

*Urophora formosa* (Coq.) ovipositing in flower head of *Grindelia camporum* Greene. (Courtesy of I. E. Savage and G. M. Buxton.)



*Paracantha gentilis*. Her. ovipositing in thistle, Mill Valley, V-54. (Courtesy of E. S. Ross.)

BULLETIN OF THE CALIFORNIA INSECT SURVEY

VOLUME 7

**THE FRUIT FLIES OR TEPHRITIDAE  
OF CALIFORNIA**

BY

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UNIVERSITY OF CALIFORNIA PRESS  
BERKELEY AND LOS ANGELES

1963

**BULLETIN OF THE CALIFORNIA INSECT SURVEY**

**Editors: E. G. LINSLEY, R. M. BOHART, P. D. HURD, R. L. USINGER**

**Volume 7**

**Submitted by editors April 6, 1962**

**Issued June 15, 1963**

**Price, \$4.00**

**UNIVERSITY OF CALIFORNIA PRESS**

**BERKELEY AND LOS ANGELES**

**CAMBRIDGE UNIVERSITY PRESS**

**LONDON, ENGLAND**

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# THE FRUIT FLIES OR TEPHRITIDAE OF CALIFORNIA

BY

RICHARD H. FOOTE AND F. L. BLANC

## INTRODUCTION

THE FAMILY TEPHRITIDAE is restricted to the temperate, subtropical, and tropical parts of the world. About 4,000 species have been described. Of the approximately 230 North American species, 105 have been found in California. The body lengths of species of this family range from 1 to over 20 mm, and the wings usually have yellow, brown, or black spots or stripes, in positions characteristic of the species.

Members of the family are intimately associated with plants. In the typical developmental cycle, gravid females insert their eggs into their plant hosts with an eversible, sclerotized ovipositor. The developing larva sheds its skin twice as it feeds and grows. An inactive fourth-instar larval stage within the puparium precedes the formation of a pupa. This process may take place within or on the host plant, but pupation itself most often occurs in the soil. Upon emergence the adult gradually attains sexual maturity and mates, and the life cycle is completed. Diapause is inherent in many temperate-zone tephritids but has been inadequately studied.

The family can be divided into two major morphological groups, both illustrated by species present in California. One of these groups is represented by the subfamily Tephritinae, most species of which oviposit in the flower heads of a large number of plants, principally composites. The larvae are short and stout and live in the ovaries and seeds of their host plants. Adults can almost always be recognized by the wing pattern, a dark field containing numerous hyaline spots. All other subfamilies are of the second group, which is characterized by a larger size, an elongated larva, and an adult wing pattern of dark spots or stripes, or a combination of both, on a hyaline field. Larvae of the second group usually live in and often seriously damage all kinds of fleshy fruits and some vegetables. However, within both

groups, especially the second, some species fall outside this general pattern by mining in and forming galls on leaves, stems, and roots.

Host races are common, probably because larvae are restricted so completely to live, healthy plant tissue as a source of food. Available evidence indicates that host races may be rather rapidly formed within a species. It is generally assumed that physiological differences, the first to appear, enable a population formerly using only one species of plant as a host to maintain itself on another with apparent ease. These populations are often beyond detection by the museum taxonomist if the differences are of relatively recent origin; they are among the most difficult of taxonomic problems. It is also generally assumed that morphological differences eventually appear if the original physiological differences are maintained, and the degree to which these observable characters are distinct then becomes, in a general way, a criterion of how long the physiological differences have existed. As debatable as these assumptions may be, the fact remains that some species are morphologically separable only by extremely obscure characters, even in flies as highly decorated as some tephritids, and satisfactory identifications can be made only when such supporting data as host, locality, and date are supplied with the specimen.

Some of the most perplexing of these host relationships—especially in California—are found in the genus *Rhagoletis*, in which the adaptation of certain morphologically distinct adults to unusual host plants, or their restriction to others, is still unstudied. Details of some of these relationships will be found in the discussions of pertinent species in this Bulletin; a review of these relationships and other biological observations will be found in Christenson and Foote (1960).

Several species of *Dacus*, *Anastrepha*, *Ceratitis*, and

*Rhagoletis* are highly destructive of commercially grown fruits and vegetables throughout the world. Of these, the genus *Rhagoletis* is the only one indigenous to the State. Its economic importance is discussed on pages 54 and 55. *Dacus cucurbitae* Coq., *D. dorsalis* Hend., and *Anastrepha ludens* (Lw.) have been field collected in California and are also discussed below. These three species, and the Mediterranean fruit fly, *Ceratitidis capitata* (Wied.), could exist indefinitely within the borders of California, as shown by climatic cabinet studies. Because the California climate is favorable, and because an ever-increasing likelihood of their introduction there exists, these species pose a constant threat to the State's agricultural and economic future.

The first taxonomic summary of North American Tephritidae was presented by Loew (1862). In this work Loew placed all the known species in the genus *Trypeta*. In 1873 he again reviewed the family, but in much greater detail, assigning the North American species to various genera on the basis of his experience with the European fauna. Little more was done until the turn of the century, when the work of Snow, Doane, Cresson, and Coquillett added the descriptions of many new species, especially from the southwestern United States, to the North American literature. From the 1920's to the present, refinements have been made by Benjamin, Johnson, Curran, Phillips, Malloch, Quisenberry, and others. In spite of the widespread interest in these beautiful flies, the North American members of the family have never been completely reviewed under one cover. The present Bulletin is the most comprehensive area survey since the appearance of Phillips' (1923) review of the Tephritidae of northeastern North America.

No intensive investigation of the phylogeny of the family has ever been undertaken. Because the artificial key to genera presented in this Bulletin is effective, and because so little is known about the origins and evolution of Tephritidae, we have not attempted any kind of supergeneric taxonomy in this work.

### MORPHOLOGY

The following morphological notes review the terminology used in this Bulletin and discuss the limits of modification of some of the taxonomic characters encountered in the California members of the family. Only those terms likely to cause confusion are presented.

#### Head

(Figs. 1, 8)

*Frons*.—The proportion of width to length is

measured between the eyes at the vertex and between the vertex and the lunule (fig. 1). The upper fronto-orbital bristles are always present, usually in two pairs, but one or three pairs may be present. The lower fronto-orbitals vary from one to five pairs, but are usually present in two or three pairs.

*Face*.—That portion of the head extending from the antennae to the anterior oral margin (fig. 1). The gena is measured vertically from the oral margin to the bottom of the compound eye. Its genal bristle is usually found directly below the eye. The antero-lateral margin of the oral opening is occasionally rather heavily haired. The postocular bristles are always present and may be dark and slender or rather robust, light colored, and blunt tipped.

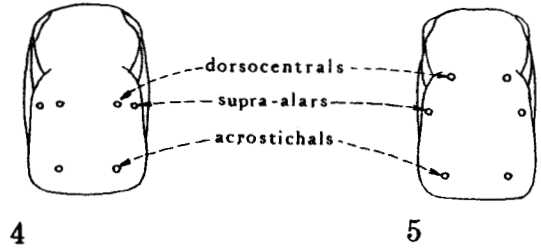
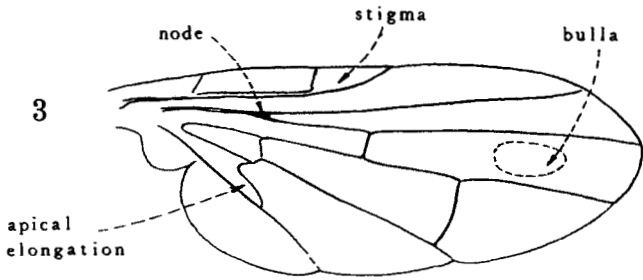
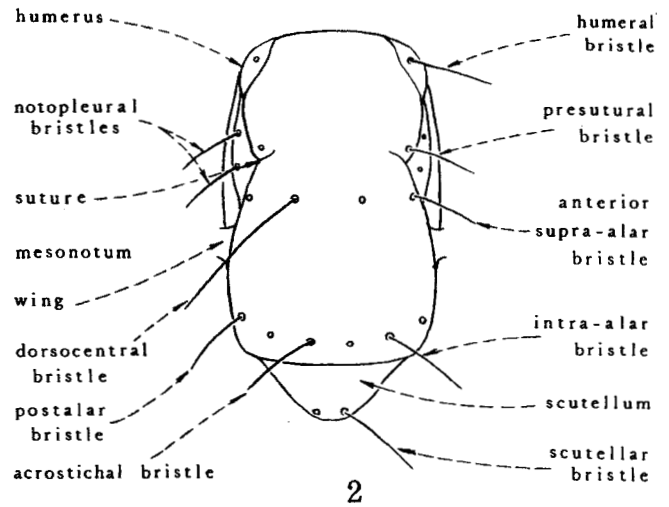
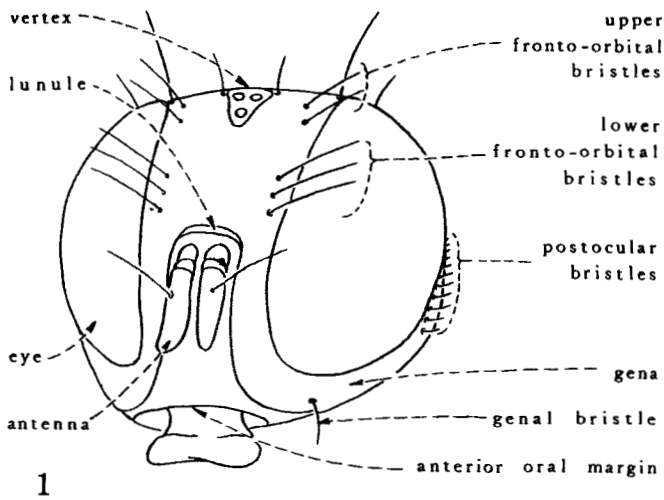
*Antenna*.—The third segment, usually rounded apically, sometimes has a distinct apicodorsal point, as in all species of the genus *Rhagoletis*, and is provided with an arista, which may be varicolored but is never plumose.

*Mouthparts*.—These consist of a rostrum and labellum. In such genera as *Dioxyna*, *Paroxyna*, *Rhyncicina*, and *Urophora*, the labellum is slender and attached by its anterior end to the rostrum, thus forming a geniculate structure (fig. 8).

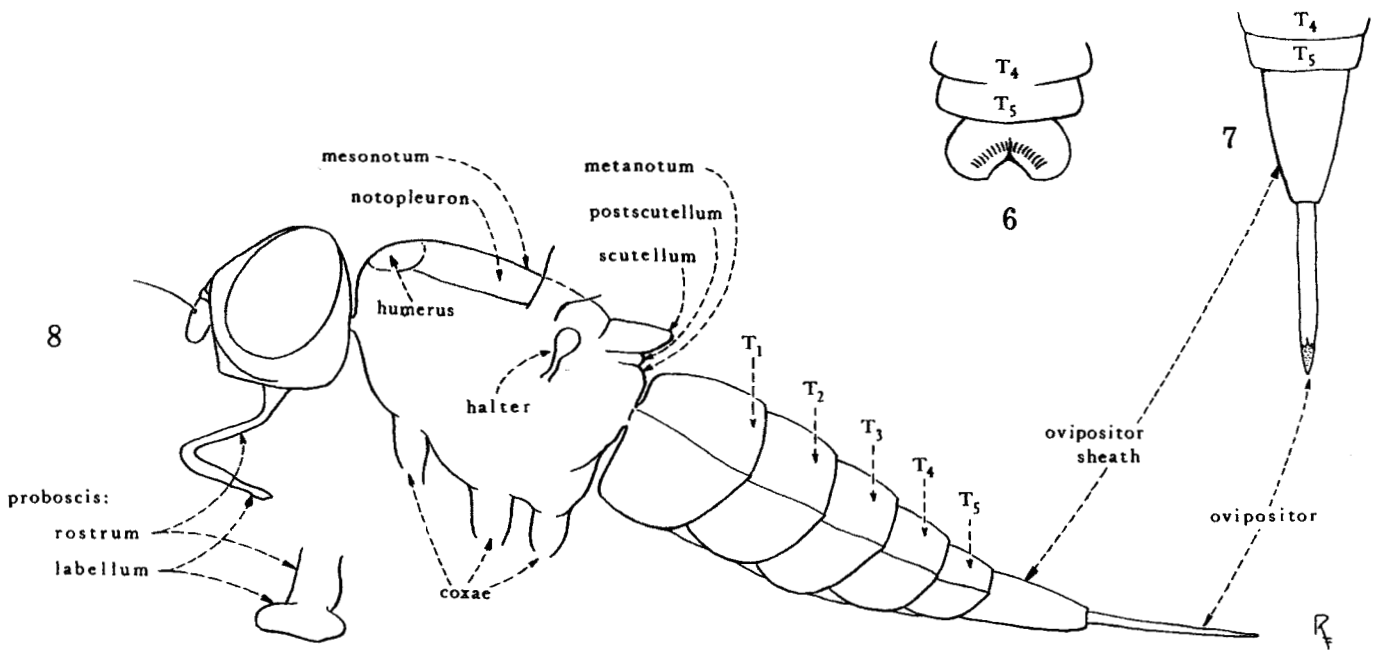
#### Thorax

(Figs. 2-5, 8, 9)

The mesonotum and scutellum of many species of tephritids are ornamented with a color pattern of tomentum or pollinosity, usually of specific or generic significance. The mesonotum is always interrupted by an incomplete suture. California tephritids usually have the following complement of dorsal and dorso-lateral bristles: one pair of humerals; one pair of presuturals (except in *Epochra*); one pair of anterior supra-alars; one pair of postalars; one pair of intra-alars; one pair of acrostichals; one pair, sometimes two, of dorsocentrals; and two pairs of notopleurals. All these bristles are relatively stable in position, as shown in figure 2, except the dorsocentrals. The dorsocentrals are found in a number of positions. In this Bulletin their location is described as "closer to the acrostichals than to the anterior supra-alars" or "in a line drawn between the anterior supra-alars" (figs. 2, 4) or "closer to the suture than to a line drawn between the supra-alars" (fig. 5). The scutellum of *Procecidochares* species is distinctively enlarged and shining dark brown or black, and the postscutellum and metanotum (fig. 8) sometimes bear color patterns of importance. One or two pairs of scutellar bristles are present in California species, the distal pair sometimes rather short. Features of the legs, except for certain bristles (described ade-



(See Fig. 9 for names of cells and veins)





quately in the text) and coloration, are little used. The color, but not the shape, of the halteres is sometimes significant. Wings (figs. 3, 9) are extensively used because they usually bear significant taxonomic characters. Among the most important of these is the color pattern and its relation to the veins. (See the wing drawing and photographs at the end of this Bulletin.) The configuration of some of the veins is also used to distinguish genera. Among venation characters are the presence or absence of setae on the node and vein  $R_{4+5}$ ; the proportion of height to width of the stigma; the distance along vein  $M_{1+2}$  separating veins r-m and m; the position of vein r-m in relation to the stigma; the presence or absence of a bulla, or darkened thickening, in cell  $R_3$ ; and the presence and extent of an apical elongation in cell 1st A.

#### Abdomen

(Figs. 6-8)

The abdominal terga are marked in fig. 8 as  $T_1$ ,  $T_2$ , etc.; their relative lengths may be significant, as also may be the length of the ovipositor sheath of the female in proportion to one or more of the abdominal terga. In dorsal view the extreme base of the ovipositor sheath is almost always hidden by the terminal tergum. It should be understood that the sheath length given is of the visible dorsal portion. The characters of the ovipositor (figs. 7, 8) and external male genitalia (fig. 6) have rarely been used in this Bulletin because other, more easily accessible taxonomic characters are present in the California species.

#### ABOUT THIS BULLETIN

Only those Tephritidae which have been collected within the borders of California are included in this Bulletin.

The genera are arranged alphabetically. For each genus the following information is given: diagnostic characters; biological information about the California species; an indication of how the California fauna relates to that of North America and the world; references to significant taxonomic revisions from which additional information may be obtained; and a key to the California species.

Species within each genus are also alphabetically arranged. The following information is given for each species: original citation; information on type material, including kind and sex, locality data, and present location (see Acknowledgments, this page); synonyms, if any; geographic range; California records, including number of specimens, sex, locality, date, collector, host, and other information when available; a

distribution map showing localities of actual captures; a discussion of taxonomic characters distinguishing the species from close relatives; a wing figure; and for some species, a summary of or references to the significant literature dealing with taxonomy, morphology, biology, or economic importance.

All hosts known to be associated with the species, whether within or outside the State, appear in the host list. The world distribution of each species is given in the geographic range section. The concluding bibliography includes only those publications referenced in the text by author and date, and is not presented as an exhaustive coverage of literature on the California species.

#### ACKNOWLEDGMENTS

The family Tephritidae has been extensively collected in California, and there are specimens in many collections within and outside the state. We here gratefully acknowledge the cooperation of the following institutions and individuals in making this material available for our study. The abbreviations below are used throughout the text to indicate type depositories and the present location of material seen in this study. References to "(FLB)" indicate specimens in the collection of the junior author.

- A. E. Menke, Jr., Los Angeles, California . . . (AEM)  
 American Museum of Natural History,  
 New York, New York . . . . . (AMNH)  
 Academy of Natural Sciences,  
 Philadelphia, Pennsylvania . . . . . (ANSP)  
 British Museum (Natural History),  
 London, England . . . . . (BM)  
 California Academy of Sciences,  
 San Francisco . . . . . (CAS)  
 California Department of Agriculture,  
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 Berlin, Germany . . . . . (DEI)  
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 United States National Museum,  
 Washington, D. C. . . . . (USNM)  
 Washington State University, Pullman . (WSU)

## SYSTEMATIC TREATMENT

### KEY TO THE CALIFORNIA GENERA OF TEPHRITIDAE

- 1 Third antennal segment three to four times as long as greatest width; cell 1st A with length of apical elongation four to five times its width at base (fig. 3); humeral bristles absent  
*Dacus* (p. 14)
- Third antennal segment less than three times as long as greatest width, or apical elongation of cell 1st A less than four times its width at base; humeral bristles present . . . . . 2
- 2(1) Dorsocentral bristles (fig. 2) closer to a transverse line between acrostichal bristles than to a line between supra-alar bristles . . . . . 3
- Dorsocentral bristles closer to a transverse line between supra-alar bristles than to a line between acrostichal bristles (figs. 4, 5) . . . . . 4
- 3(2) Posterior upper fronto-orbital bristles (fig. 1) convergent; vein  $M_{1+2}$  (fig. 9) without distinct anterior curve at apex . . . . . *Paraterellia* (p. 44)
- Posterior upper fronto-orbital bristles not convergent; vein  $M_{1+2}$  curving anteriorly at apex (fig. 18) . . . . . *Anastrepha* (p. 11)
- 4(2) Usually only one pair of upper fronto-orbital bristles; if two pairs present, scutellum (figs. 2, 8) enlarged and shining black . . . . . 5
- Two or three pairs of upper fronto-orbital bristles; scutellum not enlarged . . . . . 8
- 5(4) Vein  $Cu_2$  (closing apex of cell 1st A) transverse or slightly convex (figs. 114, 115), never drawn out to a point on vein  $Cu_2+2nd\ A$  . *Urophora* (p. 89)
- Vein  $Cu_2$  concave, resulting in an elongation of cell 1st A along vein  $Cu_2+2nd\ A$  (fig. 3) . . . . . 6
- 6(5) Length of antenna not more than half that of face; males with some of lower fronto-orbital bristles enlarged . . . . . *Strauzia* (p. 63)
- Antenna conspicuously longer than half length of face; males with lower fronto-orbital bristles normal in size . . . . . 7
- 7(6) Vein r-m situated at midpoint of cell 1st  $M_2$ ; notopleural bristle (fig. 2) with short, fine setae

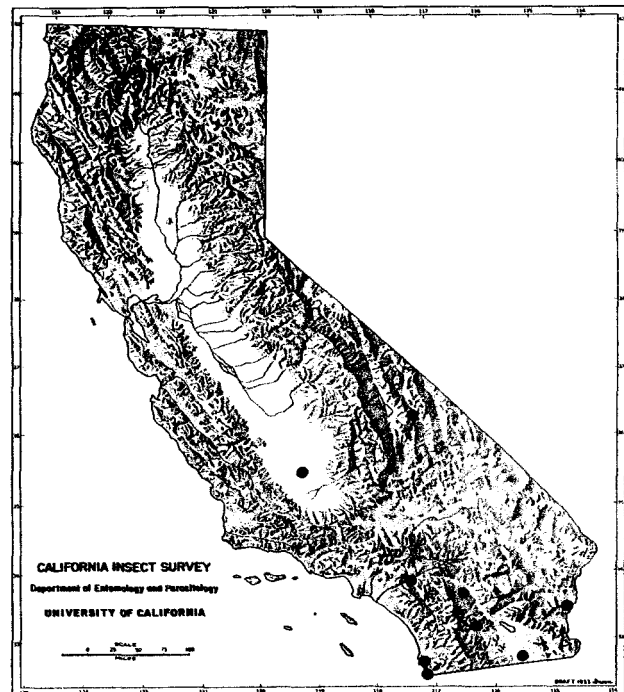
- surrounding base . . . . . *Epochra* (p. 16)
- Vein r-m situated distinctly apicad of midpoint of cell 1st  $M_2$ ; notopleural bristle without short, fine setae surrounding base  
*Procecidochares* (p. 50)
- 8(4) Two pairs of dorsocentral bristles, one anterior and one posterior to suture . *Procecidocharoides* (p. 54)
- One pair of dorsocentral bristles (fig. 2) always situated posterior to suture . . . . . 9
- 9(8) Posterior upper fronto-orbital bristles (fig. 1) convergent . . . . . 10
- Posterior upper fronto-orbital bristles not convergent . . . . . 11
- 10(9) Frons usually haired; if bare, node (fig. 3) bare and dark pattern confined to stigma (figs. 3, 40) and, occasionally, some of the veins . *Neaspilota* (p. 33)
- Frons bare; node with at least one dark bristle, usually several; wing always banded (fig. 45)  
*Orellia* (p. 38)
- 11(9) Dorsocentral bristles closer to a line between supra-alar bristles than to transverse suture (fig. 4) . . . . . 12
- Dorsocentral bristles closer to transverse suture than to a line between supra-alar bristles (fig. 5); if doubtful, bulla present in cell  $R_5$  (fig. 3) . . . . . 17
- 12(11) Oral margin anterior to genal bristle (fig. 1) with a number of well-developed bristles  
*Chetostoma* (p. 12)
- Oral margin anterior to genal bristle without well-developed bristles . . . . . 13
- 13(12) Vein r-m situated approximately at midpoint of cell 1st  $M_2$  . . . . . 14
- Vein r-m situated distinctly apicad of midpoint of cell 1st  $M_2$  . . . . . 15
- 14(13) Third antennal segment with a distinct point dorso-apically . . . . . *Rhagoletis* (p. 54)
- Third antennal segment rounded dorso-apically  
*Trypeta* (p. 88)
- 15(13) Some of the postocular bristles (fig. 1) pale  
*Xenochaeta* (p. 92)
- All postocular bristles black . . . . . 16

- 16(15) Anterior oral margin strongly developed and projecting . . . . . *Euleia* (p. 27)
- Anterior oral margin not strongly developed or projecting . . . . . *Myoleja* (p. 32)
- 17(11) One or two pairs scutellar bristles (fig. 2); if two, head with length greater than height, mouth parts geniculate with labellum long and slender (fig. 8); stigma hyaline at extreme base . . . 18
- Two pairs scutellar bristles, the inside pair sometimes very short; head not longer than high . . . 21
- 18(17) Cell 1st  $M_2$  dark with a single rounded hyaline spot near apex (fig. 16) . . . . . 19
- Cell 1st  $M_2$  predominantly hyaline or with several hyaline spots, never with a single rounded hyaline spot . . . . . 20
- 19(18) Apex of cell  $R_5$  dark (fig. 11) . . . *Aciurina* (p. 7)
- Apex of cell  $R_5$  hyaline (fig. 116) . . . . . *Valentibulla* (p. 91)
- 20(18) Head usually with height distinctly greater than length; proboscis not geniculate, labellum not elongate . . . . . *Trupanea* (p. 73)
- Head distinctly longer than high; proboscis geniculate, labellum elongate . . . . . *Dioxya* (p. 15)
- 21(17) One pair of well-developed lower fronto-orbital bristles; gena (fig. 1) directly below eye very broad; labellum elongate . . . . . *Oxya* (p. 40)
- More than one pair of well-developed lower fronto-orbital bristles; gena normal . . . . . 22
- 22(21) Eye with height more than one and one-half times as great as width; cell 2nd C more than twice as long as the short stigma (fig. 78) . . . *Stenopa* (p. 63)
- Eye height not exceeding one and one-half times width; cell 2nd C not more than twice as long as length of the short stigma . . . . . 23
- 23(22) Three pairs upper fronto-orbital bristles . . . . . *Paracantha* (p. 41)
- Two pairs upper fronto-orbital bristles . . . . . 24
- 24(23) Wing with distinct oblique bands (fig. 91) . . . . . *Tomoplagia* (p. 72)
- Wing pattern consisting of a dark field with hyaline spots, or with a dark subapical stellate pattern as in *Trupanea* . . . . . 25
- 25(24) Two pairs lower fronto-orbital bristles . . . . . 26
- Three pairs lower fronto-orbital bristles . . . . . 28
- 26(25) Anterior oral margin not strongly projecting anteriorly; male with fore femur swollen and with striations around anal region of terminalia (fig. 6) . . . . . *Euaresta* (p. 17)
- Anterior oral margin projecting anteriorly; male fore femur not swollen and without striations around anal region of terminalia . . . . . 27
- 27(26) Stigma usually with a rounded central hyaline spot (fig. 58); hind femur with more than one dorsal subapical seta, two most apical ones side by side; proboscis geniculate, labellum usually elongated (fig. 8) . . . . . *Paroxya* (p. 46)
- Stigma never with rounded central hyaline spot; hind femur with one dorsal subapical seta; proboscis never geniculate (fig. 8, bottom) . . . . . *Tephritis* (p. 64)
- 28(25) Vein  $R_{4+5}$  strongly setose dorsally; apical margin

- of wing never with crescent-shaped hyaline marking (fig. 10) . . . . . *Acinia* (p. 6)
- Vein  $R_{4+5}$  usually bare dorsally; if setose, apical margin of wing with crescent-shaped hyaline marking (fig. 35) . . . . . 29
- 29(28) Wing broad, apex usually with distal crescent-shaped (fig. 35) or other extensive hyaline marking, or if this marking obscured, many small more or less subequal yellow or subhyaline spots present on wing disk (fig. 33) . . . . . 30
- Wing elongate and with neither distal crescent nor many small subequal yellow or subhyaline spots . . . . . 31
- 30(29) Presutural bristle (fig. 2) present; wing dark to extreme base . . . . . *Eutreta* (p. 27)
- Presutural bristle absent; basal one-fifth to one-fourth of wing hyaline (fig. 20) . . . . . *Cryptotreta* (p. 14)
- 31(29) Wing pattern with a *Trupanea*-like preapical dark mark and with hyaline or yellowish spots filling basal half of wing disk (figs. 30, 31) . . . . . *Euarestoides* (p. 22)
- Wing pattern more or less evenly reticulate, macroscopically with a mid-anterior hyaline wedge composed of coalescing hyaline spots (figs. 43, 44) . . . . . *Neotephritis* (p. 35)

Genus *Acinia* Robineau-Desvoidy

These are small flies with a yellowish pollinose head, body, and legs, and numerous yellow or golden mesonotal hairs. Among the genera with hyaline wing spots on a dark background, *Acinia* is distinctive in that many of the spots are surrounded by a rim



Map 1. Distribution in California of *Acinia lucata* (Fabricius)

of infuscation darker than the yellowish parts of the wing disk. As far as is known, the larvae live in the flower heads of composites. The affinities of this genus with European genera are not well known; *Acinia* probably ranges well into the Neotropical Region. Only one North American species, *fuscata* (F.), is known. The genus has been discussed by Benjamin (1934).

*Acinia fuscata* (Fabricius)

(Fig. 10; Map 1)

*Musca fuscata* Fabricius, 1794, Ent. Syst., 4:359. Type (sex not known); "Americae meridionalis insulis" (location of type not known).

**Geographic range.**—Arizona, California, Florida, Georgia, Nevada, New Jersey, New Mexico, and Texas; also Mexico (Baja California).

**California records.**—IMPERIAL Co.: El Centro, 2 ♀♀, ex *Pluchea sericea*, II-15-45 (Anderson, CDA). INYO Co.: Darwin Falls, 1 ♀, VII-15-55 (E. I. Schlinger, UCD). KERN Co.: 12 mi. E. Famosa, 1 ♂, 1 ♀, on flowers of *Pluchea purpurascens*, VIII-26-59 (H. L. Wilson, CDA). RIVERSIDE Co.: Blythe, 1 ♂, 3 ♀♀, alfalfa, VI-24-45 (E. G. Linsley, CIS). "Palm K," 1 ♂, on *Baccharis emoryi*, X-7-34 (P. H. Timberlake, UCR). Riverside, 1 ♂, (UCLA). SAN DIEGO Co.: Borego, 1 ♀, *Croton californicus*, IV-30-54 (M. Wasbauer, CIS). San Diego, 1 ♀, IX-12-13 (E. P. Van Duzee, CAS). San Ysidro, 2 ♂♂, 1 ♀, *Pluchea sericea* flower bud, VIII-7-50 (USNM) and 1 ♂, 1 ♀, reared ex flower bud *Pluchea sericea*, VIII-15-60 (E. D. Alpert, CDA).

The absence of a crescent-shaped hyaline spot near the wing margin and the presence of well-defined setae on the dorsal surface of vein  $R_{4+5}$  separate this species from those of *Eutreta*. The species is distinctive in having dark-margined hyaline spots in the anterior half of the wing disk. The many records of this species from the Neotropical Region are not well substantiated.

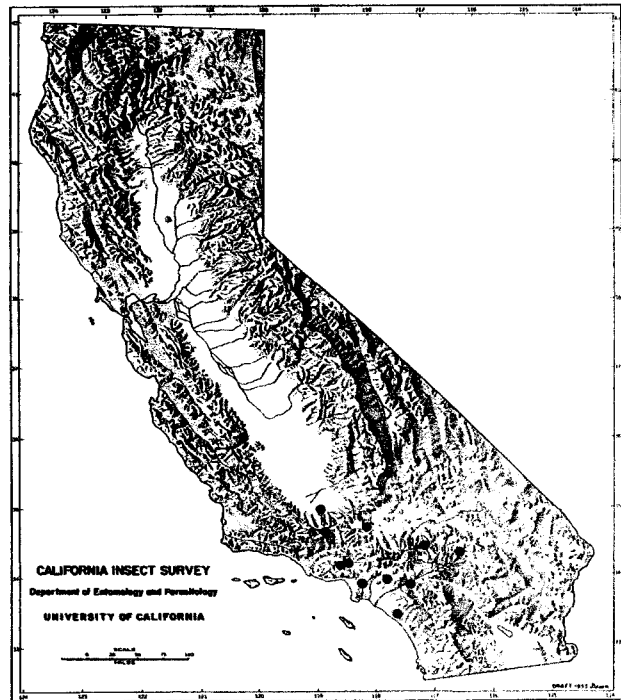
Genus *Aciurina* Curran

All California species of *Aciurina* have very dark wings interrupted by characteristic hyaline markings. In general appearance they are similar to species of *Valentibulla*, but may be distinguished by the lack of a marginal hyaline mark in cell  $R_5$ . Most of the species form galls and develop in *Chrysothamnus* and *Haplopappus*. The genus, comprising 12 species, is restricted to the western and far western United States and Mexico; only 7 species are found in California. The genus has been treated by Bates (1935) under the name *Tephrella*.

KEY TO THE CALIFORNIA SPECIES OF ACIURINA

- 1 Apical hyaline spot in cell 2nd  $M_2$  crossing vein  $M_{1+2}$  and continuing into cell  $R_5$  . . . . . 2
- Apical hyaline spot in cell 2nd  $M_2$  confined to that cell; cell  $R_5$  entirely dark . . . . . 5
- 2(1) Femora entirely yellow . . . . . 3
- Femora black or dark brown, at least basally . . . . . 4

- 3(2) Three hyaline spots in cell  $R_1$ , the center one descending into cell  $R_3$  . . . . . *trilitura* Blanc and Foote (p. 10)
- Two hyaline spots in cell  $R_1$ , the apical one descending into cell  $R_3$  . . . . . *trixa* Curran (p. 11)
- 4(2) Extreme base of wing dark brown . . . . . *maculata* (Cole) (p. 9)
- Base of wing to humeral crossvein hyaline . . . . . *bigeloviae* (Cockerell) (p. 8)
- 5(1) Base of wing to humeral crossvein hyaline or yellowish-brown . . . . . *ferruginea* (Doane) (p. 8)
- Extreme base of wing dark brown . . . . . 6
- 6(5) Cell  $Cu_1$  with two marginal hyaline indentations, the proximal wider than the distal one; stigma about one and one-half times as long as proximal width . . . . . *thoracica* Curran (p. 9)
- Cell  $Cu_1$  with several small, round, hyaline spots; stigma at least twice as long as proximal width . . . . . *aplopappi* (Coquillett) (p. 7)



Map 2. Distribution in California of *Aciurina aplopappi* (Coquillett)

*Aciurina aplopappi* (Coquillett)

(Fig. 11, Map 2)

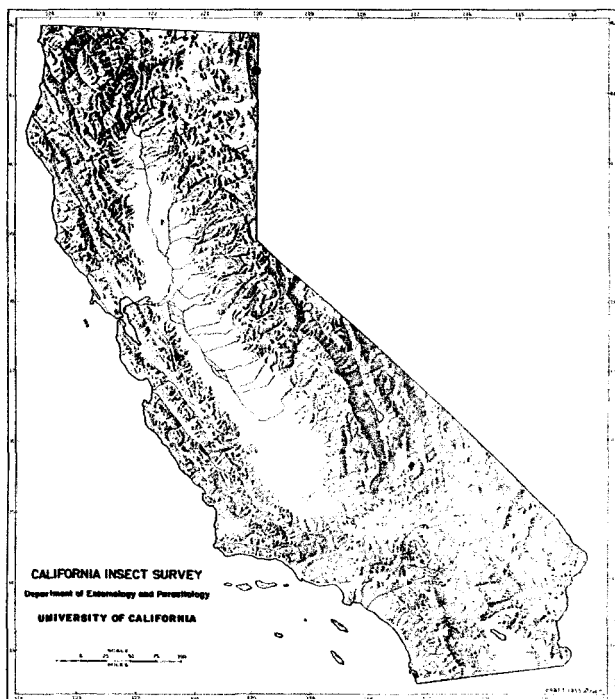
*Trypeta (Aciura) aplopappi* Coquillett, 1894, Can. Ent., 26:72. Syntypes ♂ and ♀; Los Angeles Co., Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—FRESNO Co.: Coalinga, 4 ♂♂, 1 ♀, swept from *Haplopappus linearitoli*, IV-24-56 (F. L. Blanc, FLB); 6 ♂♂, 3 ♀♀, swept from *Haplopappus linearitoli*, V-4-56 (H. L. Wilson, CDA). KERN Co.: Arvin, 1 ♀, IV-20-60 (G. G. Beever, CDA). Rosamond, 1 ♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB). LOS

ANGELES CO.: Chatsworth, 1 ♀, IV-27-36 (LAM). Claremont, 1 ♂, bud galls on *Haplopappus pinifolia* (USNM). Gorman, 1 ♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB); 1 ♀, IV-23-1886 (FLB); (cotypes), 2 ♂♂ (Coquillett, USNM); 2 ♂♂ (USNM); galls (Coquillett, USNM). Newhall Ranch, 1 ♂, 1 (abdomen missing), 1 ♀, IV-5-40 (Henry Wilcox, USNM; Howard Wilcomb, LACO). ORANGE CO.: Gavilan, 1 ♀, reared from oak gall, III-17-34 (C. M. Dammers, UCR). RIVERSIDE CO.: Riverside, 2 ♀♀, ex stem galls on *Gutierrezia sarothrae*, IV-2-37 (USNM). SAN BERNARDINO CO.: Nr. Arrastro Canyon, Apple Valley, Mojave Desert, 1 ♂, on *Haplopappus cooperi*, VIII-20-41 (P. H. Timberlake, UCR). Big Rush Creek Wash, Mojave Desert, 1 ♂, on *Chrysothamnus* sp., V-12-44 (P. H. Timberlake, UCR).

*A. ferruginea* (Doane), *thoracica* Curr., and *aplopappi* (Coq.) are closely related in having cell 2nd  $M_2$  completely dark; but no difficulty should be experienced in separating them when illustrations and key characters are used.



Map 3. Distribution in California of *Aciurina bigeloviae* (Cockerell)

*Aciurina bigeloviae* (Cockerell)

(Fig. 12; Map 3)

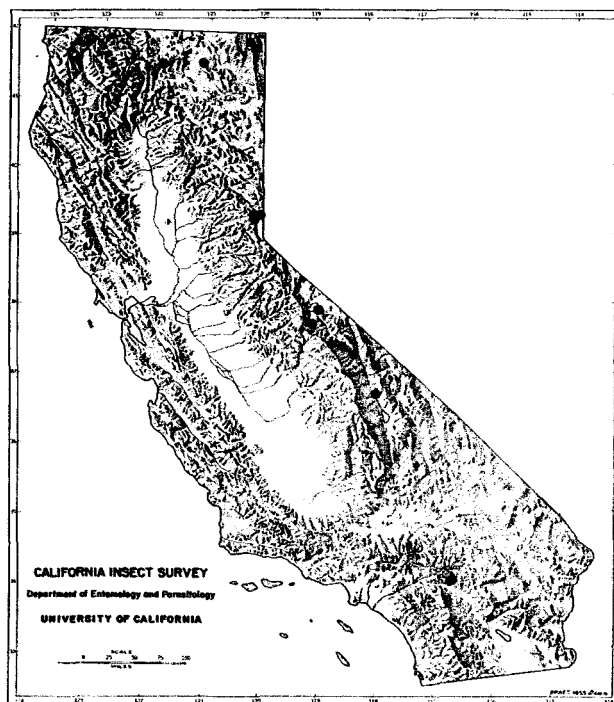
*Trypeta bigeloviae* Cockerell, 1890, Ent. Mo. Mag., 26:324. Holotype ♂; West Cliff, Custer Co., Colo. (location of type not known).

Synonym.—*Trypeta bigeloviae* var. *disrupta*, Cockerell, 1890:324. *Trypeta bigelovii* is a misspelling of this species name by Coquillett, 1895:174.

Geographic range.—California and Colorado.

California records.—MODOC Co.: Cedarville, 1 ♂, 1 ♀, VI-1-46 (W. F. Barr, CIS).

*A. trixa* Curr., *maculata* (Cole), and *bigeloviae* (Ckll.) show in cell  $R_5$  an anterior continuation of the distal hyaline marking in 2nd cell  $M_2$ . The proximal marking in 2nd cell  $M_2$  in *trixa* and *maculata* is apparently a result of a fusion of the two spots normally present in *ferruginea*, *thoracica*, and *aplopappi* (see discussion of *aplopappi*); in most specimens of *bigeloviae*, there are three markings in 2nd cell  $M_2$  and the proximal two are not fused.



Map 4. Distribution in California of *Aciurina ferruginea* (Doane)

*Aciurina ferruginea* (Doane)

(Fig. 13; Map 4)

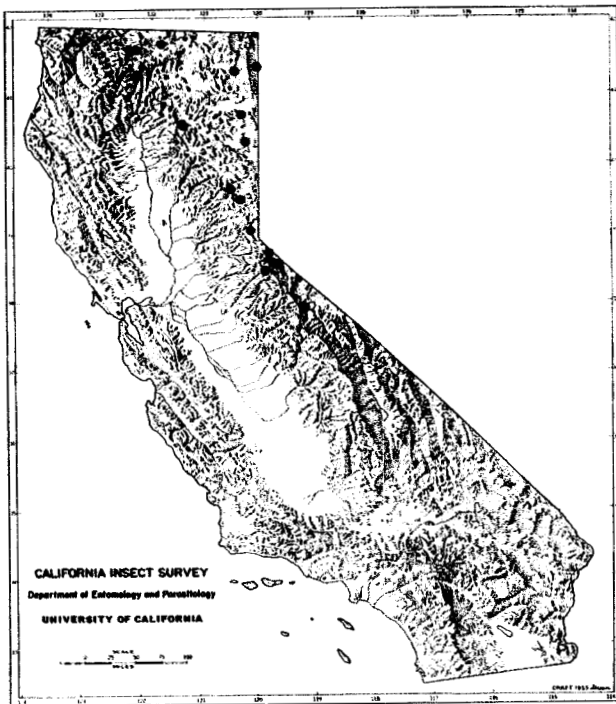
*Aciurina ferruginea* Doane, 1899, Jour. N. Y. Ent. Soc., 7:182, pl. III, fig. VI. Holotype (sex not known); Washington (WSU).

Geographic range.—California, Colorado, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

California records.—INYO Co.: Bishop, 2 ♂♂, 3 ♀♀, galls of *Solidago* sp., VIII-17-50 (USNM). Bishop Canyon, 1 ♂, 8,400 ft., VIII-2-36 (UCLA); 1 ♂, 8,400 ft., VIII-2-36 (CAS). Independence, 1 ♀, VI-11-37 (N. W. Frazier, CAS); 1 ♂, (N. W. Frazier and E. S. Ross, CAS). Westgard Pass, 1 ♀, VII-12-53 (W. D. McLellan, UCD). MODOC Co.: Davis Creek, 1 ♀, VII-16-22 (C. L. Fox, CAS). Hackamore, 2 ♂♂, *Juniperus* sp., VII-12-47 (R. L. Usinger, CIS). 19 mi. N.W. Lake City, 1 ♂, VIII-10-59 (J. R. Powers, CIS). MONO Co.: Davis Creek, 1 ♀, VII-16-22 (C. L. Fox, CAS). Grant Lake, 2 ♀♀, *Chrysothamnus* sp. VIII-5-48 (P. D. Hurd and J. W. MacSwain, CIS); 2 ♂♂, VIII-3-50 (J. W. MacSwain, CIS); 1 ♀, *Chrysothamnus viscidiflorus typicus*, IX-10-57 (B. J. Adelson, CIS). Tom's Place, 1 mi. W., 1 ♂, VIII-3-57 (D. D. Linsdale, CIS). 20 mi. E. Junction Highways 120 and 395, 1 ♂, IX-9-58

(A. D. Telford, UCD). NEVADA Co.: Boca Dam, 11 mi. E. Truckee, 1 ♂, 2 ♀♀, *Chrysothamnus viscidiflorus typicus*, VIII-24-56 (E. G. Linsley, CIS). Hobart Mills, 2 ♂♂, 2 ♀♀, VIII-26-48 (R. F. Smith, CIS); 1 mi. S., 4 ♀♀, *Chrysothamnus viscidiflorus typicus*, IX-1-57 (E. G. Linsley, CIS). Truckee, 2 ♀♀, *Chrysothamnus* sp., VIII-30-55 (Joan Linsley and E. G. Linsley, CIS). Truckee, 4 mi. N., 4 ♂♂, 3 ♀♀, *Chrysothamnus viscidiflorus typicus*, IX-5-57 (E. G. Linsley, CIS). SAN BERNARDINO Co.: South Fork Camp, San Bernardino Mountains, 6,200 ft., 1 ♂, 1 ♀, on *Chrysothamnus viscidiflorus pumilus*, IX-4-49 (P. H. Timberlake, UCR). SISKIYOU Co.: Antelope Creek, nr. Tennant, 1 ♀, *Chrysothamnus viscidiflorus typicus*, VIII-13-58 (J. A. Powell, CIS).

*A. ferruginea* may be distinguished from *thoracica* and *aplopappi*, two closely related species, by the yellowish-hyaline area at the extreme base of the wing (see discussion of *aplopappi*).



Map 5. Distribution in California of *Aciurina maculata* (Cole)

*Aciurina maculata* (Cole)

(Fig. 14; Map 5)

*Aciurina maculata* Cole, in Cole and Lovett, 1919, Proc. California Acad. Sci., (4)9:252, pl. 19, fig. 27. Holotype ♂; Jackson Co., Ore. (CAS).

*Synonym*.—*Aciurina pacifica* Curran, 1932:10.

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

*California records*.—ALPINE Co.: Ebbetts Pass, 4 mi. N. E., 1 ♂, 1 ♀, on *Chrysothamnus* sp., 7,000 ft., VI-16-59 (R. P. Allen, CDA). Fredericksburg, 5 ♂♂, 5 ♀♀, swept from *Chrysothamnus* sp., V-5-59 (F. L. Blanc, FLB); 1 ♂, swept from *Chrysothamnus* sp., V-7-59 (F. L. Blanc, FLB). Heenan Lake, Markleeville, 7,000 ft., 8 ♂♂, 7 ♀♀, reared from galls on *Chrysothamnus* sp., V-7-59 (F. L. Blanc, FLB). Markleeville, 3 ♂♂, 3 ♀♀, VI-16-59 (R. P. Allen, CDA). Markleeville, 3

mi. S. of, on Highway 4, 10 ♂♂, 4 ♀♀, swept from *Chrysothamnus* sp., V-6-59 (F. L. Blanc, FLB). Woodfords, 2 ♂♂, swept from *Chrysothamnus nauseosus*, VI-19-58 (F. L. Blanc, CDA); 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp., V-5-59 (F. L. Blanc, FLB). EL DORADO Co.: Lake Tahoe, 1 ♂, VI-19-36 (R. M. Bohart, CAS). LASSEN Co.: Ravenville, 1 ♂, 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB). Standish, 7 mi. E., 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB). MODOC Co.: Alturas, 5 mi. E., 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB). Cedarville, 2 ♂♂, 1 ♀, VI-1-46 (W. F. Barr, CIS). MONO Co.: Tioga Lodge, Mono Lake, 1 ♂, VI-22-29 (R. L. Usinger, CAS). PLUMAS Co.: Blairsden, 3 ♂♂, 3 ♀♀, swept from *Chrysothamnus* sp., V-19-59 (F. L. Blanc, FLB). SHASTA Co.: Old Station, 1 ♀, V-1-47 (A. T. McClay, UCD); 1 ♂, V-1-47 (A. T. McClay, CDA). SHASTA Co., 1 ♂, V-11-13 (USNM). SIERRA Co.: Sierraville, 1 ♀, swept from *Chrysothamnus* sp., V-19-59 (F. L. Blanc, FLB). SISKIYOU Co.: Macdoel, 5 ♂♂, 3 ♀♀, reared from stem galls on *Chrysothamnus* sp., collected III-2-60, emerged III-25-60 (F. L. Blanc, FLB). Montague, 1 ♂, 1 ♀, *Artemisia* sp., V-28-36 (Jones and Fosen, CDA). Weed, 1 ♂, 1 ♀, sage, V-11-32 (S. Lockwood, USNM). Yreka, 1 ♀, *Artemisia tridentata*, V-10-32 (E. O. Essig, CIS); 2 ♂♂, 2 ♀♀, *Artemisia tridentata*, V-13-32 (E. O. Essig, CIS); 1 ♂, *Artemisia tridentata*, V-13-32 (E. O. Essig, CAS); 1 (abdomen missing), *Artemisia tridentata*, V-10-32 (E. O. Essig, CAS); 1 ♂, rabbit brush, III-17-59 (J. R. Grisham, CDA).

*A. maculata* and *trixa* are difficult to separate on the basis of wing markings alone. (See discussion of *bigeloviae*.) The key characters, the relative shape of the stigma, and the quite strongly sinuous vein r-m serve to distinguish *maculata*.

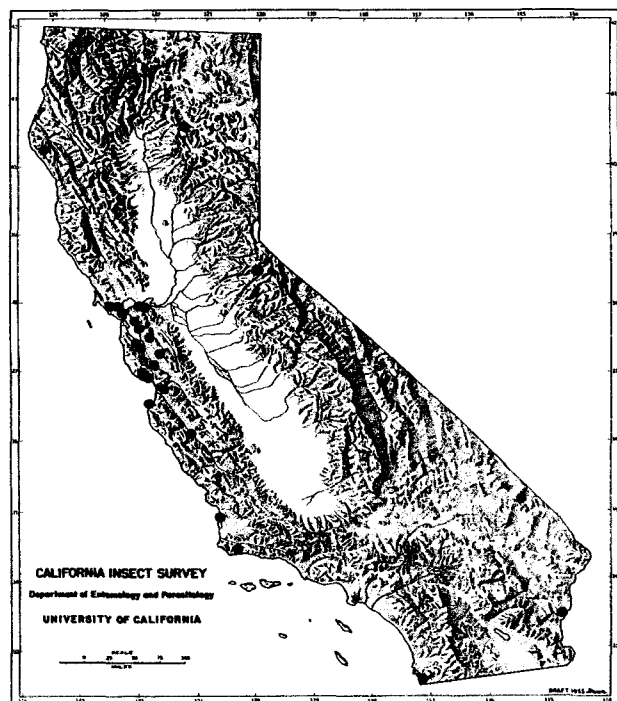
*Aciurina thoracica* Curran

(Fig. 15; Map 6)

*Aciurina thoracica* Curran, 1932, Amer. Mus. Novitates, No. 556:11, fig. 3. Holotype ♀; San Diego Co., Calif. (AMNH).

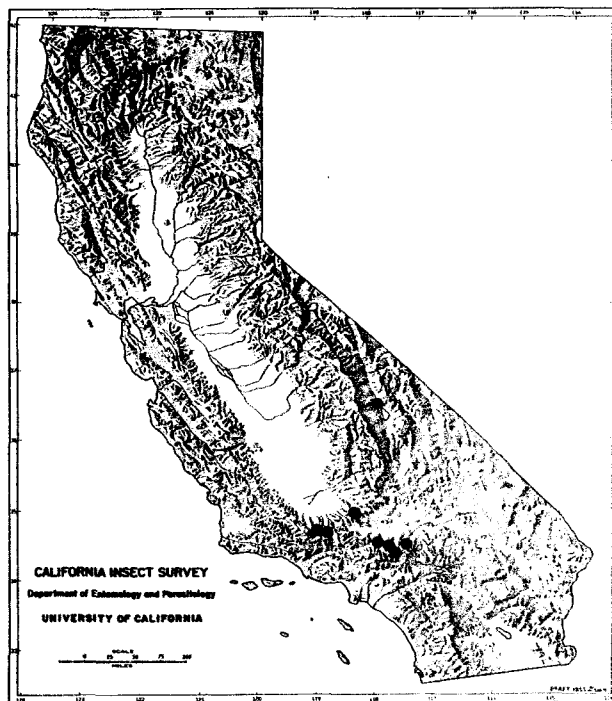
*Geographic range*.—Known only from California.

*California records*.—ALPINE Co.: Winnemucka Lake, 1 ♀, VII-30-59 (P. M. Marsh, UCD). ALAMEDA Co.: Alameda, 1 ♂, *Baccharis* sp. stem gall, III-26-37 (CAS). Berkeley, 1 ♂, VI-2-35 (CAS); Niles Canyon, 1 ♀, VII-15-16 (E. P. Van Duzee, CAS); Strawberry Canyon, University of California, 1 ♂, IX-27-47 (E. E. Seibert, CIS). CONTRA COSTA Co.: Martinez, 1 ♂, *Baccharis pilularis*, IV-9-37 (W. H. Lange, USNM). Port Costa, 1 ♂, 1 ♀, *Baccharis* sp., V-16-36 (M. A. Cazier, AMNH). HUMBOLDT Co.: Honeydew, 2 ♀♀, VI-20-50 (J. N. Simons, CIS). MARIN Co.: Alpine Lake, 1 ♂, X-5-56 (D. Burdick, CIS). Hills nr. Fairfax, 1 ♂, V-5-28 (R. L. Usinger, UCD). Mill Valley, 1 ♀, VI-8-49 (H. B. Leech, CAS). Phoenix Lake, 1 ♂, V-20-27 (H. H. Keifer, CIS). MONTEREY Co.: Carmel, 1 ♀, VI-5-27 (L. S. Slevin, CIS). King City, 1 ♀, III-11-59 (C. A. Campbell). Paradise Canyon, 1 ♀, IX-22-51 (P. H. Arnaud, PHA). RIVERSIDE Co.: Blythe, 1 ♀, IV-23-45 (USNM). SAN BERNARDINO Co.: Ivanpah, 12 mi. S.E., 1 ♀, V-1-56 (J. Powell, CIS). SAN DIEGO Co.: Otay, 1 ♂, V-7-48 (V. O. Miller, USNM); 1 ♂, 2 ♀♀, reared from stem galls



Map 6. Distribution in California of *Aciurina thoracica* Curran on *Baccharis sarothroides*, VII-11-60 (E. D. Algert, CDA). San Diego County (holotype), 1 ♀, Wheeler, (AMNH). SAN LUIS OBISPO CO.: Oso Flaco Lake, 1 ♀, VII-13-59 (C. A. Campbell, CIS). SAN MATEO CO.: Corte de Madera Creek nr. Portola (Redwood City), 1 ♂, swept from *Baccharis pilularis*, X-17-57 (P. H. Arnaud, PHA). Redwood City, 1 ♀, in automobile, X-15-51 (R. S. Beal, CIS). Woodside, Skyline and LaHonda Roads, 1 ♂, on stem of *Baccharis pilularis*, X-14-52 (P. H. Arnaud, PHA); 1 ♂, on stem of *Baccharis pilularis*, X-22-52 (P. H. Arnaud, PHA). SANTA BARBARA CO.: Gaviota Pass, 1 ♀, X-24-51 (R. M. Bohart, UCD). SANTA CLARA CO.: Alum Rock Park, 6 mi. E. of San Jose, 3 ♂♂, 4 ♀♀, reared from pupae, emerged III-21-47 (J. W. Tilden, SJS); 1 ♀, reared from pupae, emerged III-21-47 (J. W. Tilden, USNM); 2 ♀♀, reared from pupae, emerged III-18-47 (J. W. Tilden, SJS); 1 ♂, reared from pupa, emerged III-21-47 (J. W. Tilden, FLB). Mountains back of Alma, 1 ♀, V-19-28 (J. O. Martin, CAS). Palo Alto, 1 ♂, V-28-1927 (F. H. Wymore, UCLA). Stanford University, 1 ♀, X-190? (SU); 1 ♀, twig of *Baccharis pilularis*, X-5-51 (P. H. Arnaud, PHA); 1 ♀, X-3-03 (J. M. Aldrich, USNM). SANTA CRUZ CO.: Ben Lomond, 1 ♀, VI-1931 (E. C. Zimmerman, CAS). Santa Cruz, 1 ♀, multiple-purpose (Steiner) fruit fly trap in *Ceanothus* sp., VI-5-58 (T. R. Haig, CDA). SHASTA CO.: Old Station, 5 mi. S.W., 1 ♂, VIII-25-58 (J. A. Powell, CIS).

This species may be distinguished easily from its closest relative, *aplopappi*, by the shape of the stigma and the presence of only two hyaline markings in cell Cu, (see discussion of *aplopappi*).



Map 7. Distribution in California of *Aciurina trilitura* Blanc and Foote

*Aciurina trilitura* Blanc and Foote  
(Fig. 16; Map 7)

*Aciurina trilitura* Blanc and Foote, 1961, Pan-Pac. Ent., 37:75, fig. 2. Holotype ♀; Camp Baldy Road, San Bernardino Co., Calif. (CDA).

*Geographic range*.—Known only from California.

*California records*.—INYO CO.: Lone Pine (paratype), 1 ♂, IV-29-59 (R. P. Allen, FLB). KERN CO.: Frazier Park (paratype), 1 ♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Tehachapi (paratypes), 2 ♀♀, ex *Chrysothamnus nauseosus*, V-26-58 (H. L. Wilson, 1 ♀ USNM, 1 ♀ CDA). LOS ANGELES CO.: Desert Springs (paratype), 1 ♀, V-5-56 (J. Powell, CIS). Neenach (paratype), 1 ♀, *Chrysothamnus* sp., IV-28-59 (F. L. Blanc, FLB); 1 ♀, *Chrysothamnus* sp., IV-27-59 (R. P. Allen, CDA). Pearblossom (paratypes), 4 ♂♂, 6 ♀♀, ex composite, V-13-56 (W. E. Simonds, USNM, CDA). SAN BERNARDINO CO.: Camp Baldy Road, 1 ♀, 6,500 ft., VI-26-56 (A. S. Menke, Jr., CDA); 2 ♂♂, 6,500 ft., VI-26-56 (A. S. Menke, Jr., CDA); 2 ♂♂, 6,500 ft., VI-26-56 (A. S. Menke, Jr., USNM). Victorville, 1 ♂, IV-21-35 (CAS).

In wing pattern *trilitura* resembles the species of *Valentibulla*, which have three hyaline spots in cell R<sub>1</sub> distad of the stigma. It may be distinguished from them, however, by the absence of an apical hyaline spot in cell R<sub>5</sub>.



Map 8. Distribution in California of *Aciurina trixa* Curran

*Aciurina trixa* Curran

(Fig. 17; Map 8)

*Aciurina trixa* Curran, 1932, Amer. Mus. Novitates, No. 556:11, fig. 5. Holotype ♀; Stansbury Island, Utah (AMNH).

**Geographic range.**—California, Idaho, Nevada, New Mexico, Oregon, and Utah.

**California records.**—ALPINE Co.: Fredericksburg, 4 ♂♂, 2 ♀♀, swept from *Chrysothamnus nauseosus*, VI-18-58 (F. L. Blanc, CDA). Woodfords, 1 ♂, 2 ♀♀, *Chrysothamnus* sp., VI-18-58 (W. W. Middlekauff, CIS). INYO Co.: Independence, 1 ♀, VI-12-29 (R. L. Usinger, CIS). Little Lake, 1 ♂, *Chrysothamnus* sp. gall, IV-19-49 (916, LAM); gall, *Chrysothamnus* sp., V-13-49 (W. D. Pierce, LAM); 3 ♂♂, 1 ♀, *Chrysothamnus* sp. gall, IV-13-49 (W. D. Pierce, LAM). Lone Pine, 1 ♂, VI-9-29 (E. P. Van Duzee, CAS); 1 ♀, V-19-37 (CIS); 1 ♂, VI-1-37 (CAS). Westgard Pass, 1 ♀, VII-12-52 (W. D. McLellan, UCD); 7 mi. W., 2 ♂♂, V-26-53 (J. T. Brooks, CIS). Inyo County, 3 ♂♂ (USNM). KERN Co.: Frazier Park, 5 ♂♂, 2 ♀♀, swept from *Chrysothamnus nauseosus*, V-27-58 (H. L. Wilson, CDA); 3 ♂♂, swept from *Chrysothamnus nauseosus*, IV-25-56 (R. F. Wilkey, RFW); 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Kernville, 2 ♂♂, 2 ♀♀, V-10-39 (F. T. Scott, FTS). Maricopa, 1 ♂, III-31-31 (E. P. Van Duzee, CAS). Monolith, 4 ♂♂, 1 ♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB). Oakcreek Road, 5 mi. S. Tehachapi, 2 ♂♂, 2 ♀♀, swept from *Chrysothamnus nauseosus*, V-27-58 (H. L. Wilson, CDA). Tehachapi, 2 ♂♂, 2 ♀♀, ex *Chrysothamnus nauseosus*, V-27-58 (H. L. Wilson, CDA); 1 ♂, ex *Chrysothamnus nauseosus*, V-26-58 (H. L. Wilson, CDA). Rosamond, 1 ♂, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB). Kern County, 1 ♀, V-1936 (F. T. Scott, CDA). LASSEN Co.: Janesville, 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB);

2 ♂♂, reared from galls on *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB). LOS ANGELES Co.: Antelope Valley, 1 ♂, V-8-36 (L. E. Myers, LACO). Desert Springs, 1 ♂, V-5-56 (J. A. Powell, CIS). Gorman, 4 ♂♂, 3 ♀♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB); 3 ♂♂, 2 ♀♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (R. F. Wilkey, RFW); 1 ♂, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Llano, 2 ♀♀, reared from galls on *Chrysothamnus nauseosus*, IV-6-58 (W. E. Simonds, CDA). Mint Canyon, 2 ♀♀, *Senecio douglasii*, IV-17-39 (J. A. Comstock, LAM); 5 ♂♂, 2 ♀♀, V-15-39 (J. A. Comstock, LAM). Neenach (Antelope Valley), 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp. IV-28-59 (F. L. Blanc, FLB); 7 ♂♂, 4 ♀♀, *Chrysothamnus* sp., IV-27-59 (R. P. Allen, CDA); 18 ♂♂, 6 ♀♀, swept from *Chrysothamnus* sp., IV-28-59 (F. L. Blanc, FLB). Palmdale, 2 ♂♂, 1 (abdomen missing), V-8-36 (LACO); 1 ♂, galls of *Ademeria* sp., V-8-36 (L. E. Myers, LACO). Quail Lake Guard Station, 1 ♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Valyermo, 3 ♂♂, 5 ♀♀, III-22-40 (C. Henne, LAM); 1 ♂, ex galls of *Chrysothamnus nauseosus*, April (R. M. Bohart, UCLA). MODOC Co.: Cedarville, 1 ♂, VI-1-46 (W. F. Barr, CIS). RIVERSIDE Co.: Horsethief Canyon, 1 ♂, IV-21-35 (C. E. Norland, LAS). Santa Rosa Mountain, 5 ♂♂, 3 ♀♀, IV-17-51 (USNM). SAN DIEGO Co.: San Diego Co., 1 ♂, V-29-?? (E. P. Van Duzee, USNM). SAN BERNARDINO Co.: Barstow, 1 ♀, gall on *Artemisia* sp., IV-16-38 (T. G. H. Aitken, CAS). Camp Baldy Road, 1 ♂, 2 ♀♀, 6,500 ft., VI-26-56 (A. E. Menke, AEM). Mojave Desert, 1 ♀, III-35 (C. C. Papke, UCLA). Oro Grande Wash, 11 mi. S. of Adelanto, 2 ♂♂, 1 ♀, on *Chrysothamnus* sp., V-9-48 (P. H. Timberlake, UCR). Victorville, 1 ♂, IV-21-35 (LAS). SAN LUIS OBISPO Co.: Maricopa Grd., 3 ♂♂, ex gall on *Chrysothamnus* sp., III-21-31 (E. P. Van Duzee, CAS). SANTA BARBARA Co.: Cuyama Valley, 1 ♀, on weeds nr. beet field, V-2-51 (H. L. Wilson, CDA). Ventucopa, 6 ♂♂, 3 ♀♀, reared from stem galls on *Chrysothamnus nauseosus*, III-19-58 (F. L. Blanc, CDA); 2 ♀♀, reared from galls on *Chrysothamnus nauseosus*, III-25-59 (R. P. Allen, CDA). SANTA CLARA Co.: San Antonio Valley, 2 ♀♀, IV-20-48 (R. F. Smith, CIS). SISKIYOU Co.: Weed, 1 ♂, sage, V-11-52 (S. Lockwood, CDA). TULARE Co.: Tulare County, 1 ♂, V-1936 (F. T. Scott, CDA). VENTURA Co.: Stauffer, 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB).

*A. trixa*, closely related to *maculata* and *bigeloviae*, may be distinguished from those two species by use of the key characters and by comparison of specimens with illustrations (see discussions of *bigeloviae*).

Genus *Anastrepha* Schiner

This genus of large, yellowish flies is closely related to *Strauzia*, from which it is distinguished by characters given in the key. The wing markings of most *Anastrepha* species consist of an inverted V-shaped band and an S-shaped band, with other markings at the wing base. The genus ranges from latitudes 27°N to 35°S and is confined largely to the tropics of the Western Hemisphere, where the species are known to infest the fleshy fruits of many plants. Because of the predilection of some species for such commercially important crops as citrus, and because



of the large number of species, the genus, with *Rhagoletis*, is the most economically important of the endemic New World fruit flies. Of the 150 described species, only 15 are known to occur within the continental United States, and only 1 species has been recorded from California.

Studies on the biology of *Anastrepha ludens* (see below) and related species in Mexico have been summarized at some length by Baker *et al.* (1944), and taxonomic reviews of the species have been published by Stone (1942a, 1942b).



Map 9. Distribution in California of *Anastrepha ludens* (Loew)

### *Anastrepha ludens* (Loew)

(Fig. 18; Map 9)

*Trypeta ludens* Loew, 1873, Smiths. Misc. Collect., 11(256):223, pl. XI, fig. 19. Holotype ♂; Mexico (MCZ).

**Geographic range.**—Southern California, lower Rio Grande Valley in Texas; Mexico south to Costa Rica.

**California records.**—SAN DIEGO CO.: San Ysidro, 1 ♀, McPhail trap in fig, VII-3-57 (J. McKinney, CDA); 1 ♂, McPhail trap in pomegranate, VII-3-57 (J. McKinney, CDA); 1 ♂, McPhail trap in California Christmasberry, VII-3-57 (J. McKinney, CDA); 1 ♀, McPhail trap in pomegranate, VI-4-57 (E. J. Soukup and T. Garcia, CDA); 1 ♀, McPhail trap in toyon, VII-4-57 (K. H. Baker and D. W. Robinson, CDA); 1 ♀, McPhail trap in mulberry, VII-9-57 (J. McKinney, CDA); 1 ♀, McPhail trap in grapefruit, VII-10-57 (J. H. Rosenberger, CDA). San Ysidro, 2 mi. E., 1 ♂, McPhail trap in toyon, VII-23-57 (R. D. Hancock and J. L. Johnson, CDA).

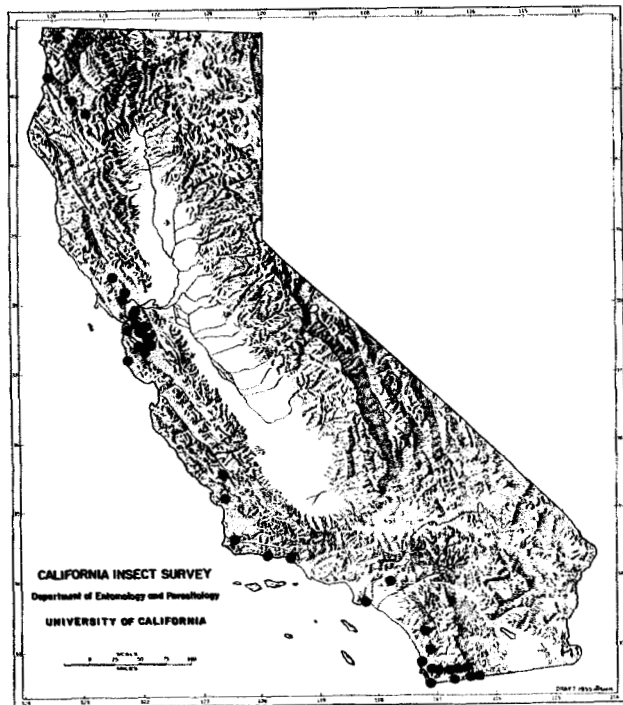
The native home of *ludens* is in the states of Tamaulipas, Nuevo Leon, and San Luis Potosi, Mexico, where it infests the fruits of the yellow chapote, *Sargentia greggii*. From this area it has spread north to the Rio Grande Valley and south as far as Costa Rica.

Hosts found to be infested in nature throughout the range of *ludens* are: *Achras zapota*, *Annona cherimola*, *A. reticulata*, *Casimiroa edulis*, *Citrus aurantium*, *C. grandis*, *C. nobilis*, *C. sinensis*, *Citrus* spp., *Eugenia jambos*, *Inga jinicuil*, *Mammea americana*, *Mangifera indica*, *Prunus persica*, *Psidium guajava*, *Punica granatum*, *Pyrus* sp., and *Sargentia greggii*. In the laboratory, *ludens* has been shown to oviposit and/or complete development in cactus, figs, bananas, walnuts, peppers, tomatos, squash, beans, and other cultivated and wild fruits, but has never been found infesting these plants in nature. The trapping of adults in extreme northern Baja California, Mexico, and the immediately adjacent San Ysidro area of California is probably the result of movement of larvae-infested fruit into the Tijuana area from the Mexican mainland.

Because it readily attacks citrus, mango, avocado, and a wide variety of other fruits in Mexico, a study of its biology was undertaken by the U. S. Department of Agriculture in 1928. A rather complete summary of these studies by Baker *et al.*, 1944, indicates that *ludens* is well adapted to the highlands of Mexico and to relatively low temperatures. It poses a constant threat to the American citrus grower because of its ability to inhabit southern fruit-growing areas of the United States.

### Genus *Chetostoma* Rondani

Species of *Chetostoma* closely resemble several members of the genus *Trypeta* in wing pattern and habitus, but *Chetostoma* species possess a small group of black, stout bristles at the anterolateral margin of the oral opening. The genus, comprising only two North American species, is restricted to the western United States. Nothing is known about its host relationships. Blanc (1959) has discussed the genus in some detail.



Map 10. Distribution in California of *Chetostoma californica* Blanc

*Chetostoma californica* Blanc

(Fig. 19; Map 10)

*Chaetostoma californica* Blanc, 1959, Pan-Pac. Ent., 35:202, fig. 1. Holotype ♂; La Mesa, San Diego Co., Calif. (CAS).

Geographic range.—Known only from California.

**California records.**—ALAMEDA Co.: Alameda, 1 ♀, Frick trap in peach, VIII-27-59 (J. V. Lonergan, CDA). Berkeley, 1 ♂, X-6-1907 (H. H. P. Severin, CIS). Castro Valley, 1 ♂, Frick trap in cherry, IX-20-57 (J. Marston, CDA). Center-ville, 1 ♂, Frick trap in cherry, VIII-53 (R. P. Allen, CDA); 2 ♂♂, 2 ♀♀, Frick trap in walnut, XI-21-58 (Johnson and Sibray, CDA). Fremont, 2 ♂♂, 1 ♀, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). Livermore, 1 ♂, Frick trap in walnut, Summer 58 (T. R. Haig, CDA). Oakland, 1 ♂, McPhail trap (SIB-7), IX-19-58 (J. V. Lonergan, CDA). Hills back of Oakland, 1 ♂, 2 ♀♀, X-6-51 (W. C. Bentinck, CIS). Alameda County, 1 ♂, Frick trap in walnut, IX-13-56 (T. Enos, CDA); 2 ♂♂, Frick trap in cherry, VIII-15-55 (Alameda County, CDA). CONTRA COSTA Co.: Pinole, 1 ♂, X-20-59 (J. Moon, CDA); 1 ♂, Frick trap, VII-16-59 (F. Brucato, CDA); 1 ♂, 1 ♀, IX-4-59 (CDA). Richmond, 1 ♀, Frick trap, VII-17-59 (F. Brucato, CDA). Contra Costa County, 1 ♀, Frick trap, VII-1958 (Contra Costa County, CDA). DEL NORTE Co.: Gasquet, 1 ♀, Frick trap in cherry, VIII-29-60 (T. O. Peacock, CDA). HUMBOLDT Co.: Orick, 1 ♀, Frick trap, Summer 60 (A. W. Longenbaugh, CDA). Willow Creek, 1 adult, Frick trap in cherry, VII-14-60 (A. W. Longenbaugh, CDA). LOS ANGELES Co.: Long Beach, 1 ♂, McPhail trap, VII-12-57 (Paul Engler, LACO). Pomona, 1 ♀, McPhail trap, VII-22-57 (Paul Engler, CDA). SAN DIEGO Co.: Alpine, 3 ♂♂, 2 ♀♀, McPhail trap I-27-59 (D. Close, CDA);

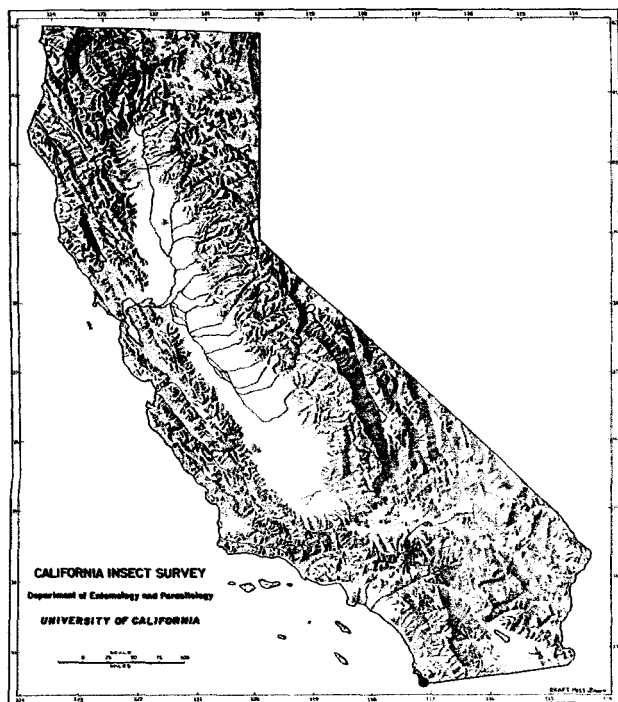
5 ♀♀, McPhail trap, III-2-59 (D. Close, CDA). Campo, 1 ♂, 6 ♀♀, McPhail trap, I-28-59 (S. M. Klopfer, CDA); 1 ♂, McPhail trap, II-19-59 (D. Close, CDA). Chula Vista, 1 ♀, Frick trap, VI-30-55 (Ray Rinder, CDA); 1 ♀, McPhail trap, II-16-54 (G. W. Schwegel, CDA). Dulzura, 1 ♀, McPhail trap in orange, VIII-9-59 (D. Close, CDA). El Cajon, 1 ♀, McPhail trap, III-2-59 (D. Close, CDA). Escondido, 1 ♀, McPhail trap, VI-9-54 (R. M. Kepner, CDA). Fallbrook, 1 ♀, McPhail trap with brown sugar, yeast, and pyridine, II-6-57 (D. F. Palmer, CDA). Guatay (paratype), 1 ♀, McPhail trap with brown sugar, yeast, pyridine, II-38-57 (Wiest, CDA). Hipass, 2 ♂♂, McPhail trap, XII-20-58 (D. Close, CDA). La Jolla, 1 ♀, McPhail trap with brown sugar, yeast and pyridine, III-11-57 (S. M. Klopfer, CDA). Lake Hodges, Rancho Santa Fe, 1 ♀, McPhail trap, VI-19-59 (M. L. Johnson, CDA). La Mesa, 1 ♂, McPhail trap with brown sugar, yeast, and pyridine, II-11-57 (G. S. Hill, CAS); 1 ♀, McPhail trap (SIB-7), I-8-59 (J. Gavin, CDA); 1 ♀, McPhail trap (SIB-7), III-11-59 (G. S. Hill, CDA). La Posta, 1 ♀, McPhail trap, II-28-59 (D. Close, CDA). Pine Valley, 1 ♂, McPhail trap, XI-29-58 (D. Close, CDA). San Ysidro, 1 ♀, McPhail trap in fig, VI-6-57 (J. L. Johnson, CAS); 1 ♀, McPhail trap with brown sugar, yeast, and pyridine in fig, VI-10-57 (J. L. Johnson, CDA); 1 ♂, McPhail trap with brown sugar, yeast, and pyridine in *Rhus integrifolia*, IX-6-57 (R. D. Hancock, CDA); 4 mi. N.E., 1 ♂, McPhail trap in olive, II-11-57 (Edward Soukup, CDA). Tecate, 1 ♀, McPhail trap with brown sugar, yeast, pyridine, XII-18-56 (G. S. Hill, CDA). Winter Gardens, 1 ♀, McPhail trap, III-3-59 (D. Close, CDA). SAN DIEGO Co., 1 ♀, McPhail trap, VI-21-54 (Ray Rinder, CDA); 2 ♀♀, VI-25-54 (Ray Rinder, CDA); 1 ♀, McPhail trap, VI-17-54 (W. M. Pearce, CDA). SAN FRANCISCO Co.: San Francisco, 1 ♀, XI-6-59 (T. R. Haig, CDA); 1 ♀, trap in plum tree, IX-17-58 (D. Voth, CDA); 1 ♀, trap in lemon, X-8-58 (D. Voth, CDA). SAN LUIS OBISPO Co.: Atascadero, 1 ♀, Frick trap in walnut, XI-12-58 (J. Williams, CDA). San Luis Obispo, 1 ♂, Frick trap, XI-9-59 (J. Williams, CDA). SAN MATEO Co.: Pescadero, 2 ♀♀, XI-9-59 (W. Plummer, CDA). Portola, 1 ♂, Frick trap in walnut, X-22-58 (CDA). Redwood City, 1 ♂, Frick trap in walnut, IX-19-57 (Max Leonard, CDA); 1 ♀, Frick trap in walnut, VIII-58 (R. C. Lauder, CDA). SANTA BARBARA Co.: Carpinteria, 1 ♀, in glass patio surrounded by fruit trees, V-13-57 (I. B. Treloar, CDA); Gobernador Canyon, 1 ♀, in NH<sub>3</sub> Frick trap, IX-24-56 (Guy Beevor, CDA). Goleta, 1 ♂, Frick trap in walnut, IX-3-57 (Guy Beevor and H. T. Osborn, CDA); 1 ♂, Frick trap in Persian walnut, IX-18-57 (Guy Beevor, CDA); 1 ♂, Frick trap in Persian walnut, IX-19-57 (Guy Beevor, CDA); 1 ♀, Frick trap, X-21-58 (Marcus Cravens, CDA). Lompoc, 1 ♂, VIII-9-38 (R. H. Beamer, UK). Santa Barbara, 1 ♂, Frick trap in walnut, IX-19-57 (Guy Beevor, CDA); 1 ♂, Frick trap in walnut, IX-4-57 (Guy Beevor and H. T. Osborn, CDA). Summerland, 1 ♀, in NH<sub>3</sub> Frick trap in black walnut, VIII-12-57 (Guy Beevor, CDA). SANTA CLARA Co.: San Jose, 1 ♂, Frick trap in cherry, VII-10-51 (G. F. Prole, CDA). Sunnyvale, 1 ♂, Frick trap, VIII-53 (R. P. Allen, CDA). SONOMA Co.: Glenn Ellen (paratype), 1 ♂, Frick trap in walnut, VII-15-57 (M. G. Dornbush, CDA). Petaluma (paratype), 1 ♀, Frick trap in walnut, VII-25-57 (F. K. Jarvinen, CDA). Santa Rosa (paratype), 1 ♂, Frick trap in walnut, VII-15-56 (T. B. Gallion, CDA). TRINITY Co.: Burnt Ranch, 1 ♂, Frick trap in *Prunus* sp., VI-2-59 (R. Graham, CDA).

