Trail 7-7,750 ft., Pothole Meadows, Yosemite. MONO CO.: Sardine Creek. MONTEREY CO.: Attoyo Seco River, Asilomar, ¾ mi. S. of Asilomar, Bradley, 9 mi. E. of King City, Point Pinos. NAPA CO.: Monticello Dam, Putah Canyon, Samuel Spring. NEVADA CO.: Truckee. ORANGE CO.: Green River Camp, Laguna Beach, Laguna Canyon, San Clemente. PLACER CO.: 4 mi. W. of Quincy. RIVERSIDE CO.: Aguanga, Box Spring Mountain, Corona, Deep Canyon on coyote dung, El Cariso Camp, 10 mi. E. of Hemet, Idyllwild, Massacre Canyon, Palm Canyon at Palm Springs, Palm Springs, Perris, Gavilan Hills 6 mi. W. of Perris, Riverside, San Andreas Canyon, San Jacinto Mts., Santa Rosa Pass, 7 and 8 mi. E. of Sunnymead, Upper Deep Canyon at Horsethief Creek, Whitewater. SACRAMENTO CO.: Sacramento. SAN BENITO CO.: Idria. SAN BERNARDINO CO.: Baldy Grade Falls, Chino, Colton, Deep Creek, East Barton Flat, Forest Home, Lake Arrowhead, Loma Linda, Mill Creek, Morongo Inn, New York Mts., 6 air mi. S. of Ivanpah, Rock Camp, South Fork of Santa Ana River, Upland, Upper Santa Ana River. SAN DIEGO CO.: Alpine, 4 mi. E. of Campo, Cuyamaca Lake, Lake Henshaw, 2 mi. NE. of Lakeside, Oak Grove, Rincon, San Diego. SAN FRANCISCO CO.: San Francisco, San Miguel Hills. SAN LUIS OBISPO CO.: La Panza, Pozo. SAN MATEO CO.: Redwood City, San Bruno Mts. SANTA CLARA CO.: Palo Alto, San Antonio Ranger Station, Sargent, Stanford University. SHASTA CO.: Hat Creek, Round Mountain. TULARE CO.: Ash Mountain, Giant Forest, 4 mi. N. of Kaweah, Woodlake. TUOLUMNE CO.: Mt. Dana, Oakland Camp, Strawberry, Yosemite 3,880-4,000 ft. VENTURA CO.: Hungry Valley 5 mi. S. of Gorman, Piru Creek NE. base of Alamo Mountain, Quatal Canyon, 1 mi. W. of Santa Susana. YOLO CO.: Cache Creek Canyon, Davis, Putah Canyon, Rumsey.





Map 19. Locality records in California for *Pegomya* (*P.*) *affinis fuscopunctata* Huckett. This general distribution is representative of several widespread species of *Pegomya* in California.

*P. affinis fuscopunctata* apparently flies throughout the year at localities near the coast. Inland the flight season is shorter, most collections having been made between April and August, but records are too scattered to define flight periods precisely. Adults have been taken as early as March in the Imperial and San Joaquin valleys and as late as October at mid elevations in the Sierra Nevada and November in the foothills of northeastern Shasta County.

Widely distributed in California, being recorded from 34 counties and 123 localities. Approximately 271 specimens were captured, of which 139 were males and 132 females. The subspecies differs from *affinis* of authors in having well etched brownish spots laterad on abdomen. The third antennal segment is entirely black and palpi, though usually entirely yellow, has infuscation at apex in occasional specimens of both sexes. The nominate subspecies is widely distributed in temperate regions of North America but is represented in California only by the subspecies *fuscopunctata*.

*Pegomya* (*Pegomya*) *anorufa* Stein

*Pegomya anorufa* Stein. 1920 May, Arch. f. Naturgesch. (1918) Abt. A 84(9):67.

*Pegomya subgrisea* Malloch. 1920 June, Amer. Ent. Soc. Trans., 46:180.

Holotype: ♂, Colorado (MNH).

*Geographic range.* — Alberta, California, Colorado, Montana, Wyoming.

*California record.* — MONO Co.: Pickel Meadow, 1♀, VIII-16-60 (R. R. Montanucci, UCD).

*P. anorufa* differs from associated species with a distal anteroventral bristle on mid femora by having fore coxae and fore femora fulvous except for infuscation along dorsal half of femur. In the male the hypopygium and processes are typically largely fulvous or reddish, and in female the fore tarsal segments are not wider than those on mid tarsus, and the third antennal segment is reddish basad.

*Pegomya* (*Pegomya*) *apicalis* (Stein)

*Eremomyia apicalis* Stein. 1898, Berlin, Ent. Ztschr. (1897) 42: 227.

Holotype: ♂, Moscow, Idaho (FMNH).

*Geographic range.* — Alberta, British Columbia, California, Idaho, Montana, New Mexico, Oregon, Utah, Washington, Wyoming.

*California records.* — ALPINE Co.: Hope Valley, 1♀, VII-9-48 (A. Bartel, CIS); 1♂, VII-18-48 (S. A. Sher, CIS). AMADOR Co.: 4 mi. N. of Silver Lake, 2♂, VII-25-55 (J. C. Downey, UCD). MARIPOSA Co.: Pohono Trail, 7-7,750 ft., 1♂, VI-18-31 (CIS). Pothole Meadows, 7,750 ft., 1♂, VII-3-46 (H. Chandler, CAS). MONO Co.: Sardine Creek, 8,500 ft., 1♂, 1♀, VI-28-51 (C. A. Downing, A. T. McClay, UCD); 1♂, VII-11-51, 2♀, VII-12-51 (A. T. McClay, UCD). Sonora Pass, 9-10,000 ft., 1♂, VII-11-57 (D. L. Flaherty, UCR). NEVADA Co.: Near Hobart Mills, 2♂, VI-17-64 (M. E. Irwin, UCR). Prosser Creek, 6,300 ft., near Hobart Mills, 1♀, VII-13-61 (J. G. Chillingworth, CNC). Sagehen Creek, near Hobart Mills, 5♂, 6♀, VII-9-15-64, in malaise trap (M. E. Irwin, UCR). Truckee, 1♀, VI-25-43 (P. H. Arnaud, CAS). PLUMAS Co.: 4 mi. W. of Quincy, 1♀, VI-25-49 (CIS). SAN FRANCISCO Co.: Twin Peaks, San Francisco, 1♀, II-27-62, variant (J. Powell, CIS). SAN MATEO Co.: San Bruno Mts., 1♀, II-25-61, variant (R. W. Thorp, CIS). TULARE Co.: Giant Forest, Sequoia National Park, 1♀, VII-28-29 (R. H. Beamer, UK). TUOLUMNE Co.: Mt. Dana, Yosemite National Park, 1♂, VII-28-36 (CIS).

*P. apicalis* differs from its allies with a distal anteroventral bristle on mid femora by having mid and hind femora of the male blackish on proximal half, and in the female, from its closest relative *quadrispinosa*, by the brownish wing veins and whitish calyptrae.

*Pegomya* (*Pegomya*) *arenosa* Huckett

*Pegomya arenosa* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:259.

Holotype: ♂, White Sands National Monument, New Mexico (USNM).

*Geographic range.* — California, New Mexico.

*California records.* — RIVERSIDE Co.: Deep Canyon, 1 ♀, XI-11-63, at light (E. I. Schlinger, M. E. Irwin, UCR). Hopkins Well, 1 ♀, IV-29-52 (P. D. Hurd, CIS).

*P. arenosa* is a pallid species, belonging to the *affinis*-group, and closely resembling *diffinis*, from which it may be separated by the more extensively yellowish thorax, whitish clear wings, and by the largely yellowish abdomen of the female.

*Pegomya (Pegomya) assimilis* Hockett

*Pegomya assimilis* Hockett. 1939, Amer. Ent. Soc. Trans., 65: 22.

Holotype: ♂, San Mateo County, California (ANSP).

*Geographic range.* — California.

*California records.* — ALAMEDA Co.: Berkeley, 2 ♂, III-28-20 (A. J. Basinger, CAS); 1 ♂, III-1933 (CU); 1 ♀, III-7-37 (C. Ferguson, CU); 1 ♀, III-14-37 (R. M. and G. E. Bohart, CAS). Fish Ranch, Berkeley Hills, 2 ♀, III-22-13 (J. C. Bridwell, CAS). Fish Ranch Road, 1 ♀, III-4-49 (J. W. MacSwain, CIS). Tesla Road, 10 mi. E. of Livermore, 1 ♀, III-14-59 (G. I. Stage, CIS). CONTRA COSTA Co.: Bollinger Canyon Road, 1 ♂, II-14-60 (J. Powell, CIS). Concord, 1 ♂, III-23-47 (C. W. Anderson, CIS). Orinda Cross Road, 3 ♂, III-4-49 (E. G. Linsley, J. W. MacSwain, CIS). Tilden Reg. Park, 1 ♀, III-30-49 (C. D. MacNeill, CIS). MARIN Co.: Woodacre, 1 ♂, III-31-49 (P. D. Hurd, CIS). MARIPOSA Co.: Yosemite Falls Trail, 1 ♀, IV-25-53 (P. H. Arnaud, CAS). SAN BERNARDINO Co.: Redlands, 1 ♂, 1913 (F. R. Cole, CAS). SAN MATEO Co.: 1 ♂, II-22-20, holotype (E. J. Whitney, ANSP). SANTA CLARA Co.: Stanford University, 1 ♀, III-18-04 (HCH); 2 ♀, II-15-50, 3 ♀, III-22-54, 1 ♂, I-31-56, 2 ♀, VI-24-56 (P. H. Arnaud, CAS). Santa Clara County, 1 ♂, II-1902, 1 ♂, II-6-04 (Coleman, CAS). YOLO Co.: Davis, 1 ♀, III-5-53, at bait (UCD). Esparto, 1 ♀, II-24-52 (K. W. Tucker, CIS).

*P. assimilis* is a robust species, associated with those having setulae at base of posterior notopleural bristle and hairs on declivity of mesopleura dorsad of the mesothoracic spiracle. It differs from species thus correlated in the absence of an anteroventral bristle on distal half of mid femur, and from *major* by the rufous or blackish second antennal segment.

*Pegomya (Pegomya) betae* (Curtis)

*Anthomyia hyoscyami* var. *betae* Curtis. 1847, Roy. Agr. Soc. England, Jour., 8:412.

*Pegomya betae* Aguilar and Missonnier. 1957, Soc. Ent. de France, Bull., 62:124.

Types: ♂ ♂, England.

*Geographic range.* — Alaska, Alberta, British Columbia, California, Colorado, Connecticut, Indiana, Massachusetts, Maine, Michigan, Minnesota, North Dakota, New Hampshire, New Jersey, New Mexico, New York, Ontario, Quebec, Utah, Wisconsin, Wyoming.

*California records.* — ALAMEDA Co.: Albany, 9 ♂, 9 ♀, VII-7-48, ex *Atriplex hastata*, (K. E. Frick, CIS). Berkeley, 11 ♂, 4 ♀, V-3-48, ex garden beet, 2 ♀, XI-5-48, ex *Atriplex hastata*, 1 ♀,

XI-8-48, ex sugar beet (K. E. Frick, CIS). LOS ANGELES Co.: Compton, 1 ♀, XI-6-08, 1 ♂, XII-12-08, 1 ♀, II-25-09, all ex spinach, 1 ♀, XI-30-08, 1 ♂, XII-4-08, both ex table beets, 1 ♂, 1 ♀, I-30-09, ex *Chenopodium* sp. (all H. O. Marsh, USNM); 1 ♂, I-15-10, 1 ♂, VII-24-10, both ex sugar beet leaves (Russell, CAS); 1 ♀, IX-5-17, ex beet (E. S. G. Titus, USU). Dominguez, 2 ♂, IX-4-51, ex table beets (USNM). MONTEREY Co.: Spreckels, 1 ♀, X-5-07 (E. C. Titus, HCH). Monterey County, 1 ♂, no date (CAS); 4 ♂, 1 ♀, no date (USNM). ORANGE Co.: Santa Ana, 1 ♀, XI-3-08, ex spinach (CAS); 1 ♀, XI-3-08, 1 ♂, XI-6-08, both ex spinach (H. O. Marsh, USNM). SACRAMENTO Co.: Sacramento, 1 ♂, V-20-50, ex lettuce (T. E. Savage, CDA). SAN BERNARDINO Co.: 1 ♀, IV-23-51, at bait (CDA). SAN DIEGO Co.: San Ysidro, 1 ♀, VI-30-50, at bait (CDA). SAN FRANCISCO Co.: San Francisco, 1 ♂, 3 ♀, VII-1960, ex beet leaves (H. B. Leech, CAS). SAN MATEO Co.: Halfmoon Bay, 1 ♀, V-23-37 (R. C. Dickson, UCR). Millbrae, 1 ♂, III-20 (E. T. Cresson, CAS). SANTA BARBARA Co.: Muir Beach, 1 ♀, VIII-6-50 (A. L. Melander, USNM). VENTURA Co.: Oxnard, 1 ♀, X-21-04, ex sugar beet, 1 ♀, VIII-27-14 (USNM).

The common name spinach leaf miner is here restricted to *P. betae*. The male may be distinguished from that of *hyoscyami* by the wider frons and swollen yellowish hypopygium. Chillcott (1959:169) has indicated slight but significant differences between the two species in the structure of the copulatory appendages, genitalia and ovipositor. In addition to the foregoing records, larvae have been bred in North America from leaves of swiss chard, mangels, *Chenopodium album*, and *Arctium lappa*. Immature stages of *betae* have been described and figured by Frost (1924:124, 218), and further references have been summarized by Hennig (1952:396-397).

*Pegomya (Pegomya) bicolor* (Wiedemann)

*Anthomyia bicolor* Wiedemann. 1817, Zool. Mag., 1(I):77.

Types: ♂, ♀, Holstein.

*Geographic range.* — Alaska, British Columbia, California, Connecticut, Idaho, Labrador, Michigan, New Brunswick, New York, Ohio, Ontario, Oregon, Pennsylvania, Quebec, Texas, Utah, Vermont, Washington, Wisconsin, Wyoming.

*California records.* — ALAMEDA Co.: Albany, 4 ♂, 6 ♀, VII-7-48, ex *Rumex crispus* (K. E. Frick, CIS). Berkeley, 1 ♂, V-23-15 (M. C. Van Duzee, USNM); 1 ♂, VIII-15 (A. L. Melander, USNM); 1 ♂, 2 ♀, V-12-25, ex *Rumex crispus* (W. W. Jones, CAS); 1 ♂, IV-23-35 (G. E. and R. M. Bohart, CAS); 1 ♂, IX-6-36 (C. A. Hamsher, UCD); 1 ♀, V-17-40 (C. A. Hanson, CIS); 1 ♂, 3 ♀, XII-14-48, 3 ♂, 5 ♀, XII-27-48, both ex *Rumex crispus* (K. E. Frick, CIS); 2 ♂, IX-17-58 (L. E. Campos, UCD). Oakland, 1 ♀, III-22-52 (R. Schuster, CIS). Redwood Canyon, 1 ♀, V-29-15 (M. C. Van Duzee, CAS). Sunol, 1 ♀, III-27-39 (T. G. H. Aitken, CAS). EL DORADO Co.: 3 mi. S. of Camino, 1 ♂, VI-26-48 (A. Bartel, CIS). HUMBOLDT Co.: Eureka, 1 ♀, VI-6 (H. S. Barber, USNM). MARIN Co.: Inverness, 15 ♂, III-31-49 (P. D. Hurd, CIS); 1 ♂, same date (P. D. Hurd, BVC). Mill Valley, 2 ♀, II-19-26 (M. C. Van Duzee, CAS). MARIPOSA Co.: Mirror Lake, 4,496 ft., 1 ♀, V-30-21, variant (E. O. Essig, CIS). MONO Co.: Sardine Creek, 8,500 ft., 1 ♀, VI-28-51 (UCLA). NEVADA Co.: Sagehen Creek,

near Hobart Mills, 1♀, VII-7-64, 1♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: Buck's Lake, 1♂, VII-14-49 (R. C. Bechtel, UCD). SAN BENITO Co.: Sargent, 1♀, VII-22-35 (J. Beamer, UK). SAN FRANCISCO Co.: San Francisco, 1♀, V-12-15 (M. C. Van Duzee, CAS); 1♂, 2♀, IV-17-26, 2♂, 5♀, VII-27-29, ex *Rumex crispus* (H. H. Keifer, CDA). SAN MATEO Co.: Corte de Madera Creek near Portola, 1♂, VI-11-54, 1♀, VII-18-64, variant (P. H. Arnaud, CAS). Halfmoon Bay, 3♂, 3♀, XI-15-39, ex *Rumex crispus* (W. H. Lange, UCD). Memorial Park, 1♂, VII-19-64 (P. H. Arnaud, CAS). Redwood City, 1♂, X-14-50, 1♂, V-30-53 (P. H. Arnaud, CAS). SANTA CLARA Co.: Stanford University, 1♀, May 1898 (Johnson, CAS). TUOLUMNE Co.: Dodge Ridge, 1♀, VII-4-51 (T. R. Haig, UCD). Sonora Pass, summit, 1♂, 2♀, VIII-28-48, 2♂, 1♀, VIII-30-48, ex *Rumex salicifolius* (K. E. Frick, CIS). Strawberry, 1♂, VII-20-51 (W. C. Bentinck, CIS).

*P. bicolor* and *triseta* Malloch are closely related, the former differing from the latter in having scutellum and third antennal segment normally entirely blackish. The common leaf miner of *Rumex* spp.

#### *Pegomya (Pegomya) caduca* Huckett

*Pegomya caduca* Huckett. 1939, Amer. Ent. Soc. Trans., 65:35.  
Holotype: ♂, Mount Rainier, Washington (USNM).

*Geographic range.* — Alaska, California, Labrador, Washington, Wyoming, Yukon Territory.

*California records.* — NEVADA Co.: Sagehen Creek, near Hobart Mills, 3♀, VII-7-64, 1♀, VII-10-64, 1♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). SIERRA Co.: Independence Lake, 1♀, VI-24-59 (L. A. Stange, UCD). Webber Lake, 1♂, VII-4-65 (P. H. Arnaud, CAS).

*P. caduca* in common with *frigida* (Zetterstedt) has an anteroventral bristle on distal half of mid femur, mid and hind femora fulvous, the male parafrontals contiguous caudad, and fore tarsal segments broadened in the female. It lacks the lustrous sheen of *frigida*, and in distinction has whitish calyptrae, and stronger posteroventral bristles on mid and hind femora of the female.

#### *Pegomya (Pegomya) caesia* Stein

*Pegomya caesia* Stein. 1906, Wein. Ent. Ztg., 25:78.  
Syntypes: ♂♂, ♀♀, Genthin (ZMUB).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Yukon Territory.

*California records.* — MONO Co.: Virginia Lakes, 9,750 ft., 3♀, VIII-17-63 (H. B. Leech, CAS). PLACER Co.: Globins, Lake Tahoe, 1♀, VII-16-55 (E. A. Kurtz, UCD). SHASTA Co.: Manzanita Lake, Lassen National Park, 1♀, V-18-41 (E. G. Linsley, CIS).

*P. caesia* runs in the male key to the same couplet with *tinctisquama*, from which it differs in both sexes by the bluish black mesonotum and scutellum, and by the whitish calyptrae. The abdomen is reddish, and

the female has cruciate bristles on interfrontalia and a rather bulky third antennal segment.

#### *Pegomya (Pegomya) canyonensis* Huckett

*Pegomya canyonensis* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:260.

Holotype: ♂, Mule Canyon, Calico Mountains, California (UCB).

*Geographic range.* — California.

*California records.* — RIVERSIDE Co.: Deep Canyon, 1♀, XII-2-63, 2♂, 1♀, XII-17-63, 1♂, II-23-64, at light (E. I. Schlinger, M. E. Irwin, UCR, HCH). Incho Mt. Creek, near Deep Canyon, 1♀, XII-2-63, at light (M. E. Irwin, UCR). SAN BERNARDINO Co.: Mule Canyon, Calico Mts., 1♂, 3♀, III-17-55, type series (M. Wasbauer, P. D. Hurd, UCB).

*P. canyonensis* runs in keys to the same couplet with *cognata* Stein, but in habitus is not unlike *hirticauda*. From both *cognata* and *hirticauda* the male of *canyonensis* may be distinguished by the glossy bare blunt processes of sternum 5. The female of *canyonensis* differs from that of *hirticauda* in the absence of the prealar and cruciate bristles, and from *cognata* by the dark gray abdomen.

#### *Pegomya (Pegomya) carduorum* Huckett

*Pegomya carduorum* Huckett. 1939, Amer. Ent. Soc. Trans., 65:1.

Holotype: ♂, Madison, Wisconsin (HCH).

*Geographic range.* — Alberta, California, New York, Pennsylvania, South Dakota, Washington, Wisconsin.

*California records.* — ALAMEDA Co.: Berkeley, 1♂, VII-20-48, ex *Carduus pycnocephalus* (K. E. Frick, CIS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♀, VII-10-64, in malaise trap (M. E. Irwin, UCR).

*P. carduorum* is related to *hyoscyami*, from which it may be separated by the yellowish calyptrae and blunt apical margin of processes in the male, and by the comparatively weaker marginal bristles on tergum 5 in the female. The larvae are known also to mine the leaves of *Cirsium* spp.

#### *Pegomya (Pegomya) casualis* Huckett

*Pegomya casualis* Huckett. 1967, Pan-Pacific Ent., 43:53.  
Holotype: ♂, San Francisco, California (CAS).

*Geographic range.* — California.

*California records.* — SAN FRANCISCO Co.: San Francisco, 1♂, III-19-64, holotype, flight trap, 6♀, III-25-64, 2♀, IV-6-7-64, flight trap (P. H. Arnaud, CAS).

*P. casualis* is closely allied to *flavifrons*, the male differing chiefly in the possession of an inner marginal series of slender hairs on distal half of processes. The brownish abdomen of the holotype has traces of a red-

dish nature. The female has abdomen reddish, and mid and hind femora largely so.

*Pegomya (Pegomya) chrysidea* Hockett

*Pegomya chrysidea* Hockett. 1939, Amer. Ent. Soc. Trans., 65: 27.

Holotype: ♂, Forest Home, San Bernardino Mountains, California (ANSP).

**Geographic range.** — Arizona, California, Oregon, Utah, Wyoming.

**California records.** — ALAMEDA Co.: Oakland, 1♂, V-21-37 (E. S. Ross, CAS). EL DORADO Co.: Whitehall, 1♂, VIII-25-34 (E. Fourness, CDA). LAKE Co.: 1♀, no date, (USNM). MARIPOSA Co.: Yosemite, 1♀, VI-29-47 (A. L. Melander, USNM). Yosemite Valley, 1♂, VI-25-21 (E. C. Van Dyke, CAS). MARIPOSA-TUOLUMNE Co.: Yosemite National Park, 1♀, VIII-1-40 (D. E. Hardy, UK). NEVADA Co.: 1 mi. N. of Truckee, 1♂, VI-13-64 (M. E. Irwin, UCR). PLUMAS Co.: 4 mi. W. of Quincy, 1♀, VI-22-49 (P. D. Hurd, CIS); 1♀, VII-19-49 (J. N. Simons, CIS). SAN BERNARDINO Co.: Baldy Grade Falls, San Gabriel Mts., 1♀, X-25-35 (A. J. Basinger, CAS). Cold Water Canyon, 10 mi. W. of Camp Baldy, 1♀, IX-9-65 (M. E. Irwin, UCR). Forest Home, 5,200 ft., 1♂, V-18-34 (A. J. Basinger, ANSP). Falls, Forest Home, 1♂, IX-21-35 (A. J. Basinger, CAS); 1♂, 1♀, VI-7-24 (J. M. Aldrich, USNM). Mt. Home Canyon, 1♀, VII-1-23, 3♂, IX-22-23, 1♂, VI-8-24 (F. R. Cole, CAS). Oak Glen, 1♂, VII-2-45 (A. L. Melander, USNM). SANTA CLARA Co.: Stevens Creek, 1♂, VII-23-40 (B. Brookman, CAS). SHASTA Co.: Hat Creek, 1♂, V-29-30, 1♀, VI-3-52, 1♀, VI-20-52, 1♂, 1♀, VI-27-29-52, 2♀, VII-5-8-52 (G. Pronin, CAS). Hat Creek P. O., 1♀, VI-25-55, 1♂, VII-2-55 (A. J. Mueller, UCD). Old Station, 1♂, VI-24-55 (J. R. Jessen, UCD). Shingletown, 1♀, VI-7-41 (UCD). TRINITY Co.: Carrville, 2,400–2,500 ft., 1♀, VI-18-34 (T. G. H. Aitken, CAS). TUOLUMNE Co.: Pinecrest, 4♂, VIII-23-47 (P. H. Arnaud, CAS). Strawberry, 1♀, VII-31-60 (L. R. Nault, UCD). Yosemite, 3,800–4,000 ft., 1♂, V-17-31 (CAS).

*P. chrysidea* belongs to the *lipsia*-group and possesses the following diagnostic characters in common with *lipsia* (Walker)\*: second antennal segment yellow, fore tibia with preapical posterodorsal bristle absent or setulose, fore tarsal segments of the female broadened. It differs from *lipsia* in having cross-veins clouded and wings mostly clear basad.

*Pegomya (Pegomya) cognata* Stein

(Map 20)

*Pegomya cognata* Stein. 1920, Arch. f. Naturgesch. (1918), Abt. A. 84(9):67.

Syntypes: ♂♂, Stanford University, California (ZMUB, USNM).

**Geographic range.** — California, Oregon.

**California records.** — ALAMEDA Co.: Albany, 1♀, III-11-21 (C. T. Dodds, CAS). Alvarado, 1♀, IV-12-31 (E. P. Van Duzee, CAS). Berkeley, 1♀, X-1914 (E. P. Van Duzee, CAS). Emeryville, 1♀, VIII-25-31 (C. T. Dodds, CAS). Hayward, 1♂, III-30-39 (K. D. Snyder, CIS); 1♂, II-11-47 (E. G.



Map 20. Locality records in California for *Pegomya (P.) cognata* Stein.

Meyers, CIS). CONTRA COSTA Co.: 2 mi. W. of Pittsburg, 1♂, IX-25-59 (D. D. Linsdale, CIS); 1♀, IX-19-57 (J. Powell, CIS). West Pittsburg, 2♂, III-21-57 (J. Powell, CIS). HUMBOLDT Co.: Eureka, 1♀, VI-22-39 (G. F. Knowlton, HCH); 1♂, VII-15-35 (R. H. Beamer, UK). Samoa Beach and dunes, 2♂, 2♀, VI-18-07 (J. C. Bradley, CU). LOS ANGELES Co.: Santa Monica Mts., 2♀, VII-3-50 (UCLA). MARIN Co.: Black Point, 1♀, VI-5-53 (H. L. Mathis, UCD). Bolinas, 1♂, II-1950, ex brackish water (R. M. Bohart, CAS). Mill Valley, 2♀, X-3-26 (E. P. Van Duzee, CAS). MONTEREY Co.: Asilomar, 1♀, V-17-59 (D. J. Burdick, CIS); 3♂, 1♀, V-23-59, variant, (J. R. Powers, CIS). Monterey, 1♂, IX-25-34 (A. L. Melander, USNM). Moss Landing, 1♂, VI-29-31 (E. P. Van Duzee, CAS). SAN DIEGO Co.: La Jolla, 1♀, III-7-14 (E. P. Van Duzee, CAS). Palm City, 1♂, VII-19-40 (R. H. Beamer, UK). San Diego, 1♂, III-29-91 (CAS); 2♀, IX-12-13, 3♂, XII-12-13 (E. P. Van Duzee, CAS). Solana Beach, 1♀, VI-19-63, palpi fuscous at apex (J. Powell, CIS). SAN LUIS OBISPO Co.: Morro Bay, 1♀, VIII-29-45, 1♂, VIII-30-45, 1♂, 1♀, IX-6-45 (A. L. Melander, USNM). SAN MATEO Co.: Millbrae, 1♀, X-5-14 (E. P. Van Duzee, CAS). Redwood City, 3♂, 5♀, VI-3-51 (P. H. Arnaud, CAS). SANTA CLARA Co.: Palo Alto, 1♀, VIII-1-57 (P. H. Arnaud, CAS). Stanford University, 3♂, II-28-06, type series (ZMUB, USNM). Santa Clara Co., 2♂, 2♀, no date (Baker, USNM). SOLANO Co.: Sears Point, 5♂, VI-29-51 (W. C. Bentinck, CIS). Sears Point Road, 3♂, 1♀, V-15-54 (E. I. Schlinger, UCD). Vallejo, 3♂, VIII-31-53 (E. I. Schlinger, UCD). SONOMA Co.: 1.5 mi. S. of Asti, 1♀, IV-8-54 (E. I. Schlinger, UCD).

*P. cognata* has the prealar bristle absent and costal setulae weak, thus running in the keys to the same

couplet with *canyonensis*, from which it may be separated by the narrower tapering processes of the male, and the fulvous mid and hind femora of the female. The above specimens exhibit a wide variation in color pattern, specimens from Asilomar being notably pale and whitish gray, with tarsi considerably yellowish, partly due evidently to their teneral condition.

*Pegomya (Pegomya) cresca* Huckett

*Pegomya cresca* Huckett. 1939, Amer. Ent. Soc. Trans., 65:30.  
Holotype: ♂, Cranbrook, British Columbia (CNC).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, South Dakota, Washington, Wyoming.

**California records.** — ALPINE Co.: Hope Valley, 1 ♀, VI-7-52 (R. C. Bechtel, UCD). EL DORADO Co.: Echo Lake, 7,000 ft., 1 ♂, VII-18-33 (E. O. Essig, CIS); 1 ♀, VIII-10-50, 1 ♀, IX-16-52 (S. B. Freeborn, CIS); 1 ♂, VII-12-53, 1 ♀, VII-27-55, 1 ♀, VII-2-61 (W. W. Middlekauff, CIS). Fallen Leaf Lake, Tahoe, 1 ♀, VI-10-16 (H. G. Dyar, USNM). MONO Co.: Mammoth Lakes, 1 ♂, VII-14-33 (CAS). White Mts., 3.5 mi. N. of Inyo Co., 10,150 ft., 1 ♀, VIII-19-63, flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen, near Hobart Mills, 1 ♀, VIII-10-51, 1 ♀, VIII-23-56 (E. G. Linsley, CIS); 1 ♂, VII-5-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 1 ♂, VII-1-64 (C. N. Slobodchikoff, CAS); 13 ♂, 24 ♀, VII-6-16-64, in malaise trap (M. E. Irwin, UCR). RIVERSIDE Co.: Deep Canyon, 1 ♀, IX-2-64 (P. A. Rauch, UCR). SHASTA Co.: Hat Creek P. O., 1 ♀, VI-23-55 (R. D. Browning, UCD). SIERRA Co.: Webber Lake, 1 ♀, VII-21-00 (Osten Sacken, USNM). TULARE Co.: Mineralking, 1 ♀, VII-23-35 (G. Heid, CAS).

*P. cresca* is related to *chrysidea* and *lipsia*<sup>\*</sup>, from both of which it differs in having a well developed preapical posterodorsal bristle on fore tibia, and in the female by having the fore tarsal segments less widely broadened. All three species have the second antennal segment fulvous.

*Pegomya (Pegomya) defecta* Huckett, new status

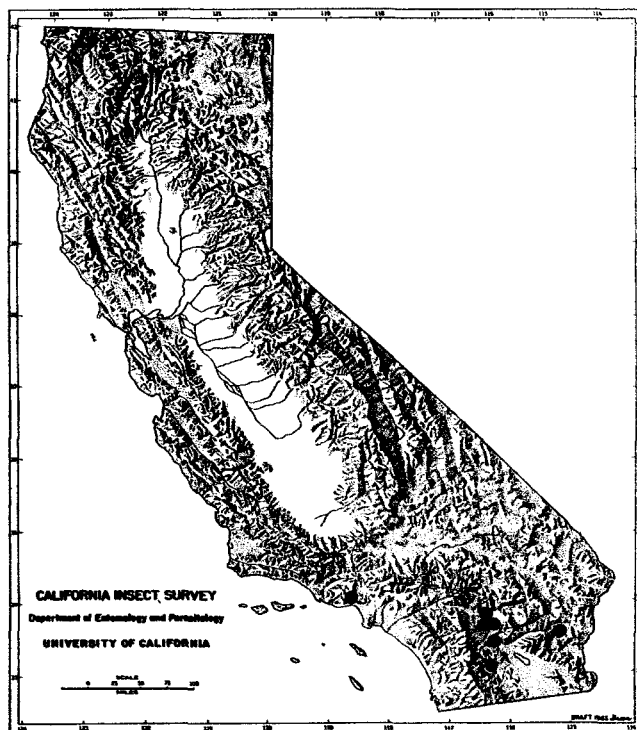
*Pegomya bicolor defecta* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:272.

Holotype: ♂, La Honda, San Mateo County, California (CAS).

**Geographic range.** — California, Oregon.

**California records.**—SAN FRANCISCO Co.: San Francisco, 1 ♀, III-19-64, flight trap, 1 ♀, III-25-64 (P. H. Arnaud, CAS). SAN MATEO Co.: La Honda, 1 ♂, IV-3-49, holotype, 2 ♂, 3 ♀, III-8-64 (P. H. Arnaud, CAS, HCH).

*P. defecta*, in distinction to *bicolor*, has wings and calyptres fuscous or brownish tinged, palpi fulvous to reddish or brownish tinged, and mesonotum and scutellum of the male nigrescent.



Map 21. Locality records in California for *Pegomya (P.) diffinis* Huckett.