*C. californica* resembles *Trypeta angustigena* Foote

in habitus and wing pattern. *T. angustigena*, however, has only one strong genal bristle, while *C. californica* has a series of eight or more.

#### Genus *Cryptotreta* Blanc and Foote

*Cryptotreta* is a very close relative of *Eutreta*: both have two pairs of scutellar bristles, three pairs of lower fronto-orbitals, and two pairs of upper fronto-orbitals (not convergent), and the dorsocentrals are very close to the suture; both also have a wide frons. Its indistinct bulla, unusual wing pattern, and lack of presutural bristles, however, readily distinguish *Cryptotreta*. Nothing is known about the biology of the single species in the genus. The genus has been discussed by Blanc and Foote (1961).



Map 11. Distribution in California of *Cryptotreta pallida* (Cole)

#### *Cryptotreta pallida* (Cole)

(Fig. 20; Map 11)

*Eurosta pallida* Cole, 1923, Proc. California Acad. Sci., (4) 12:472, fig. 10. Holotype ♂; San Francisquito Bay, Baja California (CAS).

**Geographic range.**—California and Mexico (Baja California).

**California records.**—SAN DIEGO CO.: San Ysidro, 1 ♀, McPhail trap in shade tree, IV-12-60 (T. Williams, CDA).

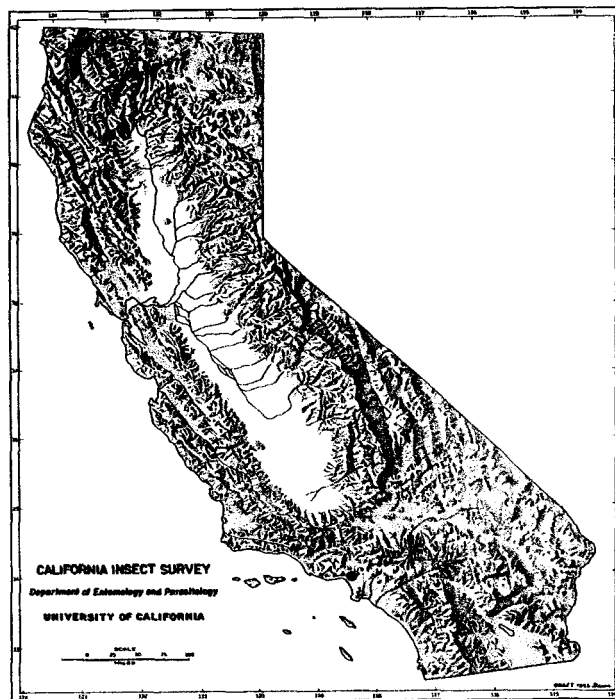
The distinctive wing pattern, with a hyaline base and apex and an indistinct bulla, and the absence of a presutural bristle separate this species from all known California Tephritidae. Only two specimens, the type and the San Ysidro female, are known.

#### Genus *Dacus* Fabricius

Members of the genus *Dacus* are large flies belonging to a group of genera that lack dorsocentral, presutural, sternopleural, ocellar, postvertical, and humeral bristles. The wing pattern (figs. 21, 22) usually consists of a dark band lying along the costal margin and often additional dark markings on vein m and near the wing base. The biologies of only a few economically important species have been investigated (see Christenson and Foote, 1960); the larvae almost always feed in fruits and vegetables. The genus *Dacus*, with 350 to 375 species, is indigenous to Africa, the Mediterranean Region, the Near and Far East, Australia, and the Pacific, but in the New World it has been found only as a result of occasional introductions and has never become established. Taxonomic observations of the genus have been made by Hardy (1949, 1955), and many details of the biology of *cucurbitae* and *dorsalis* have been recorded in the past fifteen volumes of the Proceedings of the Entomological Society of Hawaii.

#### KEY TO THE CALIFORNIA SPECIES OF DACUS

- Wing with a broad dark mark lying upon vein m  
*cucurbitae* Coquillett (p. 14)  
 Wing without a broad dark mark lying upon vein m  
*dorsalis* Hendel (p. 15)



Map 12. Distribution in California of *Dacus cucurbitae* Coquillett

#### *Dacus cucurbitae* Coquillett

(Fig. 21; Map 12)

*Dacus cucurbitae* Coquillett, 1899, Ent. News, 10:129. Holotype

♀; Honolulu, Hawaii (USNM).

**Geographic range.**—Southeast Asia, Mariana Islands, and Hawaii.

**California records.**—LOS ANGELES CO.: University of California campus (Westwood), 1 ♀, McPhail trap in grapefruit, VII-24-56 (J. H. Caldwell, USNM) (see discussion).

The single specimen of this economically important fly caught to date in the Western Hemisphere was captured in a glass McPhail trap baited with an aqueous solution of brown sugar, brewer's yeast, and pyridine, operated by the Los Angeles County Department of Agriculture as part of the California State-wide foreign fruit fly detection program. Subsequent operation of over 5,000 traps and diligent search for larvae have failed to reveal additional specimens.

*D. cucurbitae* may be distinguished from all other California tephritids by the long third antennal segment and the distinctive wing pattern. Back and Pemberton (1917, 1918) have written the most comprehensive account of its biology.

At least 80 species of plants, including cucurbits, tomatoes, and many other vegetables, have been recorded as hosts of the melon fly. Within its range, *cucurbitae* is one of the most important pests with which vegetable growers have to contend.

#### *Dacus dorsalis* Hendel

(Fig. 22; Map 13)

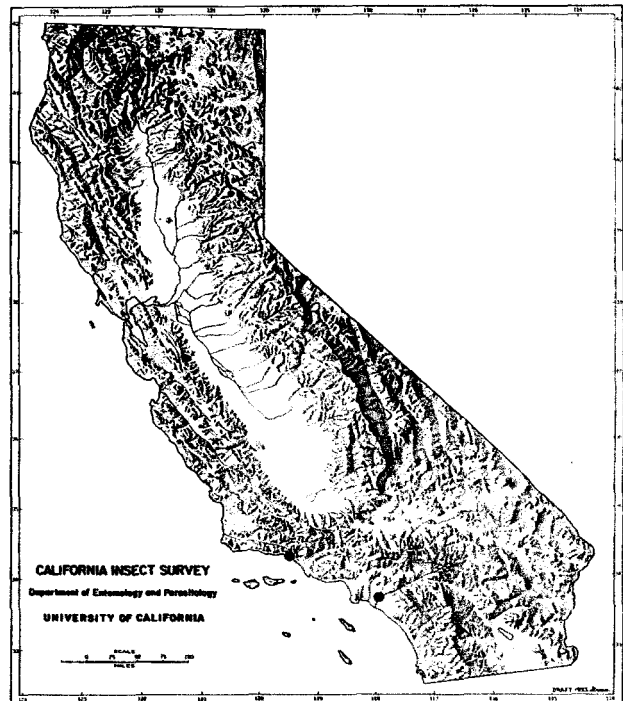
*Dacus dorsalis* Hendel, 1912, Suppl. Ent., 1:18. Syntypes ♂ and ♀, Koshun, Taiwan (DEI).

**Synonyms.**—*Musca ferruginea* Fabricius, 1794:342; *Dacus conformis* Doleschall, 1859:122. The names *ferrugineus* and *dorsalis* have also been used in combination with the generic names *Bactrocera*, *Chaetodacus*, and *Strumeta*.

**Geographic range.**—Widespread throughout India, Burma, Ceylon, Thailand, Laos, Vietnam, Indonesia, South China, the Philippine Islands, Taiwan, Ryukyu Islands, Micronesia, and Hawaii.

**California records.**—ORANGE CO.: Anaheim, 1 ♀ McPhail trap (SIB-7) in orange, VII-29-60 (Chester Johnson, CDA); 1 ♂, Steiner trap (methyl eugenol) in holly, IX-31-60 (James Johnson, CDA). SANTA BARBARA CO.: Carpinteria, 1 ♀, Steiner trap (Siglure, anisylacetone, methyl eugenol) in avocado, IX-20-60 (Ben Osuna, CDA) (see discussion).

The three specimens of this agriculturally important fly are the only records of its field collection in the Western Hemisphere. The first specimen was caught in a glass McPhail trap baited with a one per cent solution of Staley's protein insecticide bait No. 7 and was operated by Chester Johnson of the Bureau of Entomology, California Department of Agriculture, as part of the regular Statewide foreign fruit fly detection program. The subsequent deployment by Federal, State, and County agencies of over 3,000 Steiner traps baited with methyl eugenol lure



Map 13. Distribution in California of *Dacus dorsalis* Hendel

resulted in the capture of the single male fly at Anaheim by James Johnson of the Orange County Department of Agriculture. The third fly, a female, was taken at Carpinteria in Santa Barbara County in a Steiner trap baited with multiple-purpose lure. This trap was State-operated and part of the regular annual foreign fruit fly detection program. The use of over 2,000 methyl eugenol traps in and near Carpinteria has failed to detect additional specimens.

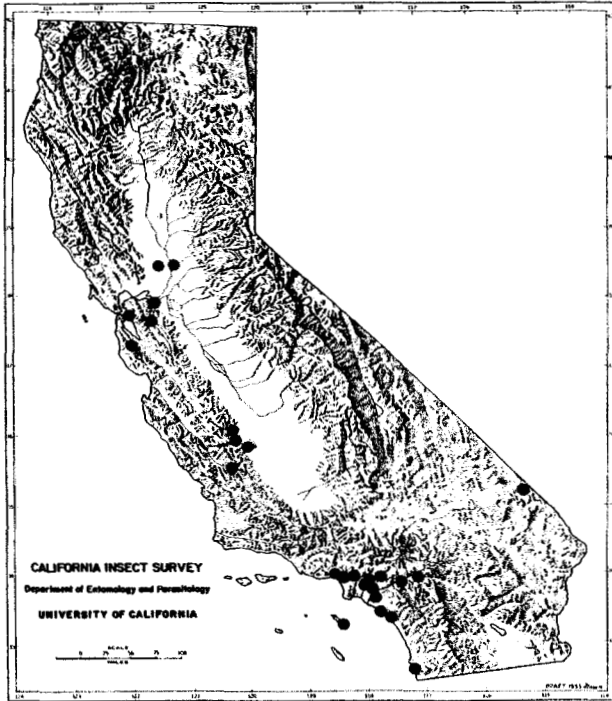
As in *cucurbitae*, the distinctive wing pattern and long antennae distinguish this species from all other California tephritids. Armitage (1951) and Fullaway (1953) have presented comprehensive accounts of the biology and economic significance of this species.

*D. dorsalis* attacks almost all kinds of fruits. In Hawaii alone, larvae have been found in at least 125 hosts.

#### Genus *Dioxyna* Frey

*Dioxyna* is very closely related to *Paroxyna*, but the species comprising the genus possess an elongated head—the length is much greater than the height—and an extremely flat frons. There are no preaedeagal setulae. The wing pattern closely resembles that of many of the species of *Paroxyna* discussed in this Bulletin, but the stigma is hyaline at the extreme base and contains no round hyaline spot. Of the 4 species in the genus, only *thomae* (Curran) and

*picciola* (Bigot) occur in North America, and *thomae* is restricted to Florida. These species, like those of *Paroxyna*, breed in flower heads and ovaries of various plants. The most recent review is of the African species by Munro (1957). In addition to the 1 positively recognised species, the genus is represented in California by a number of miscellaneous specimens, the identification of which must await a revision of *Dioxyina* and *Paroxyna*.



May 14. Distribution in California of *Dioxyina picciola* (Bigot)

*Dioxyina picciola* (Bigot)

(Fig. 23; Map 14)

*Acinia picciola* Bigot, 1857, in Sagra, Hist.-Fis., Pol. and Nat. Cuba, 2d part, Hist., Nat., 1856, 7:347. Type (sex not known); Cuba (location of type not known).

Synonyms.—*Trypeta humilis* Loew, 1862:81; *Trypeta aurifera* Thoms., 1868:585; *Paroxyna sororcula* of authors.

Geographic range.—Entire United States; Bahamas, West Indies, Mexico, and Central America. Its distribution south of Panama is not known.

California records.—ALAMEDA CO.: Alameda, 1 ♂, 3 ♀♀, ex *Coreopsis* sp., VII-15-27 (E. P. Van Duzee, CAS). Berkeley, 1 ♂, V-22-67 (H. P. Severin, CIS). CONTRA COSTA CO.: Antiock, 1 ♀, IX-36 (E. S. Ross, CAS). Tassajara, 1 ♂, III-1-36 (G. E. Bohart, CAS). FRESNO CO.: Coalinga, 10 mi. W., 1 ♂, 1 ♀, ex *Senecio douglasii*, XI-7-57 (H. L. Wilson, CDA); 12 mi. N.W., ex *Gutierrezia californica*, XI-8-57 (H. L. Wilson, CDA); 15 mi. N., 1 ♀, ex *Coreopsis calliopsidea* blossoms, III-28-56 (H. L. Wilson, FLB). Zapato Canyon, 8 mi. S. Coalinga, 1 ♂, swept from flower of *Franseria acanthicarpa*, X-23-57 (H. L. Wilson, CDA). Fresno County, 1 ♂, VIII-2-35 (M. L. Jones, CDA). KINGS CO.: Kettleman Hills, ex

*Gutierrezia californica*, I-9-58 (H. L. Wilson, CDA). LOS ANGELES CO.: Avalon, Catalina Island, 1 ♂, III-28-38 (W. P. Cockerell, CAS). Los Angeles, 1 ♂, 3 ♀♀, IX-12-30 (K. L. Wolff, LACO). Pomona, 1 ♀, IX-31 (K. L. Wolff, LACO). Puente, 1 ♂, IX-31 (K. L. Wolff, LACO). West Los Angeles, 1 ♂, melon fly trap in plum, X-15-56 (E. Blakely, CDA); 1 ♀, melon fly trap in lemon, X-17-56 (Gates, CDA); 1 ♀, melon fly trap in apricot, X-4-56 (E. Blakely, CDA). Whittier, 1 ♂, ex seed heads of *Coreopsis* sp., VIII-26 (P. H. Timberlake UCR). Westwood, 1 ♂, melon fly trap in carob, III-21-57 (B. Chan, CDA). ORANGE CO.: Laguna Beach (Baker, CIS). La Habra, 1 ♂, 2 ♀♀, Bahia flower heads, VII-15-1931 (F. R. Cole, CIS). San Juan Capistrano, 1 ♀, McPhail trap (SIB-7) in orange, IV-13-59 (C. Johnson, CDA); 1 ♀, McPhail trap in orange, IX-29-59 (C. Johnson, CDA). Santa Ana, 2 ♂♂, 1 ♀, VII-32 (D. B. Mackie, CDA). RIVERSIDE CO.: Riverside, 1 ♀, on *Alyssum maritimum*, VII-9-35 (P. H. Timberlake, UCR). SACRAMENTO CO.: Sacramento, 2 ♀♀, X-7-58 (P. H. Arnaud, PHA); 1 ♂, 2 ♀♀, ex *Bidens frondosa*, X-8-58 (P. H. Arnaud, CDA); 1 ♀, VI-22-32 (H. H. Keifer, CDA). SAN BERNARDINO CO.: Ivanpah, 12 mi. S.E., 1 ♀, V-1-56 (P. D. Hurd, CIS). Redlands, 1 ♀, 1914 (CIS). SAN DIEGO CO.: Coronado, 2 ♂♂, 2 ♀♀, ex *Coreopsis* sp., V-15-50 (E. D. Alget, USNM). San Diego, VIII-25-41 (F. H. Wylie, SDM). San Diego County, 1 ♂, IX-27 (SDM). SAN LUIS OBISPO CO.: Shandon, 6 ♂♂, 7 ♀♀, ex *Coreopsis calliopsidea*, IV-2-57 (H. L. Wilson, CDA). SAN MATEO CO.: Portola, 1 ♂, VI-5-15 (M. C. Van Duzee, CAS). YOLO CO.: Davis, 1 ♂, 1 ♀, VII-4-55 (J. C. Downey, UCD); 1 ♀, VII-27-55 (J. C. Downey, UCD).

*Dioxyina picciola* is extremely abundant almost everywhere it occurs.

Genus *Epochra* Loew

The monotypic genus *Epochra* is readily distinguished from all other known North America tephritids by the absence of the presutural bristle. The wing pattern markedly resembles that of some species of *Paraterellia* and *Trypeta*, but *Epochra* can be separated from them quickly by the character mentioned above and by the presence of only one pair of upper fronto-orbital bristles. The single species, *Epochra canadensis* (Lw.), is the well-known currant fruit fly, which has been discussed briefly by Foote (1959c).

*Epochra canadensis* (Loew)

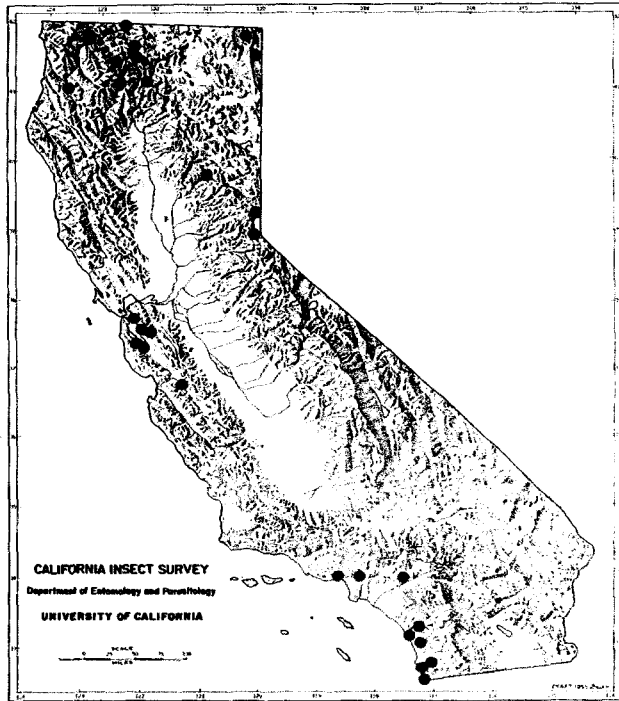
(Fig. 24; Map 15)

*Trypeta canadensis* Loew, 1873, Smiths. Misc. Collect., 11(256):235. Holotype ♀; Canada (MCZ).

Synonym.—*Epochra lunifera* Hering, 1940:5.

Geographic range.—Widespread throughout the northern United States and southern Canada.

California records.—ALAMEDA CO.: Berkeley, 1 ♀ IX-9-07 (H. H. Severin, CIS). Palomares Canyon, 1 ♂, Frick trap in cherry, VII-1-53 (W. S. Sibray, CDA). San Lorenzo, 10 ♂♂, 10 ♀♀, V-2-18 (H. H. Severin, CIS); 1 ♂, 1 ♀, V-2-18 (H. H. Severin, CAS). EL DORADO CO.: Lake Tahoe, 1 ♀, VI-19-36 (R. M. Bohart, CAS); 1 ♂, VI-23-27 (E. H. Nast, CAS). HUMBOLDT CO.: Hoopa, 1 ♂, Frick trap in *Prunus emarginata*, VI-2-59 (D. A. Davis, CDA). LOS ANGELES CO.: Beverly Hills, 1 ♂, McPhail trap with anisyl acetone in avo-



Map 15. Distribution in California of *Epochra canadensis* (Loew)

cado, III-13-57 (B. L. Chan, CDA). Los Angeles, 1 ♀, McPhail trap, II-17-58 (Paul Engler, LACO). Westwood, 1 ♀, McPhail trap in lemon, II-28-57 (A. Barney and D. Gates, CDA). MODOC Co.: Goose Lake, 1 ♀, V-24-49 (R. M. Bohart, UCD). Lake City, 1 ♀, Frick trap, IX-59 (L. White, CDA). NEVADA Co.: Truckee, 1 ♀, VI-17-27 (E. P. Van Duzee, CIS); 1 ♀, VI-18-27 (E. P. Van Duzee, CAS); 1 ♂, VI-25-43 (P. H. Arnaud, PHA). PLUMAS Co.: Meadow Valley, 1 ♀, 3,500-4,000 ft., VI-2-24 (E. C. Van Dyke, CAS). SAN BENITO Co.: Hollister, 1 ♂, III-20-57 (W. B. Saunders, CDA). SAN BERNARDINO Co.: Fontana, 1 ♂, McPhail trap, III-15-57 (Gene Harper, SBC). SAN DIEGO Co.: El Cajon, 1 ♂, 6 ♀ ♀, McPhail trap, II-28-57 (D. Close, CDA); 1 ♂, 1 ♀, McPhail trap, III-10-59 (D. Close, CDA); 1 ♂, McPhail trap, III-2-59 (J. Garcia, CDA); 1 ♀, McPhail trap, III-2-59 (D. Close, CDA). Escondido, 2 ♀ ♀, McPhail trap, III-5-59 (A. A. Church, CDA); 1 ♀, McPhail trap, III-12-59 (A. A. Church, CDA); 1 ♂, McPhail trap, III-26-56 (A. A. Church, CDA). Fallbrook, 1 ♂, 1 ♀, McPhail trap, II-13-57 (M. K. Hess, CDA). La Mesa, 1(abdomen missing), McPhail trap, III-8-56 (J. P. Dion, CDA). Oceanside, 1 ♀, McPhail trap in citrus, III-5-59 (H. T. Oldham, CDA). Palm City, 1 ♂, trap in orange, II-24-58 (J. H. Rosenberger, CDA). San Diego, 1 ♂, McPhail trap in grapefruit, III-4-57 (S. M. Klopfer, CDA); 1 ♂, McPhail trap, II-25-59 (J. Garcia, CDA). San Marcos, 1 ♀, trap, I-23-58 (E. Blake, CDA). San Ysidro, 1 ♂, McPhail trap, II-25-57 (David Conger, CDA); 1 ♂, McPhail trap in orange, II-25-57 (D. Conger, CDA). Windover Ranch, 1 ♀, McPhail trap, II-4-54 (K. H. Baker, R. W. Harper, and H. T. Osborne, CDA). SAN MATEO Co.: Atherton, 3 ♂ ♂, 2 ♀ ♀, ex current, V-4-44 (Weimer, CDA). SANTA CLARA Co.: Palo Alto, 2 ♂ ♂, 1(abdomen missing), IV-17-12 (SU). Stanford

University, 1 ♂, 1 ♀, V-5-22 (C. D. Duncun, SJS). SISKIYOU Co.: Etna, 1 ♂, 1 ♀, Frick trap in cultivated cherry, VIII-22-57 (M. Truitt, CDA). Happy Camp, 1 ♂, Frick trap, VI-16-59 (R. Klander, CDA). Hornbrook, 1 ♂, Frick trap, VI-4-59 (Truitt and Cason, CDA). McCloud, 1 ♂, Frick trap in cultivated cherry, VIII-22-57 (M. Truitt, CDA); 1 ♀, Frick trap, VI-24-58 (K. L. Funk, CDA). Mount Shasta, 1 ♀, Frick trap, VIII-22-57 (M. Truitt, CDA). Weed, 1 ♂, Frick trap, VIII-16-56 (W. W. Wiard, CDA). Yreka, 1 ♂, Frick trap, VI-6-58 (D. Hill, CDA). TRINITY Co.: Carrville, 1 ♀, V-18-34 (CAS).

A rather variable species, *Epochra canadensis* usually has a hyaline spot at the apex of cell R<sub>5</sub>. It can be recognized immediately by the absence of a presutural bristle.

*E. canadensis* is the subject of several rather extensive biological studies by Paine (1912), Severin (1917), and Gambrell (1931). Keifer (1930) has commented on its presence in currants and gooseberries.

Genus *Euaresta* Loew

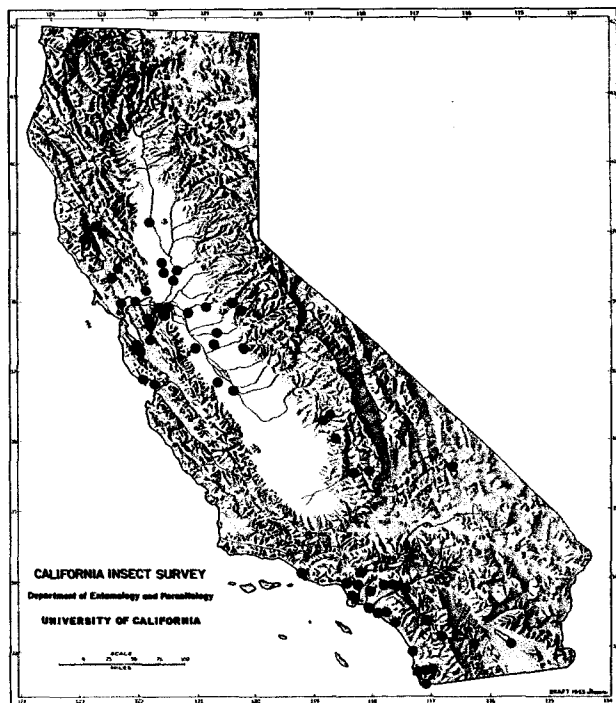
This genus of small- to medium-sized fruit flies may be distinguished from all others known in California by their size, by the presence of only two lower fronto-orbitals, and by the expanded male fore femur and the conspicuous striations near the anal region of the male aedeagus. The wing, which may be with or without a bulla, is typically dark with discal and marginal hyaline spots. Virtually nothing is known about the biology of the species. The genus appears to be limited to the New World and Australia; it is widely spread over North America, with 5 of its 8 Nearctic species occurring in California. The most recent revision of Nearctic species is that of Quisenberry (1950).

KEY TO THE CALIFORNIA SPECIES OF EUARESTA

- 1 Ground color of thorax yellow
  - aequalis* (Loew) (p. 18)
  - Ground color of thorax black, often obscured by light-colored pollinosity . . . . . 2
- 2(1) Unbroken transverse hyaline band extending from base of stigma to posterior wing margin
  - tapetis* (Coquillett) (p. 22)
  - This band not present . . . . . 3
- 3(2) Cell R<sub>5</sub> without bulla; arista yellowish at base, brown at apex, with whitish central portion
  - bullans* (Wiedemann) (p. 20)
  - Cell R<sub>5</sub> with at least a small bulla; arista brown with yellowish base, but without white on central portion . . . . . 4
- 4(3) Hyaline spot at center of cell R<sub>5</sub> never broadly joined across vein R<sub>2+3</sub> to adjacent hyaline area in cell R<sub>1</sub>; usually with distinct rounded brown spot in center of stigma
  - stigmatica* (Coquillett) (p. 21)
  - Hyaline spot at center of cell R<sub>5</sub> always broadly joined across vein R<sub>2+3</sub> with adjacent hyaline

area in cell R<sub>1</sub>; hyaline area of stigma confined to basal half of that cell

*bellula* (Snow) (p. 19)



Map 16. Distribution in California of *Euaresta aequalis* (Loew)

*Euaresta aequalis* (Loew)

(Fig. 25; Map 16)

*Trypeta aequalis* Loew, 1862, Smiths. Misc. Collect., 6(1):86, pl. II, fig. 20. Holotype ♂; Illinois (MCZ).

*Synonym*.—*Tephritis gemella* Coquillett, 1902:181.

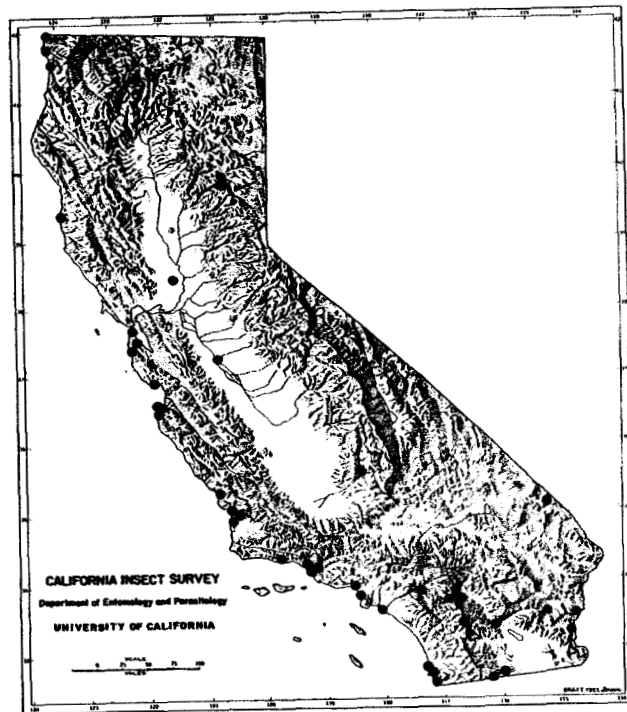
*Geographic range*.—A common and widespread species throughout the United States. The extent of its distribution in Mexico is not known.

*California records*.—ALAMEDA Co.: Niles, 2 ♂♂, 2 ♀♀, IX-2-32 (CIS). CALAVERAS Co.: Murphys, 1 ♀, Frick trap, Summer 60 (Calaveras County, CDA). COLUSA Co.: Colusa, 2 ♂♂, 2 ♀♀, IX-15-55 (R. O. Schuster, CIS). CONTRA COSTA Co.: Antiock, 2 ♂♂, IX-36 (E. S. Ross, CAS). Bethel Harbor, 1 ♂, IX-12-56 (J. A. Powell, JAP). Brentwood, 1 ♂, 1 ♀, Frick trap in walnut, IX-28-57 (J. M. Marston, CDA). Danville, 3 ♂♂, on *Xanthium* sp. leaves, VIII-17-51 (F. X. Williams, CAS); 1 ♀, on *Xanthium* sp. leaves, VIII-20-51 (F. X. Williams, CAS). Walnut Creek, 2 ♂♂, X-20-38 (C. A. Boyer, CAS); 1 ♀, X-20-38 (C. A. Boyer, CIS). FRESNO Co.: Firebaugh, 2 ♂♂, VIII-17-49 (A. D. Telford, CIS). IMPERIAL Co.: Calipatria, 10 mi N.W., 1 ♂, V-23-56 (T. R. Haig, UCD). KERN Co.: Isabella, 2 ♂♂, sweeping alfalfa, VII-31-43 (Ray F. Smith, CIS). Onyx, 28 ♂♂, 28 ♀♀, VII-23-40 (D. E. Hardy, UK). LAKE Co.: Clear Lake, 1 ♀, VIII-16 (W. M. Gifford, CAS). Lakeport, 1 ♂, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). Scott Valley, 1 ♂, Frick trap, Summer 57 (D. Hendricks, CDA). Lake County, 1 ♂ (Coquillett, USNM). LOS ANGELES Co.: Beverly Hills, 2 ♂♂, IX-15-30 (Menzies, LACO). Claremont, 1 ♀ (Baker, CDA). Los Angeles,

2 ♂♂, on *Salix* sp., IX-7-46 (W. Dwight Pierce, LAM). Pico, 1 ♂, bait trap, IX-24-35 (L. E. Myers, CDA); 2 ♂♂, 2 ♀♀, IX-15-30 (Williams, LACO). Pomona, 2 ♂♂, IX-9-30 (K. L. Wolff, CDA); 1 ♀, from cocklebur, VIII-28-31 (C. Gammon, CDA); 2 ♂♂, IX-9-30 (K. L. Wolff, CDA); 1 (abdomen missing), X-12-30 (K. L. Wolff, CDA). San Gabriel Mountains, 1 ♂, 1 ♀, IX-16-31 (Perkins, LACO). Southwest Los Angeles, 1 ♀, 1 (abdomen missing), IX-17 (D. Barry, SU). Tujunga Canyon, 1 ♂, X-27-51 (UCLA). UCLA, Westwood Hills, 1 ♀, VI-8-50 (UCLA). Whittier, 3 ♀♀, *Haplopappus venetus* var. *xernonioides*, VIII-31-20 (P. H. Timberlake, UCR). Los Angeles County, 2 ♂♂, 1 ♀ (E. J. Branigan, CDA). MARIN Co.: Novato, 1 ♂, 4 ♀♀, Frick trap, VI-21-59 (Bergin and Haig, CDA). MARIPOSA Co.: Hornitos, 1 ♂, Frick trap, IX-17-58 (R. P. Allen, CDA). MENDOCINO Co.: Hopland, 1 ♂, Frick trap in English walnut, VIII-6-57 (L. Bucknell, CDA); 1 ♂, 1 ♀, Frick trap in English walnut, IX-12-57 (R. A. de Grassi, CDA); 1 ♀, Frick trap in cherry, X-1-56 (W. W. Wiard, CDA). MERCED Co.: Dos Palos, 2 ♂♂, VIII-24-47 (V. M. Stern, CIS); 3 ♂♂, 3 ♀♀, VIII-14-47 (V. M. Stern, CIS). NAPA Co.: Calistoga, 1 ♂, Frick trap in English walnut, VIII-5-57 (D. A. Taylor, CDA); 1 ♂, Frick trap, VIII-22-56 (Glen Cagley, CDA). ORANGE Co.: Costa Mesa, 3 ♂♂, 1 ♀, cocklebur, VII-20-38 (J. G. Shanfelt, LAM). Huntington Beach, 1 ♂, 3 ♀♀, sugarbeets, IX-24-04 (E. S. G. Titus, USNM). Irvine, 1 ♂, cocklebur, VIII-17-39 (C. E. Norland, OC); 1 ♂, 1 ♀, VIII-17-39 (C. E. Norland, LAM). San Juan Capistrano, 1 ♀, McPhail trap in orange, X-1-57 (G. F. Prole, CDA). RIVERSIDE Co.: Riverside, 1 ♀, X-5-09 (G. R. Pilate, CAS); 2 ♂♂, on *Pluchea camphorata*, IX-24-33 (P. H. Timberlake, UCR); 1 ♂, 1 ♀, on *Baccharis emoryi*, IX-25-49 (P. H. Timberlake, UCR); 2 ♂♂, 3 ♀♀, on *Polygonum lapathifolium*, IX-1-35 (P. H. Timberlake, UCR); 4 ♂♂, 4 ♀♀, on *Ambrosia psilostachya*, IX-1-41 (P. H. Timberlake, UCR); 1 ♂, on *Haplopappus venetus* var. *vernonioides*, IX-25-49 (P. H. Timberlake, UCR); 1 ♀, on *Gnaphalium beneolens*, IX-24-45 (P. H. Timberlake, UCR); 1 ♀, on *Schinus molle*, IX-1-46 (P. H. Timberlake, UCR); 1 ♀, on *Solanum douglasii*, IX-1-41 (P. H. Timberlake, UCR); 1 ♀, on *Baccharis emoryi*, X-7-34 (P. H. Timberlake, UCR); 1 ♂, IX-2-50 (P. H. Timberlake, UCR); 3 ♂♂, 1 ♀, on *Xanthium pennsylvanicum*, IX-10-50 (P. H. Timberlake, UCR). Temecula, 1 ♂, VIII-13-56 (A. C. Miles and E. I. Schlinger, UCD). SACRAMENTO Co.: Sacramento, 1 ♂, on leaf of *Xanthium canadense*, IX-8-58 (P. H. Arnaud, CDA); 20 ♂♂, 5 ♀♀, on leaves of *Xanthium canadense*, IX-7-59 (F. L. Blanc, FLB); 7 ♂♂, 8 ♀♀, X-3-56 (H. R. Moffatt and A. A. Grigarick, UCD); 14 ♂♂, 11 ♀♀, (E. O. Essig, CDA). SAN BERNARDINO Co.: Chino, 1 ♂, on cocklebur, X-5-30 (CIS). Saratoga Springs, Death Valley, 1 ♂, V-30-53 (USNM). SAN DIEGO Co.: Del Mar, 1 ♀, Mexican fruit fly trap (SIB-7), VIII-14-59 (C. Avery, CDA). El Cajon, 1 ♀, McPhail trap in orange, VIII-3-56 (J. S. Hill, CDA). Lake Henshaw, 3 ♂♂, 1 ♀, cocklebur (sweeping), VIII-29-44 (S. C. Jones, SCJ). La Mesa, 1 ♂, on grape, VIII-1-53 (Gerald Hill, CDA). Mission Valley, 1 ♂, VIII-27-38 (L. W. Welsh, SDM). San Diego, 1 ♂, VII-10-16 (E. P. Van Duzee, CAS). San Ysidro, 1 ♀, McPhail trap in *Rhus laurina* (sumac), IX-3-57 (J. L. Johnson and Ed Soukup, CDA). Sentenac Canyon, 1 ♂, IX-12-38 (C. Dammers, LAM). Warners Hot Springs, 1 ♀, VIII-1-21 (SDM); 1 ♂, 1 ♀, VII-27-21 (SDM), 1 ♂, VII-29-21 (SDM); 1 ♂, VIII-6-21 (SDM); 1 ♂, VIII-15-58 (E. I. Schlinger, UCD); 4 mi. S.E., 2 ♀♀, on *Xanthium pennsylvanicum*, IX-12-38 (P. H. Timber-

lake, UCR). SAN JOAQUIN Co.: Bellota, 1 ♀, Frick trap in walnut, IX-20-57 (J. L. Joos, CDA). Stockton, 1 ♀, Frick trap in walnut, IX-20-57 (J. L. Joos, CDA); 1 ♂, VIII-20-19 (E. P. Van Duzee, CAS); 1 ♂, VIII-20-19 (E. P. Van Duzee, USNM). SAN MATEO Co.: Redwood City, 1 ♂, 1 ♀, Frick trap in walnut, IX-19-57 (Max Leonard, CDA). Woodside, 1 ♂, 2 ♀♀, Frick trap in walnut, X-2-57 (Ralph Freeman, CDA). SANTA CLARA Co.: Palo Alto, 1 ♂, 1 ♀, VII-14-1892 (SU); 25 ♂♂, 27 ♀♀, VII-14-1892 (SU). Stanford, 1 ♂, VIII-9-02 (UCM); 1 ♀, VIII-23-57 (P. H. Arnaud, PHA). Stanford University, 1 ♀, VII-190? (SU); 5 ♂♂, 2 ♀♀, IX-22-53 (P. H. Arnaud, PHA); 8 ♂♂, 1 ♀, IX-21-58 (P. H. Arnaud, PHA); 1 ♀, IX-11-57 (P. H. Arnaud, PHA); 7 ♂♂, 7 ♀♀, VII-9-02 (SU); 1 ♂, VII-12-59 (P. H. Arnaud, PHA); 2 ♀♀, X-7-05 (J. M. Aldrich, USNM); 1 ♂, VIII-9-02 (UCM). Santa Clara County, 1 ♂, 3 ♀♀, X-15-13 (E. J. Branigan, CDA); 2 ♂♂, 4 ♀♀ (Baker, SU); 1 ♀, (Baker, USNM). SANTA CRUZ Co.: Santa Cruz, 1 ♂, VI-1-36 (CAS). Watsonville, 2 ♂♂, 2 ♀♀, from sour dock, VIII-1-55 (L. R. Gillogly, RFW). SOLANO Co.: Suisun, 1 ♀, Frick trap, IX-59 (Solano County, CDA). Vacaville, 1 ♂, Frick trap in walnut, IX-29-57 (J. M. Marston, CDA). Vallejo, 1 ♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). SONOMA Co.: Santa Rosa, 1 ♀, XII-7-59 (T. R. Haig, CDA). STANISLAUS Co.: Patterson, 2 ♂♂, IX-16-53 (W. W. Middlekauff, CIS). Denair, 3 ♂♂, sunflower, VIII-8-43 (G. G. Beevor, CDA). Waterford, 1 ♂, Frick trap in walnut, IX-12-57 (Gary Posz, CDA). TULARE Co.: Sequoia National Park, 8 ♂♂, 11 ♀♀, VIII-6-40 (Kenaga, UK). Springville, 1 ♀, Frick trap in black walnut, IX-24-57 (R. P. Allen, CDA). Three Rivers, 1 ♂, Frick trap in black walnut, IX-24-57 (R. P. Allen, CDA). TUOLUMNE Co.: Sonora, 1 ♂, Frick trap, VII-27-59 (R. P. Allen, CDA). VENTURA Co.: Oxnard, 1 ♀, feeding on sugarbeet (D. K. McMillan, USNM). YOLO Co.: Clarksburg, 9 ♂♂, 2 ♀♀, *Xanthium canadense*, VIII-23-42 (H. A. Hunt, CDA). Davis, 3 ♂♂, VII-18-55 (R. K. Washino, UCD); 8 ♀♀, VII-21-55 (A. T. McClay, UCD); 1 ♀, VIII-20-55 (A. T. McClay, UCD); 2 ♂♂, 1 ♀, VIII-12-55 (R. M. Bohart, UCD); 1 ♂, 1 ♀, VIII-12-55 (E. I. Schlinger, UCD); 1 ♂, 1 ♀, VIII-9-55 (A. T. McClay, UCD); 2 ♂♂, VII-9-55 (E. I. Schlinger, UCD); 4 ♂♂, 4 ♀♀, VIII-7-55 (A. T. McClay, UCD); 3 ♂♂, 2 ♀♀, VIII-3-55 (A. T. McClay, UCD); 2 ♂♂, 3 ♀♀, VIII-7-55 (R. M. Bohart, UCD); 6 ♂♂, 3 ♀♀, VII-6-55 (A. T. McClay, UCD); 1 ♀, VII-4-55 (E. I. Schlinger, UCD); 1 ♂, VIII-4-55 (A. T. McClay, UCD); 1 ♂, 2 ♀♀, VIII-4-55 (R. M. Bohart, UCD); 2 ♂♂, 6 ♀♀, VIII-3-55 (R. M. Bohart, UCD); 4 ♂♂, 3 ♀♀, VIII-3-55 (E. I. Schlinger, UCD); 1 ♂, VIII-3-55 (A. D. Telford, UCD); 2 ♂♂, VIII-10-55 (A. D. Telford, UCD); 1 ♂, 2 ♀♀, VII-10-55 (R. E. Bohart, UCD); 1 ♂, 2 ♀♀, VIII-11-55 (A. D. Telford, UCD); 3 ♂♂, 1 ♀, VIII-11-55 (A. T. McClay, UCD); 2 ♂♂, 1 ♀, VIII-11-55 (E. A. Kurtz, UCD); 5 ♂♂, 3 ♀♀, VIII-11-55 (J. C. Downey, UCD); 1 ♂, ex *Xanthium bur* (J. M. Aldrich, USNM); 1 ♂, ex cockle (?) bur, IX-16 (De Ong, USNM).

The largest of the California species of *Euaresta*, *aequalis* may be recognized by the distinctly yellow body color. Unlike those of the remaining species, the hyaline spot near the apex of cell R<sub>3</sub> is separated by a narrow brown area from the wing margin.



May 17. Distribution in California of *Euaresta bellula* Snow

*Euaresta bellula* Snow

(Fig. 26; Map 17)

*Euaresta bellula* Snow, 1894, Kans. Univ. Quart., 2(3):172.

Lectotype ♀; Arizona (UK).

Synonym.—*Trypeta (Euaresta) stelligera* Coquillett, 1894:74.

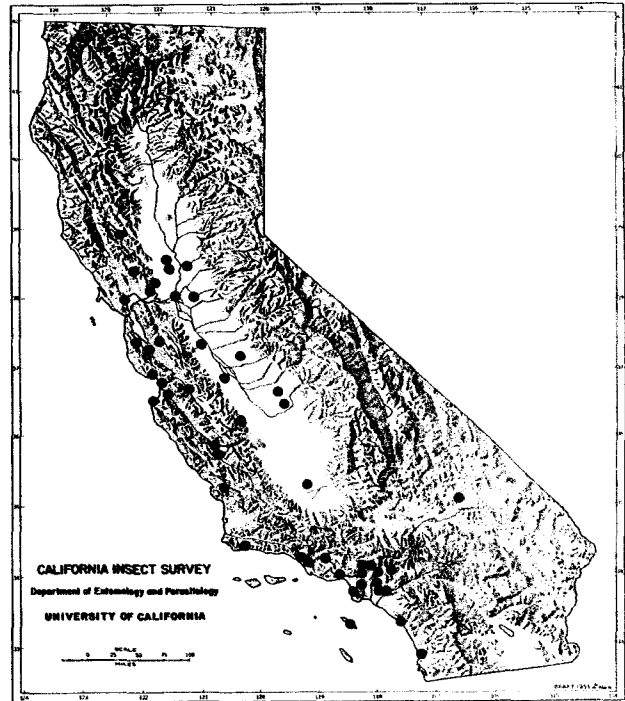
**Geographic range.**—Arizona, California, New Mexico, Oregon, Texas, and Washington; also Mexico (Baja California and Sonora).

**California records.**—DEL NORTE Co.: Crescent City, 3 ♀♀, VII-1-51 (C. Fitch, UCD). Requa, 1 ♂, VIII-4-20 (Carl D. Duncan, CIS). Smith River, 19 ♂♂, 12 ♀♀, on *Franseria chammissonis bipinnatisecta*, VII-8-30 (J. M. Aldrich, USNM). IMPERIAL Co.: Coyote Wells, 1 ♀, ex *Senecio douglasii*, IV-4-18 (H. H. Severin, CIS). Palo Verde, 3 ♀♀, on *Encelia frutescens*, IV-17-60 (CDA); 12 mi. S., 1 ♀, on *Bebbia* sp., IV-30-52 (P. H. Timberlake, UCR). KERN Co.: Kernville, 1 ♂, V-10-39 (F. T. Scott, FTS). LOS ANGELES Co.: El Segundo dunes, 9 ♂♂, 17 ♀♀, V-30-41 (K. E. Snyder, CIS). Santa Monica, 1 ♂, melon fly trap, VIII-21-56 (Mertz, CDA). MENDOCINO Co.: Fort Bragg, 1 ♀, VII-11-56 (CDA). MERCED Co.: G. J. Hatfield State Park, 5 ♂♂, 12 ♀♀, V-30-59 (C. G. Moore, CGM). MONTEREY Co.: Carmel, 3 ♂♂, 1 ♀, VI-29-31 (R. L. Usinger, CIS); 1 ♂, 1 ♀, IX-6-31 (E. P. Van Duzee, CAS). Del Monte, 7 ♂♂, 7 ♀♀, ex *Franseria acanthicarpa*, VIII-30-18 (H. H. Severin, CIS); 1 ♂, 1 ♀, ex *Franseria acanthicarpa*, VII-30-18 (H. H. Severin, CAS). Pacific Grove, 1 ♀, sand hills, VII-3-?? (Cockerell and Moore, USNM). Pt. Pinos, 4 ♂♂, 1 ♀, VIII-19-57 (P. H. Arnaud, PHA). Rocky Creek, 1 ♂, VIII-29-50 (R. C. Bechtel and R. M. Bohart, UCD). ORANGE Co.: Huntington Beach, 9 ♂♂, 10 ♀♀, ex *Franseria bipinnatifida*, VI-1-18 (H. H. Severin, CAS, CIS). Seal Beach, 1 ♂, *Franseria* sp., V-16-38 (D. Poole, LAM).



PLUMAS Co.: Keddie, 1 ♀, VI-26-49 (Claude I. Smith, CIS). Quincy, 4 mi. W., 1 ♀, VI-25-49 (P. H. Hurd, CIS); 1 ♀, VI-20-49 (P. D. Hurd, CIS); 1 ♀, VI-22-49 (Claude I. Smith, CIS). RIVERSIDE Co.: Andreas Canyon, 1 ♀, III-8-56 (J. C. Hall, UCD). Blythe, 9 mi. W., 3 ♂♂, 6 ♀♀, *Pectis papposa*, X-11-58 (J. A. Chemsak, CIS). Blythe, 18 mi. W., 2 ♀♀, on *Baileya pleniradiata*, IV-29-52 (P. H. Timberlake, UCR). Date Palm Beach, 2 ♀♀, V-10-52 (UCLA). Hopkins Well, 3 ♂♂, IV-16-58 (J. A. Powell, CIS); 1 ♂, 2 ♀♀, X-11-58 (J. A. Chemsak, CIS). Marion Mountain Camp, San Jacinto Mountains, 1 ♂, VII-1-52 (J. K. Hester, UCD). Riverside, 1 ♀, on *Salix gooddingii*, IV-18-42 (P. H. Timberlake, UCR). Santa Rosa Peak, San Jacinto Mountains, 1 ♀, 6,200 ft., V-31-40 (R. Husbands, CIS). Whitewater, 1 ♀, III-9-40 (R. M. Bohart, UCD). SAN BERNARDINO Co.: Ivanpah, 12 mi. S.E., 1 ♀, V-1-56 (M. Wasbauer, CIS). SAN DIEGO Co.: Imperial Beach, 1 ♂, VIII-7-55 (P. H. Arnaud, PHA). Jacumba, 1 ♂, XII-29-48 (R. H. Beamer, UK). La Jolla, 4 ♂♂, 6 ♀♀, VII-18-41 (E. L. Todd, UK). San Diego, 1 ♀, V-8-13 (E. P. Van Duzee, CAS); 1 ♂, "May" (E. P. Van Duzee, CAS); 1 ♂, 4 ♀♀, 2 (abdomens missing), VIII-13-16 (E. P. Van Duzee, CAS); 1 ♀, VIII-13-16 (E. P. Van Duzee, USNM). San Ysidro, 1 ♀, McPhail trap in pepper tree, IV-21-59 (H. R. Ramarey, CDA); 13 ♂♂, 12 ♀♀, from seeds of *Franseria chenopodiifolia*, collected VI-10-60 emerged VI-28-60 (E. Algert, USNM). Silver Strand, 2 ♀♀, IV-24-53 (J. A. Powell, JAP); 3 ♀♀, IV-24-53 (J. A. Powell, JAP). San Diego County bait trap XII-45 (S. V. Weimer, CDA). SAN FRANCISCO Co.: San Francisco, 4 ♂♂, on *Franseria* sp., VIII-26-30 (H. H. Keifer, UCLA); 1 ♂, 1 ♀, sand dunes, VIII-27-22 (E. P. Van Duzee, CAS, CIS); 1 ♀, VI-28-40 (B. B. Pendergast, CAS); 1 ♂, VII-16 (W. M. Gifford, CAS); 1 ♂, sand dunes, VII-25-22 (C. L. Fox, CAS); 1 ♂, sand dunes, IX-9-22 (E. P. Van Duzee, CAS); 5 ♂♂, 2 ♀♀, sand dunes, VIII-27-22 (E. P. Van Duzee, CAS); 1 ♀, 1 (abdomen missing), sand dunes, VIII-27-22 (E. P. Van Duzee, CAS); 2 ♂♂, 2 ♀♀, on *Franseria* sp., VIII-26-30 (H. H. Keifer, LACO); 4 ♂♂, 3 ♀♀, on *Franseria* sp., VIII-26-30 (H. H. Keifer, CDA); 1 (abdomen missing), sand dunes, III-27-22 (E. P. Van Duzee, CAS); 1 ♂, sand dunes, VI-25-22 (C. L. Fox, CAS). SAN LUIS OBISPO Co.: Grover City, 1 ♂, 1 ♀, dunes association, VII-4-56 (E. G. Linsley, CIS); 1 ♀, dunes association, VII-4-56 (P. D. Hurd, CIS). Morro Bay, 2 ♂♂, 1 ♀, VI-1-47 (D. J. Raski, CIS). Oso Flaco Lake, 1 ♂, 2 ♀♀, 1 (abdomen missing), VII-13-59 (C. A. Campbell, CIS); 2 ♂♂, VII-13-59 (R. M. Bohart, UCD). Pismo Beach, 2 ♂♂, 4 ♀♀, swept from flowering *Franseria bipinnatifida*, VI-29-59 (P. H. Arnaud, CDA). San Luis Obispo, 11 ♂♂, 9 ♀♀, swept from *Franseria bipinnatifida*, VI-29-58. SAN MATEO Co.: Half Moon Bay, 2 ♀♀, VIII-8-52 (W. F. Barr, UI); 100 ♂♂, 68 ♀♀, swept from *Franseria chamissonis bipinnatisecta*, VI-28-60 (F. L. Blanc, FLB). Milbrae, 1 ♀, X-30-59 (T. R. Haig, CDA). San Mateo County, 2 ♀♀, VIII-48 (R. S. Beal, CIS). SANTA CRUZ Co.: Santa Cruz, 1 ♀, VI-3-19 (E. P. Van Duzee, CIS); 1 ♀, VII-6-35 (E. P. Van Duzee, CAS); 2 ♀♀, VI-3-19 (E. P. Van Duzee, CAS); 1 ♂, VI-3-19 (E. P. Van Duzee, USNM). VENTURA Co.: Foster Park, 2 ♂♂, 2 ♀♀, VII-1-59 (F. D. Parker, CGM); 2 ♂♂, 1 ♀, VII-1-59 (M. Bruck, CGM); 1 ♀, VI-25-59 (R. D. Gehring, CIS). Saticoy, 1 ♀, VII-17-26 (S. E. Flanders, UCR). Ventura, 1 ♀ VII-1-59 (R. D. Gehring, CIS). Ventura County, 1 ♀, IV-13-36 (CAS). YOLO Co.: Davis, 1 ♂, ex sugar beets, VIII-24-18 (H. H. Severin, CIS); 9 ♂♂, 13 ♀♀, V-20-59 (C. G. Moore, CGM).

In addition to the key characters, a prominent bulla and the distinct bend in vein  $R_{4+5}$  distal to veim m will help in the identification of this species.



Map 18. Distribution in California of *Euaresta bullans* (Wiedemann)

*Euaresta bullans* (Wiedemann)

(Fig. 27; Map 18)

*Trypeta bullans* Wiedemann, 1830, Auss. Zweifl. Ins., 2:506.

Holotype (sex not known); Montevideo, Uruguay (NM).

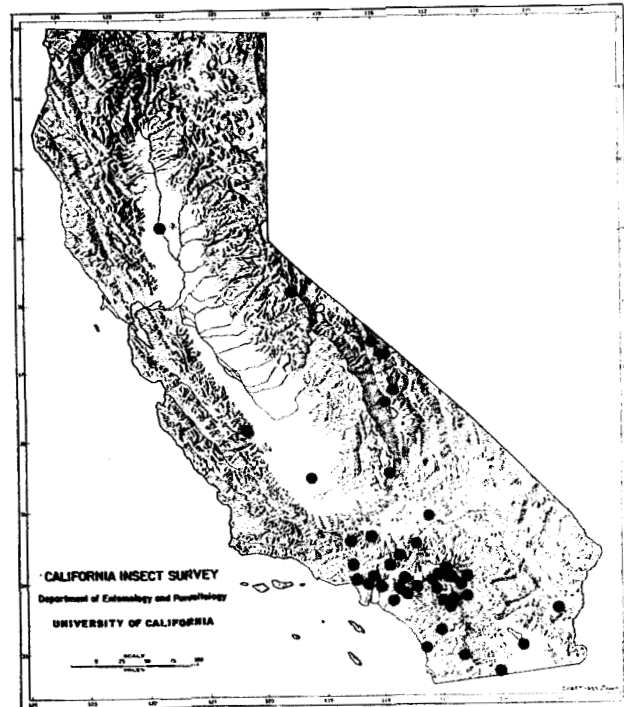
Synonyms.—*Euaresta adspersa* Coquillett, 1904:30; *Tephritis wolffi* Cresson, 1931:5.

**Geographic range.**—Known in the Nearctic Region only from California. The species has also been recorded from Brazil, Chile, and Uruguay, and is known to occur in New South Wales, Australia.

**California records.**—ALAMEDA Co.: Mission San Jose, 1 ♀, X-30-59 (T. R. Haig, CDA). FRESNO Co.: Fresno, 1 ♀, VI-3-56 (R. O. Schuster, CIS). Jacolitos Canyon, nr. Coalinga, 1 ♀, swept from composite, V-15-56 (H. L. Wilson, CDA). Selma, 2 ♂♂, 2 ♀♀, VIII-22-50 (R. C. Bechtel, UCD). KERN Co.: Poso Creek, 1 ♂, VI-5-29 (R. L. Usinger, CAS). LAKE Co.: Lower Lake, 1 ♂, V-11-26 (M. C. Van Duzee, CAS). LOS ANGELES Co.: Alhambra, 1 ♂, light trap, VI-3-19 (R. E. Campbell, USNM); 1 ♀, light trap, VI-3-19 (R. E. Campbell, USNM); 1 ♀, light trap, VI-3-19 (R. E. Campbell, USNM). Beverly Hills, 1 ♀, IX-15-30 (Menzies, LACO). Catalina Island, Rancho Escondido, 4 ♂♂, 2 ♀♀, VI-6-38 (T. D. A. Cockerell, CAS). Dominguez, 2 ♂♂, 1 ♀, sugar beets, VI-2-18 (H. H. Severin, CIS); 2 ♀♀, ex *Atriplex semibaccata*, VI-2-18 (H. H. Severin, CIS). Dominguez Junction, 1 ♀, ex *Atriplex semibaccata*, VI-2-18 (H. H. Severin, CAS). El Monte, 1 ♀, elderberry, II-17-45 (G. F. Prole, CDA). Los Angeles, 1 ♂, 2 ♀♀, IV-29-15 (M. C. Van Duzee, CAS);

1 ♀, IV-30-15 (M. C. Van Duzee, CAS); 1 ♂, V-4-15 (M. C. Van Duzee, CAS); 1 ♂, *Xanthium spinosum* (USNM). Ontario, 1 ♀, caught in automobile, IX-30-52 (J. B. Steinweden, CDA). Pasadena, 1 ♂, IX-6-30 (K. L. Wolff, LACO). Pomona, 1 ♂, 1 ♀, IX-12-30 (K. L. Wolff, LACO); 1 ♀, IX-30 (LACO); 1 ♀, IX-12-30 (K. L. Wolff, CDA). Redondo Beach, 1 ♀, *Xanthium spinosum*, X-35 (L. F. H., USNM). Westwood, 1 ♀, melon fly trap in peach, IX-25-56 (E. Blakely, CDA). Whittier, 1 ♀, VII-26-23 (A. J. Basinger, CIS). MARIN Co.: Novato, 1 ♂, X-8-53 (H. L. Mathis, UCD); 1 ♂, VII-9-53 (H. L. Mathis, UCD). MENDOCINO Co.: Hopland, 1 ♂, VIII-9-58 (S. M. Fidel, UCD). MERECD Co.: Dos Palos, 1 ♂, VIII-21-47 (V. M. Stern, CIS). Merced, 4 ♂♂, 3 ♀♀, Jimpson weed or spiny clot bur, VI-9-42 (H. W. Graves, CDA). MONTEREY Co.: Bradley, 1 ♂, V-23-20 (E. P. Van Duzee, CAS). Monterey, 1 ♂, VII-29-35 (R. H. Beamer, UK). Salinas, 1 ♀, *Parthenium argentatum* IX-1-42 (W. H. Lange, USNM). San Ardo, 6 mi. S., 1 ♀, ex *Xanthium spinosum*, VIII-3-18 (H. H. Severin, CAS). NAPA Co.: Rutherford, 1 ♀, Frick trap, VIII-10-59 (H. Stuke, CDA). ORANGE Co.: La Habra, 1 ♀, *Xanthium spinosum*, X-19-46 (Leo Davis, CDA). San Juan Capistrano 4 ♂♂, 4 ♀♀, VII-39 (C. E. Norland, OC). Yorba Linda, 1 ♂, on peach, IV-29-43 (C. Gammon, CDA). SACRAMENTO Co.: Andrus Island, 1 ♂, pear tree, IV-31 (CDA). Mills, 1 ♂, 1 ♀, *Pyrus communis*, V-11-32 (A. C. Browne, CDA). SAN BENITO Co.: San Benito County, 1 ♂, Frick trap, VIII-56 (R. P. Allen, CDA); 1 ♀, Frick trap, Summer 57 (CDA). SAN BERNARDINO Co.: Bitterwater, 2 ♀♀, X-13-18 (H. H. Severin, CIS). SAN DIEGO Co.: Sorrento, 1 ♀, peach tree, VI-7-45 (G. F. Prole, CDA). SAN JOAQUIN Co.: Lodi, 19 ♂♂, 15 ♀♀, reared from *Xanthium spinosum*, VIII-18-29 (H. H. Keifer, CDA). San Joaquin County, 2 ♀♀, V-31-17 (W. M. Giffard, CAS). SAN LUIS OBISPO Co.: San Luis Obispo, 10 mi. N.E., 2 ♀♀, VI-16-49 (R. S. Beal, CIS). SAN MATEO Co.: Portola Valley, 1 ♂, Frick trap in plum, V-15-59 (R. Mickelson, CDA). SANTA BARBARA Co.: Gaviota Pass, 2 ♂♂, VI-17-49 (R. S. Beal, CIS). Goleta, 1 ♂, VII-2-59 (F. D. Parker, CGM). SANTA CLARA Co.: San Jose, 1 ♀, X-12-49 (Stone, SJS). Santa Clara County, 2 ♂♂, 1 ♀ (Baker, USNM); 3 ♂♂, 1 ♀ (Baker, SU); 1 ♀ (Baker, UK). SANTA CRUZ Co.: Soquel, 2 ♂♂, 1 ♀, ex apricot, VI-7-45 (H. T. Osborn, CDA). Watsonville, 2 ♂♂, 1 ♀, weed, VI-7-57 (L. R. Gillogly, CDA). SOLANO Co.: Suisun, 1 ♂, Frick trap, IX-59 (Solano County, CDA). Vacaville, 1 ♀, VIII-28-48 (A. T. McClay, UCD). STANISLAUS Co.: Patterson, 2 ♀♀, VI-23-49 (T. F. Leigh, CIS); 1 ♂, sweeping alfalfa, IV-13-45 (Allen and Smith, USNM). TULARE Co.: Tulare County, 1 ♀, 1919 (F. T. Scott, CDA). VENTURA Co.: Foster Park, 1 ♂, VI-25-59 (R. D. Gehring, CIS); 1 ♀, VI-25-59 (C. A. Campbell, CIS). Peyton Ranch nr. Fillmore, 1 ♂, on *Xanthium spinosum*, VI-2-53 (J. H. Landi, UCR). Saticoy, 1 ♂, VI-17-27 (T. Craig, CAS). YOLO Co.: Davis, 2 ♀♀, VI-17-56 (A. T. McClay, UCD); 2 ♀♀, VIII-27-52 (A. A. Grigarick, UCD); 1 ♂, VI-1-48 (E. I. Schlinger, UCD); 1 ♀, V-18-52 (E. I. Schlinger, UCD). Woodland, 1 ♂, V-24-58 (C. G. Moore, UCD); 1 ♀, VI-4-33 (E. C. Zimmerman, CAS); 1 ♂, V-30-33 (E. C. Zimmerman, CAS). Yolo County, 1 ♀, VII-1-20 (A. J. Basinger, CIS).

*E. bullans* is readily distinguished from all other California species by the tricolored arista. It closely resembles *tapetis* (Coq.), from which it may be separated by the characters given in the key.



Map 19. Distribution in California of *Euaresta stigmatica* Coquillett

*Euaresta stigmatica* Coquillett

(Fig. 28; Map 19)

*Euaresta stigmatica* Coquillett, 1902, Jour. N.Y. Ent. Soc., 10:180. Syntypes ♂ and ♀; Flagstaff and Williams, Ariz. (USNM).

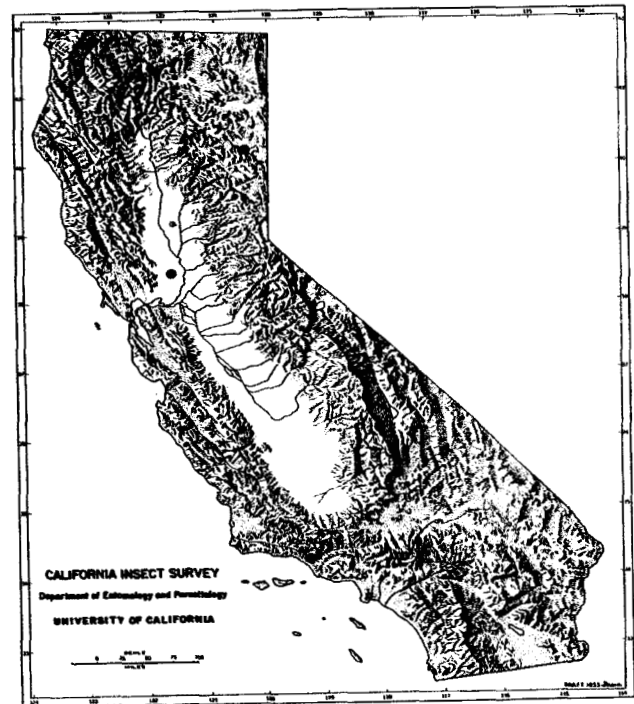
**Geographic range.**—Arizona, California, Michigan, Nevada, New Mexico, and Utah.

**California records.**—COLUSA Co.: Colusa, 1 ♀, Frick trap in prune, VIII-16-60 (Colusa County Dept. Agriculture, CDA). FRESNO Co.: Los Gatos Canyon, 2 ♂♂, 2 ♀♀, ex *Franseria acanthicarpa*, IX-4-57 (H. L. Wilson, CDA); 6 ♂♂, 4 ♀♀, ex *Franseria acanthicarpa*, IX-4-57 (H. L. Wilson and F. L. Blanc, CDA). Warthan Canyon, 8 mi. W. of Coalinga, 2 ♂♂, swept from flowers of *Franseria acanthicarpa*, IX-10-57 (H. L. Wilson, CDA). IMPERIAL Co.: Calipatria, 10 mi. N.W., 1 ♂, V-23-56 (T. R. Haig, UCD). Coyote Wells, 2 ♂♂, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS). INYO Co.: Argus Mountains, 1 ♀, V-4-39 (R. M. Bohart, UCLA). Deep Springs, 1 ♀, X-13-51 (E. L. Kessel, CAS). Lone Pine, 4 ♀♀, VII-28-40 (D. E. Hardy, UK). Inyo County, 1 ♂, 1 ♀, IX-8-58 (E. I. Schlinger, UCD). KERN Co.: Famosa, 9 mi. S.E., 8 ♂♂, 2 ♀♀, ex *Franseria acanthicarpa*, X-30-18 (H. H. Severin, CIS); 1 ♂, 1 ♀, ex *Franseria acanthicarpa*, X-30-18 (H. H. Severin, CAS). Walker Pass, 1 ♂, 2 ♀♀, *Chrysothamnus* sp., X-14-58 (J. A. Chemsak, CIS). LOS ANGELES Co.: Altadena, 1 ♀, XII-27-55 (L. Wills, UCD); 1 ♀, XII-27-55 (L. Wills, UCD). Big Pines Camp, 1 ♂, 4 ♀♀, on *Eriodictyon trichocalyx*, VIII-2-44 (P. H. Timberlake, UCR). Claremont, 1 ♂ (Baker, SU); 2 ♀♀ (Baker, CDA); 1 ♂, IX-12-35 (L. E. Myers, CDA). Crystal Lake, 1 ♂, VII-9-52 (J. K. Hester, UCD); 1 ♀, VI-29-50 (H. F. Robinson, UCD). Lake Hughes, 1 ♂, IX-14-30 (K. L. Wolff, LACO). Lancaster, 1 ♀, ex alfalfa, VIII-11-58 (E. I. Schlinger, UCR); 1 ♂, ex alfalfa, VII-

28-58 (E. I. Schlinger, UCR). Los Angeles, 1 ♀, VI-22-58 (P. H. Arnaud, CDA). Pasadena, 1 ♀, IX-6-30 (K. L. Wolff, LACO). San Fernando, 1 ♀, on avocado, X-18-30 (Bartholomew, CDA); 1 ♀, McPhail trap, IX-25-57 (R. Howell, CDA). San Fernando Valley, 1 ♀, IX-17-30 (Menzies, CDA). San Gabriel Mountains, 1 ♀, IX-16-31 (Perkins, LACO). West Los Angeles, 1 ♂, melon fly trap in hibiscus, II-8-57 (B. Osuna, CDA). Westwood, 1 ♀, melon fly trap in hibiscus, II-28-56 (A. A. Barney, CDA). Whittier, 1 ♀, II-28-12 (P. H. Timberlake, UCR). MONO Co.: Blanco's Corral, White Mountain, 6 ♂♂, 3 ♀♀, 10,000 ft., VII-1-52 (J. W. MacSwain, CIS); 5 ♂♂, 3 ♀♀, 10,000 ft., VI-30-53 (J. W. MacSwain, CIS); 2 ♀♀, 10,000 ft., VI-28-53 (W. D. McLellan, UCD). Sonora Pass, 5 mi. E., U.S.R.S., Highway 108, 1 ♂, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). ORANGE Co.: Orange, 1 ♀, McPhail trap in orange, X-2-57 (G. F. Prole, CDA). RIVERSIDE Co.: Corona, 1 ♀, McPhail trap in citrus, IX-25-57 (James Johnson, CDA). Herkey Creek, San Jacinto Mountains, 5 ♂♂, 7 ♀♀, on *Franseria acanthicarpa*, IX-9-51 (P. H. Timberlake, UCR). Hopkins Well, 1 ♀, VI-16-68 (J. A. Powell, CIS); 1 ♂, X-11-58 (J. A. Chemsak, CIS). Idyllwild, 1 (abdomen missing), VII-12-12 (P. H. Timberlake, UCR). Marion Mountain Camp, 1 ♀, VII-1-52 (J. J. Menn, CIS); 1 ♂, VII-1-52 (J. W. MacSwain, CIS); 1 ♂, VII-1-52 (S. Miyagawa, UCD). Palm Springs, 2 ♀♀, at flowers of *Baccharis sergiloides*, I-2-53 (P. H. Arnaud, PHA). Palm Springs, 4 mi. N., 1 ♂, VI-28-41 (P. H. Timberlake, UCR). Palm Springs Station, 1 ♀, VII-29-52 (J. C. Hall, UCD). Riverside, 2 ♀♀, glycerine trap in walnut, IX-24-42 (CDA); 1 ♀, *Gutierrezia californica*, XI-7-33 (P. H. Timberlake, UCR); 1 ♀, X-10-34 (P. H. Timberlake, UCR); 1 ♀, on *Eriogonum gracile*, XI-14-29 (P. H. Timberlake, UCR). San Jacinto, 3 ♀♀, ex alfalfa, VIII-13-58 (E. I. Schlinger, UCR); 1 ♂, ex alfalfa, VIII-1-58 (E. I. Schlinger, UCR); 1 ♀, ex alfalfa, IX-26-58 (E. I. Schlinger, UCR). San Jacinto Mountain Trail, 1 ♀, VII-1-52 (E. M. Evans, UCD). Sunnymead, 2 ♀♀, McPhail trap, IX-2-58 (C. Tundall, CDA). Tahquitz Valley, San Jacinto Mountains, 1 ♂, 1 ♀, VI-16-39 (J. G. Shanafelt, LAM); 1 ♂, VI-16-39 (J. G. Shanafelt, LAM). Whitewater Fish Hatchery, 1 ♀, I-16-53 (P. H. Arnaud, PHA). SAN BERNARDINO Co.: Big Bear Lake, 1 ♀, on *Prunus emarginata*, VIII-15-40 (G. G. Beevor, CDA). Big Bear Valley, 1 ♂, on *Solidago confinis*, VIII-13-33 (P. H. Timberlake, UCR). Big Pines, 4 mi. N.E., 1 ♂, 1 ♀, swept from *Artemisia* sp., VIII-25-44 (S. C. Jones, SCJ). Chino, 2 ♀♀, on walnuts, IX-20-30 (CIS); 3 ♂♂, 2 ♀♀, VIII-31 (UCLA). Devore, 1 ♀, VIII-28-31 (C. Gammon, CDA). Dollar Lake Trail, 1 ♀, VII-10-56 (H. W. Michalk, CDA). Hinkley, 1 ♀, on cotton, IX-3-53 (G. Harper and R. Schneider, CDA). Mill Creek, 1 ♂, on *Arctostaphylos drupacea*, VIII-20-39 (P. H. Timberlake, UCR). Morango, 1 ♀, on *Croton californicus*, IX-29-44 (P. H. Timberlake, UCR). Ontario, 1 ♂, 2 ♀♀, Frick trap in peach, IX-15-57 (H. R. Moffitt, UCR). Redlands, 1 ♂, 1944 (CIS); 1 ♂ (CIS); 1 ♂, IX-14 (CIS); 1 ♀, IX-26-13 (CIS); 1 ♀, on *Xanthium* sp., IX-38 (L. F. A., USNM). N. of Shandon Hills, San Bernardino, 1 ♂, on *Ceanothus crassifolius*, II-28-36 (P. H. Timberlake, UCR). Upland, 1 ♂, McPhail trap in grapefruit, X-4-57 (J. M. Johnson, CDA); 1 ♀, McPhail trap in grapefruit, X-26-57 (J. M. Johnson, CDA); 2 ♀♀, McPhail trap in grapefruit, X-18-57 (J. M. Johnson, CDA). Victorville, 1 ♂, V-2-53 (G. A. Marsh and R. O. Schuster, CIS); 5 mi. N., 1 ♀, on *Chrysothamnus* sp., X-29-32 (P. H. Timberlake, UCR). SAN DIEGO Co.: Descanso, 1 ♀, McPhail trap, IX-11-58 (D. Close, CDA).

Pauma, 1 ♀, Frick trap in apple, IX-60 (San Diego County Dept. Agriculture, CDA). Rancho Santa Fe, 1 ♂, ex alfalfa, III-3-59 (E. I. Schlinger, UCR).

*E. stigmatica* is closely related to *bella* (Lw.), an eastern United States species. The brown spot within the stigma is usually present and is an excellent separating character.



Map 20. Distribution in California of *Euaresta tapetis* (Coquillett)

*Euaresta tapetis* (Coquillett)

(Fig. 29; Map 20)

*Trypeta* (*Euaresta*) *tapetis* Coquillett, 1894, Can. Ent., 26:75. Holotype ♀; New Mexico (USNM).

*Geographic range*.—Kansas west to California.

*California records*.—LASSEN Co.: Janesville, 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, CDA); 4 mi. S., 1 ♂, on grass, V-20-59 (W. W. Wiard, CDA). VENTURA Co.: Foster Park, 1 ♂, VII-1-59 (A. E. Menke, UCD). YOLO Co.: Davis, 14 ♂♂, 14 ♀♀, V-18-59 (F. D. Parker, UCD).

*E. tapetis* closely resembles *bullans*, but differs in the presence of an inconspicuous bulla in cell R<sub>3</sub> and a transverse hyaline band extending unbroken from the base of the stigma to the posterior margin of the wing.

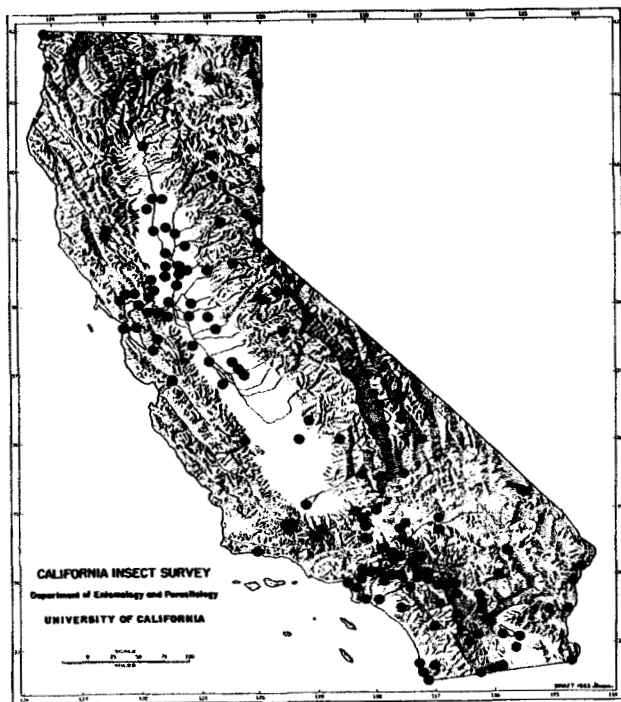
Genus *Euarestoides* Benjamin

This genus is very closely related to *Tephritis*, *Trupanea*, *Euaresta*, and *Paroxyna*. It is distinguished from all others occurring in California by the two pairs of well-developed scutellars, the three pairs of

lower fronto-orbitals, and the characteristic wing pattern: a yellow or brown reticulation in the proximal half and a dark-brown preapical area similar to that of most *Trupanea* species. As in *Trupanea*, the species inhabit flower ovaries, but little is known about their biology. The genus is spread throughout southern Canada, the United States, and to an undetermined extent in the Neotropical Region. Of the 4 known Nearctic species, 3 occur in California. The latest revision is that by Foote (1958).

KEY TO THE CALIFORNIA SPECIES OF EUARESTOIDES

- 1 Wing pattern of uniform brown color throughout, the pattern in proximal half fainter than in distal half but not distinctly yellow; ovipositor sheath yellow with black base and apex
  - acutangula* (Thomson) (p. 23)
- Pattern in proximal half of wing distinctly yellow in contrast to dark brown of distal half; ovipositor sheath entirely yellow, dark brown, or black, not bicolored . . . . . 2
- 2(1) Ovipositor sheath dark brown or black, about 1.5 times as long as last two abdominal terga
  - arnaudi* Foote (p. 26)
- Ovipositor sheath evenly yellow, about 0.2 times as long as last two abdominal terga
  - flava* (Adams) (p. 26)



Map 21. Distribution in California of *Euarestoides acutangula* (Thomson)

*Euarestoides acutangula* (Thomson)

(Fig. 30; Map 21)

*Trypeta acutangula* Thomson, 1868, *Eugenies Resa*, Ins., 6(2):583. Holotype ♂; California (NR).