*Pegomya (Pegomya) diffinis* Huckett  
(Map 21)

*Pegomya diffinis* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:261.

Holotype: ♂, San Felipe, Baja California (CAS).

**Geographic range.** — California, Baja California.

**California records.** — LOS ANGELES Co.: Santa Monica Mts., 1 ♀, VII-3-50 (CIS). RIVERSIDE Co.: 18 mi. W. of Blythe, 1 ♂, IV-2-63 (A. Willink, UCD). Desert Hot Springs, 1 ♀, III-3-55 (J. E. H. Martin, CNC). La Quinta, 1 ♀, III-5-55 (J. E. H. Martin, CNC). Palm Springs, 1 ♂, IV-24-44 (A. L. Melander, USNM). Thousand Palms, 1 ♀, III-4-55 (W. R. M. Mason, CNC); 1 ♀, III-12-55 (J. E. H. Martin, CNC). SAN DIEGO Co.: Borrego, 1 ♀, IV-26-55 (M. Wasbauer, CIS). Borrego Valley, 1 ♀, IV-18-57 (E. I. Schlinger, UCD).

*P. diffinis* belongs to the *affinis*-group and is closely related to *arenosa*, from which it differs in being more extensively gray. The hind tibia has a lengthy preapical posterodorsal bristle, and mid tibia in the female may or may not have a weak anteroventral bristle. Specimens of this species submitted by Dr. H. T. Dalmat for identification were collected from burrows of *Citellus townsendii* in Churchill County, Nevada.

*Pegomya (Pegomya) dissidens* Huckett

*Pegomya dissidens* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:261.

Holotype: ♂, Sand dunes near Stovepipe Wells, Death Valley, Inyo County (CAS).

*Geographic range and California record.* — Restricted to the holotype, taken on April 2 by H. B. Leech.

*P. dissidens* is allied to *minuta* Malloch, from which the male of *dissidens* differs in having third antennal segment yellowish.

*Pegomya (Pegomya) duplicata* (Malloch)

*Hylemyia duplicata* Malloch. 1918, Amer. Ent. Soc. Trans., 44:308.

*Pegomyia fuscineris* Stein. 1920, Arch. f. Naturgesch. (1918), Abt. A. 84(9):69.

Holotype: ♂, Yosemite Valley, California (ANSP).

*Geographic range.* — Alberta, British Columbia, California, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming.

*California records.* — ALAMEDA Co.: Albany, Antioch, 20 mi. S. of Arroyo Mocho, Berkeley, Berkeley Hills, Berkeley Hills NE. of Oakland, campus at Berkeley, Castro Valley, Fish Ranch Road, Hayward, 5 mi. E. of Livermore, Oakland, Leona Heights at Oakland, Piedmont, Pleasanton, San Lorenzo. AMADOR Co.: Silver Lake. BUTTE Co.: Butte County. CONTRA COSTA Co.: Antioch, Brentwood, near Clayton, Danville, El Cerrito, Mt. Diablo, Orinda, Point Molate at Richmond, Walnut Creek, Walnut Creek at foot of Shell Ridge. DEL NORTE Co.: Crescent City. EL DORADO Co.: 3 mi. S. of Camino, Echo, Fallen Leaf Lake, Snowline Camp. FRESNO Co.: Auberry, Firebaugh, Huntington Lake, Mono Hot Springs, Reedley, Shaver Lake. INYO Co.: Lone Pine, Mono Pass, Ruby Lake. KERN Co.: Mill Potrero, Onyx, Walker Pass. LAKE Co.: Lower Lake, Clear Lake. LOS ANGELES Co.: Agoura, Beverly Glen, Big Dalton Dam, Big Pines, Claremont, Compton, Crystal Lake, Downey, El Monte, Elizabeth Lake Canyon, Glendale, Glendora, Gorman, Los Angeles, mountains near Claremont, Newhall, Pacific Palisades, Pasadena, Placerita Canyon, Santa Fe Springs, Santa Monica Mts., Silverdale Canyon, Tanbark Flat, Westwood Hills. MADERA Co.: Bass Lake, Coarsegold, Oakhurst, San Joaquin Experiment Station, Vernal Falls. MARIN Co.: Black Point, Bolinas, Cypress Ridge, Fairfax, Lagunitas, McClure's Beach, Mill Valley, Mt. Tamalpais, Muir Woods, Novato, Paradise Cove, Point Reyes, San Anselmo, San Geronimo, Taylor State Park, Woodacre. MARIPOSA Co.: Miami Ranger Station, Mirror Lake, Snowcreek Trail, Wawona, Yosemite, Glacier Point Road and Village at Yosemite National Park. MARIPOSA-TUOLUMNE Co.: Yosemite National Park. MENDOCINO Co.: Point Arena, 6 mi. W. of Willits. MERCED Co.: G. F. Hatfield State Park. MONO Co.: Leavitt Meadow, Mammoth Lakes, Sonora Pass. MONTEREY Co.: Big Sur, Bradley, Carmel, Del Monte, Hastings Reservation near Jamesburg, Jamesburg, Monterey, Paradise Canyon near Prunedale, Pfeiffer Big Sur State Park, Seaside. NAPA Co.: Calistoga, Mt. St. Helena, Samuel Spring. NEVADA Co.: Sagehen, Sagehen Creek near Hobart Mills. ORANGE Co.: Brea, El Toro, Laguna Beach, Mariana Creek at Ortega Highway, San Clemente, Santa Ana Mts. PLACER Co.: 5 mi. N. of Auburn. PLUMAS Co.: Onion Valley, 4 mi. W. of Quincy. RIVERSIDE Co.: Banning, Dark Canyon, Deep Canyon, Fairmont Park, Fern Valley near Idyllwild, Fuller Mill Creek in San Jacinto Mts., Herkey Creek, Idyllwild, Lake Fulmor in San Jacinto Mts., Marion Mtn. Camp, Pine

Flat, Riverside, San Jacinto Mts., San Juan Camp Ortega Highway, Santa Rosa Pass, Santa Rosa Spring Camp at Santa Rosa Mts., Snow Creek at Whitewater, Strawberry Creek San Jacinto Mts., Strawberry Creek at Highway 79, summit of Upper Palm Canyon 14 mi. SE. of Keen Camp, top of Palm Canyon, Upper Deep Canyon near Horsethief Creek, 5 mi. W. of Sage, Whitewater. SACRAMENTO Co.: Sacramento. SAN BENITO Co.: Hollister, San Juan. SAN BERNARDINO Co.: Baldwin Lake, Baldy Grade Falls, Barton Flat, South Fork Camp at Barton Flat, Bear Valley, Big Bear Lake, Big Meadows, Boulder Bay at Big Bear Lake, Camp Baldy, Camp Baldy Road, Cienega, Crestline, East Highlands, Fawnskin, Forest Home Falls, Highway 38 at Little Cienega, Jenks Lake, Lake Gregory, Mill Creek Canyon, Mill Creek at Thurman Flats in San Bernardino Mts., Mountain Home, Mt. Home Canyon, Redlands, South Fork of Santa Ana River, South Forks of Upper Santa Ana River, Upper Santa Ana River. SAN DIEGO Co.: Agua Caliente Creek, Alpine, Campo, Cuyamaca Mts., Cuyamaca State Park, Descanso, Descanso Ranger Station, Doan Pond on Palomar Mt., Harbison Canyon, Jacumba, La Mesa, Laguna Mts., Lake Cuyamaca, Lake Henshaw, Lake Henshaw Dam, Mt. Home Spring at Santa Rosa Mountain, Mt. Laguna, Oak Grove, Pine Lake, Pine Valley, Pomona Range, Ramona, Rincon, San Diego, San Luis Rey Camp, Silver Strand, Warner Springs. SAN FRANCISCO Co.: Lake Merced at San Francisco, San Francisco, San Francisco sand dunes, Twin Peaks. SAN JOAQUIN Co.: Thornton, Vernalis. SAN LUIS OBISPO Co.: Atascadero, Morro Bay, Pico Creek, Pozo. SAN MATEO Co.: Corte de Madero Creek, Jasper Ridge, Junipero Serra Park, La Honda, Memorial Park, Mortara, Pescadero, Portola Road, Redwood City, San Andreas Lake, Skyline Boulevard near Skylonda, Woodside. SANTA BARBARA Co.: Goleta, Santa Barbara, Summerland. SANTA CLARA Co.: Alum Rock State Park, Coyote, Gilroy, Palo Alto, San Jose, Saratoga, Stanford University, Stevens Creek. SANTA CRUZ Co.: Big Basin, Highland Dist., Santa Cruz, Soquel. SHASTA Co.: Hat Creek, Hat Creek P. O., Moose Camp, Old Station. SIERRA Co.: Webber Lake. SOLANO Co.: Cordelia, Green Valley, Mix Canyon, Vacaville. SONOMA Co.: Cloverdale, Mesa Grande, Occidental, Petaluma, Plantation, Stillwater, Trinit. STANISLAUS Co.: Newman. SUTTER Co.: Mysolle Buttes. TEHAMA Co.: Vina. TULARE Co.: Giant Forest, Sequoia National Park, Visalia. TUOLUMNE Co.: Dardanelles, Miguel Meadows, Pinecrest, Strawberry, Tioga Pass, Tuolumne Meadows, Yosemite 3,880–4,000 ft. VENTURA Co.: Chuchupate Ranger Station at base of Frazier Mountain, Lockwood Creek near Stauffer P. O., Tapo Canyon at Santa Susana. YOLO Co.: Berryessa, Davis, Elkhorn Ferry, Putah Canyon, West Sacramento, Woodland. YOLO-SOLANO Co.: Putah Canyon.

*P. duplicata* has been collected throughout the year in the central and southern coastal counties, while its activity is restricted to the warmer months at inland stations. Records are available from March to September in the Central Valley and from April to August at various montane areas.

One of the commonest species of *Pegomya* in California, *duplicata* is recorded in 46 counties and approximately 285 localities, based on an examination of 1,256 specimens, of which 672 were males and 584 females. The species differs slightly but significantly from allied taxa, *longimana* and *orbata*, in usually having preapical posterodorsal bristle on fore tibia

well developed. The female fore tarsal segments are not broadened.

*Pegomya (Pegomya) fnitima* Stein

*Pegomya fnitima* Stein. 1898, Berlin. Ent. Zeitschr. (1897), 42:241.

Syntypes: ♂♂, ♀♀, Brookings, South Dakota (FMNH, USNM).

*Geographic range.*—California, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Missouri, New Hampshire, New York, North Dakota, Ohio, South Dakota, Tennessee, Wisconsin.

*California records.* — IMPERIAL Co.: 1 mi. W. of Glamis, sand dune assoc., 105 m elev., 1♀, IV-19-64 (E. I. Schlinger, UCR). RIVERSIDE Co.: Indio, 1♂, III-13-55 (W. R. M. Mason, CNC). Thousand Palms, 1♂, III-17-55 (J. E. H. Martin, CNC).

*P. fnitima* is closely related to *diffinis*, differing in that palpi are yellow at apex and occiput uniformly gray below vertex of head. The mid tibia may or may not possess an anteroventral bristle.

*Pegomya (Pegomya) flavifrons* (Walker)

*Eriphia flavifrons* Walker. 1849, List Dipt. Brit. Mus., 4:966.

*Pegomya fringilla* Malloch. 1920, Amer. Ent. Soc. Trans., 46:181.

Holotype: ♀, St. Martin's Falls, Albany River, Ontario (BMNH).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Connecticut, Idaho, Illinois, Manitoba, Michigan, North Carolina, Nova Scotia, Northwest Territories, New York, Ohio, Ontario, Oregon, Pennsylvania, Quebec, South Dakota, Virginia, Wisconsin.

*California records.* — ALAMEDA Co.: Berkeley, 1♀, IX-19-36 (C. A. Hamsner, UCD). MARIN Co.: Mill Valley, 1♀, III-7-26, 1♀, IV-21-26 (M. C. Van Duzee, CAS). ROSS, 1♂, VI-8-55 (H. L. Mathis, CAS). SAN FRANCISCO Co.: San Francisco, 1♀, III-19-64, flight trap, 3♀, III-25-64 (P. H. Arnaud, CAS). SAN MATEO Co.: La Honda, 1♀, IV-3-56 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Santa Cruz, 1♀, VI-1-19 (E. P. Van Duzee, CAS).

*P. flavifrons* is related to *casualis*, both having 4 interserial stripes on mesonotum of the male when viewed from behind. The femora in *flavifrons* are blackish or sometimes dark brown in the female, and in the male the processes of sternum 5 are largely bare distad and curve slightly mesad at apex of inner margin. The female differs from that of *casualis* in having the abdomen gray.

*Pegomya (Pegomya) frigida* (Zetterstedt)

*Anthomyza frigida* Zetterstedt. 1845, Diptera Scandinaviae, IV:1685.

*Pegomya bivittata* Stein. 1906, Wien. Ent. Ztg., 25:98.

*Pegomya latiovittata* Malloch. 1920, Ohio Jour. Sci., 20:272.

Types: ♂♂, Jämtland, Lule Lappmark, Norway (ZIL); *teste* Ringdahl, 1939.

*Geographic range.*—Alaska, Alberta, California, Idaho, Michigan, New Hampshire, New York, Northwest Territories, Ontario, Oregon, Quebec, Tennessee, Washington.

*California record.* — DEL NORTE Co.: Gasquet, 1♀, IX-18-34 (A. L. Melander, USNM).

*P. frigida* may readily be recognized by the highly lustrous thorax and abdomen, shiny black hypopygium of the male, and in the female by weak posteroventral bristles on mid and hind femora. The mid femora in both sexes has an anteroventral bristle on distal half, and fore tarsus of the female has broadened segments.

*Pegomya (Pegomya) fuscicauda* Huckett

(Map 22)

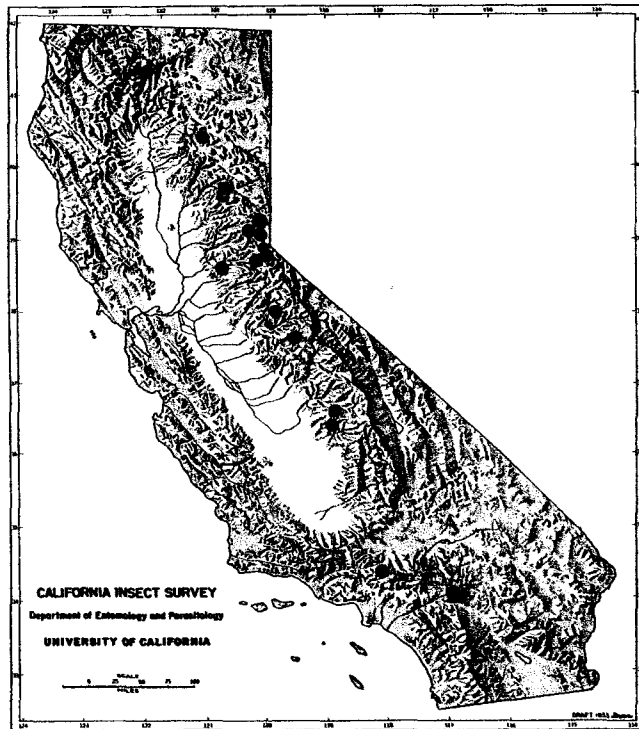
*Pegomya fuscicauda* Huckett. 1939, Amer. Ent. Soc. Trans., 65:31.

Holotype: ♂, Forest Home, San Bernardino Mountains, California (ANSP).

*Geographic range.* — Alberta, British Columbia, California, Colorado, Idaho, Oregon, Utah, Washington.

*California records.* — EL DORADO Co.: China Flat, 1♀, VI-28-48 (C. Chan, UCD). COLOMA, 1♂, V-14-55 (E. A. Kurtz, UCD). Echo Lake, 7,400 ft., 1♀, VII-27-31 (E. O. Essig, CIS); 1♀, VII-30-49, 1♂, VII-9-51 (W. W. Middlekauff, CIS); 2♂, VIII-10-50 (S. B. Freeman, CIS). Echo Portals, 7,300 ft., 1♀, VII-16-46 (P. H. Arnaud, CAS). Fallen Leaf, 6,500 ft., 1♀, VII-16-17 (J. M. Aldrich, USNM). Fallen Leaf Lake, 5♀, VIII-1931 (O. H. Swezey, CAS); 1♂, VIII-29-50 (H. H. Keifer, CDA); 1♀, X-18-53 (L. E. Campos, UCD). FRESNO-TULARE Co.: General Grant National Park, 1♀, VI-6-23 (M. E. Phillips, CU). LASSEN Co.: Butte Lake, Lassen National Park, 1♂, IX-11-48 (C. D. MacNeill, CAS). LOS ANGELES Co.: Mt. Wilson, 1♂, VIII-4-15 (J. M. Aldrich, USNM). MARIPOSA Co.: Glacier Point, 7,000 ft., Yosemite National Park, 1♀, V-16-34, variant, (CAS). NEVADA Co.: Sagehen, near Hobart Mills, 1♀, VIII-10-51, 1♀, VII-16-54 (J. A. Powell, CIS); 2♀, VIII-23-56 (E. G. Linsley, CIS); 1♂, VII-5-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 1♀, VII-6-64, 1♂, 1♀, VII-7-64, 1♀, VII-10-64, 1♂, 4♀, VII-15-64, in malaise trap (M. E. Irwin, UCR). PLACER Co.: Sugar Bowl Lodge, 1♀, VII-1-59 (CAS). Tahoe City, 1♀, no date (H. G. Dyar, USNM). PLUMAS Co.: Gold Lake Camp, 1♀, VII-20-16 (H. G. Dyar, USNM). SAN BERNARDINO Co.: Bear Valley, 1♀, IX-1-36 (A. J. Basinger, CAS). Forest Home, 1♀, XI-10-35 (M. W. Stone, USNM). Forest Home, Falls, 6♂, 1♀, XI-4-34, type series (A. J. Basinger, ANSP, CU). Mt. Home Canyon, San Bernardino Mts., 3♂, VI-8-24 (J. M. Aldrich, USNM; F. R. Cole, CAS). SIERRA Co.: Gold Lake, 1♂, VII-10-34 (L. S. Rose, CAS). SISKIYOU Co.: Panther Meadows, Mt. Shasta, 1♂, VIII-4-63 (P. H. Arnaud, CAS). TULARE Co.: Giant Forest, Sequoia National Park, 1♀, VIII-22-17 (R. C. Shannon, CU). TUOLUMNE Co.: Pinecrest, 3♂, VII-14-15-47, 1♂, VII-7-48, 1♂, VII-23-48 (P. H. Arnaud, CAS). Strawberry, 1♀, VIII-5-50 (M. E. Gardner, UCD).

*P. fuscicauda* belongs to the *lipsia*-group, and in the male, together with that of *setiformis*, has hypopygium



Map 22. Locality records in California for *Pegomya* (*P.*) *fuscicauda* Huckett.

blackish, subshining, as distinct from the grayish abdominal terga. From *setiformis* the species differs in having a weak preapical posterodorsal bristle on hind tibia, and in the female the infuscation of fore femur is restricted to dorsal half. In both species the second antennal segment is mostly fuscous, and fore tarsal segments of the female are broadened.

*Pegomya* (*Pegomya*) *geniculata* (Bouché)

*Anthomyia geniculata* Bouché. 1834, *Naturgeschichte der Insekten*, 1:81.

Type: ♂, probably Germany.

*Geographic range.* — Alaska, Alberta, British Columbia, California, Connecticut, Manitoba, Massachusetts, Michigan, New Brunswick, North Carolina, New York, Ontario, Oregon, Quebec, South Dakota, Tennessee, Vermont, Washington, Wisconsin.

*California records.* — DEL NORTE Co.: Smith River, Rowdy Creek, 1 ♀, VII-11-30 (J. M. Aldrich, USNM). HUMBOLDT Co.: Arcata, 1 ♂, IX-15 (CAS).

The delicate yellowish species *P. geniculata* has acrosticals in two widely separated series. In the female the ovipositor is weakly chitinized and bears tufts of weak black setulae; the caudal margins of terga and the caudal half of interfrontalia usually remain pallid or yellowish.

*Pegomya* (*Pegomya*) *glabra* (Stein)

*Chortophila glabra* Stein. 1920, *Arch. f. Naturgesch.* (1918), Abt. A 84(9):88.

Holotype: ♂, Pullman, Washington (ZMUB).

*Geographic range.* — British Columbia, California, Colorado, Connecticut, Idaho, Michigan, New Mexico, New York, Utah, Washington.

*California records.* — CONTRA COSTA Co.: Antioch, 1 ♀, III-16-51 (J. C. Hall, UCD); 1 ♀, III-31-53 (R. Schuster, CIS). LOS ANGELES Co.: Big Pines, 1 ♀, V-23-45 (A. L. Melander, USNM). MARIN Co.: Redwood Canyon, 1 ♂, V-17-08 (HCH). RIVERSIDE Co.: Hemet Lake, 3 ♀, VI-19-65, foreshortened (T. W. Fisher, UCR). Herkey Camp, 2 ♀, V-14-50 (A. L. Melander, USNM). Whitewater Canyon, 1 ♀, IV-6-49 (W. W. Wirth, USNM). SACRAMENTO Co.: Andrus Island, 2 ♂, III-30-31, 2 ♂, 2 ♀, IV-1931 (CDA). Isleton, 4 ♂, IV-4-31 (CDA). SAN BERNARDINO Co.: E. Barton Flat, San Bernardino Mts., 1 ♀, VI-25-46 (A. L. Melander, USNM). South of K. S. Meadows, San Bernardino Mts., 1 ♀, VI-1-47 (A. L. Melander, USNM). Upper Santa Ana River, 1 ♀, V-20-47, variant, 1 ♀, V-7-50 (A. L. Melander, USNM). SAN DIEGO Co.: San Diego, 1 ♀, I-29-55 (J. Powell, CIS). SAN FRANCISCO Co.: San Francisco, 1 ♂, 6 ♀, III-19-64, flight trap, 1 ♂, 4 ♀, III-25-64 (P. H. Arnaud, CAS). TRINITY Co.: Coffee Creek, 1 ♀, VI-17-34 (CAS). TUOLUMNE Co.: Yosemite, 3,880-4,000 ft., 1 ♀, V-22-31 (E. O. Essig, CIS).

The male of *P. glabra*, as in *rubivora*, has prebasal sclerite of hypopygium prominent and bristled. It differs from the latter in having processes short, broad, largely bare and glossy, and with an inner marginal fringe of shorter setulae, and the tibiae are partly yellowish. In both sexes of *glabra* the legs vary in color, femora in the male being usually blackish and one or more of the tibiae fuscous; in the female mid and hind femora and tibiae are usually fulvous. The abdomen of the female may be reddish, partly or entirely, or even mostly darkened. The length of specimens varies from 4 to 7 mm. The species has been bred from *Equisetum* sp.

*Pegomya* (*Pegomya*) *hirticauda* Huckett

*Pegomya hirticauda* Huckett. 1966, *Calif. Acad. Sci. Proc.*, ser. 4, 34:262.

Holotype: ♂, Stanford University, Santa Clara County, California (CAS).

*Geographic range.* — California.

*California records.* — ALAMEDA Co.: Berkeley, 1 ♂, VII-9-40 (CIS). LOS ANGELES Co.: Glendale, 2 ♂, XII-21-50, 6 ♂, 1 ♀, XII-29-52 (E. I. Schlinger, UCD). Los Angeles, 20 ♂, 30 ♀, II-23-49, teneral (CIS, HCH). Pacific Palisades, 1 ♀, XI-17-51 (UCLA); 1 ♀, XI-29-51 (CAS). MARIN Co.: Novato, 2 ♀, I-17-20-63 (E. L. Kessel, CAS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♂, VII-15-64, in malaise trap (M. E. Irwin, UCR). ORANGE Co.: San Clemente, 1 ♂, II-4-47 (A. L. Melander, USNM). PLACER Co.: near Foresthill, 1 ♂, V-12-63 (M. E. Irwin, UCD). RIVERSIDE Co.: Deep Canyon, 1 ♀, XI-18-63,



at light (E. I. Schlinger, M. E. Irwin, UCR). Riverside, 1 ♀, II-10-35, 1 ♂, 1 ♀, III-17-35 (A. L. Melander, USNM). SAN BERNARDINO Co.: Mule Canyon, Calico Mts., 1 ♀, III-17-55 (M. Wasbauer, CIS). SAN DIEGO Co.: San Diego, 3 ♂, III-8-53 (P. H. Arnaud, CAS). SAN FRANCISCO Co.: San Francisco, 1 ♀, III-25-64 (P. H. Arnaud, CAS). SAN MATEO Co.: Redwood City, 1 ♂, XII-13-53 (P. H. Arnaud, CAS). SANTA CLARA Co.: Stanford University, 1 ♂, III-29-49, 4 ♂, XI-29-51, 4 ♂, XI-16-53, type series (P. H. Arnaud, CAS). VENTURA Co.: Mt. Pinos, 8,000 ft., 1 ♀, V-8-59 (J. Powell, CIS). YOLO Co.: Davis, 2 ♀, III-8-53, at fish meal bait (E. C. Carlson, UCD).

The drab species *P. hirticauda* has a broad profrons and broad cheeks, antennae relatively long and pendent, femora mostly or entirely blackish and tibiae yellow to yellowish brown. The male has a profuse clothing of setulae on inner half of processes, extending from base to near apex, figure 86, and the female has tarsal segments 4 and 5 dilated, figure 97.

### *Pegomya (Pegomya) hyoscyami* (Panzer)

*Musca hyoscyami* Panzer. 1809. Faunae insectorum germanicae initiae oder Deutschlands Insecten. H. 108, p. 13.

Type: ♂, Germany.

*Geographic range.* — Alberta, California, Indiana, New York.

*California records.* — ALAMEDA Co.: Berkeley, 2 ♂, 3 ♀, V-31-49 (W. W. Middlekauff, CIS). LOS ANGELES Co.: Compton, 1 ♂, VII-3-38 (CAS). Downey, 1 ♀, XI-27-33 (A. J. Basinger, CAS). MONOC Co.: Cedarville, 1 ♀, VI-1-46 (W. F. Barr, CIS). MONO Co.: White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1 ♂, VIII-20-63, in flight trap (H. B. Leech, CAS). RIVERSIDE Co.: Riverside, 8 ♂, VI-1951, 1 ♂, VI-17-51, ex *Chenopodium album* (P. H. Timberlake, HCH).

The male of *P. hyoscyami* (Panzer) differs from that of *betae* (Curtis) in the shorter distance between the eyes, the interfrontalia at narrowest being obscured by the contiguous parafrontals, or nearly so. The female has weaker, smaller ventral sclerites on the third visible segment of the ovipositor than in *betae* (Chillcott, 1959:169). I have additional records of *hyoscyami* (Panzer) bred from leaves of *Atropa* sp., *Atriplex hastata*, and *Dianthus*.

### *Pegomya (Pegomya) incompleta* (Stein)

*Eremomyia incompleta* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42:228.

Holotype: ♂, St. Anthony Park, Minnesota (FMNH).

*Geographic range.* — Alberta, California, Idaho, Minnesota, Utah, Washington.

*California records.*—EL DORADO Co.: Echo Lake, 1 ♀, VII-1-53 (W. W. Middlekauff, CIS). Upper Echo Lake, 7,400 ft., 1 ♀, VII-16-33 (E. O. Essig, CAS). MONO Co.: Sonora Pass, 9-10,000 ft., 1 ♀, VII-11-57 (W. T. Crites, UCD). TUOLUMNE Co.: Chipmunk Flat, 1 ♂, VI-13-62 (J. Powell, CIS). Near Sonora Peak, 1 ♂, VI-23-60 (D. C. Rentz, CAS).

*P. incompleta* belongs to the *major*-group, having, in common, setulae at base of posterior notopleural bristle and hairs on the declivity of mesopleura dorsad of mesothoracic spiracle. The species differs from the related *valida* in having fewer anteroventral bristles on proximal half of mid femur, and in the female by the concave or dished profile of parafacials.

### *Pegomya (Pegomya) lividiventris* Huckett

*Pegomyia lividiventris* Huckett. 1939, Amer. Ent. Soc. Trans., 65:29.

Holotype: ♂, Forest Home, San Bernardino Mountains, California (ANSP).

*Geographic range.* — British Columbia, California, Idaho, Montana, Nevada, Oregon, Utah, Washington.

*California records.* — ALAMEDA Co.: Berkeley, 1 ♂, VIII-1915 (A. L. Melander, USNM). CONTRA COSTA Co.: Mt. Diablo, spring at 2,000 ft., 2 ♂, 1 ♀, VIII-2-51, 1 ♀, VIII-23-51 (F. X. Williams, CAS). EL DORADO Co.: Pyramid Ranger Station, 1 ♀, VII-12-48 (C. Chan, UCD). LASSEN Co.: Blue Lake, 1 ♂, VII-19-20-47 (D. W. Adams, CIS). MARIN Co.: Point Reyes Station, 1 ♀, V-16-64 (C. N. Slobodchikoff, CAS). MARIPOSA Co.: Yosemite National Park, Glacier Point Road, 1 ♀, VII-6-47 (A. L. Melander, USNM). Yosemite Valley, 1 ♀, VI-10-50 (B. Keh, BVC). MONO Co.: 1 mi. W. of Tom's Place, 1 ♂, VIII-13-57 (D. D. Linsdale, CIS). MONTEREY Co.: Pfeiffer Big Sur State Park, 1 ♀, VI-16-49 (P. H. Arnaud, CAS). PLUMAS Co.: Gold Lake Camp, 1 ♀, VII-20-16 (H. G. Dyar, USNM). 4 mi. W. of Quincy, 1 ♀, VII-2-49 (H. A. Hunt, UCD). RIVERSIDE Co.: Idyllwild, San Jacinto Mts., 1 ♂, VII-8-28 (E. C. Van Dyke, CAS). San Jacinto Mts., 1 ♀, VII-21-29 (P. W. Oman, UK). Strawberry Creek at Highway 79, 5 ♂, 12 ♀, VII-29-64 (M. E. Irwin, UCR). Strawberry Creek, San Jacinto, 2 ♂, 2 ♀, VII-22-64 (P. A. Rauch, UCR). Strawberry Creek, 3,000 ft., San Jacinto Mts., 1 ♀, VI-29-65 (P. A. Rauch, UCR). SAN BERNARDINO Co.: Barton Flat, 1 ♂, VIII-21-44 (A. L. Melander, USNM). Crestline, 1 ♂, 2 ♀, VII-4-42 (A. L. Melander, USNM). Forest Home, Falls, 1 ♂, IX-21-35, type (A. J. Basinger, ANSP). Mill Creek Canyon, San Bernardino Mts., 1 ♀, IX-24-23 (E. P. Van Duzee, CAS). Mtn. Home Canyon, San Bernardino Mts., 1 ♀, VI-8-24 (J. M. Aldrich, USNM). Mountain Home, 2 ♀, IX-12-53 (J. C. Hall, UCD). Santa Ana River, South Fork, 1 ♂, VIII-9-42 (A. L. Melander, USNM). Thousand Springs, San Bernardino Mts., 1 ♂, IX-21-46 (N. Crickmer, USNM). Upper Santa Ana River, 1 ♂, VIII-17-46 (J. L. Sperry, USNM); 1 ♂, IX-20-46, 1 ♂, VII-9-51 (A. L. Melander, USNM, UCR). SAN DIEGO Co.: Cuyamaca Mts., 1 ♀, VIII-16-14 (J. C. Bradley, CU). Mt. Palomar, 1 ♂, VI-28-63 (J. D. Birchim, JDB). San Diego Co., 9 ♂, 9 ♀, VII-7-29 (R. H. Beamer, UK). SAN MATEO Co.: Colma, 1 ♂, I-14-61 (K. Lenre, CAS). SHASTA Co.: 2 mi. W. of Viola, 1 ♂, V-20-41 (C. D. Michener, CIS). TUOLUMNE Co.: Yosemite, 3,880-4,000 ft., 1 ♂, VI-8-31 (CIS); 1 ♀, VIII-8-51 (B. Adelson, CIS).

*P. lividiventris* belongs to the *lipsia*-group, and may be distinguished from its relatives by the usually reddish testaceous humeral callosities and abdomen. The female has slender fore tarsal segments.

*Pegomya (Pegomya) longimana* (Pokorny)

*Chortophila longimana* Pokorny. 1887, K.-k. Zool.-Bot. Gesell. Wien, Verhandl. 37 (Abhandl.):405.  
Type: ♂, Stilfserjoch, Southern Tyrol.

**Geographic range.** — Alberta, Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Quebec, South Dakota, Utah, Washington, Wyoming, Yukon Territory.

**California records.** — ALAMEDA Co.: Hills back of Oakland, 1 ♂, XI-8-50 (W. C. Bentinck, CIS). MARIN Co.: 7 mi. W. of Fairfax, 1 ♀, VI-23-51 (W. C. Bentinck, CIS). MONO Co.: Leavitt Meadow, 7,200 ft., 1 ♀, VIII-13-63, flight trap (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 3 ♂, 16 ♀, VIII-19-63, 10 ♂, 9 ♀, VIII-20-63, both at flight trap (H. B. Leech, CAS). NEVADA Co.: Sagehen Creek; near Hobart Mills, 1 ♂, VII-6-64, 3 ♂, VII-9-64 (1 ♂ var.), 6 ♂, 2 ♀, VII-15-64, all in malaise trap (M. E. Irwin, UCR). RIVERSIDE Co.: Santa Rosa Spring Camp, 6,400 ft., Santa Rosa Mts., 2 ♀, IX-10-64 (E. I. Schlinger, M. E. Irwin, UCR). SAN BERNARDINO Co.: Big Bear, 1 ♂, VIII-21-30 (UCLA). Sugar Loaf Mt., Cienega, 1 ♀, V-11-47 (J. L. Sperry, USNM). TUOLUMNE Co.: Sonora Pass, 1 ♂, VIII-21-59 (D. D. Linsdale, CIS). Tuolumne Meadows, 8,600 ft., 1 ♂, VIII-15-16 (G. R. Pilate, USNM).