Synonym.—*Urellia abstersa* Loew of Doane, 1899:192; Snow, 1903:219; Snow, 1904:345; Johnson, 1903:106; and Cresson, 1907:106.

Geographic range.—United States west of Michigan; Great Plains region of southern Canada; extreme northeastern Mexico.

California records.—ALAMEDA Co.: Alameda, 1 ♀, X-30-59 (T. R. Haig, CDA). Oakland, 1 ♂, III-14-38 (E. S. Ross, CAS). Pleasanton, 28 ♂♂, 10 ♀♀, VIII-2-32 (CIS). Warm Spring, 1 ♀, Frick trap in black walnut, X-30-59 (Alameda County Dept. of Agriculture, CDA). ALPINE Co.: Fredericksburg, 1 ♂, 5 ♀♀, swept from *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA). Topaz Lake, 17 mi. S., 1 ♂, 2 ♀♀, 8,800 ft., VIII-16-42 (S. C. Jones, SCJ). Woodfords, 1 ♂, 1 ♀, *Chrysothamnus* sp., VI-17-58 (W. W. Middlekauff, CIS); 2 ♀♀, *Chrysothamnus* sp., VI-16-58 (W. W. Middlekauff, CIS). BUTTE Co.: Chico, 1 ♂, Frick trap in black walnut, X-22-57 (Don Black, CDA). COLUSA Co.: Colusa, 4 ♀♀, VIII-15-55 (R. O. Schuster, CIS); 2 ♀♀, VIII-10-55. CONTRA COSTA Co.: Antioch, 1 ♂, on asparagus, VIII-29-08 (I. J. Condit, CIS); 1 ♀, IX-20-58 (R. W. Thorp, CIS); 1 ♀, on asparagus, IX-18-38 (I. J. Condit, USNM). Bethel Island, 1 ♂, *Helianthus annuus*, IX-20-58 (R. W. Thorp, CIS). Brentwood, 1 ♀, Frick trap in walnut, VIII-28-57 (J. M. Marston, CDA); 2 ♂♂, 2 ♀♀, Frick trap in walnut, VIII-28-57 (J. M. Marston, CDA). Concord, 2 ♀♀, II-2-59 (J. Phillips, CDA). Pittsburg, 1 ♂, IX-25-59 (D. D. Linsdale, CIS). DEL NORTE Co.: Requa, 1 ♀, VIII-4-20 (C. D. Duncan, SJS). Smith River, 1 ♀, on flowers of *Franseria chamissonis bipinnatisecta*, VII-8-30 (J. M. Aldrich, USNM) 1 ♂, VII-22-32 (J. M. Aldrich, USNM); 2 ♂♂, 5 ♀♀, VII-8-30 (J. M. Aldrich, USNM). EL DORADO Co.: Cathedral Lake, Tahoe, 1 ♀, VII-6-15 (H. H. Severin, CIS). Deer Creek, 1 ♀, X-21-36 (H. H. Keifer, CDA). Echo, 1 ♂, VIII-10-40 (D. E. Hardy, UK). Lake Tahoe, 1 ♀ (USNM); 1 ♂, VIII-11-40 (D. E. Hardy, UK). Pacific, 1 ♂, VIII-9-40 (Kenaga, UK). FRESNO Co.: Coalinga, 3 ♂♂, 5 ♀♀, swept from *Erodium cicutarium*, II-26-57 (H. L. Wilson, CDA); 7 ♂♂, 2 ♀♀, swept from *Erodium cicutarium*, III-5-57 (H. L. Wilson, CDA); 1 ♂, 1 ♀, swept from *Monolopia major*, III-25-57 (H. L. Wilson, CDA). Coalinga, Jacalitos Canyon, 1 ♂, swept from *Amsinckia* sp., III-26-58 (H. L. Wilson, CDA). GLENN Co.: Hamilton City, 1 ♂, 2 ♀♀, ex *Xanthium canadense*, VIII-22-17 (H. H. Severin, CIS); 1 ♂, 2 ♀♀, ex *Xanthium canadense*, VIII-22-17 (H. H. Severin, CAS). Willows, 1 ♀, Frick trap in walnut, IX-20-57 (W. W. Wiard, CDA). IMPERIAL Co.: Bard, 2 ♂♂, 6 ♀♀, collected from alfalfa, I-19-38 (S. Lockwood, CDA). Brawley, 1 ♀, collected from alfalfa, I-8-56 (S. Lockwood, CDA). Coyote Wells, 24 ♂♂, 11 ♀♀, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS); 4 mi. W., 1 ♂, 2 ♀♀, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS); 2 ♂♂, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CAS). Dixiland, 1 ♀, ex *Sesuvium sessile*, III-10-18 (H. H. Severin, CAS). Fish Springs, 1 ♀, collected from desert verbena, IV-5-31 (A. C. Browne, CDA). Fort Yuma (Winterhaven), 1 ♂, McPhail trap in grapefruit, 1-22-57 (H. H. Blakemore, CDA). Niland, 10 ♂♂, 10 ♀♀, swept from *Encelia* sp., apparently *frutescens* var. *actoni*, II-6-57 (H. L. Wilson, CDA); 1 ♀, III-15-18 (CIS). Palo Verde, 12 mi. S., 1 ♂, on *Bebbia junca aspera*, IV-30-52 (P. H. Timberlake, UCR). Truckhaven, 2 ♂♂, 1 ♀, desert flora, IV-5-31 (A. C. Browne, CDA). INYO Co.: Ballarat, 1 ♀, III-31-51 (P. D. Hurd, CIS). Death Valley, 3 ♂♂, 2 ♀♀, on *Geraea* sp., III-27-40 (I. McCracken, CAS). Goodale Creek, N. of Lone Pine, 6 ♂♂, 7 ♀♀, swept from *Hymenoclea salsola* and *Salix exigua*, IV-3-53 (H. B. Leech, CAS).

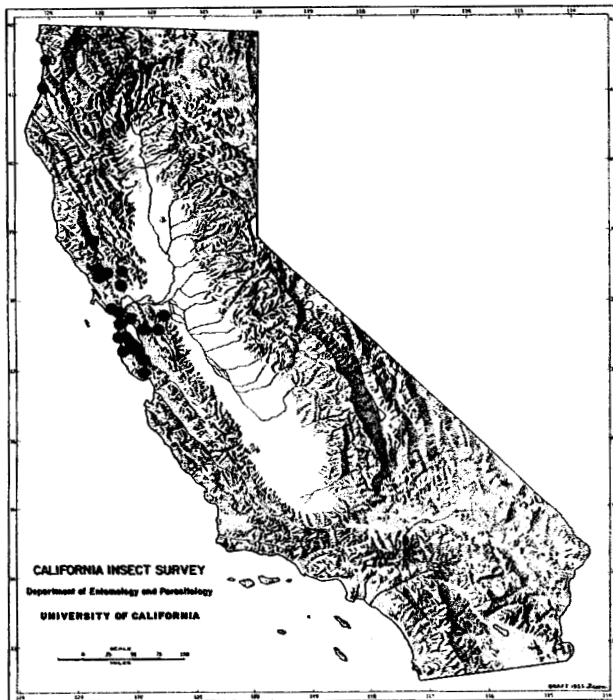
- Independence, 1 ♀, IV-29-59 (R. P. Allen, FLB). Lone Pine, 1 ♀, VI-8-29 (R. L. Usinger, CAS); 1 ♀, VI-13-37 (E. C. VanDyke, CAS); 3 mi. W., 1 ♂, ex *Melilotus indicus*, V-19-60, CDA). Olancha, 1 ♂, VI-8-29 (E. P. Van Duzee, CAS). Panamint Mountains, west slope, 3 ♂♂, III-23-40 (B. Brookman, CIS); 1 ♂, 1 ♀, III-22-40 (B. Brookman, CAS); Surprise Canyon, Panamint Mountains, 1 ♀, swept from *Encelia farinosa*, IV-24-57 (P. D. Hurd, CIS); 1 ♀, swept from *Lepidium fremontii*, IV-24-57 (P. D. Hurd, CIS); 1 ♂, 3 ♀♀, IV-8-55 (E. G. Linsley, CIS); 20 ♂♂, 33 ♀♀, *Encelia farinosa*, IV-24-57 (J. A. Powell, CIS); 21 ♂♂, 30 ♀♀ *Encelia farinosa*, IV-24-57 (G. I. Stage, CIS); 1 ♀, IV-28-53 (P. H. Timberlake, UCR); 1 ♂, 1 ♀, *Peucephyllum schottii*, IV-28-53 (P. H. Timberlake, UCR); 4 ♂♂, 3 ♀♀, *Eriogonum inflatum*, IV-24-57 (P. D. Hurd, CIS). KERN Co.: Bakersfield, 11 mi. S.W., 1 ♀, III-7-57 (E. I. Schlinger, UCD). Frazier Park, 1 ♂, 2 ♀♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (R. F. Wilkey, RFW). Mojave, 1 ♂, V-1-52 (R. M. Bohart, UCD); 7 mi. N., 1 ♀, IV-18-60 (J. F. Lawrence, CIS); 1 ♀, IV-18-60 (J. A. Powell, CIS). Red Rock Canyon, 1 ♀, IX-2-57 (E. I. Schlinger, UCD); 1 ♀, III-5-25 (L. J. Muchmore, LAM). Rosamond, 3 ♂♂, 1 ♀, swept from *Hymenoclea salsola*, IV-25-56 (F. L. Blanc, CDA); 2 ♀♀, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, CDA); 8 ♂♂, 4 ♀♀, *Tamarix gallica*, IV-5-59 (E. G. Linsley, CIS). Short Canyon, 6 mi. W. Inyokern, 3 ♂♂, 1 ♀, III-29-59 (G. I. Stage, CIS); 2 ♂♂, III-29-59 (J. R. Powers, CIS). Tehachapi, 2 ♂♂, ex *Atriplex* sp., V-26-58 (H. L. Wilson, CDA); 2 ♂♂, III-24-42 (C. D. Duncan, SJS). Walker Pass, 7 mi. E., IV-25-52 (P. D. Hurd, CIS); 1 ♂, 1 ♀, *Franseria* sp., IV-25-52 (G. A. Marsh, CIS). Onyx, 1 ♀, III-7-57 (E. I. Schlinger, UCD). LAKE Co.: Hopland grade, 1 ♀, V-6-59 (S. M. Fidel, UCD). Lakeport, 1 ♂, VIII-2-15 (E. P. Van Duzee, CAS). Upper Lake, 1 ♂, Frick trap in walnut, IX-15-57 (R. C. Lyndall, CDA). LASSEN Co.: Hallelujah Junction, 1 ♀, VI-27-49 (C. I. Smith, CIS); 1 ♀, VI-27-49 (R. L. Langston, LAM); 1 ♀, VII-4-49 (A. S. Deal, UCD). Red Rock Canyon, 1 ♂, III-4-49 (E. I. Schlinger, UCD). Spaldings, 1 ♀, VI-27-49 (F. Morishita, CIS). Wendel, 1 ♂, 1 ♀, from alfalfa, VI-4-31 (A. C. Browne, CDA). Westwood, 5 mi. E., 1 ♀, VII-9-60 (F. L. Blanc, FLB). LOS ANGELES Co.: Big Pines Camp, 1 ♂, on *Eriodictyon trichocalyx*, VIII-20-49 (P. H. Timberlake, UCR). Claremont, 1 ♂, 1 ♀ (Baker, CDA); mountains nr. Claremont, 1 ♂ (Baker, USNM). Covina, 1 ♂, 2 ♀♀, collected from cocklebur, VII-16-31 (C. Gammon, CDA). Desert Springs, 1 ♀, IV-22-55 (R. O. Schuster, CIS). Glendale, 1 ♂, III-30-56 (E. I. Schlinger, UCD). Glendora, 1 ♂, III-6-51 (C. Henne, LAM). Inglewood, 1 ♀, melon fly trap in olive, I-28-57 (H. Creeger, CDA). Lancaster, 1 ♀, VII-31-1897 (A. P. Morse, MCZ); 1 ♂, III-25-57 (E. I. Schlinger, UCD); 9 mi. W., 1 ♀, on *Chrysothamnus* sp., II-17-36 (P. H. Timberlake, UCR). Long Beach, 1 ♀, IV-52 (P. H. Timberlake, UCR). Los Angeles, 1 ♀, XII-24 (Cockillett, USNM); 1 ♂, 2 ♀♀, IV-29-15 (M. C. Van Duzee, CAS); 1 ♂, IV-30-15 (M. C. Van Duzee, CAS). Pasadena, 1 ♂, V-15 (CIS); 1 ♂, 2 ♀♀, IX-11-30 (K. L. Wolf, LACO). Pearblossom, 5 mi. S., 1 ♀, V-12-56 (E. G. Linsley, CIS). Santa Monica, 1 ♂, melon fly trap in oleander, II-4-57 (B. Osuna, CDA). Venice, 1 ♂, melon fly trap in elm, IV-30-57 (E. Arnold, CDA). MADERA Co.: Chowchilla, 1 ♂, ex sugar beets, IX-20-18 (H. H. Severin, CIS). MARIPOSA Co.: Yosemite, 3 ♀♀, 3,880-4,000 ft., VI-11-31 (CIS); 20 ♀♀, 3,880-4,000 ft., VI-11-31 (D. W. Clancy, UCR). Yosemite National Park, 2 ♀♀, beehive, VII-22-38 (CIS). MERCED Co.: Athlone, 1 ♀, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). Dos Palos, 1 ♀, VII-17-49 (A. D. Telford, CIS). Gustine, 10 mi. E., 2 ♂♂, 1 ♀, swept from *Ambrosia* sp., VIII-28-59 (F. L. Blanc, CDA). Merced, 1 ♂, 1 ♀, Frick trap in walnut IX-12-57 (Gary Posz, CDA). MODOC Co.: Buck Creek, 1 ♂, 1 ♀, VII-20-22 (C. L. Fox, USNM). Nr. Canby, 1 ♂, 1 ♀, on sunflower, VIII-1-38 (E. C. Van Dyke, CAS). Cedar Pass, 1 ♀, *Cirsium* sp., VI-29-55 (A. J. Mueller, UCD). Cedarville, 2 ♀♀, Frick trap, Summer 59 (L. White, CDA). Davis Creek, 1 ♀, VII-16-22 (C. L. Fox, CAS). MONO Co.: Leavitt Meadows, 1 ♀, VII-6-51 (C. A. Downing, CIS); 3 ♀♀, VI-28-51 (T. R. Haig, CIS); 3 ♀♀, VII-6-51 (D. P. Lawler, UCD); 1 ♂, 3 ♀♀, VII-6-51 (R. W. Morgan, CDA); 1 ♂, 3 ♀♀, VII-6-51 (E. L. Silver, UCLA); 2 ♀♀, VII-3-51 (P. D. Ashlock, PDA); 1 ♀, VII-6-51 (P. D. Ashlock, PDA); 3 ♀♀, VII-6-51 (P. D. Ashlock, PDA). Sardine Creek, 1 ♀, 8,500 ft., VI-28-51 (J. W. MacSwain, CIS); 1 ♀, VI-28-51 (A. T. McClay, UCD); 3 ♀♀, VII-6-51 (A. T. McClay, UCD); 2 ♂♂, 8 ♀♀, VII-12-51 (A. T. McClay, UCD); 2 ♀♀, VII-17-51 (A. T. McClay, UCD); 1 ♂, 10 ♀♀, 8,500 ft., VII-11-51 (A. T. McClay, UCD); 1 ♀, 8,500 ft., VI-28-51 (E. L. Silver, UCLA). NAPA Co.: Napa, 1 ♀, collected from parsnip, XI-10-43 (Weimer, CDA). NEVADA Co.: Truckee, 3 ♀♀, VI-25-43 (P. H. Arnaud, PHA); 15 ♂♂, 6 ♀♀, VIII-8-15 (H. G. Dyar, USNM). ORANGE Co.: Anaheim, 1 ♀, in McPhail trap, XI-16-50 (D. H. Byers, OC). Modjeska, 1 ♂, McPhail trap (SIB-7) in peach, X-27-59 (C. Johnson, CDA). Silverado, 5 ♂♂, 3 ♀♀, McPhail trap (SIB-7) in grapefruit, X-27-59 (C. Johnson, CDA). PLACER Co.: Wheatland, 1 ♀, Frick trap in peach, X-7-59 (E. C. Thompson, CDA). RIVERSIDE Co.: Andreas Canyon, 1 ♀, on *Baccharis glutinosa*, III-2-34 (P. H. Timberlake, UCR); 1 ♂, III-3-56 (E. I. Schlinger, UCD). Banning, 3 ♂♂, 2 ♀♀, V-18-28 (Christensen, USNM). Biskra Palms, 3 ♂♂, III-27-57 (E. I. Schlinger, UCD). Blythe, 1 ♂, swept from alfalfa, II-6-54 (F. Briggs, CDA). Cherry Valley, 2 ♂♂, I-11-38 (Christensen, USNM). Desert Hot Springs, 1 ♂, II-2-58 (H. R. Moffitt, UCD). Desert Springs, 1 ♂, 1 ♀, V-19-54 (J. C. Hall, UCD). Hopkins Well, 15 ♂♂, 24 ♀♀, IX-16-58 (J. A. Powell, CIS). Indio, 1 ♀, II-1-36 (LAM). Oasis area, Joshua Tree National Monument, 4 ♂♂, 4 ♀♀, IV-11-56 (R. Coleman, USNM). Oasis, 2 mi. S., 1 ♂, 1 ♀, on *Encelia farinosa*, III-8-36 (P. H. Timberlake, UCR). Palm Springs, Andreas Canyon, 1 ♂, on *Encelia farinosa*, III-8-52 (P. H. Timberlake, UCR). Palm Springs, 1 ♂, II-3-46 (CIS). 4 ♂♂, 3 ♀♀, II-25-54 (P. H. Arnaud, PHA); 27 ♂♂, 21 ♀♀, on *Baccharis sergiloides*, II-23-54 (P. H. Arnaud, PHA); 1 ♂, 1 ♀, II-26-54 (P. H. Arnaud, PHA); 2 ♂♂, on *Hymenoclea salsola*, III-14-42 (P. H. Timberlake, UCR); 2 ♂♂, 2 ♀♀, on *Phoradendron californicum*, III-7-55 (P. H. Timberlake, UCR); 1 ♂, III-7-36 (H. K. Pratt, UCLA); 1 ♀, IX-3 (Hubbard, USNM); 2 mi. N., 1 ♀, on *Hyptis emoryi*, III-7-36 (P. H. Timberlake, UCR). Sand dunes nr. Palm Springs, 1 ♀, on *Lepidospartum* sp., X-1-32 (P. H. Timberlake, UCR). Palm Springs Station, 1 ♀, IV-27-55 (A. T. McClay, UCD); 2 ♂♂, 3 ♀♀, II-24-54 (J. C. Hall, UCD); 1 ♀, IV-27-55 (D. L. Dahlsten, UCD); 1 ♂, VII-29-52 (J. C. Hall, UCD). Palms-to-Pines Highway, 1 ♀, on *Encelia farinosa*, V-27-38 (P. H. Timberlake, UCR); 1 ♂, on *Encelia farinosa*, III-27-38 (P. H. Timberlake, UCR). Riverside, 1 ♂, on *Sisymbrium* sp., III-9-45 (P. H. Timberlake, UCR); 1 ♀, on *Sisymbrium* sp., III-17-52 (P. H. Timberlake, UCR); 1 ♂ 1 ♀, on *Viburnum tinus*, II-21-38 (P. H. Timberlake, UCR); 1 ♀, on *Encelia farinosa*, III-16-51 (P. H. Timberlake, UCR); 1 ♂, III-10-38 (P. H. Timberlake, UCR). San Jacinto, 1 ♀, ex alfalfa,

IX-5-58 (E. I. Schlinger, UCR). Thousand Palms, 22 ♂♂, 19 ♀♀, III-7-55 (J. C. Hall, UCD); 2 ♂♂, 2 ♀♀, on *Salix exigua*, III-7-55 (P. H. Timberlake, UCR); 1 ♂, 1 ♀, III-7-55 (J. C. Hall, USNM). Whitewater, 1 ♂, 1 ♀, IV-4-57 (E. I. Schlinger, UCD). Whitewater Canyon, 1 ♂, 2 ♀♀, III-7-48 (R. Coleman, CIS); 6 ♂♂, 5 ♀♀, III-3-56 (E. I. Schlinger, UCD); 1 ♂, 1 ♀, III-3-56 (E. I. Schlinger, USNM). SACRAMENTO Co.: Carmichael, 1 ♀, fluorescent light trap, VIII-12-60 (R. F. Wilkey, RFW). Rio Linda, 1 ♀, VII-11-58 (J. Fowler, UCD). Sacramento, 1 ♂, 1 ♀, ex *Salsola kali* var. *tenuifolia*, VIII-20-18 (H. H. Severin, CIS); 1 ♂, swept from blossoms of *Artemisia heterophylla*, VII-29-58 (P. H. Arnaud, CDA); 1 ♂, VIII-10-33 (H. H. Keifer, CDA); 1 ♂, III-18-31 (H. H. Keifer, CDA); 2 ♀♀, VIII-15-30 (H. H. Keifer, CDA); 1 ♂, VIII-21-31 (H. H. Keifer, CDA); 1 ♀, VII-24-31 (H. H. Keifer, CDA); 2 ♀♀, IX-3-56 (H. R. Moffitt, UCD); 1 ♀, IX-7-59 (F. L. Blanc, FLB). SAN BERNARDINO Co.: Adelanto, 8 mi. S., 1 ♂, on *Chrysothamnus* sp., XI-29-32 (P. H. Timberlake, UCR). Bagdad, 1 ♀, III-29-52 (E. I. Schlinger, UCD). Daggett, 1 ♀, IV-27-49 (E. G. Linsley, J. W. MacSwain, and R. F. Smith, CIS). Cajon Pass, 1 ♀, V-1-49 (E. G. Linsley, J. W. MacSwain, and R. F. Smith, CIS). Earp, 10 mi. N., 1 ♂, III-31-59 (L. Strange, CGM). East Highlands, 1 ♀, II-5-23 (CIS). Hawes, 1 ♂, IV-25-52 (P. D. Hurd, CIS). Hesperia, 1 ♂, 1 ♀, sweeping wild grasses, IV-7-60 (W. Cronk, R. Camblin, and G. Harper, CDA). Ivanpah, 12 mi. S.E., 2 ♀♀, V-1-56 (M. Wasbauer, CIS); 1 ♂, V-1-56 (J. A. Powell, CIS). Kramer Hills, 1 ♀, IV-19-59 (E. I. Schlinger, UCD). Mule Canyon, Calico Mountains, 13 ♂♂, 13 ♀♀, III-17-55 (M. Wasbauer, CIS). Ord Mountain, 1 ♂, *Encelia frutescens* var. *frutescens*, IV-19-60 (J. A. Powell, CIS). Phelan, 1 ♂, V-2-53 (R. O. Schuster, CIS). Redlands, 1 ♂, 1914 (CIS); 2 ♂♂, 1 ♀ (CIS). Salt Wells, 7 mi. W., 1 ♀, III-31-59 (J. R. Powers, CIS). Shandon Hills, San Bernardino, 1 ♂, on *Ceanothus crassifolius*, II-28-36 (P. H. Timberlake, UCR). Twenty-nine Palms, 10 mi. E., 3 ♀♀, III-29-52 (E. I. Schlinger, UCD). Upland, 1 ♀, XI-10-59 (R. Camblin, CDA). Verdmont, Cajon Pass, 4 ♂♂, 3 ♀♀, IV-20-33 (E. P. Van Duzee, CAS). Victorville, 1 ♂, V-1-53 (R. O. Schuster, CIS); 5 ♂♂, 2 ♀♀, V-2-53 (G. A. Marsh and R. O. Schuster, CIS); 2 ♂♂, 4 ♀♀, V-2-53 (G. A. Marsh and R. O. Schuster, UCD); 3 mi. N. 2 ♂♂, 1 ♀, on *Chrysothamnus* sp., X-29-32 (P. H. Timberlake, UCR); 12 mi. S., 1 ♀, on *Chrysothamnus* sp., X-29-32 (P. H. Timberlake, UCR). SAN DIEGO Co.: Borego, 1 ♀, at light IV-24-49 (J. E. Gillaspay, CIS); 1 ♂, IV-1-53 (P. D. Hurd, CIS). Borego Valley, 1 ♂, 1 ♀, II-12-52 (P. H. Timberlake, UCR). Borego, 2 ♂♂, 1 ♀, IV-24-55 (R. O. Schuster, CIS); 1 ♂, on *Larrea* sp., IV-14-55 (P. H. Timberlake, UCR). Borego Valley, 3 ♀♀, III-26-59 (R. M. Bohart, UCD). Coronado, 1 ♂, McPhail trap, XI-25-59 (O. T. Beck, CDA). El Cajon, 1 ♂, IV-23-20 (E. P. Van Duzee, CIS). Jacumba, 5 mi. E., 1 ♂, 1 ♀, III-18-56 (T. R. Haig, UCD). La Jolla, 1 ♂, VII-13-41 (E. L. Todd, UK); 1 ♂, VII-15-41 (R. H. Beamer, UK). Pala, 1 ♀, McPhail trap in grapefruit, X-23-59 (C. Johnson, CDA). San Ysidro, 29 ♂♂, 24 ♀♀, IV-24-48 (E. D. Algert, USNM); 2 ♂♂, 5 ♀♀, ex *Franseria chenopodiifolia*, IV-24-48 (E. D. Algert, USNM); 9 ♂♂, 10 ♀♀, reared from *Xanthium* flowers, VIII-29-49 (E. D. Algert, USNM); 33 ♂♂, 23 ♀♀, reared from flowers of *Franseria chenopodiifolia*, collected V-5-60, emerged V-9 to V-15-60, (E. D. Algert, CDA); 1 ♀, McPhail trap, II-3-54 (G. Buxton, CDA). Sentenac Canyon, 1 ♀, IV-23-51 (E. I. Schlinger, UCD). SAN FRANCISCO Co.: San Francisco, beach,

1 ♀, II-15-51 (E. I. Schlinger and R. C. Bechtel, UCD). SAN JOAQUIN Co.: Farmington, 1½ mi. W., 1 ♂, Frick trap in walnut, VIII-20-57 (J. L. Joos, CDA). Lodi, 1 ♀, Frick trap in walnut, XI-10-57 (J. L. Joos, CDA). Stockton, 2 ♀♀, VIII-19-19 (E. P. Van Duzee, CAS). SAN LUIS OBISPO Co.: Cuyama, 5 mi. N.E., 1 ♂, 1 ♀, swept from wheat, IV-10-56 (H. T. Osborn, CDA). SANTA BARBARA Co.: Ballinger Canyon, Cuyama, 7 ♂♂, 6 ♀♀, on *Erodium cicutarium*, (H. L. Wilson, CDA). Canada del Venadito, 1 ♀, VI-23-59 (F. D. Parker, CGM). Cuyama, 1 ♀, III-29-56 (R. P. Allen, FLB). Goode Canyon, Cuyama, 1 ♀, III-27-57 (F. L. Blanc, CDA). SANTA CLARA Co.: Gilroy, 1 ♀, swept from *Coryza canadensis* var. *glabrata*, VIII-31-59 (T. R. Haig, CDA). Santa Clara County, 1 ♀ (Baker, SU). SHASTA Co.: Anderson, 1 ♂, Frick trap in walnut, Fall 58 (J. F. Weber, CDA). SIERRA Co.: Independence Lake, 1 ♀, VIII-2-58 (H. M. Court, UCD). SISKIYOU Co.: Toad Lake, 7 mi. N. of Bartle, 2 ♂♂, 3 ♀♀, reared from flower heads of *Arnica chamissonis foliosa*, VI-30-60 (T. Fuller, CDA). Tulelake District, 2 ♀♀, collected from alfalfa, VI-6-32 (Jones and Gammon, CDA). SOLANO Co.: Rio Vista, 1 ♀, IX-10-55 (E. Mezger, UCD). Suisun, 1 ♂, Frick trap, IX-59 (Solano County, CDA). Vacaville, 1 ♀, VII-31-54 (E. Mezger, UCD). Vallejo, 1 ♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). SONOMA Co.: Petaluma, 1 ♂, 1 ♀, Frick trap in walnut, IX-26-55 (R. P. Allen, RFW). Sonoma, 1 ♂, XII-22-59 (T. R. Haig, CDA). STANISLAUS Co.: Oakdale, 1 ♀, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). Westley, 1 ♀, VII-20-49 (T. F. Leigh, CIS). Highway 120 and Victory Road, 1 ♀, Frick trap, IX-58 (R. P. Allen, CDA). SUTTER Co.: Robbins, 2 ♀♀, VIII-7-58 (W. W. Middlekauff, CIS). Sutter Buttes, 1 ♀, IX-29-57 (D. D. Linsdale, CIS). TRINITY Co.: Scott Mountain, 1 ♀, 5,350 ft., VII-14-48 (A. T. McClay, UCD). TULARE Co.: Springville, 1 ♀, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). Tulare, 1 ♀, X-24-37 (Christensen, USNM). Woodlake, 1 ♂, rotary trap, III-19-47 (N. W. Frazier, CIS). TUOLUMNE Co.: Pine Crest, 1 ♀, VII-1-51 (C. A. Downing, CIS). Sonora Pass, 1 ♀, VIII-21-59 (D. D. Linsdale, CIS); 9,624 ft., VI-27-51 (E. L. Silver, UCLA); 1 ♀, VIII-21-59 (D. D. Linsdale, CIS). VENTURA Co.: Chuchupate Ranger Station, base of Frazier Mountain, 1 ♂, V-5-59 (G. I. Stage, CIS). Quatal Canyon, N.W. corner of County, 1 ♀, V-9-59 (G. I. Stage, CIS). YOLO Co.: Clarksburg, 1 ♂, 3 ♀♀, collected from *Xanthium canadense*, VIII-28-42 (H. A. Hunt, CDA). Davis, 2 ♂♂, ex sugar beets, VIII-24-18 (H. H. Severin, CAS); 1 ♂, IV-8-56 (W. H. Lange, UCD); 1 ♀, IX-8-55 (J. C. Downey, UCD); 1 ♂, IX-27-55 (A. T. McClay, UCD); 3 ♂♂, 3 ♀♀, VIII-4-55 (A. T. McClay, UCD); 3 ♂♂, 2 ♀♀, VIII-9-55 (E. I. Schlinger, UCD); 7 ♂♂, 5 ♀♀, VIII-9-55 (A. T. McClay, UCD); 5 ♂♂, 6 ♀♀, VIII-11-55 (J. C. Downey, UCD); 1 ♀, VIII-11-55 (E. A. Kurtz, UCD); 1 ♀, VIII-4-55 (E. I. Schlinger, UCD); 1 ♂, VIII-13-55 (E. I. Schlinger, UCD); 17 ♂♂, 5 ♀♀, VIII-6-55 (A. T. McClay, UCD); 3 ♂♂, 8 ♀♀, VIII-9-55 (A. T. McClay, UCD); 8 ♂♂, 2 ♀♀, VIII-7-55 (A. T. McClay, UCD); 1 ♂, VIII-3-55 (A. T. McClay, UCD); 3 ♀♀, IX-2-59 (C. G. Moore, CGM); 1 ♂, IX-26-59 (C. G. Moore, CGM); 1 ♀, X-11-50 (A. T. McClay, UCD); 1 ♂, V-7-51 (A. T. McClay, UCD); 1 ♀, V-6-51 (A. T. McClay, UCD); 1 ♂, V-8-51 (A. T. McClay, UCD); 1 ♀, IV-4-50 (A. T. McClay, UCD); 3 ♀♀, V-13-52 (A. T. McClay, UCD); 1 ♂, IX-16-54 (A. T. McClay, UCD); 1 ♀, IV-17-52 (A. T. McClay, UCD); 1 ♀, IX-7-50 (A. T. McClay, UCD); 1 ♀, IX-13-59 (J. C. Downey, UCD); 1 ♀, VII-18-55 (R. K. Washino, UCD); 1 ♂, VIII-3-55 (E. I.

Schlenger, UCD); 1 ♀, V-6-51 (R. C. Bechtel, UCD); 1 ♀, grass field, IV-4-50 (S. Kappos, UCD); 1 ♀, IX-7-53 (A. A. Grigarick, UCD); 1 ♂, sweeping rice, VIII-24-55 (E. A. Kurtz, USNM); 1 ♂, 1 ♀, VIII-11-55 (J. C. Downey, USNM); 4 ♂♂, 1 ♀, VII-24-59 (C. G. Moore, UCD). West Sacramento, 1 ♀, collected at flowers of *Solidago occidentalis*, IX-18-52 (P. H. Arnaud, PHA). Winters, 1 ♂, VIII-6-29 (R. H. Beamer, UK). Woodland, 1 ♂, VI-14-53 (E. C. Zimmerman, CAS); 1 ♂, VIII-16-53 (A. T. McClay, UCD); 1 ♀, IX-1-53 (A. T. McClay, UCD); 1 ♂, VIII-8-55 (A. D. Telford, UCD); 1 ♂, VIII-12-53 (A. T. McClay, UCD); 1 ♀, VIII-28-53 (A. T. McClay, UCD); 1 ♂, VIII-20-53 (A. T. McClay, UCD); 2 ♀♀, VII-23-53 (A. T. McClay, UCD). Yolo County, 2 ♀♀, VII-20 (A. J. Basinger, CIS). YUBA Co.: Marysville, 11 ♂♂, 2 ♀♀, collected from *Medicago sativa*, X-6-32 (H. H. Keifer, CDA).

Very commonly encountered in general collecting, this species has been confused in the literature with *E. abstersa* (Lw.), an east-coast species. The uniform color of the wing distinguishes *acutangula* from the other members of the genus which have been found in California.



Map 22. Distribution in California of *Euarestoides arnaudi* Foote

### *Euarestoides arnaudi* Foote

(Fig. 31; Map 22)

*Euarestoides arnaudi* Foote, 1958, Ann. Ent. Soc. Amer., 51:291, figs. 4, 8. Holotype ♀; Canada Road behind Belmont, San Mateo Co., Calif. (USNM).

**Geographic range.**—Arizona and California.

**California records.**—ALAMEDA Co.: Berkeley, 1 ♂, *Baccharis pilularis*, VIII-14-59 (J. A. Powell, CIS); 1 ♀, 1 (abdomen

missing), *Baccharis pilularis*, IX-4-59 (J. A. Powell, CIS); 1 ♀, IX-24-60 (D. D. Linsdale, CIS). Strawberry Canyon, Berkeley, 1 ♀, flying, IX-27-47 (R. C. Bynum, CIS). Castro Valley, 1 ♂, Frick trap in cherry, IX-20-57 (N. A. Overgaard, CDA). Livermore, 1 ♀, IV-30-28 (E. P. Van Duzee, CIS). Alameda County, 1 ♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). CONTRA COSTA Co.: Marsh Creek, 1 ♂, X-30-59 (T. R. Haig, CDA). DEL NORTE Co.: Klamath, 6 mi. N., 1 ♂, 1 ♀, VIII-13-53 (G. A. Marsh and R. O. Schuster, CIS); (paratype), 1 ♂, VIII-13-53 (G. A. Marsh and R. O. Schuster, UCD). HUMBOLDT Co.: Trinidad, 2 ♂♂, 7 ♀♀, Frick trap in *Prunus emarginata*, IX-60 (Calif. Dept. of Agriculture, CDA). MARIN Co.: Alpine Lake, 1 ♂, IX-28-56 (J. A. Powell, JAP). Mill Valley, 1 ♂, 2 ♀♀, flowers of *Baccharis* sp., IX-27-48 (H. B. Leech, CAS); 1 ♂, flowers of *Baccharis* sp., IX-27-48 (H. B. Leech, CAS). Stinson Beach, 1 ♂, VIII-15-38 (R. H. Beamer, UK). MENDOCINO Co.: Hopland, 1 ♂, V-9-26 (E. P. Van Duzee, CIS). NAPA Co.: Rutherford, 1 ♂, Frick trap, X-30-59 (H. Stako, CDA). SAN FRANCISCO Co.: San Francisco, 1 ♀, VIII-26-30 (H. H. Keifer, CDA); 1 ♂, VIII-21-59 (P. H. Arnaud, PHA); (paratype), 1 ♂, VII-1-52 (C. E. Kanfeldt, UCD). SAN MATEO Co.: Belmont, Canada Road, (holotype and paratypes), 5 ♂♂, 3 ♀♀, on *Baccharis pilularis*, IX-21-52 (P. H. Arnaud, USNM & PHA); 1 ♂, swept from *Baccharis pilularis consanguinea*, VIII-21-59 (P. H. Arnaud, PHA). Kings Mountain Road, 3 ♂♂, on *Baccharis pilularis*, IX-20-52 (P. H. Arnaud, PHA). Montara, 2 ♂♂, 2 ♀♀, VIII-31-57 (P. H. Arnaud, PHA). Portola Valley, 1 ♀, XI-6-59 (T. R. Haig, CDA). Redwood City, 1 ♀, VIII-27-50 (P. H. Arnaud, PHA). Sandhill Road, 1 ♀, on *Baccharis pilularis*, X-17-52 (P. H. Arnaud, PHA). Sandhill Road behind Belmont (paratype), 1 ♂, on *Baccharis pilularis*, IX-21-52 (P. H. Arnaud, PHA). San Gregorio, 1 ♀, VIII-22-53 (P. H. Arnaud, PHA). Skyline Boulevard and La Honda Road, 2 ♀♀, on *Baccharis pilularis*, X-22-52 (P. H. Arnaud, PHA). SANTA CLARA Co.: Los Gatos, 1 ♂, 2 ♀♀, XII-14-59 (T. R. Haig, CDA). Headwaters of Santa Clara Creek, 1 ♂, approx. 2,500 ft., X-19-46 (P. H. Arnaud, PHA). Stanford University, 1 ♂, XI-4-53 (P. H. Arnaud, PHA); 1 ♀, IX-11-57 (P. H. Arnaud, PHA); 2 ♂♂, 2 ♀♀, X-20-53 (P. H. Arnaud, PHA); 2 ♂♂, 1 ♀, X-18-53 (P. H. Arnaud, PHA); 1 ♀, X-190? (SU); (paratypes), 1 ♂, 2 ♀♀, X-27-52 (P. H. Arnaud, PHA). SANTA CRUZ Co.: Mount Herman (paratype), 1 ♀, VII-19-22 (F. E. Blaisdell, CAS). SONOMA Co.: Hilton, 1 ♀, X-30-59 (T. R. Haig, CDA). Occidental, 1 ♂, VIII-16-38 (D. W. Craik, UK). Santa Rosa, 1 ♂, XII-7-59 (T. R. Haig, CDA). Sonoma, 1 ♂, Frick trap in English walnut, VII-23-57 (M. G. Dornbush, CDA).

The abrupt line of demarcation between the yellow of the proximal wing pattern and the dark brown of the apical wing markings and the entirely black ovipositor sheath are characteristic of this species.

### *Euarestoides flava* (Adams)

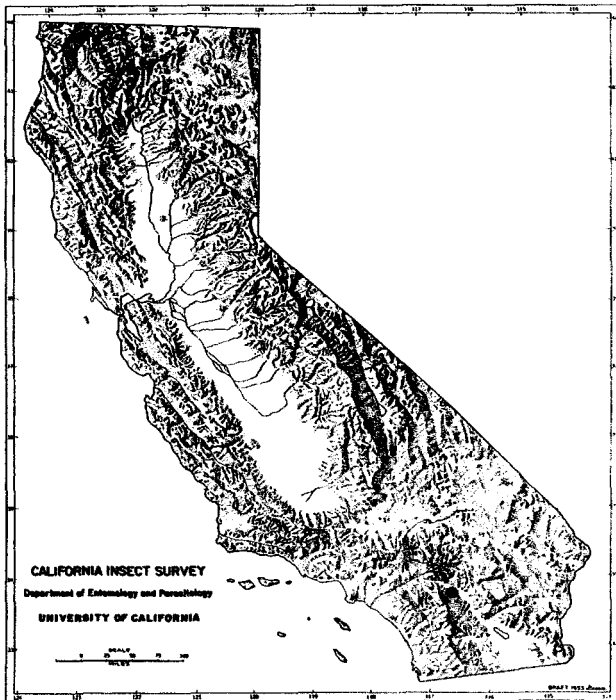
(See Fig. 31; Map 23)

*Urellia flava* Adams, 1904, Kans. Univ. Sci. Bull., 2:451. Holotype ♀; Bill Williams Fork, Ariz. (UK).

**Geographic range.**—Arizona and California.

**California records.**—RIVERSIDE Co.: Palm Springs, 1 ♂, at flowers of *Chrysothamnus* sp., XII-28-52 (P. H. Arnaud, PHA).

*E. flava* is a rare species that can be distinguished



Map 23. Distribution in California of *Euarestoides flava* (Adams)

from *arnaudi* in the female by the longer, completely yellow ovipositor sheath. Males of these two species are indistinguishable except by characters of the genitalia. The wing pattern (not figured for *flava*) resembles that of *arnaudi* in all particulars.

#### Genus *Euleia* Walker

The genus is closely related to *Epochra* and *Trypeta*; it differs from *Epochra* in having presuturals and from *Trypeta* in the large light spot in the distal third of cell 1st  $M_2$ . The larvae of the 2 known North American species are leaf miners, an unusual habit among tephritids. Foote (1959b) has reviewed the North American members of the genus.

#### *Euleia fratria* (Loew)

(Fig. 32; Map 24)

*Trypeta fratria* Loew, 1862, Smiths. Misc. Collect., 6(1):67, pl. II, fig. 4. Holotype ♂, United States (MCZ).

*Synonym*.—*Trypeta liogaster* Thomson, 1868:578.

*Geographic range*.—Eastern Canada; northern half of the United States, and Florida.

*California records*.—ALAMEDA Co.: Albany, 1 ♂, IV-29-58 (A. D. Telford, UCD). Berkeley, 2 ♂♂, 4 ♀♀, reared from *Heracleum lanatum*, VI-19-48 (K. E. Frick, KEF); 4 ♂♂, 1 ♀, reared from *Heracleum lanatum*, VI-26-48 (K. E. Frick, KEF); 13 ♂♂, 1 ♀, reared from *Oenanthе sарmentosa*, XII-13-48 (K. E. Frick, KEF); 5 ♂♂, 13 ♀♀, *Oenanthе sарmentosa*, XI-22-48 (K. E. Frick, CIS); 1 ♀, XII-4-38 (R. M.



Map 24. Distribution in California of *Euleia fratria* (Loew)

Bohart and G. E. Bohart, CAS). Berkeley, University of California Campus, 1 ♀, IV-5-55 (W. W. Middlekauff, CIS). Hills back of Oakland, 1 ♀, V-23-48 (P. D. Hurd, CIS); 3 ♂♂, reared from *Heracleum* sp., VI-12-52 (W. C. Bentinck, CIS). DEL NORTE Co.: Darlingtonia, 1 ♀, Frick trap, Summer 59 (Jack Anderson, CDA). NAPA Co.: Chiles Valley, 10 mi. S. of Pope Valley, 10 ♂♂, 6 ♀♀, reared from *Conium maculatum*, IV-27-34 (H. H. Keifer, CDA). Oakville, 3 mi. W., 1 ♀, Frick trap in English walnut, VII-16-57 (M. G. Dornbush, CDA). SANTA CRUZ Co.: Aptos, 1 ♂, Frick trap in walnut, IX-25-57 (Ralph Freeman, CDA). Laurel, 2 ♂♂, reared from *Heracleum lanatum*, VIII-21-48 (K. E. Frick, KEF). Santa Cruz, 8 mi. N., 1 ♀, trap in fig., XI-16-56 (D. G. Denning, CDA). SOLANO Co.: Suisun, 1 ♀, Frick trap in walnut, VIII-4-58 (P. C. Martinelli, CDA). SONOMA Co.: Kenwood, 1 ♂, VII-29-51 (C. D. MacNeill, CIS). Santa Rosa, 1 ♂, Frick trap in Persian walnut, VII-26-56 (L. D. Hampton, CDA).

The species is easily recognized by its distinctive wing pattern.

#### Genus *Eutreta* Loew

The wing of most species of *Eutreta* is distinctive in being broad and very dark and in having many subhyaline discal spots and a crescentic hyaline area filling all or part of the apices of cells  $R_1$ ,  $R_3$ ,  $R_5$ , and  $M_{1+2}$ . Except for 1 species, *baccharis* (Coq.) (fig. 33), the wing pattern of which resembles that of *Oxyna*, the genus is not easily confused with any other found in California. It is restricted to the New World; the extent of its penetration into South America is not known. Of the 13 species known from North America,



6 occur in California. Adults rest on various plants; *Eutreta baccharis* is known to form galls in at least two species of *Baccharis*. A key by Curran (1932b) to the 10 species then known is the only available guide to the genus.

KEY TO THE CALIFORNIA SPECIES OF EUTRETA

- 1 Third antennal segment black; face with white pollinosity . . . . . *oregona* Curran (p. 30)  
 Third antennal segment yellow or fawn; face with yellow pollinosity . . . . . 2
- 2(1) Face with a pair of dark-brown to black spots . . . . . 3  
 Face unmarked . . . . . 4
- 3(2) Hyaline spots of wing disk white or silvery gray, not coalesced near wing base  
*pacifica* Curran (p. 30)  
 Hyaline spots of wing disk yellow and coalesced into large yellow areas near wing base  
*hespera* Banks (p. 29)
- 4(2) Abdominal terga dark brown or red, at least basally; scutellum shining black  
*diana* (Osten Sacken) (p. 28)  
 Abdominal terga light brown to yellow; scutellum brown or yellowish . . . . . 5
- 5(4) Many spots in cells R<sub>1</sub>, R<sub>3</sub>, and R<sub>5</sub> coalesced; no distinct apical hyaline crescent present  
*baccharis* (Coquillett) (p. 28)  
 None of the spots in cells R<sub>1</sub>, R<sub>3</sub>, and R<sub>5</sub> coalesced; distinct apical hyaline crescent present  
*pollinosa* Curran (p. 32)

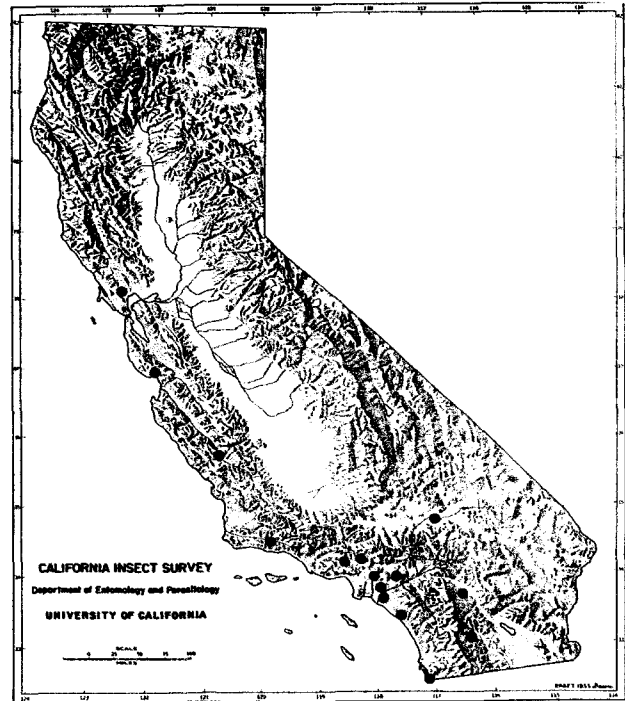
*Eutreta baccharis* (Coquillett)

(Fig. 33; Map 25)

*Trypeta* (*Tephritis*) *baccharis* Coquillett, 1894, Can. Ent., 26:73. Syntypes ♂ and ♀; southern California (USNM).

**Geographic range.**—Arizona, California, Nevada, and New Mexico; also Mexico.

**California records.**—LOS ANGELES CO.: Big Tujunga, 1 ♂, reared from *Baccharis glutinosa*, XI-6-35 (Wolff and Myers, CDA); 1 ♂, VIII-14-31 (K. L. Wolff, LACO); 1 ♂, reared from *Baccharis glutinosa*, VI-19-35 (Wolff and Myers, USNM); 1 ♂, VIII-14-31 (Wolff and Myers, USNM). Big Tujunga Canyon, 1 ♂, VII-19-52 (R. X. Schick, UCLA). Chatsworth, 1 ♀, V-20-39 (CIS). El Monte, 1 ♀, melon fly trap, VIII-31-56 (W. D. Dyer, CDA). Los Angeles County, 6 ♂♂, 4 ♀♀ (Coquillett, USNM); 1 ♂, IV-29-15 (M. C. Van Duzee, USNM). MONTEREY CO.: Bradley, 1 ♀, general sweeping along river bank, IV-5-57 (R. P. Allen, FLB). ORANGE CO.: Brea, 1 ♂, McPhail trap, X-20-58 (H. M. Couch, OC). San Juan Capistrano, S. on 101, McPhail trap, VIII-26-58 (Cleade Cloer and Frank Pelsue, CDA). Santa Ana, 1 ♀, McPhail trap, IX-15-58 (D. M. Sullivan, CDA). RIVERSIDE CO.: Palm Springs, 1 ♀, I-16-53 (P. H. Arnaud, PHA). SAN BERNARDINO CO.: Barstow, Mojave River, 1 ♀, ex Arrow weed, I-25-18 (H. H. Severin, CIS). Ontario, 1 ♀, Frick trap in peach, IX-15-57 (H. R. Moffitt, UCR). SAN DIEGO CO.: San Ysidro, 1 ♀, McPhail trap in fig., VI-20-57 (J. L. Johnson, CDA); 1 ♂, reared from galls on *Baccharis viminea*, XI-15-50 (F. L. Blanc, FLB); 1 ♂, McPhail trap, I-3-57 (J. Wright, CDA); 1 ♀, McPhail trap in orange, VII-28-59 (F. Betcher, CDA); 1 ♂, 3 ♀♀, XI-25-57 (E. D. Algert, EDA); 3 ♂♂, 2 ♀♀, reared larvae in *Baccharis viminea* branch gall, XI-6-50 (E. D. Algert, USNM). Scissors Crossing, 1 ♀, VII-4-56 (L. A. Stange, LAM). SANTA



Map 25. Distribution in California of *Eutreta baccharis* (Coquillett)

CLARA CO.: Santa Clara County, 1 ♀ (Harkins Collection, CAS). SONOMA CO.: Petaluma, 1 ♀, Frick trap in walnut, IX-55 (R. P. Allen, CDA). VENTURA CO.: Foster Park, 1 ♀, VII-1-59 (M. Bruck, CGM).

The entire body and all body hairs of this unusual species are light brown to gold, and the wing, narrower than in most species of the genus, has two areas of small dots separated by an oblique, unspotted band similar to those of species of *Oxya*. The apical hyaline crescent is absent, much reduced, or represented by coalesced hyaline spots in the apices of cells R<sub>3</sub> and R<sub>5</sub>.

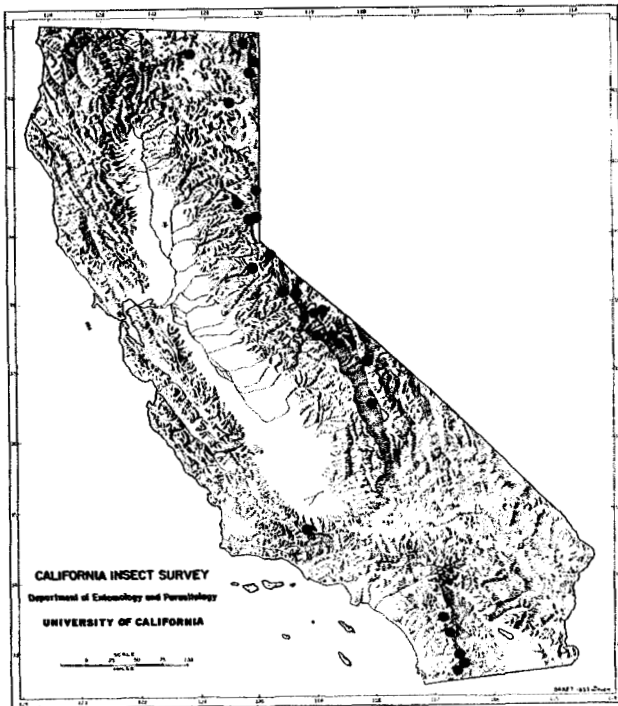
*Eutreta diana* (Osten Sacken)

(Fig. 34; Map 26)

*Trypeta* (*Eutreta*) *diana* Osten Sacken, 1877, Bull. U. S. Geol. Survey, 3(2):347. Syntypes ♂ and ♀; Missouri (location of type not known).

**Geographic range.**—Western United States east to Missouri.

**California records.**—ALPINE CO.: Fredericksburg, 1 ♂, swept from *Chrysothamnus* sp., VI-18-58 (R. P. Allen, CDA). AMADOR CO.: Silver Lake, 1 ♀, VIII-11-36 (CAS). INYO CO.: Lone Pine Creek, 3 ♂♂, 5 ♀♀, ex *Artemisia* galls, VI-6-39 (R. M. Bohart, UCLA); 4 ♂♂, 5 ♀♀, VIII-1-52 (R. J. Ford, LAM). Westgard Pass Plateau, 1 ♂ VI-5-37 (C. A. Hamsher, UCD). Whitney Portal, 8 ♂♂, 2 ♀♀, VII-3-53 (J. W. MacSwain, CIS). KERN CO.: Mill Potrero, 1 ♀, VII-8-59 (R. M. Bohart, UCD). LASSEN CO.: Hallelujah Junction, 1 ♂, VII-12-54 (R. H. Goodwin, CIS); 1 ♀, VII-18-53 (E. I. Schlinger, UCD); 2 ♂♂, 2 ♀♀, VII-18-53 (R. M. Bohart, UCD); 1 ♂, VII-4-49 (J. W. MacSwain, CIS); 1 ♀, VII-4-49 (E. L.

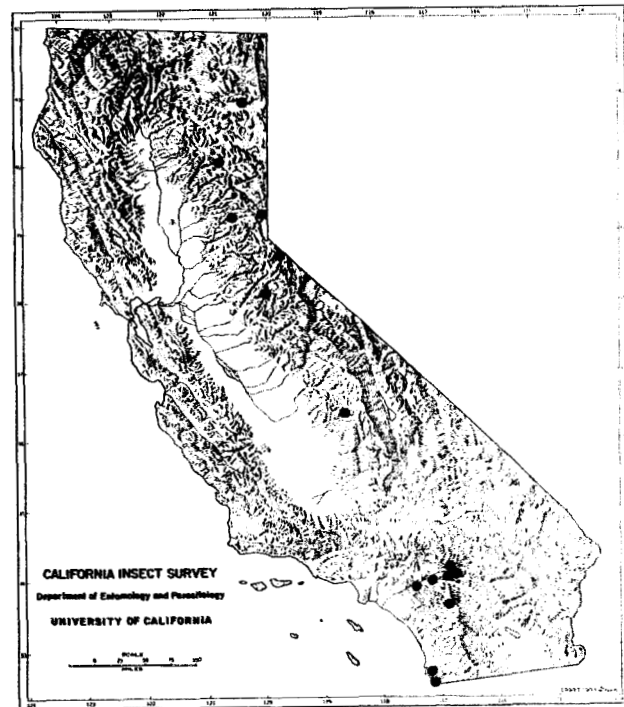


Map 26. Distribution in California of *Eutreta diana* (Osten Sacken)

Atkinson, CIS); 1 ♂, VII-4-49 (W. F. Ehrhardt, UCD); 1 ♂, VII-4-49 (A. S. Deal, UCD); 1 ♂, VII-12-54 (J. A. Powell, JAP); 1 ♂, 1 ♀, VII-17-53 (E. I. Schlinger, UCD). Said Reservoir, 1 ♀, swept from *Artemisia tridentata*, VII-22-60 (F. L. Blanc, FLB). MODOC Co.: Cedar Pass, 1 ♀, Frick trap, VII-11-52 (L. White, CDA). Davis Creek, 1 ♀, VII-14-22 (C. L. Fox, CAS). Lake City, 1 ♀, Frick trap, IX-59 (L. White, CDA); 1 mi. N., 1 ♀, VII-8-46 (P. D. Hurd and Ray F. Smith, CIS). Perez, 1 ♀, swept from *Artemisia tridentata*, VII-20-60 (F. L. Blanc, FLB). MONO Co.: Bridgeport, 1 ♀, VIII-13-52 (R. C. Bechtel, UCD). Lake Crowley, 1 ♀, VII-30-53 (Arnold Menke, AEM). Leavitt Meadows, 1 ♂, VII-6-51 (C. A. Downing, CIS). Mammoth, 1 ♀, VIII-7-36 (CAS). Tom's Place, 1 ♂, 1 ♀, VI-27-49 (H. E. Cott, UCD). 12 mi. E. Junction of highways 120-395, 1 ♀, VIII-7-58 (A. D. Telford, UCD). 20 mi. E. Junction of highways 120-395, 1 ♂, VIII-7-58 (A. D. Telford, UCD). NEVADA Co.: Boca Dam, 11 mi. E. of Truckee, 1 ♀, *Chrysothamnus nauseosus speciosus*, VIII-25-56 (E. G. Linsley, CIS). Donner Lake, 1 ♀, VII-28-32 (R. L. Usinger, CIS). Prosser Creek, 2 mi. S. of Hobart Mills, 2 ♀♀, *Chrysothamnus* sp., VIII-23-56 (E. G. Linsley, CIS). Sagehen nr. Hobart Mills, 1 ♀, VIII-21-54 (R. M. Bohart, USNM). PLACER Co.: Donner Lake, 1 ♀, VIII-24-16 (W. M. Gifford, CAS). RIVERSIDE Co.: Anza, 2 mi. E., 1 ♀, *Asclepias erosa*, VII-7-56 (P. D. Hurd, CIS). SAN DIEGO Co.: Corte Madera, 5 ♀♀, VIII-1-45 (G. Beevor, CDA). Laguna, 9 ♂♂, 1 ♀, reared from galls on *Artemisia tridentata*, V-16-50 (USNM). Lake Henshaw, 1 ♂, 1 ♀, on *Quercus agrifolia*, VII-22-50 (P. H. Timberlake, UCR). Pine Valley, 1 ♂, 2 ♀♀, ex *Artemisia tridentata*, V-5-51 (S. W. Lake, USNM). SIERRA Co.: Sierraville, 1 ♀, VII-2-54 (J. A. Powell, JAP).

*E. diana* has an unmarked face; black thorax,

scutellum, and ovipositor sheath; and a partly or wholly reddish abdomen. It may be distinguished from the other California *Eutreta* species by the characters given in the key.



Map 27. Distribution in California of *Eutreta hespera* Banks

#### *Eutreta hespera* Banks

(Fig. 35; Map 27)

*Eutreta hespera* Banks, 1926, Psyche, 33:44. Syntypes (sex not known); California and Colorado (location of types not known).

*Synonym*.—In California this species has been known erroneously as *sparsa* (Wied.) (see discussion below).

*Geographic range*.—California, Colorado, Nevada, New Mexico, Oregon, and Texas.

*California records*.—ALPINE Co.: Woodfords, 1 ♂, VII-25-50 (R. P. Allen, CAS); 1 ♂, VIII-5-54 (R. P. Allen, CDA); 1 ♂, VIII-6-59 (R. P. Allen, CDA). LASSEN Co.: Madeline, 1 ♀, *Chrysothamnus nauseosus speciosus*, IX-7-57 (E. G. Linsley, CIS). NEVADA Co.: Boca, 1 ♀, VII-5-54 (R. M. Bohart, UCD); 1 ♂, 3 ♀♀, IX-9-59 (F. D. Parker, CGM); 1 ♂, VII-5-54 (R. M. Bohart, USNM); 4 ♂♂, 4 ♀♀, IX-9-59 (F. D. Parker, UCD). Crystal Lake, 1 ♂, VII-22-31 (LACO). PLUMAS Co.: Greenville, 1 ♂, VIII-1-52 (W. C. Bentinck, CIS). RIVERSIDE Co.: Riverside, 1 ♂, IV-29-40 (C. Dammers, USNM). Tahquitz Valley, San Jacinto Mountains, 1 ♂, VII-6-50 (H. L. Hansen, CIS). SAN BERNARDINO Co.: Bear Valley, 1 ♂, wet meadow, VIII-3-33 (P. H. Timberlake, UCR). Big Meadow, San Bernardino Mountains, 1 ♀, VII-8-50 (UCLA); 1 ♀, VII-31 (USNM). Mill Creek Canyon, 1 ♀, IX-24-23 (E. P. Van Duzee, CAS). Redlands, 1 ♀, 1914 (F. R. Cole, USNM); 1 ♀, 1913 (F. R. Cole, USNM). SAN DIEGO Co.: Orange Grove, 1 ♀, V-26-36 (C. F. Harbison, CWS). San Diego, 1 ♀, III-20-08 (Ricksucker, USNM). San Ysidro, 1 ♂, III-19-36 (J.

Altstoetter, USNM). SANTA CLARA Co.: Santa Clara County, 1 ♂, VIII-36 (R. M. Bohart, CWS). TULARE Co.: Mineral King, 1 ♂, VIII-12-35 (CAS). TUOLUMNE Co.: Pinecrest, 2 ♀♀, *Solidago* sp., VIII-4-48 (P. D. Hurd and J. W. MacSwain, CIS); 1 ♂, VII-7-47 (P. H. Arnaud, PHA).

*E. hespera* may be distinguished from the only other California *Eutreta* with a spotted face (*pacifica* Curran) by the somewhat larger hyaline wing spots, which tend to fuse centrally; by the narrower apical hyaline crescent; and by the fact that the dark area between the inner margin of the crescent and the spotted area is wider than the crescent itself. This species often has been misidentified as *sparsa* (Wied.), the common *Eutreta* species of the eastern United States.



Map 28. Distribution in California of *Eutreta oregona* Curran

*Eutreta oregona* Curran

(Fig. 36; Map 28)

*Eutreta oregona* Curran, 1932, Amer. Mus. Novitates, No. 556:18. Holotype ♂; Blitzen River, Ore. (AMNH).

**Geographic range.**—California and Oregon.

**California records.**—LASSEN Co.: Hallelujah Junction, 1 ♀, VII-12-24 (J. A. Powell, JAP); 1 ♂, reared from *Artemisia tridentata*, collected IV-25-61, emerged V-16-61 (F. L. Blanc, FLB).

*E. oregona* may be recognized immediately by the black antenna, the third segment of which extends beyond the oral margin and is about three times as long as its width at the base. The lateral margins of the face are brown in some specimens.



Map 29. Distribution in California of *Eutreta pacifica* Curran

*Eutreta pacifica* Curran

(Fig. 37; Map 29)

*Eutreta pacifica* Curran, 1932, Amer. Mus. Novitates, No. 556:17, fig. 9. Holotype ♂; Pomona, Calif. (AMNH).

**Synonyms.**—Probably occasionally confused in the past with, and called, *Eutreta sparsa* (Wied) (see also *Eutreta hespera* Banks).

**Geographic range.**—California, Colorado, New Mexico, and Texas.

**California records.**—BUTTE Co.: Big Bend Mountains, 1 ♂, V-8-28 (H. H. Keifer, CAS). DEL NORTE Co.: Crescent City, 1 ♀, Frick trap in *Prunus emarginata*, VII-60 (Peacock, CDA). HUMBOLDT Co.: Trinidad, 1 ♀, on *Senecio numinius*, VI-9-59 (T. R. Haig, CDA); 8 mi. N., 2 ♂♂, VI-12-59 (T. R. Haig, UCD). KERN Co.: Mojave, 1 ♀, V-30-27 (A. C. Davis, CAS). LOS ANGELES Co.: Acton, 1 ♀, *Salix* sp., III-16-36 (CAS). Claremont, 1 ♂ (Baker, CDA). El Monte, 1 ♂, VI-8-11 (P. H. Timberlake, UCR); 1 ♂, VII-7-33 (H. H. Keifer, CDA). La Verne, 3 ♂♂, 3 ♀♀, resting on *Ambrosia* sp., V-11-51 (C. Henne, LAM); 1 ♂, 1 ♀, resting on *Ambrosia* sp., V-11-51 (C. Henne, LACO). Los Angeles, 1 ♂, VIII-19-29 (L. E. Myers, LACO); 1 ♂, IX-11-30 (K. L. Wolff, LACO). Los Cerritos (Long Beach), 1 ♂, III-14-15 (M. C. Van Duzee, CAS). North Redondo, 1 ♀, VI-41 (LAM). Santa Monica, 2 ♂♂, 2 ♀♀, collected from beans, IX-4-56 (G. G. Beevor, CDA); 2 ♀♀, V-10-52 (UCLA). Sespe River, 1 ♂, IV-23-50 (UCLA). Southgate, 1 ♀, IV-23-39 (J. Peek, UCLA). Walnut, 1 ♀, resting on fruit of navel orange, IV-19-51 (C. Henne, LAM). Westwood Hills, IV-6-36 (J. Hooper, UCLA). Whittier, 1 ♂, VIII-13-12 (P. H. Timberlake, USNM); 2 ♂♂, VII-26-23 (A. J. Basinger, CAS). Long Beach, 1 ♂, III-14-15 (M. C. Van Duzee, CAS). MARIN Co.: Inverness, 1 ♂, 1 ♀, general sweeping, IV-24-59 (Wm. Bower and G. T. Okumura,

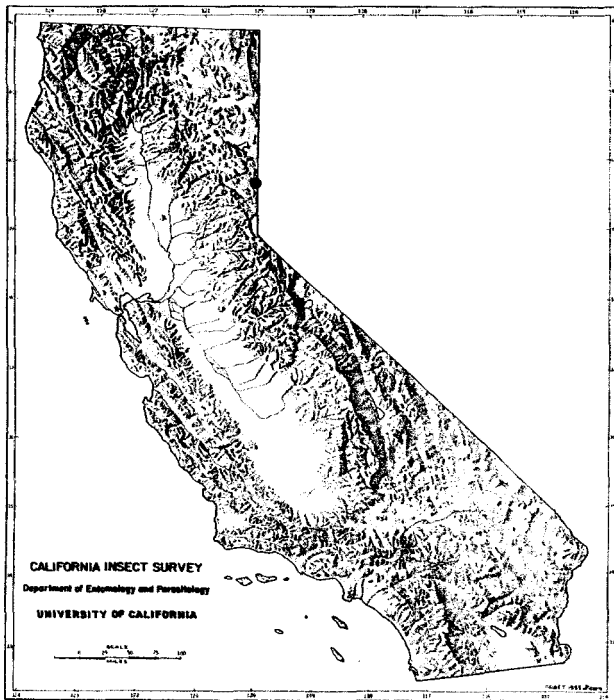
CDA). Kentfield, 1 ♀, reared from pupa found in soil about chrysanthemum, II-10-59 (P. H. Arnaud, CDA); 3 ♂♂, 4 ♀♀, reared from galls on chrysanthemum crowns, emerged II-59 (P. H. Arnaud, CDA); 3 ♂♂, 2 ♀♀, reared from galls on chrysanthemum crowns, emerged II-12-59 (P. H. Arnaud, CDA); 3 ♂♂, 5 ♀♀, reared from galls on chrysanthemum crowns, emerged II-14-59 (P. H. Arnaud, CDA). Larkspur, 1 ♂, reared from galls on chrysanthemum crowns, IV-19-59 (W. Bergin and T. R. Haig, CDA). Navato, 1 ♂, XI-2-59 (W. Bergin, CDA). Point Reyes, 9 ♂♂, 3 ♀♀, V-3-52 (C. D. MacNeill, CIS); 5 ♂♂, 1 ♀, V-3-52 (C. D. MacNeill, CAS); 1 ♀, IV-11-59 (G. I. Stage, CIS); 1 ♀, IV-19-58 (D. D. Linsdale, CIS). San Anselmo, 1 ♀, ex *Chrysanthemum* sp., IV-16-59 (W. Bergin and T. R. Haig, CDA). San Raphael, 1 larva, ex *Chrysanthemum* sp., I-29-59 (Bergin, Garvey, and Haig, CDA). Taylor State Park, 1 ♂, X-19-46 (F. E. Skinner and E. S. Ross, CAS). MENDOCINO Co.: Navarro, 1 ♂, general sweeping, V-16-59 (W. R. Bauer, CDA). MONTEREY Co.: Pfeiffer, Big Sur State Park, 1 ♀, VI-2-49 (P. H. Arnaud, PHA). ORANGE Co.: Fullerton, 2 ♂♂, 1 ♀, collected from wild radish, III-11-43 (G. G. Beevor, CDA). Garden Grove, 1 ♂, VII-39 (C. E. Norland, LAM). Green River Camp, 1 ♂, V-11-33 (E. P. Van Duzee, CAS). Laguna Beach, 1 ♂, VII-9-19(?) (E. O. Essig, CIS); 1 ♂, VI-22-38 (C. Dammers, LAM). Olive, 1 ♀, McPhail trap, VII-7-58 (F. W. Pelsue, CDA). Orange, 1 ♀, on *Helianthus annuus*, III-28-34 (P. H. Timberlake, UCR). Santa Ana, 1 ♀, alfalfa, III-24-37 (C. E. Norland, LAS); 2 ♀♀, VI-6-38 (J. G. Shanafelt, AMNH). PLACER Co.: Alta, 1 ♂, VI-25-33 (CAS). PLUMAS Co.: Graeagle, 1 ♀, VI-18-49 (E. I. Schlinger, UCD). Portola, 1 ♀, Frick trap in apple, Summer 60 (N. Overgaard, CDA). RIVERSIDE Co.: Aguanga, 4 mi. W., 5 ♂♂, IV-24-51 (R. C. Bechtel, UCD); 2 ♂♂, IV-24-51 (E. I. Schlinger, UCD). Hemet, 1 ♀, *Helianthus* sp., VIII-24-46 (J. W. MacSwain, CIS). Idyllwild, 1 ♀, fern, V-23-40 (R. Husbands, CIS); 1 ♂, V-22-40 (C. D. Michener, CIS). Riverside, 1 ♂, 1 ♀, IV-12-36 (W. C. Reeves and T. G. Aitken, CAS); 1 ♀, VI-10-34 (A. J. Basinger, CAS); 1 ♂, VI-28-40 (C. Dammers, LAM); 2 ♂♂, IV-21-40 (C. Dammers, LAM); 1 ♂, IV-25-40 (C. Dammers, LAM); 1 ♂, 2 ♀♀, on *Glycyrrhiza lepidota*, IX-9-52 (P. H. Timberlake, UCR); 1 ♀, on *Xanthium pennsylvanicum*, IX-1-41 (P. H. Timberlake, UCR); 1 ♀, swept from low vegetation, IV-6-40 (P. H. Timberlake, UCR); 1 ♂, X-20-29 (P. H. Timberlake, UCR); 2 ♀♀, on *Ambrosia psilostachya*, VIII-5-50 (P. H. Timberlake, UCR); 1 ♂, ex galls on Chinese aster, VII-27-26 (Horticultural Inspector, UCR); 1 ♂, 2 ♀♀, VI-46 (N. L. H. Krauss, USNM). Sobola Springs, 2 ♂♂, V-30-17 (E. P. Van Duzee, CAS). Tahquitz Valley, San Jacinto Mountains, 1 ♂, VII-6-50 (H. L. Hansen, CIS). Temecula, 1 ♂, 1 ♀, VII-4-50 (J. W. MacSwain, CIS); 1 ♂, IV-24-51 (R. C. Bechtel, UCD); 11 mi. S.E., 1 ♀, IV-18-50 (J. W. MacSwain, CIS). SACRAMENTO Co.: Fair Oaks, 1 ♂, V-17-47 (A. T. McClay, UCD). Sacramento, 1 ♂, 1 ♀, on *Ambrosia psilostachya*, V-1-58 (F. L. Blanc, FLB); 1 ♀, III-29-31 (H. H. Keifer, CDA); 1 ♀, VI-3-30 (S. Lockwood, CDA); 1 ♀, VII-14-30 (H. H. Keifer, CDA); 1 ♂, 1 ♀, V-17-30 (H. H. Keifer, CDA); 1 ♀, VIII-15-30 (H. H. Keifer, CDA); 1 ♂, III-18-31 (H. H. Keifer, CDA); 1 ♂, III-23-31 (H. H. Keifer, CDA); 1 ♂, VI-14-19(?), (CDA); 1 ♂ V-17-30 (H. H. Keifer, CDA); 2 ♀♀, VI-18-26 (H. C. Lewis, CDA); 1 ♂, aster, VII-16-32 (CIS); 2 ♂♂, 2 ♀♀, swept from *Ambrosia* sp., IV-22-58 (R. B. Hewitt, CDA); 2 ♂♂, swept from *Ambrosia* sp., IV-8-59 (R. F. Wilkey and P. H. Arnaud, CDA); 1 ♂, swept from

*Ambrosia* sp., III-13-59 (Greenwood and W. W. Wiard, CDA); 1 ♀, VI-29-59 (W. R. Bauer, P. H. Arnaud, and J. S. Buckett, CDA); 1 ♀, VIII-6-55 (R. W. Bushing, UCD) 12 ♂♂, 3 ♀♀, *Ambrosia* sp., IV-28-58 (P. H. Arnaud, PHA); 1 ♂, V-17-30 (H. H. Keifer, UCLA); 1 ♀, IV-18-26 (H. C. Lewis, UCLA); 1 ♂, V-29 (H. H. Keifer, UCLA); 1 ♀, VIII-4-30 (H. H. Keifer, UCLA); 1 ♂, 2 ♀♀, IV-25-49 (W. F. Ehrhardt, USNM); River Park, feeding on aphid honeydew on *Pittosporum* sp., IV-9-56 (F. L. Blanc, CDA). SAN BERNARDINO Co.: Devore, 1 ♂, on grass and weeds in wet place, VII-23-35 (P. H. Timberlake, UCR). Dollar Lake Trail, San Bernardino Mountains, 1 ♂, 1 ♀, VIII-5-56 (Arnold Menke, AEM); 1 ♀, VII-11-56 (R. M. Bohart, UCD). Etiwanda, 1 ♂, McPhail trap in eucalyptus, IX-27-57 (J. M. Johnson, CDA). San Bernardino, 1 ♀, McPhail trap, VII-3-56 (S. George, CDA). Victorville, 1 ♂, V-2-53 (G. A. Marsh and R. O. Schuster, CIS). SAN DIEGO Co.: Alvarado Canyon, 2 ♂♂, IV-29-53 (J. A. Powell, JAP) Corte Madera, 1 ♀, VIII-1-45 (G. Beevor, CDA). Del Mar, 3 mi. N.E., 1 ♂, general sweeping, V-16-58 (F. L. Blanc, CDA); 4 mi. E., 1 ♂, general sweeping, VII-10-58 (F. L. Blanc, CDA). Fairmont Canyon, 1 ♂, false willow, III-15-53 (J. Powell, JAP). Imperial Beach, 2 ♀♀, McPhail trap in orange, IV-25-56 (Ed Soukup, CDA). Linda Vista, 1 ♂, McPhail trap, III-18-59 (J. Garcia, CDA). Mission Gorge, 1 ♂, 2 ♀♀, V-24-59 (J. A. Powell, CIS). Oceanside, 2 ♂♂, aster, VII-12-37 (A. C. Dodd, CDA). Pine Valley, 1 ♀, IV-24-20 (E. P. Van Duzee, CAS); 1 ♂, 1 ♀, IV-24-20 (W. M. Gifford, CAS); 1 ♂, 1 ♀, VI-4-28 (F. W. Kelsey, SDM). 1 ♂, 1 ♀, VI-4-28 (F. W. Kelsey, SDM). Poway, 1 ♀, III-22-1885 (CAS). San Diego, 1 ♂, V-3-13 (E. P. Van Duzee, CAS); 1 ♂, V-7-13 (E. P. Van Duzee, CAS); 2 ♀♀, V-8-13 (E. P. Van Duzee, CAS); 1 ♀, IV-24-13 (E. P. Van Duzee, CAS); 1 ♀, V-21-40 (R. R. McLean, LACO); 1 ♂, III-8-53 (P. H. Arnaud, CAS). San Vicente 2 ♂♂, V-11-38 (W. E. Simonds, USNM). San Ysidro, 1 ♂, 1 ♀, McPhail trap in deciduous fruit tree, V-4-56 (Johnson and Reed, CDA); 1 ♂, McPhail trap, III-3-56 (D. A. Taylor, CDA); 1 ♂, McPhail trap in loquat, II-21-57 (C. Riding, CDA); 2 ♂♂, 2 ♀♀, reared from *Ambrosia* sp., root gall, V-24-49 (E. D. Algert, USNM). Viejas, 1 ♂, VI-3-53 (J. A. Powell, JAP). San Diego County, 1 ♀, IV-12-18 (J. I. Carlson, CAS). SAN FRANCISCO Co.: Bakers Beach, 2 ♀♀, VIII-29-53 (P. H. Arnaud, PHA). San Francisco, 1 ♂, 2 ♀♀, reared from *Franseria* sp., V-18-27 (H. H. Keifer, CDA); 3 ♂♂, reared from *Franseria* sp., VIII-26-30 (H. H. Keifer, CDA); 2 ♀♀, V-13-15 (E. P. Van Duzee, CIS); 2 ♀♀, X-12-19 (E. P. Van Duzee, CAS); 3 ♀♀, X-20-19 (E. P. Van Duzee, CAS); 2 ♀♀, III-27-19 (F. X. Williams, CAS); 1 ♂, III-15-08 (Van Dyke, CAS); 1 ♂, 1 ♀, III-24-18 (E. P. Van Duzee, CAS); 1 ♂, 1 ♀, sand dunes, V-13-27 (C. L. Fox, CAS); 1 ♂, VIII-22-09 (F. X. Williams, CAS); 1 ♀, IX-19-09 (F. X. Williams, CAS); Sunset District, 1 ♀, V-25 (F. X. Williams, CAS). SAN LUIS OBISPO Co.: Grover City, 2 ♂♂, dunes association, VII-4-56 (E. G. Linsley, CIS). Harmony, 1 ♂, IX-25-38 (M. Cazier, AMNH). Oso Flaco Lake, 2 ♂♂, VII-13-59 (C. A. Campbell, CIS). SAN MATEO Co.: Burlingame, 1 ♂, VII-10-09 (J. A. Kusche, CAS). Sharp Park, 1 ♀, V-5-49 (R. S. Beal, CIS). SANTA BARBARA Co.: Carpinteria, 1 ♂, V-19-35 (M. Cazier, AMNH). Goleta, 1 ♂, VI-19-11 (P. H. Timberlake, UCR); 2 ♂♂, 1 ♀, VI-27-59 (M. Bruck, CGM); 1 ♀, VII-4-59 (F. D. Parker, CGM); 2 ♂♂, VI-22-59 (P. M. Marsh, UCD). Santa Barbara, 1 ♂, V-21-19 (E. P. Van Duzee, CAS). SANTA CLARA Co.: Santa Clara, 2 ♂♂,

VIII-7-36 (CAS); 1 ♂, VIII-7-36 (UCLA). SANTA CRUZ CO.: Aptos, 1 ♂, X-36 (E. S. Ross, CAS). Santa Cruz, 1 ♀, VIII-31-52 (P. H. Arnaud, PHA). SHASTA CO.: Hat Creek, 1 ♀, VI-1-41 (A. T. Walz, CAS). TULARE CO.: Three Rivers, 3 ♀♀, Frick trap, X-59 (H. R. Teranishi, CDA). TUOLUMNE CO.: Pinecrest, 2 ♀♀, *Solidago* sp., VIII-4-48 (P. D. Hurd, CIS). VENTURA CO.: Port Hueneme, 1 ♀, McPhail trap in fig, VI-22-59 (B. Osuna, CDA). Santa Paula, McPhail trap in plum, VIII-25-60 (J. Lopez, CDA). Ventura, 1 ♀, X-12-53 (J. C. Hall, UCD); 1 ♂, McPhail trap, IX-25-59 (B. Osuna, CDA). YOLO CO.: Davis, 1 ♀, V-21-59 (F. D. Parker, CGM); 1 ♀, IV-8-59 (F. D. Parker, UCD). YUBA CO.: Rio Oso, 1 ♂, ex grass, IV-30-59 (R. F. Wilkey, CDA).