*P. longimana* is closely related to *duplicata*, from which *longimana* may be separated by the absence or setulose nature of the preapical posterodorsal bristle on fore tibia.

*Pegomya (Pegomya) major* (Malloch)

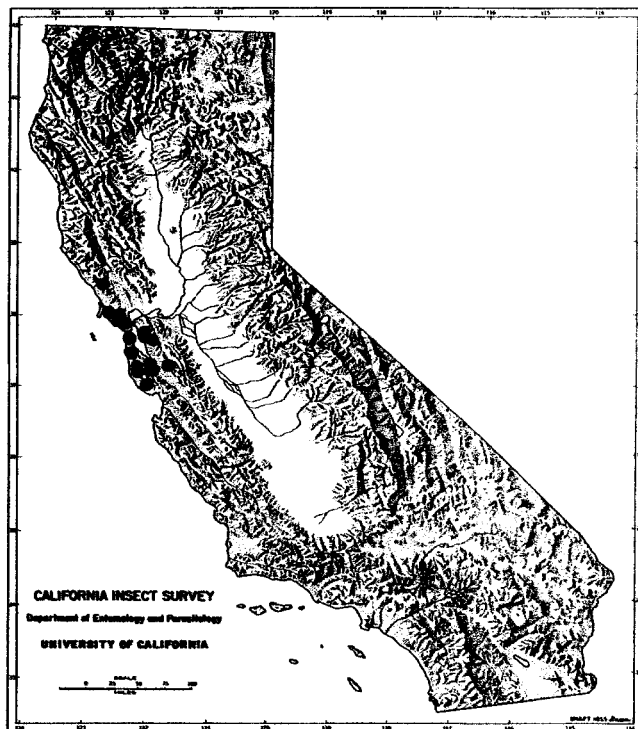
(Map 23)

*Eremomyia major* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:310.

Holotype: ♂, Sonoma County, California (CAS).

**Geographic range.** — Alberta, British Columbia, California, Idaho, Montana, Oregon, Washington.

**California records.** — ALAMEDA Co.: Berkeley, 1 ♂, IV-1935 (R. M. and G. E. Bohart, CAS); 1 ♀, III-6-54 (J. Powell, CIS). Redwood Canyon, 1 ♀, III-17-57 (P. Opler, CIS). Strawberry Canyon, Berkeley Hills, 1 ♂, III-13-60 (J. Powell, CIS). CONTRA COSTA Co.: Tilden Park, 1 ♂, III-14-49 (K. W. Tucker, CIS). Tilden Reg. Park, 1 ♂, 1 ♀, III-30-49 (C. D. MacNeill, CAS). MARIN Co.: Alpine Lake, 1 ♀, III-23-56 (A. M. Barnes, CIS); 1 ♀, III-31-56 (J. L. Herring, CIS). Inverness, 1 ♂, III-21-59 (C. W. O'Brien, CIS); 1 ♀, III-19-60 (D. C. Rentz, CAS); 1 ♀, III-25-62 (C. A. Toschi, CIS); 5 ♂, II-15-22-64 (P. H. Arnaud, CAS). Lily Lake, 1 ♀, III-16-56 (J. Powell, CIS). Mill Valley, 2 ♀, III-16-19, 1 ♂, III-18-20, 1 ♂, II-23-24, 1 ♀, II-19-26 (E. P. Van Duzee, CAS). Ross, 1 ♀, III-23-53 (H. L. Mathis, UCD). Woodacre, 1 ♀, III-31-47 (P. D. Hurd, CIS). SAN FRANCISCO Co.: San Francisco, 1 ♀, III-19-64, flight trap (P. H. Arnaud, CAS). SAN MATEO Co.: La Honda, 1 ♀, III-8-64 (P. H. Arnaud, CAS). Portola, 1 ♀, IV-13-06 (ZMUB). San Bruno Mts., 2 ♂, III-19-63 (P. H. Arnaud, CAS). San Mateo Co., 1 ♂, II-22-20 (L. A. Whitney, USNM). SANTA CLARA Co.: Alum Rock Park, 1 ♂, III-24-49 (P. D. Hurd, CIS). Palo Alto, 1 ♂, II-16-95 (ZMUB). San Jose, 1 ♂, II-4-42 (H. Madsen, CIS). SANTA CRUZ Co.: Bonny Doon, 1 ♀, IV-1-49 (P. H. Arnaud, CAS). SONOMA Co.: 1 ♂, IV-16-11, type (J. A. Kusche, CAS).



Map 23. Locality records in California for *Pegomya (P.) major* (Malloch).

*P. major* may be distinguished from its allies by the reddish or fulvous second antennal segment. I have examined the specimens from Palo Alto and Portola that were ascribed by Stein (1920:74) as belonging to *apicalis*, and find that they are conspecific with *major*.

*Pegomya (Pegomya) melanderi* Huckett

*Pegomya melanderi* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:263.

Holotype: ♂, Desert Hot Springs, Riverside County, California (USNM).

**Geographic range and California record.**—4 ♂, same locality as holotype, I-23-46, type series (A. L. Melander, USNM).

The male of *P. melanderi* may be separated from its relatives belonging to the *affinis*-group by the broad frons and frontal bristling.

*Pegomya (Pegomya) minuta* Malloch

*Pegomya minuta* Malloch. 1918, Amer. Ent. Soc. Trans., 44: 302.

Holotype: ♂, Alamogordo, New Mexico (ANSP).

**Geographic range.** — California, New Mexico, Utah.

**California records.** — INYO Co.: Shoshone, 2 ♂, 1 ♀, IV-5-36 (H. Hultgren, CAS). PLUMAS Co.: Vinton, 1 ♂, VII-18-16 (H. G. Dyar, USNM).

*P. minuta*, a pale gray species, has prealar bristle

absent, and runs in male key to the same couplet with *dissidens*, both having palpi and tarsi entirely yellow. From *dissidens* the species differs in having third antennal segment entirely black.

*Pegomya (Pegomya) nigrifemoralis* Huckett

*Pegomya nigrifemoralis* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:264.

Holotype: ♂, Hat Point, Wallowa County, Oregon (CAS).

*Geographic range*.—Alberta, California, Idaho, Oregon, Utah, Washington, Wyoming.

*California records*. — AMADOR Co.: 4 mi. N. of Silver Lake, 1 ♂, VII-25-55 (E. I. Schlinger, UCD). CONTRA COSTA Co.: Moraga Valley, 1 ♂, IV-22-40 (E. S. Ross, CIS). Orinda, 1 ♀, IV-27-55 (R. H. Goodwin, CIS). LOS ANGELES Co.: Big Pines, 1 ♀, VIII-2-44 (A. L. Melander, USNM). MODOC Co.: Cedar Pass, 1 ♀, VI-29-55 (J. W. MacSwain, CIS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1 ♀, VII-10-64, in malaise trap (M. E. Irwin, UCR). SIERRA Co.: Smith Mill, 15 mi. SE. of Sierraville, 1 ♀, VII-4-60 (F. D. Parker, UCD).

*P. nigrifemoralis* belongs to the *lipsia*-group, and has mid and hind femora entirely black in the male. The female resembles *fuscicauda* in habitus, both having fore tarsal segments slightly broadened, but it differs from the female of the latter in having fore femora infuscated on dorsal and ventral surfaces.

*Pegomya (Pegomya) orbata* Huckett

*Pegomya orbata* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:265.

Holotype: ♂, Upper Santa Ana River, San Bernardino County, California (USNM).

*Geographic range*. — California.

*California records*. — LOS ANGELES Co.: Big Pines, 1 ♀, VIII-2-44 (A. L. Melander, USNM). RIVERSIDE Co.: Santa Rosa Mt. Spring Camp, 1 ♂, IX-10-64 (M. E. Irwin, UCR). SAN BERNARDINO Co.: Bear Valley, 1 ♂, VI-6-14 (R. S. Woglum, UCR). Upper Santa Ana River, 1 ♂, V-14-47, type (A. L. Melander, USNM).

The species *P. orbata*, *duplicata* and *longimana* are closely related. In both sexes of *orbata* the mid and hind femora are infuscated on distal half, and in the female the fore tarsal segments 3 and 4 are slightly broadened.

*Pegomya (Pegomya) polygonorum* Huckett

*Pegomya polygonorum* Huckett. 1966, Calif. Acad. Sci. Proc., 34(3):265.

Holotype: ♂, Summit of Luther Pass, El Dorado County, California (UCB).

*Geographic range and California record*. — 2 ♂, same locality as holotype, IV-30 and V-28-49, type series, ex *Polygonum alpinum* All. (K. E. Frick, CIS).

The male of *P. polygonorum* has the thorax dark or

seal brown and shiny, with 3 narrow presutural vittae and 2 pale intervening lines. The bristling of processes on sternum 5 is patterned after that of *vanduzeei* and *rubrivaria*.

*Pegomya (Pegomya) quadrispinosa* Malloch

*Pegomya quadrispinosa* Malloch. 1920, Amer. Ent. Soc. Trans., 46:181.

Holotype: ♂, Gallatin County, Montana (IllNHs).

*Geographic range*. — Alberta, Arizona, California, Colorado, Montana, Oregon, Utah, Washington, Wyoming.

*California records*. — EL DORADO Co.: Fallen Leaf, 6,500 ft., 1 ♀, VII-17-17 (J. M. Aldrich, USNM). Tamarack Lake, 7,700 ft., 1 ♀, VII-12-31 (E. O. Essig, CIS). MARIPOSA Co.: Yosemite National Park, Glacier Point Road, 1 ♂, VII-1-47 (A. L. Melander, USNM). MONO Co.: Sardine Creek, 8,500 ft., 1 ♂, 1 ♀, VII-11-12-51 (A. T. McClay, UCD). SONORA Pass, 9-10,000 ft., 1 ♂, VII-10-57 (J. M. Burns, CIS). NEVADA Co.: Sagehen, near Hobart Mills, 1 ♀, VII-2-54 (J. C. Downey, UCD); 1 ♀, VII-9-54 (R. M. Bohart, UCD); 1 ♀, VII-4-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 1 ♂, VII-12-62 (R. M. Bohart, UCD); 1 ♂, VII-15-64, in malaise trap (M. E. Irwin, UCR). TUOLUMNE Co.: Blue Canyon, Sonora Pass, 1 ♀, VIII-30-60 (M. E. Irwin, UCD). Sonora Pass, 9,624 ft., 1 ♂, VIII-10-57 (D. D. Linsdale, CIS). Soda Springs, Tuolumne Meadows, 8,600 ft., 1 ♀, VIII-8-16, 2 ♀, VIII-15-16 (G. R. Pilate, USNM). Tuolumne Meadows, 2 ♀, VIII-15-16, at 8,600 ft. (G. R. Pilate, USNM); 1 ♀, VIII-1-40 (R. H. Beamer, UK).

*P. quadrispinosa* is related to *apicalis*, both having an anteroventral bristle on distal half of mid femur. Males of *quadrispinosa* differ from those of *apicalis* in having mid and hind femora fulvous, and in the females by the yellowish tinge to calyptrae and basal region of wings. In neither species are the female fore tarsal segments widened.

*Pegomya (Pegomya) rubivora* (Coquillett)

*Phorbia rubivora* Coquillett. 1897, Canad. Ent., 29:162.

Holotype: ♂, Ithaca, New York (CU).

*Geographic range*. — Alberta, British Columbia, California, Connecticut, Idaho, Manitoba, Massachusetts, Michigan, New York, Oregon, Pennsylvania, Quebec, Washington.

*California records*. — ALAMEDA Co.: Berkeley, 1 ♂, III-10-50 (C. A. Downing, UCD); 1 ♀, III-26-53 (A. E. Gray, CIS). Hills back of Oakland, 1 ♂, V-13-51 (W. C. Bentinck, CIS). Strawberry Canyon, 1 ♂, III-12-50 (L. W. Quate, CIS). Strawberry Canyon, Berkeley Hills, 1 ♂, III-13-60 (J. Powell, CIS). SANTA CLARA Co.: Stanford University, 1 ♂, III-12-61 (P. H. Arnaud, CAS).

The male of *P. rubivora* has prebasal sclerite (tergum 6) of hypopygium well bristled, and in both sexes the legs are blackish. Larvae have been bred from raspberry canes in New York State.

*Pegomya (Pegomya) rubrivaria* Hockett

*Pegomya rubrivaria* Hockett. 1967, Pan-Pacific Ent., 43:54.

Holotype: ♂, San Bruno Mountains, San Mateo County, California (UCB).

*Geographic range.* — California.

*California records.* — ALAMEDA Co.: Berkeley, 2♀, III-8-48, ex *Rumex conglomeratus*, (K. E. Frick, CIS). KERN Co.: Havi-lah, 3,000 ft., 3♀, IV-28-64 (C. A. Toschi, CIS). MARIN Co.: Taylor State Park, 1♀, III-8-49 (P. H. Arnaud, CAS). RIVERSIDE Co.: Riverside, 1♀, II-24-35 (A. L. Melander, USNM). SAN MATEO Co.: San Bruno Mts., 1♂, III-14-62, type (J. Powell, CIS). STANISLAUS Co.: Adobe Creek, 1♀, II-26-43 (R. F. Smith, CIS).

*P. rubrivaria* is closely related to *vanduzeei*, differing in both sexes by having third antennal segment partly reddish; and in the male the abdomen and mid and hind femora are fulvous.

*Pegomya (Pegomya) sagehenensis* Hockett

*Pegomya sagehenensis* Hockett. 1967, Pan-Pacific Ent., 43:54.

Holotype: ♂, Sagehen Creek, near Hobart Mills, Nevada County (UCR).

*Geographic range and California record.* — 3♂, same locality as holotype, VII-7-9-15-64, in malaise trap, type series (M. E. Irwin, UCR).

The male of *P. sagehenensis*, as represented by the type series, exhibits considerable variation in coloration of femora and tibiae. Mid and hind femora are largely yellowish brown or black, and tibiae yellowish brown, infuscated or rufous. The processes of sternum 5 are patterned after the structure and bristling of *hyoscyami*.

*Pegomya (Pegomya) setiformis* Hockett

*Pegomya setiformis* Hockett. 1939, Amer. Ent. Soc. Trans., 65: 32.

Holotype: ♂, Waterton, Alberta (CNC).

*Geographic range.* — Alberta, British Columbia, California, Idaho, Washington, Wyoming.

*California records.* — FRESNO Co.: Pioneer Basin, 10-11,000 ft., 1♂, 1♀, VIII-19-56 (E. I. Schlinger, UCD). INYO Co.: Ruby Lake, 11,500 ft., NW. Inyo Co., 1♂, 1♀, VII-13-57 (D. D. Linsdale, CIS); 1♀, VIII-13-57 (C. D. MacNeill, CAS). MONO Co.: Devil's Post Pile National Monument, 10,000 ft., 1♂, VIII-23-58 (UCR). Tioga Crest, 1♀, VII-22-56 (J. Powell, CIS). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♀, VII-7-64, in malaise trap (M. E. Irwin, UCR).

Males of *P. setiformis* and *fuscicauda* differ from those of allied species of the *lipsia*-group by having hypopygium blackish and shiny, thereby not concolorous with the gray terga of abdomen. Males of *setiformis* differ from those of *fuscicauda* in having a robust or lengthy preapical posterodorsal bristle on hind tibia, and slightly wider frons caudad. The fe-

male has fore tarsal segments broadened and differs from that of *fuscicauda* in the more extensive infuscation ventrad on proximal half of fore femur.

*Pegomya (Pegomya) setiventris flavivaria* Hockett

*Pegomya setiventris flavivaria* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:272.

Holotype: ♂, Plaskett Meadows, NW. corner of Glenn County, California (CAS).

*Geographic range and California records.* — GLENN Co.: Locality as in holotype, 1♂, VII-28-60, type (H. B. Leech, CAS). LASSEN Co.: Susan River Camp, 1♂, VII-9-10-49 (A. T. McClay, UCD). TULARE Co.: Giant Forest, 1♂, VII-23-23 (C. L. Fox, CAS).

The nominate subspecies, *P. setiventris* Hockett, occurs in central Alaska, Alberta, and southern Labrador, and the species is represented in California only by the yellowish, paler subspecies, *flavivaria*. This subspecies is notable for the lateral clumps of long bristles on sternum 3 of the male. *P. setiventris* is allied to *P. lundbeckii* Ringdahl\*.

*Pegomya (Pegomya) silvicola* Hockett

*Pegomya silvicola* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:266.

Holotype: ♂, Giant Forest, Tulare County, California (HCH).

*Geographic range and California record.* — Locality as holotype, 1♂, VII-28-29, type (R. H. Beamer, HCH).

The male of *silvicola* has the habitus of *winthemi*, from which the male differs in having scutellum entirely blackish, palpi dark brown, and lower calyptal scale not so prominently extended beyond margin of the upper scale.

*Pegomya (Pegomya) sombrina* Hockett

*Pegomya sombrina* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:267.

Holotype: ♂, Sacramento, California (UCD).

*Geographic range and California records.* — MONO Co.: Leavitt Meadow, 7,200 ft., 1♀, VIII-13-63, flight trap (H. B. Leech, CAS). SACRAMENTO Co.: Sacramento, 1♂, V-4-56, type (S. M. Fidel, UCD). VENTURA Co.: Lockwood Creek near Stauffer P. O., 1♀, V-7-59 (C. W. O'Brien, CIS).

The male of *sombrina* may be linked to the species *setibasis*\*, recorded from southern Yukon Territory, being similar in structure, bristling and marking, and from which the male of *sombrina* differs in having a wider frons caudad, interfrontalia uninterrupted, and processes flattish and bluntly rounded on apical region.

*Pegomya (Pegomya) tinctisquama* Hockett

*Pegomya tinctisquama* Hockett. 1939, Amer. Ent. Soc. Trans., 65:26.

Holotype: ♂, Keremeos, British Columbia (CNC).

*Geographic range.* — Alberta, British Columbia, California, Washington, Yukon Territory.

*California records.* — SAN BERNARDINO Co.: Oak Glen, San Bernardino Mts., 1♂, VI-19-46 (A. L. Melander, USNM). SAN FRANCISCO Co.: San Francisco beach, 1♂, VI-14-51 (E. I. Schlinger, UCD).

The female of *P. tinctisquama* is notable for its long spatulate palpi.

#### *Pegomya (Pegomya) trisetata* Malloch

*Pegomya trisetata* Malloch. 1920, Amer. Ent. Soc. Trans., 46:177.

Holotype: ♂, Cottage Beaulieu, Montreal, Quebec (MCZ).

*Geographic range.* — Alberta, British Columbia, California, Illinois, Manitoba, Massachusetts, New York, Ohio, Ontario, Pennsylvania, Quebec, Rhode Island, South Dakota, Utah, Wisconsin.

*California records.* — KERN Co.: Onyx, 1♀, VII-23-40 (D. E. Hardy, UK). LAKE Co.: Clear Lake, 1♂, VI-18-35 (A. L. Melander, USNM). RIVERSIDE Co.: Riverside, 1♀, VII-9-40 (A. L. Melander, USNM). SAN JOAQUIN Co.: Tracy, 1♀, V-20-49 (CIS).

*P. trisetata* is closely allied to *bicolor*, from which it differs in having scutellum and third antennal segment partly reddish.

#### *Pegomya (Pegomya) umbripennis* Huckett

*Pegomya umbripennis* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:268.

Holotype: ♂, Glendale, Los Angeles County, California (CIS).

*Geographic range.* — California, Washington.

*California records.* — LOS ANGELES Co.: Glendale, 1♂, XII-21-50, type (E. I. Schlinger, CIS). MONROVIA Canyon, 1♀, III-27-32 (C. H. Martin, CIS). MARIN Co.: Point Reyes, 1♂, I-26-57 (J. Powell, CIS). SAN FRANCISCO Co.: San Francisco, 1♂, III-15-08 (E. C. Van Dyke, CAS); 1♂, 1♀, III-25-64 (P. H. Arnaud, CAS). SAN MATEO Co.: Junipero Serra Park, 1♀, IV-4-64 (P. H. Arnaud, CAS). Redwood City, 1♀, III-21-48 (P. H. Arnaud, CAS). San Bruno Mts., 1♂, 1♀, I-30-65, 1♂, II-6-65 (P. H. Arnaud, CAS). SANTA CLARA Co.: Stanford University, 1♂, II-7-51 (P. H. Arnaud, CAS).

The male of *P. umbripennis* may be distinguished from similar small, gray-black forms with dark legs, blackish antennae and brown palpi, by the peculiar structure of the slender tapering processes and the purplish knobs of the halteres. The female has interfrontalia, parafacials and cheeks deep red, mid and hind femora and tibiae fulvous or yellowish brown, and knobs of halteres mainly yellowish or purplish.

#### *Pegomya (Pegomya) univittata* (von Roser)

*Anthomyia univittata* von Roser. 1840, K. Württemb. Landw. Ver., Stuttgart, Correspondenzbl. 37 (= n. ser., 17), (1):59.

Type: Sex not stated, Württemberg.

*Geographic range.* — Alaska, Alberta, British Columbia, California, Idaho, Manitoba, Massachusetts, Michigan, New Brunswick, New Hampshire, Nova Scotia, New York, Ontario, Oregon, Pennsylvania, Quebec, South Dakota, Tennessee, Vermont, Washington, Wyoming.

*California record.* — DEL NORTE Co.: Rowdy Creek, Smith River, 1♂, 1♀, VII-10-11-30 (J. M. Aldrich, USNM).

*P. univittata*, a yellowish species, is related to *geniculata*, from which it differs in having the pleural sclerites brownish tinged, and the caudal margins of abdominal terga darkened or blackish. The interfrontalia of the female is blackish caudad.

#### *Pegomya (Pegomya) valida* Huckett

*Pegomya valida* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:270.

Holotype: ♂, Parkdale, Oregon (CAS).

*Geographic range.* — California, Oregon.

*California records.* — SAN BERNARDINO Co.: Mt. Home Canyon, 1♀, VII-16-21 (F. R. Cole, CIS). SONOMA Co.: Trinita, 1♂, III-26-37 (N. W. Frazier, CIS).

*P. valida* belongs to the *major*-group, having an anteroventral bristle on distal half of mid femur. The species differs from its allies in having 3 or more anteroventral bristles on proximal half of mid femur, and in the straightened alignment of the parafacial margin when viewed in profile.

#### *Pegomya (Pegomya) vanduzeei* Malloch

*Pegomya vanduzeei* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:307.

Holotype: ♂, San Francisco, California (CAS).

*Geographic range.* — Alaska, British Columbia, California, Manitoba, Michigan, Montana, New York, Ohio.

*California records.* — ALAMEDA Co.: Berkeley, 1♂, II-21-62 (C. A. Toschi, CIS). CONTRA COSTA Co.: El Sobrante, 1♂, III-12-49 (L. W. Quate, HCH). EL DORADO Co.: Luther Pass, summit, 1♀, V-8-49, 1♀, V-16-49, ex *Polygonum alpinum* (K. E. Frick, CIS). MONO Co.: Virginia Lakes, 9,750 ft., 1♀, VIII-17-63 (H. B. Leech, CAS). SAN FRANCISCO Co.: San Francisco, 1♂, III-30-19, type (E. P. Van Duzee, CAS). SAN MATEO Co.: San Mateo, 1♀, IV-6-06 (J. M. Aldrich, USNM).

*P. vanduzeei* is related to *rubrivaria*, both having the same pattern in structure and bristling of the male processes, the palpi entirely yellow, and hind tibia with 2 anterodorsal and 2 posterodorsal bristles. It differs from *rubrivaria* in having third antennal segment black, and in the male the abdomen grayish and mid and hind femora blackish. The immature stages of *vanduzeei* have been described and figured by Frost (1924:126, 223), and larvae are recorded as mining the leaves of *Rumex obtusifolius* and *R. crispus*.

*Pegomya (Pegomya) winthemi* (Meigen)

*Anthomyia winthemi* Meigen. 1826, Syst. Besch., 5:186.

*Pegomyia fuscofasciata* Malloch. 1920, Amer. Ent. Soc. Trans., 46:178.

Type: ♀, Germany?

**Geographic range.** — Alaska, British Columbia, California, Georgia, Manitoba, Massachusetts, Maine, Michigan, North Carolina, New Hampshire, New Jersey, New York, Oklahoma, Ontario, Quebec, Tennessee, Vermont, Washington, Wisconsin.

**California records.** — CONTRA COSTA Co.: Danville, 1♀, X-15-51 (F. X. Williams, CAS). MARIN Co.: Mill Valley, 2♂, X-7-45 (E. L. Kessel, CAS). MONTEREY Co.: Carmel 1♀, VI-7-28 (L. S. Slevin, CAS). SANTA CRUZ Co.: Brookdale, 1♂, V-1-53 (A. E. Gray, UCD). SOLANO Co.: Green Valley, 1♀, IV-23-52 (R. M. Bohart, CAS). TUOLUMNE Co.: Strawberry, 1♀, VIII-20-60 (D. Q. Cavagnaro, UCD).

*P. winthemi* may be distinguished by the well-marked protrusion of the lower calyptal scale beyond margin of the upper. The female has segments 4 and 5 of mid and hind tarsi, together discoid in outline. In both these respects *winthemi* resembles the species *mallochi* Huckett\*, from which it differs in having palpi yellow, posthumeral bristle duplicated, and in the female cruciate bristles present. Larvae of *winthemi* are recorded by Séguy (1934:241) as infesting the mushrooms *Armillariella mellea*, *Boletus bulbosus*, *B. erythropus*, and *Agaricus*.

Subgenus *Nupedia* Karl

*Nudaria* Karl. 1928, In Dahl F., ed., Die Tierwelt Deutschlands. 13 Pt. 3 p. 171. Name preocc. Haworth, 1809.

*Nupedia* Karl. 1930, Zool. Anz., 86:174. New name for *Nudaria* Karl.

Type-species: *Anthomyia infirma* Meigen, teste Ackland<sup>3</sup>.

The subgenus *Nupedia* possesses all the common characteristics of *Pegomya*, differing or varying only in that setulae at apex of scutellum are finer, becoming thereby similar to hairs on ventral surface, costa sparsely haired on under surface, cruciate bristles present in both sexes, sternum 5 of males of similar structure and vestiture (figures 32, 33). All species have palpi flattish and/or more or less dilated.

KEYS TO SPECIES OF PEGOMYA (NUPEDIA)  
IN CALIFORNIA

## MALES

1. Tibiae black ..... 2  
Tibiae yellow ..... 4
2. Mesonotum gray, profrons in profile wider than half width of third antennal segment ..... *cuticornis* Huckett

<sup>3</sup> Ackland. 1965. Ent. Monthly Mag., 100:207-209; 1965, Bull. Zool. Nomencl., 22 Pt. 2, p. 110.

- Mesonotum mainly black or seal brown, profrons narrower than half width of third antennal segment ..... 3
3. Calyptal margin and hairs brownish, palpi spoon-shaped.  
*latipalpis* (Stein)  
Calyptal margin yellowish and hairs whitish, palpi narrowly dilated ..... *dissecta* of authors\*
  4. Eyes separated at narrower part of frons by distance equal to length of third antennal segment, frons bristled as in female, verticals robust ..... *abnormis* Stein  
Eyes at narrower part of frons separated by distance less than length of third antennal segment, bristling of frons dissimilar to that of female, verticals weak ..... 5
  5. Palpi black, dark brown or fuscous, usually paler proximad, antennae black ..... *acutipennis* Malloch  
Palpi yellow or fulvous ..... 6
  6. Humeral callosities and scutellum grayish black, concolorous with mesonotum, hind coxae bare on caudal surface ..... *anabnormis* Huckett  
Humeral callosities and scutellum yellowish tinged, hind coxae with a few hairs on caudal surface .....  
*rectifrons* Huckett

## FEMALES

1. Tibiae black ..... 2  
Tibiae yellow ..... 4
2. Wings with m-cu cross-vein oblique, mesonotum and abdomen pale gray ..... *cuticornis* Huckett  
Wings with m-cu cross-vein erect ..... 3
3. Palpi widely dilated, at widest broader than apical diameter of fore tibia ..... *latipalpis* (Stein)  
Palpi narrowly dilated, not wider than apical diameter of fore tibia ..... *dissecta* of authors\*
4. Palpi black, brown or rufous, partly or entirely so, antennae black ..... *acutipennis* Malloch  
Palpi yellow or fulvous ..... 5
5. Scutellum and abdomen grayish drab, and humeral callosities usually concolorous ..... *anabnormis* Huckett  
Humeral callosities, scutellum and abdomen partly yellowish tinged ..... *abnormis* Stein and *rectifrons* Huckett

*Pegomya (Nupedia) abnormis* Stein

*Pegomyia abnormis* Stein. 1920, Arch. f. Naturgesch. (1918) Abt. A 84(9):65.

Syntypes: ♂♂, ♀♀, Moscow Mountain, Moscow, Idaho (USNM, ZMUB).

**Geographic range.** — California, Idaho.

**California records.** — RIVERSIDE Co.: Top of Palm Canyon, 1♀, V-31-63 (E. I. Schlinger, UCR). Santa Rosa Spring Camp, 6,400 ft., Santa Rosa Mts., 1♀, IX-10-64 (E. I. Schlinger, UCR). SAN DIEGO Co.: Mt. Home Spring, 6,400 ft., Santa Rosa Mtn., 3♀, IX-10-64 (E. I. Schlinger, UCR). SIERRA Co.: Gold Lake, 1♂, 1♀, VII-13-34 (L. S. Ross, CAS). TUOLUMNE Co.: Lyons Dam, 1♀, VII-8-37 (T. G. H. Aitken, CAS).

The male of *P. abnormis* has frons moderately but uniformly broad, with bristling similar to that of the female. The latter is not readily distinguished from the female of *rectifrons*.

*Pegomya (Nupedia) acutipennis* Malloch

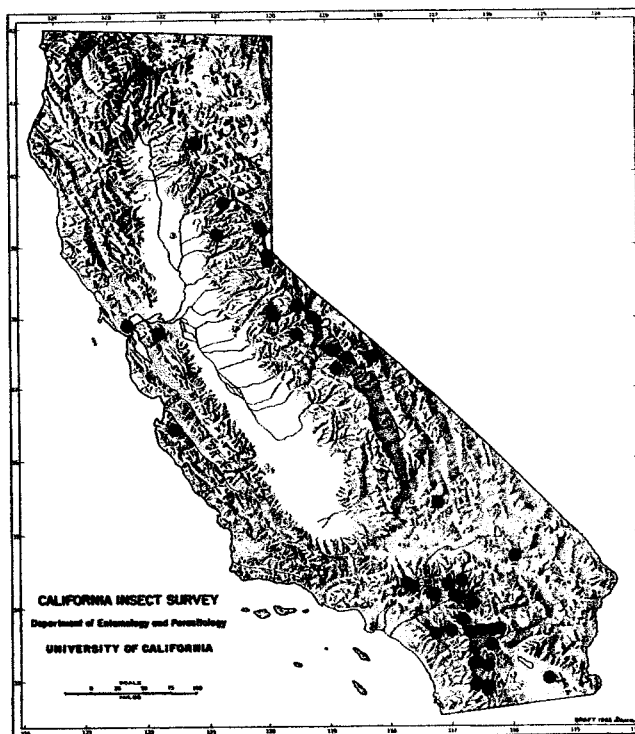
(Map 24)

*Pegomya acutipennis* Malloch. 1918, Amer. Ent. Soc. Trans., 44:301.

Holotype: ♂, Alamogordo, New Mexico (ANSP).

**Geographic range.** — Alberta, Arizona, British Columbia, California, Colorado, Illinois, New Mexico, New York, Texas, Wisconsin.