Probably the most commonly collected species of this genus in California, *pacifica* may be distinguished readily from the closely related *hespera* by the characters given in the key. See also the discussion of *hespera* (p. 000).

*E. pacifica* has recently been found to infest the crowns of cultivated chrysanthemums, but its native host appears to be ragweed.



Map 30. Distribution in California of *Eutreta pollinosa* Curran

*Eutreta pollinosa* Curran

(Fig. 38; Map 30)

*Eutreta pollinosa* Curran, 1932, Amer. Mus. Novitates, No. 556:18. Holotype ♂; Antelope Mountain, Harney Co., Ore., (AMNH).

*Geographic range*.—California and Oregon.

*California records*.—LASSEN CO.: Hallelujah Junction, 1 ♀, VII-12-24 (J. A. Powell, JAP). MONO CO.: Mill Creek, 1 ♀, IX-6-58 (E. I. Schlinger, UCD).

Unusual among those species with an unspotted face, *pollinosa* has a brown scutellum indistinctly margined by a lighter brown or yellow color. The dark-brown dorsum of the abdomen is unmarked except for a transverse light-brown to yellow band on the last abdominal tergum immediately anterior to the ovipositor sheath. The hyaline wing spots are large, and the unspotted dark area immediately basad of the apical hyaline crescent is usually wider than the crescent itself.

Genus *Myoleja* Rondani

A genus of medium-sized flies whose wings are very darkly infuscate with highly contrasting hyaline markings, *Myoleja* is not commonly encountered in general collecting, and almost nothing is known about the biology of the species. *Myoleja* is principally Holarctic with 3 Nearctic species, only 1 of which occurs in California. There is no recent revision of the genus; Blanc and Foote (1961) have keyed the known North American species.



Map 31. Distribution in California of *Myoleja unifasciata* Blanc and Foote

*Myoleja unifasciata* Blanc and Foote

(Fig. 39; Map 31)

*Myoleja unifasciata* Blanc and Foote, 1961, Pan-Pac. Ent., 37:73, fig. 1. Holotype ♂; Conn Creek, Napa Co., Calif. (USNM).

*Geographic range*.—Known only from California.

*California records*.—ALAMEDA CO.: Oakland (paratypes), 2 ♂♂, V-10-37 (E. S. Ross, CAS). Hills back of Oakland

(paratype), 1 ♂, V-13-51 (W. C. Bentinck, UCD); (paratypes), 5 ♂♂, V-13-51 (W. C. Bentinck, CIS). LOS ANGELES Co.: Santa Monica Mountains, 1 ♂, (UCLA). NAPA Co.: Conn Creek (holotype), 1 ♂, IV-23-49 (W. W. Middlekauff, USNM); (paratypes), 4 ♂♂, IV-23-49 (W. W. Middlekauff, USNM). PLACER Co.: Deer Creek, Tahoma, 1 ♂, VI-6-49 (R. M. Bohart, UCD).

This species may be recognized by the single triangular hyaline spot in cell R, immediately beyond the apex of the stigma and the two narrowly separated hyaline arcs very close to the wing apex.

Genus *Neaspilota* Osten Sacken

These are small, yellowish flies with two pairs of upper fronto-orbitals, the posterior pair convergent; with the dorsocentrals close to the supra-alar; and with two pairs of scutellars. Except for a dark marking in the stigma, most species have clear wings; the longitudinal veins are yellowish. The genus is closely related to *Orellia*, but *Orellia* species are much larger and have distinctive wing markings. *Neaspilota*, with 10 species, is strictly Nearctic; 3 of these species are found in California. Adults inhabit blossoms of composites and other plants, and the larvae, like those of *Tephritis*, *Trupanea*, and *Paroxyna*, are believed to develop in the ovaries of these plants. No complete revision of the genus has been published, but Malloch (1942) and Quisenberry (1949b) have presented keys to the known species.

A number of California specimens seen in the course of this study remain unidentified, awaiting a revision of the genus.

KEY TO THE CALIFORNIA SPECIES OF NEASPILOTA

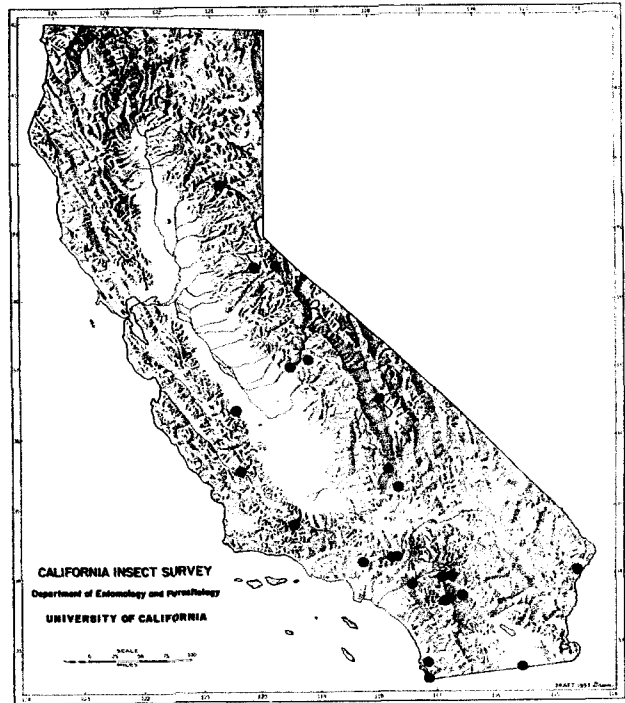
- 1 Head in profile with length greater than height; rostrum and labellum together when extended longer than head; veins r-m and m distinctly darker than longitudinal veins
  - signitera* (Coquillett) (p. 34)
- Head in profile subquadrate; rostrum and labellum together when extended never distinctly longer than head . . . . . 2
- 2(1) Abdominal terga 2, 3, 4, and 5 entirely yellow, or with dark proximal markings having their posterior borders parallel with margins of tergites, and with or without central incisure
  - brunneostigmata* Doane (p. 33)
- Abdominal terga 2, 3, 4, and 5 always with two sets of paired dark triangles often separated on median line . . . *wilsoni* Blanc and Foote (p. 35)

*Neaspilota brunneostigmata* Doane

(Fig. 40; Map 32)

*Neaspilota brunneostigmata* Doane, 1899, Jour. N. Y. Ent. Soc., 7:187. Syntypes ♂ and ♀ (type locality not known; location of types not known).

Geographic range.—Arizona, California, Idaho, New Mexico, Oregon, Texas, and Washington.

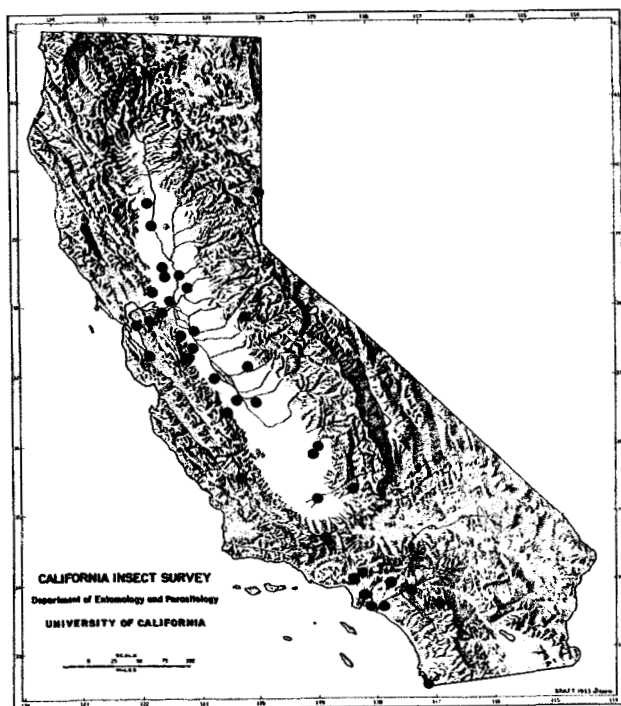


Map 32. Distribution in California of *Neaspilota brunneostigmata* Doane

California records.—ALPINE Co.: Markleeville, 5 mi. W., 1 ♂ reared from *Chrysopsis villosa*, VII-18-59 (R. F. Wilkey, CDA). AMADOR Co.: Silver Lake, 4 mi. N., 2 ♂♂, 1 ♀, VII-25-55 (E. I. Schlinger, UCD). FRESNO Co.: Coalinga, 2 ♂♂, composite, V-25-56 (H. L. Wilson, CDA); 5 mi. N., 1 ♂, 1 ♀, *Monolopia major*, III-20-57 (H. L. Wilson, CDA). Huntington Lake, VII-8-? (F. C. Clark, CAS). Jacolitos Canyon nr. Coalinga, 2 ♂♂, 5 ♀♀, composite, V-5-56 (H. L. Wilson, CDA). Lost Lake, 1 mi. W. of Friant, 1 ♀, VII-1-56 (R. O. Schuster, CIS). IMPERIAL Co.: Calexico, 1 ♂, 1 ♀, *Sida hederacea*, IV-2-18 (H. H. Severin, UCR). INYO Co.: Lone Pine, 1 ♀, V-20-51 (R. C. Bechtel, UCD). KERN Co.: Walker Pass, 7 mi. S., 2 ♂♂, 5 ♀♀, *Franseria* sp., IV-25-52 (G. A. Marsh, CIS). LOS ANGELES Co.: Big Pines Camp, 1 ♂, 3 ♀♀, on *Eriodictyon trichocalyx*, VIII-2-44 (P. H. Timberlake, UCD); 1 ♂, 2 ♀♀, on *Eriodictyon trichocalyx*, VIII-2-44 (P. H. Timberlake, UCR). Big Tujunga, 1 ♂, IX-51 (UCLA). PLUMAS Co.: Johnsville, 5 ♂♂, 3 ♀♀, reared from *Erigeron* sp., VIII-8-59 (J. S. Buckett, FLB). RIVERSIDE Co.: Road to Idyllwild, 1 ♂, 4,000 ft., IX-9-51 (P. H. Timberlake, UCR). Ripley, 7 mi. S., 1 ♂, *Baccharis emoryi*, X-19-51 (P. H. Timberlake, UCR); Riverside, 1 ♀, *Erigeron foliosus*, VI-11-36 (P. H. Timberlake, UCR); 1 ♀, *Erigeron foliosus* var. *stenophyllus*, V-26-33 (P. H. Timberlake, UCR); 1 ♀, *Baccharis emoryi*, X-7-52 (P. H. Timberlake, UCR); 1 ♀, *Eriogonum gracile*, X-16-25 (P. H. Timberlake, UCR); 1 ♂, *Heterotheca grandiflora*, X-19-45 (P. H. Timberlake, UCR). Palm Springs, 1 ♂, *Eriogonum* sp. VII-24-32 (P. H. Timberlake, UCR). SAN BERNARDINO Co.: Atolia, 3 ♂♂, 1 ♀, VI-19-52 (A. T. McClay, UCD). 4 mi. S.E. of Big Pines, 1 ♂, 1 ♀, *Artemisia* sp., VIII-25-44 (S. C. Jones, SCJ). Mill Creek, 1 ♀, *Rhamnus californica*, VI-6-40 (P. H. Timberlake, UCR); 1 ♀, VII-10-50

(P. H. Timberlake, UCR). Snow Crest Camp, 1 ♂, VII-17-52 (A. T. McClay, UCD). South Fork Camp, San Bernardino Mountains, 6,200 ft., 1 ♂, *Chrysothamnus nauseosus*, IX-10-44 (P. H. Timberlake, UCR). SAN DIEGO Co.: Mission Canyon, 2 ♂♂, 1 ♀, on *Lepidospartum* sp., X-1-32 (P. H. Timberlake, UCR). San Ysidro, 1 ♂, reared from flower heads of *Aster spinosus*, X-10-50 (E. D. Algert, FLB); 4 ♂♂, 1 ♀, reared from *Aster spinosus*, VIII-18-48 (E. D. Algert, USNM); 5 ♂♂, 5 ♀♀, reared from flower heads of *Aster spinosus*, collected V-18-60, emerged V-20 to V-30-60 (E. D. Algert, CDA). SAN LUIS OBISPO Co.: Shandon, 1 ♀, *Haplopappus venetus*, IV-4-57 (H. L. Wilson, CDA). VENTURA Co.: Quatel Canyon, N.W. corner of County, 1 ♀, *Encelia farinosa*, V-9-59 (P. D. Hurd, CIS).

This species quite closely resembles *wilsoni* Blanc and Foote. Doane gave no locality for the specimens he described. The variable nature of the material available for study indicated that this species may be a complex of several closely related forms.



Map 33. Distribution in California of *Neaspilota signifera* (Coquillett)

*Neaspilota signifera* (Coquillett)

(Fig. 41; Map 33)

*Trypeta* (*Neaspilota*) *signifera* Coquillett, 1894, Can. Ent., 26:73. Syntypes ♂♂ and ♀; Southern California (USNM).

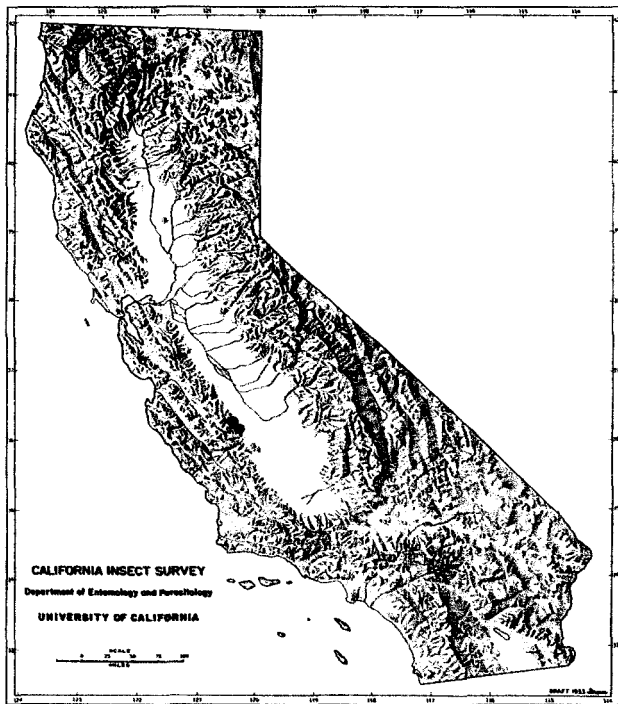
**Geographic range.**—Arizona, California, New Mexico, Oregon, and Texas.

**California records.**—ALAMEDA Co.: Berkeley, 1 ♂, 1 ♀, V-27-15 (M. C. Van Duzee, CAS). Oakland, 1 ♂, 1 ♀, III-36 (E. S. Ross, CAS). COLUSA Co.: Colusa, 1 ♂, VIII-15-55 (R. O. Schuster, CIS); 1 ♀, IX-1-55 (R. O. Schuster, CIS). CONTRA COSTA Co.: Antiock, 1 ♂, VIII-12-51 (J. C. Hall, UCD). Walnut Creek, 12 ♂♂, 9 ♀♀, V-24-49 (P. D. Hurd,

CIS). FRESNO Co.: Coalinga, 25 mi. N., 3 ♂♂, 1 ♀, *Erodium cicutarium*, III-25-57 (H. L. Wilson, CDA). Kerman, 1 ♂, 3 ♀♀, *Hemizonia pungens*, V-11-56 (A. L. Hanchett, CDA); 2 ♀♀, *Hemizonia pungens*, V-15-56 (A. L. Hanchett, CDA). Mendota, 5 ♂♂, 4 ♀♀, *Hemizonia pungens*, flowers, VI-10-57 (H. L. Wilson, CDA). GLENN Co.: Artois, 1 ♀, VII-11-52 (H. L. Hansen, CIS); 3 ♀♀, VII-15-52 (E. G. Linsley and Ray F. Smith, CIS). KERN Co.: Bakersfield, 1 ♀, VI-4-29 (R. L. Usinger, CAS). Havilah, 3 ♂♂, *Hemizonia pungens*, IX-29-58 (H. L. Wilson, CDA). Oildale, 6 ♂♂, 2 ♀♀, *Hemizonia pungens*, V-21-56 (H. L. Wilson, CDA). LASSEN Co.: Hallelujah Junction, 1 ♂, VIII-4-51 (E. I. Schlinger, UCD). LOS ANGELES Co.: Claremont, 1 ♂, (Baker, CDA); 2 ♂♂, (Baker, CDA); 2 ♀♀ (Baker, USNM). Gorman, 2 ♀♀, *Senecio douglasii*, VIII-29-57 (H. L. Wilson, CDA). Hynes, 1 ♂, VII-20-32 (K. L. Wolff, LACO). Los Angeles (cotypes), 4 ♂♂ (D. W. Coquillett, USNM). Pasadena, 1 ♂ (J. M. Aldrich, USNM). MERCED Co.: Los Banos, 3 ♂♂, *Hemizonia pungens*, V-16-56 (H. L. Wilson, CDA). Le Grand 1 ♀, *Hemizonia pungens*, VII-13-18 (H. H. Severin, UCR); 1 ♀, *Hemizonia pungens*, VII-13-18 (H. H. Severin, CIS). ORANGE Co.: Santa Ana, 1 ♀, VI-10-36 (C. E. Norland, LAM). Seal Beach, 5 ♂♂, 1 ♀, *Hemizonia parryi*, VIII-25-35 (P. H. Timberlake, UCR). Westminster, 1 ♂, V-6-39 (UCLA). RIVERSIDE Co.: Riverside, 1 ♀, *Encelia farinosa*, III-27-36 (P. H. Timberlake, UCR); 1 ♀, *Phacelia distans*, III-27-? (P. H. Timberlake, UCR); 1 ♀, *Eriogonum fasciculatum*, V-15-25 (P. H. Timberlake, UCR); 1 ♂, *Baeria chrysostoma gracilis*, IV-3-39 (P. H. Timberlake, UCR); 1 ♂, 1 ♀, *Eriogonum fasciculatum*, V-23-46 (P. H. Timberlake, UCR); 1 ♂, *Eriogonum fasciculatum*, V-14-46 (P. H. Timberlake, UCR); 1 ♀, *Salix*, IV-10-38 (P. H. Timberlake, UCR); 1 ♂, IX-6-25 (G. F. Knowlton, USNM). San Jacinto, 1 ♂, 1 ♀, V-29-17 (E. P. Van Duzee, CAS); 1 (abdomen missing), V-29-17 (E. P. Van Duzee, CAS). SACRAMENTO Co.: Elk Grove, 1 ♀, IV-18-52 (E. C. Carlson, UCD). Sacramento, 1 ♂, swept from alfalfa, IV-25-29 (C. C. Wilson, USNM). SAN DIEGO Co.: San Ysidro, 9 ♂♂, 11 ♀♀, reared from *Haplopappus venetus* var. *vernonioides*, VIII-6-48 (E. D. Algert, USNM). San Diego Co., 1 ♂, III-30-16 (H. G. Dyer, USNM). SAN JOAQUIN Co.: Manteca, 5 mi. S.E., 1 ♂, 2 ♀♀, *Hemizonia pungens*, IX-6-18 (H. H. Severin, UCR); 1 ♂, 3 ♀♀, *Hemizonia pungens*, IX-6-18 (H. H. Severin, CIS); Manteca, 1 ♀, sugar beet field, IX-4-18 (H. H. Severin, CIS). Tracy, 1 ♂, VI-21-49 (Ray F. Smith, CIS). SAN LUIS OBISPO Co.: Shandon, 1 ♂, 1 ♀, *Baeria chrysostoma*, V-2-57 (H. L. Wilson, CDA). SANTA CLARA Co.: San Jose, 1 ♀, V-20-47 (Carl Duncan, SJS). SOLANO Co.: Rio Vista, 1 ♀, VI-2-49 (R. S. Beal, CIS). Vacaville, 1 ♀, VIII-24-48 (A. T. McClay, UCD). STANISLAUS Co.: Adobe Creek, W. Stanislaus County, 1 ♂, *Ceanothus* sp., V-6-48 (Ray F. Smith, CIS). Westland, 3 ♂♂, 3 ♀♀, *Brassica* sp., IV-1-48 (P. D. Hurd, USNM). TEHAMA Co.: Tehama County, 1 ♀, Ladino clover, VI-29-54 (W. W. Wiard, CDA). TULARE Co.: Strathmore, 1 ♀, *Baeria californica*, IV-1-33 (P. H. Timberlake, UCR). Woodville, 4 mi. N., 3 ♂♂, *Wislezonia refracta*, X-8-59 (R. R. Snelling, CIS). TUOLUMNE Co.: Chinese Camp, 3 mi. S.E., 1 ♂, 1 ♀, V-20-56 (E. I. Schlinger, UCD). YOLO Co.: Davis, 63 ♂♂, 74 ♀♀, V-14-52 (A. T. McClay, UCD); 1 ♂, VII-28-55 (A. T. McClay, UCD); 1 ♀, VIII-14-55 (A. D. Telford, UCD); 1 ♂, VIII-19-55 (J. C. Downes, UCD); 3 ♂♂, 10 ♀♀, IV-10-51 (E. I. Schlinger and R. C. Bechtel, UCD); 4 ♂♂, 4 ♀♀, V-13-52 (A. T. McClay, UCD); 2 ♂♂, V-23-54 (R. C. Bechtel, UCD); 1 ♀, V-30-54 (R. C. Bechtel,

UCD); 1 ♀, VIII-9-55 (A. T. McClay, UCD); 1 ♂, VII-31-55 (A. T. McClay, UCD); 1 ♂, VI-17-56 (A. T. McClay, UCD); 1 ♀, IX-2-56 (A. T. McClay, UCD). Woodland, 2 ♀♀, VIII-13-55, VIII-14-55 (A. T. McClay, UCD); 2 ♂♂, 3 ♀♀, VII-23-53 (A. T. McClay, UCD); 1 ♀, VII-20-53 (A. T. McClay, UCD); 1 ♀, VIII-30-53 (A. T. McClay, UCD); 3 ♀♀, VII-5-56 (A. T. McClay, UCD).

This is a distinctive species with the head elongate, much as in *Dioxya picciola*, and with an elongate labellum. The basal half of the stigma is always darkly marked, and veins r-m, m, and portions of the longitudinal veins touching them are distinctly darker than the rest of the veins.



Map 34. Distribution in California of *Neaspilota wilsoni* Blanc and Foote

*Neaspilota wilsoni* Blanc and Foote

(Fig. 42; Map 34)

*Neaspilota wilsoni* Blanc and Foote, 1961, Pan-Pac. Ent., 37:78, fig. 4. Holotype ♂; Jacalitos Canyon, Fresno Co., Calif. (CDA).

**Geographic range.**—Known only from Fresno County, California.

**California records.**—FRESNO CO.: Coalinga, 1 ♀, composite, V-21-56 (H. L. Wilson, CDA); 1 ♂, 1 ♀, composite, V-25-56 (H. L. Wilson, USNM); 1 ♂, 1 ♀, *in copulo* on composite, V-25-56 (H. L. Wilson, CDA); 15 mi. N., 3 ♂♂, *Coreopsis calliopsidea*, III-28-56 (H. L. Wilson, FLB); Jacalitos Canyon, 1 ♂, composite, V-15-56 (H. L. Wilson, CDA); 3 ♂♂, 3 ♀♀, composite, V-15-56 (H. L. Wilson, USNM); 2 ♂♂, 1 ♀, composite, V-15-56 (H. L. Wilson, CDA).

This species is much like *brunneostigmata*, but the larger size and dark abdominal markings distinguish

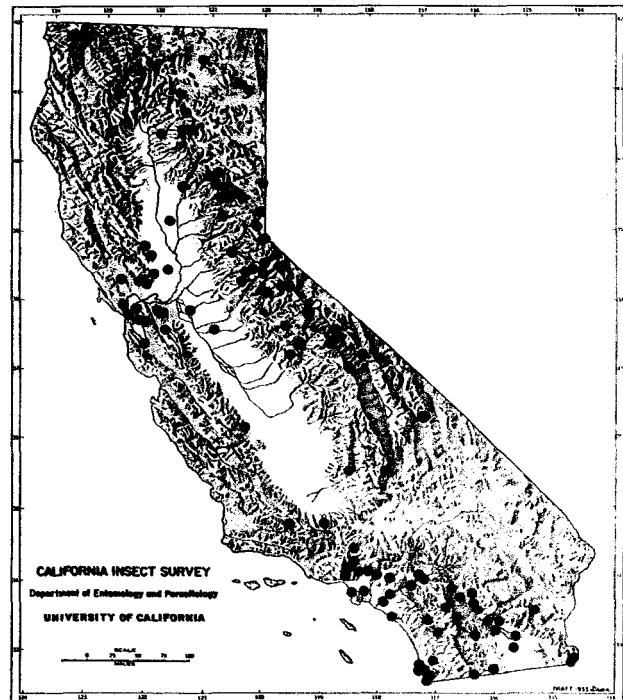
it from that species. These markings on the terga 2, 3, 4, and 5 consist of two sets of paired dark triangles.

Genus *Neotephritis* Hendel

The wings of these small- to medium-sized flies have dark ground color interrupted by hyaline spots of varying size. Virtually nothing is known about the biology of any of the forms. The genus has 1 South American, 5 Mexican, and 3 North American species, 2 of which are known to occur in California. The North American species have been reviewed by Foote (1960f).

KEY TO THE CALIFORNIA SPECIES OF NEOTEPHRITIS

- Two light spots in cell  $R_5$  immediately anterior to vein  $M_{1+2}$ ; ovipositor sheath darkened at apex  
*finalis* (Loew) (p. 35)
- Three small hyaline spots in cell  $R_5$  immediately anterior to vein  $M_{1+2}$ ; ovipositor sheath darkened at base  
*inornata* (Coquillett) (p. 37)



Map 35. Distribution in California of *Neotephritis finalis* (Loew)

*Neotephritis finalis* (Loew)

(Fig. 43; Map 35)

*Trypeta finalis* Loew, 1862, Dipt. Amer. Sept. Ind., Cent. II, p. 92; Berl. Ent. Zeitschr., 6:222. Syntypes ♂ and ♀; California (MCZ).

**Synonym.**—*Tephritis affinis* Snow, 1894: 172.

**Geographic range.**—Southern Canada; northern Mexico; the Continental United States except Alaska and New England.

**California records.**—ALAMEDA CO.: Berkeley, 1 ♂, IV-18-20 (A. J. Basinger, CIS); 1 ♀, V-2-46 (W. F. Barr, UI). Berkeley Hills, 1 ♂, IV-5-59 (J. A. Chemsak, CIS). Hills back of



- Oakland, 9 ♂♂, 2 ♀♀, *Wyethia* sp. IV-3-59 (J. A. Powell, CIS). Livermore, 9 ♂♂, 5 ♀♀, from fruits of *Wyethia helenioides* and *Balsamorhiza* sp., V-18-53 (W. A. Weber, UI); 1 ♂, 1 ♀, from fruits of *Wyethia helenioides* and *Balsamorhiza* sp., V-18-53 (W. A. Weber, USNM). Oakland, 1 ♀, IV-17-15 (A. P. McKinstry, CAS). Oakland Hills, 1 ♂, II-22-36 (A. P. McKinstry, CAS). Tilden Park, Berkeley, 1 ♀, IV-18-54 (J. A. Powell, JAP). Alameda County, 1 ♀, (USNM). ALPINE CO.: Carson Pass, 17 ♂♂, 11 ♀♀, balsam root, VIII-5-30 (H. H. Keifer, CDA); 7 ♂♂, 4 ♀♀, VII-26-59 (L. A. Stange, UCD). Hope Valley, 4 ♂♂, VII-9-48 (R. C. Rynum, CIS); 3 ♂♂, VII-18-48 (E. O. Essig, CIS); 9 ♂♂, 3 ♀♀, VII-9-48 (L. W. Quate, CIS); 3 ♂♂, 8 ♀♀, VII-9-48 (D. Carter, CIS); 1 ♀, VII-18-48 (P. D. Hurd, CIS); 5 ♂♂, 3 ♀♀, VII-9-48 (K. W. Tucker, CIS); 1 ♂, VII-18-48 (D. Carter, CIS); 1 ♀, VII-9-48 (C. D. MacNeill, CIS); 2 ♂♂, 2 ♀♀, VII-9-48 (C. Chan, UCD); Winnemucka Lake, 1 ♂, 1 ♀, VI-30-59 (R. M. Bohart, UCD). Woodfords, 1 ♀, VIII-5-54 (R. P. Allen, CDA). AMADOR CO.: Peddler Hill, 1 ♀ (W. C. Bentinck, CIS). Silver Lake, 4 mi. N., 1 ♂, VII-25-55 (J. C. Downey, UCD). BUTTE CO.: Yankee Hill, 1 ♂, III-20-28 (H. H. Keifer, CAS). CALAVERAS CO.: West Point, 1 ♂, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). CONTRA COSTA CO.: Marsh Creek Springs, 6 ♂♂, IV-24-37 (G. Ferguson, SCJ). Mt. Diablo, 2 ♂♂, III-28-49 (C. D. MacNeill, CIS); 1 ♂, VI-5-46 (T. G. H. Aitken, CAS). Richmond, 1 ♂, VIII-10-35 (Kinstry, UK). DEL NORTE CO.: Bear Basin Lookout, 1 ♂, Frick trap in *Prunus emarginata*, IX-1-60 (Peacock, CDA). EL DORADO CO.: Echo, 1 ♀, VII-10-40 (Kenaga, UK). Echo Portals, 7,300 ft., *Balsamorhiza* sp., VII-5-59 (P. H. Arnaud, PHA). Fallen Leaf Lake, 1 ♀, VIII-31 (O. B. Swixey, CAS); 6 ♂♂, 4 ♀♀, reared from *Wyethia* sp., collected VIII-12-32, emerged VIII-20-32 (H. H. Keifer, CDA). Glenn Alpine Creek, Tahoe, 1 ♂, VII-24-15 (CIS); 1 ♂, 1 ♀, I-24-15 (E. P. Van Duzee, CIS). Glenn Alpine, 1 ♀, grass, IX-1-30 (H. H. Keifer, CDA). Lakeside, 2 ♂♂, 3 ♀♀, *Chrysothamnus nauseosus*, VII-27-30 (H. H. Keifer, CDA). Lake Tahoe, 1 ♂, 1905 (J. H. Thompson, SU); 1 ♀, VIII-11-40 (Kenaga, UK). Snowline Camp, 1 ♂, 1 ♀, VI-25-48 (S. A. Sher, CIS); 1 ♀, VII-4-48 (A. Bartel, CIS); 1 ♀, VII-21-48 (P. D. Hurd, CIS); 2 ♀♀, VII-7-48 (A. Bartel, CIS). Stateline, 1 ♀, VII-1-38 (F. L. Blanc, FLB). Tallac Lake, 1 ♂, 1 ♀, VII-7-15 (CIS). FRESNO CO.: Coalinga, Los Gatos Canyon, 1 ♂, III-17-31 (E. P. Van Duzee, CAS). Mono Hot Springs, 1 ♂, 1 ♀, VIII-8-56 (R. O. Schuster, CIS). IMPERIAL CO.: Bard, 1 ♀, alfalfa, I-19-38 (S. Lockwood, CDA). Brawley, alfalfa, I-8-38 (CDA). Coyote Wells, 4 mi. W., 1 ♀, *Senecio douglasii*, IV-4-18 (H. H. Severin, CAS); 1 ♀, *Senecio douglasii*, I-22-18 (H. H. Severin, CAS). Fish Springs, 2 ♂♂, desert verbena, IV-5-31 (A. C. Browne, CDA). Ft. Yuma, 1 ♂, McPhail trap in grapefruit, I-22-57 (H. H. Blakemore, CDA). Imperial County Desert, 1 ♂, IV-19-15 (M. C. Van Duzee, CAS). Niland, 3 ♂♂, *Encelia* sp., appar. *trutescens* var. *actoni*, II-6-57 (H. L. Wilson, CDA). 34 mi. W. of El Centro, 1 ♂, *Encelia farinosa*, II-19-46 (P. H. Timberlake, UCR). Winterhaven, 2 ♂♂, compositae, IV-12-59 (G. G. Beever and W. P. Cronk, CDA). INYO CO.: Bishop, 1 ♂, 1 ♀, VII-28-40 (L. C. Kinter and D. E. Hardy, UK). Deep Springs, 1 ♂, X-13-51 (E. L. Kessel, CAS). Green Lake, 1 ♂, 1 ♀, VI-31 (K. L. Wolff, LACO). Surprise Canyon, Panamint Mountains, 1 ♀, IV-8-55 (E. G. Linsley, CIS); 1 ♀, IV-24-47 (J. A. Powell, CIS); 1 ♂, V-9-58 (L. A. Stange, UCD). KERN CO.: Greenhorn Mountain, 1 ♀, V-10-39 (F. T. Scott, UCR). Fort Tejon, 1 ♀, V-29-27 (A. C. Davis, CAS). Walker Pass, 2 ♀♀, IV-26-49 (E. G. Linsley, J. W. MacSwain, R. F. Smith, CIS). LOS ANGELES CO.: Altadena, 1 ♀, diamalt trap in peach, IV-22-43 (Cameron, CDA). Azusa, 2 ♂♂, 2 ♀♀, sunflower, II-20-45 (G. F. Prole, CDA). Beverly Glen, West Los Angeles, 1 ♀, VI-20-52 (W. A. McDonald, UCLA); 1 ♀, VI-5-52 (UCLA). Downey, 1 ♂, 2 ♀♀, sunflower, IV-3-30 (H. M. Armitage, LACO). Little Rock, 1 ♂, bait trap in pear, V-11-44 (E. Zeiler, LACO). Los Angeles, pupa and 1 wing, pupated V-10, emerged V-21 (A. Davidson, USNM). Manhattan Beach, 1 ♂, III-8-41 (Roberds, LAM). Mint Canyon, 1 ♂, wild growth, IV-8-31 (A. C. Browne, CDA). N. Claremont, 1 ♂, emerged from flower heads of *Helianthus* sp., V-23-51 (C. Henne, LACO); 1 ♂, resting on *Helianthus*, V-11-51 (C. Henne, LAM). San Fernando Valley, 1 ♀, VI-10-29 (L. E. Myers, LACO). Van Nuys, 1 ♀, IV-16-43 (G. G. Beever, CDA). Westwood Hills, 2 ♀♀, II-29-36 (CIS); 1 ♂, 1 ♀, *Brassica* sp., III-14-37 (N. F. Hardman, CAS); 3 ♀♀, V-7-35 (E. G. Linsley, UCLA); 1 ♂, *Encelia californica*, IV-25-41 (R. M. Bohart, USNM). Los Angeles County: 1 ♂ (USNM); 1 ♀ (CAS); 1 ♂, VI-12-39 (F. Cramer, LAM). LASSEN CO.: Blue Lake, 2 ♂♂, VII-20-47 (T. F. Leigh, CIS); 2 ♂♂, 2 ♀♀, VII-20-47 (R. L. Usinger, CIS); 2 ♀♀, VII-19-47 (D. W. Adams, CIS). Hallelujah Junction, 1 ♂, VI-27-49 (Claude I. Smith, CIS); 1 ♂, VII-17-53 (E. I. Schlinger, UCD). Summit Camp, 1 ♀, VI-28-49 (E. I. Schlinger, UCD). MADERA CO.: Bass Lake, 1 ♀, VI-8-42 (CIS); 2 ♀♀, VI-3-42 (A. J. Walz, CIS). Jackass Meadow, 1 ♂, *Pinus contorta*, VII-31-46 (T. O. Thatcher, CIS). MARIN CO.: Fairfax, 1 ♂, III-3-27 (C. L. Fox, CAS). N. end Golden Gate Bridge, 1 ♀, IV-12-53 (H. B. Leech, CAS). MARIPOSA CO.: Yosemite National Park, 1 ♂, VII-1-40 (Kenaga, UK); 1 ♀, VIII-1-40 (D. E. Hardy, UK). MODOC CO.: Likely, 1 ♂, 3 ♀♀, reared from *Wyethia* sp., VII-21-60 (F. L. Blanc, CDA). Tulelake Quarantine Station, Perez, 1 ♀, in office, VII-31-56 (E. A. Sweet, CDA). MONO CO.: Leavitt Meadows, 1 ♀, VII-5-51 (R. W. Morgan, CIS). Mammoth Lake, 1 ♂, VII-29-40 (L. Kintert, UK); 1 ♀, VII-29-40 (Kenaga, UK). McGee Creek, 1 ♂, 2 ♀♀, *Crypsis niliacea*, VI-28-38 (C. A. Fleschner, LAM). Nr. Whitmore Springs, 1 ♂, VI-24-37 (E. C. Van Duzee, CAS). Sardine Creek, VII-12-51 (A. T. McClay, UCD). NAPA CO.: Gordon Valley, 1 ♀, Frick trap in walnut, VIII-12-57 (H. Stabo, CDA). Soda Creek, 2 ♂♂, 1 ♀, reared from balsam root, V-18-31 (H. H. Keifer, UCLA); 5 ♂♂, 4 ♀♀, reared from balsam root, V-18-31 (H. H. Keifer, CDA); 14 ♂♂, 21 ♀♀, reared from balsam root, V-18-31 (H. H. Keifer, CDA). NEVADA CO.: Sagehen, nr. Hobart Mills, 1 ♂, VII-2-54 (J. A. Powell, JAP); 1 ♂, VII-2-54 (J. A. Powell, JAP). Truckee, 1 ♀, VII-7-27 (E. P. Van Duzee, CAS). ORANGE CO.: Green River Camp, Lower Santa Ana Canyon, 2 ♂♂, 3 ♀♀, V-11-33 (E. P. Van Duzee, CAS). Laguna Beach, 1 ♂, McPhail trap in grapefruit, II-20-56 (D. H. Byers, CDA). Rancho Santa Ana Botanical Gardens, 1 ♂, 1 ♀, on *Encelia californica*, V-6-50 (P. H. Timberlake, UCR). PLACER CO.: Lake Tahoe, 1 ♀, VI-19-36 (R. M. Bohart, CAS). PLUMAS CO.: Bucks Lake, 2 ♂♂, 1 ♀, reared from *Wyethia mollis*, VII-12-58 (R. F. Wilkey, CDA). Gold Lake Camp, 1 ♀, VII-19-16 (H. G. Dyar, USNM). Johnsville, 10 mi. W., 4 ♂♂, 5 ♀♀, reared from *Wyethia mollis*, VII-8-58 (J. S. Buckett, CDA). Onion Valley, 1 ♂, VII-6-52 (E. I. Schlinger, UCD). Quincy, 4 mi. W., 2 ♂♂, VI-21-49 (Claude I. Smith, CIS); 1 ♀, VII-6-49 (E. I. Schlinger, UCD). RIVERSIDE CO.: Andreas Canyon, 1 ♂, IV-2-55 (J. C. Hall, UCD). Coachella Valley, 1 ♀, IV-7-20 (R. S. Woglum, CIS).

Edom, 5 mi. N., 1 ♂, *Geraea canescens*, III-14-37 (P. H. Timberlake, UCR). Hopkins Well, 1 ♀, IV-14-58 (P. D. Hurd, CIS); 13 ♂♂, 6 ♀♀, IV-16-58 (J. A. Powell, CIS). Hunter's Spring, 1 ♂, V-10-52 (University of California, Los Angeles, UCD). Oasis, 2 mi. S., 1 ♂, 1 ♀, *Encelia farinosa*, III-8-36 (P. H. Timberlake, UCR). Palm Springs, 2 ♂♂, II-3-46 (CIS); III-14-36 (A. Pratt, CAS); 2 ♂♂, III-7-36 (H. K. Pratt, UCLA); 1 ♂, I-14-53 (P. H. Arnaud, PHA); 1 ♂, flowers of *Chrysothamnus* sp., XII-28-52 (P. H. Arnaud, PHA); 1 ♀, *Encelia farinosa*, III-10-35 (P. H. Timberlake, UCR); 2 ♂♂, 1 ♀, *Encelia farinosa*, I-5-53 (P. H. Arnaud, PHA); 1 ♂, flower of *Chrysothamnus* sp., XII-28-52 (P. H. Arnaud, PHA); 1 ♀, flower of *Chrysothamnus* sp., I-5-53 (P. H. Arnaud, PHA); 1 ♂, *Larrea* sp., III-20 (Cockerell, UCR); 1 ♀, *Encelia farinosa*, III-24 (Cockerell, UCR); 1 ♂, XII-25-52 (P. H. Arnaud, PHA); 1 ♀, XII-31-52 (P. H. Arnaud, PHA); 2 ♂♂, I-20-53 (P. H. Arnaud, PHA); 1 ♂, 1 ♀, I-16-53 (P. H. Arnaud, PHA); 1 ♂, I-4-53 (P. H. Arnaud, PHA); 1 ♀, XII-29-52 (P. H. Arnaud, PHA); 1 ♂, *Encelia farinosa*, III-5-53 (P. H. Timberlake, UCR); 1 ♂, *Chrysothamnus paniculatus*, II-18-33 (P. H. Timberlake, UCR); 1 ♀, III-24-33 (C. D. Duncan, SJS). Palm Springs Canyon, 1 ♂, 1 ♀, *Encelia farinosa*, III-5-33 (P. H. Timberlake, UCR); 1 ♀, I-15-53 (P. H. Arnaud, PHA). Palm Springs Station, 1 ♀, IV-29-52 (J. C. Hall, UCD). Pinon Flat, San Jacinto Mountains, 1 ♀, VI-18-41 (E. C. Van Dyke, CAS). Riverside, 1 ♀, I-30-36 (P. H. Timberlake, UCR); 1 ♀, *Encelia farinosa*, III-23-38 (P. H. Timberlake, UCR); 1 ♀, III-30-38 (C. M. Dammers, LAM); 1 ♂, 1 ♀, *Encelia farinosa*, IV-7-42 (P. H. Timberlake, UCR). Tahquitz Valley, 1 ♂, VI-3-40 (Fred H. Rindge, CIS). Temecula, 1 ♀, IV-24-51 (E. I. Schlinger, UCD); 1 ♂, 1 ♀, IV-24-51 (W. J. Wall, UCD). Thousand Palms, 1 ♂, III-24-57 (J. C. Hall, UCD). Whitewater, 2 ♀♀, *Geraea canescens*, III-9-40 (R. M. Bohart, UCLA, UCD); 1 ♂, I-21-53 (P. H. Arnaud, PHA). SAN BERNARDINO Co.: Arrowhead Springs, 1 ♂, *Pittosporum* sp., II-17-58 (Guy Beevor, CDA). East Highlands, 1 ♂, II-25-14 (F. R. Cole, CIS); 2 ♂♂, II-25-23 (CIS). SAN DIEGO Co.: Borrego, 1 ♂, IV-24-55 (R. O. Schuster, CIS); 1 ♂, *Larrea* sp., IV-2-53 (P. D. Hurd, CIS); 1 ♂, 1 ♀, desert *Encelia*, III-14-53 (J. A. Powell, JAP); 1 ♂, desert *Encelia*, III-14-53 (J. A. Powell, JAP). Borrego, Palm Canyon, 1 ♂, IV-19-57 (R. M. Bohart, UCD). Coronado, 1 ♂, II-25-60 (F. Yaruss, CDA); 6 ♂♂, 9 ♀♀, reared from young seeds, *Encelia californica*, collected IV-2-60, emerged IV-7 to IV-16-60 (E. D. Algert, CDA). Coyote Creek, Borrego, 1 ♂, reared from flower heads of *Encelia farinosa*, IV-27-51 (F. L. Blanc, FLB). Hipass, 2 ♀♀, McPhail trap, XII-20-58 (D. Close, CDA). La Jolla, 1 ♂, I-7-14 (E. P. Van Duzee, CAS); 1 ♀, I-10-14, (E. P. Van Duzee, CAS); 2 ♂♂, 1 ♀, III-1-14 (E. P. Van Duzee, CAS); 2 ♀♀, III-19-14 (E. P. Van Duzee, CAS); 1 ♀, VII-19-14 (E. P. Van Duzee, CAS); 1 ♀, III-21-14 (E. P. Van Duzee, CAS). Lakeside, 1 ♂, 5 ♀♀, reared from balsam root, VIII-17-29 (CDA); 1 ♀, reared from *Balsamorhiza* sp., VIII-12-29 (H. H. Keifer, CDA). Otay, 9 ♂♂, 8 ♀♀, *Encelia* sp., IV-24-48 (E. D. Algert, USNM). Otay Mesa, 1 ♂, Frick trap, VIII-59 (CDA). Pauma Valley, 1 ♀, McPhail trap, X-22-59 (C. Johnson, CDA). Pt. Loma, 1 ♂, 1 ♀, II-17-35 (C. M. Brown, CAS). San Diego, 1 ♀, IV-6-13 (E. P. Van Duzee, CAS); 1 ♂, 3 ♀♀, IV-6-15 (M. C. Van Duzee, CAS); 1 ♀, sunflower, VI-21-53 (J. A. Powell, JAP); 1 ♀, *Encelia* sp., II-3-28 (C. C. Searl, SDM); 2 ♂♂, 5 ♀♀ (SU); 4 ♂♂, 1 ♀, household, III-25-33 (CDA). San Ysidro, 1 ♀, I-20-60 (J. H. Rosenberger, CDA). SAN JOAQUIN

CO.: San Joaquin County, 1 ♂ (USNM). SAN MATEO Co.: Jasper Ridge, 2 ♂♂, 2 ♀♀, III-23-36 (A. E. Smith, SJS); 1 ♂, IV-16-44 (C. D. Duncan, SJS). SANTA BARBARA Co.: Cuyama, 1 ♀, general sweeping, IV-8-58 (R. P. Allen, FLB); 1 ♀, general sweeping, IV-8-58 (R. P. Allen, CDA). SANTA CLARA Co.: Palo Alto, 1 ♂, 1 ♀, V-25-92 (R. W. Doane, SU); 1 ♀, V-25-92 (R. W. Doane, UK). SHASTA Co.: Cayton, 1 ♀, VII-9-13 (E. P. Van Duzee, CAS). Hat Creek, 2 ♂♂, VI-1-41 (CIS); 1 ♂, *Wyethia* sp., VI-1-41 (C. D. Mitchner, CIS). Mt. Lassen, 1 ♀, 8,000 ft., VII-14-24 (E. P. Van Duzee, CAS). Mt. Lassen National Park, 1 ♂, 1 ♀, VI-13-31 (E. C. Van Duzee, CAS). Shingletown, 1 ♂, VI-21-41 (C. D. Mitchner, CAS). SIERRA Co.: Calpine, 1 ♂, 1 ♀, *Wyethia* sp., VI-20-42 (S. C. Jones, SCJ); 1 ♀, VI-30-42 (G. G. Beevor, CDA). Downieville, 12 mi. N.E., 1 ♂, *Prunus emarginata*, VI-30-42 (S. C. Jones, SCJ). Gold Lake, 2 ♂♂, VII-8-54 (R. M. Bohart, UCD). Sardine Creek, 2 ♂♂, VIII-31-58 (F. E. Strong, UCD). Sierra City, 9 ♂♂, 9 ♀♀, 4,600 ft., VI-18-42 (G. G. Beevor, CDA). Sierraville, 1 ♂, VII-24-56 (R. M. Bohart, UCD). SISKIYOU Co.: Siskiyou County, 1 ♂, Frick trap in cultivated cherry, VI-7-58 (D. Hill, CDA). SONOMA Co.: Trinity, 2 ♀♀, XII-20-37 (N. W. Frazier, CIS). STANISLAUS Co.: Modesto, 1 ♀, Frick trap in walnut, VI-23-59 (W. Hammond, CDA). SUTTER Co.: Marysville Buttes, 2 ♂♂, 3 ♀♀, reared from *Wyethia* sp., V-17-28 (H. H. Keifer, CAS). TRINITY Co.: Carrville, 1 ♂, 2,400-2,500 ft., V-24-34 (CAS). Trinity County, 1 ♀, VI-9-34 (G. H. Aitken, CAS). TUOLUMNE Co.: Leland Meadow, 1 ♀, VII-16-57 (J. W. MacSwain, CIS). Sonora Pass, Summit, 3 ♂♂, 3 ♀♀, 9,000 ft., *Wyethia* sp., VIII-16-42 (G. G. Beevor, CDA); 1 ♀, 9,000 ft., VII-22-51 (W. C. Bentinck, CIS); 2 mi. W., 1 ♂, VIII-21-59 (R. W. Thorp, CIS). VENTURA Co.: Ventura County, 1 ♂, IV-13-36 (CAS). YOLO Co.: Cache Creek, 2 ♂♂, V-30-54 (W. H. Lange, UCD); 1 ♂, V-17-58 (C. G. Moore, UCD). Davis, 1 ♂, IV-8-59 (F. D. Parker, UCD). Putah Canyon, 4 ♂♂, III-1-53 (D. E. Barcus, UCD). Rumsey, 1 ♂, IV-7-56 (S. M. Fidel, UCD).

*N. finalis* resembles the large species of *Tephritis* but has three pairs of lower fronto-orbitals. It may be recognized without magnification by the large costal triangular hyaline area on the middle of the wing.

#### *Neotephritis inornata* (Coquillett)

(Fig. 44; Map 36)

*Tephritis inornata* Coquillett, 1902, Jour. N. Y. Ent. Soc., 10:181. Holotype ♂, Las Vegas Hot Springs, N. Mex. (USNM).

**Geographic range.**—Arizona, California, Colorado, and New Mexico.

**California records.**—INYO Co.: Bishop, 1 ♂, VII-28-40 (L. C. Kintert, UK). NEVADA Co.: North San Juan, 1 ♂, Frick trap, IX-1-60 (Nevada County Dept. Agriculture, CDA).

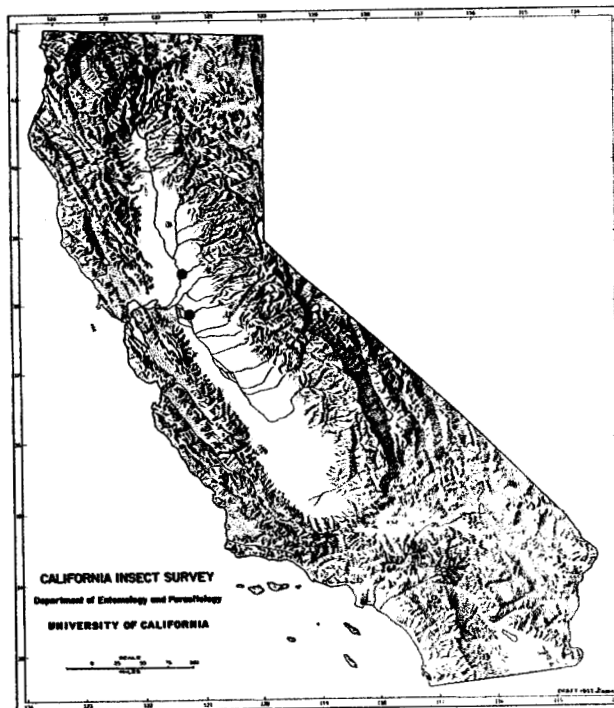
*N. inornata* may be distinguished from *finalis* by the color of the ovipositor sheath and features of the wing pattern. Moreover, in *inornata*, cell R<sub>3</sub> contains three hyaline spots immediately anterior to vein M<sub>1+2</sub> (see key), all hyaline spots have less distinct margins, and the spots forming the hyaline triangle immediately distad of the stigma are much more closely fused than in *finalis*.



(UCLA). Glendale, 1 ♂, VI-25-48 (E. I. Schlinger, UCD). Mint Canyon, 3 ♂♂, 2 ♀♀, *Cirsium occidentale*, V-13-54 (O. Clark, UCR). N. Claremont, 3 ♂♂, 1 ♀, reared from flower heads of *Cirsium occidentale*, VII-5-51 (LAM); 1 ♂, V-10-51 (C. Henne, LACO). Santa Monica Mountains, 2 ♂♂, *Adenostoma* sp., V-31-48 (UCLA); 1 ♂, 3 ♀♀, V-24-52 (UCLA). Los Angeles County, 1 ♂, V-7-39 (CIS). MADERA Co.: Coarsegold, 1 ♀, V-12-42 (E. G. Linsley, CIS). MARIN Co.: Mill Valley, 1 ♀, VIII-19-29 (E. P. Van Duzee, CAS). Pt. Reyes, 2 ♂♂, 2 ♀♀, VI-5-29 (R. E. Ryckman, USNM). MARIPOSA Co.: Yosemite, 1 ♂, 3,880-4,000 ft., V-7-28 (E. O. Essig, USNM). MODOC Co.: Cedar Pass, 1 ♂, VI-29-55 (J. C. Wells, UCD); 5 ♂♂, 1 ♀, VI-29-55 (D. L. Dahlsten, UCD); 4 ♂♂, 5 ♀♀, (R. D. Browning, UCD); 4 ♂♂, 3 ♀♀, *Cirsium* sp., VI-29-55 (A. J. Mueller, UCD); 1 ♂, 3 ♀♀, VI-29-55 (K. Bowers, UCD). Davis Creek, 1 ♂, 1 ♀, VII-11-22 (C. L. Fox, CAS); 1 ♂, VII-11-22 (C. L. Fox, USNM). Sugar Hill, 1 ♀, VII-5-50 (H. E. Cott, UCD). MONO Co.: Leavitt Meadows, 1 ♂, VII-6-51 (R. W. Morgan, CIS); 1 ♀, VII-6-51 (C. A. Downing, CIS). Sardine Creek, 8,500 ft., VII-17-51 (A. T. McClay, UCD). MONTEREY Co.: Arroyo Seco, 1 ♂, VI-1-57 (D. Burdick, CIS); 1 ♂, VI-6-57 (G. I. Stange, CIS). Monterey, 1 ♀, VI-7-56 (B. J. Adelson, CIS). NEVADA Co.: Sagehen, nr. Hobart Mills, 2 ♂♂, 1 ♀, VII-4-54 (P. H. Hurd, CIS); 2 ♂♂, VII-9-54 (R. C. Blayloch, UCD); 1 ♂, VII-25-54 (R. C. Blayloch, UCD); 2 ♂♂, VII-9-54 (R. M. Bohart, USNM). Truckee, 7 mi. S.E., 1 ♂, 1 ♀, VI-24-54 (R. C. Blayloch, UCD). PLACER Co.: Brockway, 1 ♀, VII-15-41 (G. Mansfield, SJS). Placer County, 1 ♂, IV-25-13 (Brannigan, CDA). PLUMAS Co.: Almanor, 4 ♂♂, 7 ♀♀, *Cirsium anderssonii*, VII-10-60, VII-11-60 (F. L. Blanc, FLB). Meadow Valley, 1 ♀, 3,500-4,000 ft., VI-3-24 (E. C. VanDyke, CAS). Portola, 1 ♂, grass & mixed vegetation, VI-25-57 (H. T. Osborn and Bond, CDA). Quincy, 4 mi. W., 1 ♀, VI-30-49 (W. F. Ehrhardt, UCD). Twain, 3 ♂♂, 1 ♀, *Cirsium* sp., VI-23-59 (F. L. Blanc, FLB). RIVERSIDE Co.: Anza, E. of, 1 ♂, thistle flower, V-17-54 (J. Donovan, CDA). Banning, 1 ♀, V-30-28 (E. C. Van Dyke, CAS). SAN BENITO Co.: Idria (Glen mine), 2 ♂♂, VI-29-55 (P. D. Hurd, CIS). SAN BERNARDINO Co.: Mill Creek Canyon, 1 ♂, IX-22-19 (F. R. Cole, CIS). Ontario, 11 ♂♂, 3 ♀♀, *Cirsium arvense*, V-5-56 (G. A. Pohl, CDA). SAN DIEGO Co.: El Capitan (Lakeside), 10 ♂♂, 4 ♀♀, red thistle, VII-18-45 (G. G. Beevor, CDA). SAN FRANCISCO Co.: San Francisco, Lone Mountain, 3 ♀♀, VI-?-25 (F. X. Williams, CAS); 1 ♀, V-20-09 (F. X. Williams, CAS). San Francisco, 1 ♂, sand dunes, V-5-14 (C. L. Fox, CAS); 2 ♂♂, 2 ♀♀, thistle, V-23-38 (H. H. Keifer, CDA); Cliff House, 1 ♂, V-18-09 (F. X. Williams, CAS). SAN LUIS OBISPO Co.: Guadalupe, N. of, 1 ♀, *Cirsium* sp., VII-9-56 (H. L. Wilson, CDA). SAN MATEO Co.: Moss Beach, *Cirsium quercetorum*, V-20-37 (W. H. Lange, USNM). SANTA CLARA Co.: Alum Rock Park, 1 ♀, V-25-50 (P. D. Hurd, CIS). SANTA CRUZ Co.: Soquel, 1 mi. N.E., 1 ♂, VII-16-56 (S. M. Fidel, UCD). SHASTA Co.: Brown Butte, 1 ♀, *Juniperus* sp., VII-7-47 (R. L. Usinger, CIS). SIERRA Co.: Webber Lake, 1 ♂, 5 ♀♀, *Cirsium drummondii*, II-7-58 (P. H. Arnaud, CDA); 17 ♂♂, 25 ♀♀, *Cirsium drummondii*, II-7-58 (P. H. Arnaud, PHA); 2 ♂♂, 2 ♀♀, *Cirsium drummondii*, II-7-58 (P. H. Arnaud, FLB). TUOLUMNE Co.: Tuolumne City, 1 ♂, 1 ♀, VI-5-53 (J. G. Rosen, CIS). VENTURA Co.: Fillmore, 1 ♂, V-27-24 (C. T. Dodds, CAS); 1 ♂, *Cirsium lanceolatum*, V-28-24 (C. T. Dodds, CAS); 1 ♂, V-29-24 (C. T. Dodds, CAS); 1 ♀, V-29-24 (C. T. Dodds,

USNM). Sespe Canyon, 1 ♀, V-10-59 (F. D. Parker, CGM); 1 ♂, 1 ♀, VII-10-59 (R. W. Spore, UCD).

*O. occidentalis* is the most commonly encountered member of the genus in California. It is easily distinguished from *undosa* by the characters given in the key.



Map 38. Distribution in California of *Orellia ruficauda* (Fabricius)

### *Orellia ruficauda* (Fabricius)

(Fig. 46; Map 38)

*Musca ruficauda* Fabricius, 1794, Ent. Syst., 4:353. Type (sex not known); France (location of type not known).

*Synonyms*.—*O. ruficauda* is known in much of the American literature as *florescentiae* L.

*Geographic range*.—Europe; southern Canada; northern United States.

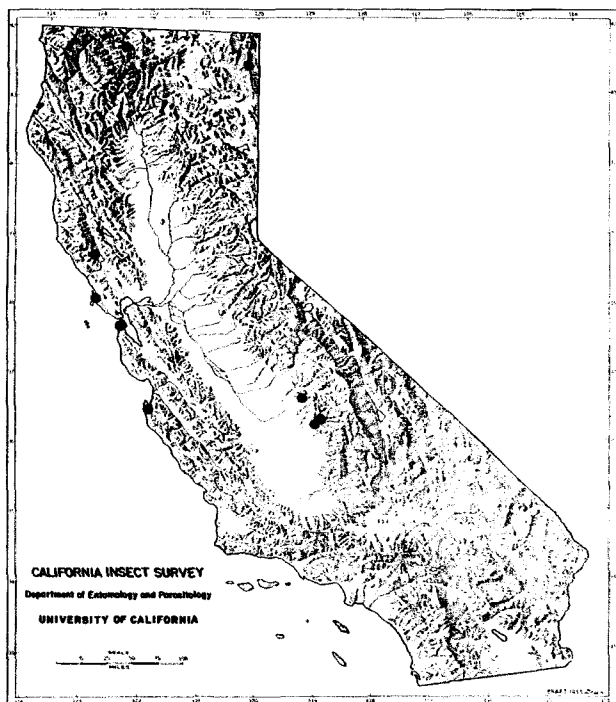
*California records*.—DEL NORTE Co.: Crescent City, 40 mi. S., 9 ♂♂, 8 ♀♀, reared from Canada thistle, VIII-25-42 (Beard, CDA). SACRAMENTO Co.: Sacramento, 1 ♀, X-22-42 (H. H. Keifer, CDA). SAN JOAQUIN Co.: San Joaquin County, 1 ♀, Canada thistle in barley, VI-6-58 (J. L. Joos, CDA).

*O. ruficauda* is the only *Orellia* in which the wing pattern is composed of large, dark spots rather than bands. The indistinct spot lying upon vein m is occasionally darker than shown in figure 46 but is never connected to the dark stigmal mark.

### *Orellia undosa* (Coquillett)

(Fig. 47; Map 39)

*Trypeta undosa* Coquillett, 1899, Jour. N. Y. Ent. Soc., 7:262. Holotype ♀; Colorado (USNM).



Map 39. Distribution in California of *Orellia undosa* (Coquillett)

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

**California records.**—FRESNO Co.: Dunlap, 3 ♀♀, IV-6-60 (R. P. Allen, CDA). MARIN Co.: Inverness, 1 ♂, general sweeping, IV-24-57 (R. P. Allen, CDA). MODOC Co.: Cedar Pass, 4 ♂♂, 3 ♀♀, VI-29-55 (A. L. Mueller, UCD); 1 ♂, 3 ♀♀, VI-29-55 (R. D. Browning, UCD); 4 ♂♂, 1 ♀, VI-29-55 (K. Bowers, UCD). MONTEREY Co.: Malpas Creek, Highway 1, Carmel, 2 ♂♂, 1 ♀, flowers of *Cirsium*, V-14-59 (T. R. Haig, CDA). SAN FRANCISCO Co.: San Francisco, 1 ♂, 1 ♀, thistle, V-20-13 (E. C. VanDyke, CAS); 1 ♂, IV-18-09 (F. X. Williams, USNM); San Francisco, Cliffhouse, 2 ♂♂, IV-18-09 (F. X. Williams, CIS). San Francisco, Presidio, 2 ♂♂ *Cirsium occidentale*, IV-3-54 (E. I. Schlinger, USNM); 1 (abdomen missing), IV-3-54 (W. H. Lange, USNM). SISKIYOU Co.: Yreka, 1 ♀, *Artemisia tridentata*, V-13-32 (E. O. Essig, CIS). SONOMA Co.: Cloverdale, 3 mi. N., 1 ♀, *Carduus pycnocephalus*, IV-30-59 (T. R. Haig, CDA). TULARE Co.: Kaweah, 1 ♂, 1 ♀, IV-22-37 (F. T. Scott, CDA). Lemon Cove, 1 ♂, *Cirsium californicum*, IV-26-56 (R. F. Wilkey, RFW).

The long dark hairs at the oral margin and the black scutellar spot adequately distinguish this species from *occidentalis*.

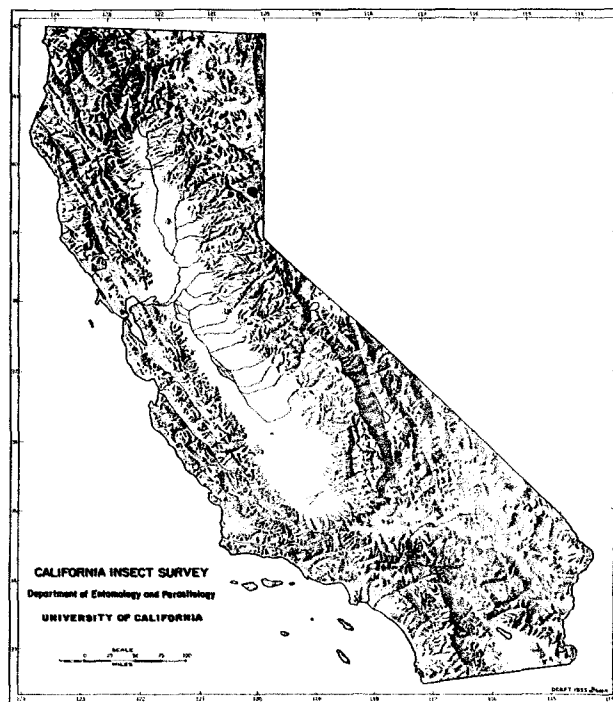
Genus *Oxyina* Robineau-Desvoidy

Members of this genus closely resemble those of *Tephritis* and *Paroxyina* in their small size, grayish bodies, and yellowish legs, but are distinguished from them by the presence of only one pair of well-developed lower fronto-orbitals and of two pairs of dorsocentrals. The hyaline spots of the wing tend

to form transverse bands. The genus is Holarctic with 3 Nearctic species, all of which occur in California. The true host plants of all 3 species are unknown. The latest revision is by Quisenberry (1949a).

KEY TO THE CALIFORNIA SPECIES OF OXYINA

- 1 A broad, unbroken hyaline band extending completely across wing distad of stigma and veins m and r-m; proximal posterior quarter of wing disk without markings  
*palpalis* (Coquillett) (p. 41)
- A narrow hyaline band, obviously composed of fused hyaline spots, extending across wing in this position; proximal posterior quarter of wing disk with irregular dark spots . . . . . 2
- 2(1) Femora black, narrowly yellow at apices  
*utahensis* Quisenberry (p. 41)
- Femora yellow, sometimes with faint dark marks  
*aterrima* (Doane) (p. 40)



Map 40. Distribution in California of *Oxyina aterrima* (Doane)

*Oxyina aterrima* (Doane)

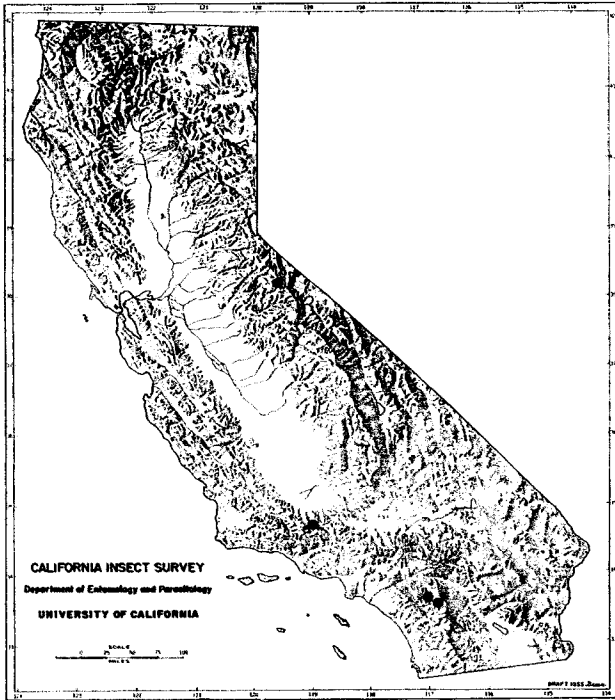
(Fig. 48; Map 40)

*Eurosta aterrima* Doane, 1899, Jour. N. Y. Ent. Soc., 7:187, pl. 4, fig. 2. Holotype ♀; Colorado (WSU).

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

**California records.**—PLUMAS Co.: E. of Loyaltan, 1 ♂, 1 ♀, *Chrysothamnus* sp., V-19-59 (F. L. Blanc, FLB); 1 ♀, *Chrysothamnus* sp., V-19-59 (F. L. Blanc, USNM).

*O. aterrima* may be easily distinguished by the characters presented in the key. In some specimens all femora may be black-dusted dorsally.



Map 41. Distribution in California of *Oxya palpalis* (Coquillett)

*Oxya palpalis* (Coquillett)

(Fig. 49; Map 41)

*Tephritis palpalis* Coquillett, 1904, *Invertebrata Pacifica*, 1:30. Holotype ♂; Ormsby Co., Nev. (USNM).

**Geographic range.**—Idaho, California, Nevada, Utah, and Washington.

**California records.**—KERN Co.: Frazier Park, 1 ♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). MONO Co.: Leavitt Meadows, 1 ♀, VII-6-51 (A. T. McClay, UCD). RIVERSIDE Co.: Hemet Reservoir, San Jacinto Mountains, 1 ♂, *Artemisia* sp., VI-14-40 (F. H. Rindge, CIS).

*O. palpalis* may be recognized by the somewhat blunt wing tip and by the wide transverse hyaline band in the wing pattern. It differs from *utahensis* Quis. in that it lacks the dark marking in the basal, proximal quarter of the wing.

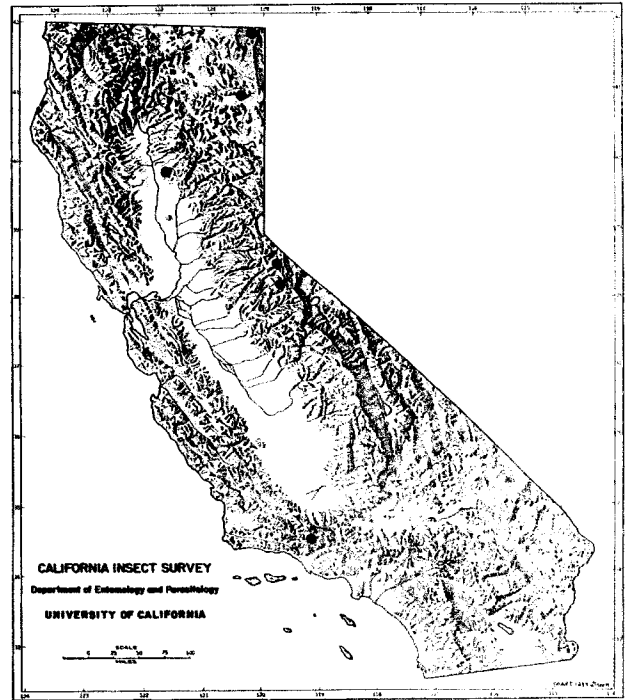
*Oxya utahensis* Quisenberry

(Fig. 50; Map 42)

*Oxya utahensis* Quisenberry, 1949, *Pan-Pac. Ent.*, 25:73, fig. 1, E. Holotype ♂, Temple Fork, Logan Canyon, Utah (AMNH).

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

**California records.**—ALPINE Co.: Markleeville, 3 mi. S. on Highway 4, 1 ♂, 2 ♀♀, *Chrysothamnus* sp., V-6-59 (A. G. Forbes, CDA). MODOC Co.: Goose Lake, 1 ♂, V-24-49 (R. M. Bohart, UCD). SHASTA Co.: Madeline, 1 ♂, *Chrysothamnus* sp., V-20-59 (F. L. Blanc, FLB). TEHAMA Co.: Pine Creek,



Map 42. Distribution in California of *Oxya utahensis* Quisenberry

1 ♂, V-25-50 (H. P. Chandler, CAS). TUOLUMNE Co.: Sonora Pass, 1 ♂, 9,000-10,000 ft., VII-15-51 (A. T. McClay, UCD). VENTURA Co.: Grande Valley, 9 mi. S.W. of Stauffer P.O., 1 ♂, 1 ♀, V-7-59 (G. I. Stage, CIS).

The transverse hyaline band of the wing of this species is composed of a number of coalescing hyaline spots. The more broken appearance of this banding is in contrast to that of *palpalis*, in which the edges of the bands are distinctly separated from the adjacent dark areas.

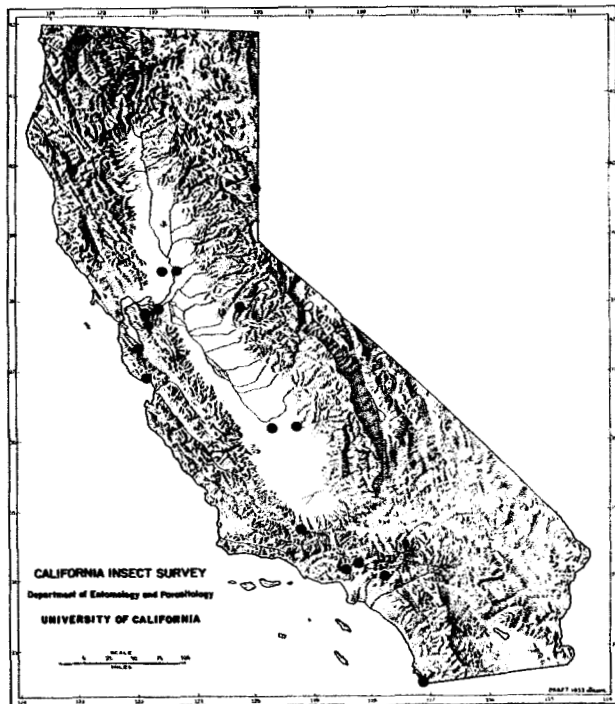
Genus *Paracantha* Coquillett

The wing pattern alone (figs. 51, 52, 53) is sufficient to distinguish the members of this genus from all other tephritid species in the State. Both of the upper fronto-orbitals are yellowish white and set inside the line of lower fronto-orbitals. The genus, containing 10 species, ranges from northern United States into Argentina; 3 of the 5 Nearctic species occur in California. Malloch (1941) and Aczél (1952) have reviewed the genus.

KEY TO THE CALIFORNIA SPECIES OF PARACANTHA

- 1 Hyaline triangle at apex of cell  $R_5$  with bordering dark rays terminating on tips of veins  $R_{4+5}$  and  $M_{1+2}$  . . . . . *cultaris* (Coquillett) (p. 42)
- Hyaline triangle at apex of cell  $R_5$  with posterior bordering dark ray terminating distinctly anterior to vein  $M_{1+2}$  . . . . . 2
- 2(1) Gena with a group of ten to twenty stiff, black,

anteriorly directed hairs anterior to genal  
bristle . . . . . *genalis* (Malloch) (p. 42)  
Gena without stiff, black, anteriorly directed  
hairs, with only slender scattered hairs  
*gentilis* Hering (p. 43)



Map 43. Distribution in California of *Paracantha cultaris* (Coquillett)

*Paracantha cultaris* (Coquillett)

(Fig. 51; Map 43)

*Trypeta* (*Carphotricta*) *cultaris* Coquillett, 1894, Can. Ent., 26:72. Syntypes ♂ and ♀♀; Southern California. (USNM).

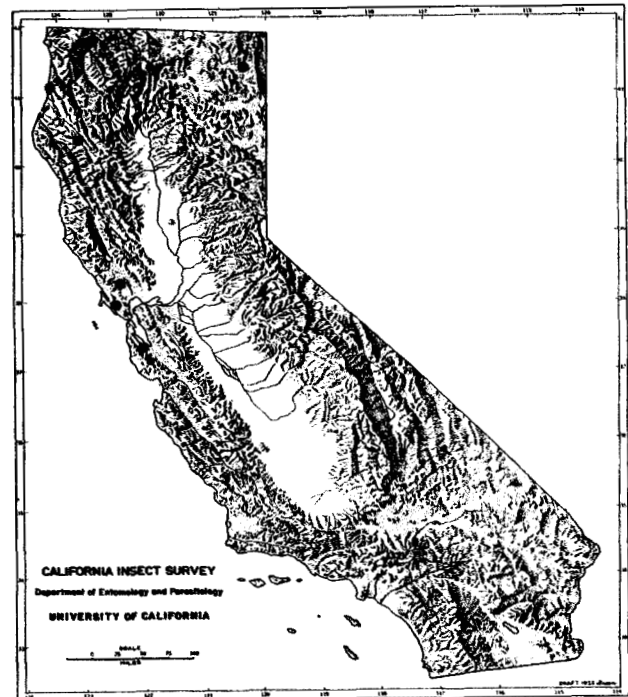
**Geographic range.**—Arizona, California, Idaho, Nebraska, Nevada, New Mexico, Oregon, Texas, Washington, and Mexico south to Costa Rica.