**California records.** — CONTRA COSTA CO.: Mt. Diablo, 1 ♂, VIII-17-51 (W. C. Bentinck, CIS). EL DORADO CO.: Echo, Lake Tahoe, 1 ♀, VI-2-40 (T. G. H. Aitken, CAS). Fallen Leaf Lake, 1 ♂, VI-15-16 (H. G. Dyar, USNM); 1 ♀, VIII-29-50 (H. H. Keifer, CDA). FRESNO CO.: Pioneer Basin, 10-11,000 ft., 1 ♀, VIII-19-56 (E. I. Schlinger, UCD). IMPERIAL CO.: Algodones Sand Dunes, 6 mi. W. of Glamis, 1 ♀, XI-18-63 (E. I. Schlinger, UCR). LOS ANGELES CO.: Big Pines, 1 ♀, VIII-2-44 (A. L. Melander, USNM). MARIN CO.: Paradise Cove, 1 ♂, VIII-19-46 (E. L. Kessel, CAS). MARIPOSA-TUOLUMNE CO.: Yosemite National Park, 1 ♀, VIII-1-40 (R. H. Beamer, UK). MONO CO.: Leavitt Meadow, 7,200 ft., 1 ♀, VIII-13-63, flight trap (H. B. Leech, CAS). Mammoth Lake, 1 ♀, VII-12-33 (CAS). 4 mi. SW. of Tom's Place, 1 ♀, VI-13-61 (H. V. Daly, CIS). Virginia Lakes, 9,750 ft., 2 ♀, VIII-17-63 (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 2 ♂, 29 ♀, VIII-19-20-63, flight trap (H. B. Leech, CAS). MONTEREY CO.: Hastings Reservation, near Jamesburg, 1 ♂, XII-6-59 (D. D. Linsdale, CIS). NEVADA CO.: Camp Celio, near Nevada City, 1 ♂, VI-29-56 (C. M. Gardella, CIS). Sagehen Creek, near Hobart Mills, 2 ♀, VII-15-64, in malaise trap, (M. E. Irwin, UCR). PLUMAS CO.: Gold Lake Camp, 2 ♀, VII-19-20-16 (H. G. Dyar, USNM). RIVERSIDE CO.: Deep Canyon, 1 ♀, I-9-63, 1 ♂, II-6-63, 1 ♀, III-6-63 (E. I. Schlinger, UCR); 1 ♀, X-28-63, 1 ♂, XI-11-63, 1 ♂, XI-12-63, 1 ♀, XI-18-63, 1 ♂, 6 ♀, XII-2-63, 2 ♂, 1 ♀, XII-3-63, 4 ♂, 12 ♀, XII-17-63, 2 ♀, XII-24-63, 6 ♂, 11 ♀, II-23-64, 1 ♀, III-8-64, 2 ♀, IV-28-65, 12 ♂, 34 ♀, at light (E. I. Schlinger, M. E. Irwin, UCR). Hemet Valley, 1 ♀, V-10-52 (UCLA). Marion Mt. Camp, San Jacinto Mts., 1 ♂, VII-1-52 (J. K. Hester, UCD). Millard Canyon, 1 ♂, V-10-63 (E. I. Schlinger, UCR). Palm Springs, 1 ♂, XII-26-52 (P. H. Arnaud, CAS). 2 mi. E. of N. Palm Springs, 4 ♂, 4 ♀, XII-17-63 (E. I. Schlinger, UCR). Perris, 1 ♂, IV-14-37 (A. J. Basinger, CAS). Santa Rosa Spring Camp, 6,400 ft., Santa Rosa Mts., 1 ♀, IX-10-64 (E. I. Schlinger, UCR). Strawberry Creek at Highway 79, 2 ♀, VII-29-64 (M. E. Irwin, UCR). Thousand Palms Oasis, Thousand Palms, 1 ♂, II-26-55 (W. R. M. Mason, CNC). San Jacinto Mts., 1 ♀, VII-21-29 (P. W. Oman, UK). Whitewater Canyon, 1 ♂, V-4-54 (J. C. Hall, UCD). SAN BERNARDINO CO.: Big Bear, San Bernardino Mts., 1 ♀, VIII-2-50 (UCLA). Camp Baldy Road, 6,500 ft., 1 ♀, VI-26-56 (R. C. Bechtel, UCD). Fawnskin, 4 ♀, VII-29-61 (G. C. Eickwort, MSUM). Granite Cove, Granite Mts., 15.8 mi. SW. of Kelso, 1 ♀, IV-15-62 (C. A. Toschi, CIS). 11 mi. SE. of Lucerne Valley, 5,500 ft., 1 ♀, V-13-55 (W. R. Mason, CNC). Lytle Creek, near Glenn Ranch, from mine tunnel, 3 ♂, 12 ♀, VI-12-60 (Ryckman and Winkler, CNC). Mill Creek, 5,200-5,500 ft., San Bernardino Mts., 1 ♀, VIII-28 (Rehn and Hebard, ANSP). Morongo Valley, 1 ♂, IV-19-44 (A. L. Melander, USNM). Mt. Home Canyon, San Bernardino Mts., 1 ♀, VI-8-24 (J. M. Aldrich, USNM). SAN DIEGO CO.: Borrego, 1 ♂, IV-27-55 (R. Schuster, CIS). Borrego Desert, Palm Canyon, 1 ♂, XI-10-45 (A. L. Melander, USNM). Cuyamaca Mts., 2 ♂, 17 ♀,



Map 24. Locality records in California for *Pegomya (Nupedia) acutipennis* Malloch.

VIII-16-14 (J. C. Bradley, CU). Laguna Mts., 1 ♀, VII-6-29 (P. W. Oman, UK). Mt. Laguna, 1 ♂, VI-21-63 (I. H. Pogojeff, UCD). SHASTA CO.: Hat Creek, Lassen National Park, 1 ♀, VII-5-52 (G. Pronin, CAS). SIERRA CO.: Gold Lake, 1 ♀, VII-13-34 (L. S. Ross, CAS). SISKIYOU CO.: Mt. Shasta City, 6 ♀, VIII-26-58 (J. Powell, CIS). TUOLUMNE CO.: Bumble Bee, 1 ♀, VI-25-51 (A. T. McClay, UCD). Pinecrest, 1 ♀, VII-14-48 (P. H. Arnaud, CAS). Strawberry, 1 ♀, VI-19-51 (UCD).

The darkened palpi and blackish antennae should serve to distinguish the species from its relatives with yellowish tibiae.

*Pegomya (Nupedia) anabnormis* Huckett

*Pegomya anabnormis* Huckett. 1939, Amer. Ent. Soc. Trans., 65:20.

Holotype: ♂, Keremeos, British Columbia (CNC).

**Geographic range.** — British Columbia, California, New Mexico, South Dakota.

**California records.** — CONTRA COSTA CO.: Mt. Diablo, 2 ♀, VII-17-51 (W. C. Bentinck, CIS). INYO CO.: Cedar Flat, Westgard Pass, 7,310 ft., 1 ♀, VIII-21-63, variant, "nuisance fly, stays around one's face" (H. B. Leech, CAS). LOS ANGELES CO.: 1 mi. W. of Little Rock, 1 ♂, V-13-56 (E. G. Linsley, J. W. MacSwain, CIS). MONTEREY CO.: Hastings Reservation, near Jamesburg, 1 ♂, XI-22-56 (D. D. Linsdale, CIS). MONO CO.: Virginia Lakes, 9,750 ft., 1 ♂, VIII-17-63 (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1 ♂, 1 ♀, VIII-19-20-63, flight trap (H. B. Leech, CAS). RIVERSIDE CO.:

Cavillan Hills, 6 mi. W. of Perris, 1♂, III-24-61 (R. L. Langston, CIS). SAN BERNARDINO Co.: Baldy Grade Falls, San Gabriel Mts., 1♀, X-25-35 (A. J. Basinger, CAS). Fawnskin, 1♀, VII-31-61 (G. C. Eickwort, MSUM). Forest Home, Falls, 1♀, IX-4-34 (A. J. Basinger, CNC). 12 mi. SE. of Ivanpah, 1♂, 1♀, V-1-56 (P. D. Hurd, J. Powell, CIS). Morongo Valley, 3,000 ft., 1♂, IV-19-55 (W. R. M. Mason, CNC). Mountain House, 1♀, IX-12-53 (E. I. Schlinger, UCD). 8 mi. W. of Victorville, 1♂, IV-11-58, ex *Yucca brevifolia* (J. Powell, CIS). SAN DIEGO Co.: Laguna Mts., 2♂, VII-6-29 (L. D. Anderson, UK). TUOLUMNE Co.: Strawberry, 1♀, VI-20-51, 1♀, VI-23-51 (A. T. McClay, UCD).

*P. anabnormis* and *rectifrons* have tibiae and palpi yellow, and in contrast to *abnormis* the frons in male constricted caudad. From *rectifrons* the species *anabnormis* differs in having scutellum gray and humeral callosities usually so.

#### *Pegomya (Nupedia) cuticornis* Hockett

*Pegomya cuticornis* Hockett. 1939, Amer. Ent. Soc. Trans., 65:18.

Holotype: ♂, Hedley, British Columbia (CNC).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Yukon Territory.

**California records.** — INYO Co.: Mono Pass, 1♀, VIII-13-57 (D. D. Linsdale, CIS). Ruby Lake, 1♀, VIII-13-57 (D. D. Linsdale, CIS). MONO Co.: Glacier Creek, 11,000 ft., 1♀, IX-7-59 (D. W. Price, UCD). TULARE Co.: 2 mi. SSW. of Little 5 Lakes, Sequoia National Park, 1♂, VII-14-64 (A. A. Lee, CAS).

*P. cuticornis* has legs black, as in *latipalpis*, from which it may be distinguished by the paler gray thorax and abdomen, and broader parafacials and cheeks. Cross-vein m-cu is usually more oblique than in *latipalpis*.

#### *Pegomya (Nupedia) latipalpis* (Stein)

*Chortophila latipalpis* Stein. 1920, Arch. f. Naturgesch. (1918), Abt. A 84(9):89.

Holotype: ♂, Longmire's Springs, Mt. Rainier, Washington (ZMUB).

**Geographic range.** — Alberta, British Columbia, California, Michigan, Washington.

**California records.** — EL DORADO Co.: Echo Portals, 7,300 ft., 1♂, VII-11-46 (P. H. Arnaud, CAS). MARIN Co.: Mill Valley, 1♂, VI-22-53 (H. L. Mathis, UCD). MONO Co.: Virginia Lakes, 9,750 ft., 1♂, VIII-17-63 (H. B. Leech, CAS). MONTEREY Co.: Pfeiffer Big Sur State Park, 1♂, VI-17-49 (P. H. Arnaud, HCH). NEVADA Co.: Sagehen Creek, near Hobart Mills, 1♂, VII-10-64, in malaise trap (M. E. Irwin, UCR). TULARE Co.: Alta Meadows, 9,000 ft., 2♂, VIII-24-17 (USNM).

The male of *P. latipalpis* has the calyptal margins and hairs brownish, and the palpi unusually broad for this sex in *Nupedia*.

#### *Pegomya (Nupedia) rectifrons* Hockett

*Pegomya rectifrons* Hockett. 1939, Amer. Ent. Soc. Trans., 65:19.

Holotype: ♂, Moscow Mountain, Moscow, Idaho (ANSP).

**Geographic range.** — California, Idaho.

**California records.** — LOS ANGELES Co.: San Antonio Canyon, Ontario, 1♀, VII-25-07 (J. S. Hine, CAS). Santa Monica Mts., 1♂, VII-3-50 (UCLA). MARIPOSA Co.: North Fork, 1♂, VI-3-33 (R. P. Allen, CIS). Yosemite Valley, 1♀, VI-18-21 (E. C. Van Dyke, CAS). MONO Co.: White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1♂, 4♀, VIII-19-20-63, flight trap (H. B. Leech, CAS). RIVERSIDE Co.: Idyllwild, San Jacinto Mts., 1♂, VI-7-39 (B. Brookman, CAS). SAN BERNARDINO Co.: Barton Flat, South Fork Camp, 1♀, V-24-44 (A. L. Melander, USNM). Sugar Loaf, San Bernardino Mts., 1♀, VII-4-46 (A. L. Melander, USNM). SAN DIEGO Co.: Laguna Mts., 2♂, VII-6-29 (L. D. Anderson, P. W. Oman, UK).

*P. rectifrons* is related to *abnormis*, differing markedly in the male by the much narrower frons caudad and the contiguous parafrontals.

#### Subgenus *Pseudonupedia* Ringdahl

*Pseudonupedia* Ringdahl. 1959, In Entomologiska Foreningen i Stockholm, Svensk Insektfauna. XI. Muscidae. H. 3, p. 292.

Type-species: *Anthomyia intersecta* Meigen.

The subgenus *Pseudonupedia* may be distinguished from *Nupedia* and *Pegomya sens. str.* by the characteristic form of terminal segments of the male abdomen, as exemplified in *intersecta* (Meigen). The fifth tergum is markedly reduced in dimensions, anal segment (tergum 9) sharply conical and projecting caudad, and has lengthy apical bristles as viewed *in situ*. The basal plates of hypopygium are polished, and processes of sternum 5 are horny, and developed as bare pliant appendages, figure 27. The larvae have been reared from *Boletus* sp. (Ringdahl, loc. cit., p. 294).

#### *Pegomya (Pseudonupedia) intersecta* (Meigen)

*Anthomyia intersecta* Meigen. 1826, Syst. Besch., 5:175.

Type: ♂, locality not stated (MNHP), *teste* Stein, 1900.

**Geographic range.** — Alberta, British Columbia, California, Colorado, Maine, Michigan, Montana, Nebraska, Oregon, Utah.

**California records.** — ALAMEDA Co.: Berkeley, 1♂, 1♀, IX-19-36 (HCH). Strawberry Cyn., Berkeley Hills, 1♀, I-10-62 (J. Powell, CIS). ALPINE Co.: Markleeville, 2♂, VIII-26-63 (N. Twomey, HCH). CONTRA COSTA Co.: Tilden Park, 1♀, II-10-64 (J. M. Ross, BVC). LOS ANGELES Co.: Monrovia Canyon, 1♂, II-17-35 (M. W. Stone). MODOC Co.: Cedar Pass, 1♂, VI-29-55 (D. L. Dahlsten, UCD). 6 mi. NW. of Cedarville, 1♂, VII-4-62 (J. S. Buckett, UCD). MONO Co.: Virginia Lakes, 9,750 ft., 1♂, 3♀, VIII-17-63 (H. B. Leech, CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 2♀, VIII-20-63, flight trap (H. B. Leech, CAS). SAN BERNARDINO Co.: Mule Canyon, Calico Mts., 1♂, III-17-55, variant (M. Wasbauer, CIS). SANTA



CLARA Co.: Palo Alto, 1 ♀, VIII-3-95 (HCH). SHASTA Co.: 3 mi. SE. of Mt. Lassen, 1 ♂, VII-8-55 (R. D. Browning, UCD). YOLO Co.: Esparto, 1 ♀, VII-24-17 (K. W. Tucker, CIS).

I have treated the foregoing specimens as being conspecific despite considerable variation in color of mesonotum, scutellum and calyptrae of male. In this sex the mesonotum and scutellum may be gray with 1 or 3 mesonotal stripes, partly browned, or entirely deep seal brown with little trace of mesonotal striping, the latter condition being the case with males from Markleeville, Cedarville and Mt. Lassen. These specimens also have calyptrae fuscous, which may or may not be the case with specimens having grayish mesonotum and scutellum. I find little variation in the female.

Genus *Hydrophoria* Robineau-Desvoidy

*Hydrophoria* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:503.

Type-species: *Anthomyia conica* Wiedemann; designation Rondani, 1866.

The genus *Hydrophoria* represents a composite grouping of several lesser segregates, and as a whole is not readily defined for diagnostic purposes. The lower calyptral scale is usually extended to a greater or less degree beyond margin of upper, the dorsal bristle of the mesopleural series is relatively strong, figure 15, and in the male, at least, there are usually 3 or 4 vittae on the mesonotum. Two separate genera have been recognized by European authors that would be included in *Hydrophoria* as here treated, namely *Acroptena* Pokorny, characterised as possessing 3 mesonotal vittae, and *Hydrophoria sens. str.* with 4 interserial stripes and having a pectinate arista. To the former segregate would be assigned most of the species known in California, and to the latter *galeata* and *subpellucida* of Malloch. Adults are found to frequent the vicinity of lakes, ponds, streams and moist terrain. Larvae so far as is known are aquatic or semiaquatic.

KEYS TO SPECIES OF HYDROPHORIA IN CALIFORNIA

MALES

1. Mid tibia with medial anteroventral bristle.....5  
Mid tibia without anteroventral bristle.....2
2. Prealar bristle as long as posterior notopleural bristle...  
*conica* (Wiedemann)\*  
Prealar bristle shorter than posterior notopleural bristle...3
3. Hairs present near base of posterior notopleural bristle  
and usually on upper border of hypopleura.....  
*divisa* (Meigen)  
Hairs absent near base of posterior notopleural bristle  
and usually absent on upper border of hypopleura....4
4. Profrons as broad as width of third antennal segment,

- hind tibia with a posterior bristle on proximal half...  
*galeata* Malloch
- Profrons narrower than width of third antennal segment,  
hind tibia without posterior bristle on proximal half...  
*subpellucida* Malloch
5. Hypopleura usually with one or more hairs on upper  
border .....6  
Hypopleura usually without hairs on upper border....11
6. Narrower part of frons at least as wide as distance be-  
tween posterior ocelli inclusive, interfrontalia thereat  
nearly so, parafrontals with extensive series of long  
slender bristles and setulae, continued caudad to level  
with apex of ocellar triangle .....*nigerrima* Malloch  
Narrower part of frons less in width than distance be-  
tween posterior ocelli inclusive, interfrontalia thereat  
obscured or linear, parafrontal series of bristles dis-  
continued caudad, or if continued to level with apex  
of ocellar triangle the caudal bristles are much weaker  
and shorter than those cephalad .....7
7. Arisal hairs slightly shorter than half width of third  
antennal segment, processes short and bluntly rounded  
at apex .....*frontata* (Zetterstedt)  
Longer arisal hairs longer than half width of third  
antennal segment, processes tapering distad.....8
8. Basal sclerite of hypopygium bare, without bristles....  
*polita* Malloch  
Basal sclerite of hypopygium with bristles.....9
9. Anal sclerite (tergum 9) of hypopygium clothed with  
diverse short bristles and setae which tend to become  
longer dorsad (cephalad), gonostyli slender and geni-  
culate when viewed laterad, fig. 63.....  
*brunneifrons* (Zetterstedt)  
Anal sclerite clothed exclusively with short setae which  
tend to become coarser and denser mesocaudad (ven-  
trad), gonostyli not geniculate, fig. 64.....10
10. Cerci with tuft of short fine hairs, processes with tuft of  
fine hairs at base of inner border.....*pilipyga* Huckett  
Cerci without tuft of hairs, processes with fringe of  
slender setulae on proximal half of inner border.....  
*rotundata* Huckett
11. Tergum 4 tufted below.....12  
Tergum 4 not tufted below.....14
12. Segment 5 of fore tarsus armed with stoutish bristle and  
segment 4 longer than segment 3, mid femur with  
posteroventral bristles scarcely longer than apical  
setulae, hind femur exclusive of basal bristle without  
posteroventral bristles, fig. 96.....*wierzejskii* (Mik)  
Segment 5 of fore tarsus not armed with stoutish bristle  
and segments 2, 3 and 4 successively shorter, postero-  
ventral bristles on mid femur lengthy and on hind  
femur present .....13
13. Tergum 4 sharply narrowed laterad (ventrad) by infold-  
ing of integument so that lateral margin appears less  
than half as long as that of tergum 3..*implicata* Huckett  
Tergum 4 not sharply narrowed laterad by infolding of  
integument, lateral margin of tergum 4 appears longer  
than half length of that of tergum 3...*borealis* Malloch
14. Anal sclerite of hypopygium strongly appressed as viewed  
from above, the bristling becoming longer and denser  
ventrad (caudad), middle bristles of marginal series  
on tergum 5 set much further from caudal margin  
than those of tergum 4, caudal border of tergum 5  
being extensively membranous, processes largely bare

- distad ..... *seticauda* Malloch  
 Anal sclerite not thus appressed and with bristles becoming longer dorsad (cephalad), marginal bristles on terga 4 and 5 nearly equidistant from caudal margin respectively, processes setulose at apex.....15
15. Mesonotum with 1 or more pairs of weak bristlelike presutural acrosticals, setulae along cephalic border of mesonotum coarse and spinulose, dorsocentral marks on abdomen broad and becoming conspicuously narrower caudad ..... *ambigua* (Fallén)\*  
 Presutural acrosticals uniformly setulose, setulae along cephalic border of mesonotum fine, dorsocentral marks on abdominal segments 3, 4 and 5 of nearly equal proportions ..... *flavohalterata* Malloch

## FEMALES

1. Mid tibia with medial anteroventral bristle.....5  
 Mid tibia without anteroventral bristle.....2
2. Prealar bristle as long as posterior notopleural bristle....  
*conica* (Wiedemann)\*  
 Prealar bristle shorter than posterior notopleural bristle...3
3. Hairs present at base of posterior notopleural bristle and on upper border of hypopleura cephalad of spiracle..  
*divisa* (Meigen)  
 Hairs absent at base of posterior notopleural bristle and on upper border of hypopleura.....4
4. Profrons as broad as width of third antennal segment, haustellum polished, marginal bristles of tergum 5 finely developed, not stronger than discal bristles.....  
*galeata* Malloch  
 Profrons narrower than width of third antennal segment, haustellum dull, marginal bristles of tergum 5 slightly stronger than those of discal region.....  
*subpellucida* Malloch
5. Hypopleura usually with hairs on upper border and parafrontals broadened caudad and profusely setulose.....6  
 Hypopleura usually without hairs on upper border, if with hairs parafrontals narrow and sparsely setulose..10
6. Terminal sclerites of ovipositor with few fine recurrent spinules on dorsum, mid and/or hind tibiae yellowish ..... *brunneifrons* (Zetterstedt)  
 Terminal sclerites of ovipositor without fine recurrent spinules on dorsum, mid and hind tibiae blackish.....7
7. Arisal hairs slightly shorter than half width of third antennal segment ..... *frontata* (Zetterstedt)  
 Longer arisal hairs slightly longer than half width of third antennal segment .....8
8. Scutellum pale gray laterad, basal bristles set in brown spots ..... *polita* Malloch  
 Scutellum dark gray or fuscous laterad.....9
9. Calyptal margins pale brown, knobs of halteres black. .  
*nigerrima* Malloch  
 Calyptal margins pale yellow, knobs of halteres purple. .  
*rotundata* Hockett
10. Presutural acrosticals with one or more pairs of weak bristlelike setae that are stronger than adjacent setulae.11  
 Presutural acrosticals uniformly setulose.....13
11. Scutellum entirely black and shiny, mesonotum largely so, costal thorn as long as humeral cross-vein.....  
*seticauda* Malloch  
 Scutellum at least grayish laterad and dull, costal thorn shorter than humeral cross-vein.....12
12. Posterior notopleural bristle with 1 or more weak setulae at base ..... *wierzejskii* (Mik)

Posterior notopleural bristle without setulae at base.....

*implicata* Hockett

13. Ovipositor with dorsal sclerites entirely polished, anteroventral bristles of hind femur continued on proximal region as stoutish bristles, stronger than posteroventral bristles opposite ..... *flavohalterata* Malloch

Ovipositor with caudal part of dorsal sclerites largely dull, anteroventral bristles on proximal region of hind femur usually weaker and finer than those distad....

*borealis* Malloch

*Hydrophoria borealis* Malloch

*Hydrophoria borealis* Malloch. 1920, Amer. Ent. Soc. Trans., 46:172.

Holotype: ♂, Katmai, Alaska (OSUM).

*Geographic range.* — Alaska, Alberta, British Columbia, California, Idaho, Minnesota, New Hampshire, Ontario, Washington, Wisconsin, Yukon Territory.

*California records.*—PLUMAS Co.: Buck's Lake, 1 ♂, VI-23-49 (P. D. Hurd, CIS). TULARE Co.: Giant Forest, Sequoia National Park, 1 ♀, VII-28-29 (R. H. Beamer, UK). TUOLUMNE Co.: White Mt., 11,000 ft., 1 ♀, VII-24-36 (CIS).

The male of *borealis* has a tuft of bristles on tergum 4, and may be separated from the male of *implicata* in that tergum 4 does not become conspicuously narrower toward the lateral margin (ventrad). The female resembles that of *flavohalterata*, from which it may be distinguished by weaker anteroventral bristles on proximal half of hind femur, and by dullish sclerites of ovipositor.

*Hydrophoria brunneifrons* (Zetterstedt)

*Anthomyza brunneifrons* Zetterstedt. 1938, Insecta Lapponica, p. 690.

*Hydrophoria occidentalis* Malloch. 1920, Amer. Ent. Soc. Trans., ser. 4, 46:170.

*Alliopsis californiensis* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:356 (new synonymy).

Type: ♀, Torne Lappmark (ZIL).

*Geographic range.* — Alaska, Alberta, California, Colorado, Idaho, Manitoba, Nevada, Northwest Territories, Ontario, Oregon, Utah, Washington, Yukon Territory, Greenland.

*California records.* — ALAMEDA Co.: Berkeley, 1 ♀, V-6-57 (D. D. Linsdale, BVC). ALPINE Co.: Hope Valley, 1 ♀, VII-9-48 (O. E. Myers, CIS). HUMBOLDT Co.: Trinidad, 1 ♂, VI-7-25 (J. O. Martin, CAS). INYO Co.: Argus Mts., 1 ♂, 1 ♀, V-22-37 (CAS). Lone Pine, 1 ♂, 1 ♀, V-16-37 (L. R. Gillogly, J. H. Mitchell, AMNH). LAKE Co.: Highlands, Clear Lake, 1 ♀, V-29-52 (P. H. Arnaud, CAS). Lower Lake, Clear Lake, 1 ♂, V-11-25 (E. P. Van Duzee, CAS). MODOC Co.: Lily Lake, 4 ♂, IX-24-63 (A. M. Barnes, BVC). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 1 ♀, VI-20-53 (J. W. MacSwain, CIS); 1 ♀, VI-24-53 (W. D. McLellan, UCD). NAPA Co.: Monticello Dam, 1 ♀, XI-2-63 (J. S. Buckett, UCD). SHASTA Co.: Viola, 3 ♀, V-19-41 (C. D. Michener, CIS). SOLANO Co.: Sears Point Road, 1 ♂, V-15-54 (E. I. Schlinger, UCD). YOLO Co.: Davis, 4 ♂, 2 ♀, IV-8-51, 1 ♂, 1 ♀, IV-10-51 (E. I. Schlinger, UCD);

1♂, 1♀, IV-15-52 (J. K. Hester, UCD); 1♀, III-8-53, 1♀, III-22-53, both at bait (UCD); 1♀, V-2-53 (UCD); 1♀, IV-24-56 (R. M. Bohart, UCD).

The male of *H. brunneifrons* differs from those of allied species in the bristling of the anal segment, the bristles becoming more diverse and longer dorsad (cephalad), figure 63. The female differs in having weak recurrent spinules on terminal sclerites of ovipositor. In both sexes one or more pairs of tibiae are usually reddish or yellowish.

*Hydrophoria divisa* (Meigen)

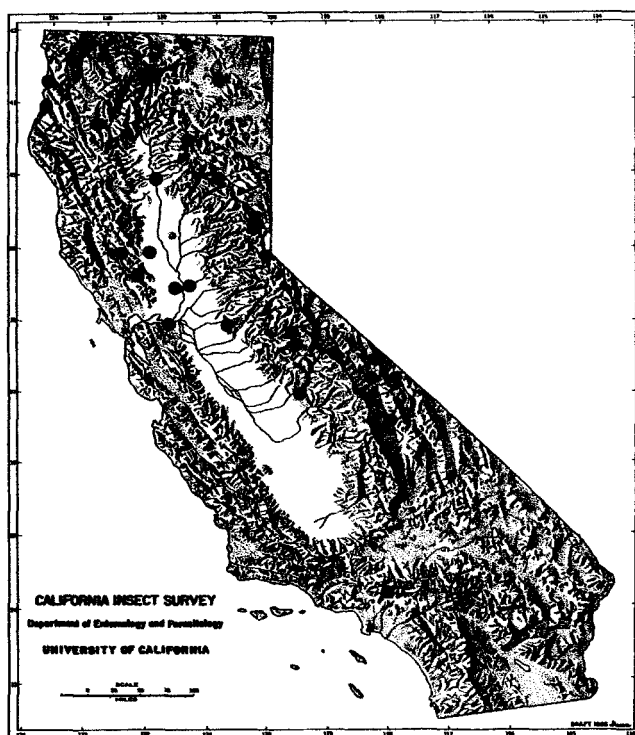
(Map 25)

*Anthomyia divisa* Meigen. 1826, Syst. Besch., 5:99.

Type: ♂, Germany?

**Geographic range.** — Widely distributed throughout North America, from central Alaska and Yukon Territory eastward through the Northwest Territories and Canadian provinces to Labrador and southern Greenland, southward to North Carolina, Missouri, Kansas, Utah and the states bordering the Pacific coast.

**California records.** — CALAVERAS Co.: Milton, 1♀, X-21-17 (J. C. Bradley, CAS). COLUSA Co.: Arbuckle, 1♀, V-8-62 (P. M. Marsh, UCD). CONTRA COSTA Co.: Antioch, 1♂, V-21-49 (L. W. Quate, CIS). EL DORADO Co.: Glenn Alpine, Lake Tahoe, 4♂, 7♀, IX-1-30 (H. H. Keifer, CDA). Lake Tahoe, 1♀, VIII-11-40 (E. E. Kenaga, UK). FRESNO Co.: Lost Lake, 1 mi. W. of Friant, 1♀, VII-1-56 (R. O. Schuster, CIS). HUMBOLDT Co.: Orick, 1♂, VI-22-39 (C. F. Knowlton, USU). Samoa Beach and dunes, 1♀, VI-18-07 (J. C. Bradley, CU). INYO Co.: Antelope Spring, 8 mi. SW. of Deep Spring, 1♀, VII-1-61 (C. I. Stage, CIS). Bishop, 1♀, V-21-51 (E. I. Schlinger, UCD). Deep Springs, 1♀, VII-14-53 (H. Nakakihara, UCD). Lone Pine, 1♀, V-18-37 (E. C. Van Dyke, CAS); 1♀, V-16-37 (L. R. Gillogly, AMNH); 1♂, V-19-37 (J. H. Mitchell, AMNH). LAKE Co.: Cache Creek, Lower Lake, 1♀, V-10-26 (E. P. Van Duzee, CAS). LASSEN Co.: Blue Lake, 1♂, VII-19-20-47 (T. F. Leigh, CIS). LOS ANGELES Co.: Big Dalton Canyon, 1♀, VII-19-52 (A. T. McClay, UCD). MARIPOSA Co.: Yosemite Valley, 1♂, V-23-21 (E. C. Van Dyke, CAS). MODOC Co.: Canby, 1♀, X-12-52 (E. I. Schlinger, UCD). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 1♂, VI-20-53 (J. W. MacSwain, CIS). Crooked Creek, 10,150 ft., White Mts., 3 airline mi. N. of Inyo Co. line, 1♀, VII-19-61 (H. V. Daly, CIS). Mammoth Lake, 1♀, VII-15-33 (CAS). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1♂, 1♀, VIII-19-20-63, flight trap (J. B. Leech, CAS). NAPA Co.: Putah Canyon, 1♀, VI-14-51 (W. C. Bentinck, CIS). NEVADA Co.: Truckee, 1♂, VII-6-27 (E. P. Van Duzee, CAS); 1♂, VI-25-43 (P. H. Arnaud, CAS). PLUMAS Co.: 4 mi. W. of Quincy, 1♂, VI-25-49 (H. A. Hunt, UCD). SACRAMENTO Co.: Sacramento, 1♀, IV-22-27 (C. C. Wilson, USNM); 7♀, VI-4-52, 12♂, 1♀, VI-10-52, 1♂, VI-18-52 (P. H. Arnaud, CAS). SHASTA Co.: Manzanita Lake, Lassen National Park, 1♂, VI-12-41 (C. D. Michener, CIS). SIERRA Co.: Webber Lake, 1♀, VII-3-64 (C. N. Slobodchikoff, CAS). SISKIYOU Co.: Big Springs Wild Life Refuge, 3,650 ft., 1♂, VIII-6-65 (T. W. Fisher, R. Orth, UCR). Tule Lake Refuge, 4,150 ft., 1♀, VII-1-37 (Bolinger and Jewett, USU). 4 mi. S. of Weed, 10♀, VIII-8-58 (J. Powell, CIS). TEHAMA



Map 25. Locality records in California for *Hydrophoria divisa* (Meigen).

Co.: Red Bluff, 1♂, V-22-52 (E. I. Schlinger, CIS). TRINITY Co.: Junction City, 2♂, IX-14-39 (G. F. Knowlton, USU). TUOLUMNE Co.: Kennedy Meadow, 1♀, VII-9-51 (A. T. McClay, UCD). Yosemite, 3,880-4,000 ft., 1♀, V-27-31, 1♀, V-20-31 (CIS). YOLO Co.: Davis, 1♀, IV-25-50, 1♀, V-4-51, 1♀, V-8-51, 1♂, V-13-52 (A. T. McClay, UCD); 1♂, V-19-50 (J. C. Hall, UCD); 1♂, V-5-51, 1♂, VI-27-51 (E. I. Schlinger, UCD); 1♂, III-14-53, at bait (UCD).

*H. divisa* has hairs on upper border of hypopleura, and may readily be distinguished from others having this character by the absence of a mid anteroventral bristle on mid tibia. The parafrontals of the female remain narrow caudad and have few setulae.

*Hydrophoria flavohalterata* Malloch

*Hydrophoria flavohalterata* Malloch. 1920, Amer. Ent. Soc. Trans., 46:171.

Holotype: ♂, Moscow, Idaho (USNM).

**Geographic range.** — California, Idaho, Utah, Washington.

**California record.** — MARIPOSA Co.: Yosemite Valley, 1♀, VIII-27-49 (P. H. Arnaud, CAS).

Males of *H. flavohalterata* and *seticauda* lack the tuft of bristles on tergum 4. From the latter *flavohalterata* differs in the conformation and bristling of caudal segments of abdomen as indicated in the key. The female of *flavohalterata*, as in the male, has the presutural acrosticals entirely setulose, and differs from

closely allied forms in the stronger anteroventral bristles on the proximal half of hind femur, and the shiny polished sclerites of ovipositor.

#### *Hydrophoria frontata* (Zetterstedt)

*Anthomyza frontata* Zetterstedt. 1838, Insecta Lapponica, p. 669.

Type: ♀, Swedish Lapland (ZIL).

**Geographic range.** — California, Colorado, Labrador, Manitoba, Northwest Territories, Quebec, Yukon Territory, Greenland.

**California record.** — LASSEN CO.: Black's Mtn., 1 ♂, VI-13-41 (P. D. Hurd, CIS).

The species is typical of a group within the genus that has a clothing of short setae on anal (tergum 9) segment of the male, the setae becoming denser and coarser toward the base of anal cleft, figure 64. This character is possessed by *nigerrima*, *polita*, *pilipyga*, and *rotundata*. From such related species *frontata* may be distinguished by the shorter hairs on arista, and in the male by the bluntly rounded apical margin of processes on sternum 5.

#### *Hydrophoria galeata* Malloch

*Hydrophoria galeata* Malloch. 1920, Ohio Jour. Sci., 20:270.

Holotype: ♂, Savonoski, Naknek Lake, Alaska (OSUM).

**Geographic range.** — Alaska, Alberta, British Columbia, California, Colorado, Idaho, Northwest Territories, South Dakota, Utah, Yukon Territory.

**California record.** — RIVERSIDE CO.: Whitewater Canyon, 1 ♂, IV-6-49 (CIS).

*H. galeata* is allied to *subpellucida*, but differs from the latter in having a broader profrons, a polished haustellum, and in the male by having a posterior bristle on proximal half of hind tibia.

#### *Hydrophoria implicata* Hockett

*Hydrophoria implicata* Hockett, 1944, Ent. Soc. Amer. Ann., 37:287. New name for *Hydrophoria ambigua* Stein (1898: 208), not Fallén.

**Geographic range.** — Alberta, British Columbia, California, Connecticut, District of Columbia, Idaho, Illinois, Manitoba, Massachusetts, Maine, Michigan, Minnesota, Montana, New Brunswick, New Hampshire, New Jersey, Nova Scotia, Northwest Territories, New York, Ontario, Pennsylvania, Quebec, Saskatchewan, Washington, Wisconsin.

**California records.** — EL DORADO CO.: Luther Pass, 5 ♂, 6 ♀, VII-6-59 (P. H. Arnaud, CAS). Grass Lake, Luther Pass, 6 ♂, 1 ♀, VII-24-55 (J. C. Downey, E. I. Schlinger, UCD). SHASTA CO.: Cassel, 1 ♂, VII-5-55 (J. R. Jessen, UCD).

The male of *H. implicata* may readily be recognized by the sharply narrowing tergum 4 ventrad, and by the tuft of bristles thereon.

#### *Hydrophoria nigerrima* Malloch

*Hydrophoria nigerrima* Malloch. 1920, Amer. Ent. Soc. Trans., 46:169.

Holotype: ♂, Mt. Rainier, Washington (USNM).

**Geographic range.** — California, Montana, Washington.

**California records.** — FRESNO CO.: Mount Rixford, 12,000 ft., 1 ♂, 1 ♀, VIII-12-14 (R. L. B., ILLNHS). INYO CO.: Near Mono Pass, 12,000 ft., NW. Inyo Co., 2 ♂, VIII-8-61 (C. D. MacNeill, D. C. Rentz, M. R. Lundgren, CAS); 1 ♂, VIII-9-61 (C. D. MacNeill, CAS). MARIPOSA CO.: Snow Creek Trail, Yosemite National Park, 1 ♀, VII-22-36 (W. B. Herms, CIS). SHASTA CO.: 3 mi. SE. of Mt. Lassen, 1 ♂, VII-8-55 (J. W. MacSwain, CIS). TUOLUMNE CO.: Conness Glacier, Yosemite National Park, 6 ♂, 8 ♀, VII-24-36, 3 ♂, 2 ♀, VII-30-36 (W. B. Herms, CIS). Ellery Lake, Tioga Pass, 9,400 ft., 1 ♀, VII-3-27 (J. M. Aldrich, USNM). Mt. Conness, Yosemite National Park, 1 ♀, VII-23-36 (W. B. Herms, CIS). Saddlebag Lake, Yosemite National Park, 1 ♂, VII-31-36 (W. B. Herms, CIS). Tioga Lake, 1 ♀, VII-29-36 (CIS).

*H. nigerrima* differs from its relatives of the *frontata* grouping in that interfrontalia of the male is more broadly maintained caudad, and parafrontals are a more extensive series of slender bristles that end caudad opposite apex of ocellar triangle. The calyptral margins of the female are pale brown.

#### *Hydrophoria pilipyga* Hockett

*Hydrophoria pilipyga* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:272.

Holotype: ♂, King's Creek Meadow, Shasta County, California (CAS).

**Geographic range.** — California.

**California records.** — MONO CO.: Mt. Barcroft Lab., 12,500 ft., White Mts., 9 airline mi. N. of Inyo Co., 1 ♂, VII-5-61 (J. Powell, CIS). SHASTA CO.: Same locality as holotype, 1 ♂, VII-23-50, type (P. H. Arnaud, CAS).

The male of *H. pilipyga* may be distinguished from allied taxa by the dense tuft of short fine hairs on cerci. The basal plate of hypopygium is partly dulled mesad, and hence not entirely polished as in *rotundata*, *polita* and *nigerrima*.

#### *Hydrophoria polita* Malloch

*Hydrophoria polita* Malloch. 1920, Amer. Ent. Soc. Trans., 46:170.

Holotype: ♂, Bozeman, Montana (ILLNHS).

**Geographic range.** — Alaska, California, Colorado, Manitoba, Montana, Nevada, Northwest Territories, Yukon Territory.

**California records.** — EL DORADO CO.: Echo Lake, 7,500 ft., 1 ♀, VII-13-61 (J. G. Chillcott, CNC). MONO CO.: Sardine Creek, 8,500 ft., 1 ♀, VIII-6-51, 2 ♂, VII-11-51, 2 ♂, VII-18-51 (A. T. McClay, UCD). NEVADA CO.: Sagehen Creek, 6,500 ft., near Hobart Mills, 1 ♀, VII-13-61 (J. G. Chillcott, CNC). TUOLUMNE CO.: Chipmunk Flat, 1 ♂, VIII-9-60 (A. S. Menke,

UCD). Sonora Pass, 1 ♂, VIII-21-59 (D. D. Linsdale, BVC).

The male of *H. polita* has basal sclerite of hypopygium entirely polished and bristleless, thereby differing from its congeners. The female has a paler grayish scutellum than in females of kindred species.

### *Hydrophoria rotundata* Huckett

*Hydrophoria rotundata* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:273.

Holotype: ♂, Hat Lake, Lassen National Park, Shasta County, California (USNM).

*Geographic range.* — California, Oregon.

*California records.* — SHASTA Co.: Same locality as holotype, 1 ♂, VI-14-41, type (C. D. Michener, USNM). SISKIYOU Co.: McBride Campground, 4 road-miles E. of Shasta City, 1 ♂, VII-23-62 (D. C. Rentz, C. D. MacNeill, CAS). Mt. Shasta, 7,000 ft., 1 ♂, VII-13-58 (J. Powell, CIS). TUOLUMNE Co.: Ellery Lake, Tioga Pass, 9,400 ft., 1 ♀, VII-3-27 (J. M. Aldrich, USNM).

The male of *H. rotundata* is notably robust and largely black, with blending stripes on mesonotum and abdomen; the basal plate of hypopygium is entirely polished and has bristles.

### *Hydrophoria seticauda* Malloch

(Map 26)

*Hydrophoria seticauda* Malloch. 1919, Calif. Acad. Sci. Proc., ser. 4, 9:306.

Holotype: ♂, Huntington Lake, Fresno County, California (CAS).

*Geographic range.* — Alaska, British Columbia, California, Idaho, Nevada, Northwest Territories, Oregon, Utah, Washington, Yukon Territory.

*California records.* — EL DORADO Co.: Echo Portals, 7,300 ft., 1 ♂, VII-11-46 (P. H. Arnaud, CAS). Grass Lake, Luther Pass, 1 ♂, 1 ♀, VII-24-55 (E. I. Schlinger, UCD). FRESNO Co.: Huntington Lake, 7,000 ft., 1 ♂, VII-5-19, type (F. C. Clark, CAS); 1 ♀, VII-9-19 (F. C. Clark, CAS). LOS ANGELES Co.: Big Pines, 1 ♀, VIII-2-44, 4 ♂, 2 ♀, VI-29-48 (A. L. Melander, USNM). Green Valley, 2 ♀, VII-26-44 (A. L. Melander, USNM). MONO Co.: Mammoth Lake, 1 ♂, VII-15-33 (CAS). Sardine Creek, 8,500 ft., 1 ♂, VI-28-51 (A. T. McClay, UCD). 4 mi. SW. of Tom's Place, 1 ♀, VII-13-61 (H. V. Daly, CIS). NEVADA Co.: Sagehen, near Hobart Mills, 1 ♂, VII-4-54 (P. D. Hurd, CIS); 1 ♀, VII-4-62 (C. A. Toschi, CIS). Sagehen Creek, near Hobart Mills, 2 ♀, VII-13-61 (J. G. Chillcott, CNC); 1 ♀, VII-7-64, in malaise trap (M. E. Irwin, UCR). PLUMAS Co.: 4 mi. W. of Quincy, 1 ♀, VII-2-49 (CIS). RIVERSIDE Co.: Tahquitz Valley, San Jacinto Mts., 1 ♀, VII-6-50 (W. A. McDonald, UCLA). SAN BERNARDINO Co.: Barton Flat, 1 ♂, VIII-3-42 (A. L. Melander, USNM). Mill Creek Canyon, San Bernardino Mts., 2 ♂, VI-9-24 (J. M. Aldrich, USNM; F. R. Cole, CAS). Round Cienega, 1 ♂, IX-1-23 (F. R. Cole, CAS). South Fork Meadows, Upper Santa Ana River, 1 ♀, VI-1-47 (A. L. Melander, USNM); 2 ♀, VI-25-48, 1 ♂, VII-27-48 (J. L. Sperry, USNM). Thousand Springs, San Bernardino Mts., 1 ♂, VI-1-47 (A. L. Melander, USNM). Upper Santa Ana River, 1 ♀, IX-4-



Map 26. Locality records in California for *Hydrophoria seticauda* Malloch.

50 (A. L. Melander, USNM). SHASTA Co.: Hat Lake, Lassen National Park, 1 ♂, VII-23-50 (P. H. Arnaud, CDA). 3 mi. SE. of Mt. Lassen, 1 ♀, VII-8-55 (J. W. MacSwain, CIS). TRINITY Co.: Big Fist, 1 ♂, VI-23-31 (E. C. Van Dyke, CAS). TULARE Co.: Giant Forest, Sequoia National Park, 1 ♂, VII-28-29 (R. H. Beamer, UK). Sequoia National Park, 2 ♂, VI-6-35, at 6,200 ft. (A. L. Melander, USNM); 1 ♀, VIII-6-40 (D. E. Hardy, UK). TUOLUMNE Co.: Basin Creek Campground, 1 ♀, VI-2-63 (P. H. Arnaud, CAS). Bell Meadows, 1 ♂, 1 ♀, VIII-18-48 (P. H. Arnaud, CAS). Pinecrest, 5 ♂, 1 ♀, VII-29-47, 1 ♀, VIII-5-47, 1 ♂, VIII-13-47, 1 ♀, VI-29-48, 1 ♀, VII-5-48, 2 ♂, VII-17-48, 1 ♂, 2 ♀, VIII-3-48, 1 ♂, VIII-4-48, 1 ♂, VIII-10-48, 1 ♂, 1 ♀, VIII-11-48 (P. H. Arnaud, CAS). Strawberry, 1 ♀, VI-19-51 (E. L. Silver, UCLA); 1 ♀, VI-18-57 (CIS); 1 ♂, VII-8-57 (W. T. Crites, UCD).

The male of *H. seticauda* may be distinguished by the flattish appressed conformation of ninth tergum when viewed from behind, thus giving abdomen an abrupt truncated appearance. The processes of sternum 5 are broad and bare except for weak bristles on inner border. The female has weak bristly presutural acrosticals, scutellum entirely black and shiny, and hind femora with or without one or more posteroventral bristles.

### *Hydrophoria subpellucida* Malloch

*Hydrophoria subpellucida* Malloch. 1918, Amer. Ent. Soc. Trans., 44:296.

*Hydrophoria subpellucens* Malloch. 1920, Canad. Ent., 52:254, 256.

*Hydrophoria ruralis* Hockett, not Meigen. 1944, Ent. Soc. Amer. Ann., 37:291.

Holotype: ♂, Alamogordo, New Mexico (ANSP).

**Geographic range.** — Alberta, Arizona, California, North Carolina, New Mexico, New York, Ohio, Pennsylvania, South Dakota, West Virginia.

**California record.** — EL DORADO Co.: Lake Tahoe, 1♀, VIII-1-40 (E. E. Kenaga, UK).

The male of *H. subpellucida* usually possesses one or two extra slender preapical posterodorsal bristles on hind tibia. The haustellum in both sexes is slightly dullish, differing thereby from its congeners. The species is allied to *galeata*.

### *Hydrophoria wierzejskii* (Mik)

*Spilogaster wierzejskii* Mik. 1867, K.-k. Zool.-Bot. Gesell. Wien, Verhandl., 17 (Abhandl.):420.

*Hydrophoria elongata* Malloch. 1920, Amer. Ent. Soc. Trans., 46:172.

Type: ♂, Halicz, southeast Poland.

**Geographic range.** — Alberta, British Columbia, California, Colorado, Idaho, Manitoba, Michigan, Missouri, North Dakota, Northwest Territories, New York, Saskatchewan, South Dakota, Utah, Washington.

**California records.** — ALPINE Co.: Woodfords, 1♀, VI-17-58 (W. W. Middlekauff, CIS). LASSEN Co.: Bridge Creek Camp, 1♂, VII-9-49 (E. I. Schlinger, UCD). SHASTA Co.: Cassel, 2♂, VII-5-55 (J. R. Jessen, UCD); 3♀, VII-15-55 (E. I. Schlinger, UCD). SIERRA Co.: 1 mi. W. of Sierraville, 3♂, 2♀, VIII-3-65 (T. W. Fisher, R. Orth, UCR).

The male of *H. wierzejskii* may be distinguished by the stout bristle on fore tarsal segment 5, and by the fact that segment 4 of fore tarsus is longer than segment 3. The posteroventral bristles on mid femur are very short. The female is similar to that of *implicata*, from which it may be separated by having one or more weak setulae near the base of posterior notopleural bristle.

### Genus *Anthomyia* Meigen

*Anthomyia* Meigen. 1803, Mag. f. Insektenkunde, 2:281. Hennig. 1968, In Lindner, Die Fliegen der Palaearktischen Region, Bd. VII-1 63a Anthomyiidae (Lief. 276), p. 202.

Type-species: *Musca pluvialis* Linnaeus; designation Latreille, 1810.

Pale whitish gray species with hairs on propleura, mesonotum with contrasting brownish black spots, a transverse band, or 2 vittae, abdomen with trimaculate tergal marks, arista pubescent; male with basal plate of hypopygium polished, and processes of sternum 5 as pendent, horny, shiny plates, sparsely bristled, female with strong fascial marks on profrons and postvibrissal region, similar in these latter respects to *Craspedochoeta*. Larvae are known to infest bird nests (Dobrosky, 1925; Séguy, 1937).

### KEY TO SPECIES OF ANTHOMYIA IN CALIFORNIA AND ADJACENT AREAS

1. Males .....2  
Females .....3
2. Postsutural marks on mesonotum separated by gray lines along planes of dorsocentral bristles. . . . .*pluvialis* (Linnaeus)\*  
Postsutural mark or marks on mesonotum not divided by gray lines along planes of dorsocentral bristles. . . . .  
*oculifera* Bigot
3. Mesonotum with 2 long vittae along planes of dorsocentral bristles .....*oculifera* Bigot  
Mesonotum with 5 separate marks. . . . .*pluvialis* (Linnaeus)\*

### *Anthomyia oculifera* Bigot

*Anthomyia oculifera* Bigot. 1885, Soc. Ent. de France, Ann. (1884), sér. 6, 4:299.

Holotype: ♂, Baltimore, Maryland (University Museum, Oxford).

**Geographic range.** — Alberta, Arizona, British Columbia, California, Georgia, Idaho, Illinois, Maryland, Michigan, New Hampshire, New Mexico, New York, Oregon, Quebec, Washington.

**California records.** — ALAMEDA Co.: Hills back of Oakland, 1♂, III-25-51, 1♂, VII-14-51 (W. C. Bentinck, CIS). TILDEN Park, 2♂, III-31-61 (N. Twomey, BVC). EL DORADO Co.: Strawberry, 1♂, VII-6-58 (L. E. Campos, UCR). HUMBOLDT Co.: Fort Seward, 1♂, V-22-33 (P. Schulthess, CAS). MARIN Co.: Mill Valley, 17♂, 1♀, III-7-26 (E. P. Van Duzee, CAS); 6♂, III-6-26, 2♂, III-20-26 (M. C. Van Duzee, CAS). NOVATO, 3♂, IV-11-48 (E. L. Kessel, CAS); 1♂, IV-5-6-65 (P. H. Arnaud, CAS). MONO Co.: Leavitt Meadow, 7,200 ft., 1♀, VIII-13-63, flight trap (H. B. Leech, CAS). NAPA Co.: Calistoga, 1♀, V-29-52 (P. H. Arnaud, CAS). PLUMAS Co.: Buck's Lake, 1♂, VII-14-49 (W. W. Middlekauff, CIS). MOHAWK, 1♂, VII-7-57, 1♂, VIII-12-57 (D. C. Rentz, UCD). RIVERSIDE Co.: San Jacinto Mts., 1♀, VII-21-29 (R. H. Beamer, UK). SAN BERNARDINO Co.: Barton Flat, Sugar Loaf, 9♂, 15♀, IX-17-45 (A. L. Melander, USNM). E. Barton Flat, 1♂, 1♀, VI-25-46 (A. L. Melander, USNM). Mountain Home, 1♂, IX-12-53 (E. I. Schlinger, UCD). Mt. Home Canyon, 1♂, VII-1916 (F. R. Cole, CAS). Redlands, 1♂, 1♀, II-4-23, 1♂, II-5-23 (F. R. Cole, CAS). Sugar Loaf, San Bernardino Mts., 2♂, 4♀, VII-4-46 (A. L. Melander, USNM). SAN DIEGO Co.: San Diego, 1♀, II-18-20 (G. H. Field, CAS). SAN MATEO Co.: Portola, 3♂, IV-13-06 (J. M. Aldrich, USNM). Redwood City, 1♂, III-23-52, 1♂, III-29-52 (P. H. Arnaud, CAS). SANTA CLARA Co.: Saratoga, 2♂, VIII-12-55 (B. Keh, BVC). Stanford University, 1♀, III-24-06 (J. M. Aldrich, USNM); 2♂, III-19-54, 7♂, III-25-54, 1♂, IV-1-54 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Santa Cruz Mts., 1♀, VIII-13-38 (R. H. Beamer, UK). SHASTA Co.: Moose Camp, 5♂, VI-19-54 (E. I. Schlinger, UCD). SOLANO Co.: Green Valley, 1♂, II-24-54 (E. I. Schlinger, UCD).

The male of *A. oculifera* has a postsutural brownish fascia across discal region of the mesonotum, evenly or unevenly dense, but not interrupted along planes of dorsocentral bristles. The female has two longitudinal stripes on mesonotum.

Genus *Anthomyiella* Malloch

*Anthomyiella* Malloch. 1920, Amer. Ent. Soc. Trans., 46:174.

Type-species: *Anthomyia pratincola* Panzer, original designation.

Diminutive grayish species, about 3 mm in length, fore tibia with an unusually long strong dorsal bristle, lower calyptal scale extended beyond margin of upper, abdomen with restricted tridentate tergal marks, hind tibia with a dorsal bristle near middle of tibia, posterodorsal bristles absent. Male with a dark central blotch on mesonotum.

*Anthomyiella pratincola* (Panzer)

*Anthomyia pratincola* Panzer. 1809, Faunae insectorum germanicae initiae oder Deutschlands Insecten. H. 108, p. 12.

Type: ♂, Germany.

**Geographic range.** — Alberta, California, Colorado, Idaho, Kansas, Manitoba, Massachusetts, Michigan, Montana, North Carolina, New Jersey, New York, Oklahoma, Ontario, Oregon, Pennsylvania, Quebec, South Dakota, Washington, Wyoming.

**California records.** — ORANGE CO.: LOS CERRITOS, 1 ♀, IV-3-15 (M. C. Van Duzee, CAS). SAN BERNARDINO CO.: CHINO, 1 ♀, VIII-5-36 (A. J. Basinger, CAS). SAN FRANCISCO CO.: SAN FRANCISCO, 1 ♀, VIII-27-22, sand dunes (E. P. Van Duzee, CAS).

Genus *Calythea* Schnabl and Dziedzicki

*Pegomyia (Calythea)* Schnabl and Dziedzicki. 1911, K. Leop.-Carol. Deut. Akad. d. Naturf., Abhandl. 95:111.

*Calythea* Hennig. 1968, In Lindner, Die Fliegen der Palaearktischen Region, Band VII-1 63a Anthomyiidae (Lief. 276), p. 196; Ackland. 1968, Ent. Monthly Mag., 104:135-144.

Type-species: *Musca albicincta* Fallén, monobasic, name preocc. Rossi, 1794, = *Anthomyia nigricans* Robineau-Desvoidy, 1830.

Small species, about 3 to 4 mm long, prosternum with marginal hairs, hypopleura in Nearctic species with hairs cephalad and ventrad of metathoracic spiracle, propleura without hairs, lower calyptal scale extended beyond margin of upper, abdomen with tridentate tergal markings, hind tibia with a single mid dorso-posterodorsal bristle, the actual posterodorsal plane thus lacking bristles.

KEY TO SPECIES OF CALYTHERA

1. Antennae separated at base by a broad rounded carina in both sexes ..... *monticola* (Bigot)\*<sup>4</sup>  
 Antennae separated at base by a narrow ridgelike carina in both sexes .....
2. Mesonotum in male entirely black when viewed from behind, female unknown ..... *bidentata* Malloch\*  
 Mesonotum in male partly gray and with a median stripe when viewed from behind ..... *micropteryx* (Thomson)

<sup>4</sup> *Calythea separata* Malloch, 1924 = *Anthomyia monticola* Bigot, 1885, teste Ackland, loc. cit. p. 142.



Map 27. Locality records in California for *Calythea micropteryx* (Thomson).

*Calythea micropteryx* (Thomson)

(Map 27)

*Anthomyia micropteryx* Thomson, 1869. In K. Svenska Vetenskaps-Akademien, Kongliga svenska fregatten Eugenies resa omkring jorden. Pt. 2: Zoologie, [Sec.] I: Insekter, p. 555.  
 Type: ♂, California (MNHS).

**Geographic range.** — Widely distributed throughout the provinces of Canada and in the continental United States; northward to as far as the southwestern terrain of the Northwest Territories, and southward to include Texas, New Mexico and Arizona.

**California records.** — ALAMEDA CO.: Arroyo Mocho, 20 mi. S. of Livermore. ALPINE CO.: Ebbetts Pass, Hope Valley, 1.5 mi. NE. of Red Lake. AMADOR CO.: Peddler Hill, 4 mi. N. of Silver Lake. CALAVERAS CO.: Big Trees, Calaveras, Milton, Mokelumne Hill. CONTRA COSTA CO.: Marsh Creek, Mt. Diablo, Walnut Creek at foot of Shell Ridge. EL DORADO CO.: Al Tahoe, Bijou, Fallen Leaf 6,500 ft., Fallen Leaf Lake, Fred's Place, Lake Tahoe, Meyers, Snowline Camp. FRESNO CO.: Mono Hot Springs, Watts Valley. IMPERIAL CO.: Brawley. INYO CO.: Antelope Springs, Goodale Creek N. of Lone Pine, Deep Springs, Independence, Little Lake, Silver Canyon in White Mts., Surprise Canyon in Panamint Mts., Whitney Portal. KERN CO.: Kernville, Lebec, Mill Potrero, Onyx, Red Rock Canyon, 16 mi. S. of Weldon. LASSEN CO.: South end of Eagle Lake, Hallelujah Junction, Susan River Camp. LOS ANGELES CO.: Claremont, Mint Canyon at Solemint, Whittier. MADERA CO.: San Joaquin Experiment Station, Sugar Pine 4,300-5,000 ft. MARIPOSA CO.: Yosemite. MODOC CO.: Alturas. MONO CO.:

Crooked Creek in White Mts., Crooked Creek Laboratory 10,-150 ft., Lake Mary at Mammoth Lakes, Poison Creek in White Mts., Wyman Canyon in White Mts., Leavitt Meadows. MONTE-REY CO.: Arroyo Seco, Lockwood, Paloma Creek 5 mi. NW. of Arroyo Seco Road, Paradise Canyon near Prunedale. NAPA CO.: Monticello Dam, Samuel Spring. NEVADA CO.: Fuller Lake, Truckee, 4 mi. N. of Truckee. ORANGE CO.: Green River Camp, Los Cerritos. PLACER CO.: Lakeside at Lake Tahoe, Towle. PLUMAS CO.: Keddie, Quincy. RIVERSIDE CO.: Aguanga, Cathedral City, Cottonwood Spring, Drip Spring, Hopkins Well, Hot Mineral, Hunter's Spring, Indio, Keen Camp, La Quinta, 6 mi. W. of Mur, Murray Canyon at Palm Springs, Palm Canyon, Palm Springs, Pinon Flat San Jacinto Mts., Pinyon Flat 16 mi. SW. of Palm Desert, Riverside, San Andreas, San Jacinto Mts., Summit Upper Palm Canyon 14 mi. SE. of Keen Camp, Thousand Palms, Upper Deep Canyon at Horsethief Creek, White-water. SAN BENITO CO.: New Idria. SAN BERNARDINO CO.: Apple Valley, Bear Valley, Chino, Granite Cove Granite Mts., 15.8 mi. SW. of Kelso, 25 mi. S. of Ivanpah, Mill Creek Canyon San Bernardino Mts., Mojave Desert, Morongo, Morongo Valley, 1 mi. W. of Mt. Whitney, Mule Canyon at Calico Mts., Quail Spring, Redlands, Round Cienega, Santa Ana River South Fork, Twentynine Palms, Upper Santa Ana River, Victorville, Walker Pass Station, Wrightwood. SAN DIEGO CO.: Borrego, Palm Canyon at Borrego, Tub Canyon at Borrego, Clark Lake in Borrego Desert, Cuyamaca Lake, Descanso, Laguna Mts., Mt. Laguna, Rincon. SAN LUIS OBISPO CO.: 2 mi. NE. of Caliente Mtn., 10 mi. W. of Simmler. SAN MATEO CO.: Portola. SANTA CLARA CO.: Palo Alto, San Antonio Ranger Station, San Jose. SHASTA CO.: 5 mi. N. of Cassel, Round Mountain. SIERRA CO.: Webber Lake. SISKIYOU CO.: Antelope Creek near Tennant, Hebron Summit. SOLANO CO.: Rockville, Vacaville. SONOMA CO.: Cloverdale, Mesa Grande, Mesa Grande Russian River, Preston. TRINITY CO.: Eagle Creek. TULARE CO.: 3.6 mi. W. of California Hot Springs, South Fork of Kaweah River, Pinehurst. TUOLUMNE CO.: Belle Meadows, Bumble Bee, Pinecrest, Strawberry, Yosemite 3,880-4,000 ft. VENTURA CO.: Hungry Valley 5 mi. S. of Gorman, Pine Creek at NE. base of Alamo Mtn., Piru, Santa Paula. YOLO CO.: Davis, 4 mi. NE. of Rumsey, Winters, Woodland.

*C. micropteryx* seems to have a somewhat shorter flight period than the other species of anthomyiids which are abundant in California. Records indicate a season primarily between March and November in the coastal counties, with a few collections in January and December in southern California. Adults have been taken in March in the Imperial Valley and from April to September in the foothills around the Central Valley. Elsewhere *C. micropteryx* has been collected as late as October at Alturas, Modoc County, and November at moderate elevations in Shasta County.

*C. micropteryx* is widely distributed in California, having been recorded from 39 counties and approximately 158 localities. The survey was based on an examination of 491 specimens, comprised of 276 males and 215 females. The species may be distinguished from *monticola* (Bigot)\* (= *separata* Malloch) by the weaker facial carina at base of antennae, and the male from that of *bidentata* by the partly grayish and distinctly striped mesonotum when viewed from behind,

not wholly deep black. Coffey (1966:216) has reared the species from cow dung, and has taken adults on the droppings of horses, pigs, and rarely of sheep.

#### Genus *Paraprosalpia* Villeneuve

*Prosalpia* Pokorny. 1893, Wien. Ent. Ztg., 12:54, 55. Name preocc. Koch, 1872.

*Prosalpia* (*Paraprosalpia*) Villeneuve. 1922, Paris, Mus. Natl. d'Hist. Nat. Bull., 28:511.

Type-species: *Prosalpia rambolitensis* Villeneuve, original designation.

The genus *Paraprosalpia*, as it is at present represented in California, may be recognized by the bare shiny bladlike plates forming processes of sternum 5 of the male abdomen. These plates are held lengthwise to abdomen and in a vertical plane, being subparallel to one another. It may also be noted that the inner pair of vertical bristles of the male head is long, upright and bristlelike, arista almost bare, haustellum rigid, polished and moderately narrow in both sexes, with the labellum reduced; apical setulae between apical bristles of scutellum mostly weak and hairlike in females, but variable in males; fifth abdominal segment as viewed from above foreshortened as compared to the length of other segments of abdomen.

#### KEYS TO SPECIES OF PARAPROSALPIA IN CALIFORNIA

##### MALES

1. Cheek about as high as half height of eye, parafacials at middle as wide as length of third antennal segment...  
*genalis* Huckett  
Cheek less in height than half that of eye, parafacials at middle not as wide as length of third antennal segment .....2
2. Hind femur with a multiple series of bristles on proximal half of antero- and posteroventral surfaces.....  
*brevitarsis* (Malloch)  
Hind femur with a single series of anteroventral bristles proximad, and with 1 to 3 posteroventral bristles on middle third .....3
3. Hind tibia with 3 anterodorsal bristles, processes of sternum 5 with ventral (inner) margin undulating or uneven in profile, bulging ventrad at middle.....  
*conifrons* (Zetterstedt)  
Hind tibia with 2 anterodorsal bristles, processes with ventral margin even in profile.....*brunetta* (Huckett)

##### FEMALES

1. Cheek fully as high as half height of eye, parafacials at middle as wide as length of third antennal segment...  
*genalis* Huckett  
Cheek less in height than half that of eye, parafacials at middle not as wide as length of third antennal segment..2
2. Mid tibia without anteroventral bristle.. *brevitarsis* (Malloch)  
Mid tibia normally with anteroventral bristle.....  
*conifrons* (Zetterstedt)



*Paraprosalpia brevitarsis* (Malloch)

*Hylemyia brevitarsis* Malloch. 1918, Amer. Ent. Soc. Trans., 44:309.

Holotype: ♂, Redwood Canyon, California (ANSP).

Geographic range. — California.

California records. — MARIN Co.: Lagunitas Canyon, 1 ♂, III-29-08 (IINHS). Redwood Canyon, 1 ♂, V-17-08, type (ANSP). Taylor State Park, 1 ♂, 1 ♀, V-8-49 (P. H. Arnaud, CAS).

The male of *P. brevitarsis* differs from its congeners in having a double or uneven series of slender and more robust anteroventral and posteroventral bristles on the proximal half of hind femur. The female may be linked to that of *conifrons*, from which it differs in the absence of an anteroventral bristle on mid tibia.

*Paraprosalpia brunetta* (Huckett)

*Hylemyia brunetta* Huckett. 1929, Canad. Ent., 61:139.

Holotype: ♂, Seton Lake, Lillooet, British Columbia (CNC).

Geographic range. — British Columbia, California, Quebec.

California record. — SAN BERNARDINO Co.: Mill Creek Canyon, 1 ♂, VI-4-24 (F. R. Cole, CAS).

The male of *P. brunetta* differs from that of *conifrons* in having 2 anterodorsal bristles on hind tibia, and by the even profile to the ventral margin of processes.

*Paraprosalpia conifrons* (Zetterstedt)

*Aricia conifrons* Zetterstedt. 1845, Diptera Scandinaviae, 4:1569.

Types: ♂, ♀, Western Jämtland, Lule Lappmark (ZIL).

Geographic range. — Alaska, Alberta, British Columbia, California, Idaho, Labrador, Manitoba, Maine, New Hampshire, Northwest Territories, Oregon, Quebec, Utah, Washington, Yukon Territory.

California records. — SAN BERNARDINO Co.: Mt. Home Canyon, San Bernardino Mts., 1 ♂, VI-8-24 (J. M. Aldrich, USNM). SAN DIEGO Co.: Oak Grove, 2 ♂, V-8-45 (A. L. Melander, USNM).

The male of *P. conifrons* has middle section of inner (ventral) margin of processes angularly extended, thus giving the margin an uneven or undulating profile. The female has an anteroventral bristle on mid tibia.

*Paraprosalpia genalis* Huckett

*Paraprosalpia genalis* Huckett. 1950, Brooklyn Ent. Soc. Bull., 45:140.

Holotype: ♂, Livermore, California (USNM).

Geographic range. — California, Utah.

California records. — ALAMEDA Co.: Arroyo Mocho, 5 mi. S. of Livermore, 1 ♀, III-19-51 (E. G. Linsley, CIS). Berkeley, 1 ♂, III-11-49 (D. Cox, CIS). Livermore, 1 ♂, 1 ♀, III-14-37, types (G. Ferguson, USNM). CONTRA COSTA Co.: Mt. Diablo,

1 ♀, III-1-36 (E. S. Ross, CAS). MENDOCINO Co.: Ukiah, 1 ♂, III-31-31 (C. C. Wilson, USNM). SAN FRANCISCO Co.: San Francisco, 1 ♀, III-16-13 (J. C. Bridwell, USNM).

*P. genalis* is notable for its extra broad cheeks and parafacials. The female has a short anterior bristle near the anterodorsal of mid tibia.

Genus *Leucophora* Robineau-Desvoidy

*Leucophora* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém présentés par divers Savans [ser. 2], 2:562.