Washington, and Mexico south to Costa Rica.

**California records.**—CONTRA COSTA CO.: Antiock, 1 ♂, X-7-39 (CIS); 1 ♂, III-6-59 (C. W. O'Brien, CIS); 1 ♀, II-27-59 (C. W. O'Brien, CIS). Danville, 1 ♂, *Baccharis pilularis*, XII-21-51 (F. X. Williams, CAS). HUMBOLT CO.: Richardson Grove, Highway 101, 5 mi., N., 1 ♀, thistle, IV-30-59 (T. R. Haig, CDA). KERN CO.: Mill Potrero, 1 ♂, VII-6-59 (A. H. Menke, UCD). KINGS CO.: Grangeville, 1 ♀, IV-29-54 (R. P. Allen, CDA). LASSEN CO.: Hallelujah Junction, 1 ♂, VI-27-49 (C. L. Smith, CIS); 1 ♀, VII-4-49 (J. W. MacSwain, CIS); 1 ♂, VI-27-49 (F. Morishita, CIS); 1 ♀, VII-18-53 (R. M. Bohart, UCD); 1 ♀, VII-17-53 (E. I. Schlinger, UCD). LOS ANGELES CO.: North Claremont, 1 ♀, reared from puparium found in flower head of *Cirsium occidentale*, V-23-51 (C. Henne, LACO); 1 ♂, reared from puparium found in flower head of *Cirsium occidentale*, VI-7-51 (C. Henne, LACO). San Fernando Valley, 1 ♀, reared from sunflower, VI-10-29 (L. E. Myers, LACO); 1 ♀, reared from sunflower, VI-15-29 (L. E. Myers, LACO); 1 ♂, resting on chrysanthemums, XI-22-50 (W. D. Dyer, LACO). Tujunga Can-

yon, 1 ♂, X-27-51 (UCLA). Nr. Van Nuys, 1 ♂, reared from *Helianthus annuus*, IX-9-44 (L. Martin, LAM). PLACER CO.: Placer County, 1 ♂, IV-25-13 (Branigan, CDA). SACRAMENTO CO.: Sacramento, 1 ♂, I-13-22 (B. G. Thompson, CIS); 2 ♀♀, *Helianthus annuus*, VIII-2-58 (F. L. Blanc, FLB); 1 ♀, *Helianthus annuus*, VII-18-58 (F. L. Blanc, FLB); 3 ♀♀, reared from *Helianthus* sp., VII-11-30 (H. H. Keifer, CDA); 2 ♂♂, 2 ♀♀, *Helianthus*, VII-14-30 (H. H. Keifer, CDA); 1 ♀, *Helianthus*, VII-16-30 (H. H. Keifer, CDA); 1 ♂, 2 ♀♀, *Helianthus*, VII-17-30 (H. H. Keifer, CDA); 2 ♂♂, 2 ♀♀, *Helianthus*, (H. H. Keifer, CDA); 2 ♀♀, *Helianthus*, VII-25-30 (H. H. Keifer, CDA); 1 ♀, willow, IV-10-59 (G. M. Buxton, CDA); 1 ♂, 1 ♀, reared from *Helianthus* sp., VII-16-30 (H. H. Keifer, SU); 2 ♂♂, 3 ♀♀, *Helianthus annuus*, VIII-21-52 (P. H. Arnaud, PHA); 1 ♀, III-11-59 (P. H. Arnaud, PHA); 1 ♀, III-18-59 (P. H. Arnaud, PHA); 3 ♀♀, swept from grass, II-25-60 (G. M. Buxton, CDA); 2 ♂♂, 2 ♀♀, reared from *Helianthus* sp., VII-21-30 (H. H. Keifer, UCLA). SAN DIEGO CO.: San Ysidro, 1 ♀, McPhail trap in fig, VII-1-59 (Williams, CDA). SANTA CLARA CO.: Stanford University, 1 ♀, VI-30-10 (SU). SANTA CRUZ CO.: Santa Cruz, 1 ♂, VI-1-36 (CAS); 1 ♂, VI-1-36 (UCLA). TULARE CO.: Visalia, 1 ♂, III-29-39 (F. T. Scott, UCR). TUOLUMNE CO.: Sonora, 1 ♀, IV-4-51 (W. H. Lange, UCD). YOLO CO.: Davis, 1 ♂, IX-27-37 (UCD).

In addition to the characters given in the key, *cultaris* may be recognized by the presence of only two wedge-shaped hyaline marks between the apices of veins  $R_{2+3}$  and  $R_{4+5}$ .



Map 44. Distribution in California of *Paracantha genalis* Malloch

*Paracantha genalis* Malloch

(Fig. 52; Map 44)

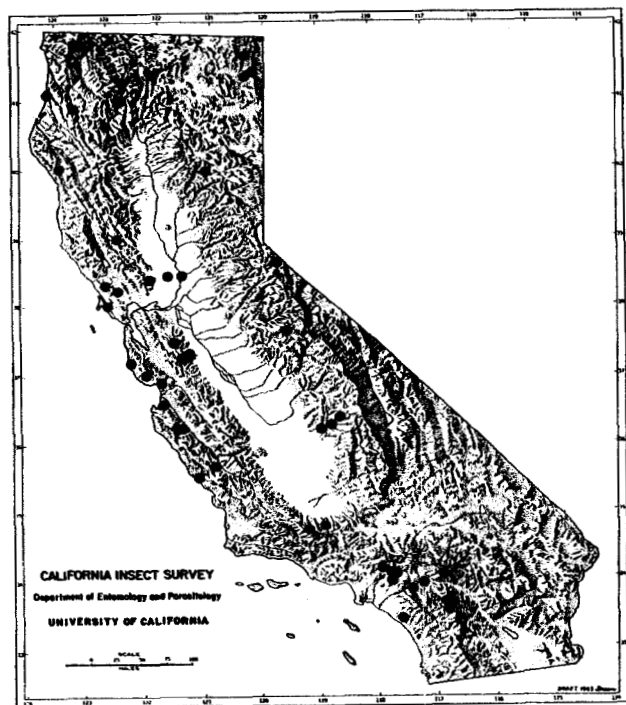
*Paracantha genalis* Malloch, 1941, Rev. de Ent., 12:40, figs. 2,

7. Holotype ♂; Halfmoon Bay, Calif. (USNM).

**Geographic range.**—California, Idaho, Montana, Oregon, and Utah.

**California records.**—HUMBOLT Co.: Fork of VanDuzen River, Dinsmore, 1 ♀, Frick trap in *Prunus emarginata*, VIII-60 (T. R. Haig, CDA). Trinidad, 8 mi. N., Highway 101, 1 ♂, fern bracken, VI-12-59 (T. R. Haig, CDA). LAKE Co.: Bolce Resort, 1 ♂, Frick trap in walnut, IX-59 (W. F. Cruickshank, CDA). MARIN Co.: Taylor State Park, 4 ♂♂, 1 ♀, X-19-46 (F. E. Skinner and E. S. Ross, CAS). MODOC Co.: Mile Creek, Alturas, 1 ♂, thistle, V-20-59 (A. G. Forbes, FLB). SAN DIEGO Co.: Laguna Mts., 2 ♂♂, 1 ♀, 6,000 ft., VIII-24-24 (J. O. Martin, CIS); 2 ♂♂, 6,000 ft., VIII-24-24 (J. O. Martin, CAS). SAN MATEO Co.: Redwood City, 1 ♀, XI-49 (P. H. Arnaud, PHA). SONOMA Co.: Pengrove, 1 ♂, Frick trap in English walnut, VII-22-57 (M. G. Dornbush, CDA).

The genal bristles readily distinguish this from other California species of *Paracantha*. Side by side with *cultaris* and *gentilis*, this species can be readily picked out by the grayish cast of the brown color, a character not easily detected when the species stands alone. The wing-tip pattern is similar to that of *gentilis*.



Map 45. Distribution in California of *Paracantha gentilis* Hering

*Paracantha gentilis* Hering

(Fig. 53 and frontispiece; Map 45)

*Paracantha gentilis* Hering, 1940, Arb. morph. taxon. Ent., 7:53, 54. Syntypes ♂ and ♀; Hunter's Creek, Wyo. (location of types not known).

**Synonyms.**—*Paracantha mimetica* Malloch, 1941:41; *Paracantha mimetica* var. *elongata* Malloch, 1941:41.

**Geographic range.**—Arizona, California, Colorado, Kansas, Montana, Nevada, New Mexico, Oregon, Texas, Washington, Wyoming, Utah; northern Mexico.

**California records.**—ALAMEDA Co.: Arroyo Mocho, 20 mi. S. Livermore, 1 ♀, IV-30-57 (D. Burdick, CIS). ALPINE Co.: Woodfords, 1 ♀, V-8-59 (R. P. Allen, CDA). DEL NORTE Co.: Doe Flat Road, 1 ♂, Frick trap in *Prunus emarginata*, VII-60 (Peacock, CDA). HUMBOLT Co.: Richardson Grove, 5 mi. N., Highway 101, 3 ♂♂, 4 ♀♀, thistle, IV-30-59 (T. R. Haig, CDA). Trinidad, 1 ♀, *Cirsium brevistylum*, VI-9-59 (T. R. Haig, CDA). Willow Creek, 1 ♂, Frick trap in cultivated cherry, IX-60 (A. Longenbaugh, CDA). KERN Co.: Fort Tejon, 1 ♀, IV-6-32 (E. P. Van Duzee, CAS). Mill Potrero, 3 ♂♂, 1 ♀, VII-6-59 (F. D. Parker, CGM); 1 ♂, VII-6-59 (C. A. Campbell, CIS); 1 ♀, VII-6-59 (A. R. Menke, UCD). LAKE Co.: Clear Lake Oaks, 1 ♀, V-25-41 (J. W. Tilden, SJS). LOS ANGELES Co.: Camp Baldy, 1 ♀, VI-26-50 (W. A. McDonald, UCLA). Crystal Lake, 1 ♂, VII-9-52 (A. T. McClay, UCD). North Claremont, 2 ♀♀, *Cirsium* sp., V-11-51 (C. Henne, LAM); 4 ♂♂, 8 ♀♀, reared from flower heads of *Cirsium sierrae bernardino*, V-23-51 (LAM). Tanbark Flat, 1 ♀, VI-18-56 (C. L. Wiley, CIS). MARIN Co.: Bear Valley, 1 ♀, VI-12-21 (C. L. Fox, CAS). MARIPOSA Co.: Yosemite, 2 ♀♀, 3,880-4,000 ft., V-20-31 (T. G. Aitken, CAS). MODOC Co.: Cedar Pass, 1 ♂, 1 ♀, *Cirsium* sp., VI-29-55 (R. D. Browning, UCD); 1 ♀, *Cirsium* sp., VI-29-55 (A. J. Mueller, UCD); 2 ♂♂, VI-29-55 (K. Bowers, UCD). Davis Creek, 1 ♀, VII-17-22 (C. L. Fox, CAS). Mile Creek, Alturas, 2 ♀♀, thistle, V-20-59 (A. G. Forbes, FLB). MONTEREY Co.: Bryson, 1 ♂, V-18-20 (E. P. Van Duzee, CAS). Fort Ord, 1 ♀, VII-15-57 (H. M. Court, UCD). Hastings Reservation, nr. Jamesburg, 1 ♂, V-4-58 (D. D. Linsdale, CIS). ORANGE Co.: Gavilan, 1 ♂, *Salix lasiolepis*, III-2-37 (P. H. Timberlake, UCR). PLACER Co.: Placer County, 2 ♂♂, 3 ♀♀, IV-25-13 (Branigan, CDA). PLUMAS Co.: Twain, 2 ♂♂, red thistle, VI-23-59 (F. L. Blanc, FLB). RIVERSIDE Co.: Keen Camp, 1 ♂, V-18-51 (R. C. Bechtel, UCD). Piñon Flat, San Jacinto Mountains, 1 ♀, *Cirsium* sp., V-28-40 (CIS). Riverside, 1 ♀, bull thistle, IV-25-57 (F. K. Foulke, CDA). SACRAMENTO Co.: Sacramento, 1 ♀, VI-13-32 (H. H. Keifer, CDA). SONOMA Co.: Freestone, 1 ♀, IX-7-50 (H. H. Keifer, CDA). Pengrove, 1 ♂, Frick trap in Persian walnut, VII-22-57 (M. G. Dornbush, CDA). SAN BERNARDINO Co.: Mill Creek, 6,000 ft., *Chrysothamnus nauseosus*, IX-22-46 (P. H. Timberlake, UCR). Redlands, 1 ♂, 1914 (F. R. Cole, CIS). SAN LUIS OBISPO Co.: Cambria Pines, 1 ♂, VI-12-58 (E. G. Linsley, CIS). SAN MATEO Co.: Pescadero, 1 ♀, VI-4-22 (E. P. Van Duzee, CAS). SANTA CLARA Co.: Arroyo Bayo, Mt. Hamilton, 1 ♀, VII-10-54 (J. W. Tilden, SJS). SANTA CRUZ Co.: Boulder Creek, 2 ♂♂, archoke, V-24 (W. H. Irwin, SU). Soquel, 9 mi. N.E., 1 ♀, VII-4-56 (S. M. Fidel, UCD). SISKIYOU Co.: Callahan, 1 ♂, VI-13-34 (T. G. H. Aitken, CAS). Nr. Callahan, 1 ♂, VI-13-34 (T. G. H. Aitken, CAS). STANISLAUS Co.: Adobe Creek, 1 ♂, 1 ♀, II-26-48 (R. F. Smith, CIS). TRINITY Co.: Carrville, 1 ♂, 2,400-2,500 ft., VI-16-34 (CAS). Weaverville, 1 ♀, V-22-55 (J. C. Downey, UCD). Trinity County, 1 ♂, VI-12-43 (CAS); 1 ♀, VI-13-34 (CAS). TULARE Co.: Bear-Paw Meadow, Sequoia National Park, 1 ♀, VII-21-53 (A. Menke, LAM). Kaweah, 2 ♂♂, 3 ♀♀, IV-37 (F. T. Scott, CDA); 1 ♀, VI-1-39 (F. T. Scott, UCR). Lemon Cove, 2 ♂♂, 2 ♀♀, *Cirsium californicum*, IV-26-56 (R. F. Wilkey, RFW). Sequoia National Park, 3 ♀♀, 3,000-5,000 ft., IV-27-39 (E. C. Van Dyke, CAS). YOLO Co.: Davis, 1 ♀,



VII-1-52, (E. I. Schlinger, UCD). Putah Canyon, 1 ♀, VI-3-48 (E. I. Schlinger, UCD).

In addition to the key characters, *gentilis* possesses three wedge-shaped hyaline spots in the apex of cell  $R_3$  between veins  $R_{2+3}$  and  $R_{4+5}$ . This character readily separates it from *cultaris*, which has only two such spots. The absence of heavy genal hairs readily distinguishes it from *genalis*.

#### Genus *Paraterellia* Foote

This genus resembles *Orellia* closely in having two or four distinct black spots on each segment of the abdominal tergum, and convergent upper fronto-orbital bristles. They are the only North American genera with this combination of characters. *Paraterellia* is easily distinguished from *Orellia*, however, by the absence of a distinct dark or black area on the dorsum of the thorax. Nothing is known about the biology of the species. The genus is restricted to the western United States, and does not have species in any other major geographical region. A recent revision by Foote (1960a) summarizes the information available on the 3 known species.

#### KEY TO THE CALIFORNIA SPECIES OF PARATERELLIA

- 1 A wide, continuous brown band extending along entire costal margin of wing from base to vein  $M_{1+2}$  . . . *varipennis* (Coquillett) (p. 45)

This brown band interrupted by at least one hyaline area immediately distad of stigma, band on apical half of costal margin narrower and darker than that on basal half . . . . . 2

- 2(1) Hyaline area lying between veins r-m and m with convex sides, always completely closed by a brown band at costal margin and closed, or nearly so, by a brown area at posterior margin *superba* Foote (p. 44)

This hyaline area almost parallel-sided and extending completely across wing from costal to posterior margin . . . *epsilon* Foote (p. 45)

#### *Paraterellia superba* Foote

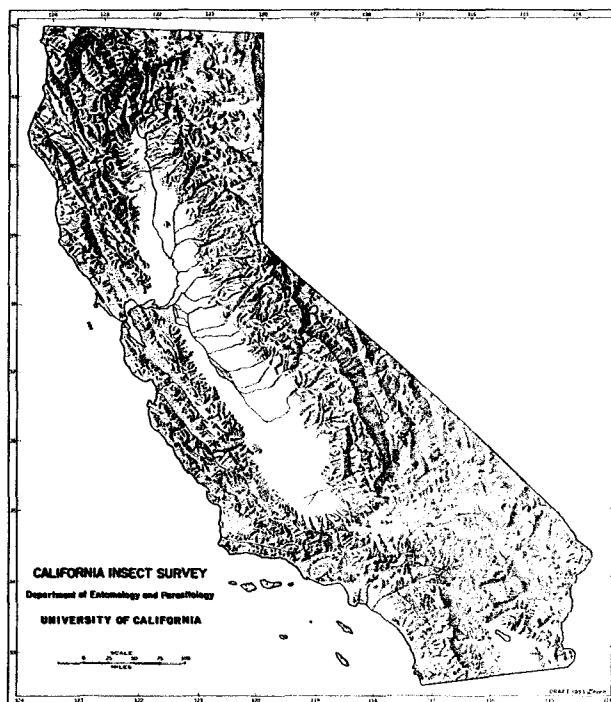
(Fig. 54; Map 46)

*Paraterellia superba* Foote, 1960, Ann. Ent. Soc. Amer., 53:123. Holotype ♀; Woodfords, Alpine Co., Calif. (CDA).

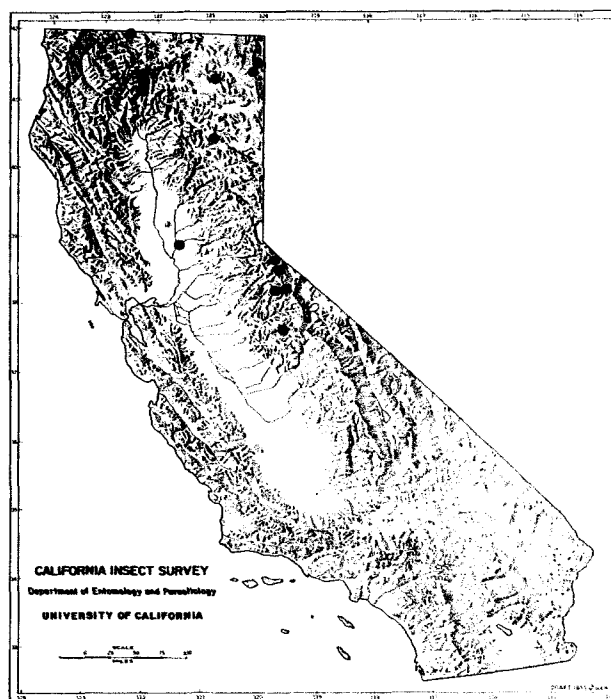
*Geographic range*.—Arizona, California, Colorado, and Utah.

*California records*.—ALPINE CO.: Woodfords, 1 ♀, VII-27-30 (H. H. Keifer, USNM).

The position of wing bands in *superba* is very similar to that in *varipennis*, but the bands in the apical half of the wing are narrower and darker than those in the basal half, and a costal hyaline area is present immediately apicad of the stigma.



Map 46. Distribution in California of *Paraterellia superba* Foote



Map 47. Distribution in California of *Paraterellia varipennis* (Coquillett)

*Paraterellia varipennis* (Coquillett)

(Fig. 55; Map 47)

*Trypeta varipennis* Coquillett, 1902, Jour. N. Y. Ent. Soc., 10:180. Holotype ♀; Bright Angel Hotel, brink of Grand Canyon, Coconino Co., Ariz. (USNM).

*Synonym.*—*Trypeta versatilis* Curran, 1932:13.

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

*California records.*—ALPINE Co.: Markleeville, 1 ♂, Frick trap in apple, X-6-60 (R. P. Allen, CDA). Woodfords, 1 ♂, Frick trap in apple, X-6-60 (R. P. Allen, CDA). LASSEN Co.: Bridge Creek Camp, VII-9-49 (D. Cox, CIS). MARIPOSA Co.: Yosemite, 1 ♀, VII-16-39 (E. Zimmerman, USNM). MODOC Co.: Canby, California Inspection Station, 2 ♂♂, on building, IX-3-56 (H. A. Sweet, CDA). Cedar Pass, 1 ♂, Frick trap in *Prunus emarginata*, VII-11-52 (L. White, CDA). Lake City, 2 ♀♀, Frick trap, IX-59 (L. White, CDA). Modoc County, 1 ♀, VIII-13-39 (K. D. Snyder, CIS). MONO Co.: U. S. F. S., Highway 108, 5 mi. E. Sonora Pass, 2 ♂♂, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). SISKIYOU Co.: Dunsmuir, 1 ♂, 1 ♀, Frick trap in cherry, VIII-18-56 (W. W. Wiard, CDA); 2 ♀♀, Frick trap in cherry, VII-4-52 (R. P. Allen, CDA); Frick trap in cherry, VIII-18-56 (W. W. Wiard, CDA); 1 ♂, Frick trap in cherry, VIII-8-51 (CDA). Hilt, 1 ♂, Frick trap in cherry, VII-26-55 (W. W. Wiard, CDA); 1 ♀, in berries of *Juniperus occidentalis*, VII-10-14 (USNM). Mt. Shasta, 1 ♀, VIII-7-50 (CDA). Weed, 2 ♂♂,

Frick trap in cherry, VII-21-52 (R. P. Allen, CDA). Siskiyou County, Frick trap in cherry, VII-15-52 (D. W. Robinson, CDA). SUTTER Co.: Rio Oso, 1 ♀, trap in peach, VIII-24-59 (A. C. Perrin, CDA). TUOLUMNE Co.: U. S. F. S., Highway 108, 1.7 mi. above 7,000 ft. sign, Sonora Pass, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA).

The species is easily recognized by the unbroken brown band extending from the tip of vein  $M_{1+2}$  to the base of the wing, and by the characteristic position of the other transverse bands.

*Paraterellia ypsilon* Foote

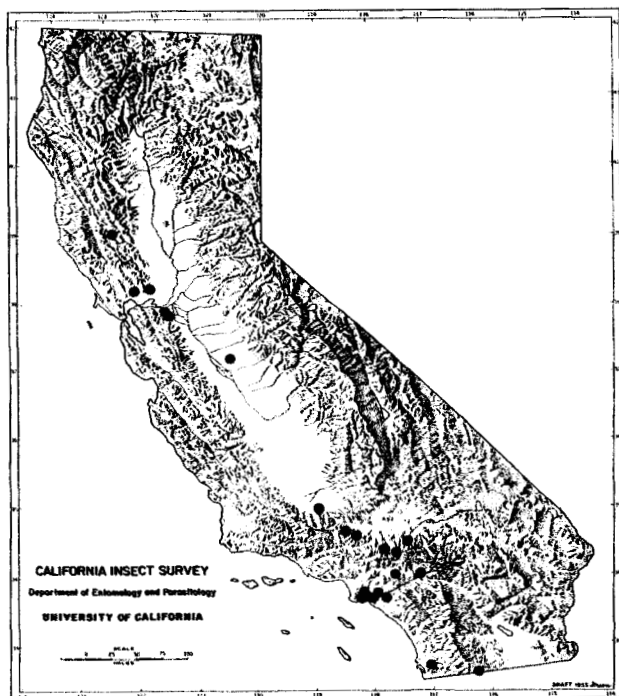
(Fig. 56; Map 48)

*Paraterellia ypsilon* Foote, 1960, Ann. Ent. Soc. Amer., 53:124. Holotype ♀; Plunge Creek, Highlands, San Bernardino Co., Calif. (CDA).

*Geographic range.*—Known only from California.

*California records.*—CONTRA COSTA Co.: Antiock, 1 ♂, Persian walnut, VIII-7-58 (E. Kalar, CDA). Brentwood, 1 ♀, Frick trap, VII-2-55 (R. P. Allen, CDA). KERN Co.: Lamont, 1 ♂, Frick trap, Summer 60 (R. P. Allen, CDA). LAKE Co.: Clear Lake, 1 ♂, Frick trap in Persian walnut, VII-26-57 (Pierce and Lyndall, CDA). LOS ANGELES Co.: Artesia, 2 ♂♂, trap, VII-17-57 (P. Engler, CDA). Fairmont (paratype), 1 ♀, VI-30-32 (Murphy, CDA; (paratype), 1 ♂ (USNM). Long Beach, 1 ♀, McPhail trap, VII-12-57 (P. Engler, CDA), Quartz Hill, 1 ♀, resting on catalpa, VI-21-57 (K. Stephens, CDA). Valyermo (paratypes), 1 ♂, 1 ♀, Frick trap, VII-7-58 (K. Stephens, USNM); (paratype), 1 ♀, Frick trap, VII-10-58 (K. Stephens, USNM); 1 ♂, 4 ♀♀, Frick trap, VII-10-58 (K. Stephens, CDA). MERCED Co.: Merced, 1 ♀, Frick trap in olive, VI-16-60 (S. Fullerton, CDA). NAPA Co.: Napa, 1 ♀, Frick trap in Persian walnut, VIII-8-57 (H. Stabo, CDA). ORANGE Co.: Orange, 1 ♂, McPhail trap, VII-17-57 (O. Beck, CDA). Placentia, 1 ♀, McPhail trap in sapote, VII-7-60 (C. Johnson, CDA). Stanton (paratype), 1 ♂, McPhail trap in fig, VII-9-57 (D. H. Byers, USNM). SAN BERNARDINO Co.: Phelan, 2 mi. W. (paratype), 1 ♀, VI-9-58 (E. I. Schlinger, USNM). Plunge Creek, Highlands (holotype), 1 ♀, McPhail trap, VI-28-56 (Gene Harper, USNM); (paratype), 1 ♀, McPhail trap, VI-28-56 (Gene Harper, USNM); 1 ♂, McPhail trap, VI-28-56 (Gene Harper, CDA). Mouth of Plunge Creek, 1 ♀, McPhail trap, VI-18-56 (Stewart George, CDA). Upland, 1 ♂, McPhail trap, VII-24-56 (Gene Harper, CDA). Victorville (paratype), 1 ♀, McPhail trap, VII-23-56 (Gene Harper, CDA). SAN DIEGO Co.: Jacumba, 1 ♂, 5 ♀♀, McPhail trap, V-16-59 (D. Close, CDA); 4 ♀♀, McPhail trap, VII-18-59 (D. Close, CDA). Spring Valley (paratype), 1 ♀, McPhail trap in orange, VI-28-56 (R. Rinder, CDA). SOLANO Co.: Solano County, 1 ♂, Frick trap, VII-53 (CDA).

This is the only North American fruit fly which has, as part of its wing pattern, a distinct Y-shaped mark composed of brown bands (see fig. 56).



Map 48. Distribution in California of *Paraterellia ypsilon* Foote

Genus *Paroxyna* Hendel

The genus *Paroxyna* comprises small flies similar in habitus and biology to species of *Tephritis*. Most individuals possess a small rounded, hyaline spot in the stigma, a character shared by few other North American tephritids; a small to large marginal hyaline spot below the apex of vein  $R_{2+3}$ ; and usually three well-developed hyaline spots in cell  $R_1$  beyond the stigma. The mouthparts are always geniculate. As far as known, the larvae of all the species inhabit the flower heads of various plants, especially composites. The genus is worldwide in distribution with 31 known European, 26 African, and 16 North American species. Of the latter, only 7 are known to occur in California. See also the discussion of *Dioxyna* Frey, which contains a species, *picciola* Bigot, formerly included in *Paroxyna*.

The genus in California is represented by large numbers of miscellaneous specimens in our study collections. Unfortunately the identification of these specimens must await a revision of the North American fauna, which contains many undescribed species.

## KEY TO THE CALIFORNIA SPECIES OF PAROXYNA

- 1 Legs yellow, sometimes with thin, dark pollinosity; scutellum mostly yellow; thorax and abdomen light brown, without stripes or spots  
*murina* (Doane) (p. 49)  
At least basal half of all femora black pollinose; abdominal terga with dark markings . . . 2
- 2(1) Small, dark species with golden tomentum on mesonotum, sometimes also with indistinct stripes . . . *clathrata* (Loew) (p. 47)  
Larger, lighter species, mesonotum primarily golden pollinose, usually with brownish stripes . . . 3
- 3(2) Cell 2nd C mostly dark, usually with two small hyaline spots, one at each end of cell . . . 4  
Cell 2nd C with large light spots, the central dark area no more than half the cell length . . . 5
- 4(3) Wing relatively dark, the hyaline spots small; mesonotum golden pollinose, the brown stripes inconspicuous or absent  
*snowi* (Hering) (p. 49)  
In extent, dark area of wing equal to, or less than, hyaline area; gray pollinose mesonotum with distinct brown stripes  
*variabilis* (Loew) (p. 50)
- 5(3) Dark species; hyaline wing spots with indistinct borders, mesonotum without distinctly golden pollinosity . . . *genalis* (Thomson) (p. 48)

Light-brown species; mesonotum distinctly golden pollinose; most wing spots distinctly bordered . . . 6

- 6(5) Abdominal terga abundantly set with blunt, white setae; dark area of wing very dark brown or blackish . . . *americana* (Hering) (p. 46)  
Blunt, white setae present but sparse on abdominal terga; dark area of wing very light brown  
*corpulenta* (Cresson) (p. 48)



Map 49. Distribution in California of *Paroxyna americana* Hering

*Paroxyna americana* Hering

(Fig. 57; Map 49)

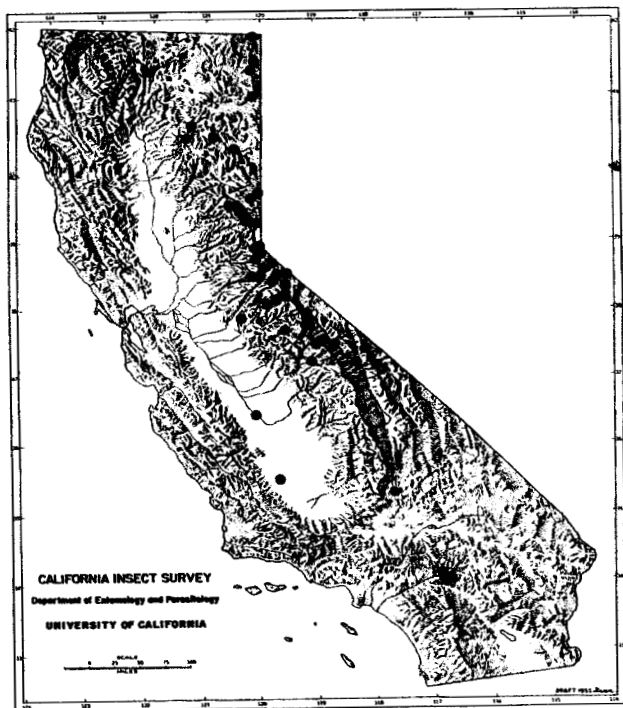
*Paroxyna difficilis americana* Hering, 1944, *Siruna Seva*, 5:11.  
Holotype ♂; South Fork, Rio Grande River (MH).  
*Synonyms*.—*Paroxyna franciscana* Hering, 1947:5.

*Geographic range*.—California and Colorado.

*California records*.—ALAMEDA Co.: Oakland, 1 ♀, trap in peach, VII-11-57 (N. L. Jones, CDA); 1 ♀, Steiner trap, VII-24-57 (J. V. Lonergan, CDA). LOS ANGELES Co.: Pacific Palisades, 1 ♀, ex composite flower, V-22-57 (G. Buxton and G. F. Prole, CDA). MONTEREY Co.: Salinas, 1 ♀, Steiner trap in fruit tree, IX-10-57 (R. Emperan, CDA). SAN BENITO Co.: San Juan Bautista, 1 ♀, Steiner trap in pear, VIII-26-57 (W. B. Saunders, CDA). SAN LUIS OBISPO Co.: Shandon, 1 ♂, swept from *Haplopappus linearifolius*, IV-2-57 (H. L. Wilson, CDA). SAN MATEO Co.: Menlo Park, 1 ♀, Steiner trap in peach, VIII-16-57 (A. Ross, CDA). SANTA CRUZ Co.: Aptos, 1 ♀, Steiner trap in peach, VIII-14-57 (A. Ross, CDA). Santa

Cruz, 1 ♀, Japanese beetle trap, VIII-15-57 (R. W. Nutter, CDA).

The wing patterns of *corpulenta* (Cress.) and *americana* are similar, that of *americana* usually with less widely separated hyaline spots and a darker brown background color. The two species are further distinguished by characters given in the key, most effectively when compared side by side (see also the discussion of *corpulenta*).



Map 50. Distribution in California of *Paroxyna clathrata* (Loew)

*Paroxyna clathrata* (Loew)

(Fig. 58; Map 50)

*Trypeta clathrata* Loew, 1862, Smiths. Misc. Collect., 6(1):80, pl. II, fig. 15. Holotype ♀; "Middle States" (MCZ).

**Geographic range.**—Probably entire North American continent.

**California records.**—ALPINE Co.: Ebbetts Pass, 1 ♂, 8,730 ft., VI-30-60 (J. F. Lawrence, CIS); 1 ♂, 8,730 ft., VI-30-60 (J. A. Chemsak, CIS); 1 ♀, 8,730 ft., VI-30-60 (J. A. Powell, CIS); 1 ♀, VII-30-59 (L. E. Campos, UCD). Fredericksburg, 2 ♀♀, *Chrysothamnus* sp., V-5-59 (F. L. Blanc, CDA); 2 ♀♀, sweeping mixed grasses, V-7-59 (F. L. Blanc, CDA); 1 ♂, swept from *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA). Hope Valley, 1 ♀, *Salix* sp., VI-30-57 (J. A. Powell, FLB); 1 ♀, VII-18-48 (D. Carter, UCD). Markleeville, 1 ♀, V-6-59 (F. L. Blanc, CDA). Red Lake, 1½ mi. N.E., 4 ♂♂, 1 ♀, VII-25-55 (E. I. Schlinger, UCD). Winnemucca Lake, 1 ♂, 4 ♀♀, VII-30-59 (P. M. Marsh, UCD); 1 ♀, VII-30-59 (L. E. Campos, UCD). Woodfords, 2 ♂♂, 2 ♀♀, meadow sweeping, V-17-60 (R. P. Allen, CDA); 2 ♂♂, V-4-59 (R. P.

Allen, CDA); 3 ♂♂, 4 ♀♀, *Chrysothamnus* sp., V-5-59 (F. L. Blanc, CDA). AMADOR Co.: Silver Lake, 1 ♂, grass and sage, VIII-2-35 (H. H. Keifer, CDA); 4 mi. N., 14 ♂♂, 10 ♀♀, VII-25-55 (E. I. Schlinger, UCD). EL DORADO Co.: Angora Park, Tahoe, 1 ♂, IX-26-15 (E. P. Van Duzee, CIS); 1 ♂, VII-10-15 (E. P. Van Duzee, CAS); 2 ♂♂, VII-26-15 (E. P. Van Duzee, CIS); 2 ♂♂, 1 ♀, VII-26-15 (E. P. Van Duzee, CIS). Bijou, 1 ♀, VI-24-53 (P. H. Arnaud, PHA). Cathedral Lake, Tahoe, 1 ♀, VII-6-15 (E. P. Van Duzee, CIS). Echo Portals, 1 ♂, *Ceanothus cordulatus*, 7,300 ft., VII-5-59 (P. H. Arnaud, PHA). Fallen Leaf Lake, 1 ♀, VIII-31 (O. H. Sweezy, CAS). Glen Alpine Creek, 1 ♂, VII-5-15 (E. P. Van Duzee, CAS). Meyers, 1 ♀, VII-24-55 (J. C. Downey, UCD); 2 ♂♂, 1 ♀, VII-20-55 (E. I. Schlinger, UCD); 2 mi. S., 1 ♂, VII-24-55 (J. C. Downey, UCD). Tallac Lake, Tahoe, 1 ♀, IX-17-15 (E. P. Van Duzee, CIS); 1 ♀, VII-17-15 (E. P. Van Duzee, CIS). FRESNO Co.: Helm, 1 ♀, VII-24-57 (H. Michalk, UCD). Mono Hot Springs, 1 ♀, VIII-8-56 (R. O. Schuster, CIS). INYO Co.: Bishop Creek, 1 ♀, 8,400 ft., VIII-2-36 (CAS). Deep Springs Lake, 2 ♀♀, *Chrysothamnus* sp., VII-16-53 (J. W. MacSwain, CIS). KERN Co.: Johannesburg, 2 ♂♂, IX-4-58 (E. I. Schlinger, UCD). Lost Hills, 15 mi. N.W., 1 ♀, *Wislizenia refracta*, X-29-18 (H. H. Severin, CIS). LASSEN Co.: Blue Lake, 2 mi. N.W., 2 ♂♂, 1 ♀, VII-19-47 (D. W. Adams, UCD). Bridge Creek Camp, 1 ♀, VII-14-54 (J. A. Powell, JAP); 1 ♀, VII-14-54 (R. C. Blaylock, UCD). Hallelujah Junction, 1 ♀, VII-4-49 (J. W. MacSwain, UCD); 1 ♀, VII-16-53 (E. I. Schlinger, UCD); 1 ♂, 3 ♀♀, VII-4-49 (A. S. Deal, UCD); 1 ♂, VII-4-51 (E. I. Schlinger, UCD). Janesville, 1 ♀, swept from *Chrysothamnus* sp., V-20-59 (F. L. Blanc, CDA). Summit Camp, 1 ♀, VI-28-49 (R. L. Langston, LAM). Summit Lake, Lassen National Park, 1 ♂, VII-23-50 (L. W. Quate, CDA). MARIPOSA Co.: Lake Tenaya, Yosemite National Park, 1 ♂, VII-20-58 (A. D. Telford, UCD). Modoc Co.: Cedar Pass, 1 ♀, VI-29-55 (J. C. Wells, UCD); 6 ♂♂, 6 ♀♀, VI-29-55 (K. Bowers, UCD); 2 ♂♂, VI-29-55 (R. D. Browning, UCD). Lake City, 1 ♀, VII-30-22 (C. L. Fox, CIS). Modoc National Forest, 1 ♀, *Prunus emarginata*, VIII-4-40 (G. G. Beevor, CDA). New Pine Creek, 8 mi. E., 1 ♀, VII-29-52 (W. C. Bentinck, CIS). MONO Co.: Blanco's Corral, White Mountains, 1 ♂, 4 ♀♀, 10,000 ft., VI-29-53 (D. D. Linsdale, CIS); 2 ♂♂, 2 ♀♀, VI-28-53 (J. T. Brooks, CIS); 4 ♂♂, 2 ♀♀, 10,000 ft., VI-30-53 (J. W. MacSwain, UCD); 21 ♂♂, 18 ♀♀, 10,000 ft., VII-16-53 (E. I. Schlinger, UCD); 1 ♀, 10,000 ft., VI-20-53 (J. W. MacSwain, UCD); 2 ♀♀, 10,000 ft., VI-28-53 (W. D. McLellan, UCD). Coleville, 4 ♂♂, 2 ♀♀, IX-6-58 (E. I. Schlinger, UCD). Crooked Creek, White Mountains, 1 ♂, 1 ♀, 9,000 ft., VI-20-53 (J. W. MacSwain, CIS). Grant Lake, *Chrysothamnus viscidiflorus*, IX-10-57 (B. J. Adelson, CIS); 2 ♀♀, VIII-3-50 (J. W. MacSwain, UCD). Junction highways 120 and 395, 20 mi. S., 2 ♂♂, VIII-7-58 (A. D. Telford, UCD); 5 ♂♂, 1 ♀, VIII-3-58 (A. D. Telford, UCD). Lake George, 1 ♀, VI-27-39 (C. A. Fleschner, LAM). Leavitt Meadows, 1 ♂, 2 ♀♀, VII-6-51 (C. A. Downing, CIS); 1 ♂, VI-28-51 (T. R. Haig, CIS); 1 ♀, VII-6-51 (E. L. Silver, UCLA); 2 ♀♀, VII-6-51 (C. A. Downing, UCD); 1 ♀, VII-6-51 (D. P. Lawfer, UCD); 3 ♀♀, VII-6-51 (A. T. McClay, UCD); 3 ♂♂, VI-15-47 (L. R. Gillogly, UCD). Leevining, 7 mi. S., 2 ♂♂, 2 ♀♀, IX-4-58 (E. I. Schlinger, UCD). Mammoth Camp, 2 ♀♀, on *Sidalcea glaucescens*, VII-31-39 (W. D. Pierce, LAM); 1 ♂, 2 ♀♀, VIII-3-39 (W. D. Pierce, LAM). Mill Creek, 1 ♂, 1 ♀, IX-6-58 (E. I. Schlinger, UCD). Mono,

1 ♂, VI-31 (K. L. Wolff, LACO). Pine Cliff Resort, Inyo National Forest, 2 ♂♂, 1 ♀, VIII-3-39 (D. Poole, LAM). Rutherford Cottage, 3 ♂♂, 2 ♀♀, on *Ceanothus velutinus*, VIII-7-39 (W. D. Pierce, LAM). Sardine Creek, 1 ♂, 8,500 ft., VI-28-51 (J. W. MacSwain, UCD); 2 ♂♂, 3 ♀♀, 8,500 ft., VII-17-51 (A. T. McClay, UCD); 3 ♂♂, 4 ♀♀, 8,500 ft., VII-18-51 (A. T. McClay, UCD); 1 ♀, 8,500 ft., VI-28-51 (A. T. McClay, UCD); 12 ♂♂, 8 ♀♀, 8,500 ft., VII-6-51 (A. T. McClay, UCD); 4 ♂♂, 5 ♀♀, 8,500 ft., VII-12-51 (A. T. McClay, UCD); 6 ♂♂, 8 ♀♀, 8,500 ft., VII-11-51 (A. T. McClay, UCD); 1 ♀, 8,500 ft., VI-28-51 (R. W. Morgan, UCD); 3 ♂♂, 1 ♀, 8,500 ft., VII-11-51 (R. W. Morgan, UCD). Tom's Place, 1 mi. W., 4 ♂♂, 4 ♀♀, VIII-13-57 (D. D. Linsdale, CIS). White Mountain, 1 ♀, VII-21-53 (UCD). Mono County, 1 ♂, 1939, (W. D. Pierce, LAM). NEVADA CO.: Boca, 1 ♀, VII-3-54 (J. A. Powell, JAP); 1 ♀, VIII-3-55 (E. I. Schlinger, UCD). Sagehen, nr. Hobart Mills, 2 ♀♀, VI-25-54 (J. A. Powell, JAP). Truckee, 1 ♀, VI-17-27 (E. P. Van Duzee, CAS); 1 ♂, VI-19-27 (E. P. Van Duzee, CAS). PLUMAS CO.: E. of Loyalton, 1 ♀, *Chrysothamnus* sp., V-19-59 (F. L. Blanc, CDA). SAN BERNARDINO CO.: Atolia, 1 ♀, VI-19-52 (A. T. McClay, UCR). Barton Flats, 1 ♂, VII-11-56 (R. M. Bohart, UCD). Big Bear Valley, 1 ♂, *Solidago confinis*, VIII-13-33 (P. H. Timberlake, UCR). South Fork Camp, 1 ♂, 1 ♀, *Eriogonum fasciculatum*, IX-2-46 (P. H. Timberlake, UCR). SHASTA CO.: Hat Lake, 1 ♀, VII-23-50 (P. H. Arnaud, CDA). SIERRA CO.: Sierraville, 1 ♂, 1 ♀, *Chrysothamnus* sp., V-19-59 (F. L. Blanc, CDA). Weber Lake, 5 mi. E., 1 ♀, VII-29-55 (H. R. Moffitt, UCD); 1 ♂, VII-30-55 (E. A. Kurtz, UCD). Yuba Pass, 1 ♀, VIII-20-53 (E. I. Schlinger, UCD). TUOLUMNE CO.: Kennedy Meadow, 1 ♀, VII-9-51 (A. T. McClay, UCD); VII-4-51 (R. W. Morgan, UCD). Sonora, 1 ♂, VII-12-51 (A. T. McClay, UCD). Sonora Pass, 9,624 ft., VI-27-51 (A. T. McClay, UCD); 2 ♂♂, 4 ♀♀, swept from *Wyethia* sp., VII-21-56 (J. A. Powell, JAP); 1 ♀, 9,624 ft., VI-27-51 (E. L. Silver, UCLA); 40 ♂♂, 32 ♀♀, 9,000-10,000 ft., VII-17-51 (A. T. McClay, UCD); 2 ♂♂, 2 ♀♀, 9,000-10,000 ft., VII-11-51 (A. T. McClay, UCD). Sonora, 2 ♀♀, 9,624 ft., VII-17-53 (E. I. Schlinger, UCD). Sonora Pass, 2 mi. W., 1 ♀, *Epilobium angustifolium*, VII-16-59 (G. I. Stage and R. R. Snelling, CIS); 1 ♀, VIII-21-59 (R. W. Thorp, CIS). Strawberry, 1 ♀, VIII-7-58 (W. H. Lange, UCD).

*P. clathrata* and *genalis* (Thoms.) are the only dark-gray California species known. Both have very dark-gray pollinose femora, but *clathrata* exhibits a golden mesonotal color and can be further distinguished from *genalis* by the different wing pattern, which contains fewer and more clearly delineated hyaline spots. The stigma of *clathrata* occasionally lacks the round hyaline spot.

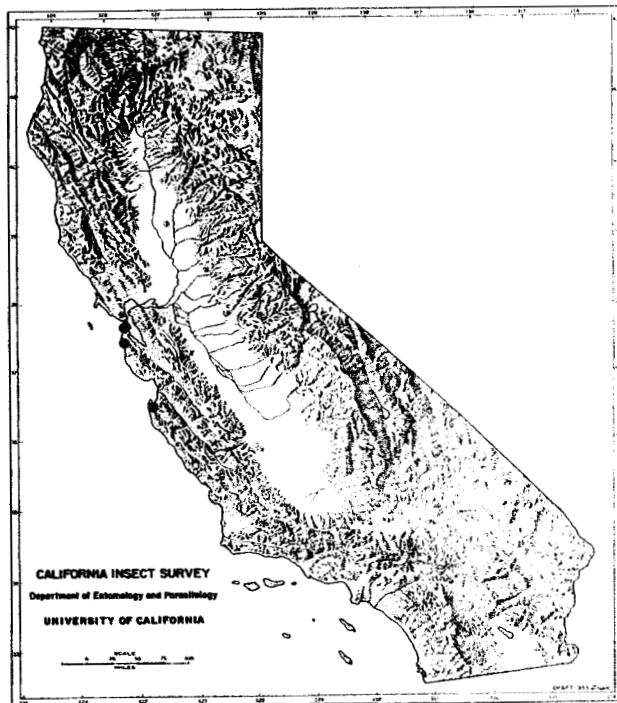
#### *Paroxyna corpulenta* (Cresson)

(Fig. 59; Map 51)

*Tephritis corpulenta* Cresson, 1907, Trans. Amer. Ent. Soc., 33:103, pl. 1, fig. 4. Holotype ♂; Cloudcroft, N. Mex. (ANSP).

*Geographic range*.—California and New Mexico.

*California records*.—MONTEREY CO.: Carmel, 1 ♂, 1 ♀, IX-6-31 (E. P. Van Duzee, CAS). SAN FRANCISCO CO.: San



Map 51. Distribution in California of *Paroxyna corpulenta* (Cresson)

Francisco, 1 ♂, collected from *Haplopappus ericoides*, VII-26-30 (H. H. Keifer, CDA). SAN MATEO CO.: Half Moon Bay, 5 mi. N., 1 ♂, 1 ♀, on potato tops, VI-27-58 (R. P. Allen, CDA).

See the discussion of *americana* for morphological means of distinguishing these two species. The mesonotum of *corpulenta* is very distinctly golden when viewed from behind, and the dark spots surrounding the bases of the acrostichal and dorso-centrals are somewhat larger than in *americana*.

#### *Paroxyna genalis* (Thomson)

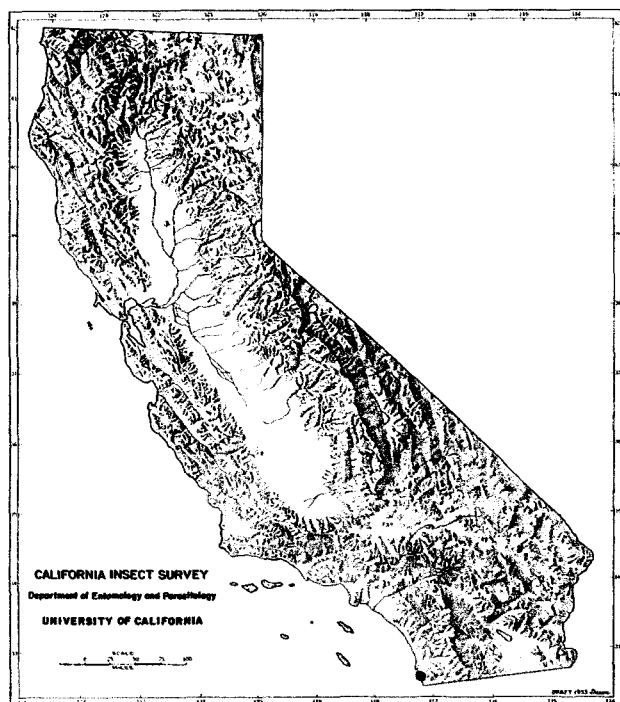
(Fig. 60; Map 52)

*Trypeta genalis* Thomson, 1868, Eugenes Resa, 6(2):585. Syntypes ♂ and ♀, California (NR).

*Geographic range*.—Known only from California.

*California records*.—SAN DIEGO CO.: Coronado, 19 ♂♂, 17 ♀♀, reared from *Senecio californicus*, collected IV-2-60, emerged IV-6-60 to IV-12-60 (E. D. Algert, CDA).

Although the wing pattern of *genalis* resembles those of *americana* and *clathrata* in the distribution pattern of hyaline spots, it can be distinguished from the known California species by the indistinct borders of these spots. The entire body and all femora are dark-gray pollinose with little or no evidence of golden pollinosity on the mesonotum.



Map 52. Distribution in California of *Paroxyna genalis* (Thomson)

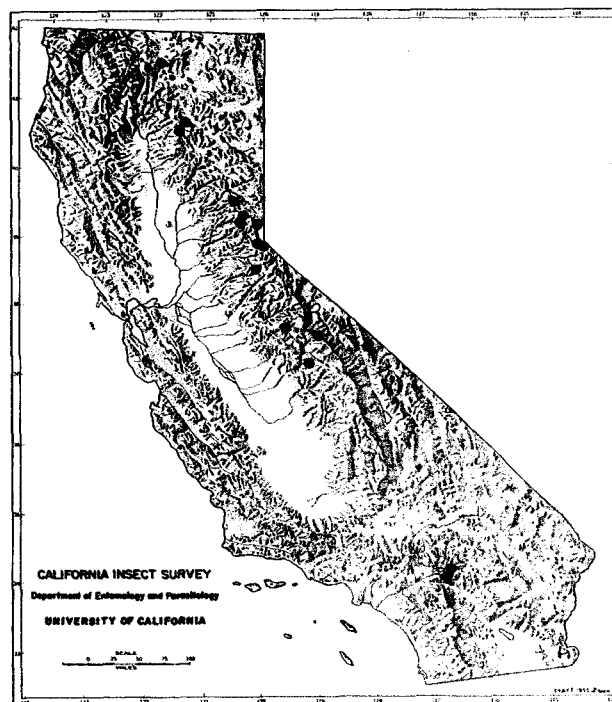
*Paroxyna murina* (Doane)

(Fig. 61; Map 53)

*Tephritis murina* Doane, 1899, Jour. N. Y. Ent. Soc., 7:189, pl. IV, fig. 5. Type (sex not known); Washington (WSU).

*Geographic range*.—California, New Mexico, Oregon, and Washington.

*California records*.—AMADOR Co.: Maiden's Grave, Highway 88, 1 ♂, 2 ♀♀, reared from flowers of *Haplopappus bloomeri*, VIII-11-60 (R. P. Allen, CDA). Silver Lake, 4 mi. N., (E. I. Schlinger, UCD). EL DORADO Co.: Echo Portals, 1 ♀, 7,300 ft., VII-5-59 (P. H. Arnaud, PHA). Glen Alpine Creek, Tahoe, 1 ♀, VII-16-15 (E. P. Van Duzee, CIS); 1 ♀, VI-23-15 (E. P. Van Duzee, CAS). FRESNO Co.: Huntington Lake, 1 ♀, 7,000 ft., VII-26-19 (E. P. Van Duzee, CAS). MARIPOSA Co.: Paradise River, Yosemite National Park, 1 ♀, VII-24-38 (CIS). MONO Co.: Mammoth Camp, 1 ♀, VIII-3-39 (D. Poole, LAM). Mammoth Lake, 1 ♀, VII-11-33 (CAS). Pine Cliff Resort, Inyo National Forest, 1 ♂, 2 ♀♀, VIII-3-39 (D. Poole, LAM). Sardine Creek, 1 ♂, 1 ♀, 8,500 ft., VII-12-51 (A. T. McClay, UCD); 1 ♂, 8,500 ft., VI-28-51 (A. T. McClay, UCD). NEVADA Co.: Norden, 1 mi. W., 1 ♀, sweeping meadow, VII-9-60 (I. Savage, FLB). Sagehen, nr. Hobart Mills, 1 ♀, VIII-23-56 (E. G. Linsley, CIS). PLACER Co.: Carnelian Bay, Lake Tahoe, 1 ♀, VI-24-54 (J. A. Powell, JAP). SAN BERNARDINO Co.: Baldwin Lake, 3 ♀♀, *Chrysothamnus viscidiflorus*, IX-1-36 (P. H. Timberlake, UCR). South Fork Camp, San Bernardino Mountains, 1 ♀, on *Eriogonum fasciculatum*, IX-12-46 (P. H. Timberlake, UCR). SHASTA Co.: Manzanita Lake, 5 mi. E., 1 ♀, VIII-18-59 (CDA). Old Station, 5 mi. S.W., 1 ♀, VIII-25-58 (J. A. Powell, JAP). SIERRA Co.: Yuba Pass, 1 ♀, 6,700 ft., VII-9-54 (J. A. Powell, JAP); 1 ♀, VII-31-58 (F. E. Strong). SISKIYOU Co.:



Map 53. Distribution in California of *Paroxyna murina* (Doane)

Antelope Creek nr. Tennant, 1 ♂, *Chrysothamnus viscidiflorus typicus*, VII-13-58 (J. A. Powell, JAP).

A distinctive, medium to large species with well-separated hyaline spots in the apical half of the wing and a tendency for these spots to merge in the posterior basal quarter of the wing disc. *P. murina* is the only known California *Paroxyna* with yellow femora and scutellum and without dark markings on the mesonotum and abdominal terga.

*Paroxyna snowi* Hering

(Fig. 62; Map 54)

*Paroxyna snowi* Hering, 1944, Siruna Seva, 5:8. Holotype ♂; Mt. Hood, Ore. (UK).

*Synonym*.—*Tephritis obscuripennis* Snow, 1894:174.

*Geographic range*.—California and Oregon.

*California records*.—EL DORADO Co.: Fallen Leaf Lake, 1 ♀, VII-4-30 (A. C. Browne, CDA). TUOLUMNE Co.: Pinecrest, 1 ♀, VII-13-48 (P. H. Arnaud, PHA).

A large species, *P. snowi* is easily distinguished from the other known California *Paroxyna* by the small scattered hyaline spots on the wing and the relatively dark gross appearance of the wing. The mesonotum is very distinctly golden, without markings, and the abdominal terga are distinctly marked.



Map 54. Distribution in California of *Paroxyna snowi* Hering

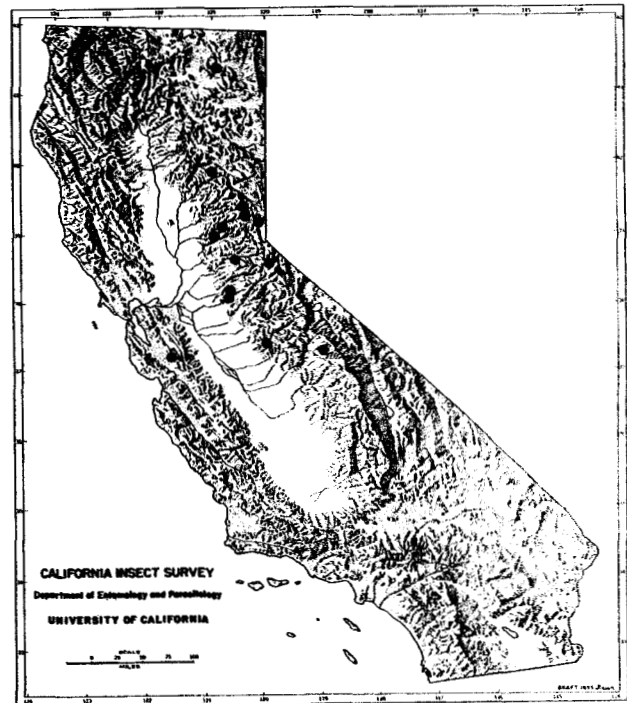
*Paroxyna variabilis* (Doane)  
(Fig. 63; Map 55)

*Tephritis variabilis* Doane, 1899, Jour. N. Y. Ent. Soc., 7:188, pl. IV fig. 4. Lectotype ♀; Washington (WSU).

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

**California records.**—ALPINE CO.: Hope Valley, 1 ♂, VII-18-48 (L. W. Quate, CIS). CALAVERAS CO.: Mokelumne Hill, 1 ♀, ex poison oak, IV-28-59 (G. Buxton, CDA). San Andreas, 2 mi. S., 5 ♂♂, reared from *Agoseris grandiflora*, VI-13-60 (R. F. Wilkey, CDA). EL DORADO CO.: Snowline Camp, 1 ♂, VII-7-48 (L. W. Quate, CIS); 2 ♂♂, 1 ♀, VII-7-48 (A. Bartel, CIS); 1 ♂, 1 ♀, VI-25-48 (S. A. Sher, CIS); 1 ♀, VI-21-48 (P. D. Hurd, CIS). FRESNO CO.: Jackass Meadow, 1 ♂, *Pinus contorta*, VII-31-46 (T. O. Thatcher, CIS). MARIPOSA CO.: Mariposa, 1 ♀, on composite, IV-26-56 (F. L. Blanc, FLB). MODOC CO.: Canby, 1 ♀, *Ranunculus*, VI-2-46 (R. F. Smith, CIS). NEVADA CO.: Fordice Creek Camp, 1 ♀, VI-15-51 (E. I. Schlinger, UCD). PLACER CO.: Carnelian Bay, Lake Tahoe, 1 ♂, VI-3-59 (R. M. Bohart, UCD). Colfax, 1 ♂, V-20-52 (R. M. Bohart, UCD). Dutch Flat, 1 ♂, 1 ♀, V-20-52 (A. T. McClay, UCD); 1 ♂, V-20-52 (E. I. Schlinger, UCD). PLUMAS CO.: Quincy, 4 mi. W., 1 ♂, VI-19-49 (R. C. Bechtel, UCD). SANTA CLARA CO.: Mt. Hamilton, 1 ♀, V-26-57 (D. Burdick, CIS). SIERRA CO.: Webber Lake, 1 ♀, VIII-2-58 (P. H. Arnaud and G. Buxton, CDA).

Like *snowi*, *variabilis* is a large distinctive species with cell 2nd C quite dark, the hyaline spots sometimes not present. The mesonotum is light-gray pollinose with four or five brown, longitudinal stripes, and the abdominal terga are extensively marked.



Map 55. Distribution in California of *Paroxyna variabilis* (Doane)

Genus *Procecidochares* Hendel

The wing pattern in this genus consists of a dark basal spot and three dark transverse to oblique bands on a hyaline field. Almost all the species are black-bodied, with a swollen, shining, black scutellum and contrasting white or yellowish-white mesonotal hairs. Only one pair of upper fronto-orbital bristles is present. The species are very similar to those of *Procecidocharoides*, from which they may be distinguished by the single pair of upper fronto-orbital bristles and by the absence of any markings in the hyaline area between the first and second wing bands. The genus is largely North American, with 5 of the 9 known species occurring in California. Little is known about the biology of the species, some of which make galls on various plants. Little has been written about this genus since the latest complete revision by Aldrich (1929).

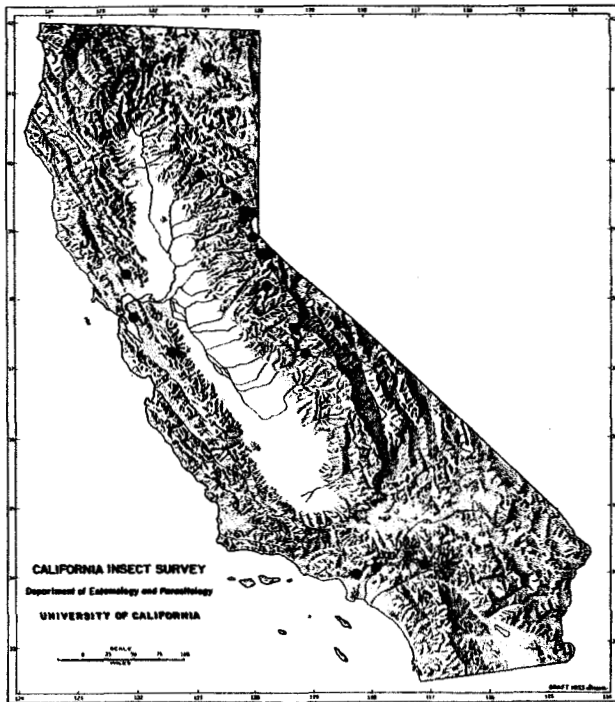
KEY TO THE CALIFORNIA SPECIES OF PROCECIDOCHARES

- 1 Two pairs of dorsocentral bristles, one anterior and one posterior to suture . . . . . 2
- One pair of dorsocentral bristles, always posterior to suture . . . . . 3
- 2(1) Pale setae present on mesonotum between dorsocentral bristle and wing base  
*grindeliae* Aldrich (p. 52)
- No pale setae present on mesonotum between dorsocentral bristle and wing base  
*anthracina* (Doane) (p. 51)

- 3(1) Pleural tergites pollinose; at least apical half of fore femur yellow . *flavipes* Aldrich (p. 51)
- Pleural tergites shining; not more than apical fourth of fore femur yellow . . . . . 4
- 4(3) Area of pale hairs on mesonotum abruptly narrowed between the acrostichals, these hairs arrayed in two prominent patches immediately anterior to scutellum . *minuta* (Snow) (p. 52)
- Area of pale hairs on mesonotum with nearly parallel sides from suture to scutellum, the hairs arrayed in four small but prominent patches immediately anterior to scutellum
- stonei* Blanc and Foote (p. 53)

8,500 ft., VII-6-51 (A. T. McClay, UCD); 1 ♂, 8,500 ft., VII-6-51 (T. R. Haig, CIS). NAPA Co.: Rutherford, 1 ♂, Frick trap, VIII-10-59 (H. Stako, CDA). NEVADA Co.: Boca, 1 ♀, VI-28-54 (J. A. Powell, CIS). Donner Lake, 1 ♀, VI-19-36 (SCJ). Sagehen Creek, 1 ♀, VII-25-56 (R. M. Bohart, UCD); 1 ♀, VII-25-56 (R. M. Bohart, UCD). PLUMAS Co.: Buck's Lake, 1 ♀, VII-14-49 (J. W. MacSwain, CIS); 1 ♀, VII-14-49 (D. Cox, CIS). SAN BERNARDINO Co.: Lake Arrowhead, 4 mi. E., 1 ♂, 5 ♀♀, on cascara, VIII-27-43 (S. C. Jones, SCJ). SANTA CLARA Co.: San Antonio Valley, 1 ♀, VI-21-51 (W. C. Bentinck, CIS). SIERRA Co.: Sierraville, 1 ♂, swept from *Chrysothamnus* sp., V-19-59 (F. L. Blanc, FLB). Sierra County, 1 ♀, VI-18-13 (F. W. Nunenmacher, SU). TUOLUMNE Co.: Dardanelles, 1 ♀, VI-26-56 (A. T. McClay, UCD).

*P. anthracina* and *P. grindeliae* Aldr. are rather large species (body length about 4.5 mm) with two pairs of dorso-central bristles and black femora. They may be distinguished from each other by the presence or absence of pale hairs on the polished raised area of the mesonotum between the posterior dorso-central bristle and the wing base, *anthracina* having this area entirely free of such bristles and *grindeliae* having a single or irregular double row.



Map 56. Distribution in California of *Procecidochares anthracina* (Doane)

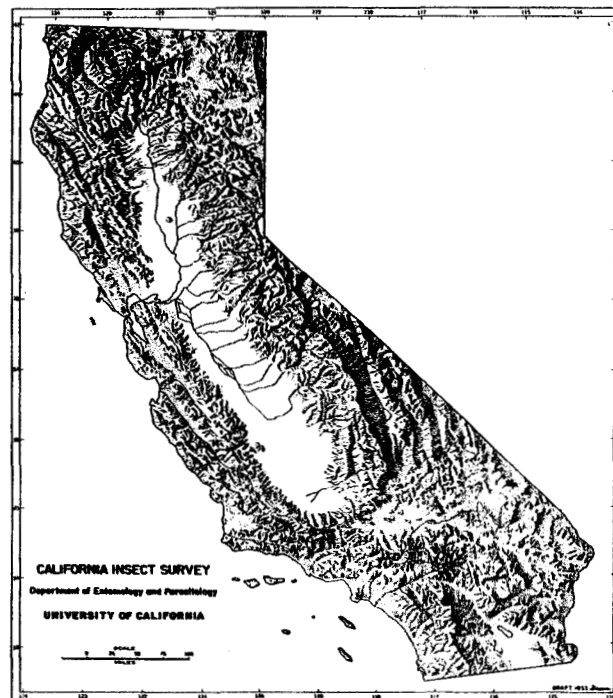
*Procecidochares anthracina* (Doane)

(Fig. 64; Map 56)

*Oedaspis anthracina* Doane, 1899, Jour. N. Y. Ent. Soc., 7:180, pl. III, fig. 3. Syntypes ♀♀; Idaho and Michigan (WSU).

**Geographic range.**—Arizona, California, Colorado, Idaho, Michigan, Oregon, and Utah.

**California records.**—ALPINE Co.: Luther Pass, 2 mi. S., 1 ♂, VII-6-59 (P. H. Arnaud, PHA); 1 ♂, VII-6-59 (P. H. Arnaud, FLB). Woodfords, 1 ♀, swept from grass, VI-17-59 (R. P. Allen, FLB). EL DORADO Co.: Fallen Leaf Lake, 1 ♀, VIII-31 (O. B. Swezey, CAS). Tallac Lake, Tahoe, 1 ♂, 2 ♀♀, VII-17-15 (E. P. Van Duzee, CIS). FRESNO Co.: Huntington Lake, 1 ♀, VII-16-49 (P. H. Arnaud, PHA). LOS ANGELES Co.: Glendale, 1 ♀, VII-12-48 (E. I. Schlinger, UCD). Tanbark Flat, 1 ♀, VI-30-50 (T. R. Haig, CIS). MADERA Co.: Little Yosemite, 1 ♀, 6,000 ft., V-18-28 (E. O. Essig, USNM). MODOC Co.: Mammoth, 1 ♀, VII-7-33 (CAS). MONO Co.: Sardine Creek, 3 ♂♂, 8,500 ft., VII-18-51 (A. T. McClay, UCD); 1 ♀, 8,500 ft., VII-11-51 (A. T. McClay, UCD); 1 ♂,



Map 57. Distribution in California of *Procecidochares flavipes* Aldrich

*Procecidochares flavipes* Aldrich

(Fig. 65; Map 57)

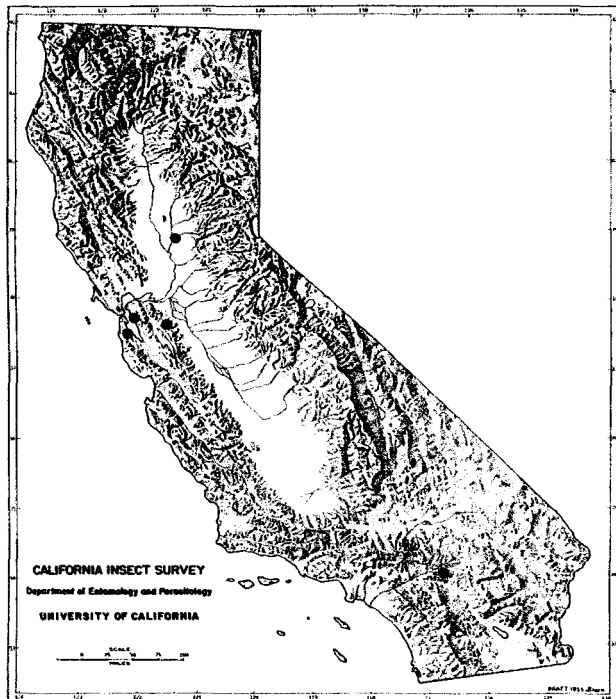
*Procecidochares flavipes* Aldrich, 1929, Proc. U. S. Nat. Mus., 76(2799):5. Holotype ♀; Socorro Island, Revillagigedo Islands, Mexico (USNM).

**Geographic range.**—California; also islands west of Mexico.



**California records.**—RIVERSIDE Co.: Tahquitz Peak, San Jacinto Mountains, 3 ♀♀, VI-16-39 (J. G. Shanafelt, LAM). Tahquitz Valley, San Jacinto Mountains, 1 ♀, VI-16-39 (J. G. Shanafelt, LAM).

*P. flavipes* is an unusual member of the genus in having a small second pair of upper fronto-orbital bristles. The wing pattern is distinguished by the relatively deep hyaline incision in the dark apical band, and the pleural tergites are distinctly grayish pollinose. It is the only California species with extensively yellow femora; the brown markings on fore and mid femora are always basal and rarely occupy more than the basal two-thirds of the mid femur.



Map 58. Distribution in California of *Procecidochares grindeliae* Aldrich

*Procecidochares grindeliae* Aldrich

(Fig. 66; Map 58)

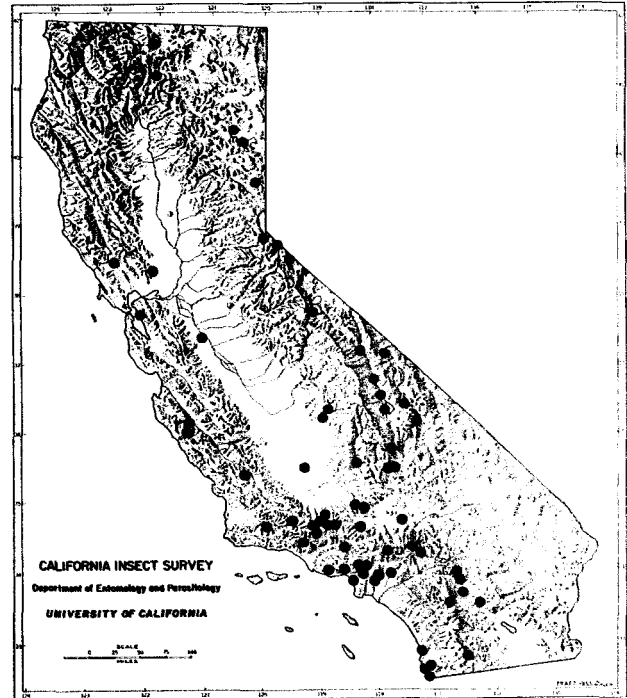
*Procecidochares grindeliae* Aldrich, 1929, Proc. U. S. Nat. Mus., 76(2799):6. Holotype ♂; Alameda Co., Calif. (USNM).

**Geographic range.**—California and Colorado.

**California records.**—ALAMEDA Co.: Altamont, 3 mi. W., 2 ♀♀, *Grindelia* sp., IV-30-56 (R. P. Allen, CDA). Hills back of Oakland, 1 ♀, V-8-10 (E. C. Van Dyke, CAS). Alameda (paratype), 1 ♀, on *Grindelia robusta*, XI (USNM); 2 ♀♀, XI (USNM). Alameda County, 1 ♂, 3 ♀♀, XI (USNM). SAN BERNARDINO Co.: Big Meadows, 1 ♂, VIII-31 (CIS). SAN MATEO Co.: Milbrae, 3 ♂♂, 11 ♀♀, in galls of *Grindelia humilis*, X-29-15 (P. H. Timberlake, UCR); 1 ♂, in gall of *Grindelia humilis*, X-24-15 (P. H. Timberlake, UCR); 1 ♂, in gall of *Grindelia humilis*, X-28-15 (P. H. Timberlake, UCR);

1 ♂, in gall of *Grindelia humilis*, X-27-15 (P. H. Timberlake, UCR); 2 ♂♂, in galls of *Grindelia humilis*, X-20-15 (P. H. Timberlake, UCR); 3 ♂♂, 1 ♀, in galls of *Grindelia humilis*, X-22-15 (P. H. Timberlake, UCR). YUBA Co.: Rio Oso, 1 ♀, ex *Grindelia* sp., IV-30-59 (R. F. Wilkey, RFW).

Similarities and differences of *grindeliae* and *anthracina* are listed in the discussion of *anthracina*.



Map 59. Distribution in California of *Procecidochares minuta* (Snow)

*Procecidochares minuta* (Snow)

(Fig. 67; Map 59)

*Oedaspis minuta* Snow, 1894, Kans. Univ. Quart., 2(3):164, pl. 6, fig. 2. Holotype ♂; Montana (UK).