Type-species: *Leucophora cinerea* Robineau-Desvoidy; designation Coquillett, 1901.

The genus *Leucophora* is not readily defined for diagnostic purposes. Any such concept seems to depend chiefly on observations concerning the peculiar habits of various species. In general, the genal, facial and occipital parts of the adult head are buccate or inflated, interfrontalia in most females is narrower, as the frons approaches a pattern resembling the males; postocular series of setulae is restricted to the dorsal half of eye, thorax is robust and abdomen in the male conical, having hypopygium dull and not prominent; ovipositor has recurrent spines on anal palpi, figure 55, except in *maculata*; legs are proportionately stout.

Adults are recorded in many instances as shadowing (for purposes of oviposition) the flight of certain bees and wasps as they approach their burrows in the ground (Collin, 1921, Powell, 1964). The larvae, so far as is known, inhabit nests of solitary bees and wasps asinquilines (Huie, 1916) or parasites (Séguy, 1937:136).

KEYS TO SPECIES OF LEUCOPHORA IN CALIFORNIA

MALES

1. Mid tibia with mid ventral or anteroventral bristle. . . . . 2  
Mid tibia without mid ventral or anteroventral bristle. . . . . 5
2. Notopleural depression with hairs. . . . . 2a  
Notopleural depression without hairs. . . . . 3
- 2a. Scutellum fuscous on lateral and ventral surfaces, lower caudal sternopleural bristle weakly developed. . . . .  
*fusca* Huckett  
Scutellum uniformly grayish, lower caudal sternopleural bristle strongly developed. . . . . *annexa* Huckett
3. Haustellum compact or stocky, mid tibia with anteroventral bristle, cruciate setulae present. . . . . 4  
Haustellum narrowed, mid tibia with strong bristle on mid ventral plane, cruciate setulae absent. . . . .  
*obtusa* (Zetterstedt)
4. Abdomen with well-marked anterior incisures on terga 3 and 4, cerci with cluster of weak slender bristles directed ventrad. . . . . *megacephala* Huckett  
Abdomen without well-marked anterior incisures on terga 3 and 4, and with weak short setulae on discal surface of cerci. . . . . *unilineata* (Zetterstedt)\*
5. Haustellum slender or narrowed, epistoma extended cephalad to level with tip of profrons as viewed in profile. . . . . 6

- Haustellum short, or compact and stocky, epistoma not extended cephalad to level with tip of profrons.....7
6. Prealar bristle absent, parafacials narrower than length of antenna ..... *haustellaris* Hockett  
Prealar bristle long, parafacials wider than length of antenna, notopleural depression with hairs. . . . . *annexa* Hockett
7. Processes with series of longish bristles from base to apex and are directed ventrad. . . . . *maculata* (Stein)  
Processes without extensive series of longish bristles directed ventrad .....8
8. Prealar bristle absent, narrower part of frons wider than width of third antennal segment. . . . . *marylandica* (Malloch)  
Prealar bristle present, narrower part of frons not wider than width of third antennal segment. . . . .9
9. Cerci with cluster of weak slender bristles directed ventrad, mid tibia with 2 posterodorsal bristles, m-cu cross-vein suberect, profrons as long as length of antenna ..... *megacephala* Hockett  
Cerci without cluster of slender bristles directed ventrad, mid tibia with 1 posterodorsal bristle, m-cu cross-vein oblique .....10
10. Anteroventral and posteroventral bristles near middle of hind femur longer than height of femur where situated ..... *sociata* (Meigen)  
Anteroventral and posteroventral bristles near middle of hind femur not longer than height of femur thereat. . . . . *cinerea* Robineau-Desvoidy

## FEMALES

1. Mid tibia with mid ventral or anteroventral bristle.....2  
Mid tibia without mid ventral or anteroventral bristle...5
2. Notopleural depression with hairs.....2a  
Notopleural depression without hairs.....3
- 2a. Scutellum fuscous on lateral and ventral surfaces.....  
*fusca* Hockett  
Scutellum grayish on lateral and ventral surfaces.....  
*annexa* Hockett
3. Frons at vertex wider than distance between first pair of dorsocentral bristles, haustellum compact or stocky. . . . . *megacephala* Hockett  
Frons at vertex narrower than distance between first pair of dorsocentral bristles, haustellum moderately narrow or lengthened .....4
4. Mid tibia with bristle on anteroventral surface, fore tibia with robust preapical posterodorsal bristle, cruciate setulae present ..... *unilineata* (Zetterstedt)\*  
Mid tibia with bristle on mid ventral surface, fore tibia lacks robust preapical posterodorsal bristle, cruciate setulae absent ..... *obtusa* (Zetterstedt)
5. Haustellum slender, epistoma extended cephalad to a level with tip of profrons..... *haustellaris* Hockett  
Haustellum short, compact, epistoma not extended cephalad .....6
6. Narrower part of frons wider than distance between first pair of dorsocentral bristles. . . . . *marylandica* (Malloch)  
Narrower part of frons less than distance between first pair of dorsocentral bristles .....7
7. Ovipositor with recurrent spinules on terminal sclerites, fig. 55 .....8  
Ovipositor lacking recurrent spinules on terminal sclerites. . . . . *maculata* (Stein)
8. Palpi flattish, narrowly spatulate and tapering toward apex ..... *sociata* (Meigen)
- Palpi slender, filiform .....9
9. Narrower part of frons not exceeding in width length of third antennal segment, terga 3, 4 and 5 extensively gray on dorsum..... *cinerea* Robineau-Desvoidy  
Narrower part of frons wider than length of third antennal segment, terga 3, 4 and 5 deeply and extensively marked on dorsum..... *innupta* Hockett

*Leucophora cinerea* Robineau-Desvoidy

*Leucophora cinerea* Robineau-Desvoidy. 1830, [Paris] Inst. de France, [Cl. des] Sci. Math. et Phys., Acad. Roy. des Sci., Mém. présentés par divers Savans [ser. 2], 2:563.

*Anthomyia albiseta* von Roser. 1840, K. Württemb. Landw. Ver., Stuttgart, Correspondenzbl. 37 (= n. ser., 17), (1):59.  
*Aricia albescens* Zetterstedt. 1845. Diptera Scandinaviae, 4: 1520.

Types: ♂, ♀. France.

*Geographic range.* — Alaska, British Columbia, California, Colorado, Idaho, Nova Scotia, Oregon, Utah, Washington.

*California records.* — ALPINE CO.: Markleeville, 1♂, VI-23-61 (A. S. Menke, UCD). FRESNO CO.: Bubbs Creek, 1♂, VII-14-10 (E. C. Van Dyke, CAS). LOS ANGELES CO.: Glendale, 1♂, VIII-25-54 (E. I. Schlinger, UCD). Rock Creek, 1♂, VII-21-36 (A. J. Basinger, CAS). Santa Catalina Id., 1♀, no date (HCH). Santa Monica Mts., 1♀, VII-6-49 (UCD). Tanbark Flat, 1♀, VI-25-56 (R. M. Bohart, UCD); 1♂, 1♀, VII-15-56 (E. I. Schlinger, UCD). MARIN CO.: Muir Woods, 1♂, VII-6-50 (A. L. Melander, USNM). MONO CO.: White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 1♀, VIII-20-63, flight trap (H. B. Leech, CAS). MONTEREY CO.: Bradley, 1♂, V-17-20 (E. P. Van Duzee, CAS). PLACER CO.: Towle, 2♂, VIII-20-38 (J. Russell, HCH). PLUMAS CO.: 8 mi. NW. of Chester, 1♀, VIII-18-58 (J. A. Powell, CIS). RIVERSIDE CO.: San Jacinto Mts., 1♂, VII-21-29 (R. H. Beamer, HCH). Strawberry Creek at Highway 79, 3,000 ft., 1♂, VIII-28-65 (M. E. Irwin, UCR). Strawberry Creek, 6 mi. W. of Mountain Center, 1♂, VII-7-64 (E. I. Schlinger, UCR). 1 mi. S. of Temecula, 1♀, VII-2-63 (J. Powell, CIS). Upper Deep Canyon at Horsethief Creek, 3,400 ft., 1♂, VI-11-65 (R. E. Somerby, UCR). SAN BERNARDINO CO.: 1 mi. E. of Cajon Junction, 8♂, VIII-11-56 (E. I. Schlinger, UCD). Mill Creek Canyon, 1♂, VI-1-23 (F. R. Cole, CAS). Mt. Home Canyon, 3♂, VII-1-23 (F. R. Cole, CAS). Ontario, 1♀, VIII-5-33 (A. J. Basinger, HCH). SAN MATEO CO.: Corte de Madera, Portola, 1♀, X-7-57 (P. H. Arnaud, CAS). Corte de Madera Creek, near Portola, 2♂, V-31-54 (P. H. Arnaud, CAS). SANTA CRUZ CO.: Felton, 300-500 ft., Santa Cruz Mts., 1♀, V-15-19-07 (J. C. Bradley, CU). SHASTA CO.: Moose Camp, 1♂, VII-14-51 (E. I. Schlinger, UCD). TUOLUMNE CO.: Belle Meadows, 2♂, VIII-18-48 (P. H. Arnaud, CAS). Pinecrest, 1♂, VII-15-47 (P. H. Arnaud, HCH). Tuolumne Meadow Ranger Station, 1♀, VIII-21-58 (A. D. Telford, UCD).

*L. cinerea* is related to *sociata*, from which it may be distinguished in the male by the paler whitish gray mesonotum and scutellum, the mesonotum being with or without a median vitta. In the female of *cinerea* the palpi are slender, clavate, and the hind femur has no stoutish bristle near middle of posteroventral surface.

*Leucophora annexa* Huckett

*Leucophora annexa* Huckett. 1940, N. Y. Ent. Soc. Jour., 48: 355.

Holotype: ♂, Lind, Washington (USNM).

*Geographic range.* — California, Idaho, Washington.

*California record.* — LOS ANGELES CO.: 5 mi. N. of Pearblossom, Lovejoy Buttes, 1 ♂, IV-12-64 (R. L. Langston, CIS).

*L. annexa* may be separated from *fusca* by the wholly grayish scutellum, and by the stronger ventral bristle of the caudal pair of sternopleurals. The above male has stronger bristling and more diffuse clothing setulae on thorax and abdomen than in topotypical specimens of *annexa*, and the anteroventral bristle of mid tibia is weak or setulose, but perceptible.

*Leucophora fusca* Huckett

*Leucophora fusca* Huckett. 1940, N. Y. Ent. Soc. Jour., 48:353.

Holotype: ♂, Moscow Mountain, Moscow, Idaho (USNM).

*Geographic range.* — Alberta, California, Idaho, Indiana, Oregon, Washington, Yukon Territory.

*California records.* — ALAMEDA CO.: Melrose, 2 ♂, IV-2-22 (E. P. Van Duzee, CAS). EL DORADO CO.: Al Tahoe, 1 ♀, VI-23-53 (P. H. Arnaud, CAS). LOS ANGELES CO.: Santa Monica Mts., 1 ♂, III-20-50 (UCLA). MARIN CO.: Alpine Lake, 1 ♂, III-11-59 (J. Powell, CIS). 1 mi. N. of San Geronimo, 1 ♀, IV-7-56 (D. D. Linsdale, CIS). PLUMAS CO.: 10 mi. S. of Johnsville, 1 ♂, VI-12-61 (J. S. Buckett, UCD). RIVERSIDE CO.: Herkey Creek, 3 ♂, IV-23-37, variant (A. J. Basinger, CAS). SACRAMENTO CO.: Sacramento, 1 ♂, III-29-31 (H. H. Keifer, CDA). SAN MATEO CO.: Sandhill Road, 1 ♂, IV-1-54 (P. H. Arnaud, CAS). SHASTA CO.: Manzanita Lake, Lassen National Park, 1 ♀, VI-12-41 (C. D. Michener, CIS). SIERRA CO.: 12 mi. SE. of Sierraville, 1 ♀, VII-4-53 (R. M. Bohart, UCD).

*L. fusca* and *annexa* are closely related, both having hairs on notopleural depression. The former may be separated from the latter by the brownish infuscation of scutellum. Specimens from Herkey Creek differ from other males in the series by having setulae on prosternum, an aberration that I have observed on specimens belonging to other species in the genus, e.g., *L. unistriata* (Zetterstedt).

*Leucophora haustellaris* Huckett

*Leucophora haustellaris* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:275.

Holotype: ♂, Mill Valley, Marin County, California (CAS).

*Geographic range and California records.*—LOS ANGELES CO.: Tanbark Flat, 1 ♀, III-29-57 (J. Powell, CIS). MARIN CO.: Mill Valley, 2 ♂, III-7-24 (M. C. Van Duzee, CAS).

*L. haustellaris* may be linked to those species having a slender haustellum and lacking setulae on the notopleural depression. From such forms it may be sepa-

rated by the absence of the prealar bristle and mid ventral bristle of mid tibia.

*Leucophora innupta* Huckett

*Leucophora innupta* Huckett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:276.

Holotype: ♀, Barton Flat, South Fork Camp, San Bernardino Mountains (USNM).

*Geographic range.* — California, Idaho, Northwest Territories, Oregon.

*California records.* — ALPINE CO.: 2 mi. N. of Blue Lakes, 1 ♀, VII-17-60 (C. G. Moore, UCD). CONTRA COSTA CO.: Tassajara, 1 ♀, VIII-15-39 (G. E. Bohart, CAS). DEL NORTE CO.: Little Grayback Pass, NE. Del Norte Co., 1 ♀, VII-9-58 (J. Powell, CIS). FRESNO CO.: Huntington Lake, 1 ♀, VII-8-19 (E. P. Van Duzee, CAS). IMPERIAL CO.: 3.5 mi. W. of Gordons Wells, 1 ♀, IV-10-57 (E. I. Schlinger, UCD). INYO CO.: Lone Pine, 1 ♀, V-21-37 (E. C. Van Dyke, CAS). LASSEN CO.: Hallelujah Junction, 1 ♀, VI-28-62 (R. M. Bohart, UCD). LOS ANGELES CO.: Tanbark Flat, 1 ♀, VI-22-50 (P. D. Hurd, CIS); 1 ♀, VII-13-52 (A. T. McClay, UCD); 1 ♀, VI-17-56 (R. M. Bohart, UCD). MARIN CO.: San Rafael, 1 ♀, VI-9-43 (P. H. Arnaud, CAS). MONO CO.: Sonora Pass, 9,624 ft., 9 ♀, VIII-20-60 (A. S. Menke, UCD). MONTEREY CO.: Pleyto, 1 ♀, V-21-20 (E. P. Van Duzee, CAS). NEVADA CO.: Sagehen, near Hobart Mills, 1 ♀, VII-9-54, 1 ♀, VII-21-54 (R. M. Bohart, UCD). PLACER CO.: Carnelian Bay, Lake Tahoe, 2 ♀, IX-5-56, 1 ♀, VI-17-58, 1 ♀, VII-8-58, 1 ♀, X-10-59 (R. M. Bohart, UCD, UCR). RIVERSIDE CO.: Herkey Creek Camp, 1 ♀, V-31-63 (E. I. Schlinger, UCR). Riverside, 2 ♀, III-24-57, 1 ♀, V-2-65 (E. I. Schlinger, UCD, UCR). 7 mi. E. of Sunnymead, 1 ♀, V-9-64 (M. E. Irwin, UCR). SAN BERNARDINO CO.: Barton Flat, South Fork Camp, San Bernardino Mts., 1 ♀, IX-12-44, holotype (A. L. Melander, USNM). SAN DIEGO CO.: La Mesa, 1 ♀, IV-11-53 (F. X. Williams, CAS). SAN LUIS OBISPO CO.: Pozo, 12 ♀, IV-27-30-62 (J. Powell, CIS); 2 ♀, IV-28-62 (C. A. Toschi, CIS). SANTA CLARA CO.: Stanford, 1 ♀, VII-15 (A. L. Melander, USNM). SANTA CRUZ CO.: Felton, 300-500 ft., Santa Cruz Mts., 1 ♀, V-15-19-07 (J. C. Bradley, CU). SIERRA CO.: Independence Lake, 1 ♀, VII-27-56 (R. M. Bohart, UCD). VENTURA CO.: Hungry Valley, 5 mi. S. of Gorman, 1 ♀, V-6-59 (G. I. Stage, CIS). YOLO CO.: Davis, 2 ♀, IX-25-55 (J. C. Downey, E. I. Schlinger, UCD); 1 ♀, IX-26-56, 1 ♀, VI-17-58 (R. M. Bohart, UCD); 1 ♀, IV-28-57 (R. F. Schoeppner, UCD).

The female *L. innupta* runs in the key to the same couplet with *cinerea*, both having recurrent spinules on the terminal sclerites of ovipositor. *L. innupta* may be distinguished from *cinerea* by the wider frons and more heavily marked abdomen. I have not been able to recognize the male.

Adults of *L. innupta* were observed by Powell (1964: 174) to be active around the nesting burrows of the small sphecoid wasp, *Xylocelia occidentalis* (Fox), which uses aphids as provisions. Female flies taken at the site, Pozo, San Luis Obispo County, have been examined and found to represent the recently described *innupta*, although they were considered to be *L. obtusa* (Zetterstedt) at the time of Powell's report.

*Leucophora maculata* (Stein)

*Hammomyia maculata* Stein. 1898, Berlin. Ent. Ztschr. (1897) 42:229.

Syntypes: ♂, ♀, Moscow, Idaho (FMNH).

**Geographic range.** — Alberta, Arizona, British Columbia, California, Colorado, Idaho, Manitoba, Montana, North Dakota, Northwest Territories, New York, Oregon, South Dakota, Utah, Washington, Wyoming.

**California records.** — ALPINE Co.: Winnemucca Lake, 1♂, VI-30-59 (R. M. Bohart, UCD). BUTTE Co.: Feather Falls, 1♂, VIII-1-57 (T. R. Haig, UCD). EL DORADO Co.: Echo Lake, 1♂, VII-8-46 (P. H. Arnaud, CAS). Grass Lake, 1♂, VII-16-62 (R. M. Bohart, UCD). Pollock Pines, 1♂, VIII-19-53 (E. I. Schlinger, UCD). IMPERIAL Co.: 3.5 mi. W. of Gordons Wells, 1♂, IV-10-57 (E. I. Schlinger, UCD). INYO Co.: 1 mi. N. of Lone Pine, 1♂, VI-12-64 (M. E. Irwin, UCR). LOS ANGELES Co.: Mountains near Claremont, 1♂, no date (Baker, USNM). MARIPOSA-TUOLUMNE Co.: Lake Tenaya, Yosemite National Park, 1♂, VII-20-58 (A. D. Telford, UCD). MONO Co.: Blanco's Corral, 10,000 ft., White Mts., 1♂, VI-30-53 (J. W. MacSwain, CIS). Near Monitor Pass, 1♂, VI-23-62 (C. D. MacNeill, CAS). Sonora Pass, 9,624 ft., 3♂, VIII-20-60, variant (A. S. Menke, UCD). White Mts., 3 mi. N. of Inyo Co., 10,150 ft., 2♂, VIII-20-63, flight trap (H. B. Leech, CAS). MONTEREY Co.: Arroyo Seco Camp, 1♂, VI-5-58 (R. M. Bohart, UCD). Bryson, 3♂, V-18-20 (E. P. Van Duzee, CAS). Pfeiffer Big Sur State Park, 1♀, VI-17-49 (P. H. Arnaud, CAS). PLACER Co.: Lake Forest, Lake Tahoe, 1♀, VII-16-49 (E. G. Linsley, CIS). RIVERSIDE Co.: Canyon Reservoir, Riverside, 1,387 ft., 1♂, IV-17-65 (M. E. Irwin, UCR). Corona, 1♂, III-25-32 (A. J. Basinger, HCH). 6 mi. W. of Indio, 2♂, 1♀, IV-30-49 (E. G. Linsley, CIS). Joshua Tree National Monument, Live Oak Tank, 1♂, IV-22-44 (A. L. Melander, USNM). Pinon Flat, 1♂, IV-29-53 (F. X. Williams, CAS). Riverside, 1♂, III-14-33, 1♂, III-30-33, 1♂, IV-1-33, 1♂, IV-3-33, 2♂, IV-10-33 (A. J. Basinger, HCH); 2♂, III-25-55 (J. C. Hall, UCD); 1♂, VI-8-56 (E. I. Schlinger, UCD). 7 mi. E. of Sunnymead, 4♂, V-9-64 (M. E. Irwin, UCR). 8 mi. E. of Sunnymead, 3♂, III-27-59 (J. C. Hall, UCD); 2♂, IV-16-65 (M. E. Irwin, UCR). SACRAMENTO Co.: Sacramento, 1♂, V-4-30, variant (H. H. Keifer, CDA). SAN BENITO Co.: Pinnacles National Monument, 1♂, IV-24-48 (J. W. MacSwain, CIS). SAN BERNARDINO Co.: Granite Cove, Granite Mts., 15.8 mi. SW. of Kelso, 1♂, IV-15-62 (C. A. Toschi, CIS). Mill Creek, 4♂, V-5-65, 2♂ var. (M. E. Irwin, UCR). SAN DIEGO Co.: E. Escondido, 1♂, IV-5-51 (CDA). 2 mi. NE. of Lakeside, 1♂, III-29-61 (P. D. Hurd, CIS). Oak Grove, 1♂, V-11-53 (J. Wilcox, CAS). Palomar Mtn., 1♂, VI-14-48 (A. L. Melander, USNM). Near San Vicente Res[ervoir], 1♂, VI-10-65 (J. C. Hall, UCR). SAN FRANCISCO Co.: San Francisco, 1♂, IV-18-61 (R. Brown, CAS). San Francisco Beach, 1♂, V-16-51 (E. I. Schlinger, UCD). SAN LUIS OBISPO Co.: San Luis Obispo, 1♂, IV-24-19 (E. P. Van Duzee, CAS). SANTA CLARA Co.: Stanford University, 2♂, V-21-53 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Soquel, 4♂, VI-22-24-50 (M. T. James, WSU). SIERRA Co.: Sardine Lakes, 1♂, VII-31-58 (F. E. Strong, UCR). SONOMA Co.: Maacama Creek, 1♂, VIII-24-53 (E. I. Schlinger, UCD). TRINITY Co.: Fawn Lodge, 1♀, V-28-55 (E. I. Schlinger, UCD). TUOLUMNE Co.: Pinecrest, 1♂, VI-30-48, 1♂, VIII-17-48 (P. H. Arnaud, CAS). YOLO Co.: Putah Canyon, 1♂, VI-2-62 (M. E. Irwin, UCD).

The male of *L. maculata* may be distinguished from its nearest relatives by the numerous long ventrally directed bristles on processes of sternum 5. The mesonotum, scutellum and abdomen may be more densely and extensively marked than is normal. The female may be distinguished by the absence of recurrent spinules on the terminal sclerites of ovipositor, and by its blunt or truncate form thereat.

Male specimens of *maculata* far outnumber those of females, 67 to 4, and in the absence of specimens *in coitu* the possibility that males of *innupta* may here be found cannot be overlooked. But so far the evidence is negative as deduced from an examination of the male genitalia.

*Leucophora marylandica* (Malloch)

*Hammomyia marylandica* Malloch. 1920, Amer. Ent. Soc. Trans., 46:185.

Holotype: ♂, Beltsville, Maryland (USNM).

**Geographic range.** — Alberta, British Columbia, California, Colorado, Georgia, Labrador, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ontario, Quebec, Texas.

**California record.** — INYO Co.: Ruby Lake, NW. Inyo Co., 11,500 ft., 1♀, VIII-13-57 (C. D. MacNeill, CAS).

*L. marylandica* may be distinguished from its congeners recorded from California by the longish pubescence of arista and the reddish tinge to one or more pairs of tibiae. In these respects the species is related to *johnsoni* (Stein)\*. The female of *marylandica* has a broad frons throughout, and in both sexes the prealar bristle and ventral bristle on mid tibia are absent.

*Leucophora megacephala* Hockett

*Leucophora megacephala* Hockett. 1966, Calif. Acad. Sci. Proc., ser. 4, 34:277.

Holotype: ♀, Humboldt County, California (CAS).

**Geographic range.** — California.

**California records.** — HUMBOLDT Co.: 1♀, V-14-11, type (CAS). MENDOCINO Co.: 12 mi. NE. of Rockport, 1♂, II-2-62 (J. Powell, CIS).

*L. megacephala* may be separated from its relatives by the stocky or compact haustellum, 2 posterodorsal bristles on mid tibia, and in the male by a cluster of weak bristles on the cerci. The female has a broad frons.

*Leucophora obtusa* (Zetterstedt)

*Anthomyza obtusa* Zetterstedt. 1838, Insecta Lapponica, p. 632.

Type: ♀, Lycksele Lappmark (ZIL).

**Geographic range.** — Alaska, California, Colorado, District of Columbia, Idaho, Illinois, Indiana, Kansas, Massachusetts, Michigan, Montana, New Jersey, New York, Ohio, Oregon, Pennsylvania, Quebec, Texas, Utah, Vermont, Washington, Wisconsin, Yukon Territory.

*California records.* — ALAMEDA Co.: Berkeley, 1 ♂, III-25-55 (J. Powell, CIS). Berkeley, Univ. Calif. Campus, 1 ♀, III-16-62 (A. G. Raske, CIS). Berkeley Hills, 1 ♀, III-26-54 (R. F. Smith, E. G. Linsley, CIS). Fish Ranch Road, 1 ♀, III-4-49 (E. G. Linsley, CIS). CONTRA COSTA Co.: Albany, 1 ♀, III-1-36 (P. A. McKinstry, UK). Orinda, 1 ♂, IV-27-55, variant (R. H. Goodwin, CIS). LAKE Co.: North Fork, Cache Creek Highway No. 20, 1 ♀, V-14-61 (F. D. Parker, UCD); 1 ♀, V-19-61 (J. S. Buckett, UCD). LOS ANGELES Co.: Artesia, 1 ♀, II-10-35 (M. W. Stone, HCH). Santa Monica Mts., 2 ♂, 1 ♀, III-20-50 (HCH). Tanbark Flat, 2 ♀, III-29-57 (J. Powell, CIS). Westwood Hills, 1 ♀, II-29-36 (CIS). Los Angeles Co., 1 ♀, March (CAS); 1 ♀, May (USNM). MARIN Co.: Phoenix Lake, 1 ♀, III-23-57 (J. Powell, CIS). MONTEREY Co.: San Ardo, 1 ♂, III-23-31 (E. P. Van Duzee, CAS). NAPA Co.: Putah Canyon, 4 ♂, 1 ♀, III-15-16-53 (J. C. Hall, UCD). SAN DIEGO Co.: Alpine, 1 ♀, III-31-61 (J. Powell, CIS). Julian, 1 ♀, V-5-45 (USNM). SAN JOAQUIN Co.: Wear, A.E.C., 1 ♂, II-13-60 (D. C. Rentz, CAS). SANTA CLARA Co.: Coyote, 1 ♂, III-9-47 (P. H. Arnaud, CAS). Stanford University, 1 ♂, III-29-49, 1 ♂, II-15-53, 1 ♀, III-19-54 (P. H. Arnaud, CAS). SANTA CRUZ Co.: Felton, 300-500 ft., Santa Cruz Mts., 1 ♀, V-15-19-07 (J. C. Bradley, CU). Santa Cruz, 1 ♂, V-24 (R. Latta, HCH). Soquel, 1 ♀, V-1953 (C. A. Hamsher, UCD). SONOMA Co.: 1.5 mi. S. of Asti, 1 ♀, IV-8-54 (E. I. Schlinger, UCD). Boyes Spring, 1 ♀, III-25-37 (N. W. Frazier, CIS). Cazadero, 1 ♀, IV-12-18 (J. C. Bradley, CU); 1 ♀, IV-13-18 (E. P. Van Duzee, CAS).

*L. obtusa* has eyes in both sexes closely converging toward narrower part of frons, cruciate setulae absent, and haustellum not stocky; mid tibia with a strong mid ventral bristle and fore tibia in female without preapical posterodorsal bristle. The prealar bristle is variable in length.

### *Leucophora sociata* (Meigen)

*Anthomyia sociata* Meigen. 1826, Syst. Besch., 5:98.

*Hammomyia depressa* Malloch. 1918, Amer. Ent. Soc. Trans., 44:304.

Type: ♂, locality not stated (MNHW).

*Geographic range.* — Alaska, Alberta, Arizona, British Columbia, California, Colorado, Idaho, Manitoba, Maryland, New Hampshire, Oregon, Utah, Washington, Wisconsin.

*California records.* — EL DORADO Co.: Echo Portals, 7,300 ft., 1 ♂, VII-11-46 (P. H. Arnaud, CAS). LOS ANGELES Co.: San Gabriel Canyon, 1 ♀, X-21-29 (R. H. Beamer, HCH). MONO Co.: Cottonwood Creek, 9,300 ft., 1 ♂, VII-10-61 (H. V. Daly, CIS). Mammoth Lake, 1 ♀, VII-13-33 (CAS). Poison Creek, 10,000 ft., White Mts., 1 ♂, 1 ♀, VI-26-61 (J. Powell, CIS). Sonora Pass, 9,624 ft., 2 ♀, VIII-20-60 (A. S. Menke, UCD). White Mts., 3 mi. N. of Indio Co., 10,150 ft., 1 ♀, VIII-20-63, flight trap (H. B. Leech, CAS). PLACER Co.: Carnelian Bay, Lake Tahoe, 3 ♀, X-10-59 (R. M. Bohart, UCD). RIVERSIDE Co.: Massacre Canyon, 1 ♀, V-4-65 (M. E. Irwin, UCR). TEHAMA Co.: Vina, 1 ♀, VI-11-20. TUOLUMNE Co.: Pinecrest, 1 ♂, VII-3-48 (P. H. Arnaud, CAS). Strawberry, 1 ♀, VI-21-57 (A. E. Pritchard, CIS).

The male of *L. sociata* may be distinguished from that of *cinerea*, its nearest relative, by the series of robust anteroventral bristles on hind femur, those at

the middle being stronger. In the female the palpi are narrowly flattish and pointed at apex, the hind femur has a robust mid posteroventral bristle. Females of *sociata* have been observed as active near burrows of the ground-nesting wasp *Xylocelia virginiana* Rohwer, as if for purposes of oviposition (Krombein, 1958:23).

### Genus *Proboscimyia* Bigot

*Proboscimyia* Bigot. 1883, Soc. Ent. de France, Ann., sér. 6, 3 (Bull.):xxx.

*Proboscidomyia* Bigot. 1885, Soc. Ent. de France, Ann. (1884), sér. 6, 4:266.

*Dolichoglossa* Stein. 1898, Berlin. Ent. Ztschr. (1897), 42:230.  
Type-species: *Proboscimyia siphonina* Bigot, monobasic.

The genus *Proboscimyia*, as represented by the adult stage, is allied to *Leucophora* Robineau-Desvoidy. The proboscis is longer than in *Leucophora*, and is particularly long and slender in the type species. The lower calyptral scale extends slightly beyond the margin of the upper. Nothing, so far as I am aware, is recorded of the habits of the species.

#### KEY TO SPECIES OF PROBOSCIMYIA

Proboscis (haustellum and labellum) longer than fore tarsus  
*siphonina* Bigot  
Proboscis scarcely as long as fore tarsus. . . . . *brevis* Huckett\*

### *Proboscimyia siphonina* Bigot

*Proboscimyia siphonina* Bigot. 1883, Soc. Ent. de France, Ann. sér. 6, 3 (Bull.):xxx.

*Proboscidomyia siphonina* Bigot. 1885, Soc. Ent. de France, Ann. (1884), sér. 6, 4:266.

*Dolichoglossa americana* Stein. 1898, Berlin. Ent. Ztschr. (1897), 42:230, 286.

Type: ♂, Rocky Mountains, North America (University Museum, Oxford).

*Geographic range.* — California, Colorado, Illinois, Kansas, Nebraska, New Mexico, South Dakota, Texas, Utah.

*California record.* — IMPERIAL Co.: 8 mi. N. of Glamis, sand dunes, 1 ♂, II-20-65 (E. I. Schlinger, M. E. Irwin, UCR).

### Genus *Eustalomyia* Kowarz

*Eustalomyia* Kowarz. 1873, K.-k. Zool.-Bot. Gesell. Wien, Verhandl., 23 (Abhandl.):461.

Type-species: *Musca hilaris* Fallén, original designation.

Adults of the genus *Eustalomyia* are whitish gray with strong vittate markings on thorax and transverse incisures on abdomen. The head has cheeks broad, bare and depressed or sunken below eye, face uncurved at oral margin, interfrontalia without cruciate bristles, haustellum short and thickened, labellum large; scutellum with blackish marks laterad and ventrad; wings with m-cu cross-vein sigmoid and lower

or under surface of costa bounding cell 2 C hairy; abdomen slender and cylindrical in male, hypopygium small, terminal sclerites of ovipositor without recurrent spinules; fore metatarsus with one or more slender sensory posteroventral hairs exclusive of those at base and at apex.

Larvae of *Eustalomyia* are reported to live in nests of crabronine wasps, built in herbs, shrubs and trees (Séguy, 1923:137-139). The species *vittipes*\* has been bred by Dr. K. V. Krombein from nests of *Ectemnius* (*Hypocrabro*) *paucimaculatus* (Packard) and *Euplilis rufigaster* (Packard) in Hibiscus on Plumers Island in the Potomac River.

#### KEY TO SPECIES OF EUŞTALOMYIA IN CALIFORNIA

1. Tibiae yellow and mid and hind femora partly or entirely so, arisal hairs plumose.....*vittipes* (Zetterstedt)\*  
Tibiae rufous or blackish, mid and hind femora entirely black, arisal hairs pubescent.....2
2. Arisal hairs 3 times longer than basal diameter of arista, hind tibia with preapical anterodorsal bristle longer and stronger than preapical posterodorsal...*festiva* (Zetterstedt)  
Arisal hairs scarcely longer than basal diameter of arista, hind tibia with preapical anterodorsal bristle shorter and not as strong as preapical posterodorsal.....  
*histrío* (Zetterstedt)

#### *Eustalomyia festiva* (Zetterstedt)

*Aricia festiva* Zetterstedt. 1845, Diptera Scandinaviae, 4:1424.  
Type: ♀, middle Sweden.

*Geographic range.* — California, Connecticut, Iowa, Michigan, Nevada, New Hampshire, New York, Ontario, Pennsylvania, Quebec, Washington, Wisconsin.

*California records.* — HUMBOLDT Co.: Pepperwood, 1 ♀, VI-17-35 (E. W. Baker, AMNH). MARIN Co.: Phoenix Lake, 1 ♂, V-3-62 (R. Reynolds, CAS).

#### *Eustalomyia histrío* (Zetterstedt)

*Anthomyza histrío* Zetterstedt. 1838, Insecta Lapponica, p. 676.  
*Anthomyia brixia* Walker. 1849, List Dipt. Brit. Mus., 4:946.  
Types: ♂, ♀, Lycksele Lappmark (ZIL).

*Geographic range.* — California, Michigan, New Hampshire, Nova Scotia, Quebec, Washington.

*California records.* — EL DORADO Co.: Echo Portals, 7,300 ft., 1 ♀, VII-9-46 (P. H. Arnaud, CAS). FRESNO Co.: Huntington Lake, 1 ♀, VII-14-19 (E. P. Van Duzee, CAS). SISKIYOU Co.: Panther Meadows, Mt. Shasta, 2 ♂, VIII-4-63 (P. H. Arnaud, CAS). TUOLUMNE Co.: Bumble Bee, 1 ♀, VII-2-51 (T. R. Haig, UCD).

Smith (1954:222) reared *E. histrío* from a puparium found in a living cherry trunk in Shropshire, England.

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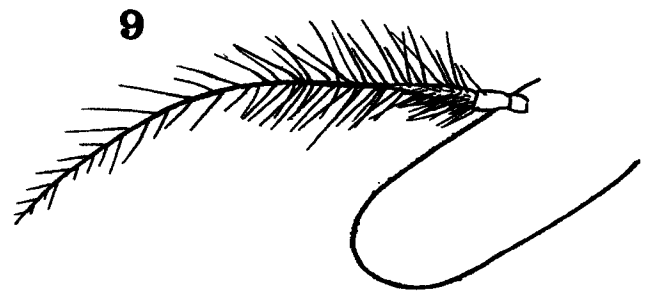
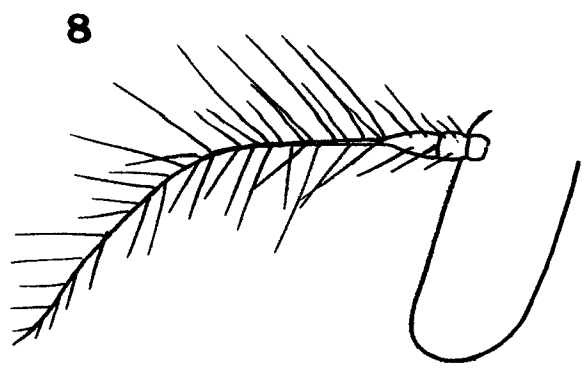
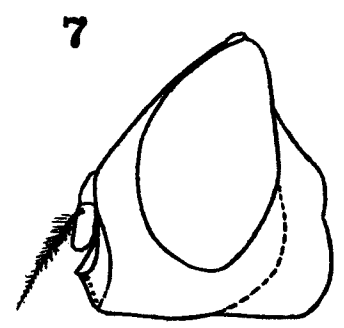
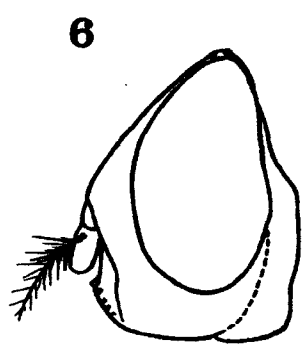
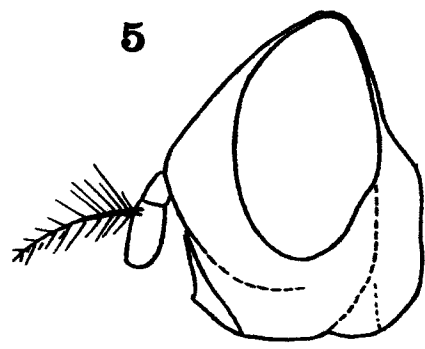
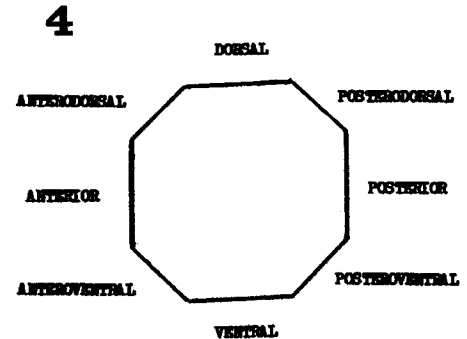
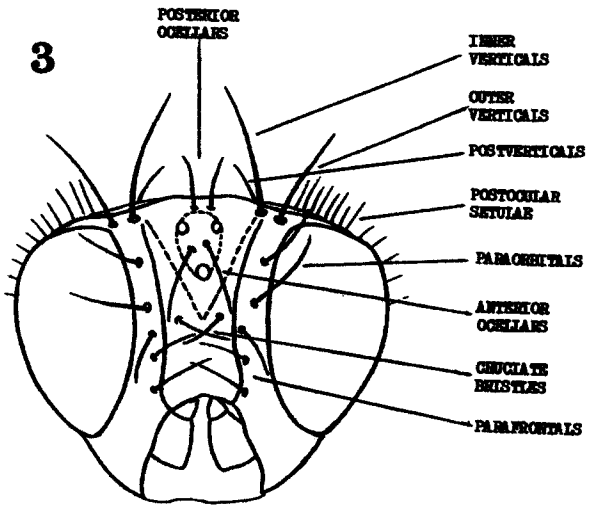
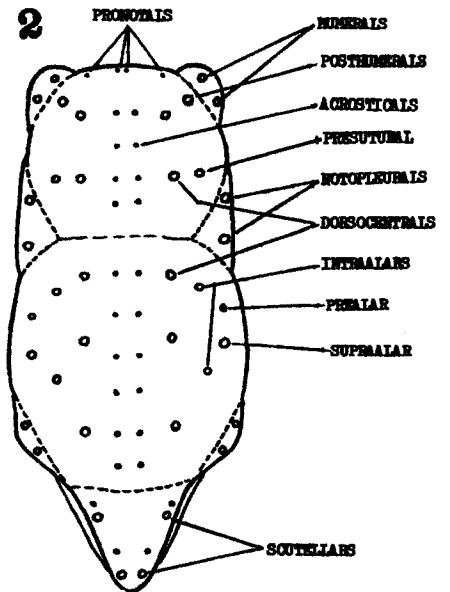
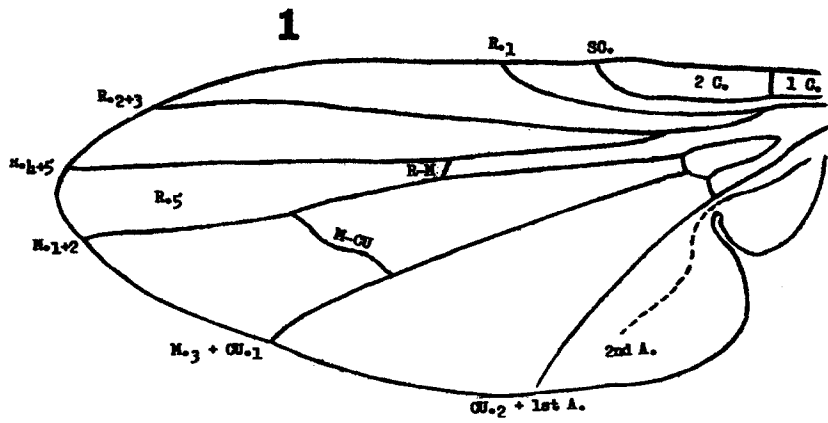
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**PLATES**

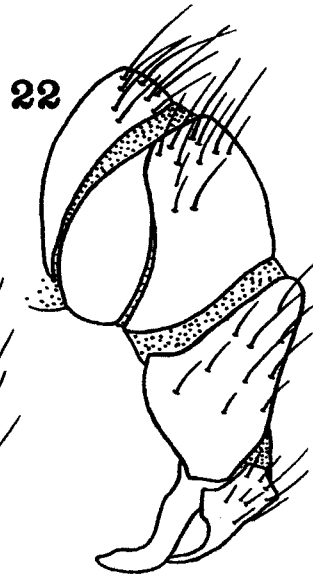
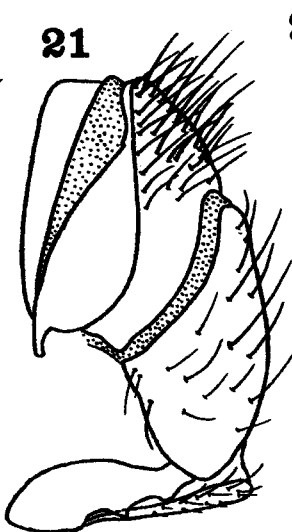
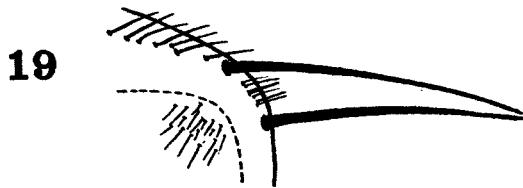
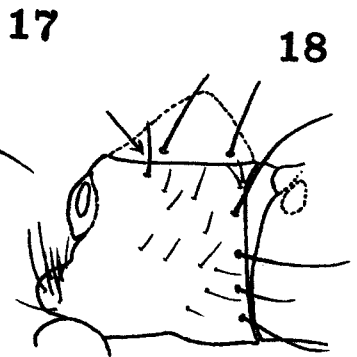
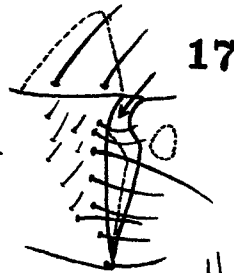
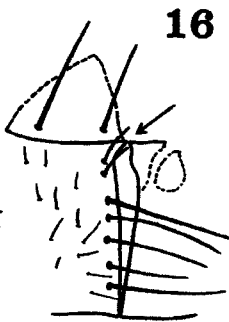
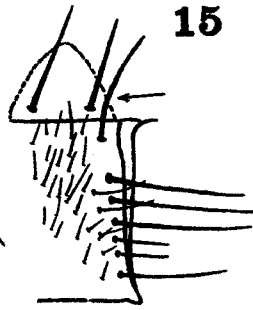
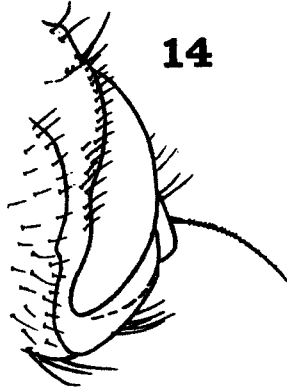
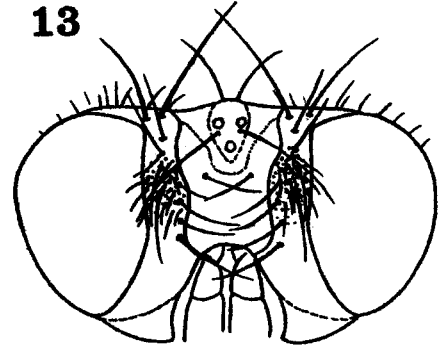
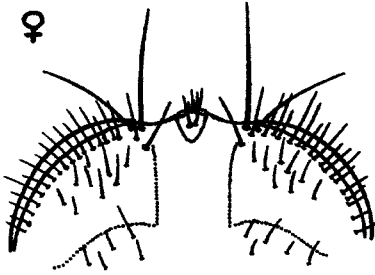
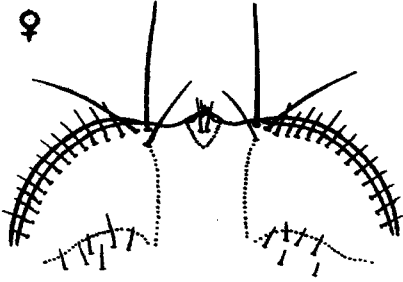
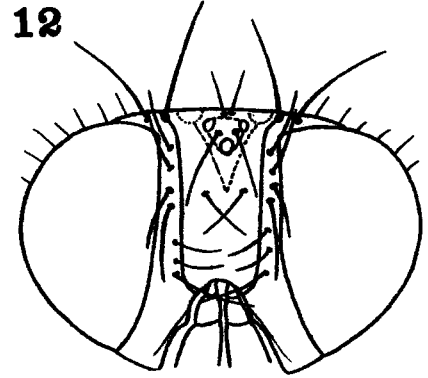
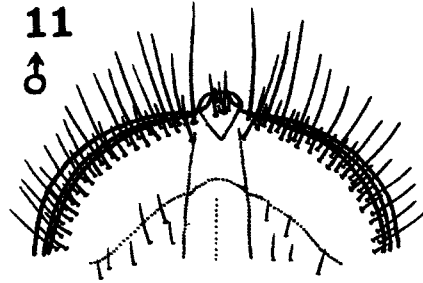
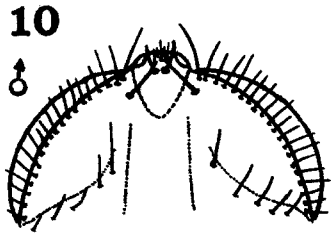
## PLATE I

- Fig. 1. Wing venation and nomenclature.  
Fig. 2. Arrangement of bristles on mesonotum and scutellum, and nomenclature.  
Fig. 3. Bristles on female head, and nomenclature.  
Fig. 4. Diagram showing cross section of leg parts with surface terminology.  
Fig. 5. *Botanophila formiceps* Hockett ♂, profile of head.  
Fig. 6. *Botanophila pseudospinidens* Hockett ♂, profile of head.  
Fig. 7. *Botanophila spinidens* Malloch ♂, profile of head.  
Fig. 8. *Botanophila emarginalis* Hockett ♀, hairing of arista.  
Fig. 9. *Botanophila spiniventris* Coquillett ♂, hairing of arista.



## PLATE II

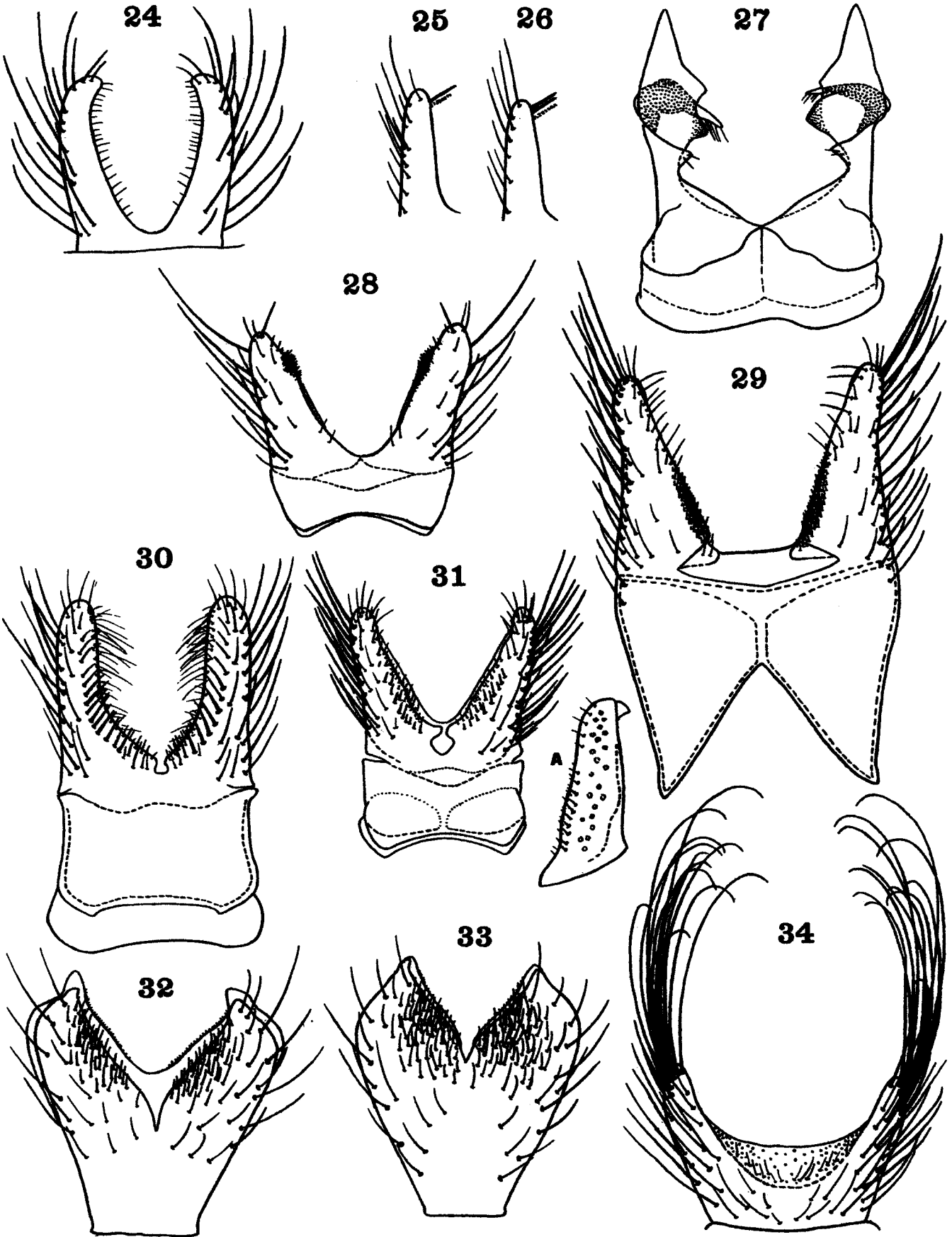
- Fig. 10. *Delia antiqua* (Meigen) ♂ ♀, setulae lacking below postocular series.
- Fig. 11. *Pegohylemyia fugax* (Meigen) ♂ ♀, setulae present below postocular series.
- Fig. 12. *Hydrophoria wierzejskii* (Mik) ♀, with narrow parafrontals.
- Fig. 13. *Hydrophoria brunneifrons* (Zetterstedt) ♀, with broad parafrontals.
- Fig. 14. *Leucophora maculata* (Stein) ♂, restricted series of postocular setulae.
- Fig. 15. *Hydrophoria borealis* Malloch ♀, robust dorsal bristle of mesopleural series.
- Fig. 16. *Delia platura* (Meigen) ♀, weak dorsal bristle of mesopleural series.
- Fig. 17. *Leucophora maculata* (Stein) ♀, weak dorsal bristles of mesopleural series.
- Fig. 18. *Lasiomma nidicola* Aldrich ♀, anterior bristle on upper border of mesopleura.
- Fig. 19. *Nupedia abnormis* Stein ♂, hairlike apical setulae of scutellum.
- Fig. 20-22. Lateral aspect of hypopygium in *Delia*, *Pegohylemyia*, *Botanophila*, exemplifying differences in dorsal conformation and bristling, semi-diagrammatic.
- Fig. 20. *Delia antiqua* (Meigen).
- Fig. 21. *Pegohylemyia fugax* (Meigen).
- Fig. 22. *Botanophila inornata* Stein\*.
- Fig. 23. *Calythea micropteryx* (Thomson) ♂, setulae on hypopleural region.



## PLATE III

Ventral aspect of sternum 5 in male.

- Fig. 24. *Chiastocheta solidiceps* Hockett, processes.
- Fig. 25. *Delia propinqua* Hockett, process.
- Fig. 26. *Delia garretti* Hockett, process.
- Fig. 27. *Pseudonupedia intersecta* (Meigen).
- Fig. 28. *Phorbia nitidula* (Coquillett).
- Fig. 29. *Phorbia lobata* Hockett.
- Fig. 30. *Botanophila emarginalis* Hockett.
- Fig. 31. *Botanophila marginella* Malloch. A, lateral view of process, bristles omitted.
- Fig. 32. *Nupedia acutipennis* Malloch.
- Fig. 33. *Nupedia dissecta* of authors\*.
- Fig. 34. *Delia setiventris* Stein, sternum 4.

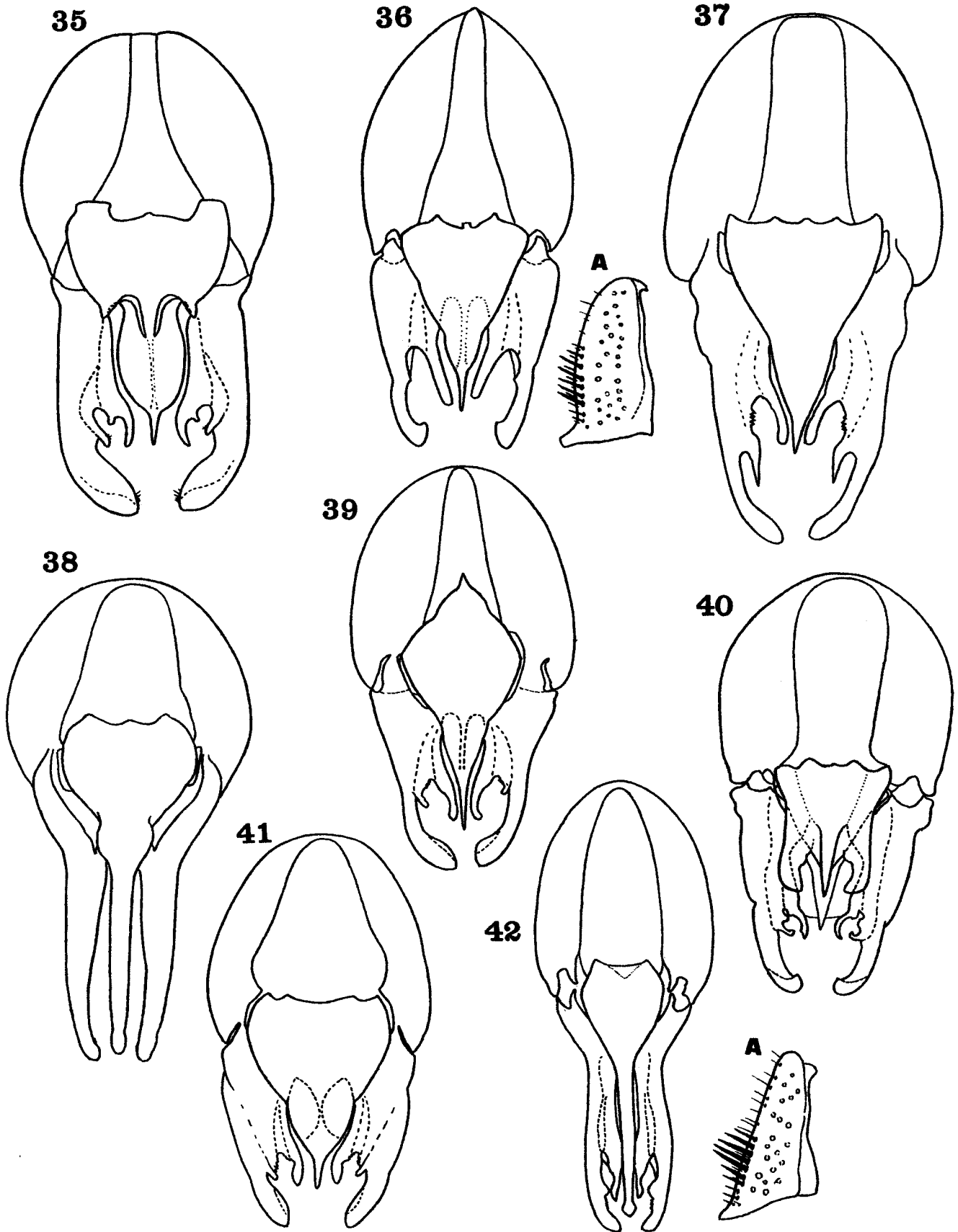


## PLATE IV

Dorsal or caudad aspect of male copulatory appendages, bristles omitted.

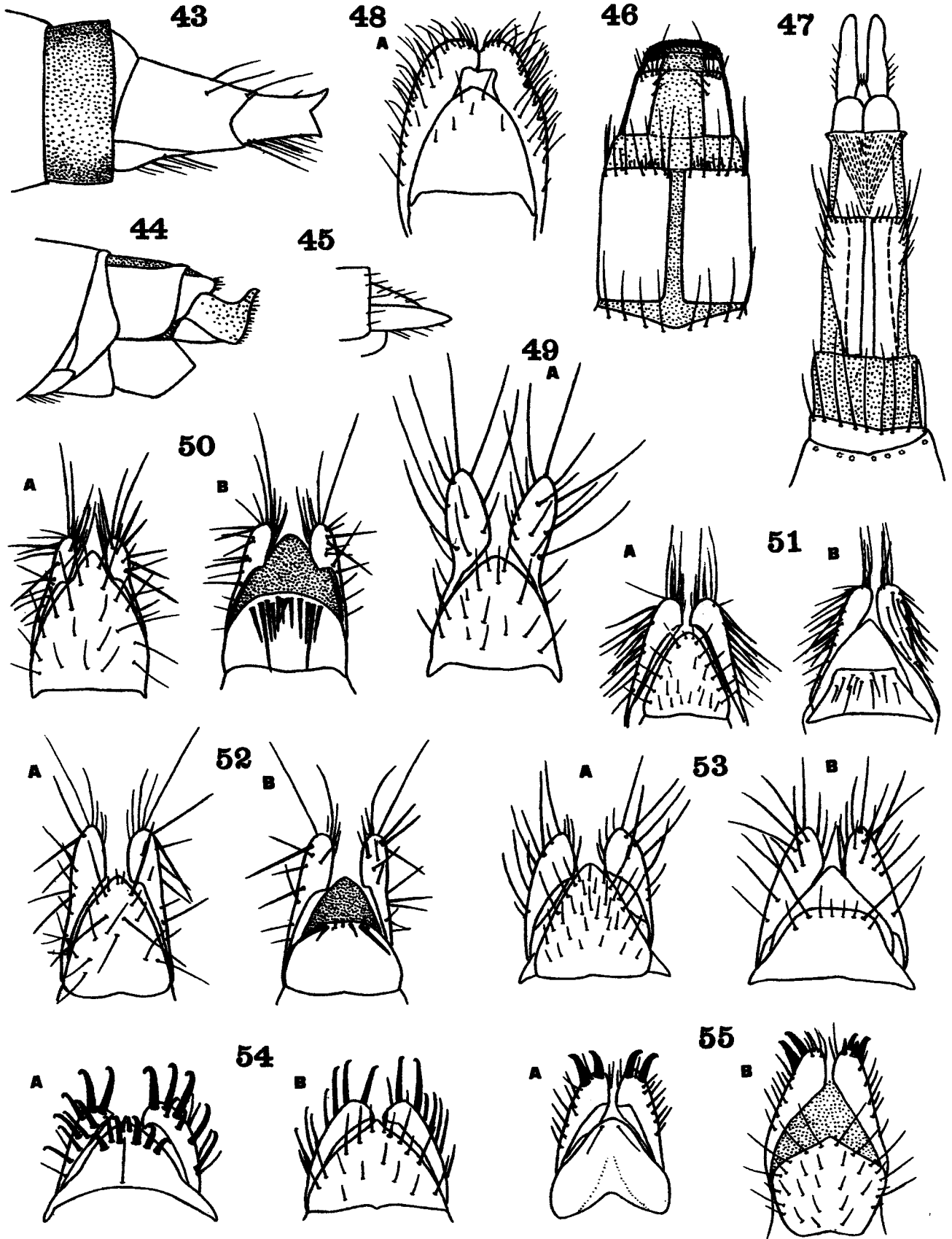
- Fig. 35. *Botanophila emarginalis* Hockett.  
Fig. 36. *Botanophila varicolor* (Meigen)\*. A, lateral view of process of sternum 5.  
Fig. 37. *Botanophila piloseta* Malloch.  
Fig. 38. *Botanophila fibulans* Hockett.  
Fig. 39. *Botanophila acuticauda* Hockett.  
Fig. 40. *Botanophila trifurcata* Hockett.  
Fig. 41. *Botanophila marginella* Malloch.  
Fig. 42. *Botanophila spinidens* Malloch. A, lateral view of process of sternum 5.





## PLATE V

- Fig. 43. *Macateeia protuberans* Malloch\*, lateral aspect of ovipositor.  
Fig. 44. *Phorbia sombrosa* Hockett, lateral aspect of ovipositor.  
Fig. 45. *Pegohylemyia vallaris* Hockett, lateral view of terminal sclerites of ovipositor.  
Fig. 46. *Chiastocheta solidiceps* Hockett, dorsal aspect of ovipositor.  
Fig. 47. *Pegomya glabra* (Stein), dorsal aspect of ovipositor.  
Fig. 48-55. Terminal or caudal sclerites of ovipositor. A, dorsal; B, ventral aspects.  
Fig. 48. *Pegohylemyia impersonata* Hockett.  
Fig. 49. *Pegohylemyia discreta* (Meigen).  
Fig. 50. *Delia normalis* Malloch.  
Fig. 51. *Delia albula* (Fallén).  
Fig. 52. *Delia aemene* (Walker).  
Fig. 53. *Delia deviata* Hockett.  
Fig. 54. *Delia neomexicana* Malloch.  
Fig. 55. *Leucophora obtusa* (Zetterstedt).



## PLATE VI

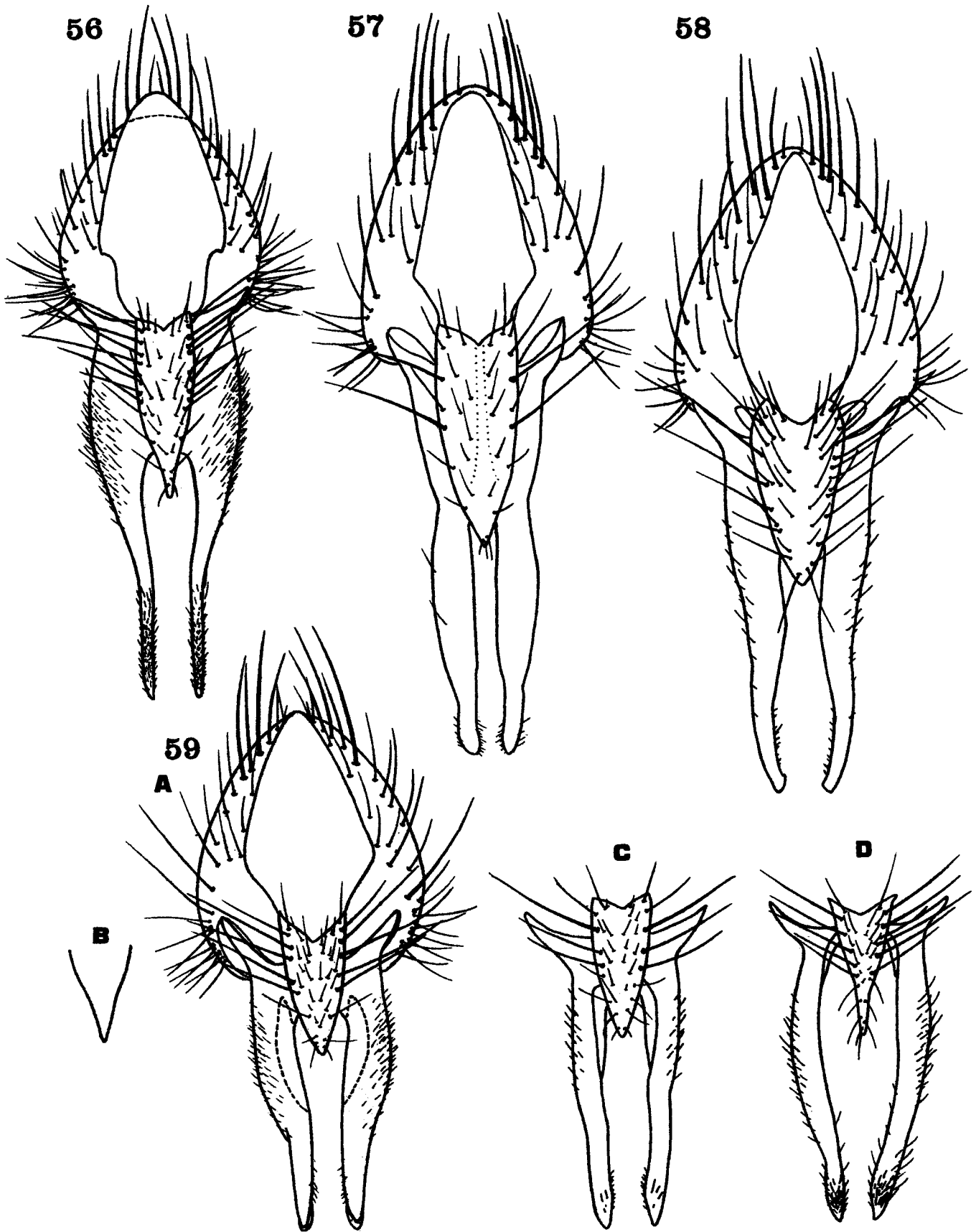
Dorsal or caudal aspect of male copulatory appendages.