**Geographic range.**—Western United States.

**California records.**—ALAMEDA Co.: Berkeley, 1 ♂, V-1-15 (E. P. Van Duzee, CAS). Oakland, 1 ♂, IV-18-52 (R. Schuster, CIS). ALPINE Co.: Fredericksburg, 1 ♂, swept from *Chrysothamnus* sp., VI-19-58 (F. L. Blanc, CDA); 2 ♂♂, 1 ♀, *Chrysothamnus* sp., VI-18-58 (R. P. Allen, CDA); 4 ♂♂, 1 ♀, *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA); 1 ♂, 1 ♀, swept from *Chrysothamnus* sp., VI-18-58 (W. W. Middlekauff, CIS). Woodfords, 2 ♀♀, swept from *Chrysothamnus* sp., VI-18-58 (W. W. Middlekauff, CIS). EL DORADO Co.: Echo Lake, 1 ♀, VII-23-55 (E. I. Schlinger, UCD). INYO Co.: Argus Mountains, 1 ♀, VI-4-39 (R. M. Bohart, UCD). Bishop Creek, 1 ♂, (E. P. Van Duzee, CAS). Deep Springs, 1 ♀, VII-16-53 (E. I. Schlinger, UCD). Deep Springs Lake, 1 ♀, *Chrysothamnus* sp., VII-16-53 (J. W. MacSwain, CIS). Independence, 1 ♂, VI-14-29 (E. P. Van Duzee, CAS). Little Lake, 1 ♂, 1 ♀, V-8-58 (L. A. Stange, UCD). Lone Pine, 1 ♂, IV-29-59 (R. P. Allen, CDA). Owens Lake, 1 ♀, on *Bigelovia* sp., VII-27-11 (J. M. Aldrich, USNM); 1 ♀, VI-2-37 (N. W. Frazier, CAS). South Inyo Mountains, 1 ♀,

VI-5-39 (R. M. Bohart, UCD). KERN Co.: Cameron Canyon, 5 mi. W. of Mojave, 6 ♂♂, 2 ♀♀, *Chrysothamnus nauseosus*, V-22-58 (H. L. Wilson, CDA). Famosa, 1 ♂, ex *Franseria acanthicarpa*, X-30-18 (H. H. Severin, CAS); 1 ♂, ex *Erodium* sp., III-12-? (CDA). Fort Tejon, 1 ♂, IX-15-50 (P. H. Timberlake, UCR). Frazier Park, 1 ♀, VII-14-46 (CIS); 2 ♀♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Inyokern, 13 ♂♂, reared ex galls on *Chrysothamnus nauseosus*, X-8-57 (J. C. Hall, UCD). Kernville, 1 ♂, 1 ♀, V-10-39 (F. T. Scott, CDA). Mojave District, 1 ♀, collected from wild buckwheat, VII-6-33 (CDA). Oakcreek Road, 5 mi. S. of Tehachapi, 4 ♀♀ swept from *Chrysothamnus nauseosus*, V-27-58 (H. L. Wilson, CDA). Tehachapi Pass, 1 ♀, VI-6-29 (R. L. Usinger, CAS). Walker Pass, 7 mi. E., 1 ♂, *Franseria* sp., IV-25-52 (G. A. Marsh, CIS). LASSEN Co.: Honey Lake, 1 ♂, *Prunus demissa*, VII-28-39 (S. Lockwood, CDA). Susanville, 1 ♀, sagebrush, VI-15-50 (R. W. Harper, CIS). LOS ANGELES Co.: Agoura, 1 ♀, VIII-1-52 (R. X. Schick, USNM). Antelope Valley, 2 ♂♂, 1 ♀, *Artemisia* sp., V-8-36 (L. E. Myers, LACO). Big Rock Creek, 1 ♂, ex rosette gall on *Chrysothamnus* sp., V-5-26 (P. H. Timberlake, UCR). Burbank, 1 ♂, 1 ♀, VII-31 (K. L. Wolff, LACO). Castaic Junction, 1 ♂, swept from *Lepidospartum squamatum*, VIII-29-57 (H. L. Wilson, CDA). Claremont, 1 ♂, 3 ♂♂ (Baker, USNM). El Monte, 1 ♂, VII-13-31 (K. L. Wolff, LACO); 1 ♂, elderberry, II-17-45 (G. F. Prole, CDA); 1 ♀, *Heterotheca grandiflora*, VII-31 (K. L. Wolff, CDA) El Segundo, *Corethrogyne flaginifolia* (W. Dwight Pierce, LAM). Elysian Park, 2 ♂♂, VI-22-30 (Bartholomew, CDA). Gorman, 8 ♂♂, 2 ♀♀, ex *Senecio douglasii*, VIII-29-57 (H. L. Wilson, CDA). Montebello, 1 ♂, sweeping barley, V-45 (G. F. Prole, CDA). Neenach, Antelope Valley, 2 ♂♂, swept from *Chrysothamnus* sp., IV-28-59 (F. L. Blanc, FLB); 3 ♀♀, *Chrysothamnus* sp., IV-27-59 (R. P. Allen, CDA). Pasadena, 1 ♂, VI-17-08 (E. D. Ball, AMNH). Quail Lake Guard Station, 2 ♀♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Rivera, 1 ♀, IX-14-34 (K. L. Wolff, LACO). Sawtelle, 1 ♂, VII-31 (K. L. Wolff, CDA). Los Angeles County, 1 ♀, *Chrysothamnus* sp. galls, V-3-38 (V. E. Williams, CDA); 1 ♂, XI-18-28, IV (Coquillett, USNM); 1 ♂, (Coquillett, USNM); 1 ♂ (Coquillett, USNM). MONO Co.: Coleville District, 1 ♂, from gooseberry, VI-13-32 (M. L. Jones, CDA). Sardine Creek, 2 ♂♂, 8,500 ft., VII-18-51 (A. T. McClay, UCD). MONTEREY Co.: Arroyo Seco Camp, 2 ♀♀, V-10 and 11-58 (L. A. Stange, UCD). Paraiso Hot Springs, 1 ♀, *Chrysopsis villosa*, VI-15-54 (Owen Bryant, CAS). PLUMAS Co.: E. of Loyalton, 2 ♂♂, 1 ♀, swept from *Chrysothamnus* sp., V-19-59 (F. L. Blanc, FLB). RIVERSIDE Co.: Desert Springs, 1 ♂, V-19-54 (J. C. Hall, USNM). Indio, 1 ♂, on *Haplopappus acradenius*, XI-12-32 (P. H. Timberlake, UCR). Keen Camp, 2 ♂♂, V-6 and 12-17 (E. P. Van Duzee, CAS). Palm Springs, 1 ♂, 1 ♀, ex rosette gall on *Franseria*, collected II-16-41, emerged III-26-41 (P. H. Timberlake, UCR); 1 ♀, ex rosette gall on *Franseria* sp., collected II-16-41, emerged III-2-41 (P. H. Timberlake, UCR); 5 mi. W., 1 ♂, III-10-55 (P. H. Timberlake, UCR). SAN BERNARDINO Co.: Deep Creek, 1 ♀, ex *Chrysothamnus nauseosus*, 1953, (P. H. Timberlake, UCR); 2 ♀♀, ex galls on *Chrysothamnus* sp., collected X-25-53, emerged X-28-53 and XI-1-53 (P. H. Timberlake, UCR). Kramer Hills, 1 ♂, IV-25-57 (J. A. Powell, CIS). Morongo, 1 ♂, 1 ♀, on *Haplopappus* sp., X-14-51 (P. H. Timberlake, UCR). Summit Valley, 2 ♂♂, 1 ♀, *Chrysopsis villosa*(?), VI-28-56 (Gene Harper, CDA). SAN DIEGO Co.:

Coronado, 1 ♂, 1 ♀, reared from flower head of *Chrysopsis villosa*, VIII-15-60 (E. D. Algert, CDA); 10 ♂♂, 4 ♀♀, reared larvae in *Chrysopsis villosa* stem galls, III-21-51 (E. D. Algert, USNM). Del Mar, 3 mi. N.E., 5 ♂♂, 2 ♀♀, general sweeping, V-16-58 (F. L. Blanc, CDA). Laguna Mountains, 5 ♂♂, 4 ♀♀, *Solidago* sp., IX-28-49 (E. D. Algert, USNM). San Diego, 1 ♂, VII-18-51 (E. P. Van Duzee, CAS); 1 ♂, V-3-13 (E. P. Van Duzee, CAS); 1 ♀, X-17-13 (E. P. Van Duzee, CAS). San Ysidro, 22 ♂♂, 9 ♀♀, reared ex *Viguiera laciniata* stem gall, XI-25-57 (E. D. Algert, USNM). SAN LUIS OBISPO Co.: Shandon, 20 mi. S., 1 ♂, ex *Lepidospartum squamatum*, XI-11-59 (H. L. Wilson, CDA). SANTA BARBARA Co.: Bluff Camp, San Rafael Mountains, 2 ♀♀, VI-29-59 (M. Bruck, CGM); 1 ♀, VI-29-59 (F. D. Parker, CGM). Ventucopa, 1 ♂, wheat field, V-1-56 (G. Beevor, CDA). SISKIYOU Co.: McCloud, 1 ♂, from *Prunus emarginata*, VIII-27-42 (G. Beevor, CDA). Montague, 1 ♂, *Artemisia* sp., V-20-36 (Jones and Fosen, CDA). SOLANO Co.: Putah Canyon, 1 ♂, VI-9-58 (L. E. Campos, UCD). SONOMA Co.: Mark West Spring, 1 ♀, VIII-22-35 (H. H. Kiefer, CDA). STANISLAUS Co.: Patterson, 2 ♂♂, IV-21-52 (W. W. Middlekauff, CIS). TULARE Co.: Lemoncove, 1 ♀, *Phacelia* sp., IV-14-50 (E. G. Linsley, CIS). Potwisha, 1 ♂, III-29-51 (J. W. MacSwain, CIS). VENTURA Co.: Chuchupate Ranger Station, base Frazier Mountain, 1 ♀, *Haplopappus cooperi*, V-1-59 (J. R. Powers, CIS). Sespe Gorge, 1 ♂, swept from willow, VII-12-56 (H. L. Wilson, CDA). Stauffer, 3 ♀♀, swept from *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB).

*P. minuta* may be recognized by the absence of a presutural dorsocentral bristle, by the shining pleural tergites, and by the strongly constricted mesonotal area containing the pale hairs. The average body length of California specimens is about 2.5 mm.

#### *Procecidochares stonei* Blanc and Foote

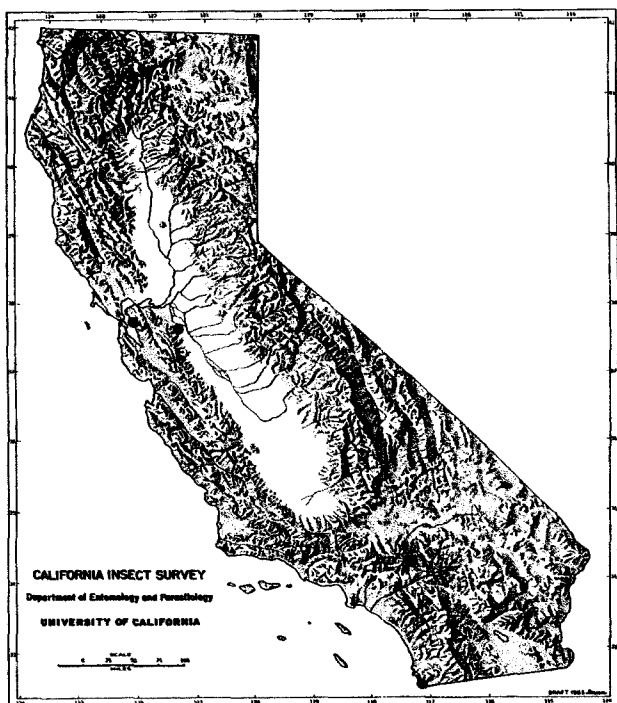
(Fig. 68; Map 60)

*Procecidochares stonei* Blanc and Foote, 1961, Pan-Pac. Ent., 37:77, fig. 3. Holotype ♀; San Ysidro, Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—ALAMEDA Co.: Oakland (paratype), 1 (sex not known), IV-2-55 (B. Hudson, CIS). SAN BERNARDINO Co.: Deep Creek, Mojave River, Mojave Desert (paratype), 1 ♀, *Chrysothamnus* sp., collected X-25-53, emerged XI-1-53 (P. H. Timberlake, UCR). SAN DIEGO Co.: San Ysidro, 1 ♂, 1 ♀, ex stem galls on *Viguiera laciniata*, collected I-23-60, emerged II-1-60 (E. D. Algert, CDA); (paratypes), 8 ♂♂, 2 ♀♀, III-17-49 (USNM); (paratypes), 4 ♂♂, 6 ♀♀, ex stem gall on *Viguiera laciniata*, III-5-48 (V. O. Miller, USNM); (paratypes), 11 ♂♂, 6 ♀♀, ex stem galls on *Viguiera laciniata*, collected I-23-60, emerged II-1-60 (E. D. Algert, CDA); (holotype ♀ and paratypes), 4 ♂♂, 3 ♀♀, I-20-48 (E. D. Algert, USNM). SAN JOAQUIN Co.: Tracy, from alfalfa, V-25-42 (H. W. Graves, CDA).

Comparable in size to *anthracina* and *grindeliae*, *P. stonei* may be distinguished from them by the lack of a presutural dorsocentral bristle. The pleural tergites are glossy dark brown or black. *P. stonei* may be distinguished from *minuta* by the shape of the mesonotal area containing the pale hairs—in *minuta*



Map 60. Distribution in California of *Procecidochores stonei*  
Blanc and Foote

the area is strongly constricted at the acrostichals, whereas in *stonei* it is nearly parallel-sided, causing the acrostichals to arise from inside the pollinose area rather than from the adjacent dark shining surface.

#### Genus *Procecidocharoides* Foote

The genus is easily confused with *Procecidochores*, which has a swollen scutellum and in some species two pairs of dorsocentral bristles. It may be distinguished from that genus by the presence of two well-developed pairs of upper fronto-orbital bristles and by the clouded or definitely marked appearance of the hyaline area of the wing between the second (from base) and third transverse bands. There are 3 known species, all North American; the California species, *flavissima*, is the most commonly collected one. Nothing is known about the biology of these flies. The genus and the 3 included species were discussed by Foote (1960e).

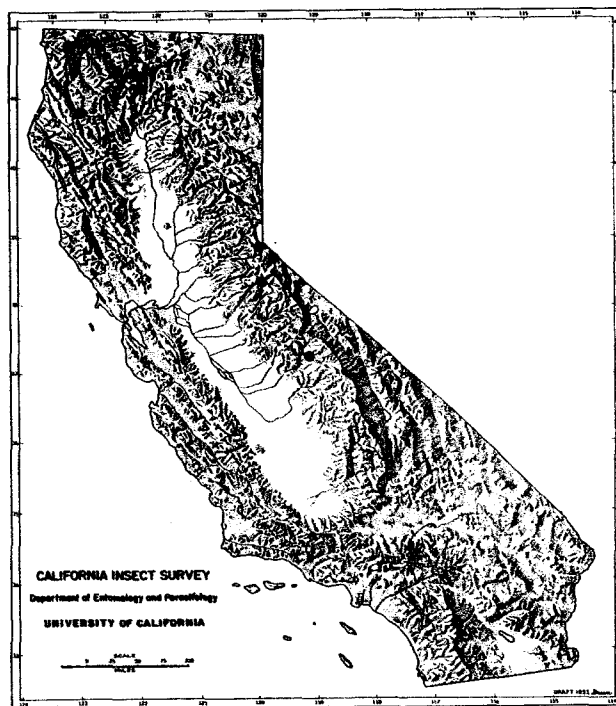
#### *Procecidocharoides flavissima* Foote

(Fig. 69; Map 61)

*Procecidocharoides flavissima* Foote, 1960, Ann. Ent. Soc. Amer., 53:672, fig. 2. Holotype ♀; Yreka, Siskiyou Co., Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—ALPINE CO.: Lake Alpine, 4 mi. E., 1 ♀, Frick trap in *Prunus emarginata*, VII-60 (R. P. Allen, CDA).



Map 61. Distribution in California of *Procecidocharoides flavissima*  
Foote

Woodfords, 1 ♂, 1 ♀, Frick trap in *Prunus emarginata*, VII-60 (R. P. Allen, CDA). DEL NORTE CO.: Bear Basin Lookout, 1 ♀, Frick trap in *Prunus emarginata*, IX-1-60 (Peacock, CDA). EL DORADO CO.: Fallen Leaf Lake (paratype), VIII-31 (O. B. Swezey, CAS). FRESNO CO.: Huntington Lake (paratype), 1 ♀, 7,000 ft., VI-11-19 (F. E. Blaisdel, CDA). SISKIYOU CO.: Dunsmuir (paratype), 1 ♂, VIII-12-56 (W. W. Wiard, CDA). Etna (paratypes), 2 ♀♀, in Frick trap in cherry, VIII-22-57 (M. Truitt, CDA). Happy Camp (paratype), 1 ♂, VIII-16-56 (W. W. Wiard, USNM). Humbug, Yreka (holotype), 1 ♀, Frick trap in cherry, VII-7-59 (R. Klander, USNM). Mount Shasta (paratype), 1 ♀, VIII-17-56 (W. W. Wiard, CDA). Yreka (paratype), 1 ♀, Frick trap in cherry, VII-7-59 (R. Klander, CDA). TRINITY CO.: U. S. F. S. Green Mountain Ranger Station, Ironsides Mountain, 1 ♀, Frick trap in *Prunus emarginata*, VIII-12-60 (Dixon Jones, CDA).

*P. flavissima* closely resembles *penelope* (O. S.), the eastern United States representative of the genus, in that the mesonotum is covered by numerous short, blunt, golden setae, and the abdomen and legs are yellowish brown without darker markings. It is a unique species in having, in addition to these characters, narrow wing bands and a very wide yellow mesonotal margin.

#### Genus *Rhagoletis* Loew

Among those genera with black postoculars and with the dorsocentral bristles in or near a line between the supra-alars, *Rhagoletis* is distinctive in that the third antennal segment has a distinct apicodorsal point.

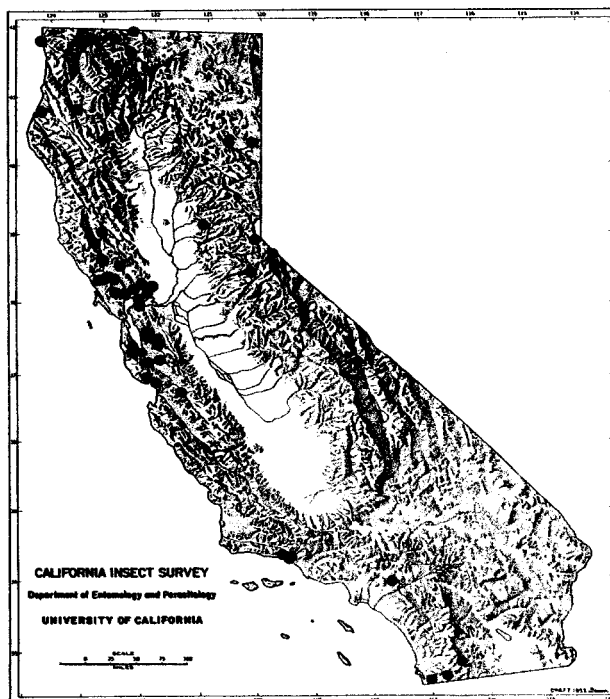
Most of the species are dark bodied with whitish or yellowish markings, but 2 California species have yellowish bodies; these may be distinguished from *Zonosemata* by the lack of brown mesonotal markings and the slightly more forward position of the dorsocentral bristles. See also the discussion of *Xenochaeta*. The genus occurs in Europe and North, Central, and South America. *Rhagoletis cerasi* (L.), the most important European species, is a serious pest of cultivated cherries, whereas the Neotropical *Rhagoletis ochraspis* (Wied.) and relatives attack cucurbits and solanaceous plants. The population center of the genus, however, is North America, where nearly all of the 12 known species cause varying degrees of economic distress and, with *Anastrepha*, are by far the most important fruit flies indigenous to the New World.

A comprehensive review of the North American species was given by Cresson (1929); a key by Curran (1932a) is the latest summary of taxonomic work. The reader is also referred to Pickett (1937) and Pickett and Neary (1940) for additional information on the taxonomic status of some of the species.

KEY TO THE CALIFORNIA SPECIES OF RHAGOLETIS

- 1 Mesonotum yellow or yellowish brown; scutellum sometimes with a lighter area dorsally . . . 2
- Mesonotum dark brown to black; scutellum usually with a strongly contrasting yellow or yellowish-white spot dorsally . . . . . 3
- 2(1) An isolated short, dark band apicad of stigma extending from costa posteriorly to about vein  $R_{4+5}$  . . . . . *basiola* (Osten Sacken) (p. 55)
- Wing pattern without such a dark band . . . . . *completa* (Cresson) (p. 58)
- 3(1) Hyaline area in cell  $R_1$  immediately apicad of stigma extending unbroken from costa to at least vein  $M_3 + Cu_1$ , most often to posterior wing margin . . . . . 4
- Hyaline area in cell  $R_1$  immediately apicad of stigma extending posteriorly no farther than vein  $M_{1+2}$ , or absent . . . . . 7
- 4(3) Wing hyaline at terminus of vein  $R_{4+5}$  . . . . . 5
- Wing dark at terminus of vein  $R_{4+5}$  . . . . . 6
- 5(4) The two basal brown bands on the wings connected broadly posteriorly . . . . . *tabellaria* (Fitch) (p. 61)
- The two brown bands on the wings distinctly separated along their entire lengths . . . . . *ribicola* Doane (p. 61)
- 6(4) Apical costal band forked, the anterior arm sometimes isolated as a dark spot astride apex of vein  $R_{4+5}$  . . . . . *cingulata indifferens* Curran (p. 57)
- Apical costal band not forked . . . . . *berberis* Curran (p. 56)

- 7(3) Triangular hyaline area immediately distad of stigma extending from costa posteriorly into cell  $R_{4+5}$  . . . . . *fausta* (Osten Sacken) (p. 60)
- No such hyaline area present immediately distad of stigma . . . . . *zephyria* Snow (p. 62)



Map 62. Distribution in California of *Rhagoletis basiola* (Osten Sacken)

*Rhagoletis basiola* (Osten Sacken)

(Fig. 70; Map 62)

*Trypeta* (*Zonosema*) *basiolum* Osten Sacken, 1877, Bull. U. S. Geol. and Geogr. Survey, 3(2):348. Syntypes ♂ and ♀; Brookline, Mass. (MCZ).

Synonyms.—*Trypeta flavonotata* Macquart of Loew, 1873:336; *Spilographa setosa* Doane, 1899:178.

Geographic range.—North America from localities near the Arctic Circle to 35°N. latitude.

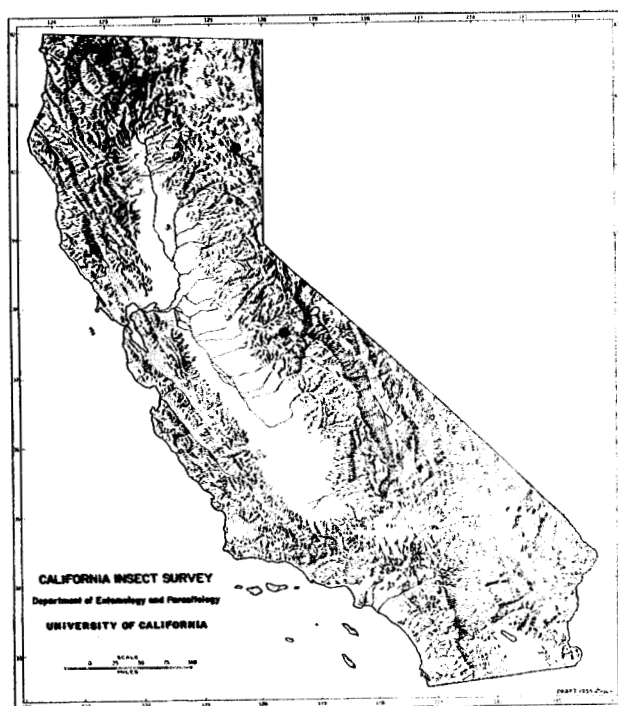
California records.—ALAMEDA CO.: Castro Valley 1 ♂, Frick trap in cherry, IX-20-57 (Jerry Marston, CDA). Palmeres Canyon, 1 ♂, 1 ♀, Frick trap, VIII-11-53 (W. S. Sibray, CDA). Alameda County, 2 ♂♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). ALPINE CO.: Markleeville, 1 ♀, Frick trap in apple, X-6-60 (R. P. Allen, CDA). Woodfords, 2 ♂♂, 2 ♀♀, Frick trap in *Prunus emarginata*, X-F-FJ (R. P. Allen, CDA). Highway 88 at Woods Lake turnoff, 1 (sex not known), Frick trap in *Prunus emarginata*, X-6-60 (R. P. Allen, CDA). CONTRA COSTA CO.: Crockett, 1 ♂, Frick trap, VII-16-59 (R. Brucato, CDA). Port Costa, 1 ♀, Frick trap, VII-30-59 (Contra Costa County, CDA). DEL NORTE CO.: Crescent City, 1 ♀, Frick trap in cultivated cherry, VIII-60 (Peacock, CDA). EL DORADO CO.: Tallac Lake, Tahoe, 1 ♂, VII-25-15 (E. P. Van Duzee). HUMBOLDT CO.: Eureka, 1 ♂, Frick trap, VIII-60 (CDA). INYO CO.: Bishop, 1 ♀, Frick trap in pear, X-6-60 (R. P. Allen, CDA). LAKE CO.: Lakeport, 3 ♂♂, Frick trap in

walnut, X-10-57 (Ralph Freeman, CDA). LASSEN Co.: Susanville, 1 ♀, Frick trap in cherry, VII-59 (E. E. Fix, CDA). Wendel, 1 ♀, VII-13-54 (R. H. Goodwin, CIS). MENDOCINO Co.: Hopland, 1 ♂, Frick trap in walnut, IX-12-57 (R. A. de Grassi, CDA); 1 ♀, Frick trap in cherry, X-1-56 (W. W. Wiard, CDA). MODOC Co.: Lake City, 1 ♀, VII-26-22 (C. L. Fox, CIS); 1 ♀, VII-26-22 (C. L. Fox, CAS); 1 ♂, 1 ♀, Frick trap, IX-59 (L. White, CDA); 1 ♀, VIII-2-22 (C. L. Fox, CAS). MONO Co.: Leevining Canyon, bottom S turn, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). Tioga Pass, 5.6 mi. E. on Highway 120, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). MONTEREY Co.: Monterey County, 1 ♂, Frick trap in walnut, X-15-57 (CDA). NAPA Co.: Calistoga, 1 ♂, Frick trap, VII-8-57 (D. D. Taylor, CDA); 1 ♀, Frick trap in walnut, IX-6-56 (R. Lewis, CDA). Gordon Valley, 8 ♂♂, 2 ♀♀, Frick trap, VII-8-57 (Henry Stabo, CDA). Napa, 1 ♂, Frick trap, Summer 57 (CDA). NEVADA Co.: Grass Valley, 1 ♂, Frick trap, X-15-56 (Ralph Freeman, CDA). SAN BENITO Co.: Hollister, 1 ♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). SAN BERNARDINO Co.: Ontario, 1 ♀, Frick trap in peach, IX-15-57 (H. R. Moffitt, UCR). SAN DIEGO Co.: Dulzura, 3 ♂♂, 2 ♀♀, reared larvae from wild rose fruit, V-16-50 (E. D. Algert, USNM). Laguna Mountains, 1 ♀, Frick trap, IX-14-59 (CDA). Otay Mesa, 1 ♂, 1 ♀, rose haws, IV-1-47 (G. Beevor, CDA). SAN MATEO Co.: La Honda, 1 ♂, reared from rose haws, collected IX-11-29, emerged II-2-31, (CDA); 1 ♂, reared from wild rose haws, II-12-31 (CDA); 1 ♂, reared from wild rose haws, II-12-31 (USNM). Protola Valley, 1 ♂, Frick trap in plum, VII-20-59 (B. Fisher and T. R. Haig, CDA). SANTA BARBARA Co.: Carpinteria, 1 ♂, 2 ♀♀, Frick trap in black walnut, IX-5-57 (G. Beevor and H. T. Osborn, CDA). Summerland, 1 ♀, Frick trap in black walnut, VIII-12-57 (G. Beevor, CDA). SANTA CLARA Co.: Campbell, ½ mi. N., 1 ♂, VII-28-50 (R. P. Allen, CDA). Evergreen, 1 ♂, 1 ♀, Frick trap, IX-5-57 (Ralph Freeman, CDA). Stanford University, 5 ♂♂, 3 ♀♀, reared, 1930 or 1931 (C. D. Duncun, SJS). SANTA CRUZ Co.: Aptos, 1 ♂, wild rose, II-5-31 (CDA). Santa Cruz Big Trees, 1 ♂, VIII-16-35 (P. H. Timberlake, UCR). SISKIYOU Co.: Dunsuir, 1 ♂, Frick trap in cherry, VI-18-59 (Truitt and Forbes, CDA). Etna, 1 ♀, Frick trap in cherry, VII-3-52 (CDA). Happy Camp, 3 ♂♂, 1 ♀, Frick trap in cherry, VII-27-55 (W. W. Wiard, CDA); 9 ♂♂, 2 ♀♀, Frick trap, VII-14-56 (W. W. Wiard, CDA). Hornbrook, 1 ♂, Frick trap, VII-26-55 (W. W. Wiard, CDA). Horse Creek, 1 ♀, VII-10-52 (R. P. Allen, CDA). McKinney Creek, 1 ♂, VII-8-52 (R. P. Allen, CDA). Yreka, 1 ♀, Frick trap, VII-36-55 (W. W. Wiard, CDA). SOLANO Co.: Suisun, 1 ♂, Frick trap in cherry, VI-57 (G. A. Pohl, CDA). Vallejo, 1 ♂, Frick trap in walnut, IX-57 (G. A. Pohl, CDA). Vacaville, 1 ♀, reared from rose haws, I-5-31 (H. H. Keifer, LACO); 1 ♂, reared from rose haws, I-7-31 (H. H. Keifer, CDA); 1 ♂, reared from rose haws, I-12-31 (H. H. Keifer, CDA); 1 ♂, reared from rose haws, VIII-10-30 (H. H. Keifer, CDA); 1 ♂, 1 ♀, reared from rose haws, I-10-31 (H. H. Keifer, SU); 1 ♂, reared from wild rose haws, I-12-31 (H. H. Keifer, USNM); 1 ♀, reared from wild rose haws, I-10-31 (Keifer, USNM). SONOMA Co.: El Verano, 2 ♀♀, Glycene lye trap, VII-12-55 (R. P. Allen, CDA). Healdsburg, 1 ♀, Frick trap, VII-5-57 (W. A. Tillinghast, Jr., CDA). Kenwood, 1 ♂, Frick trap, VII-8-57 (R. Spadoni, CDA). Petaluma, 1 ♂, 2 ♀♀, Frick trap, VII-26-55 (R. P. Allen, RFW). Santa Rosa, 2 ♂♂, Frick trap, VII-8-57 (R. Spadoni, CDA); 1 ♂, Frick

trap, VII-13-56 (G. Dimalla, CDA). Sebastopol, 2 ♂♂, Frick trap in cherry, VII-3-54 (R. P. Allen and R. A. Ballard, CDA). Sonoma, 1 ♀, XII-25-59 (T. R. Haig, CDA). TRINITY Co.: Burnt Ranch, 1 ♀, Frick trap in cherry, VII-15-57 (M. Truitt, CDA).

The synonymy of this species has been reviewed in detail by Stone (1951) and the biology and host relationships by Balduf (1959). *R. basiola* may be distinguished from all other California *Rhagoletis* by the presence in cell  $R_1$  of an isolated costal dark spot apical of the stigma, and by the nearly complete lack of dark markings on the yellowish-brown head, thorax, and abdomen.

*R. basiola* is apparently restricted to the genus *Rosa*, of which at least 19 species are known to be hosts throughout its range.



Map 63. Distribution in California of *Rhagoletis berberis* Curran

### *Rhagoletis berberis* Curran

(Fig. 71; Map 63)

*Rhagoletis berberis* Curran, 1932, Amer. Mus. Novitates, No. 526:8, fig. 61. Holotype ♀; Hood River, Ore. (AMNH).

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

*California records*.—LASSEN Co.: Susanville, 1 ♂, Frick trap in cherry, VII-59 (E. E. Fix, CDA). MENDOCINO Co.: Hopland, 1 ♀, Frick trap in plum, VII-2-59 (T. R. Haig, CDA). MARIPOSA Co.: Yosemite National Park, Waterwheel Falls, 1 ♂, VII-28-39 (R. L. Usinger, CIS). SISKIYOU Co.: Dunsuir, 1 ♀, Frick trap in cherry, VII-19-52 (R. P. Allen, CDA). Etna, 1 ♂, Frick trap in cherry, VII-25-52 (R. P. Allen, CDA); ½ mi. S., 2 ♀♀, Frick trap in cherry, VII-17-52

(R. P. Allen, CDA). Happy Camp, 8 ♂♂, 1 ♀, VII-27-51 (R. M. Hawthorne, CDA); 1 ♂, 1 ♀, VI-24-51 (D. Robinson and C. Gammon, CDA); 5 ♂♂, collected from *Berberis*, VII-5-51 (D. W. Robinson, CDA); 1 (abdomen missing), VI-14-51 (R. M. Hawthorne, CDA); Buckhorn Ranch, 1 ♀, Frick trap, VII-10-52 (D. W. Robinson, CDA). Horse Creek, 4 mi. E., 1 ♀, Frick trap, VII-10-52 (R. P. Allen, CDA). Mount Shasta, 1 ♀, Frick trap in cherry, VII-2-59 (C. Cason, CDA). Scott Bar, 1 ♀, pie cherry tree, VII-7-58 (M. Truitt, CDA). Yreka, 1 ♂, 4 ♀♀, Frick trap in cherry, VIII-1-57 (W. W. Wiard, CDA); 1 ♂, VII-9-52 (R. P. Allen, CDA); 1 ♂, 1 ♀, VII-5-51 (R. P. Allen, CDA); 3 ♂♂, 3 ♀♀, Frick trap, VII-26-55 (W. W. Wiard, CDA); 1 ♂, 4 ♀♀, Frick trap in cherry, VIII-1-57 (W. W. Wiard, CDA); 1 ♀, Frick trap, VII-28-55 (D. P. Haley, RFW).

This relatively little-known species closely resembles *R. cingulata indifferens* in that the apical costal band is not separated from the costa by a hyaline area along its length. However, the small elongated hyaline spot at the apex of vein  $R_{2+3}$  so characteristic of *indifferens* is completely lacking in *berberis*. The two apical dark bands may be completely separated from each other at the costa in some specimens.

The type and paratypes of this species were reared from *Berberis nervosa*.



Map 64. Distribution in California of *Rhaagoletis cingulata indifferens* Curran

*Rhaagoletis cingulata indifferens* Curran  
(Fig. 72; Map 64)

*Rhaagoletis indifferens* Curran, 1932, Amer. Mus. Novitates, No. 526:8, fig. 5. Holotype ♂; Hood River, Ore. (AMNH).

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

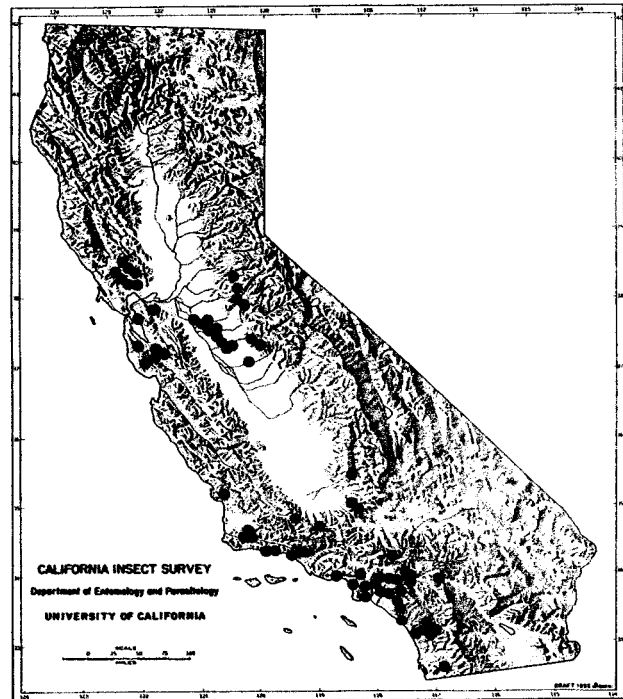
**California records.**—DEL NORTE CO.: Crescent City, Peacock Ranch, 4 ♂♂, 4 ♀♀, Frick trap in *Prunus emarginata*, VIII-31-60 (T. O. Peacock, CDA). Gasquet, 12 mi. E., U. S. F. S. Old Lookout, Bear Basin, larvae, in fruit of *Prunus emarginata*, IX-21-60 (Peacock and Forbes, CDA). EL DORADO CO.: Wrights Lake, 3 mi. S., 1 ♀, Frick trap in *Prunus emarginata*, IX-16-42 (G. Beevor, CDA). HUMBOLDT CO.: Hoopa, 3 mi. N.W., 30 ♂♂, 16 ♀♀, Frick trap in seedling cherry, VIII-14-58 (CDA). Korbekel, 8 mi. E., 1 ♂, Frick trap in seedling cherry, IX-8-60 (R. E. Graham, CDA). Weitchpec, 1 ♂, Frick trap in cultivated cherry, VIII-22-57 (M. Truitt, CDA). NEVADA CO.: Moss Acres, 4 ♂♂, 7 ♀♀, *Prunus emarginata*, VIII-18-42 (S. C. Jones and G. Beevor, SCJ). Nevada City, 7 ♂♂, *Prunus emarginata*, VIII-13-42 (S. C. Jones, SCJ); 1 ♂, 1 ♀, trap in *Prunus emarginata*, VIII-4-42 (G. Beevor, CDA). North Bloomfield, 2 mi. N., Frick trap in *Prunus emarginata*, VII-27-60 (D. A. Taylor, CDA). SARDINE DISTRICT, 21 ♂♂, 2 ♀♀, *Prunus emarginata*, VIII-1-40 (G. Beevor, CDA); 15 ♂♂, 2 ♀♀, *Prunus emarginata*, VII-31-40 (G. Beevor, CDA); 9 ♂♂, 2 ♀♀, *Prunus emarginata*, VII-31-40 (G. Beevor, USNM); 15 ♂♂, 1 ♀, *Prunus emarginata*, VIII-1-40 (G. Beevor, USNM). Sardine Springs, 1 ♀, trap in *Prunus emarginata*, VIII-4-42 (G. Beevor, CDA). Nevada County, 1 ♂, 1 ♀, 1952, (CDA). PLACER CO.: Airport Camp, 10 ♂♂, 2 ♀♀, ex *Prunus emarginata*, IX-6-45 (G. Beevor, CDA). Blue Canyon, 1 (abdomen missing), 1952, (CDA). Dutch Flat, 1 mi. E., larvae, in fruit of *Prunus emarginata*, 3,490 ft., IX-21-52 (F. L. Blanc, CDA). Emigrant Gap, 7 ♂♂, 7 ♀♀, reared from *Prunus emarginata*, IX-7-38 (S. Smith, CDA); 1 ♂, 3 ♀♀, reared from *Prunus emarginata*, IX-20-59 (H. H. Keifer, CDA); 3 ♂♂, 2 ♀♀, *Prunus emarginata*, VIII-5-42 (G. Beevor, CDA); 1 ♂, reared from *Prunus emarginata*, collected IX-20-38, emerged IV-8-39, (H. H. Keifer, USNM); 1 ♂, reared from *Prunus emarginata*, collected IX-20-38, emerged VI-2-39, (H. H. Keifer, USNM); 1 ♂, from *Prunus emarginata*, IX-7-38 (S. Smith, USNM); 1 ♂, from *Prunus emarginata*, collected IX-7-38, emerged V-23-39 (USNM). Towle, 1 ♀, VIII-20-38 (Gene Russell, UK). PLUMAS CO.: Almanor Lake, on *Prunus emarginata*, VIII-11-42 (S. C. Jones and G. Beevor, SCJ). SHASTA CO.: Manzanita Lake, 1 larva, in fruit of *Prunus emarginata*, VIII-24-59 (D. Avis, CDA). Ponderosa, 5 larvae, in fruit of *Prunus emarginata*, VIII-17-59 (R. Klander, CDA). SIERRA CO.: Sierra City, 1 ♂, *Prunus emarginata*, VII-24-40 (G. Beevor, CDA); 1 (abdomen missing), 1952 (CDA); 5 ♂♂, *Prunus emarginata*, VIII-5-42 (G. Beevor, CDA); 1 ♀, *Prunus emarginata*, VII-14-42 (G. Beevor, CDA); 1 mi. S., 8 ♂♂, 2 ♀♀, *Prunus emarginata*, VIII-12-42 (G. Beevor, CDA). SISKIYOU CO.: Bartle, 4 ♂♂, 3 ♀♀, from *Prunus emarginata*, VIII-5-40 (G. Beevor, USNM). Bartle District, 17 ♂♂, 6 ♀♀, *Prunus emarginata*, VIII-5-40 (G. Beevor, CDA). Dunsmuir, 1 ♀, reared from pupa under pie cherry, V-25-52 (D. W. Robinson, CDA); 1 ♂, 1 ♀, Frick trap, VII-25-52 (CDA); 1 ♂, VII-13-51 (R. P. Allen, CDA); 1 ♀, puparium collected under pie cherry III-26-52 (reared at Hamburg), emerged V-27-52 (D. W. Robinson, CDA); 1 ♂, Frick trap in cherry, VII-2-52 (R. P. Allen, CDA); 2 ♂♂, reared from puparia from under pie cherry, VI-4-52 (D. W. Robinson, CDA); 2 ♂♂, 1 ♀, Frick trap in cherry, VI-5-52 (R. P. Allen, CDA); 3 ♂♂, 1 ♀, Frick trap in cherry, VII-29-52 (R. P. Allen, CDA); 1 ♂, 1 ♀, from puparia collected under pie cherry III-26-52

(reared at Hamburg), emerged V-28-52 (D. W. Robinson, CDA); 1 ♂, from puparium collected under pie cherry III-26-52 (reared at Hamburg), emerged VI-9-52 (D. W. Robinson, CDA); 1 ♀, Frick trap in cherry, VII-14-60 (E. Harris, CDA); 3 mi. N., 1 ♂, 1 ♀, Frick trap in cherry, VII-21-52 (CDA). Dunsmuir, St. Germain's, 1 ♂, 1 ♀, Frick trap in cherry, VII-19-52 (R. P. Allen, CDA). Etna, 1 ♀, Frick trap, VIII-22-57 (M. Truitt and W. W. Wiard, CDA). Hamburg, 2 ♂♂, 1 ♀, cherry, VII-5-50 (H. T. Osborn, CDA); 2 ♂♂, 1950, (CDA); 1 ♂, 1 ♀, on cultivated cherry, VII-7-50 (Osborn, Cook, and Wallier, CDA); 1 ♂, 1 ♀, Frick trap, V-28-51 (R. P. Allen, CDA); 2 (abdomens missing), cherry, VII-11-50 (H. T. Osborn, CDA); 1 (abdomen missing), cherry, VII-5-50 (H. T. Osborn, CDA). Happy Camp, 1 ♂, cultivated cherry, VI-20-51 (R. M. Hawthorne, CDA); 1 ♂, reared from test plot. VII-11-52 (D. W. Robinson, CDA). Happy Camp, Fowler Property, 1 (abdomen missing), reared from test plot group 2, from 1951 collection, VII-11-52 (D. W. Robinson, CDA). Hilt, 1 ♂, Frick trap, 1957, (CDA). Horse Creek, 1 ♀, Frick trap in cultivated cherry, VIII-12-57 (C. Cason and R. Houdeshell, CDA). Humbug, 2 ♂♂, 1 ♀, Frick trap in pie cherry, VII-8-60 (R. Klander, CDA). Humbug, 6 mi. w. of Yreka, U. S. F. S. Guard Station, 1 ♂, Frick trap in pie cherry, VIII-7-57 (C. Cason and R. Houdeshell, CDA). McCloud, 1 ♂, *Prunus emarginata*, VIII-10-42 (S. C. Jones, SCJ); 1 ♂, reared from *Prunus emarginata*, VI-15-43 (H. H. Keifer, CDA); 100 ♂♂, 27 ♀♀, *Prunus emarginata*, VIII-8-42 (G. Beevor, CDA); 5 ♂♂, *Prunus emarginata*, VIII-8-42 (G. Beevor, UCD); 104 ♂♂, 59 ♀♀, *Prunus emarginata*, VIII-6-40 (G. Beevor, CDA); 25 ♂♂, *Prunus emarginata*, VIII-1-42 (G. Beevor, CDA); 26 ♂♂, 3 ♀♀, *Prunus emarginata*, VIII-27-42 (G. Beevor, CDA); 2 ♂♂, 6 ♀♀, reared from *Prunus emarginata*, collected 1942, emerged VII-1-43 (G. Beevor, CDA); 33 ♂♂, 25 ♀♀, *Prunus emarginata*, VIII-6-40 (G. Beevor, USNM); 2 ♂♂, from *Prunus emarginata*, VIII-8-40 (G. Beevor, USNM). Montague, Willow Creek Road, larvae in cherries, VII-19-57 (Charles Cason, CDA); Ed Silva property, 22 mi. N.E., larvae in cherries, VII-23-57 (M. Truitt, CDA). Mount Shasta (city), 1 ♀, *Prunus* sp., VII-16-39 (E. H. Fosen, CDA); 1 ♂, 1 ♀, Frick trap in cherry, VII-21-52 (CDA); 1 ♂, VIII-6-58 (J. A. Powell, CIS); 3 ♂♂, Frick trap in cherry, VII-30-52 (R. P. Allen, CDA); 2 ♂♂, Frick trap in Royal Ann Cherry, VIII-12-57 (C. Cason and W. W. Wiard, CDA); 1 mi. E., 5 ♂♂, 1 ♀, *Prunus emarginata*, VIII-10-42 (S. C. Jones, SCJ); 1 mi. E., 2 ♂♂, 1 ♀, *Prunus emarginata*, VIII-11-42 (S. C. Jones, SCJ). Sawyers Bar, 1 ♀, cherry, VII-8-58 (M. Truitt and T. Gallion, CDA). Seiad, 11 ♂♂, 5 ♀♀, Frick trap in cultivated cherry, VIII-15-57 (M. Truitt, CDA). Thompson Creek, 1 ♀, Frick trap in cultivated cherry, VIII-22-57 (C. Cason and M. Truitt, CDA). Yreka, 1 ♂, Frick trap in sour cherry, VIII-9-57 (W. W. Wiard and M. Truitt, CDA). TRINITY CO.: Callahan, Scott Mountain Summit, 1 larva, in fruit of *Prunus emarginata*, VIII-19-59 (R. Klander, CDA). Helena, 1 ♂, Frick trap in cultivated cherry, VII-14-60 (R. Graham, CDA). Trinity Center, 1 larva, in fruit of *Prunus emarginata*, VIII-19-59 (R. Klander, CDA).

*R. c. indifferens* is the only California member of the genus in which the apical costal band is narrowly split by a wedge-shaped hyaline mark which extends from the apex of cell  $R_3$  basally at least to vein  $R_{4+5}$ . When this hyaline wedge is long enough to

attain the costa near the apex of vein  $R_{2+3}$ , a segment of the anterior fork of the costal band is isolated by a hyaline area at the apices of cells  $R_3$  and  $R_5$ . Frick (1954) has presented an extensive account of the bionomics of *cingulata indifferens* with a long bibliography, and Blanc and Keifer (1955) have discussed in detail the taxonomy and host relationships of the two geographical populations of *R. cingulata* in North America.

Of primary economic importance to cherry growers in the Pacific Northwest, *indifferens* has been reared many times throughout its range from cultivated varieties of sweet and sour cherry (*Prunus avium* and *P. cerasus*, respectively) and from *Prunus emarginata*, the bitter cherry, a native plant on the Pacific Coast.



Map 65. Distribution in California of *Rhagoletis completa* Cresson

*Rhagoletis completa* Cresson

(Fig. 73; Map 65)

*Rhagoletis suavis* ssp. *completa* Cresson, 1929, Trans. Amer. Ent. Soc., 55:412, pl. XVI, fig. 9. Holotype ♂; Chino, San Bernardino Co., Calif. (ANSP).

**Geographic range.**—California, Kansas, Minnesota, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Washington.

**California records.**—ALAMEDA CO.: Alameda, 1 ♂, Frick trap in plum, IX-59 (H. Zepeda, CDA). AMADOR CO.: Pioneer, 1 ♂, Frick trap in Persian walnut, IX-16-60 (L. Brown, CDA). CALAVERAS CO.: Angels Camp, 1 ♀, Frick trap in black walnut, IX-59 (Calaveras County, CDA); 1 ♀, Frick trap in English walnut, IX-59 (Calaveras County, CDA). Mountain

Ranch, 1 ♂, Frick trap in walnut, IX-30-58 (W. B. Andahl and F. Peterson, CDA). Murphys, 1 ♂, 3 ♀♀, Frick trap in walnut, X-60 (W. B. Andahl, CDA). CONTRA COSTA Co.: Pleasant Hill, 1 ♀, Frick trap, X-30-59 (J. Phillips and T. R. Haig, CDA). KERN Co.: Bodfish, Highway 178, 1 ♂, Frick trap in black walnut, 2,600 ft., IX-27-56 (G. Beevor, CDA). Caliente, 1 ♀, Frick trap in walnut, IX-12-57 (G. Beevor, CDA). Frazier Park, 1 ♂, 2 ♀♀, Frick trap in walnut, IX-25-56 (G. Beevor, CDA). Keene, 1 ♂, Frick trap in walnut, IX-12-57 (G. Beevor, CDA). Klipstine Canyon, 10 mi. S. of Maricopa, 1 ♀, Frick trap in walnut, VIII-23-57 (G. Beevor, CDA). Tehachapi, 1 ♀, Frick trap in walnut, IX-12-57 (G. Beevor, CDA). LOS ANGELES Co.: Beverly Hills, McPhail trap (SIB-7), VII-6-60 (Los Angeles County, LACO). Big Pines, 1 ♂, Frick trap in *Prunus emarginata*, VIII-31-60 (C. Gammon, CDA). Downey, McPhail trap (SIB-7), VII-27-60 (Los Angeles County, LACO). Inglewood, McPhail trap (SIB-7), VII-8-60 (Los Angeles County, LACO). La Puente, McPhail trap (SIB-7), VII-12-60 (Los Angeles County, LACO). Long Beach, McPhail trap (SIB-7), VII-15-60 (Los Angeles County, LACO). Los Angeles, 1 ♂, 1 ♀, walnut hulls, VI-10-28 (H. M. Armitage, USNM). Maywood, McPhail trap (SIB-7), VII-12-60 (Los Angeles County, LACO). Pomona, 58 ♂♂, 27 ♀♀, reared from *Juglans cinerea*, IX-37 (F. R. Platt, LAM); 18 ♂♂, 10 ♀♀, VIII-10-29 (C. Gammon, CDA); 8 ♂♂, 4 ♀♀, from walnut, VIII-12-40 (G. Beevor, CDA); 22 ♂♂, 13 ♀♀, VIII-10-29 (C. Gammon, CDA); 4 ♂♂, 2 ♀♀, VIII-31 (UCLA); 1 ♂, 3 ♀♀, (Boyce Collection, UCLA); (paratype), 1 ♂, VIII-10-29 (C. Gammon, CDA); (paratype), 1 ♀, VIII-10-29 (C. Gammon, CAS). Whittier, 2 ♂♂, 4 ♀♀, from walnut, VII-31-50 (H. M. Graham, CIS); McPhail trap (SIB-7), VII-1-60 (Los Angeles County, LACO). Los Angeles County, 7 ♂♂, 3 ♀♀, V-17-52 (R. Laxineta, UCLA). MARIPOSA Co.: Cathay, 1 ♀, Frick trap in black walnut, IX-17-58 (R. P. Allen, CDA). Hornitos, 1 ♀, Frick trap in black walnut, IX-17-58 (R. P. Allen, CDA). MENDOCINO Co.: Hopland, 12 mi. S., on U.S. Highway 101, 1 ♀, Frick trap in walnut, IX-9-57 (T. Erikson, CDA). MERCED Co.: Cressy, 1 ♂, Frick trap in walnut, VIII-25-59 (J. Coffey and R. P. Allen, CDA). Delhi, 1 ♂, Frick trap in peach, VIII-29-60 (M. Tanner, CDA). Le Grand, 1 ♀, Frick trap in walnut, IX-17-57 (R. P. Allen, CDA). Livingstone, 1 ♀, Frick trap in peach, VIII-26-60 (M. Tanner, CDA). Winton, 1 ♂, Frick trap in peach, VIII-29-58 (J. Smith, CDA). NAPA Co.: Calistoga, 1 ♂, Frick trap in walnut, 1959, (H. Stabo, CDA). Napa, 3 mi. N.W., 1 ♂, 2 ♀♀, Frick trap in walnut, VIII-16-57 (CDA). Oakville, 1 ♂, Frick trap in walnut, VIII-19-59 (H. Stabo, CDA). St. Helena, 2 mi. S., 1 ♂, Frick trap in walnut, X-17-56 (R. E. Barrett, CDA). Yountville, 1 ♀, Frick trap in walnut, IX-5-57 (CDA). ORANGE Co.: Brea, 2 ♂♂, reared from *Juglans* sp., IV-20-38 (C. E. Norland, LAM). Fullerton, 2 ♂♂, 3 ♀♀, VII-29-58 (R. M. Bohart, UCD). Olive, 1 ♂, McPhail trap in orange, 1957 (T. Carroll, CDA). Orange, McPhail trap in fig, VIII-26-60 (C. Johnson, CDA). Silverado, McPhail trap in orange, VII-29-60 (C. Johnson, CDA). Trabuco, McPhail trap (SIB-7) in orange, IX-23-60 (C. Johnson, CDA). Yorba Linda, McPhail trap (SIB-7) in orange, VIII-31-60 (C. Johnson, CDA). RIVERSIDE Co.: Nr. Chino, 2 ♂♂, Persian walnuts, VIII-22-38 (A. M. Boyce, USNM). Corona, 1 ♀, on walnut leaf, VII-20-52 (C. M. Finnell, CDA). Riverside, 2 ♀♀, from walnut, VIII-28-43 (S. C. Jones, SCJ); 12 ♂♂, 9 ♀♀, reared from walnut, V-21-57 (H. R. Moffitt, UCD); 3 ♂♂, X-37 (E. S. Ross,

CAS); 1 ♀, VI-1-39 (W. C. Bush and B. Brookman, CAS); 9 ♂♂, 15 ♀♀, reared from black walnut, emerged VIII and IX-49 (P. H. Timberlake, UCR); 22 ♂♂, 11 ♀♀, VIII-26-52 (UCLA). SAN BERNARDINO Co.: Chino (paratypes), 4 ♂♂, 2 ♀♀, Persian walnut, VIII-15-29 (A. M. Boyce, USNM); (topotype), 1 ♂, VIII-30 (A. M. Boyce, CIS); 1 ♂, 2 ♀♀, Persian walnut, VIII-10-28 (A. M. Boyce, CIS); 1 ♂, II-34 (LAM); 1 ♀, VI-34 (LAM); 4 ♂♂, 4 ♀♀, from *Juglans regia*, IX-28 (C. Gammon, CDA); 7 ♂♂, 5 ♀♀, VII (UCLA); 1 ♂, 1 ♀, VIII-31 (UCLA); 3 ♂♂, 2 ♀♀, VII-30-29 (FDA); 9 ♂♂, ex Persian walnut, IX-10-29 (A. M. Boyce, AMNH); 5 ♂♂, 7 ♀♀, VII-30-29 (USNM); 2 ♂♂, 3 ♀♀, Persian walnut, VIII-15-28 (A. M. Boyce, USNM). Colton, larvae, in fruit of peach, IX-14-60 (R. Birdsell, CDA). Fontana, McPhail trap (SIB-7) in grapefruit, VIII-24-60 (E. Wright, CDA). Ontario, 1 ♀, Frick trap, VIII-21-59 (E. Wright, CDA); 1 ♂, 13 ♀♀, Frick trap, VIII-21-59 (E. Wright, CDA); 1 ♀, VII-18-50 (CDA). Yucaipa, larvae, in fruit of peach, IX-19-60 (A. Langley, CDA). SAN DIEGO Co.: Bonsall, McPhail trap (SIB-7) in orange, IX-20-60 (C. Johnson, CDA). Lyons Guard Station, 1 ♂, Frick trap, IV-2-59 (CDA). Pauma Valley, McPhail trap (SIB-7) in orange, VIII-13-60 (C. Johnson, CDA). Rainbow Valley, McPhail (SIB-7) trap in orange, IX-20-60 (C. Johnson, CDA). San Clemente, McPhail (SIB-7) trap in orange, VIII-29-60 (C. Johnson, CDA). San Luis Rey, McPhail trap (SIB-7) in orange, VIII-29-60 (C. Johnson, CDA). Valley Center, 1 ♂, 1 ♀, ex walnut, IX-10-40 (R. R. McLean, CDA). SAN JOAQUIN Co.: Escalon, 1 ♀, Frick trap in black walnut, IX-11-58 (J. L. Joos, CDA). Lathrop, 3 mi. S.W., 1 ♀, Frick trap in black walnut, IX-17-58 (J. L. Joos, CDA). Manteca, 1 ♂, Frick trap in black walnut, IX-11-58 (J. L. Joos, CDA); 4 mi. E., 3 ♂♂, 3 ♀♀, McPhail trap in tangerine, IX-6-58 (L. O. Stierlin, CDA). Ripon, 1 ♀, Frick trap in black walnut, VIII-27-58 (J. L. Joos, CDA). SAN LUIS OBISPO Co.: San Luis Obispo, 1 ♂, Frick trap in walnut, XI-3-60 (W. Fray, CDA). SAN MATEO Co.: Portola Valley, 1 (sex not known), Frick trap in walnut, X-22-60 (R. Mickelsen, CDA). SANTA BARBARA Co.: Buellton, 1 ♂, Frick trap in black walnut, IX-18-58 (G. Beevor, CDA). Carpinteria, at Ventura County line, larvae, in Persian walnut husks, IX-24-56 (G. G. Beevor, CDA); 2 ♂♂, 1 ♀, Frick trap in black walnut IX-24-56 (G. Beevor, CDA). Golita, 5 ♂♂, 4 ♀♀, McPhail trap (SIB-7), IX-25-58 (G. Beevor, CDA). Los Olivos, 1 ♀, Frick trap in black walnut, IX-11-58 (G. Beevor, CDA). Santa Barbara, 1 ♂, Frick trap in walnut, IX-8-58 (CDA). Santa Ynez, 1 ♀, Frick trap in walnut, VII-29-58 (M. E. Cravens, CDA). Solvang, 1 ♀, Frick trap in walnut, IX-23-58 (CDA). SANTA CLARA Co.: Campbell, 1 ♂, Frick trap in walnut, IX-5-57 (Anthony Ross, CDA); 1 ♂, Frick trap in walnut, IX-5-57 (Anthony Ross, CDA). Los Gatos, 1 ♀, Frick trap in walnut VII-15-58 (CDA). San Jose, 38 larvae, walnut husks, IX-13-58 (CDA). Santa Clara, 16 larvae, walnut husks, IX-17-58 (CDA). SANTA CRUZ Co.: Burrell, 1 ♀, Frick trap in cherry, VIII-13-58 (CDA). SONOMA Co.: Boyes Springs, 1 ♂, Frick trap in walnut, VII-15-57 (CDA). Eldridge, 1 ♂, Frick trap in walnut, VIII-21-57 (CDA). Kenwood, 1 ♂, Frick trap in walnut, VII-19-57 (CDA). Sonoma, 2 ♀♀, XII-22-59 (T. R. Haig, CDA); 1 ♀, Frick trap in Persian walnut, IX-4-56 (H. Ballert, CDA); 5 larvae, in husk of black walnut, IX-19-56 (B. L. Pedrazini, CDA). STANISLAUS Co.: Denair, 2 larvae, in walnut husk, IX-17-57 (CDA). Empire, 1 ♂, 2 ♀♀, McPhail trap in lime, VIII-29-58 (CDA). Hugh-



son, 15 larvae, in walnut husk, IX-17-57 (CDA). Modesto, 1 ♂, 1 ♀, Frick trap in walnut, IX-9-57 (R. P. Allen, CDA); 2½ mi. N., 1 ♂, Frick trap in walnut, IX-12-57 (Gary Posz, CDA); 5 mi. N.W., 1 larva in walnut husk, IX-11-57 (CDA). TUOLOMNE CO.: Columbia, Frick trap in walnut, VIII-25-60 (S. M. Fullerton, CDA). Sonora, 1 mi. E., 1 ♀, Frick trap in black walnut, IX-18-58 (CDA). VENTURA CO.: Meiners Oaks, McPhail trap (SIB-7) in plum, VIII-29-60 (B. Osuna, CDA). Ojai, McPhail trap (SIB-7) in peach, VIII-29-60 (B. Osuna, CDA).

The brownish-yellow mesonotum and dark, wide wing bands, in addition to the key characters and host, make *R. completa* easily recognized. This species is the subject of an exhaustive biological study by Boyce (1934).

Throughout its range this fly has been reared from nearly every variety of Persian walnut (*Juglans regia*) and from many wild species and hybrids of *Juglans*. *R. completa* is known to infest peaches growing in the immediate vicinity of walnuts. Females have deposited their eggs in many other kinds of fruits and some vegetables under artificial conditions, but the larvae have failed to complete development.



Map 66. Distribution in California of *Rhaгоletis fausta* (Osten Sacken)

*Rhaгоletis fausta* (Osten Sacken)

(Fig. 74; Map 66)

*Trypeta (Acidia) fausta* Osten Sacken, 1877, Bull. U.S. Geol. and Geogr. Survey, 3(2):346. Syntypes ♂ and ♀; Mt.

Washington, N. H. (MCZ).

**Geographic range.**—Southern Canada; northern United States and California.

**California records.**—ALPINE CO.: Ebbett Pass, Highway 4, ½ mi. W. of Highland Lake Road, 1 larva, in fruit of *Prunus emarginata*, IX-13-60 (R. P. Allen, CDA). Woodfords, 1 ♂, *Prunus emarginata*, VII-29-40 (G. Beevor, SCJ); 10 ♂♂, 10 ♀♀, Frick trap in *Prunus emarginata*, VII-60 (R. P. Allen, CDA); 1 ♂, ex *Prunus emarginata*, VII-29-40 (G. Beevor, USNM). AMADOR CO.: Lumber Yard Ranger Station, 2 mi. S., Highway 88, 1 ♂, Frick trap in *Prunus emarginata*, X-6-60 (R. P. Allen, CDA). Peddler Hill, 3.8 mi. E., Highway 88, 1 ♂, Frick trap in *Prunus emarginata*, X-6-60 (R. P. Allen, CDA). DEL NORTE CO.: Crescent City, Peacock Ranch, Frick trap in *Prunus emarginata*, IX-1-60 (T. O. Peacock, CDA). EL DORADO CO.: Silver Lake, 1 ♀, *Prunus emarginata*, IX-22-40 (D. B. Mackie, SCJ). FRESNO CO.: Cherry Gap, ¼ mi. N., Highway 180, 1 ♂, Frick trap in *Prunus emarginata*, IX-60 (R. P. Allen, CDA). General Grant Big Tree Grove, 1 larva in *Prunus emarginata*, 1 adult in Frick trap in *Prunus emarginata*, VIII-10-60 (R. P. Allen, CDA). HUMBOLDT CO.: Red Cap Creek, 1 ♂, Frick trap in *Prunus emarginata*, Summer 59, (California Department of Agriculture, CDA). KERN CO.: Piute Peak, 1 (abdomen missing), 8,200 ft., VIII-23-45 (CDA). LAKE CO.: Lake Pillsbury, 4 larvae, in *Prunus emarginata*, IX-2-60 (R. Klander, CDA). MODOC CO.: Cedar Pass, 4 ♀♀, Frick trap in *Prunus emarginata*, VII-11-52 (Loring White, CDA). Lake City, 1 ♀, VII-28-22 (C. L. Fox, CAS). MONO CO.: Tioga Pass, 5.6 mi. E., Highway 120, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). NEVADA CO.: Emigrant Gap, 3 ♂♂, *Prunus emarginata*, VII-26-41 (S. C. Jones, SCJ); 2 ♂♂, 1 ♀, reared from *Prunus emarginata*, collected VII-26-40, emerged V-26-41 (USNM). Nevada City, 1 ♀, McPhail trap, VII-16-42 (G. Beevor, CDA); 2 ♀♀, *Prunus emarginata*, VII-20-42 (G. Beevor, CDA); 2 ♀♀, *Prunus emarginata*, VII-27-42 (G. Beevor, CDA); 3 ♀♀, trap in *Prunus emarginata*, VIII-4-42 (G. Beevor, CDA). Norden, 25 adults, Frick trap in *Prunus emarginata*, VIII-3-60 (D. A. Taylor, CDA). North Bloomfield, 2 adults, Frick trap in *Prunus emarginata*, VIII-3-60 (D. A. Taylor, CDA). Sardine, 1 ♂, *Prunus emarginata*, VII-31-40 (G. Beevor, CDA); 1 ♀, ex *Prunus emarginata*, VII-31-40 (G. Beevor, USNM). Sardine Springs, 5 ♀♀, trap in *Prunus emarginata*, VIII-4-42 (G. Beevor, CDA). PLACER CO.: Baxter, 2 mi. W., ¼ mi. N. of Highway 40, 1 ♂, Frick trap VII-1-52 (CDA). PLUMAS CO.: Almanor Lake, 1 ♂, 2 ♀♀, *Prunus emarginata*, VIII-11-42 (S. C. Jones and G. Beevor, SCJ). SHASTA CO.: Manzanita Lake, 2 mi. S.E. 4 ♂♂, *Prunus emarginata*, VIII-11-42 (G. Beevor, CDA); 1 ♂, *Prunus emarginata*, VIII-11-42 (G. Beevor, UCD); 1 ♂, 2 ♀♀, *Prunus emarginata*, VIII-11-42 (S. C. Jones, SCJ). SIERRA CO.: Downieville, 12 mi. N.E., 1 ♂, (CDA). Sierra City, 1 ♂, *Prunus emarginata*, VII-29-40 (G. Beevor, SCJ); 1 ♂, ex *Prunus emarginata*, collected VII-29-40, emerged V-24-41, (G. Beevor, USNM); 1 mi. S., 1 ♀, Frick trap in *Prunus emarginata*, VIII-4-42 (G. Beevor, CDA). SISKIYOU CO.: Dunsuir (St. Germain Foundation), 1 ♂, Frick trap in cultivated cherry, VII-19-52 (R. P. Allen, CDA). McCloud, 1 ♂, *Prunus emarginata*, VIII-1-42 (G. Beevor, CDA); 1 (abdomen missing), *Prunus emarginata*, VIII-8-42 (G. Beevor, CDA); 1 ♀, reared from *Prunus emarginata*, collected IX-7-40, emerged VI-10-41, (E. H. Fosen, CDA). TEHAMA CO.: Paskenta, 20 mi. W., 2 larvae, in fruit of *Prunus*

*emarginata*, IX-1-60 (R. Klander, CDA). TRINITY Co.: Big Bar, 1 larva, in fruit of *Prunus emarginata*, VII-29-60 (R. Graham and D. Avis, CDA). Ironside Mountain, Green Mountain Road, Frick trap in *Prunus emarginata*- VIII-12-60 (D. Jones, CDA). Weaver Bally, 2 ♀♀, Frick trap in *Prunus emarginata*, VIII-60 (California Department of Agriculture, CDA). TULARE Co.: Guernsey Mill Road, 1 ♂, 7,300 ft., VIII-26-45 (CDA). Pinehurst, 5 ♀♀, *Prunus emarginata*, VIII-19-42 (S. C. Jones and G. Beevor, SCJ). Sequoia Junction, 1 mi. S.W., on Highway 180, 1 ♂, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). Sequoia National Park, 3½ mi. E. of entrance, 2 ♂♂, 3 ♀♀, *Prunus emarginata*, VIII-19-42 (S. C. Jones and Guy Beevor, SCJ). Sequoia National Park, 6 mi. N. of Sequoia Lodge, 2 ♂♂, 3 ♀♀, *Prunus emarginata*, VIII-19-42 (S. C. Jones and G. Beevor, SCJ). Woodcock Meadow, ½ mi. S. of Kings Canyon View, 1 ♀, Frick trap in *Prunus emarginata*, IX-60 (R. P. Allen, CDA). TUOLUMNE Co.: Carson Pass, 0.9 mi. E. of 7,000 ft. marker, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). Carson Pass, 3.5 mi. W., on Highway 108, 1 ♂, Frick trap in *Prunus emarginata*, 8,000 ft., X-7-60 (R. P. Allen, CDA).

*R. fausta* is easily recognized by the extremely wide dark band lying upon vein m, the hyaline spot in that band near the apex of cell 1st M<sub>2</sub>, and the transverse hyaline marking immediately distad of the stigma extending from the costa well into cell R<sub>5</sub>.

Reviews of the biology of this species have been published by Cox (1952) and Frick (1954). The species has been reared from cultivated cherries, *Prunus avium* and *P. cerasus*, and from several wild species of *Prunus*, at various localities. Glasgow (1933) reported that the wild pin cherry, *Prunus pensylvanica*, is the preferred host of *fausta* in New York.

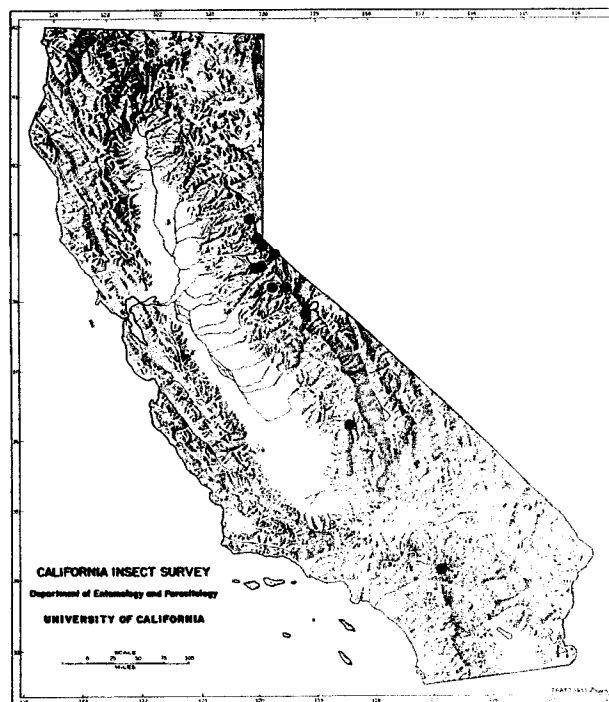
#### *Rhagoletis ribicola* Doane

(Fig. 75; Map 67)

*Rhagoletis ribicola* Doane, 1908, Ent. News, 9:69, pl. I. Holotype ♂; Washington (USNM).

*Geographic range*.—California, Idaho, Montana, and Washington.

*California records*.—ALPINE Co.: Woodfords, 2 mi. W., on Highway 88, 1 ♂, Frick trap in *Prunus emarginata*, X-6-60 (R. P. Allen, CDA). Highway 88 at woods Lake turn off, 1 ♀, Frick trap in *Prunus emarginata*, X-6-60 (R. P. Allen, CDA). AMADOR Co.: Silver Lake, 1 ♂, VIII-24-41 (W. B. Carter, CDA). EL DORADO Co.: Cathedral Lake, Tahoe, 1 ♂, VII-6-15 (E. P. Van Duzee, CIS). Echo Lake, 1 ♀, flying, VIII-40 (UCD). MODOC Co.: Lake City, 1 ♂, Frick trap, IX-59 (L. White, CDA). MONO Co.: Sonora Pass, 5 mi. E., on Highway 108, 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). Tioga Pass, 5.6 mi. E., on Highway 108, 1 ♂, 2 ♀♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). NEVADA Co.: Norden, 1 ♀, on *Prunus emarginata*, VIII-25-59 (D. Avis, CDA). SAN BERNARDINO Co.: Big Bear Lake, 1 ♀, IX-2-50 (Janet Boyce, CDA). SISKIYOU Co.: Dunsmuir, 1 ♂, Frick trap in cherry, VI-23-59 (M. Truitt and Cason, CDA). TULARE Co.: Mineralking, 1 ♀, VII-30-35



Map 67. Distribution in California of *Rhagoletis ribicola* Doane

(CAS). TUOLUMNE Co.: Dardanelles, 2 mi. E., 1 ♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA). Sonora Pass, 1.7 mi. above 7,000 ft. sign, Highway 108, 1 ♂, 2 ♀♀, Frick trap in *Prunus emarginata*, X-7-60 (R. P. Allen, CDA).

Although *ribicola* and *tabellaria* resemble each other closely, there are constant differences between these species: *ribicola* lacks any connection between the two basal brown bands; and Pickett (1937) states that the terminalia of the two species differ markedly.

*R. ribicola* is commonly found on cultivated and wild species of gooseberry and currant.

#### *Rhagoletis tabellaria* (Fitch)

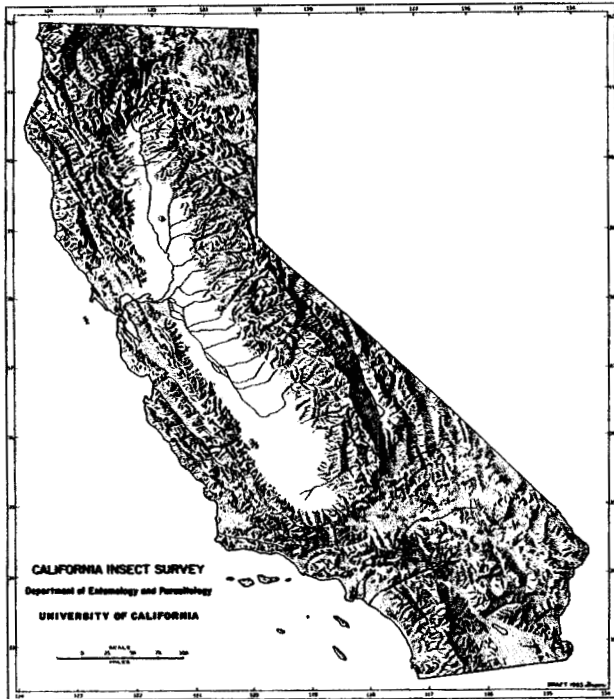
(Fig. 76; Map 68)

*Tephritis tabellaria* Fitch, 1855, Trans. N. Y. State Agric. Soc., 14:770 (1854). Type (sex not known); New York (location of type not known).

*Geographic range*.—British Columbia; California, Oregon, Washington; also southeastern Canada and northeastern United States.

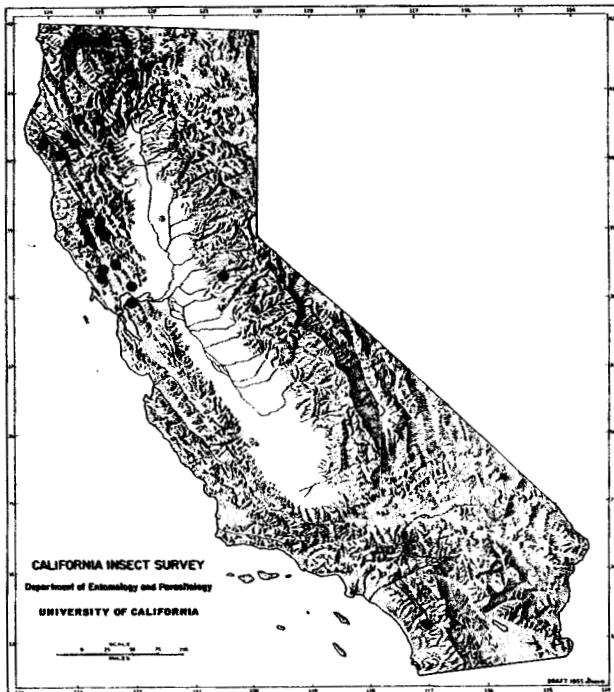
*California records*.—MONO Co.: Mono Lake, 1 ♂, VII-25-31 (J. M. Aldrich, USNM). SISKIYOU Co.: Dunsmuir, Frick trap, VII-25-52 (CDA).

*R. tabellaria* and *ribicola* are the only California representatives of the genus in which the wing pattern has an uninterrupted transverse hyaline band distad of the stigma and a hyaline area between much of the apical costal band and the costa. *R. tabellaria*



Map 68. Distribution in California of *Rhagoletis tabellaria* (Fitch)

is distinguished by the posterior joining of the two basal dark bands. Pickett (1937) indicates that the terminalia of *tabellaria* and *ribicola* differ markedly.



Map 69. Distribution in California of *Rhagoletis zephyria* Snow

### *Rhagoletis zephyria* Snow

(Fig. 77; Map 69)

*Rhagoletis zephyria* Snow, 1894, Kans. Univ. Quart., 2:164, pl. VI fig. 1. Lectotype ♂; southern California (UK).

Synonym.—*Rhagoletis symphoricarpi* Curran, 1924:57.

Geographic range.—Southwestern Canada; western United States and also Florida.

California records.—AMADOR CO.: Volcano, 1 ♂, Frick trap in apple, VIII-60 (R. P. Allen, CDA); 2 larvae, in fruit of *Symphoricarpos albus*, X-6-60 (R. P. Allen, CDA); 1 ♂, Frick trap in black walnut, IX-17-59 (L. Brown, CDA). CONTRA COSTA CO.: Pinole, 1 ♂, Frick trap in peach, X-19-59 (R. DeBoer and J. Moon, CDA). HUMBOLDT CO.: Dinsmore, 1 ♀, Frick trap in cultivated cherry, VIII-60 (CDA). Garberville, 1 ♀, ex snowberry, VI-15-43 (H. H. Keifer, CDA). Honeydew, Frick trap in cultivated cherry, VIII-8-60 (E. Harris, CDA). LAKE CO.: Finley, 1 ♀, Frick trap in walnut, X-10-57 (Rex Lyndall, CDA). Lakeport, 1 ♀, Frick trap in walnut, VIII-15-57 (Ralph Freeman, CDA); 2 ♂♂, 3 ♀♀, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). Upper Lake, 1 ♂, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). MENDOCINO CO.: Hopland, 1 ♀, Frick trap in English walnut, VIII-6-57 (L. Bucknell, CDA). Potter Valley, 2 ♀♀, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). NAPA CO.: Calistoga, 6 ♂♂, 5 ♀♀, Frick trap, VII-8-57 (D. D. Taylor, CDA); 1 ♀, Frick trap, VII-13-56 (R. Griffin, CDA). Napa, 5½ mi. S.W., 1 ♂, VII-18-50 (R. P. Allen, CDA). Napa County, 1 ♂, Frick trap, VII-53 (CDA). SAN DIEGO CO.: Pauma Valley, 1 mi. E. of Pauma store, 1 adult, McPhail trap (SIB-7) in orange, VII-27-60 (Chet Johnson, CDA). SISKIYOU CO.: Barkhouse Creek, 1 ♀, Frick trap, VII-7-51 (R. P. Allen, CDA); 1 mi. S. Klamath River, 1 ♀, VII-21-51 (CDA). DUNSMUIR, 6 ♂♂, 3 ♀♀, Frick trap in cherry, VII-19-52 (R. P. Allen, CDA). North Dunsmuir, 1 ♀, Frick trap, VIII-9-55 (W. W. Wiard, CDA). Etna, 1 ♂, 3 ♀♀, Frick trap in cherry, VII-17-52 (R. P. Allen, CDA); 1 ♂, Frick trap in cherry, VII-25-52 (R. P. Allen, CDA). Happy Camp, 1 ♂, Frick trap, VII-29-55 (W. W. Wiard, CDA); 1 ♂, 1 ♀, Frick trap, VIII-5-55 (W. W. Wiard, CDA). Indian Creek, 1 ♀, Frick trap, VII-23-55 (W. W. Wiard, CDA). Walker Creek, Old Highway 96, 1 ♀, Frick trap in cherry, VII-2-59 (R. Klandler, CDA). Yreka, 1 ♀, Frick trap, VI-28-52 (R. P. Allen, CDA); 1 ♂, VII-5-51 (R. P. Allen, CDA); 1 ♂, Frick trap, VI-27-55 (W. W. Wiard, CDA); 3 ♂♂, 2 ♀♀, Frick trap, VI-26-55 (W. W. Wiard, CDA); 2 ♂♂, 2 ♀♀, Frick trap, VII-28-55 (D. P. Haley, RFW); 1 ♂, 1 ♀, Frick trap, VII-9-52 (R. P. Allen, CDA). SONOMA CO.: Sebastopol, 1 ♂, Frick trap in cherry, VII-3-54 (R. P. Allen, and R. A. Ballard, CDA). Green Valley Road, 1 ♂, VII-19-50 (CDA). Sonoma County, 1 ♀, Frick trap, VII-1-53 (CDA). TRINITY CO.: Cobbs Store, upper Van Duzen River, 1½ mi. S of Low Gap, 1 ♀, Frick trap in cherry, VIII-15-60 (R. E. Graham, CDA). Douglas City, 1 ♀, Frick trap in cherry, VIII-19-60 (D. Jones, CDA). Hawkins Bar, 1 ♂, Frick trap in cherry, VIII-16-60 (D. Jones, CDA). Hyampom, 1 ♂, on leaf of cherry, VIII-8-60 (Dixon James, CDA).