Fig. 56. *Delia cerealis* (Gillette)\*.

Fig. 57. *Delia concordia* Hockett.

Fig. 58. *Delia lupini* (Coquillett).

Fig. 59. *Delia neomexicana* Malloch. A, Yosemite; B, Sonora Pass; C, Tennessee Pass, Colorado;; D, Ruby Lake.

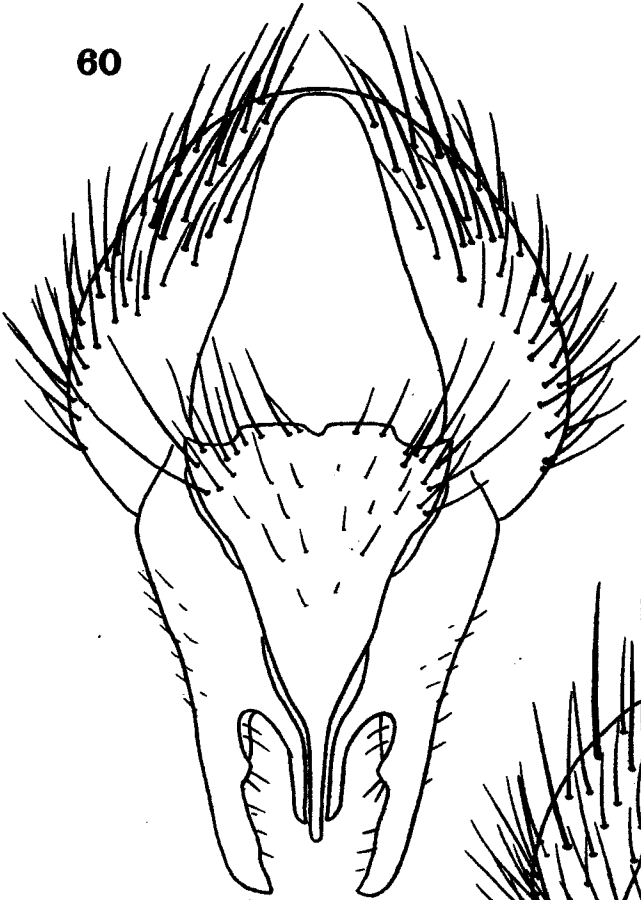


## PLATE VII

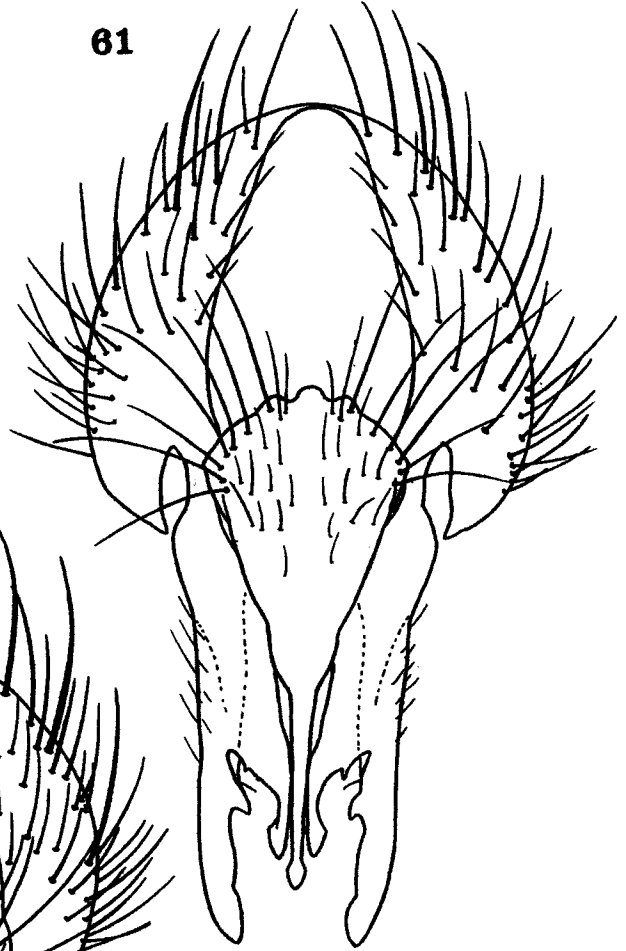
Dorsal or caudal aspect of male copulatory appendages.

- Fig. 60. *Botanophila sperata* Hockett.
- Fig. 61. *Botanophila formiceps* Hockett.
- Fig. 62. *Botanophila pseudospinidens* Hockett.
- Fig. 63. *Hydrophoria brunneifrons* (Zetterstedt).
- Fig. 64. *Hydrophoria frontata* (Zetterstedt).

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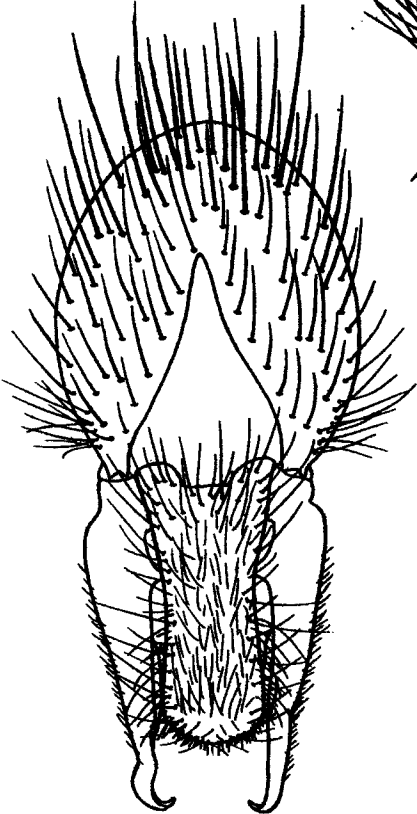
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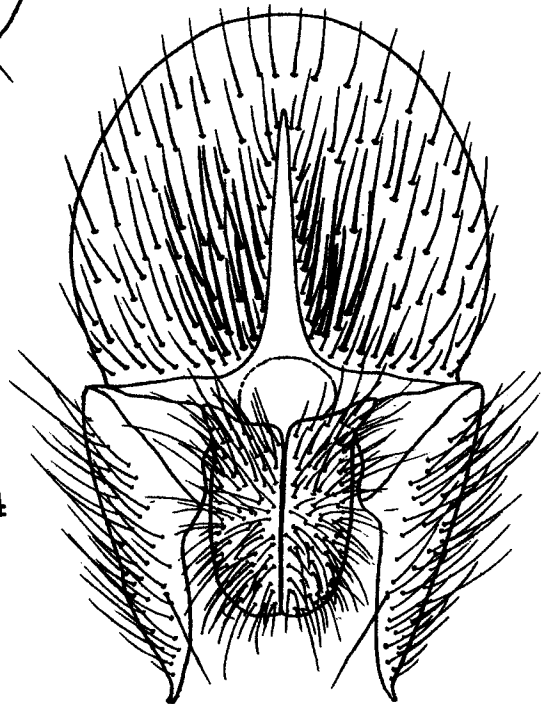
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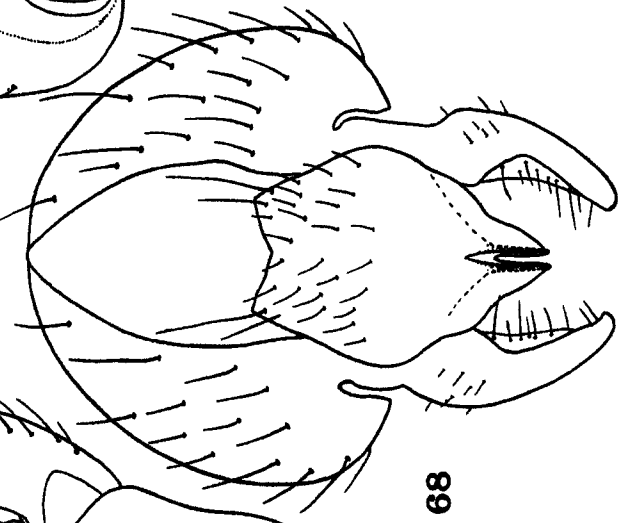
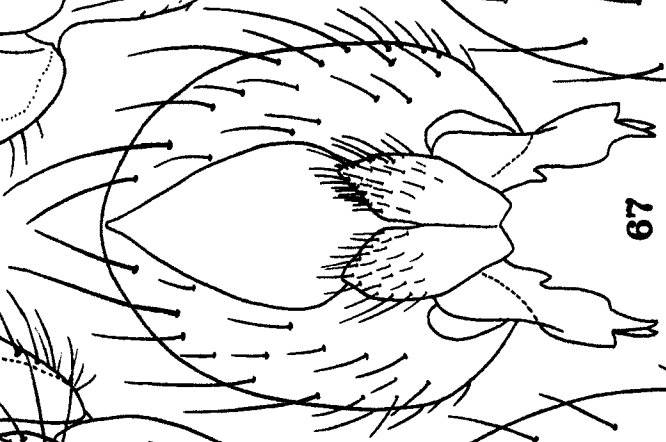
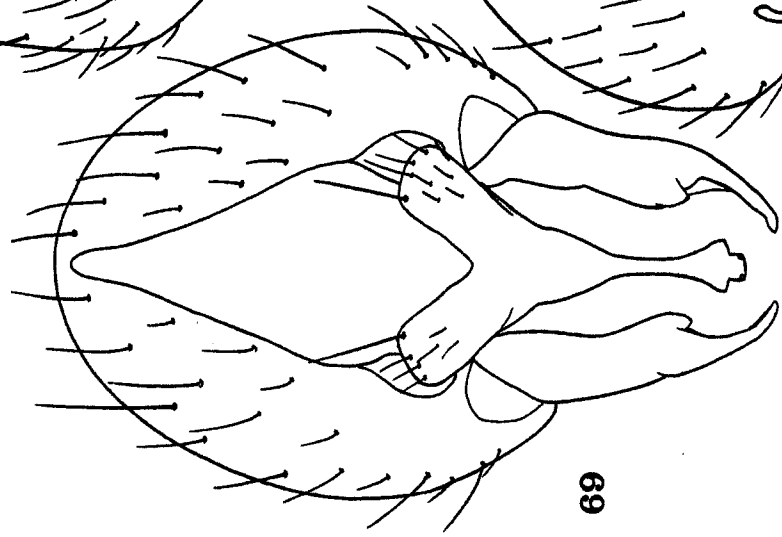
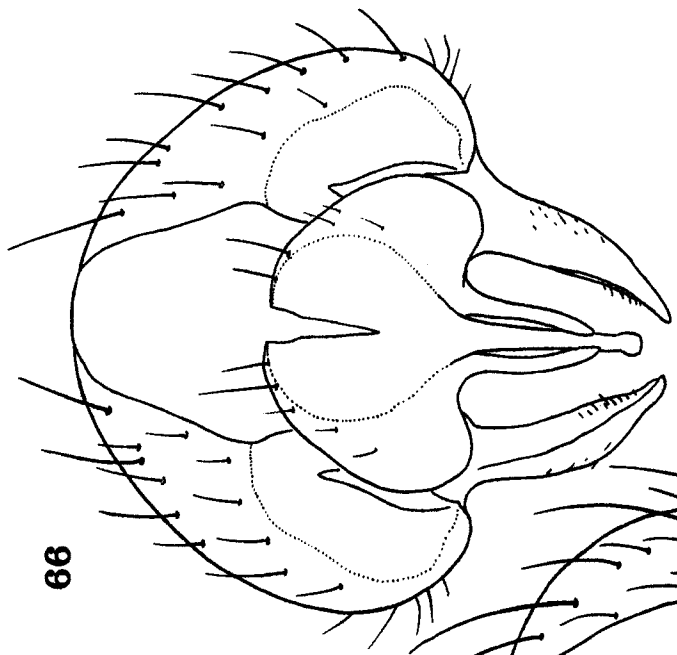
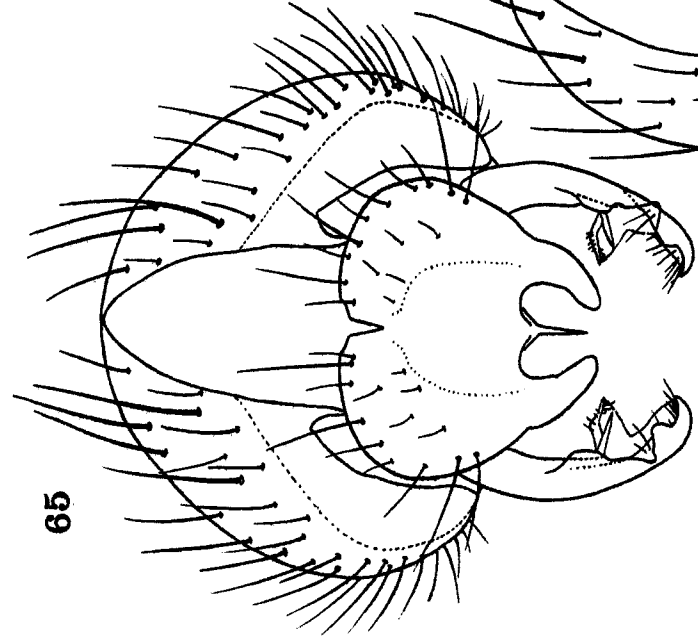


## PLATE VIII

Dorsal or caudal aspect of male copulatory appendages.

- Fig. 65. *Pegohylemyia salutaris* Hockett.
- Fig. 66. *Pegohylemyia sodalis* Hockett.
- Fig. 67. *Pegomya hirticauda* Hockett.
- Fig. 68. *Pegohylemyia vallis* Hockett.
- Fig. 69. *Egle steini* Schnabl.
- Fig. 70. *Egle parvaeformis* Schnabl.

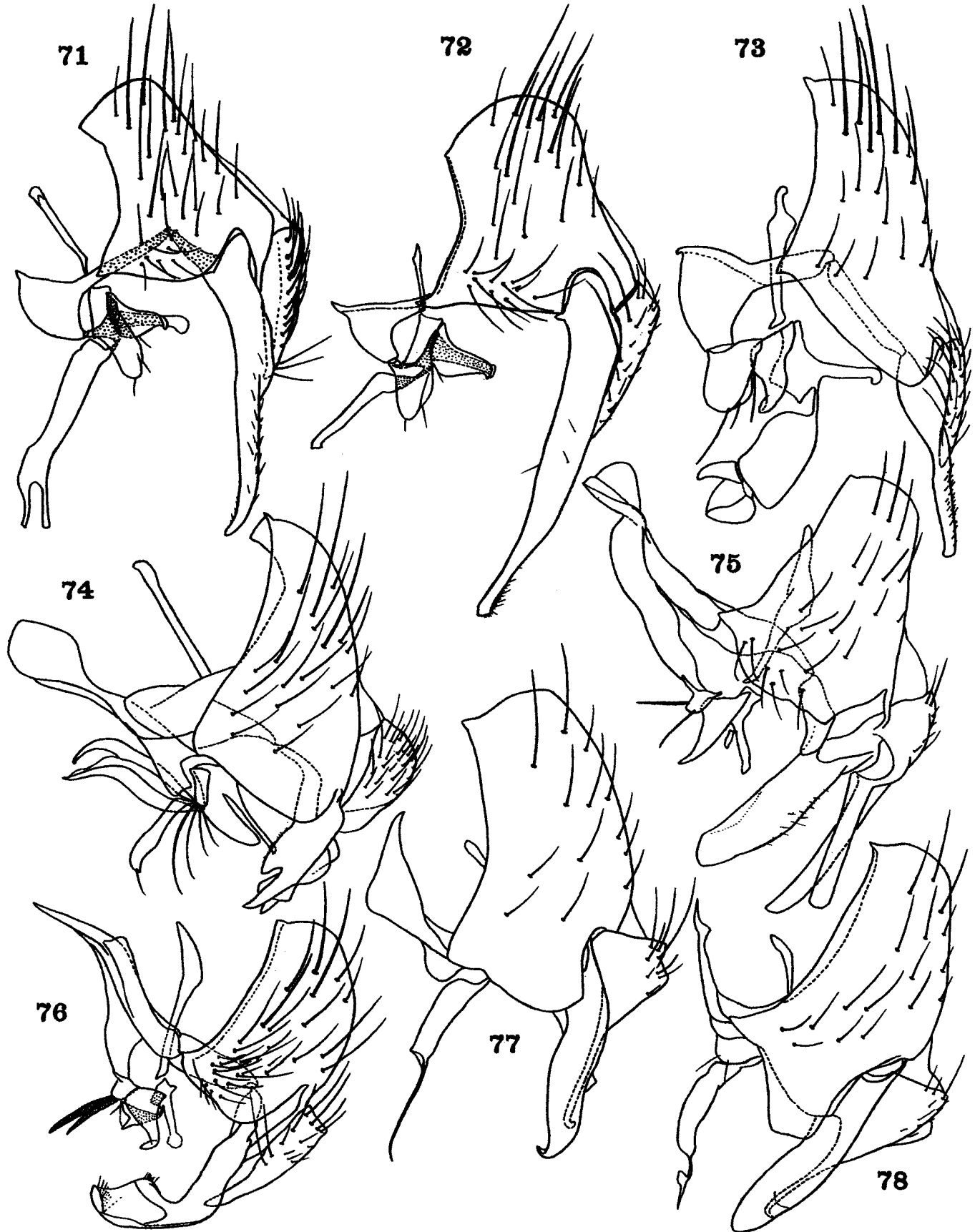




## PLATE IX

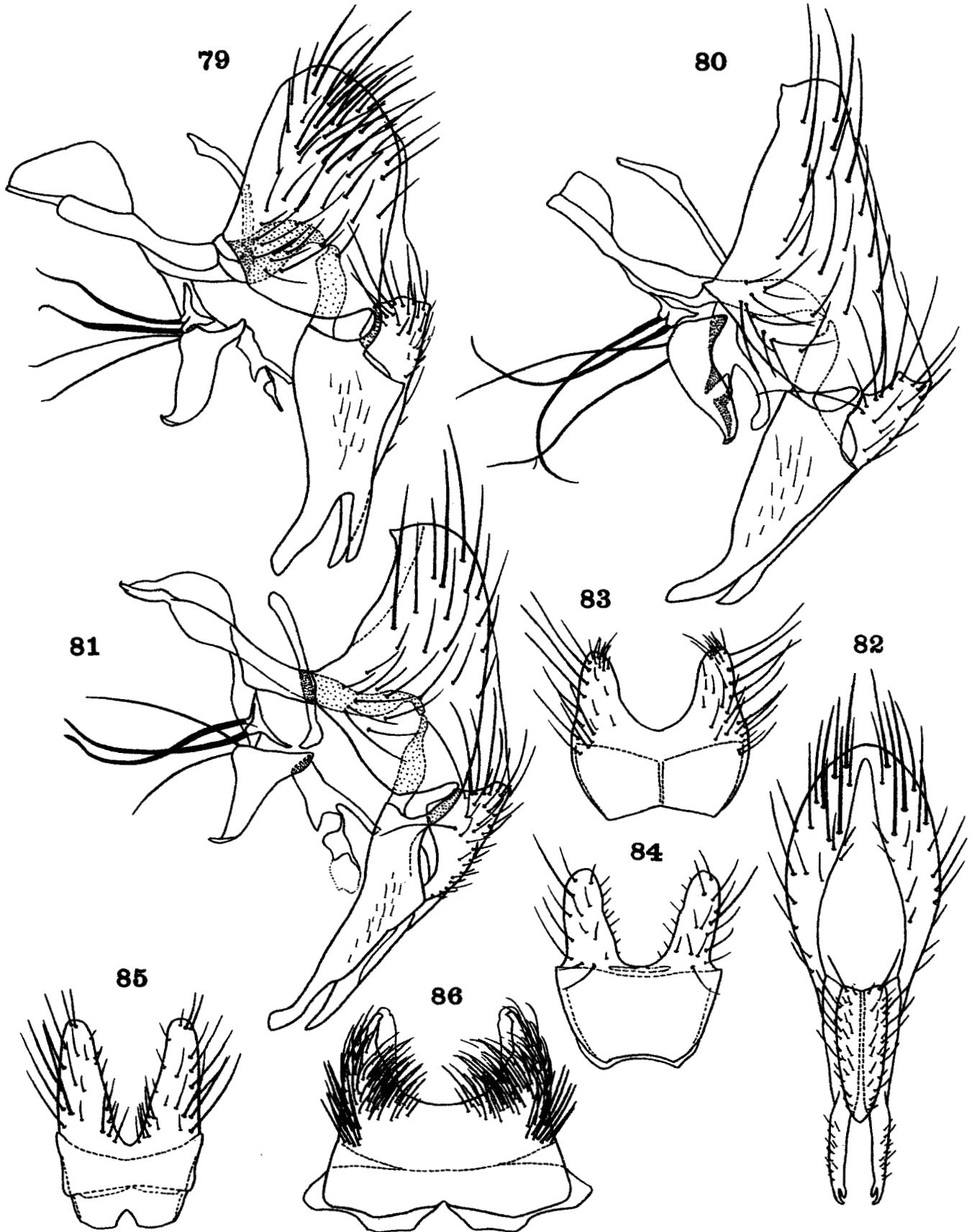
Lateral aspect of male copulatory appendages and genitalia.

- Fig. 71. *Delia lupini* (Coquillett).
- Fig. 72. *Delia concordia* Hockett.
- Fig. 73. *Pegomya affinis fuscopunctata* Hockett.
- Fig. 74. *Pegomya hirticauda* Hockett.
- Fig. 75. *Pegohylemyia sodalis* Hockett.
- Fig. 76. *Pegohylemyia salutaris* Hockett.
- Fig. 77. *Egle parvaeformis* Schnabl.
- Fig. 78. *Egle steini* Schnabl.



## PLATE X

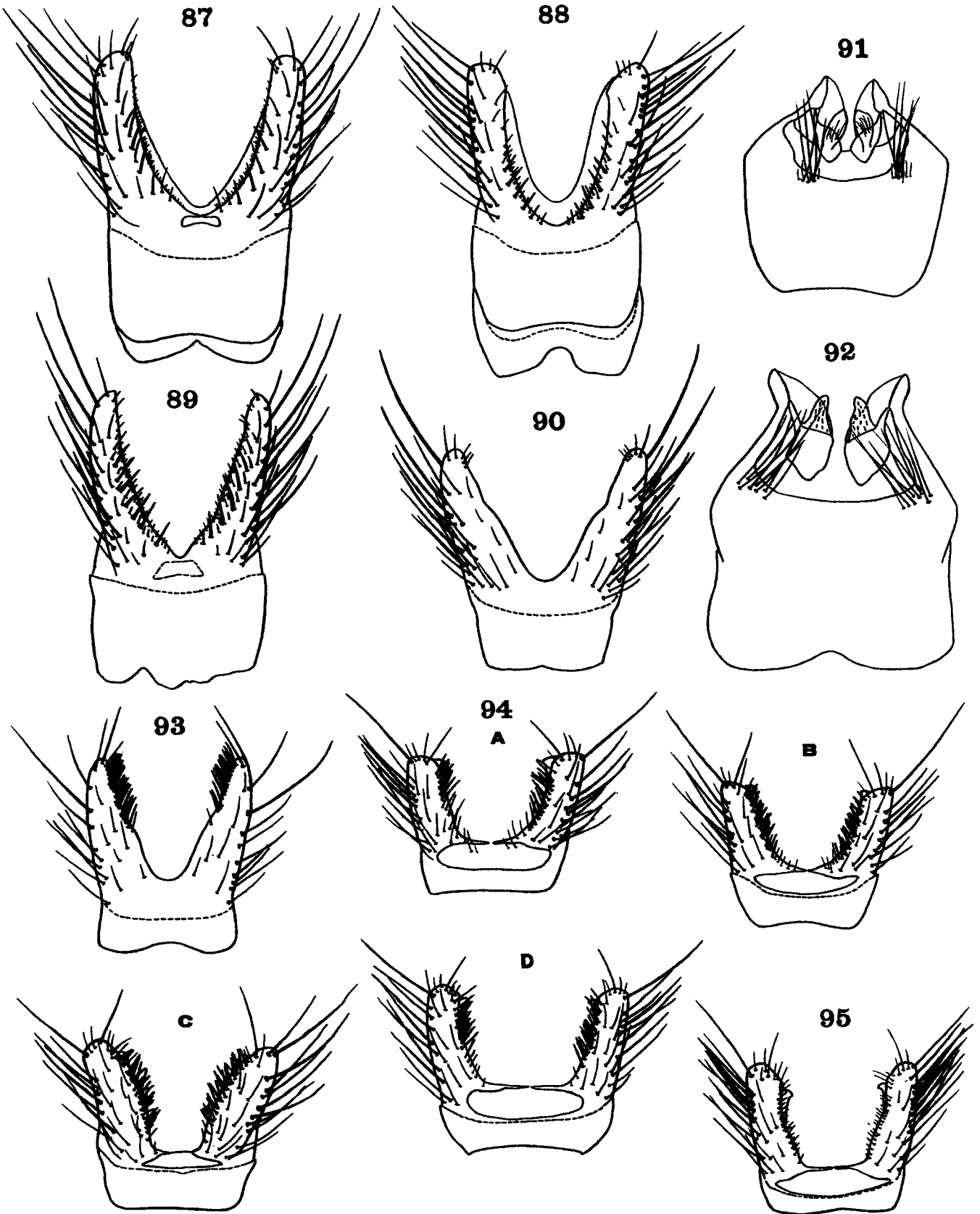
- Fig. 79. *Botanophila sperata* Hockett, lateral aspect of male copulatory appendages.
- Fig. 80. *Botanophila formiceps* Hockett, lateral aspect of male copulatory appendages.
- Fig. 81. *Botanophila pseudospinidens* Hockett, lateral aspect of male copulatory appendages.
- Fig. 82. *Pegomya affinis fuscopunctata* Hockett, dorsal or caudal aspect of male copulatory appendages.
- Fig. 83. *Pegomya affinis fuscopunctata* Hockett, ventral aspect of sternum 5 of male.
- Fig. 84. *Pegohylemyia sodalis* Hockett, ventral aspect of sternum 5 of male.
- Fig. 85. *Pegohylemyia salutaris* Hockett, ventral aspect of sternum 5 of male.
- Fig. 86. *Pegomya hirticauda* Hockett, ventral aspect of sternum 5 of male.



## PLATE XI

Ventral aspect of sternum 5 of male.

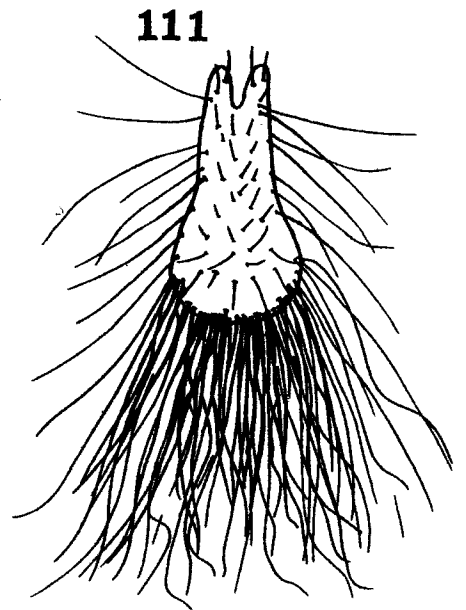
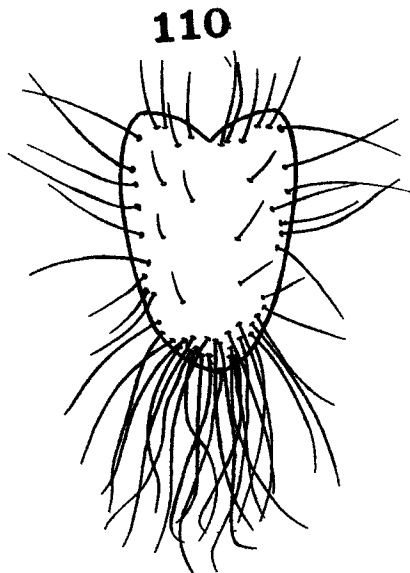
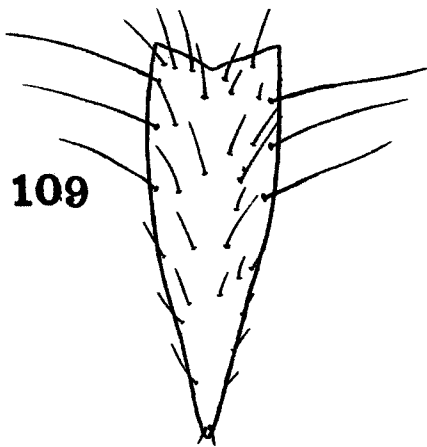
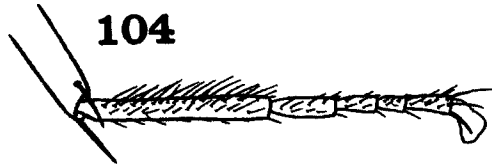
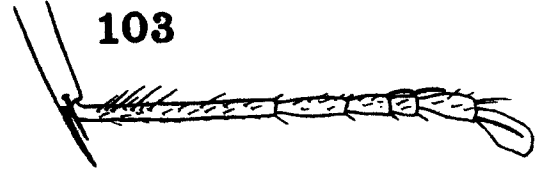
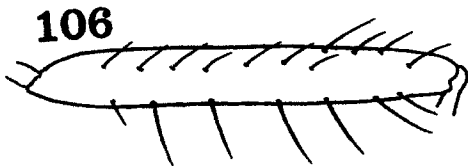
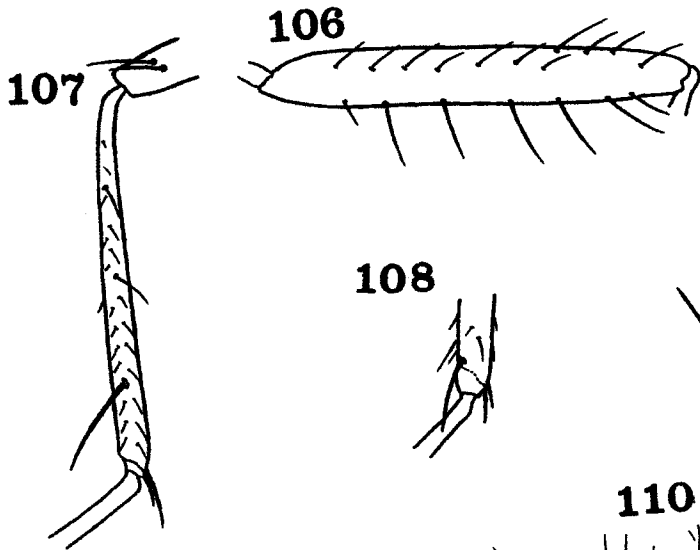
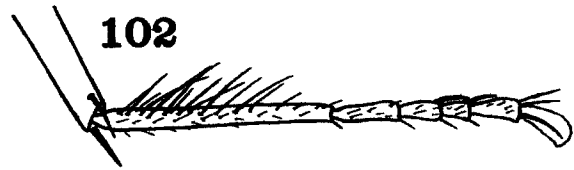
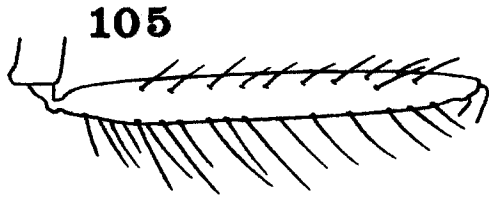
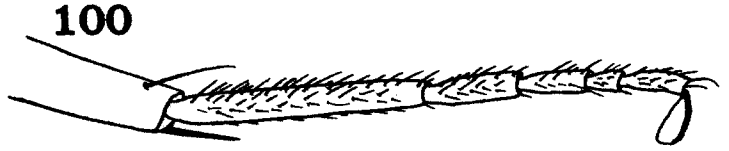
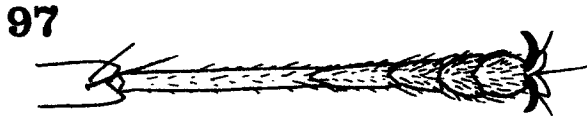
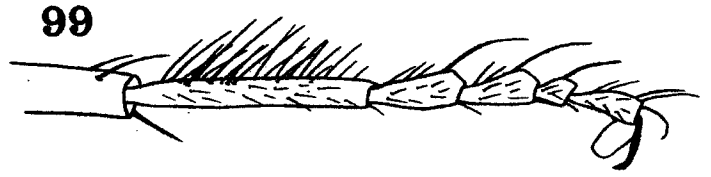
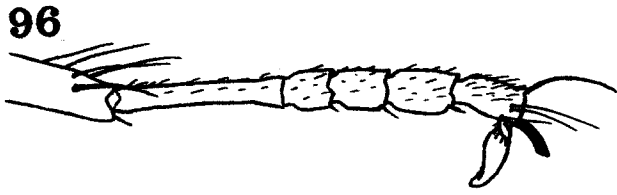
- Fig. 87. *Botanophila formiceps* Hockett.  
Fig. 88. *Botanophila pseudospinidens* Hockett.  
Fig. 89. *Botanophila sperata* Hockett.  
Fig. 90. *Delia lupini* (Coquillett).  
Fig. 91. *Egle parvaeformis* Schnabl.  
Fig. 92. *Egle steini* Schnabl.  
Fig. 93. *Delia concorda* Hockett.  
Fig. 94. *Delia neomexicana* Malloch. A, Yosemite; B, Sonora Pass; C, Tennessee Pass, Colorado; D, Ruby Lake.  
Fig. 95. *Delia cerealis* (Gillette)\*.



## PLATE XII

- Fig. 96. *Hydrophoria wierzejskii* (Mik) ♂, lateral aspect of fore tarsus.  
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