The relationships of the *Rhagoletis* species *pomonella*, *mendax*, *symphoricarpi*, and *zephyria* have long been the subject of dispute. The first three have wing patterns nearly identical to that of *zephyria*, shown in figure 77, and other external morphological

features are so variable or so inadequately studied that no conclusions about their status as species are possible. However, important constant differences in male genitalia between *pomonella* and *zephyria* do exist as shown by Curran (1924) and Benjamin (1934). Further, Benjamin (1934) asserted that the genitalia and other characters of *zephyria* (from California and Florida) and *symphoricarpi* are identical. We prefer to adopt these conclusions until further biological investigations can test their validity. This is the only California *Rhagoletis* lacking a hyaline marking across cell R, immediately apicad of the stigma.

*R. zephyria* has been reared from the fruits of *Symphoricarpos racemosus* (snowberry) in British Columbia, Washington, Oregon, and California. Its close relative, *pomonella*, is a major pest of cultivated apples in the midwestern and eastern United States. However, infestations of apples by snowberry fruit flies have never been observed, even though these two hosts grow in close proximity in many localities along the Pacific Coast.

#### Genus *Stenopa* Loew

These are moderately large, dark flies with many stout, whitish hairs on the head and thorax. The genus is closely related to *Aciurina*, from which it may be distinguished by the wing pattern, the two pairs of scutellar bristles, and the shape of the head. Virtually nothing is known about the biology of the 2 species, one of which is confined to the northern Rocky Mountain region. Quisenberry (1949) discusses the differences between these species.

#### *Stenopa vulnerata* (Loew)

(Fig. 78; Map 70)

*Trypeta vulnerata* Loew, 1873, Smiths. Misc. Collect., 11(256): 232. Holotype ♀; Massachusetts (MCZ).

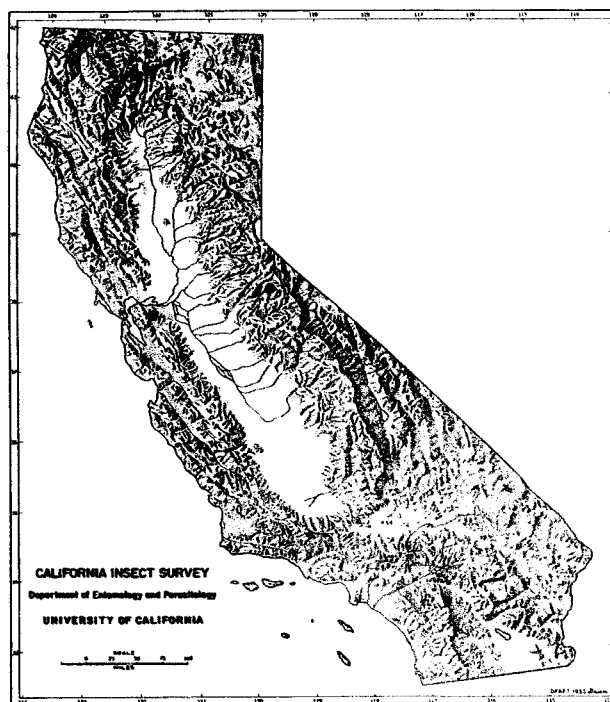
**Geographic range.**—Found in southern Canada and nearly every state in the United States.

**California records.**—CONTRA COSTA CO.: Contra Costa County, 2 ♂♂ (W. M. Wheeler, AMNH). TUOLUMNE CO.: Sonora Pass, 1 ♀, VIII-16-59 (G. T. Stage, and R. R. Snelling, CIS).

In addition to the generic characters, the distinctive wing pattern prevents *vulnerata* from being easily confused with any other North American tephritid.

#### Genus *Strauzia* Robineau-Desvoidy

These are large yellowish flies grossly resembling species of *Epochra*, *Trypeta*, *Orellia*, and *Anastrepha*. Males tend to have somewhat narrower wings than females, and are distinguished by the lower fronto-orbital bristles, which are very large, long, black,



Map 70. Distribution in California of *Stenopa vulnerata* (Loew)

somewhat club-shaped, and borne on distinct ridges at the sides of the frons. *Strauzia* is strictly North American in distribution. The single species, *longipennis*, is extremely widespread, although apparently rare in California. Phillips (1923) discusses the 7 known varieties.

#### *Strauzia longipennis* (Wiedemann)

(Fig. 79)

*Trypeta longipennis* Wiedemann, 1830, Auss. Zweif. Ins., 2:483. Syntypes ♂ and ♀; "Nordamerika" (location of types not known).

**Synonyms.**—*Strauzia armata* Robineau-Desvoidy, 1830:719; *Strauzia inermis* Robineau-Desvoidy, 1830:718; *Tephritis trimaculata* Macquart, 1843:383; *Trypeta cornigera* Walker, 1849:1010; *Trypeta cornigera* Walker, 1849:1011. In 1873, Loew (pp. 239-242) described seven varieties of *longipennis* as follows: *arculata*, *confluens*, *intermedia*, *longitudinalis*, *perfecta*, *typica*, and *vittigera* (see discussion).

**Geographic range.**—Known from nearly every state in the Union.

**California records.**—Only two of the Loew varieties, *typica* and *vittigera*, have been recorded from California; the exact localities are not known. In this study we have seen no California specimens of any of the varieties.

Phillips (1923) presents wing figures and a key to the 7 varieties described by Loew. All of the forms discussed by Phillips, and several more represented by males only, have been found in the course of a

preliminary unpublished study based on a large series of specimens. The results, although not yet complete, seem to show that *longipennis* may consist of more than one distinct species. Only the wing of "variety *vittigera*" is figured in this Bulletin.

Genus *Tephritis* Latreille

*Tephritis* is a genus of small flies with two pairs of lower fronto-orbitals, two pairs of scutellars, grayish pollinose bodies, yellowish legs, and dark wings with hyaline spots. The genus is easily distinguished from *Trupanea* by the two pairs of scutellars and from *Euaresta* by the absence of striations in the anal region of the male claspers. See the discussion of *Paroxyna* for separation from that genus. Almost nothing is known about the biology of these species, but like members of *Trupanea*, they develop in the flower heads and ovaries of various plants. The genus is worldwide in distribution, with 16 Nearctic species, 11 of which occur in California. Quisenberry (1951) and Foote (1959a, 1960d) have revised the Nearctic species.

KEY TO THE CALIFORNIA SPECIES OF TEPHRITIS

- 1 Apical margin of wing wholly whitish from a point approximately midway between apices of veins  $R_{2+3}$  and  $R_{4+5}$  directly posteriorly to wing margin . . . . . *rufipennis* Doane (p. 70)
- Apical margin of wing without such a whitish band . . . . . 2
- 2(1) Cell  $R_3$  entirely dark except for one or two small, round, hyaline spots at extreme apex . . . . . *opacipennis* Foote (p. 69)
- Cell  $R_3$  with at least one hyaline spot centrally . . . . . 3
- 3(2) Preapical dark-brown area of wing obscured by numerous round and confluent subhyaline spots; dark pattern in cell  $R_3$  immediately below stigma usually marked with at least one yellowish subhyaline spot; if no spot present, anterior arm of Y-shaped mark at apex of wing broken and represented only by a spot at tip of vein  $R_{4+5}$ , or anterior arm present but conspicuously narrower than posterior arm . . . . . 4
- Preapical dark area usually with at most a few small, round, subhyaline spots, and its appearance never obscured by these; dark pattern in cell  $R_1$  immediately below stigma unmarked; Y-shaped mark at wing apex never broken . . . . . 5
- 4(3) Cell 2nd A brown to posterior margin along entire length, with round hyaline spots in the field . . . . . *californica* Doane (p. 67)
- Posterior margin of cell 2nd A entirely hyaline . . . . . *arizonensis* Quisenberry (p. 67)
- 5(3) Wing pattern much as in *Trupanea*, the subapical stellate marking distinct and the markings in posterior proximal quarter of wing disc reduced . . . . . 6
- Extensive dark markings present in posterior proximal quarter of wing disc . . . . . 7
- 6(5) Dark marks present in distal half of field of cell  $Cu_1$  . . . . . *stigmatica* (Coquillett) (p. 71)

- Distal half of field of cell  $Cu_1$  entirely hyaline . . . . . *labecula* Foote (p. 69)
- 7(5) Distal half or more of cell  $R_1$  (measured from apex of stigma to apex of cell) entirely dark . . . . . *webbi* Doane (p. 72)
- Distal half of cell  $R_1$  (measured from apex of stigma to apex of cell) with at least one large hyaline spot . . . . . 8
- 8(7) Cell 2nd A dark to posterior margin and with round hyaline spots . . . . . *signatipennis* Foote (p. 71)
- Cell 2nd A entirely hyaline along its posterior margin . . . . . 9
- 9(8) Dark band from stigma to vein  $R_{4+5}$  situated at right angles to horizontal axis of wing; apex of cell R broadly hyaline . . . . . *candidipennis* Foote (p. 68)
- Dark band covering stigma extending obliquely to cover vein r-m . . . . . 10
- 10(9) Hyaline spot in cell  $R_5$  at anterior end of vein m usually egg-shaped, the narrow end pointing anteriorly and rarely confluent with the hyaline spot in cell  $R_3$  . . . . . *ovatifennis* Foote (p. 69)
- Hyaline spot in cell  $R_5$  at anterior end of vein m more or less quadrate, extending from vein  $R_{4+5}$  to vein  $M_{1+2}$  and usually contiguous with hyaline area in cell  $R_3$  directly anterior to it . . . . . *araneosa* (Coquillett) (p. 64)



Map 71. Distribution in California of *Tephritis araneosa* (Coquillett)  
*Tephritis araneosa* (Coquillett)  
 (Fig. 80; Map 71)  
*Trypeta* (*Euaresta*) *araneosa* Coquillett, 1894, Can. Ent., 26:74.  
 Holotype ♀; Southern California (USNM).

*Synonyms*.—*Urellia pacifica* Doane, 1899:192; *Urellia aldrichii* Doane, 1899:192.

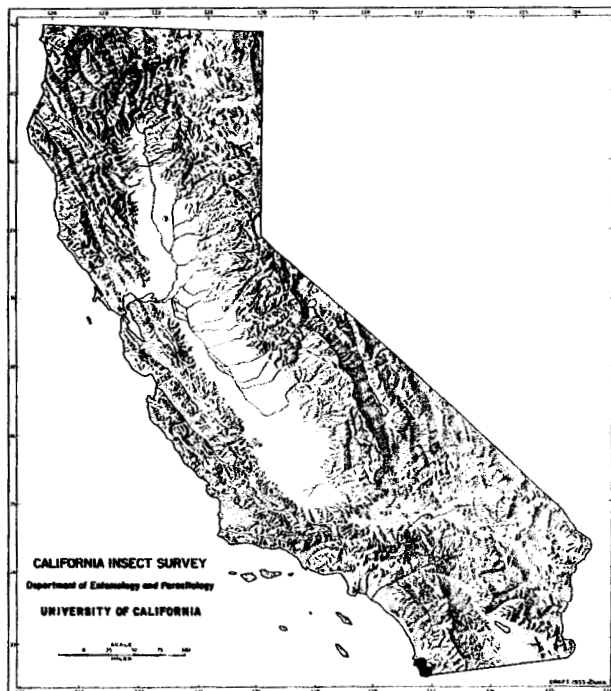
*Geographic range*.—Widespread from Manitoba and South Dakota westward. It also occurs in northern Baja California.

*California records*.—ALAMEDA Co.: Berkeley, 1 ♀, XII-24-34 (CAS). ALPINE Co.: Carson Pass, 4 ♂♂, 1 ♀, *Chrysothamnus nauseosus*, VII-27-30 (H. H. Keifer, CDA). Grover Hot Springs, 1 ♂, swept from *Libocedrus decurrens*, VI-19-58 (F. L. Blanc, CDA). Hope Valley, 1 ♀, VII-9-48 (K. W. Tucker, CIS); 1 ♂, VII-9-48 (D. Carter, CIS). Silver Creek, 2 ♂♂, 1 ♀, VI-17-58 (F. L. Blanc, CDA). AMADOR Co.: Silver Lake, 4 mi. N., 2 ♀♀, VII-25-55 (E. I. Schlinger, UCD). BUTTE Co.: Chico, 1 ♀, Frick trap in black walnut, X-22-57 (Don Black, CDA). COLUSA Co.: Colusa, 1 ♀, VII-18-55 (R. O. Schuster, CIS); 2 ♂♂, IX-1-55 (R. O. Schuster, CIS); 1 ♂, 2 ♀♀, VIII-15-55 (R. O. Schuster, CIS). CONTRA COSTA Co.: Mount Diablo, 1 ♂, on manzanita flowers, II-22-37 (R. L. Usinger, CAS); 1 ♂, VI-4-52 (E. I. Schlinger, UCD). Port Chicago, 1 ♂, Frick trap, X-30-59 (J. Phillips, CDA). EL DORADO Co.: Camp Richardson, 1.5 mi. W., 1 ♀, VII-24-55 (E. I. Schlinger, UCD). Emerald Beach, 2 ♂♂, 1 ♀, VI-30-27 (Aldrich, USNM). Grass Lake, Luther Pass, 1 ♂, 2 ♀♀, VII-24-55 (J. C. Downey, UCD). Lakeside, Lake Tahoe, 5 ♂♂, 2 ♀♀, *Chrysothamnus nauseosus*, VII-27-30 (H. H. Keifer, CDA). Meyers, 1 ♀, VII-23-58 (J. C. Downey, UCD); 1 ♂, 1 ♀, VII-24-58 (J. C. Downey, UCD); 1 ♂, VII-23-55 (E. I. Schlinger, UCD); 2 mi. S., 1 ♀, VII-24-55 (J. C. Downey, USNM). Mount Tallac, 1 ♀, VII-15-15 (E. P. Van Duzee, CIS). Wright's Lake, 1 ♀, VII-2-48 (D. Carter, CIS); 1 ♂, VII-2-48 (D. Carter, CIS). FRESNO Co.: Coalinga, Jacalitos Canyon, 1 ♂, XI-4-59 (H. L. Wilson, CDA). Fresno, 1 ♂, *Achillea millefolium*, V-30-56 (R. O. Schuster, CIS); 1 ♂, 1 ♀, III-26-30 (E. A. Schwarz, USNM). Lost Lake, Friant, 1 mi. W., 2 ♂♂, VII-1-56 (R. O. Schuster, CIS). Mono Hot Springs, 1 (abdomen missing), VIII-8-56 (R. O. Schuster, CIS). HUMBOLDT Co.: Dyerville, 1 ♂, 1 ♀, VI-17-55 (H. J. Rayner, CAS). INYO Co.: Death Valley, 2 ♂♂, on *Geraea* sp., III-27-40 (I. McCracken, CAS). KERN Co.: Bakersfield, 2 ♀♀, cotton gin trash, XII-10-37 (G. L. Smith, CDA). Glenview, 4 mi. E., 1 ♂, 3 ♀♀, Frick trap in walnut, VIII-22-57 (G. Beever and H. T. Osborn, CDA). Glenville, 1 ♂, 1 ♀, on automobile window, VIII-5-57 (G. Beever, CDA). Mojave, 1 ♂, rabbit brush, II-1-18 (H. H. Severin, CIS). Sand Canyon, Monolith, 6 ♀♀, swept from flowers of *Lepidospartum squamatum*, VII-26-57 (H. L. Wilson, CDA). Tehachapi, 2 ♀♀, *Lepidospartum squamatum*, VIII-14-56 (H. L. Wilson, CDA); 1 ♂, ex *Lepidospartum squamatum*, VIII-24-57 (H. L. Wilson, CDA); 10 mi. S., 1 ♂, 4 ♀♀, ex *Senecio douglasii*, VIII-27-57 (H. L. Wilson, CDA). LAKE Co.: Finley, 1 ♀, Frick trap in walnut, X-10-57 (Rex Lyndall, CDA). Lakeport, 1 ♂, 1 ♀, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). LASSEN Co.: Susan River Camp, 1 ♀, VII-9-49 (A. T. McClay, UCD). LOS ANGELES Co.: Burbank, 1 ♂, VIII-31 (K. Wolff, LACO); 1 ♀, III-25-39 (CIS). Big Pines Camp, 1 ♀, on *Eriodictyon trichocalyx*, VIII-2-49 (P. H. Timberlake, UCR). Claremont, 1 ♂, 1 ♀, (Baker, SU); 1 (abdomen missing), 1 ♀, (Baker, USNM). Glendale, 1 ♂, VI-17-56 (E. I. Schlinger, UCD). Hawaiian Gardens, 1 ♂, *Baccharis* sp., IX-22-34 (CDA). Hollywood, 1 ♀, Med. fruit fly carton trap in avocado (oil of angelica), III-14-57 (E. Bullington, CDA). Inglewood, 1 ♀, Melon fly trap in orange, I-28-57 (H. Creeger, CDA). Los Angeles, 1 ♀, collected from cull dump, IX-19-34 (CDA); (paratypes), 3 ♀♀ (Coquillett, USNM). West Los Angeles,

1 ♀, melon fly trap in avocado, I-25-57 (B. Osuna, CDA); 1 ♀, melon fly trap in peach, X-15-56 (R. L. Bailey, CDA). Malibu, 1 ♂, McPhail trap, VIII-19-57 (C. Sartwell, CDA). Pasadena, 1 ♀ (Aldrich, USNM). Pomona, 1 ♀, IX-12-30 (K. L. Wolff, LACO). Santa Monica, 1 ♀, melon fly trap in avocado, X-23-56 (R. L. Bailey, CDA); 1 ♀, melon fly trap in lemon, X-29-56 (E. Blakely, CDA). Venice, 1 ♂, melon fly trap in citrus, XII-27-56 (B. Chan, CDA); 1 ♂, melon fly trap in fig, XII-18-56 (B. Osuna, CDA). Westwood, 1 ♀, melon fly trap, XII-5-56 (P. Thompson, CDA); 1 ♀, melon fly trap, X-10-56 (Percy Jones, CDA); 1 ♀, melon fly trap in hackberry, X-4-56 (E. Blakely, CDA). Whittier, 1 ♀, VI-3-11 (P. H. Timberlake, UCR); 2 ♀♀, on flower heads of *Artemisia* sp., I-22-12 (P. H. Timberlake, UCR); 3 ♂♂, 1 ♀, in flower heads of *Artemisia* sp., I-21-12 (P. H. Timberlake, UCR). MARIN Co.: Alpine Lake, 1 ♀, XII-18-59 (D. C. Rentz, CAS). Mill Valley, 1 ♂, 1 ♀, XI-29-12 (P. H. Timberlake, UCR). Nr. Mill Valley, 1 ♀, XII-5-12 (P. H. Timberlake, UCR). MARIPOSA Co.: Soda Springs, Tuolumne Meadows, 1 ♀, 8,600 ft., VIII-8-16 (G. R. Pilate, USNM). MENDOCINO Co.: Potter Valley, 1 ♀, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). MONO Co.: Long Valley, 1 ♀, *Iris hartwegii*, VI-30-38 (C. A. Fleschner, LAM). MONTEREY Co.: Carmel Valley, 1 ♂, 1 ♀, XII-30-59 (T. R. Haig, CDA). Gonzoles, 1 ♀, ex *Eriodictyon cicutarium*, VI-23-18 (H. H. Severin, CAS); 1 ♀, on celery, V-17-56 (N. F. McCalley, UCD). Greenfield, 1 ♀, Summer 58 (N. F. McCalley, CDA). King City, 1 ♂, Summer 58 (CDA); 1 ♂, ex *Atriplex semibaccata*, VII-3-18 (H. H. Severin, CIS); 2 mi. W., 1 ♀, ex *Artemisia californica*, X-9-18 (H. H. Severin, CAS); 2 mi. W., 2 ♂♂, 1 ♀, ex *Artemisia californica*, X-9-18 (H. H. Severin, CIS). Salinas, 1 ♂, 4 ♀♀, XII-30-59 (T. R. Haig, CDA). Monterey County, 1 ♀, Frick trap in walnut, X-56 (R. P. Allen, CDA). NAPA Co.: Calistoga, 1 ♀, Frick trap in English walnut, VII-22-57 (D. D. Taylor, CDA). Napa, 2 ♀♀, Frick trap in English walnut, VIII-15-56 (T. B. Gallion, CDA). NEVADA Co.: Hobart Mills, 1 ♀, VI-20-32 (A. C. Browne, CDA). Nr. Hobart Mills, 1 ♀, X-10-52 (E. I. Schlinger, UCD). Sagehen, nr. Hobart Mills, 1 ♀, VI-25-54 (J. A. Powell, JAP). Truckee, 1 ♂, 5 ♀♀, VI-25-43 (P. H. Arnaud, PHA). ORANGE Co.: Gavilan, 1 ♀, on *Ceanothus crassifolius*, IV-1-38 (P. H. Timberlake, UCR). PLACER Co.: Colfax, 1 ♀, V-20-52 (E. I. Schlinger, UCD). Immigrant Gap, 1 ♂, *Prunus emarginata*, IX-20-38 (H. H. Keifer, CDA). PLUMAS Co.: Almanor, 1 ♂, 8 ♀♀, swept from *Chrysothamnus* sp., VII-8-60 and VII-10-60 (F. L. Blanc, FLB). Buck's Lake, 2 ♀♀, VII-1-49 (R. L. Langston, LAM). Graegle, 1 ♀, VI-17-49 (E. I. Schlinger, UCD). Greenville, 1 ♀, VIII-1-52 (W. C. Bentinck, CIS). Keddie, 1 ♂, VI-26-49 (C. I. Smith, CIS); 1 ♀, VI-26-49 (C. I. Smith, CIS). Onion Valley, 1 ♀, VII-6-52 (E. I. Schlinger, UCD). Quincy, 4 mi. W., 1 ♀, VI-20-49 (P. D. Hurd, CIS); 3 ♀♀, VI-22-49 (C. I. Smith, CIS); 1 ♀, VI-25-49 (P. D. Hurd, CIS); 1 ♀, VI-22-49 (R. L. Langston, LAM); 1 ♂, VII-22-49 (W. F. Ehrhardt, UCD); 1 ♀, VII-3-49 (E. Morishita, CIS); 1 ♀, VII-19-49 (J. N. Simmons, CIS); 2 ♂♂, VII-6-49 (A. T. McClay, UCD); 2 ♀♀, VI-22-49 (W. F. Ehrhardt, USNM); 4 ♂♂, 1 ♀, VII-6-49 (A. T. McClay, USNM). RIVERSIDE Co.: Riverside, 1 ♂, on *Schinus molle*, I-30-38 (P. H. Timberlake, UCR); 1 ♀, on *Eriogonum fasciculatum*, X-30-35 (P. H. Timberlake, UCR); 1 ♂, ex *Erigeron foliosus*, VI-11-26 (P. H. Timberlake, UCR). Tahquitz Valley, 1 ♀, VII-6-50 (W. A. McDonald, UCLA); 1 ♀, VII-6-50 (H. M. Graham, CIS); 1 ♀, VIII-6-56 (H. F.

Robinson, UCD); 1 ♂, sweeping, VI-3-40 (Fred H. Rindge, CIS). SACRAMENTO Co.: Sacramento, 28 ♂♂, 22 ♀♀, swept from blossoms of *Artemisia heterophylla*, VII-24-58 (P. H. Arnaud, PHA); 1 ♀, VII-14-30 (H. H. Keifer, CDA); 4 ♂♂, 8 ♀♀, VIII-26-29 (H. H. Keifer, CDA); 6 ♂♂, 3 ♀♀, VIII-26-29 (H. H. Keifer, CDA); 5 ♂♂, 6 ♀♀, VIII-26-29 (H. H. Keifer, CDA); 2 mi. W., 1 ♀, ex *Salsola kali* var. *tenuifolia*, VIII-20-18 (H. H. Severin, CIS); Municipal Airport, 1 ♂, Med. fruit fly oil of angelica trap, IX-25-56 (R. A. Smith, CDA). SAN BENITO Co.: Bitterwater, 5 mi. S., 1 ♀, III-30-59 (C. W. O'Brien, CIS). Hollister, 1 ♀, Frick trap in walnut, IX-15-56 (R. P. Allen, CDA). SAN BERNARDINO Co.: Arrowhead Lake, 1 ♀, on *Salix lemmonii*, VII-7-35 (P. H. Timberlake, UCR). Big Bear Lake, 1 ♀, rabbit brush, VIII-25-43 (S. C. Jones, SCJ). Big Meadow, 1 ♂, VII-8-50 (UCLA). Big Pines, 4 mi. N.E., 1 ♂, 7,200 ft., sweeping *Artemisia* sp., VIII-25-44 (S. C. Jones, SCJ). Mill Creek Canyon, 1 ♂, ex *Adenostoma* sp., IX-24-23 (E. P. Van Duzee, CIS); 4 ♂♂, ex *Gutierrezia* sp., IX-23-23 (E. P. Van Duzee, CAS); 2 ♀♀, IX-22-23 (E. P. Van Duzee, CIS); 2 ♀♀, ex *Gutierrezia*, IX-23-23 (E. P. Van Duzee, CIS); 4 ♂♂, IX-24-23 (F. R. Cole, CIS). Ontario, 1 ♂, 3 ♀♀, Frick trap in peach, IX-15-57 (H. R. Moffitt, UCR). Redlands, 1 ♀, 1914 (CIS). San Bernardino, west end, 1 ♀, McPhail trap, VII-12-55 (S. George, RFW). Seven Oaks, 3 ♂♂, *Chrysothamnus* sp., VIII-25-43 (S. C. Jones, SCJ); 1 ♂, 1 ♀, *Chrysothamnus* sp., VIII-25-43 (S. C. Jones, SCJ). SAN DIEGO Co.: Laguna, 1 ♂, VI-8-38 (C. E. Norland, LAS). Nester, 1 ♂, McPhail trap (SIB-7), VI-1-59 (F. Betcher, CDA). San Diego, 1 ♂, McPhail trap in avocado, X-3-57 (G. F. Prole, CDA); 1 ♀, I-18-13 (E. P. Van Duzee, CAS). SAN FRANCISCO Co.: San Francisco, 1 (abdomen missing), 1 ♂, 1 ♀, III-28 (M. C. Van Duzee, CAS). SAN JOAQUIN Co.: Stockton, 2 (abdomens missing), 1 ♂, VIII-21-19 (E. P. Van Duzee, CAS). SAN LUIS OBISPO Co.: Arroyo Grande, 2 ♀♀, on *Baccharis pilularis*, XII-14-59 (H. L. Wilson, CDA). Atascadero, 10 mi. W., 1 ♀, X-23-30 (E. C. Van Dyke, CAS). SAN MATEO Co.: Milbrae, 1 ♂, from flower heads of *Grindelia* sp., XI-20-15 (P. H. Timberlake, UCR). Portola Valley, 1 ♀, XII-22-59 (T. R. Haig, CDA). Sharp Park, 1 ♂, 1 ♀, V-5-49 (R. S. Beal, CIS). SANTA BARBARA Co.: Canada del Refugio, 1 ♂, VI-25-59 (F. D. Parker, CGM). Casitas Pass, 1 ♂, 1 ♀, XII-1-11 (P. H. Timberlake, UCR). Gaviota Pass, 1 ♂, VI-17-49 (R. S. Beal, CIS). Lompoc, 1 ♂, IX-8-08 (J. C. Bradley, CAS). Montecito, 1 ♀, Frick trap in black walnut, IX-5-59 (G. Beevor and H. T. Osborn, CDA). Santa Barbara, 1 ♂, III-17-48 (R. S. Beal, CIS). SANTA CLARA Co.: Arroyo Mocho, 20 mi. S. of Livermore, 1 ♂, III-2-58 (D. Burdick, CIS). Mount Hamilton, 1 ♀, *Pectocarya* sp., IV-15-41 (G. E. Bohart, CIS). San Jose, 1 ♂, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). Stanford University, 1 ♀, XI-19-58 (P. H. Arnaud, PHA); 1 ♂, XI-07 (SU). Santa Clara County, 1 ♀ (Baker, SU); 1 ♀ (Baker, USNM). SHASTA Co.: Cassel, 4 ♂♂, 1 ♀, VII-5-55 (A. J. Mueller, UCD); 1 ♂, VII-5-55 (A. J. Mueller, UCD). Hat Creek, 1 ♀, VII-2-55 (J. R. Dressen, UCD); 1 ♂, VII-3-55 (D. L. Dahlsten, UCD); 1 ♀, VI-21-55 (K. Bower, UCD). Manzanita Lake, 4 ♂♂, 1 ♀, VIII-18-59 (H. L. Wilson, CDA). SIERRA Co.: Independence Lake, 1 ♂, 1 ♀, VII-20-54 (R. M. Bohart, UCD); 1 ♀,

VII-20-54 (J. A. Powell, JAP); 6 ♂♂, 13 ♀♀, VI-26-59 (L. A. Stange, UCD). Sardine Lake, 1 ♂, 1 ♀, VII-31-58 (F. E. Strong, UCD). Sierraville, 2 ♂♂, 2 ♀♀, swept from *Chrysothamnus* sp., V-19-59 (F. L. Blanc, CDA). SISKIYOU Co.: Happy Camp, 1 ♀, Frick trap, VII-26-55 (W. W. Wiard, CDA). Hilt, 1 ♂, 1 ♀, Frick trap in cultivated cherry, VIII-13-57 (M. Truitt and W. W. Wiard, CDA). Tulelake, 1 ♂, swept from potato, VII-19-54 (O. G. Bacon, UCD). Walker, 1 ♀, V-29-20 (C. L. Fox, CIS). Yreka, Frick trap in cherry, VI-9-59 (M. Truitt and R. Klander, CDA). SOLANO Co.: Putah Creek nr. Davis, 2 ♂♂, 2 ♀♀, ex *Artemisia heterophylla*, VII-12-56 (J. A. Powell, CDA); 10 ♂♂, 7 ♀♀, ex *Artemisia heterophylla*, VII-12-56 (J. A. Powell, CDA). Suisun, 1 ♀, Frick trap, IX-59 (Solano County Dept. of Agriculture, CDA). SONOMA Co.: El Verano, 1 ♀, Frick trap in walnut, VIII-15-56 (T. B. Gallion, CDA). Penngrove, 1 ♂, Frick trap in English walnut, VII-18-57 (M. G. Dornbush, CDA). TRINITY Co.: Coffee Creek Ranger Station, 10 mi. N., 1 ♀, VII-14-55 (D. L. Dahlsten, UCD). Trinity County, 1 ♀, (T. G. H. Aitken, CAS). TULARE Co.: Tulare, 2 ♂♂, 2 ♀♀, Frick trap in walnut, IX-10-57 (C. L. Geoble, CDA). TUOLUMNE Co.: Dardanelles, 1 ♀, VII-13-51 (W. H. Lange, UCD); 1 ♂, VI-26-51 (P. D. Ashlock, PDA); 1 ♂, VI-26-51 (P. D. Ashlock, PDA). Pinecrest, 1 ♀, VI-27-48 (P. H. Arnaud, PHA). Sonora Pass, 3 ♀♀, VI-27-51 (E. L. Silver, UCLA); 1 ♀, 9,000 ft., VII-22-51 (W. C. Bentinck, CIS); 1 ♂, VI-27-51 (T. R. Haig, UCD); 1 ♀, 9,000-10,000 ft., VII-11-51 (A. T. McClay, UCD). Strawberry, 1 ♀, VIII-7-58 (W. H. Lange, UCD). YOLO Co.: Davis, 1 ♂, VII-23-55 (H. R. Moffitt, UCD); 1 ♀, VII-16-55 (E. I. Schlinger, UCD); 2 ♀♀,



Map 72. Distribution in California of *Tephritis arizonensis* Quisenberry

VII-15-56 (A. T. McClay, UCD); 4 ♂♂, 1 ♀, (A. T. McClay, UCD); 1 ♀, VII-4-59 (F. E. Strong, UCD).

*T. araneosa* is by far the most widespread species of North American *Tephritis*. It is rather difficult to distinguish from *signatipennis* Foote and *ovatifennis* Foote which occur in the same California areas. The wing pattern shown in figure 80 closely resembles that present in the type material in the U. S. National Museum.

*Tephritis arizonensis* Quisenberry

(Fig. 81; Map 72)

*Tephritis arizonaensis* Quisenberry, 1951, Jour. Kans. Ent. Soc., 24:62, fig. 1. Holotype ♀; Tumacari Mountains, Ariz. (UK).

**Geographic range.**—Arizona and California.

**California records.**—SAN DIEGO CO.: Otay, 3 ♂♂, 4 ♀♀, reared from stem tip mines on *Baccharis sarothroides*, VII-11-60 (E. D. Algert, CDA). San Diego, 1 ♀, IV (E. P. Van Duzee, CAS).

*T. arizonensis* is known in California from only two collections. It is closely related to *californica* Doane in wing pattern, but the hyaline posterior margin of cell 2nd A distinguishes it.

*Tephritis californica* Doane

(Fig. 82; Map 73)

*Tephritis californica* Doane, 1899, Jour. N. Y. Ent. Soc., 7:190, pl. IV, fig. 7. Holotype ♀, Palo Alto, Calif. (WSU).

**Geographic range.**—Known only from California.

**California records.**—ALAMEDA CO.: Berkeley, 1 ♂, III-29-36 (G. E. Bohart, CAS); 3 ♀♀, III-7-37 (G. Ferguson, SCJ); 1 ♀, XII-24-34 (CAS); 8 ♂♂, 2 ♀♀, *Baccharis pilularis*, VIII-14-59 (J. A. Powell, CIS); 11 ♂♂, VIII-14-59 (G. I. Stage, CIS); 1 ♂, 1 ♀, *Baccharis pilularis*, XII-18-59 (J. A. Powell, CIS); 1 ♂, VIII-14-59 (G. I. Stage, CIS); 1 ♀, X-31-47 (W. W. Wirth, USNM). OAKLAND, 1 ♂, I-22-33 (E. S. Ross, CAS). OAKLAND HILLS, nr. Mills College, 1 ♀, III-22-59 (C. D. MacNeill, CAS). TILDEN PARK, Berkeley Hills, 1 ♀, III-1-56 (M. Wasbauer, CIS). ALPINE CO.: Red Lake, 1.5 mi. N.E., 1 ♀, VIII-25-55 (E. I. Schlinger, USNM). AMADOR CO.: Buckhorn, 1 ♀, VII-25-55 (J. C. Downey, UCD). Silver Lake, 4 mi. N., 5 ♀♀, VII-25-55 (E. I. Schlinger, UCD); 2 ♂♂, VII-25-55 (E. I. Schlinger, USNM). CONTRA COSTA CO.: Concord, 1 ♂, 1 ♀, sticky board, pear decline vector survey, XII-10-60 (H. L. Wilson, CDA). Crockett, 2 mi. S.E., larvae, pupae, and adults, reared from *Baccharis pilularis consanguinea*, X-6-60 (F. L. Blanc, CDA). Danville, 1 ♀, sticky board, pear decline vector survey, XII-10-60 (H. L. Wilson, CDA). Lafayette, 1 ♂, Citronella bait trap, VI-27-50 (CDA). Martinez, 4 ♂♂, 3 ♀♀, on *Baccharis pilularis*, VI-6-59 (T. R. Haig, CDA); 2 ♀♀, swept from *Baccharis pilularis consanguinea*, I-6-60 (T. R. Haig, CDA). Orinda, 2 ♀♀, IV-10-55 (R. H. Goodwin, CIS). Pinole, 1 ♀, Frick trap, X-30-59 (J. Moon, CDA). Tice Valley, 1 ♀, Frick trap, XI-2-59 (T. Phillips, CDA). EL DORADO CO.: Camp Richardson, 1.5 mi. W., 1 ♀, VII-24-55 (J. C. Downey, UCD); 1 ♀, VII-24-55 (E. I. Schlinger, USNM). Echo Lake, 1 ♂, 2 ♀♀, VII-23-55 (E. I. Schlinger, UCD); 1 ♀, VII-23-55 (E. I. Schlinger, USNM).



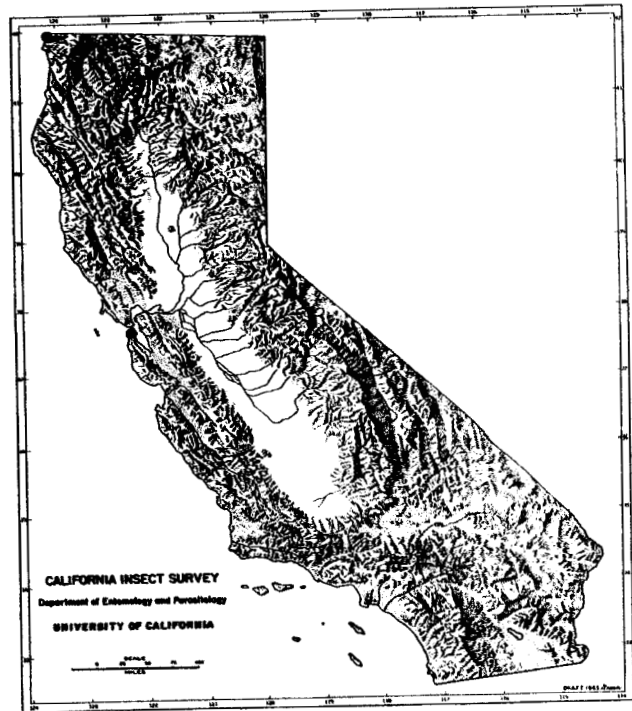
Map 73. Distribution in California of *Tephritis californica* Doane

Meyers, 1 ♂, VII-24-55 (E. I. Schlinger, USNM); 3 ♀♀, VII-24-55 (E. I. Schlinger, UCD). FRESNO CO.: Auberry, 2 mi. W., 1 ♀, sticky board, pear disease vector survey, XII-10-60 (H. L. Wilson, CDA). LOS ANGELES CO.: Montebello, 1 ♂, McPhail trap, VII-31-57 (P. B. Engler, LACO). MARIN CO.: Alpine Lake, 1 ♂, XII-18-59 (D. C. Rentz, CAS). Fairfax, 1 ♂, 1 ♀, III-26-27 (C. L. Fox, CAS). Kentfield, 1 ♀, Frick trap, III-10-59 (T. R. Haig, CDA). Kentfield, 1 ♀, IX-21-59 (B. Bergin and T. R. Haig, CDA). Mill Valley, 1 ♀, III-14-25 (H. H. Keifer, CAS); 1 ♀, IV-16-23 (E. P. Van Duzee, CAS); 2 ♀♀, III-20-48 (E. L. Kessel, CAS); 1 ♂, flowers of *Baccharis* sp., IX-27-48 (H. B. Leech, CAS). Mount Tamalpais, 1 (abdomen missing), VI-23-18 (E. P. Van Duzee, CAS). Phoenix Lake, 1 ♀, IV-23-40 (J. W. Tilden, SJS). Ross, 1 (abdomen missing), III-31-18 (E. P. Van Duzee, CAS). Marin County, 1 ♂, VIII-27-33 (E. P. Van Duzee, CAS); 2 ♀♀, VIII-3-29 (R. H. Beamer, UK). MONTEREY CO.: Paradise Canyon nr. Prunedale, 1 ♀, blossoms of *Baccharis pilularis*, IX-21-50 (P. H. Arnaud, PHA). Salinas, 1 ♀, XII-30-59 (T. R. Haig, CDA). San Ardo, 1 ♀, III-24-31 (E. P. Van Duzee, CAS). NAPA CO.: Napa, 1 ♀, Frick trap, Summer 57 (CDA); 1 ♀, Frick trap in walnut, VIII-15-56 (T. B. Gallion, CDA). St. Helena, 1 ♀, Frick trap in walnut, IX-7-56 (R. Griffin, CDA). RIVERSIDE CO.: Riverside, 1 ♀, on *Baccharis emoryi*, X-6-40 (P. H. Timberlake, UCR). SAN DIEGO CO.: Otay, 1 ♂, 1 ♀, fruit fly trap, I-25-60 (R. Hancock, CDA). San Diego, 1 ♀, IV (E. P. Van Duzee, CAS); 1 ♀, McPhail trap (SIB-7), XI-20-59 (Beck and Yaruss, CDA). SAN LUIS OBISPO CO.: Arroyo Grande, 1 ♂, 1 ♀, on *Baccharis pilularis*, XII-14-59 (H. L. Wilson, CDA). SAN MATEO CO.: Belmont, behind, 3 ♂♂, 7 ♀♀, on *Baccharis pilularis*, IX-21-52 (P. H. Arnaud,



PHA). Belmont, Canada Road, 3 ♂♂, 1 ♀, swept from *Baccharis pilularis consanguinea*, VIII-21-59 (P. H. Arnaud, PHA). Jasper Ridge, 3 ♂♂, IX-1-53 (P. H. Arnaud, PHA). Portola, 1 ♂, XI-27-53 (P. H. Arnaud, PHA). Redwood City, 3 ♂♂, 1 ♀, II-3-52 (P. H. Arnaud, PHA); 2 ♂♂, VIII-20-49 (P. H. Arnaud, PHA); 17 ♂♂, 9 ♀♀, I-18-46 (P. H. Arnaud, PHA); 1 ♂, Frick trap in apple, XI-6-59 (R. Mikelsen, CDA). San Mateo, 1 ♀, III-12-50 (R. S. Beal, CIS); 1 ♀, IV-18-50 (R. S. Beal, CIS); 2 ♀♀, III-18-50 (R. S. Beal, CIS). Woodside, 3 ♀♀, swept from blossoms of *Baccharis pilularis consanguinea*, XI-11-57 (P. H. Arnaud, PHA); 1 ♀, swept from blossoms of *Baccharis pilularis consanguinea*, X-1-58 (P. H. Arnaud, PHA); 3 ♂♂, 5 ♀♀, I-18-47 (P. H. Arnaud, PHA). Santa Clara Co.: Goleta, 1 ♀, VII-2-59 (F. D. Parker, CGM). Lompoc, 2 ♂♂, 2 ♀♀, VIII-7-38 (R. I. Sailer, UK); 1 ♂, 1 ♀, VIII-6-38 (R. H. Beamer, UK); 1 ♀, VIII-6-38 (G. Russell, UK). Santa Barbara, 1 ♀, McPhail trap (SIB-7) in peach, IX-14-59 (B. Osuna, CDA). Santa Maria, 6 ♂♂, 6 ♀♀, on *Baccharis pilularis*, XII-15-59 (H. L. Wilson, CDA). SANTA CLARA Co.: Los Gatos, 3 ♂♂, 4 ♀♀, XII-14-59 (T. R. Haig, CDA). Stanford University, 2 ♂♂, 2 ♀♀, I-29-47 (J. W. Tilden, SJS); 1 ♂, XI-15-57 (P. H. Arnaud, PHA); 4 ♀♀, XI-21-57 (P. H. Arnaud, PHA); 4 ♂♂, 1 ♀, XI-5-57 (P. H. Arnaud, PHA); 4 ♂♂, IX-11-57 (P. H. Arnaud, PHA); 1 ♀, IX-28-58 (P. H. Arnaud, PHA); 1 ♀, XI-19-53 (P. H. Arnaud, PHA); 1 ♂, X-31-51 (P. H. Arnaud, PHA); 1 ♂, 1 ♀, on *Baccharis pilularis*, IX-15-53 (P. H. Arnaud, PHA); 4 ♀♀, XI-28-50 (P. H. Arnaud, PHA); 3 ♀♀, XI-20-53 (P. H. Arnaud, PHA); 2 ♀♀, blossoms of *Baccharis pilularis*, IX-27-50 (P. H. Arnaud, PHA); 1 ♂, X-30-53 (P. H. Arnaud, PHA); 4 ♀♀, XI-28-50 (P. H. Arnaud, PHA); 2 ♂♂, XII-29-1897 (SU); 1 ♂, X-24-06 (SU); 2 ♀♀, XI-07 (SU); 1 ♀, VI-18-47 (J. W. Tilden, SJS); 1 ♀, VI-3-47 (J. W. Tilden, SJS); 1 ♀, VI-13-47 (H. W. Tilden, SJS); 3 ♂♂, 3 ♀♀, I-29-47 (J. W. Tilden, SJS); 31 ♂♂, 8 ♀♀, swept from *Baccharis pilularis consanguinea*, I-29-53 (P. H. Arnaud, PHA); 1 ♂, swept from *Baccharis pilularis consanguinea*, I-29-60 (P. H. Arnaud, PHA); 42 ♂♂, 20 ♀♀, swept from *Baccharis pilularis consanguinea*, II-6-60 (P. H. Arnaud, PHA); 5 ♂♂, 6 ♀♀, II-21-53 (P. H. Arnaud, UCD); 2 ♂♂, 2 ♀♀, swept from *Baccharis pilularis consanguinea*, II-6-60 (P. H. Arnaud, FLB). SANTA CRUZ Co.: Watsonville, 1 ♀, XI-2-59 (T. R. Haig, CDA). SOLANO Co.: Sears Point, 1 ♀, VI-29-51 (W. C. Bentinck, CIS). Suisun, 1 ♂, 2 ♀♀, Frick trap, IX-59 (Solano County Dept. Agriculture, CDA). SONOMA Co.: Cloverdale, 1 ♀, VIII-15-26 (H. H. Keifer, CAS). Glen Ellen, 1 ♀, Frick trap in walnut, VIII-13-56 (L. D. Hampton, CDA). Santa Rosa, 1 ♂, 4 ♀♀, XII-7-59 (T. R. Haig, CDA); 2 ♀♀, III-7-38 (Cruik, UK). Sonoma, 2 ♀♀, Frick trap, Summer 57 (N. W. Frazier, CIS); 2 ♀♀, Frick trap in walnut, VIII-15-56 (T. B. Gallion, CDA). Trinity, 2 ♀♀, XII-20-37 (N. W. Frazier, CIS); 1 ♂, 1 ♀, XII-20-37 (N. W. Frazier, CIS). TRINITY Co.: Salyer, 1 ♀, Frick trap in cherry, IX-3-59 (R. E. Graham, CDA). YOLO Co.: Winters, 1 ♂, VIII-6-29 (R. H. Beamer, UK).

*T. californica* is closely related in wing pattern to *arizonensis*, from which it may be distinguished by the dark posterior margin of cell 2nd A. Most specimens of *californica* are larger than those of *arizonensis*.



Map 74. Distribution in California of *Tephritis candidipennis* Foote

### *Tephritis candidipennis* Foote

(Fig. 83; Map 74)

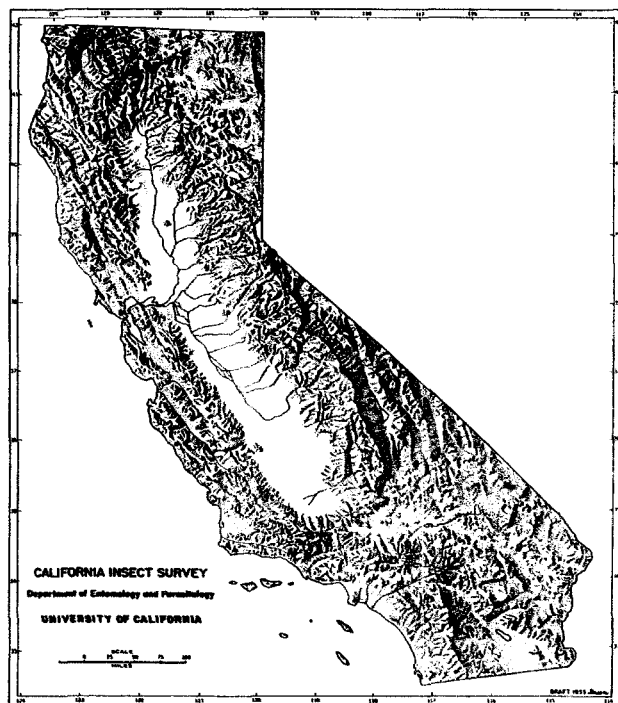
*Tephritis candidipennis* Foote, 1960, Jour. Kans. Ent. Soc., 33:82, fig. 4. Holotype ♀, Fieldbrook, Calif. (USNM).

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

**California records.**—DEL NORTE Co.: Smith River, 1 ♂, VII-17-30 (J. M. Aldrich, USNM). HUMBOLDT Co.: Fieldbrook, 3 ♂♂, 2 ♀♀, V-31-03 (H. S. Barber, USNM). MONO Co.: Leavit Meadows, 1 ♀, VII-6-51 (D. P. Lawfer, UCD). SAN FRANCISCO Co.: San Francisco (paratypes), 6 ♂♂, 2 ♀♀, ex tansey, X-20-25 (H. H. Keifer, CAS); (paratypes), 1 ♂, 1 ♀, ex tansey, X-13-25 (H. H. Keifer, CAS); (paratypes), 3 ♂♂, 2 ♀♀, ex tansey, X-16-25 (H. H. Keifer, CAS); (paratypes), 1 ♂, 2 ♀♀, ex tansey, X-19-25 (H. H. Keifer, CAS); (paratypes), 2 ♂♂, 3 ♀♀, ex tansey, X-22-25 (H. H. Keifer, CAS); (paratype), 1 ♂, 1 (abdomen missing), ex tansey, X-26-25 (H. H. Keifer, CAS); (paratypes), 6 ♂♂, VI-22-29 (H. H. Keifer, CDA); (paratypes), 4 ♀♀, reared from *Tanacetum camphoratum*, VIII-8-29 (H. H. Keifer, CDA); (paratypes), 4 ♂♂, reared from *Tanacetum camphoratum*, VIII-14-29 (H. H. Keifer, CDA); (paratypes), 4 ♂♂, reared from *Tanacetum camphoratum*, VIII-17-29 (H. H. Keifer, CDA); 2 ♂♂, 3 (abdomens missing), ex tansey, X-29-19 (E. P. Van Duzee, CIS); 2 ♀♀, sand dunes, IX-9-22 (E. P. Van Duzee, CIS); 1 ♂, X-24-25 (H. H. Keifer, CIS); 1 ♂, ex tansey, X-27-25 (H. H. Keifer, CIS); 2 ♂♂, ex tansey, X-15-25 (H. H. Keifer, CAS); 1 ♀, ex tansey, X-24-25 (H. H. Keifer, CAS); 1 ♂, reared from *Tanacetum camphoratum*, VIII-8-29 (H. H. Keifer, CIS); 2 ♂♂, 2 ♀♀, reared from *Tanacetum camphoratum*, VIII-14-29 (H. H. Keifer, CDA); 5 ♂♂, 4 ♀♀, reared from *Tanacetum camphoratum*, VIII-17-29 (H.

H. Keifer, CDA); 1 ♂, VI-22-29 (H. H. Keifer, USNM).

The reduced dark markings in the wing pattern are quite characteristic of this species. The similarity of *candidipennis* to *ovatifennis* and *araneosa* is striking, for the wing presents the appearance of an *araneosa* with greatly enlarged hyaline spots. The species is larger than *araneosa*, however, and has a longer ovipositor sheath.



Map 75. Distribution in California of *Tephritis labecula* Foote

*Tephritis labecula* Foote

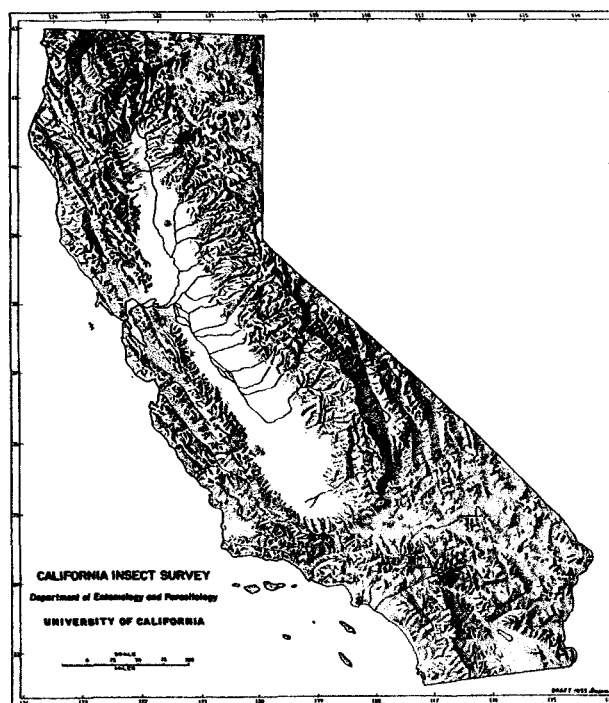
(Fig. 84; Map 75)

*Tephritis labecula* Foote, 1959, Bull. Brooklyn Ent. Soc., 54:13, fig. 2. Holotype ♀; Grand Co., Utah (CM).

**Geographic range.**—California, Nevada, Oregon, Utah, and Wyoming.

**California records.**—ALPINE CO.: Fredericksburg, 1 (abdomen missing), 1 ♂, swept from *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA). Markleeville, 1 ♂, V-6-59 (F. L. Blanc, FLB). Woodfords, 1 ♂, swept from *Chrysothamnus* sp., V-5-59 (F. L. Blanc, FLB).

The species closely resembles *Tephritis stigmatica*, from which it is easily separated by the much narrower dark ray from the stigma to vein r-m and the absence of dark markings in the distal half of the field of cell Cu<sub>1</sub>. It is also similar to *Trupanea femoralis* (Thoms.), from which it may be separated by the two pairs of scutellar bristles.



Map 76. Distribution in California of *Tephritis opacipennis* Foote

*Tephritis opacipennis* Foote

(Fig. 85; Map 76)

*Tephritis opacipennis* Foote, 1960, Jour. Kans. Ent. Soc., 33:74, fig. 1. Holotype ♂; Cedar Pass, Modoc Co., Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—MODOC CO.: Cedar Pass (holotype), 1 ♂, VI-29-55 (J. W. MacSwain, CIS); 1 ♂, VI-29-55 (D. L. Dahlsten, USNM). SAN BERNARDINO CO.: South Fork Camp (paratype), 1 ♂, San Bernardino Mountains, 6,200 ft., on *Chrysothamnus nauseosus*, IX-11-44 (P. H. Timberlake, UCR). SHASTA CO.: Hat Lake (paratype), 1 ♂, VI-20-41 (P. D. Hurd, CIS).

Rarely collected in California, *opacipennis* is distinctive in having, anterior to vein M<sub>2</sub>+Cu<sub>1</sub>, an extensive dark area which is unbroken by hyaline spots except at and near the wing margins. It is very different from any other North American *Tephritis* species.

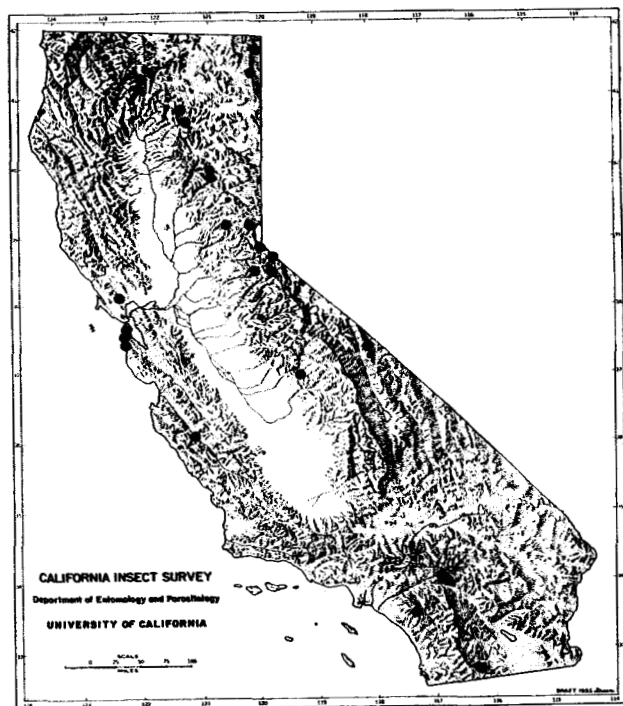
*Tephritis ovatifennis* Foote

(Fig. 86; Map 77)

*Tephritis ovatifennis* Foote, 1960, Jour. Kans. Ent. Soc., 38:81, fig. 3. Holotype ♀, Halfmoon Bay, Calif. (USNM).

**Geographic range.**—California, Nevada, Oregon, Utah, and Washington.

**California records.**—ALPINE CO.: Fredericksburg, 1 ♂, swept from *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA). Grover Hot Springs, 1 ♂, swept from *Libocedrus decurrens*, VI-19-58 (F. L. Blanc, CDA). AMADOR CO.: Silver Lake, 4 mi. W., 1 ♀,

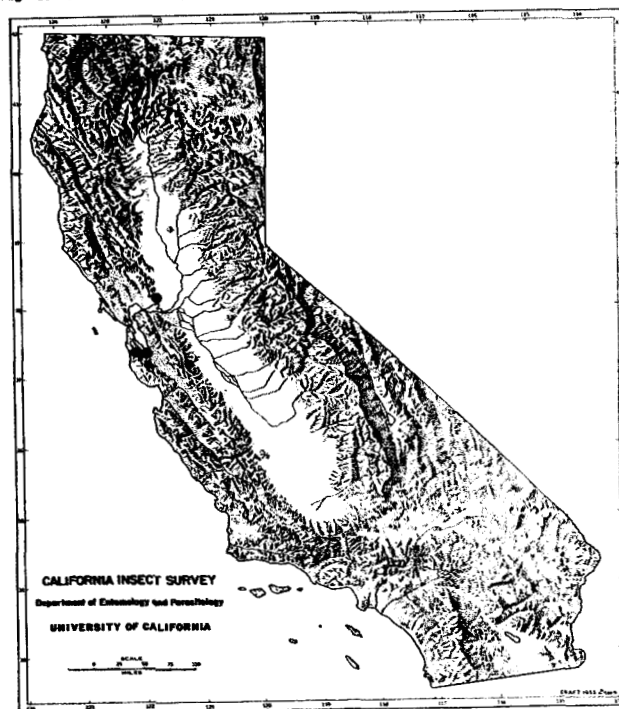


Map 77. Distribution in California of *Tephritis ovatipennis* Foote

VII-25-55 (J. C. Downey, UCD). EL DORADO CO.: Camp Richardson, 1½ mi. W., VII-24-55 (E. I. Schlinger, UCD). FRESNO CO.: Shaver Lake, 1 ♂, VIII-8-56 (R. O. Schuster, CIS). MODOC CO.: Cedar Pass, 1 ♀, VI-29-55 (J. W. MacSwain, CIS). Ft Bidwell, 8 mi. S. (paratype), 1 ♂, VII-28-53 (W. C. Bentinck, CIS). MONO CO.: Blanco's Corral, White Mountains, 1 ♀, VI-30-53 (J. W. MacSwain, USNM). MONTEREY CO.: King City, 3 ♂♂, ex *Artemisia californica*, X-9-18 (H. H. Severin, CIS). PLACER CO.: Emigrant Gap, 3 ♂♂, 3 ♀♀, VII-1-49 (H. B. Leech, CAS). Summit, 1 ♀, VII-19-15 (H. G. Dyar, USNM). PLUMAS CO.: Keddie, 1 (abdomen missing), 1 ♀, VI-26-49 (C. I. Smith, CIS). Quincy, 4 mi. W., 2 ♀♀, VI-22-49 (W. F. Ehrhardt, UCD); 1 ♂, VI-19-49 (R. C. Bechtel, UCD); 2 ♂♂, VII-6-49 (A. T. McClay, UCD); 1 ♂, 1 ♀, VI-25-49 (P. D. Hurd, CIS); 1 ♀, VI-22-49 (C. I. Smith, CIS). RIVERSIDE CO.: Elsinore, 1 ♀, McPhail trap in walnut, VII-1957 (C. Below, CDA). SAN BERNARDINO CO.: Dollar Lake Trail, 1 ♂, VII-10-58 (H. W. Michalk, CDA). Mill Creek Canyon, 2 ♀♀, IX-22-23 (E. P. Van Duzee, CAS); 1 ♀, ex *Gutierrezia* sp., IX-23-23 (E. P. Van Duzee, CAS). Seven Oaks (paratype), 1 ♀, *Chrysothamnus* sp., VIII-25-43 (S. C. Jones, SCJ). SAN DIEGO CO.: Indian Canyon, 1 ♀, VI-7-48 (G. A. Marsh, CIS). SAN FRANCISCO CO.: San Francisco, 3 ♂♂, 3 ♀♀, VII (USNM); (paratypes), 1 ♂, 1 ♀, III-24-26 (M. C. Van Duzee, CAS); (paratypes), 5 ♀♀, VI (Koebele, CAS). SAN MATEO CO.: Half Moon Bay (holotype & paratypes), 2 ♂♂, 2 ♀♀, *Erigeron glaucus*, VII-3-37 (W. H. Lange, USNM). Sharp Park (paratypes), 2 ♂♂, 1 ♀, V-5-49 (R. S. Beal, CIS). SHASTA CO.: Cassel, 2 ♂♂, VII-5-55 (A. J. Mueller, UCD). Hat Creek P.O., 1 ♂,

VII-3-55 (D. L. Dahlsten, UCD). SISKIYOU CO.: Dunsuir, 1 ♂, Frick trap in cultivated cherry, VIII-16-57 (W. W. Wiard, CDA). Mt. Shasta City, 1 ♀, VI-23-58 (J. A. Powell, CIS). SONOMA CO.: Petaluma, 1 ♂, Frick trap in walnut, IX-26-55 (R. P. Allen, RFW).

The wing of *ovatipennis*, like that of *candidipennis*, resembles the wing of *araneosa* in the positions of the hyaline spots relative to one another. Its wing is much darker than those of *candidipennis* and *araneosa*, and the spot lying at the anterior end of vein m is always ovate, rarely touching the spot in cell R<sub>3</sub> anterior to it.



Map 78. Distribution in California of *Tephritis rufipennis* Doane

### *Tephritis rufipennis* Doane

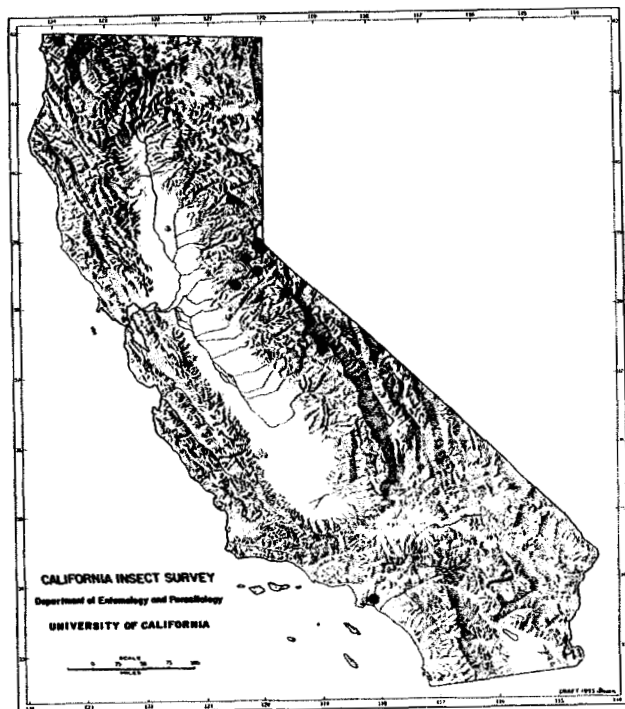
(Fig. 87; Map 78)

*Tephritis rufipennis* Doane, 1899, Jour. N. Y. Ent. Soc., 7:190, pl. IV, fig. 8. Syntypes ♂♂; California (WSU).

**Geographic range.**—Known only from California.

**California records.**—SAN MATEO CO.: San Mateo County, 1 ♀, (Baker, USNM). SANTA CLARA CO.: Stanford University, 1 ♂, swept from *Baccharis pilularis consanguinea*, I-29-60 (P. H. Arnaud, FLB). SOLANO CO.: Solano County, 1 ♀, XI-1-46 (R. A. Flock, USNM).

Rarely encountered in California collections, this species has a very distinctive wing pattern which cannot be confused easily with that of any other North American *Tephritis*. The pattern superficially resembles that present in *Oxyna*, but species of the latter possess only one pair of lower fronto-orbitals.



Map 79. Distribution in California of *Tephritis signatipennis* Foote

*Tephritis signatipennis* Foote

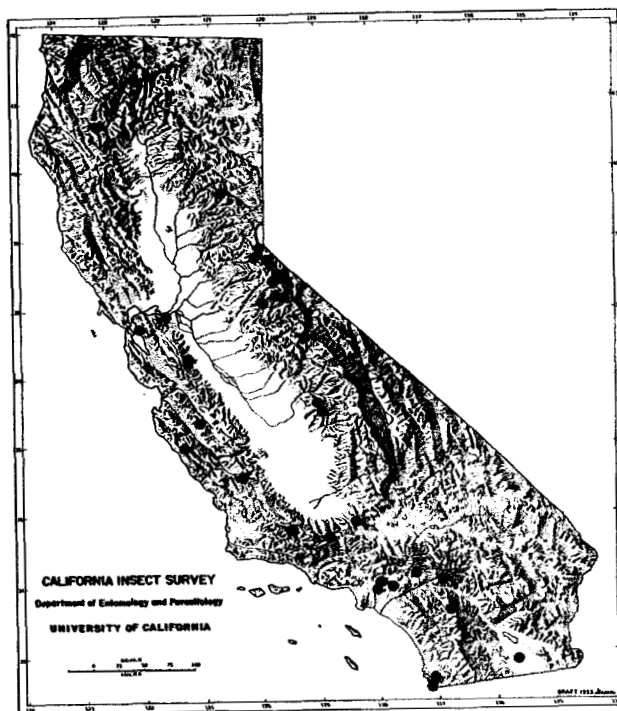
(Fig. 88; Map 79)

*Tephritis signatipennis* Foote, 1960, Jour. Kans. Ent. Soc., 33:77, fig. 2. Holotype ♀; Dardanelles, Tuolumne Co., Calif. (USNM).

**Geographic range.**—California, Nevada, and Washington; also Mexico (Baja, California).

**California records.**—AMADOR CO.: Buckhorn, 1 ♀, VII-25-55 (J. C. Downey, UCD). Silver Lake, 4 mi. N., 3 ♀♀, VII-25-55 (E. I. Schlinger, UCD); (paratype), 1 ♀, VIII-25-55 (E. I. Schlinger, UCD). DEL NORTE CO.: Patricks Creek (paratypes), 1 ♀, 1 (abdomen missing), VII-3-36 (J. T. Howell, CAS). EL DORADO CO.: Camp Richardson, 1.5 mi. W. (paratype), 1 ♀, VII-24-55 (J. C. Downey, UCD). Cathedral Lake, Tahoe (paratypes), 6 ♀♀, IX-6-15 (E. P. Van Duzee, CIS). Echo Lake (paratypes), 1 ♂, 2 ♀♀, VII-23-55 (E. I. Schlinger, UCD); 1 ♀, VII-9-54 (W. W. Middlekauff, CIS). Meyers (paratypes), 3 ♀♀, VII-24-55 (E. I. Schlinger, UCD). Wrights Lake (paratype), 1 ♀, VII-2-48 (L. W. Quate, CIS). LOS ANGELES CO.: Hawaiian Gardens (paratype), 1 ♀, *Baccharis*, IX-22-34 (CDA). MONO CO.: Leavitt Meadows (paratype), 1 ♂, VI-28-51 (T. R. Haig, CIS). Mammoth Lakes (paratype), 1 ♀, X-21-39 (W. D. Pierce, LAM). Sardine Creek, 1 ♀, 8,500 ft., VI-28-51 (P. D. Ashlock, PDA); 1 ♀, VI-28-51 (P. D. Ashlock, PDA). SIERRA CO.: Gold Lake (paratypes), 2 ♀♀, VII-10-21 (C. L. Fox, CAS). TUOLUMNE CO.: Dardanelles, 1 ♂, 3 ♀♀, VI-26-51 (A. T. McClay, CDA); 2 ♂♂, 17 ♀♀, VI-26-51 (A. T. McClay, UCD); 2 ♀♀, VI-26-51 (P. D. Ashlock, PDA); 2 ♀♀, VI-26-51 (P. D. Ashlock, PDA); (paratypes), 3 ♀♀, VI-26-51 (A. T. McClay, UCD); (paratype), 1 ♀, VI-26-51 (A. T. McClay, CDA).

The dark posterior margin of cell 2nd A serves to distinguish this species from *candidipennis*, *ovatifennis*, and *araneosa*. It is as large as *candidipennis* and has a longer ovipositor sheath than *araneosa*.



Map 80. Distribution in California of *Tephritis stigmatica* (Coquillett)

*Tephritis stigmatica* (Coquillett)

(Fig. 89; Map 80)

*Urellia stigmatica* Coquillett, 1899, Jour. N. Y. Ent. Soc., 7:266. Syntypes ♂ and ♀; Colorado (USNM).

**Geographic range.**—Widespread throughout the western United States.

**California records.**—ALAMEDA CO.: Oakland, 1 ♀, III-15-36 (E. C. Van Dyke, CAS). ALPINE CO.: Ebbetts Pass, 1 ♂, VI-30-60 (J. A. Chemsak, CIS). Grover Hot Springs, 10 ♂♂, 8 ♀♀, reared from flowers of *Senecio* sp., VI-19-58 (F. L. Blanc, CDA); 1 ♂, swept from *Senecio* sp., V-6-59 (F. L. Blanc, FLB). Heenan Lake, 3 ♂♂, 1 ♀, swept from *Senecio* sp., V-7-59 (F. L. Blanc, FLB). Markleeville, 1 ♂, V-6-59 (R. P. Allen, CDA); 1 ♂, 2 ♀♀, V-6-59 (F. L. Blanc, FLB). CONTRA COSTA CO.: Antiock, 1 ♂, IX-10-47 (P. D. Hurd, CIS). EL DORADO CO.: Echo Lake, 1 ♀, VII-23-55 (E. I. Schlinger, UCD). Fallen Leaf Lake, 1 ♂, VIII-31 (O. H. Swezey, CAS). Luther Pass, 1 ♀, VII-6-59 (P. H. Arnaud, PHA). Strawberry, 1 ♂, VII-6-58 (L. E. Campos, UCD). FRESNO CO.: Dunlap, 10 ♂♂, 2 ♀♀, swept from *Senecio douglasii*, IV-5-60 (R. P. Allen, FLB). HUMBOLDT CO.: Blue Lake, 2 ♀♀, VI-20 and 27-07 (Bradley, ANSP). IMPERIAL CO.: Brawley, 1 ♀, alfalfa, I-8-36 (S. Lockwood, CDA). KERN CO.: Sand Canyon, 1 ♂, 2 ♀♀, swept from flowers of *Lepidospartum squamatum*, VIII-26-57 (H. L. Wilson, CDA). Tehachapi, 1 ♂, 4 ♀♀, reared from *Senecio* sp., X-22-29 (CDA); 1 ♂, reared from *Senecio* sp., IX-30-29 (CDA); 1 ♂, reared

from *Senecio* sp., X-7-29 (CDA); 7 ♂♂, 1 ♀, reared from *Senecio* sp., X-27-29 (CDA); 3 ♂♂, 1 ♀, reared from *Senecio* sp., IX-30-29 (CDA); 1 ♂, 2 ♀♀, reared from *Senecio* sp., IX-27-29 (CDA); 1 ♂, 1 ♀, reared from *Senecio* sp., X-27-29 (LACO); 1 ♂, 1 ♀, collected from *Senecio* sp., VIII-14-56 (H. L. Wilson, CDA); 26 ♂♂, 18 ♀♀, ex *Senecio douglasii*, VIII-27-57 (H. L. Wilson, CDA); 1 ♂, 2 ♀♀, ex *Lepidospartum squamatum*, VIII-26-57 (H. L. Wilson, CDA). LOS ANGELES CO.: Claremont, 1 ♀, (Baker, USNM). Gorman, 2 ♀♀, swept from *Chrysothamnus* sp., IX-17-59 (F. L. Blanc, FLB); 2 ♀♀, ex *Senecio douglasii*, VIII-29-57 (H. L. Wilson, CDA). San Antonio Canyon, 2 ♂♂, 1 ♀, VIII-31-31 (C. Gammon, CDA). San Gabriel Wash, nr. Baldwin Park, 1 ♂, III-12-48 (P. H. Timberlake, UCR). MADERA CO.: Nr. Garnet Lake, 4 ♂♂, reared from *Senecio integerrimus*, VIII-4-50 (USNM). MONO CO.: Sonora Pass, 1 ♀, VII-17-51 (A. T. McClay, UCD). MONTEREY CO.: Junipero Serra Park, Santa Lucia Mountains, 6 ♂♂, 2 ♀♀, swept from young *Pinus lambertiana* at peak, 5,800 ft., VIII-10-56 (H. B. Leach, CAS); 11 ♂♂, 16 ♀♀, swept from young *Pinus coulteri* at peak, 5,800 ft., VIII-14-56 (H. B. Leach, CAS). PLUMAS CO.: Johnsville, 10 mi. W., 2 ♀♀, reared from *Senecio* sp., VIII-8-59 (J. S. Buckett, CDA). RIVERSIDE CO.: Ribbonwood, San Jacinto Mountains, 1 ♂, composite, V-21-40 (W. L. Swisher, LAM). SAN BENITO CO.: Pinnacles National Monument, 1 ♂, VI-24-48 (W. W. Middlekauff, CIS). SAN BERNARDINO CO.: Cajon Junction, 1 ♂, VIII-24-53 (J. C. Hall, UCD). Mill Creek Canyon, 2 ♀♀, IX-24-23 (F. R. Cole, CIS). SAN DIEGO CO.: Chollas Valley, 3 ♂♂, 1 ♀, 1 (abdomen missing), XII-31 (H. T. Osborn, CDA). San Ysidro, 9 ♂♂, 9 ♀♀, reared from flower heads of *Senecio* sp., collected VII-22-60, emerged VII-27 to VIII-12-60 (E. D. Algert, CDA). SAN LUIS OBISPO CO.: Shandon, 1 ♀, XI-10-59 (H. L. Wilson, CDA). SANTA BARBARA CO.: Cuyama, 1 ♀, reared from *Senecio douglasii*, III-16-60 (R. P. Allen, CDA). STANISLAUS CO.: Del Puerto Canyon, 1 ♀, *Eriodictyon*, V-11-48 (Ray F. Smith, CIS). TRINITY CO.: Trinity County, 1 ♂, V-18-34 (CAS). TULARE CO.: Badger, 1 ♂, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). TUOLUMNE CO.: Dodge Ridge, 1 ♂, VII-4-51 (T. R. Haig, UCD). Pinecrest, 3 ♂♂, 4 ♀♀, VII-3-51 (A. T. McClay, UCD); 4 ♀♀, VII-3-51 (C. A. Downing, CIS); 1 ♂, 1 ♀, VI-29-48 (P. H. Arnaud, PHA); 1 ♀, VII-5-48 (P. H. Arnaud, PHA); 2 ♂♂, VI-28-48 (P. H. Arnaud, PHA). Sonora Pass, 1 ♀, VII-17-51 (A. T. McClay, UCD).

*T. stigmatica* might easily be confused with certain species of *Trupanea* save for the presence of two pairs of scutellars. This is the largest of the California *Tephritis* species.

#### *Tephritis webbi* Doane

(Fig. 90; Map 81)

*Tephritis webbii* Doane, 1899, Jour. N. Y. Ent. Soc., 7:189, pl. IV, fig. 6. Syntypes ♀♀; Idaho and Minnesota (WSU).

*Geographic range*.—Minnesota west to California.

*California records*.—EL DORADO CO.: Echo Lake, 1 ♀, VI-30-53 (W. W. Middlekauff, CIS); 1 ♂, VI-20-55 (W. W. Middlekauff, CIS). Lakeside, 1 ♂, VI-4-27 (Aldrich, USNM). Lake Tahoe, 1 ♀, VI-19-36 (R. M. Bohart, CAS). Tallac Lake, 1 ♂, III-25-15 (E. P. Van Duzee, CIS); 1 ♂, VII-17-15 (E. P. Van Duzee, UCR). Wrights Lake, 1 ♂, 8 ♀♀, VII-2-48 (D. Carter, USNM); 1 ♀, VII-2-48 (R. C. Bynum, USNM). FRESNO CO.: Shaver Lake, 1 ♀, VII-19 (CAS). INYO CO.: Big

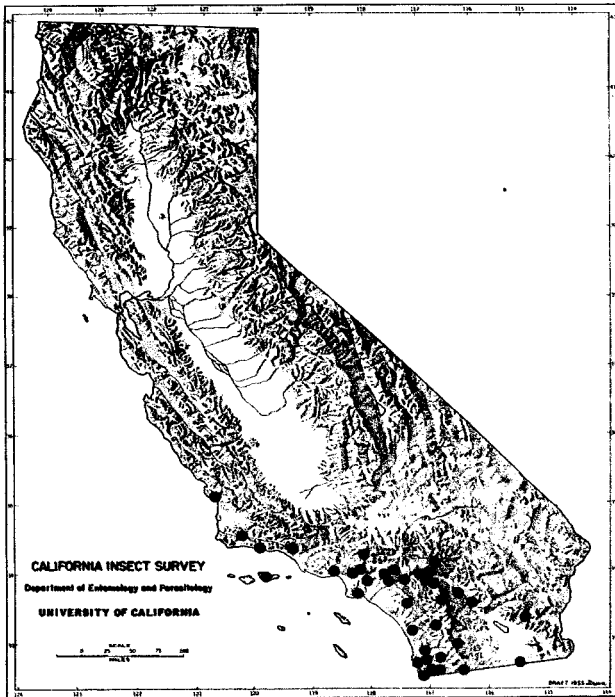


Map 81. Distribution in California of *Tephritis webbi* Doane  
Pine, 1 ♂, VI-17-29 (E. P. Van Duzee, CIS). Ruby Lake, 1 ♀, VIII-13-57 (J. A. Powell, CAS). MARIPOSA CO.: Yosemite Valley, 1 ♀, V-31-21 (E. C. Van Dyke, CIS). MONO CO.: Leavitt Meadows, 1 ♀, VII-6-51 (R. W. Morgan, UCD). SARDINE CREEK, 1 ♀, 8,500 ft., VII-17-51 (A. T. McClay, USNM). PLUMAS CO.: Quincy, 1 ♀, swept from miscellaneous grasses V-18-59 (F. L. Blanc, FLB). SHASTA CO.: Moose Camp, 1 ♀, VI-14-54 (E. I. Schlinger, USNM).

A large, dark-winged species of *Tephritis* with few if any large hyaline spots in the wing disc, *webbi* is not a commonly encountered species.

#### Genus *Tomoplagia* Coquillett

Species of *Tomoplagia* are recognized by the distinctive wing pattern, which varies little among the members of the genus. The genus is further distinguished by its yellow bristles, two pairs of upper fronto-orbitals, and the rounded apex of the third antennal segment. There are 43 known species; all but 2, *obliqua* and *cressoni*, are restricted to tropical and subtropical America. *T. obliqua* (Say) occurs in most of the temperate United States south of Washington, D. C., and west to New Mexico. *T. cressoni* Aczél is the only species of this genus known in California. The larvae of many tropical *Tomoplagia* are addicted to fleshy fruits such as guava and orange, but others may feed on other parts of various plants. Aczél (1955) has reviewed all the important species except *obliqua*.



Map 82. Distribution in California of *Tomoplagia cressoni* Aczél

*Tomoplagia cressoni* Aczél

(Fig. 91; Map 82)

*Tomoplagia cressoni* Aczél, 1955, Proc. U. S. Nat. Mus., 104:347; figs. 95, g-k, 97, c, d; pl. 20, fig. 7. Holotype ♂; Ontario, Calif. (USNM).

**Geographic range.**—Arizona, California, New Mexico, and Texas.

**California records.**—IMPERIAL Co.: Beale's Well, 14 mi. N.E., 1 ♀, on *Acacia greggi*, V-25-49 (R. C. Dickson, UCR). Calexico, 1 ♀, Frick trap, III-10-54 (T. Gallion, CDA). Imperial County, 1 ♂, IV-19-15 (M. C. Van Duzee, CAS). LOS ANGELES Co.: Beverly Hills, 1 ♂, McPhail trap in evergreen, IX-13-57 (C. Sartwell, CDA). Nr. Claremont, 1 ♂ (Baker, USNM). Crystal Lake, 1 ♂, VII-22-31 (LACO). Encino, 1 ♀, bait trap, IX-12-38 (L. E. Myers, LACO). Glendale, 1 ♀, bait trap, IX-9-38 (L. E. Myers, LACO); McPhail trap (SIB-7), VII-8-60 (Los Angeles County, LACO). Long Beach, McPhail trap (SIB-7), VII-28-60 (Los Angeles County, LACO). Los Angeles, 1 ♀, fruit fly survey, X-22-53 (LACO). North Whittier Heights, 1 ♂, bait trap, IX-16-35 (L. E. Myers, LACO). Pomona, 1 ♀, bait trap, IX-12-38 (Hamsher, LACO). San Marino, 1 ♂, bait trap, IX-12-38 (Hamsher, LACO). Westwood Hills, 1 ♀, VIII-11-35 (E. G. Linsley, CAS). Los Angeles County, 1 ♂, 1 ♀ (Coquillett, USNM). RIVERSIDE Co.: Beaumont, 1 ♂, McPhail trap (SIB-7), XI-24-58 (Max Finney, CDA); 1 ♀, McPhail trap (SIB-7), VI-16-60 (Anderson and Curtin, CDA). Calimesa, 1 ♀, Frick trap, VII-13-57 (J. E. Gillaspay, UCR). Chino Canyon, nr. Palm Springs, 1 ♂, 15 watt black light, IV-20-60 (J. F. Lawrence, CIS). Elsinore, 1 ♀, McPhail trap in walnut, VII-17-57 (C. Below, CDA). Idyllwild, 1 ♀, VIII-3-35 (R. H. Beamer, UK). Indio, 1 ♂, VIII-5-35 (R. H. Beamer, UK). Midland Canyon, 1 ♀,

VII-6-53 (R. H. Beamer, UK). Riverside, 1 ♀, on *Solanum douglasii*, VII-2-35 (P. H. Timberlake, UCR). SAN BERNARDINO Co.: Big Bear Valley, 1 ♀, on *Solidago confinis*, VIII-7-33 (P. H. Timberlake, UCR). Chino, 3 ♀♀, on walnuts, IX-25-30 (CIS). Cucamonga, 1 ♂, McPhail trap in black walnut, X-4-57 (J. Johnson, CDA). Oak Glen, 1 ♂, Frick trap in California live oak, VII-7-60 (C. H. Wortman, CDA). Ontario, 1 ♀, from orange grove, VI-1-35 (G. A. Pohl, CDA). Redlands, 1 ♀, 1914 (F. R. Cole, CIS). Santa's Village, Highway 18, Frick trap (in *Prunus emarginata*), VIII-17-60 (W. Burr, CDA). Yucaipa, 1 ♂, Frick trap, VII-22-57 (J. E. Gillaspay, UCR). SAN DIEGO Co.: Alpine, 1 ♂, McPhail trap (SIB-7), V-23-59 (Clare, CDA). Banner, 2 mi. E., 1 ♂, V-20-41 (R. C. Dickson, UCR). Campo, 1 ♂, VIII-10-35 (R. H. Beamer, UK). Dulzura, 2 ♂♂, *Perezia microcephala*, VII-22-49 (USNM). East Poway, 1 ♀, citrus, X-10-58 (W. S. Radcliff, CDA). El Cajon, 1 ♂, McPhail trap, XI-2-56 (F. Yaruss, CDA). Mount Palomar, 1 ♂, McPhail trap (SIB-7), VII-25-58 (F. W. Pelsue, CDA). Otay Mountain, Chula Vista, 1 ♀, Frick trap, V-14-59 (S. Klopfer, CDA). San Diego, 1 ♂, 1 ♀, Oriental fruit fly trap, VI-17-52 (M. G. Gondeck, CDA). San Luis Rey, 2 mi. E., 1 ♀, McPhail trap (SIB-7) in orange, X-17-60 (C. Johnson, CDA). San Ysidro, 1 ♀, McPhail trap in *Rhus integrifolia*, IX-6-57 (R. D. Hancock, CDA). San Diego County, 1 ♂, McPhail trap, VI-29-54 (R. Rinder, CDA); 1 ♀, Oriental fruit fly trap, VIII-28-50 (CDA). SAN LUIS OBISPO Co.: Pismo Beach, 1 ♀, McPhail trap (SIB-7) in avocado, X-27-60 (B. Osuna, CDA). SANTA BARBARA Co.: Goleta, 1 ♂, Frick trap in Persian walnut, VIII-13-57 (G. Beevor, CDA). Santa Cruz Island, 1 ♂, fruit fly trap, X-21-60 (L. Keenan and Robinson, CDA). Santa Ynez 1 ♀, McPhail trap (SIB-7), VI-29-60 (B. Osuna, CDA). VENTURA Co.: Meiners Oak, 1 ♂, McPhail trap (SIB-7) in plum, IX-12-60 (B. Osuna, CDA).

*T. cressoni* is usually somewhat smaller than *obliqua* (Say), the eastern United States species, and can always be identified by the presence of a small brown spot at the tip of the scutellum.

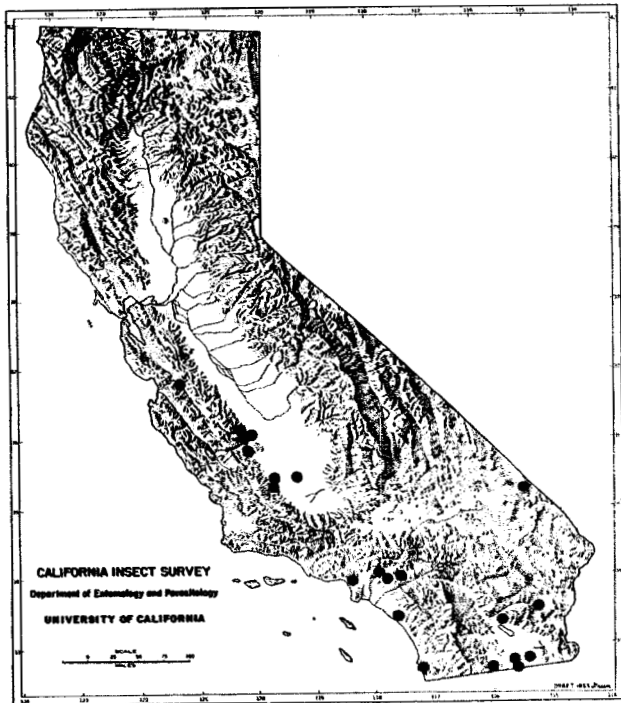
Genus *Trupanea* Guettard

The genus *Trupanea* is composed of small species having gray pollinose bodies, one pair of scutellars, yellowish head and legs, and hyaline wings with a distinctive dark, subapical, starlike pattern. The larvae inhabit ovaries of a large number of plants, especially composites, thus affecting the production of seed. The extent of damage and of host specificity is unknown. The genus is worldwide in distribution, and of the 20 species known to occur in North America, 15 have been recorded from California. The latest revision of the genus is by Foote (1960b).

KEY TO THE CALIFORNIA SPECIES OF TRUPANEA

- 1 An unbroken dark brown area in distal anterior quarter of wing disc; proximal half of wing light brown . . . *conjuncta* (Adams) (p. 78)
- Wing with a preapical dark area in distal third or half of cell R<sub>3</sub> and basal half of cell R<sub>5</sub>, with narrow dark rays diverging from it to wing margins . . . . . 2
- 2(1) Vein r-m connected to stigma by a dark ray as wide or nearly as wide as length of stigma . . . 3

- Dark ray connecting stigma with vein r-m much narrower than length of stigma, sometimes completely absent . . . . . 5
- 3(2) Two dark rays partially or entirely across cell 1st  $M_2$ ; vein  $M_3+Cu_1$  infuscated along most of its length; male with apical Y-shaped mark incomplete . . . . . *femoralis* (Thompson) (p. 79)  
Only one dark ray across cell 1st  $M_2$ , this sometimes broken or absent; vein  $M_3+Cu_1$  with a dark spot near center, or entirely devoid of markings (only males can be separated) . . . . . 4
- 4(3) Third antennal segment dark brown to black; apical Y-shaped mark incomplete; vein  $M_3+Cu_1$  with a dark spot at center . . . . . *nigricornis* (Coquillett) (p. 83)  
Third antennal segment yellow, nearly the same color as second; apical Y-shaped mark complete; vein  $M_3+Cu_1$  completely devoid of dark markings . . . . . *bisetosa* (Coquillett) (p. 76)
- 5(2) Two dark rays through cell 1st  $M_2$ , the proximal one sometimes broken in posterior half of cell and not attaining vein  $M_3+Cu_1$ , or broken in center of that cell . . . . . 6  
One dark ray through cell 1st  $M_2$ , in addition sometimes a spot near the middle of that cell and a dark spot in line with it on vein  $M_3+Cu_1$ , or with other markings within cell proximal to distal ray . . . . . 8
- 6(5) Distal ray through cell 1st  $M_2$  only to vein  $M_3+Cu_1$  and never beyond; elongate dark streak from base to middle or beyond of vein  $M_3+Cu_1$  . . . . . *wheeleri* Curran (part) (p. 87)  
Distal ray through cell 1st  $M_2$  continuing to hind margin of wing; if broken in cell  $Cu_1$  its continuation always marked by a dark marginal spot . . . . . 7
- 7(6) Distance along vein  $M_3+Cu_1$  between proximal and distal rays in cell 1st  $M_2$  greater than distance between distal ray and vein m, the dark mark on vein  $M_3+Cu_1$  at middle of that vein . . . . . *arizonensis* Malloch (p. 75)  
Distance along vein  $M_3+Cu_1$  between proximal and distal rays in cell 1st  $M_2$  equal to or less than distance between distal ray and vein m, the dark mark on vein  $M_3+Cu_1$  distinctly apical of the middle . . . . . *maculigera* Foote (p. 83)
- 8(5) Hyaline spot immediately anterior to vein m quadrate and attaining vein  $R_{2+3}$  along most of its width . . . . . *imperfecta* (Coquillett) (p. 80)  
Hyaline spot immediately anterior to vein m rounded anteriorly and rarely exceeding posterior two-thirds of cell  $R_5$  . . . . . 9
- 9(8) Distal end of cell R completely hyaline, but occasionally a very narrow band of infuscation borders vein r-m . . . . . 10  
Distal end of cell R definitely infuscated in addition to the narrow band along vein r-m . . . . . 17
- 10(9) Dark ray from stigma to vein r-m completely absent, or broken in cell  $R_1$  . . . . . 11  
Dark ray from stigma to vein r-m always present and complete in cell  $R_1$  . . . . . 13
- 11(10) Dark ray from stigma to vein r-m broken in cell  $R_1$  and complete in cell  $R_3$ ; females . . . . . *radifera* (Coquillett) (p. 85)  
Dark ray from stigma to vein r-m completely absent; males . . . . . 12
- 12(11) Light spot immediately anterior to vein m large and occupying at least posterior half of cell  $R_5$ ; dark area in tip of cell  $R_1$  barely longer than the adjacent hyaline spot at apex of vein  $R_{2+3}$  . . . . . *radifera* (Coquillett) (p. 85)  
Light spot immediately anterior to vein m small and occupying distinctly less than posterior half of cell  $R_5$ ; dark area in apex of cell  $R_1$  more than twice as long as adjacent hyaline spot; males . . . . . *jonesi* Curran (p. 81)
- 13(10) Infuscation at center of vein  $M_3+Cu_1$  elongate, at least three times as long as wide; females . . . . . *jonesi* Curran (p. 81)  
Infuscation at center of vein  $M_3+Cu_1$  subquadrate, triangular, or completely absent; males and females . . . . . 14
- 14(13) Marginal light spot at apex of vein  $R_{2+3}$  very close to distal margin of dark area surrounding it . . . . . *californica* Malloch (part) (p. 77)  
Marginal light spot at apex of vein  $R_{2+3}$  at or near middle of dark spot surrounding it . . . . . 15
- 15(14) Proximal light spot in cell  $R_5$  distinct, broadly based on vein  $M_{1+2}$  and extending about two-thirds of the way across cell  $R_5$  . . . . . *pseudovicina* Hering (p. 84)  
Proximal light spot in cell  $R_5$  lacking, indistinct, or extending completely across cell, never broadly based on vein  $M_{1+2}$  . . . . . 16
- 16(15) Head in profile with height distinctly greater than length . . . . . *signata* Foote (part) (p. 85)  
Head in profile at least as long as high, or longer . . . . . *actinobola* (Loew) (part) (p. 75)
- 17(9) Apex of cell R with dark, even infuscation similar to that in base of cell  $R_5$ , the proximal border sharply delimited . . . . . *vicina* (van der Wulp) (p. 86)  
Apex of cell R with infuscation either in a distinct spot surrounded at least in part distally by a lighter or hyaline area, or broad and lightly areolate, the proximal border never sharply delimited . . . . . 18
- 18(17) Vein  $M_3+Cu_1$  with an elongated infuscated streak from base to midpoint or slightly beyond . . . . . *wheeleri* Curran (part) (p. 87)  
Infuscation on vein  $M_3+Cu_1$  in the form of a spot, or entirely lacking . . . . . 19
- 19(18) Infuscation in apex of cell R with distinct margins . . . . . *signata* Foote (part) (p. 85)  
Infuscation in apex of cell R indistinctly margined . . . . . 20
- 20(19) Marginal hyaline spot at apex of vein  $R_{2+3}$  separated from the next distal hyaline area by a dark ray about as wide as that covering vein m . . . . . *californica* Malloch (part) (p. 77)  
Marginal hyaline spot at apex of vein  $R_{2+3}$  separated from the next distal hyaline area by a dark ray two or more times as wide as that covering vein m . . . . . *actinobola* (Loew) (part) (p. 75)



Map 83. Distribution in California of *Trupanea actinobola* (Loew)

*Trupanea actinobola* (Loew)

(Fig. 92; Map 83)

*Trypeta actinobola* Loew, 1873, Smiths. Misc. Collect., 11(256):326. Holotype ♂; Texas (MCZ).

**Geographic range.**—Widespread over the entire United States.

**California records.**—FRESNO CO.: Coalinga, 1 ♂, 1 ♀, *Lepidospartum squamatum*, X-15-56 (H. L. Wilson, CDA); 1 ♂, swept from *Atriplex polycarpa*, XI-8-56 (H. L. Wilson, CDA); 2 ♂♂, swept from composite, V-25-56 (H. L. Wilson, CDA); 1 (abdomen missing), swept from *Atriplex polycarpa*, XI-8-56 (H. L. Wilson, CDA); 2 ♀♀, *Atriplex expansa*, VII-20-17 (H. H. Severin, CIS); 1 ♂, 1 ♀, *Atriplex polycarpa*, X-12-58 (H. L. Wilson, CDA); 1 ♂, 1 ♀, ex *Gutierrezia* sp., X-12-58 (H. L. Wilson, CDA); 3 ♂♂, 1 ♀, ex *Lepidospartum squamatum*, XI-10-58 (H. L. Wilson, CDA); 1 ♀, ex *Gutierrezia californica*, XI-4-57 (H. L. Wilson, CDA); 1 ♀, *Lepidospartum squamatum*, XI-4-57 (H. L. Wilson, CDA); 5 mi. S., 1 ♂, ex *Lepidospartum squamatum*, XI-6-57 (H. L. Wilson, CDA); 6 mi. S., 13 ♂♂, 8 ♀♀, ex *Gutierrezia californica*, X-23-57 (H. L. Wilson, CDA); 6 mi. S., 4 ♂♂, 2 ♀♀, ex *Gutierrezia sarothrae*, IX-23-18 (H. H. Severin, CAS); 6 mi. S., 3 ♂♂, 1 ♀, ex *Gutierrezia sarothrae*, IX-23-18 (H. H. Severin, CIS). Coalinga, 6 mi. S., 6 ♂♂, 2 ♀♀, ex *Gutierrezia californica*, XI-12-57 (H. L. Wilson, CDA); 6 mi. S., 2 ♀♀, ex *Lepidospartum squamatum*, XI-8-57 (H. L. Wilson, CDA); 6 mi. S., 1 ♂, *Lepidospartum squamatum*, XI-12-57 (H. L. Wilson, CDA); 8 mi. S., 1 ♂, *Lepidospartum squamatum*, X-23-57 (H. L. Wilson, CDA) 8 mi. S., 1 ♀, *Franseria acanthicarpa*, X-23-57 (H. L. Wilson, CDA); 10 mi. S., 1 ♂, 3 ♀♀, *Lepidospartum squamatum*, X-29-57 (H. L. Wilson,

CDA); 10 mi. S., 1 ♂, 2 ♀♀, *Lepidospartum squamatum*, XI-6-57 (H. L. Wilson, CDA); 6 mi. S.W., 1 ♂, 1 ♀, 1 (abdomen missing), ex *Lepidospartum squamatum*, X-28-57 (H. L. Wilson, CDA); 6 mi. W., 3 ♂♂, 2 ♀♀, *Lepidospartum squamatum*, XI-1-57 (H. L. Wilson, CDA); 10 mi. W., 1 ♂, ex *Senecio douglasii*, XI-7-57 (H. L. Wilson, CDA); 12 mi. N.W., 1 ♂, 1 ♀, ex *Lepidospartum squamatum*, XI-8-57 (H. L. Wilson, CDA); 12 mi. N.W., 1 ♂, 1 ♀, *Lepidospartum squamatum*, XI-13-57 (H. L. Wilson, CDA). Huron, 5 mi. W., 1 ♂, ex *Atriplex polycarpa*, IX-22-18 (H. H. Severin, CIS). Jacalitos, 7 mi. W., 1 ♂, ex *Stenotopsis linearifolius*, III-26-58 (H. L. Wilson, CDA). Warthon Canyon, Coalinga, 1 ♂, 5 ♀♀, swept from *Atriplex polycarpa*, X-31-56 (H. L. Wilson, CDA). Zapato Canyon, Coalinga, 2 ♀♀, swept from *Lepidospartum squamatum*, XI-1-56 (H. L. Wilson, CDA). IMPERIAL CO.: Calexico, 1 ♀, ex alfalfa, X-15-59 (E. I. Schlinger, UCR). Coyote Wells, 4 mi. W., 1 ♀, ex *Senecio douglasii*, IV-4-18 (H. H. Severin, CIS). El Centro, 1 ♂, caught in argon light trap, X-29-59 (C. R. Waegner, CDA). Holtville, 1 ♀, XII-1-59 (A. L. Hanchett, CDA). Saudia, ex "Mexican asparagus," XII-30-44 (Anderson, CDA). KERN CO.: Belridge, 1 ♂, *Atriplex polycarpa*, XI-20-58 (H. L. Wilson, CDA). Famosa, 9 mi. S.E., 1 ♀, ex *Franseria acanthicarpa*, X-30-18 (H. H. Severin, CIS). Lost Hills, 9 mi. W., 1 ♂, ex *Atriplex polycarpa*, IX-28-18 (H. H. Severin, CIS). KINGS CO.: Avenal, 2 ♂♂, swept from *Atriplex polycarpa*, XI-1-56 (H. L. Wilson, CDA). LOS ANGELES CO.: Claremont, 1 ♂, (Baker, USNM). Tanbark Flat, 1 ♂, VII-18-52 (A. T. McClay, UCD). West Los Angeles, 1 ♂, McPhail trap (sugar and yeast) in loquat tree, I-4-57 (B. Osuna, CDA). ORANGE CO.: Gavilan, 1 ♂, in *Gutierrezia californica*, VI-9-50 (P. H. Timberlake, UCR). RIVERSIDE CO.: Hopkins Well, 1 ♂, 2 ♀♀, IV-16-58 (J. A. Powell, CIS). Hunter's Spring, 1 ♀, V-10-52 (UCLA). SAN BENITO CO.: Hollister, 1 ♂, Frick trap in walnut, IX-15-56 (R. P. Allen, CDA). SAN BERNARDINO CO.: Cucamonga, 1 ♂, XI-12-58 (G. Harper, CDA). Ivanpah, 25 mi. S., 1 ♂, 1 ♀, *Chrysothamnus* sp., X-13-58 (J. A. Chemsak, CIS). SAN DIEGO CO.: San Diego, 1 ♀, in automobile, IX-25-56 (L. M. Huey, SDM).

An extremely variable species having a single ray through cell 1st  $M_2$  commonly ending short of vein  $M_3+Cu_1$ ; the apex of cell R with or without infuscation; and with or without a spot at the center of vein  $M_3+Cu_1$ . The species represents a complex of North American forms needing additional study.

*Trupanea arizonensis* Malloch

(Fig. 93; Map 84)

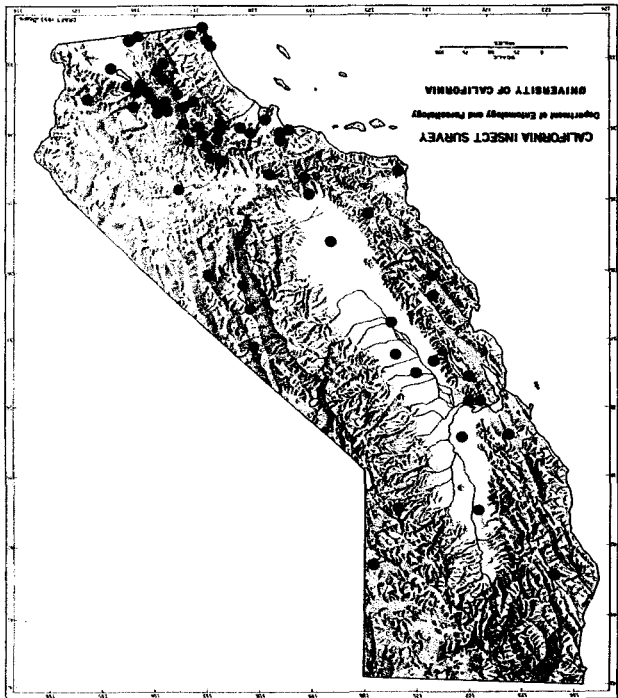
*Trypanea arizonensis* Malloch, 1942, Proc. U. S. Nat. Mus., 92(3133):15, fig. 1, v. Holotype ♀; Tucson, Ariz. (USNM).

**Geographic range.**—Arizona, California, and Texas; also Mexico (Baja California).

**California records.**—LOS ANGELES CO.: Redondo, 1 (abdomen missing), (LAM). MONTEREY CO.: Asilomar, 1 ♀, V-17-59 (G. I. Stage, CIS). RIVERSIDE CO.: Hunter's Spring, 1 ♂, 1 ♀, V-10-52 (UCLA).

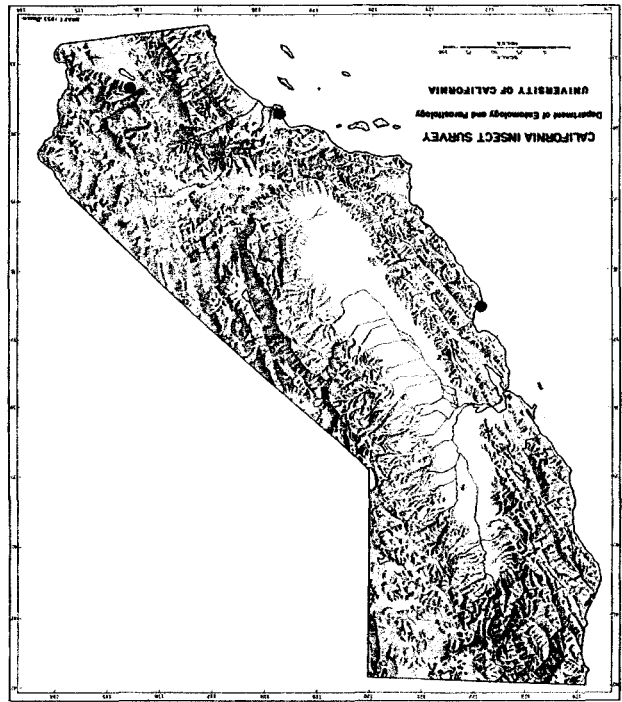
*T. arizonensis* is a very small species, the most outstanding character of which is the relative position of the dark rays in cell 1st  $M_2$ . From *maculigera*





Map 85. Distribution in California of *Trupanea bisetosa* (Coquillett)

*Franseria* sp., IV-25-52 (G. A. Marsh, CIS), Wheeler Ridge, Lassen Co.: Amedee, 1 ♂, VII-4-47 (T. F. Leigh, CIS), Mohr, 1 ♂, X-11-52 (E. I. Schlinger, UCD), Los Angeles Co.: Claremont, 1 ♂, 1 ♀, (Baker, CDA), Downey, 1 ♀, IV-3-30 (H. M. Armistage, LACO), Gorman, 2 ♂ ♀, VI-18-52 (A. T. McClay, UCD), Lancaster, 1 ♀, (Caudron, LACO), San Fernando, 1 ♂, *Encelia californica*, I-10-44 (C. A. Hamm, UCD), San Fernando Valley, 1 ♀, reared from sunflower, VI-15-29 (L. E. Myers, LACO); Santa Monica, 1 ♀, melon fly trap in orange, XI-23-56 (R. Bailey, CDA), Tanbark Flat, 1 ♀, VII-8-52 (A. T. McClay, UCD); 1 ♀, VII-17-52 (A. T. McClay, UCD); 1 ♀, VI-26-52 (J. K. Hester, UCD), Van Nuys, Clay, UCD); 1 ♀, *Hemizonia pungens*, emerged IX-14-44 (Lloyd Martin, LAM), MERCED CO.: Merced, Snelling Highway and Merced River Bridge, 1 ♀, caught in automobile, VIII-10-53 (R. P. Allen, CDA), MONTEREY CO.: King City, 1 ♂, ex *Atriplex semibaccata*, VII-3-18 (H. H. Severin, CIS), RIVERSIDE CO.: Box Canyon, 1 ♀, on *Eriogonum thomasi*, IV-27-52 (P. H. Timberlake, UCR), Coachella Valley, 2 ♀ ♀, IV-7-20 (R. S. Woglum, CIS); 1 ♀, V-9-27 (E. C. Van Dyke, CAS), Cottonwood Spring, 2 ♀ ♀, collected at light, IV-26-49 (L. W. Qate, CIS), Dead Indian Creek, 4 ♀ ♀, V-10-52 (UCLA), Edom, 3 mi. S., 2 ♀ ♀, *Dicoria canescens*, X-15-47 (P. H. Timberlake, UCR), Hemet, 1 ♂, *Helianthus* sp., VII-24-46 (J. W. MacSwain, CIS), Hopkins Well, 1 ♂, IV-16-58 (J. A. Powell, CIS), Hunter's Spring, 1 ♀, V-10-52 (UCLA), Indio, 6 mi. W., 1 ♂, 5 ♀ ♀, *Melilotus* sp., IV-30-49 (E. G. Linsley, J. W. MacSwain, and R. F. Smith, CIS); 18.7 mi. S., 1 ♂, IV-23-51 (P. H. Timberlake, UCR), Mount San Jacinto, 1 ♀, V-28-39 (R. M. Bohart, UCLA), Palm Springs, 1 ♀, XI-3-46 (CIS); 1 ♂, 11 ♀ ♀, *Encelia farinosa*, I-5-53 (P. H. Arnaud,



Map 84. Distribution in California of *Trupanea arizonensis* Malloch

Footnote: it may be separated by its smaller size and the more proximal position of the marginal hyaline spot at the apex of vein  $R_{2+3}$  in the surrounding dark area.

*Trupanea bisetosa* (Coquillett)

(Figs. 94, 95; Map 85)  
*Urella bisetosa* Coquillett, 1899, Jour. N. Y. Ent. Soc., 7:266.  
 Holotype ♀; Las Cruces, N. Mex. (USNM).

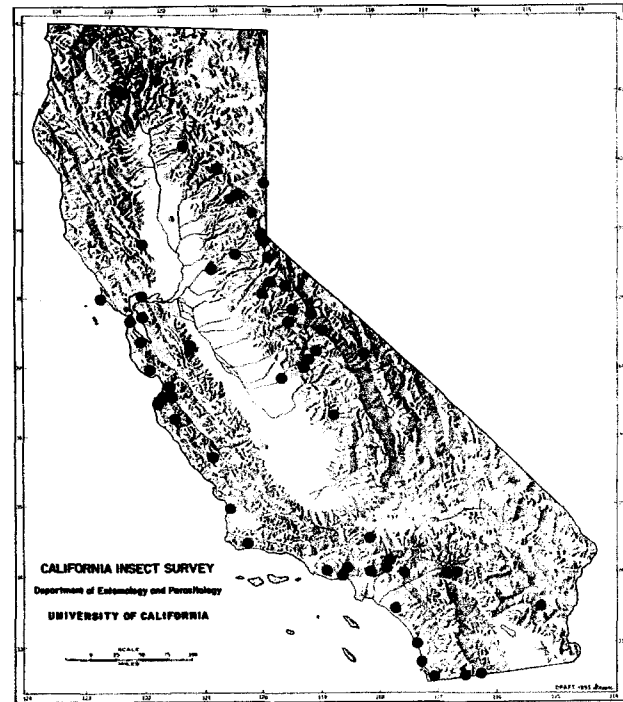
Geographic range.—Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming.

*California records*.—ALAMEDA CO.: Pleasanton, 1 ♂, 2 ♀ ♀, VIII-1-32 (CIS), CONTRA COSTA CO.: Antioch, 1 ♂, XI-10-47 (P. D. Hurd, CIS), Pacheco, 1 ♂, X-1-50 (H. L. Hansen, CIS), FRESNO CO.: Firebaugh, 2 ♀ ♀, VIII-16-49 (A. D. Telford, CIS), GLENN CO.: Artois, 1 ♀, VII-16-52 (H. L. Hansen, CIS), HUMBOLDT CO.: Dinmore, fork of Van Duzen River, 1 ♀, Frick trap in *Prunus emarginata*, VIII-60 (CDA), IMPERIAL CO.: Coyote Wells, 4 mi. W., 5 ♀ ♀, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS); 1 ♀, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS), Dixiland, 1 ♂, ex *Pluchea sericea*, III-13-18 (H. H. Severin, CIS), Fish Springs, 1 ♀, desert verbena, IV-4-31 (A. C. Browne, CDA), Niland, 3 ♀ ♀, ex *Encelia* sp., apparently frutescens var. *actoni*, II-6-57 (H. L. Wilson, CDA), INYO CO.: Lone Pine, 1 ♀, VI-9-29 (E. P. Van Duzee, CAS), Olancho, 1 ♀, VI-8-29 (E. P. Van Duzee, CAS), Panamint Spring, 15 mi. S., 2 ♀ ♀, V-28-53 (R. O. Schuster, CIS); 1 (abdomen missing), V-28-53 (R. O. Schuster, CIS), Westgard Pass, 7 mi. W., 1 ♀, VI-26-53 (W. D. McJellan, UCD), KERN CO.: McFarland, 1 ♀, argon light trap, X-28-58 (F. Betcher, CDA), Walker Pass, 7 mi. E., 1 ♀,

PHA); 1 ♀, I-10-53 (P. H. Arnaud, PHA); 2 ♀♀, XII-28-52 (P. H. Arnaud, PHA); 1 ♂, 1 ♀, at flower of *Baccharis sergiioides*, I-2-53 (P. H. Arnaud, PHA); 1 ♂, *Baccharis sergiioides*, I-2-53 (P. H. Arnaud, PHA); 1 ♂, III-14-41 (P. H. Timberlake, UCR); 1 ♂, XII-29-52 (P. H. Arnaud, PHA); 3 ♀♀, IV-5-25 (CIS); 4 mi. N., 1 ♂, on *Dalea californica*, V-10-41 (P. H. Timberlake, UCR). Palm Springs, Andreas Canyon, 1 ♀, on *Erigonum fasciculatum polifolium*, IV-24-32 (P. H. Timberlake, UCR); 1 ♀, on *Stephanomeria pauciflora*, V-10-54 (P. H. Timberlake, UCR); 2 ♀♀, on *Eriodictyon crassifolium*, IV-14-46 (P. H. Timberlake, UCR). Palm Springs, Chino Canyon, 1 ♀, XII-24-50 (P. H. Arnaud, PHA). Palm Springs, Palm Canyon, 1 ♀, ex *Acacia greggi*, IV-15-38 (R. M. Bohart and G. E. Bohart, CAS). Palm Springs Station, 1 ♂, VII-29-52 (J. C. Hall, UCD). Pinon Flat, San Jacinto Mountains, 1 ♂, 1 ♀, V-27-39 (B. Brookman, CAS). Riverside, 2 ♀♀, ex flower of *Encelia farinosa*, V-10-36 (P. H. Timberlake, UCR); 1 ♀, on *Artemisia californica*, VII-11-35 (P. H. Timberlake, UCR); 1 ♀, on *Eriogonum fasciculatum*, V-27-46 (P. H. Timberlake, UCR); 1 ♀, on *Encelia farinosa*, II-23-40 (P. H. Timberlake, UCR); 1 ♀, ex *Encelia farinosa*, V-9-50 (P. H. Timberlake, UCR). Sobola Springs, 2 ♀♀, V-30-17 (E. P. Van Duzee, CAS). Thousand Palms, 1 ♀, on *Encelia farinosa*, IV-3-49 (P. H. Timberlake, UCR). SAN BENITO CO.: Pinacles, 1 ♂, IV-24-48 (W. W. Middlekauff, CIS). SAN BERNARDINO CO.: Adelanto, 1½ mi. S., 1 ♂, IV-25-37 (P. H. Timberlake, UCR). Apple Valley, 1 ♂, V-9-58 (P. D. Hurd, CIS). Big Bear Lake, 1 ♀, aster, VIII-24-43 (S. C. Jones, SCJ). Colton, 1 ♂, ex Russian thistle, IX-28-59 (H. L. Wilson, CDA). East Highlands, 1 ♀, II-15 (CIS). Manix, 13 mi. N., 1 ♂, *Senecio* sp., VI-25-53 (R. O. Schuster, CIS). Ord Mountain, 1 ♂, *Encelia frutescens* var. *frutescens*, IV-19-60 (J. F. Lawrence, CIS). Redlands, 1 ♂, 1914 (CIS). San Geronimo Pass, 1 ♀, on *Acamptopappus sphaerocephalus*, V-10-51 (P. H. Timberlake, UCR). Verdmont, Cajon Pass, 1 ♂, IV-20-33 (E. P. Van Duzee, CAS); 1 ♂, IV-20-33 (E. P. Van Duzee, CIS). Victorville, 1 ♂, V-2-53 (G. A. Marsh and R. O. Schuster, CIS). SAN DIEGO CO.: Borrego, 1 ♂, *Croton californicus*, IV-30-54 (M. Wasbauer, CIS); 2 ♀♀, IV-24-55 (R. O. Schuster, CAS); 1 ♀, *Croton* sp., V-4-56 (P. H. Timberlake, UCR). Borrego, Coyote Creek, 1 ♀, reared from flower heads of *Encelia farinosa*, collected IV-27-51, emerged V-7-51 (F. L. Blanc, FLB). Borrego Valley, Palm Canyon, 1 ♀, IV-26-53 (UCLA). Desert Edge, 2 ♀♀, IV-14-15 (M. C. Van Duzee, CIS); 1 ♂, 5 ♀♀, IV-14-15 (M. C. Van Duzee, CAS). Indian Wells, 1 ♂, IV-24-53 (UCLA). La Jolla, 1 ♀, III-12-14 (E. P. Van Duzee, CAS). San Diego, 1 ♀, in house, III-25-33 (CDA); 1 ♀, IX-12-13 (E. P. Van Duzee, CAS). San Ysidro, 1 ♂, McPhail trap (SIB-7) in pepper, XII-19-58 (Ramirez, CDA). Sentenac Canyon, 1 ♀, V-14-49 (F. L. Blanc, FLB); 1 ♀, IV-26-53 (UCLA). San Diego County, 1 ♀, *Encelia* sp., II-3-28 (C. C. Searl, SDM). SAN LUIS OBISPO CO.: Simmler, 1 ♂, III-20-40 (J. W. Tilden and G. S. Mansfield, SJS). SANTA BARBARA CO.: Lompoc, 1 ♂, III-24-41 (R. M. Bohart, UCLA). SIERRA CO.: Sierra City, 1 ♀, *Senecio* sp., VII-18-42 (G. Beevor, CDA). SONOMA CO.: Trinity, 2 ♀♀, XII-20-37 (N. W. Frazier, CIS). STANISLAUS CO.: Ceres, 1 ♀, VIII-28-53 (W. W. Middlekauff, CIS). Patterson, 1 ♂, VII-7-49 (T. F. Leigh, CIS). YOLO CO.: Davis, 1 ♀, IX-49 (W. L. Kubik, UCD).

Females of *bisetosa* and *nigricornis* (Coq.) are not separable, but males of *bisetosa* are distinctive in

possessing a yellow third antennal segment and no indication of a dark spot on vein  $M_3+Cu_1$ .



Map 86. Distribution in California of *Trupanea californica* Malloch

### *Trupanea californica* Malloch

(Fig. 96; Map 86)

*Trypanea californica* Malloch, 1942, Proc. U. S. Nat. Mus., 92(3133):17. Holotype ♂; Emerald River, Tahoe, Calif. (USNM).

*Synonym*.—*Trypanea microsetulosa* Malloch, 1942:17.

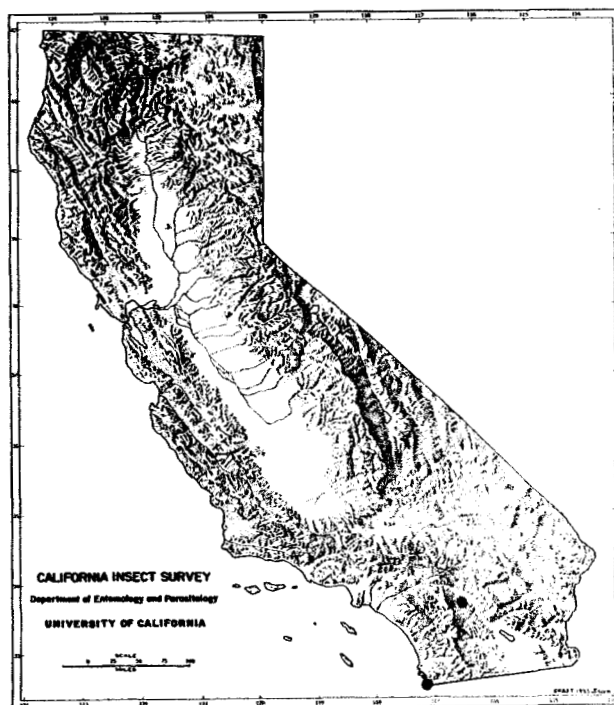
*Geographic range*.—Arizona, California, Colorado, Nevada, New Mexico, Oregon, Texas, and Washington.

*California records*.—ALAMEDA CO.: Lake Anza, Oakland Hills, 1 ♂, X-19-50 (H. L. Hansen, CIS). ALPINE CO.: Hope Valley, wing only, VII-9-48 (A. Bartel, CIS); 1 ♂, VII-18-48 (D. Carter, CIS). EL DORADO CO.: Echo, 1 ♀, VIII-10-40 (Kenaga, UK). Emerald Bay, Tahoe (paratypes), 2 ♂♂, 1 ♀, VI-30-27 (J. M. Aldrich, USNM). Fallen Leaf (paratype), 1 ♀, 5,600 ft., VII-15-17 (J. M. Aldrich, USNM). Folsom Lake, 1 ♀, on *Gnaphalium chilense*, XI-11-59 (R. F. Wilkey, RFW). Lake Tahoe, 1 ♀, VI-19-36 (R. M. Bohart, CAS). Pacific, 3 ♂♂, 1 ♀, VIII-9-40 (Kenaga, UK). Snowline Camp, 2 ♂♂, VII-4-48 and VII-7-48 (A. Bartel, CIS); 1 ♂, VII-7-48 (L. W. Quate, CIS). FRESNO CO.: Huntington Lake, 1 ♂, 7,000 ft., VII-9-19 (E. P. Van Duzee, CAS). Lost Lake, Friant, 1 mi. W., 2 ♂♂, 2 ♀♀, VII-1-56 (R. O. Schuster, CIS). Mono Hot Springs, 1 ♂, VIII-8-56 (R. O. Schuster, CIS). Shaver Lake, 1 ♂, VII-19 (CAS). INYO CO.: Bishop, 1 ♂, VII-28-40 (Hardy, UK). LOS ANGELES CO.: Beverly Glen, 2 ♀♀, VI-30-52 (R. X. Schick, UCLA). Big Dalton Canyon, 1 ♀, VII-15-56 (R. C. Bechtel, USNM). Big Pines Camp, 1 ♀, on *Eriodictyon trichocalyx*, VIII-2-44 (P. H. Timberlake, UCR). Johnstone Point, 1 ♂, VII-14-50 (R. Schuster, CIS). Palm-

dale, 1 ♀, VII-22-40 (Hardy, UK). Pasadena, 2 ♀♀, *Artemisia* sp., VIII-27-45 (C. Henne, LAM). Sepulveda Canyon, 1 ♂, V-7-39 (UCLA). Tanbark Flat, 1 (abdomen missing), VII-13-52 (S. Miyagawa, UCD). LASSEN CO.: Hallelujah Junction, 1 ♂, VII-16-53 (E. I. Schlinger, UCD). MARIN CO.: Point Reyes Station, 1 ♀, VIII-31-54 (A. D. Telford, USNM). MARIPOSA CO.: Tuolumne Meadows, 1 ♀, VII-1-40 (Hardy, UK). Yosemite National Park, 7 ♂♂, 2 ♀♀, VIII-40 (Hardy, UK). MONO CO.: Mammoth Lake, 2 ♂♂, 1 ♀, VII-29-40 (Hardy, UK). Sardine Creek, 2 ♀♀, VII-18-51 (A. T. McClay, UCD). Sonora Pass, 3 ♀♀, VII-17-51 (A. T. McClay, UCD). MONTEREY CO.: Bryson, 1 ♂, V-18-20 (E. P. Van Duzee, CAS). Carmel Highlands, Highway 1, 1 ♂, 5 ♀♀, on leaves and flowers of *Anaphalis margaritacea*, V-14-59 (T. R. Haig, CDA). Fort Ord, 2 ♂♂, VII-15-57 (H. M. Court, CDA). Hastings Reservation, nr. Jamesburg, 1 ♂, 1 ♀, XI-22-56 (D. D. Linsdale, CIS); 1 ♂, XII-6-59 (D. D. Linsdale, CIS). Pacific Grove, 1 ♂, X-7-06 (Bradley, ANSP). Paradise Canyon, nr. Prunedale, 1 ♂, VIII-31-53 (P. H. Arnaud, PHA). Salinas, 1 ♂, 1 ♀, *Parthenium argentatum*, VIII-11-42 (W. H. Lange, USNM). NEVADA CO.: Sagehen, nr. Hobart Mills, 1 ♂, VII-2-54 (E. I. Schlinger, USNM). Truckee, 1 ♂, VI-26-43 (P. H. Arnaud, PHA). ORANGE CO.: Irvine, 1 ♂, lima beans, VII-25-52 (T. Bingoldnee and E. Chandler, CDA). PLUMAS CO.: Quincy, 4 mi. W., 1 (abdomen missing), VI-30-49 (E. L. Atkinson, CIS). Clio, 1 ♂, VII-9-16 (H. G. Dyar, USNM). RIVERSIDE CO.: Hopkins Well, 1 ♂, IV-16-58 (J. A. Powell, CIS). SAN BERNARDINO CO.: Barton Flats, San Bernardino Mountains, 1 ♂, VII-11-56 (R. W. Bushing, USNM). Cucamonga, 1 ♂, ex flowers, XI-12-58 (G. Harper, CDA). Dollar Lake Trail, 3 ♀♀, VII-10-56 (H. W. Michalk, CDA). Mill Creek, 3 ♀♀, *Gnaphalium* sp., VIII-27-45 (P. H. Timberlake, UCR). South Fork Camp, on *Gnaphalium thermale*, IX-10-44 (P. H. Timberlake, UCR). SAN DIEGO CO.: Campo, 1 ♂, VIII-18-40 (Hardy, UK). Jacumba, 2 ♂♂, 1 ♀, VII-17-40 (Hardy, UK). Jacumba Spring, 1 ♂, VI-28-17 (J. M. Aldrich, USNM). La Jolla, 1 ♀ (UK). Leucadia, 1 ♂, sunflower, V-30-45 (G. F. Prole, CDA). Otay, 5 ♂♂, 2 ♀♀, reared larvae in *Gnaphalium* sp. flowers, XI-10-50 (USNM). San Diego County, abdomen and wing of male, V-23 (E. P. Van Duzee, CAS). SAN FRANCISCO CO.: San Francisco, 1 ♂, VIII-22-36 (CDA); 1 ♀, VIII-21-36 (CDA); 1 ♂, 1 ♀, VIII-27-36 (CDA); 1 ♂, 1 ♀, reared from *Anaphalis*, collected II-10-34, emerged III-1-34 (H. H. Keifer, CDA); 5 ♂♂, 5 ♀♀, reared from *Anaphalis* sp., collected IX-16-37, emerged X-5-37 (H. H. Keifer, CDA); (paratype), 1 ♂, X-12-19 (E. P. Van Duzee, USNM). SAN LUIS OBISPO CO.: Oso Flaco Lake, 1 ♀, VII-13-59 (C. A. Campbell, CIS). SAN MATEO CO.: Woodside, 1 ♂, 1 ♀, swept from *Baccharis pilularis consanguinea*, X-3-59 (P. H. Arnaud, PHA). SANTA BARBARA CO.: Gaviota Pass, 1 ♂, VI-17-49 (R. S. Beal, CIS). SANTA CRUZ CO.: Felton, 1 ♀, V-17-47 (P. H. Arnaud, PHA). Mount Herman, 1 ♀, VIII-14-31 (L. O. Muchmore, LAM). SIERRA CO.: Sierra City, 1 ♂, *Prunus emarginata*, VII-14-42 (G. Beevor, CDA). Yuba Pass, 1 ♀, VIII-20-53 (E. I. Schlinger, UCD). SISKIYOU CO.: McCloud, 1 ♂, 1 ♀, *Prunus emarginata*, VIII-27-42 (CDA). SOLANO CO.: Vallejo, 1 ♀, Frick trap in walnut, IX-18-57 (Ralph Freeman, CDA). STANISLAUS CO.: Adobe Creek, western Stanislaus County, 1 ♂, *Phacelia* sp., V-6-48 (R. F. Smith, CIS). TEHAMA CO.: Mineral, 1 ♂, grass, VIII-18-59 (R. F. Wilkey, RFW). TRINITY CO.: Coffee Creek Ranger Station, 10 mi. N., 1 ♀, *Symphoricarpos* sp., VII-15-55 (J. W. MacSwain, CIS). Trinity East Camp,

1 ♂, VI-3-51 (A. T. McClay, UCD). Trinity River Camp, 2 ♂♂, VII-17-53 (A. T. McClay, USNM). TULARE CO.: Sequoia National Park, 5 ♂♂, VIII-6-40 (Hardy, UK). TUOLUMNE CO.: Bumble Bee, 1 ♂, VI-25-51 (A. T. McClay, UCD). Dardanelles, 1 ♂, 1 ♀, VI-26-51 (A. T. McClay, UCD). Kennedy Meadow, 5 ♂♂, VII-9-51 (A. T. McClay, UCD). Pinecrest, 1 ♀, VII-29-48 (P. H. Arnaud, PHA). Strawberry, 3 ♂♂, 1 ♀, VII-15-51 (A. T. McClay, UCD). VENTURA CO.: Shewood Lake, 1 ♀, VII-26-52 (R. X. Schick, UCLA). YOLO CO.: Rumsey, 1 ♂, V-17-59 (C. G. Moore, CGM).

This species may be distinguished by the position of the marginal hyaline spot at the apex of vein  $R_{2+3}$ . In *californica* it is much closer to the next distal hyaline area than in *actinobola*.



Map 87. Distribution in California of *Trupanea conjuncta* (Adams)

*Trupanea conjuncta* (Adams)

(Fig. 97; Map 87)

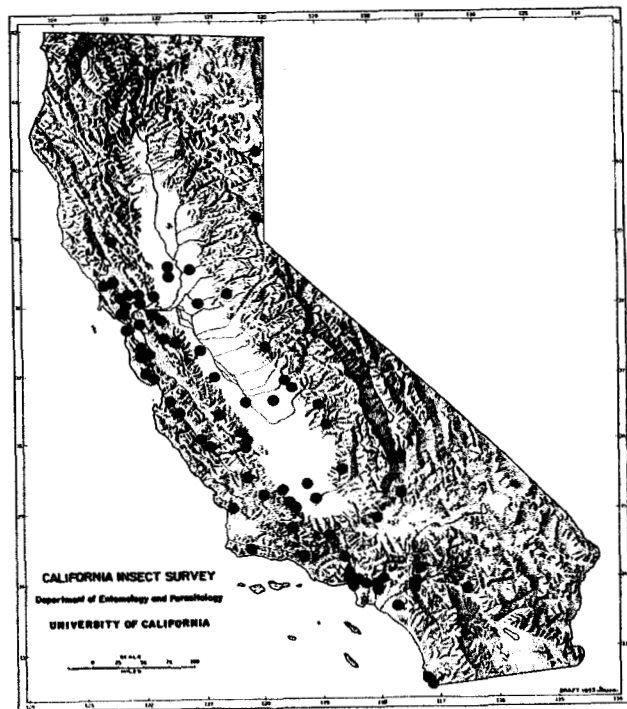
*Urellia conjuncta* Adams, 1904, Kans. Univ. Sci. Bull., 2:450. Holotype ♀; Bill Williams Fork, Ariz. (UK).

*Geographic range*.—Arizona and California.

*California records*.—RIVERSIDE CO.: Andreas Canyon, Palm Springs, 1 ♀, on *Encelia farinosa*, III-8-56 (P. H. Timberlake, UCR). SAN DIEGO CO.: San Ysidro, 1 ♀, McPhail trap (SIB-7) in shade tree, XII-12-58 (Ramirez, CDA).

*T. conjuncta* is rarely collected. It is quite different from all other *Trupanea* in having an unbroken dark-brown area in the distal anterior quarter of the wing disc and, proximad from it, an extremely broad, light-brown area extending from the costa across the stigma and cells  $R_1$ ,  $R_2$ , and  $R_3$ . The heads of both

sexes are subquadrate from lateral view, and the female ovipositor sheath is about one and one-half times as long as the last two abdominal terga.



Map 88. Distribution in California of *Trupanea femoralis* (Thomson)

*Trupanea femoralis* (Thomson)

(Figs. 98, 99; Map 88)

*Trypeta femoralis* Thomson, 1868, Engenies Resa, Ins., 6(2) (Dipt.): 582. Holotype ♂; California (NM).

Synonym.—*Urellia occidentalis* Adams, 1904:450.

Geographic range.—Known only from California.

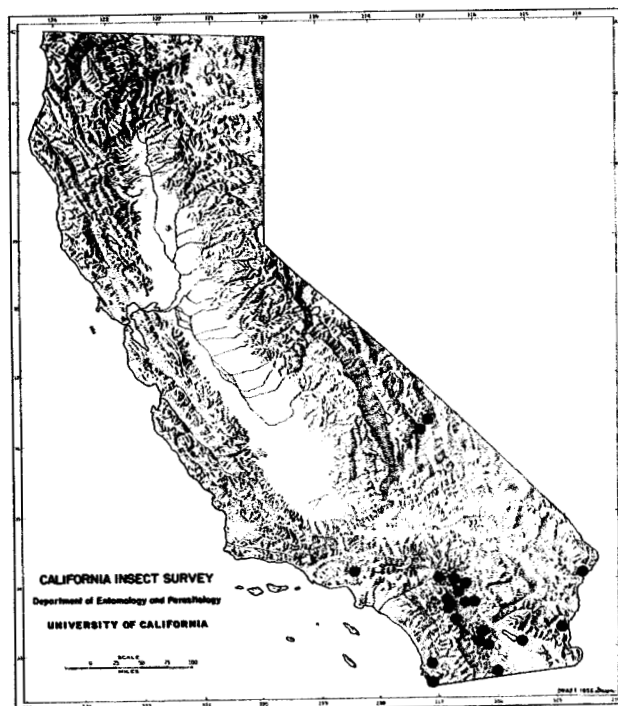
California records.—ALAMEDA CO.: Arroyo Mocho, 2 ♂♂, swept from *Hemizonia* sp., X-7-56 (J. A. Powell, JAP). Berkeley, 1 ♂, VIII-14-59 (G. I. Stange, CIS). Livermore, 1 ♀, III-14-37 (G. Ferguson, SCJ). Pleasanton, 1 ♂, 2 ♀♀, VIII-1-32 (CIS); 1 ♂, VIII-1-32 (USNM). Alameda County, 1 ♀, Frick trap, X-56 (R. P. Allen, CDA). CALAVERAS CO.: Mokelumne Hill, 1 ♀, Frick trap, IX-59 (Calaveras County, CDA). CONTRA COSTA CO.: Martinez, 1 ♀, Frick trap in walnut, VIII-6-57 (E. Kalar, CDA). FRESNO CO.: Coalinga, 1 ♀, swept from *Haplopappus linearifolius*, IV-24-56 (F. L. Blanc, CDA); 3 ♀♀, *Hemizonia* sp., IV-24-56 (F. L. Blanc, CDA); 5 ♂♂, 3 ♀♀, swept from *Erodium cicutarium*, II-26-57 (H. L. Wilson, CDA); 3 ♀♀, swept from *Layia platyglossa*, V-4-56 (H. L. Wilson, CDA); 2 ♂♂, swept from *Haplopappus linearifolius*, V-4-56 (H. L. Wilson, CDA); 1 ♀, swept from composite, V-25-56 (H. L. Wilson, CDA); 1 ♀, swept from *Erodium cicutarium*, III-25-57 (H. L. Wilson, CDA); 1 ♂, swept from *Layia platyglossa*, IV-24-56 (F. L. Blanc, CDA); 3 ♂♂, 1 ♀, ex *Erodium cicutarium*, III-5-57 (H. L. Wilson, CDA); 1 ♂, V-21-56 (H. L. Wilson, CDA); 1 ♀, *Erodium cicutarium*, II-21-56 (H. L.

Wilson, CDA); 1 ♀, ex *Haplopappus venetus*, IX-10-57 (H. L. Wilson, CDA); 1 ♂, *Atriplex polycarpa*, X-12-50 (H. L. Wilson, CDA); 5 mi. N., 13 ♂♂, 8 ♀♀, *Monolopia major*, III-20-57 (H. L. Wilson, CDA); 8 mi. N., 81 ♂♂, 30 ♀♀, swept from *Monolopia major*, III-25-57 (H. L. Wilson, CDA); 6 mi. S., 1 ♀, ex *Gutierrezia californica*, X-23-57 (H. L. Wilson, CDA); 6 mi. S., 1 ♂, ex *Lepidospartum* sp., XI-8-57 (H. L. Wilson, CDA); 6 mi. W., 1 ♂, swept from *Lepidospartum squamatum*, X-28-57 (H. L. Wilson, CDA); 1 ♂, *Lepidospartum squamatum*, XI-1-57 (H. L. Wilson, CDA); 10 mi. W., 2 ♀♀, ex *Senecio douglasii*, XI-7-57 (H. L. Wilson, CDA); 1 ♀, ex *Lepidospartum squamatum*, XI-6-57 (H. L. Wilson, CDA); 12 mi. N.W., 1 ♀, ex *Lepidospartum squamatum*, XI-13-57 (H. L. Wilson, CDA). Fresno, 1 ♀, ex *Gutierrezia* sp., X-12-58 (H. L. Wilson, CDA). Jacalitos, 7 mi. W., 1 ♂, ex *Haplopappus linearifolius*, III-26-58 (H. L. Wilson, CDA). Jacalitos Canyon, 1 ♀, swept from composite, V-15-56 (H. L. Wilson, CDA). Lost Lake, Friant, 1 mi. W., 1 ♂, VII-1-56 (R. O. Schuster, CIS). Mendota, 1 ♂, ex *Hemizonia* sp., XI-2-56 (Ballard, CDA); 22 mi. S., 1 ♂, V-18-18 (H. H. Severin, CIS). Warthon Canyon, 1 ♂, *Lepidospartum squamatum*, XI-4-57 (H. L. Wilson, CDA). Warthon Canyon, Coalinga, 2 ♀♀, swept from *Atriplex polycarpa*, X-30-56 (H. L. Wilson, CDA); 2 ♂♂, *Atriplex polycarpa*, X-31-56 (H. L. Wilson, CDA). Watts Valley, 1 ♀, VI-23-56 (R. O. Schuster, CIS). Yearout, 1 ♀, swept from *Bassia hyssopifolia*, V-10-56 (H. L. Wilson, CDA). Zapoto Canyon, Coalinga, 1 ♂, 1 ♀, swept from *Lepidospartum squamatum*, X-1-56 (H. L. Wilson, CDA). INYO Co.: Little Lake, 1 ♀, VII-25-40 (Hardy, UK). KERN Co.: Belridge, 1 ♂, ex *Isomeris arborea*, XI-20-58 (H. L. Wilson, CDA). Famosa, 9 mi. S.E., 2 ♂♂, ex *Franseria acanthicarpa*, X-30-18 (H. H. Severin, CIS). Fellows, 1 ♀, swept from tall yellow composite, IX-26-57 (H. L. Wilson, CDA). Glennville, 5 mi. W., 1 ♀, IX-17-59 (H. L. Wilson, CDA). Mojave, 4 mi. W., 1 ♂, ex composite, V-22-58 (H. L. Wilson, CDA). Oildale, 2 ♀♀, swept from *Salsola kali*, X-7-57 (H. L. Wilson, CDA). Taft, 1 ♂, 1 ♀, XI-3-58 (H. L. Wilson, CDA). LAKE Co.: Kelseyville, 1 ♀, Frick trap in walnut, X-10-57 (Ralph Freeman, CDA). Lake County, 1 ♀, Frick trap in walnut, X-56 (W. W. Wiard, CDA); 1 ♂, Frick trap, Summer 57 (CDA). LASSEN Co.: Amedee, 1 ♂, VII-4-47 (T. F. Leigh, CIS). LOS ANGELES Co.: Castaic Junction, 2 ♀♀, swept from *Lepidospartum squamatum*, VIII-29-57 (H. L. Wilson, CDA). Glendora, Angeles National Forest, 1 ♂, meadow, VII-15-44 (USNM). Gorman, 1 ♀, ex *Senecio douglasii*, VIII-29-57 (H. L. Wilson, CDA). Hollywood, 1 ♀, melon fly trap in *Ceanothus* sp., XI-14-56 (L. Pyeatt, CDA); 1 ♂, melon fly trap in magnolia, XI-8-56 (W. E. Roberts, CDA). Los Angeles, 1 ♀, I-31-49 (UCLA). Santa Monica, 1 ♂, melon fly trap in date palm, XII-5-56 (R. L. Bailey, CDA). Sawtelle, 2 ♀♀, VII-15-31 (K. L. Wolff, LACO). Tanbark Flats, 1 ♂, 1 ♀, VI-26-52 (J. K. Hester, UCD). Van Nuys, 1 ♀, emerged from *Hemizonia pungens*, IX-13-44 (Lloyd Martin, LAM). Venice, 1 ♀, melonfly trap in avocado, XII-11-56 (R. L. Bailey, CDA). Westwood, 1 ♀, VII-20-35 (E. G. Linsley, B. Brookman, CAS). Whittier, 1 ♀, on *Encelia californica*, (P. H. Timberlake, UCR). MARIN Co.: Alpine Lake, 1 ♀, V-29-56 (J. A. Powell, JAP). Navato, 1 ♂, X-30-59 (T. R. Haig, CDA). MARIPOSA Co.: Mariposa, 1 ♀, Frick trap in apple, X-13-59 (R. P. Allen, CDA). MERCED Co.: Los Banos, 1 ♀, swept from *Hemizonia pungens*, V-16-56 (H. L. Wilson, CDA). MONTEREY Co.: Chualar, 1 ♂, 1 ♀, lettuce, IV-30-56 (R. V. Emparan, CDA). King City, 6 mi. S., 2 ♀♀,

ex *Amaranthus graecizans*, VIII-3-18 (H. H. Severin, CIS). Salinas, 1 ♀, windshield of automobile, V-11-59 (T. R. Haig, CDA). San Lucas, 1 ♀, swept from *Monolopia major*, III-26-57 (H. L. Wilson, CDA); 1 ♀, ex *Atriplex expansa*, IX-13-58 (H. L. Wilson, CDA). NAPA CO.: Vallejo, 5 mi. N., 5 ♂♂, 3 ♀♀, IX-7-52 (P. H. Arnaud, PHA). Napa, 1 ♀, Frick trap, Summer 57 (CDA). NEVADA CO.: Sagehen, nr. Hobart Mills, 1 ♂, VI-25-54 (R. H. Goodwin, CIS). ORANGE CO.: Silverado, 1 ♂, McPhail trap (SIB-7) in grapefruit X-13-59 (C. Johnson, CDA). RIVERSIDE CO.: Desert Spring, 1 ♂, V-19-54 (J. C. Hall, USNM). Riverside, 1 ♀, ex *Heterotheca grandiflora*, IX-20-35 (P. H. Timberlake, UCR). SACRAMENTO CO.: Carmichael, 1 ♀, leaf of peach tree, IX-25-56 (R. F. Wilkey, FLB). SAN BENITO CO.: Panoche Valley, 1 ♂, 2 ♀♀, swept from cotton, X-20-59 (F. L. Blanc and T. R. Haig, CDA). SAN BERNARDINO CO.: Atolia, 4 ♂♂, VI-19-52 (A. T. McClay, UCD). Colton, 1 ♀, VII-5-51 (J. C. Hall, CDA). Crestline, 11 mi. N., 1 ♀, VI-27-52 (6 collectors, UK). SAN DIEGO CO.: Coronado, 2 ♂♂, 1 ♀, reared from flower head of *Chrysopsis villosa*, VIII-15-60 (E. D. Algert, CDA). Otay, 1 ♂, reared from flower heads of *Haplopappus venetus*, collected VIII-29-60, emerged IX-7 to IX-15-60 (E. D. Algert, CDA). San Ysidro, 1 ♀, McPhail trap in pepper, III-16-59 (Williams, CDA); 1 ♂, 1 ♀, reared from flower of *Heterotheca grandiflora*, X-28-50 (E. D. Algert, USNM); 5 ♂♂, 5 ♀♀, reared from flowers of *Haplopappus venetus*, X-15-48 (E. D. Algert, USNM). 1 ♀, larva reared in *Aster spinosus*, VIII-18-48 (E. D. Algert, USNM). SAN FRANCISCO CO.: San Francisco Beach, 1 ♀, II-15-51 (E. I. Schlinger, R. C. Bechtel, UCD). SAN JOAQUIN CO.: Lodi, 1 ♀, VIII-20-52 (E. I. Schlinger, UCD). SAN LUIS OBISPO CO.: Arroyo Grande, 1 ♂, on *Baccharis pilularis*, XII-14-59 (H. L. Wilson, CDA). Navajo Canyon, ex *Monolopia* sp., III-4-60 (H. L. Wilson, CDA). Shandon, 10 mi. S., 4 ♀♀, swept from flowers of *Stenotopsis linearifolius*, IV-2-57 (H. L. Wilson, CDA). Shandon, MacMillan Canyon, 1 ♀, swept from *Atriplex semibaccata*, XI-19-56 (H. L. Wilson, CDA). SAN MATEO CO.: Portola Valley, 1 ♀, X-30-59 (T. R. Haig, CDA). Redwood City, 2 ♀♀, VIII-27-50 (P. H. Arnaud, PHA). SANTA BARBARA CO.: Cuyama, 8 ♂♂, 11 ♀♀, swept from *Monolopia major*, III-19-58 (F. L. Blanc, FLB). New Cuyama, 1 ♂, III-3-60 (R. P. Allen, CDA). Santa Yuez Mountains, 1 ♂, VI-24-59 (M. Bruck, CGM). Ventucopa, 4 ♂♂, 1 ♀, general sweeping, III-27-57 (F. L. Blanc, CDA). SANTA CLARA CO.: Isabella Creek, 1 ♀, V-1-54 (J. C. Downey, USNM). Santa Clara County, 1 ♂ (Baker, USNM). SANTA CRUZ CO.: Boulder Creek, 1 ♂, Frick trap in walnut, IX-5-56 (L. R. Gillogly, CDA). Felton, 1 ♀, V-17-47 (P. H. Arnaud, PHA). SOLANO CO.: Fairfield, 1 ♀, Frick trap in walnut, IX-12-57 (Ralph Freeman, CDA). Suisun, 2 ♂♂, 2 ♀♀, Frick trap, Summer 59 (Solano County Dept. Agriculture, CDA). SONOMA CO.: Occidental, 1 ♀, VIII-16-38 (Russell, UK). Penngrove, 1 ♀, Frick trap in black walnut, VII-18-57 (M. G. Dornbush, CDA). Petaluma, 1 ♂, Frick trap in walnut, IX-26-55 (R. P. Allen, RFW). Santa Rosa, 1 ♀, Frick trap in walnut, VII-19-56 (L. D. Hampton, CDA); 1 ♀, Frick trap, Summer 57 (CDA). Sonoma, 1 ♂, 7 ♀♀, Frick trap, Summer 57 (CDA). STANISLAUS CO.: Stanislaus County, 1 ♀, Frick trap, Summer 58 (R. P. Allen, CDA). TULARE CO.: Badger, 1 ♂, Frick trap in walnut, IX-20-57 (R. P. Allen, CDA). Pinehurst, 1 ♂, Frick trap in black walnut, IX-20-57 (CDA). Three Rivers, 1 ♀, VI-35 (Oman, USNM). VENTURA CO.: Ojai, 1 ♀, in oil of angelica Med. fruit fly trap, VII-24-56 (Earl Kalar, UCR);

7.8 mi. W., 1 ♀, IX-12-50 (P. H. Timberlake, UCR). YOLO CO.: Davis, 1 ♂, V-13-52 (A. T. McClay, UCD); 1 ♂, V-14-52 (A. T. McClay, UCD); 1 (abdomen missing), VIII-24-52 E. I. Schlinger, UCD); 1 ♂, V-9-36 (M. A. Cazier, AMNH); 1 ♂, VIII-7-55 (A. T. McClay, UCD); 1 ♂, VIII-21-55 (A. T. McClay, UCD); Woodland, 1 ♀, IX-1-53 (A. T. McClay, UCD); 1 ♀, VII-17-55 (A. T. McClay, UCD).

*T. femoralis*, like *nigricornis* and *bisetosa*, has a wide dark ray on the wing from the stigma to vein r-m. It is distinguished from them by the presence of an unbroken dark streak from the base to beyond the center of vein  $M_3+Cu_1$ , and by the interrupted apical Y-shaped mark in the wing of the male.



Map 89. Distribution in California of *Trupanea imperfecta* (Coquillett)

### *Trupanea imperfecta* (Coquillett)

(Figs. 100, 101; Map 89)

*Urellia imperfecta*, Coquillett, 1902, Jour. N. Y. Ent. Soc., 10:181. Holotype ♂; Williams, Ariz. (USNM).

**Geographic range.**—Arizona, California, and Nevada.

**California records.**—IMPERIAL CO.: Coyote Wells, 4 mi. W., 1 ♀, ex *Senecio douglasii*, IV-4-18 (H. H. Severin, CIS). Niland, 2 ♂♂, 1 ♀, ex *Encelia* sp., apparently *frutescens* var. *actoni*, II-6-57 (H. L. Wilson, CDA). Palo Verde, 12 mi. S., 1 ♀, *Bebbia junca aspera*, IV-30-52 (P. H. Timberlake, UCR). INYO CO.: Panamint Valley, 1 ♀, III-12-41 (T. Aitken, USNM). Surprise Canyon, Panamint Mountains, 2 ♂♂, IV-24-57 (G. I. Stage, CIS); 1 ♂, *Eriogonum inflatum*, IV-24-57 (P. D. Hurd, CIS). LOS ANGELES CO.: Sunland, 1 ♂, XI-31 (K. Wolff, LACO). RIVERSIDE CO.: Andreas Canyon, 1 ♂, 2 ♀♀, III-3-56 (E. I. Schlinger, UCD). Andreas Canyon, nr. Palm Springs, 1 ♀, X-29-48 (P. H. Timberlake, UCR). Chino Canyon, nr. Palm Springs, 7 ♂♂, 4 ♀♀, *Beb-*

*bia junca*, IV-20-60 (J. R. Powers, CIS). Edom, 3 mi. S., 1 ♀, on *Dicoria canescens*, X-15-47 (P. H. Timberlake, UCR). Marion Mountain Camp, San Jacinto Mountains, 1 ♀, VII-1-52 (H. L. Mathis, UCD). Palm Springs, 1 ♀, IV-22-45 (J. A. Comstock, LAM); 1 ♂, 1 ♀, swept from *Encelia farinosa*, I-5-53 (P. H. Arnaud, PHA); 2 ♀♀, XII-22-55 (L. Wills, UCD); 4 mi. N., 2 ♂♂, II-25-41 (P. H. Timberlake, UCR). Palm Springs, Chino Canyon, 2 ♂♂, 2 ♀♀, XII-27-50 (P. H. Arnaud, PHA). Pinon Flat, 1 ♂, V-30-39 (E. G. Linsley, CIS). Tahquitz Valley, 3 ♀♀, VI-16-39 (J. G. Shanafelt, LAM). Whitewater Canyon, 1 ♀, on *Lepidospartum* sp., IV-14-52 (P. H. Timberlake, UCR). SAN BERNARDINO Co.: Bennett Wash, nr. Parker Dam, 2 ♀♀, XI-23-51 (C. D. MacNeill, CDA). Erp, 10 mi. N., 7 ♀♀, IV-22-60 (J. A. Powell, CIS). Morongo Valley, 1 ♀, on *Gutierrezia microcephala*, X-5-34 (P. H. Timberlake, UCR). Santa Ana River, San Bernardino Mountains, 1 ♂, VIII-22-52 (P. H. Timberlake, UCR). South Fork Camp, 1 ♀, on *Gnaphalium* sp., IX-16-44 (P. H. Timberlake, UCR); 1 ♀, on *Chrysothamnus viscidiflorus pumilus*, IX-11-44 (P. H. Timberlake, UCR). Yucca Valley, 1 ♂, on *Gutierrezia microcephala*, IX-28-44 (P. H. Timberlake, UCR). SAN DIEGO Co.: Borrego, 5 ♀♀, ex *Bebbia junca aspera*, IV-18-48 (E. D. Algert, USNM). Borrego Valley, 1 ♀, IV-22-51 (E. I. Schlinger, UCD). Mission Canyon, 1 ♂, on *Lepidospartum* sp., X-1-32 (P. H. Timberlake, UCR). Ocotillo, 12 mi. S., 1 ♂, on *Hyptis emoryi*, XI-12-39 (P. H. Timberlake, UCR). Otay, 3 ♂♂, 11 ♀♀, reared from seeds of *Bebbia junca*, collected V-5-60, emerged V-7 to V-11-60 (E. D. Algert, CDA). The Narrows, 2 mi. W., 1 ♂, IV-22-51 (E. I. Schlinger, UCD).

Both sexes of *T. imperfecta* are readily recognized by the presence on the wing of a complete dark ray from the stigma to vein m and the extremely large hyaline spot in cell R<sub>5</sub> immediately anterior to vein m. In addition, the male lacks the apical Y-shaped spot, and the dark markings of the wing disc are more reduced than in any other *Trupanea*.

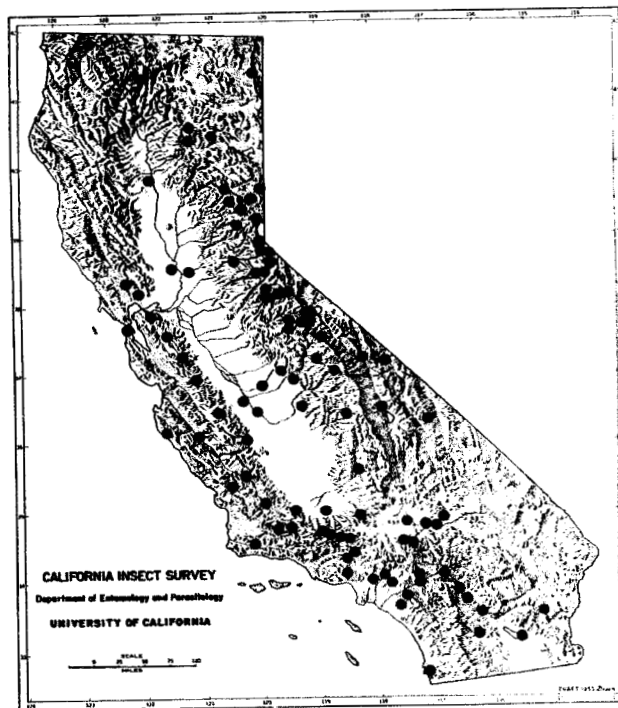
### *Trupanea jonesi* Curran

(Figs. 102, 103; Map 90)

*Trupanea jonesi* Curran, 1932, Amer. Mus. Novitates, No. 556:6, fig. 6. Holotype ♀; Corvallis, Ore. (AMNH).  
Synonym.—*Trypanea microstigma* Curran, 1932:7.

**Geographic range.**—Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Texas, Utah, and Wyoming.

**California records.**—ALAMEDA Co.: Livermore, 1 ♀, III-14-37 (G. Ferguson, SCJ). ALPINE Co.: Hope Valley, 1 ♂, VI-7-52 (R. M. Bohart, UCD); 4 ♀♀, VII-18-48 (D. Carter, CIS); 2 ♀♀, VII-18-48 (L. W. Quate, CIS); 1 ♂, IX-11-38 (M. Cazier, AMNH). Red Lake, 1.5 mi. N.E., 1 ♂, VII-25-55 (E. I. Schlinger, UCD). AMADOR Co.: Maiden's Grave, Highway 88, 5 ♂♂, 4 ♀♀, reared from flowers of *Haplopappus bloomeri*, VIII-11-60 (R. P. Allen, CDA). Silver Lake, 4 mi. N., 7 ♀♀, VII-25-55 (J. C. Downey, UCD). CONTRA COSTA Co.: Concord, 1 ♀, sticky board, pear disease vector survey, XII-10-60 (H. L. Wilson, CDA). EL DORADO Co.: Echo Lake, 3 ♀♀, VII-23-55 (J. C. Downey, UCD). Grass Lake, Luther Pass, 1 ♀, VII-24-55 (E. I. Schlinger, UCD); 11 ♀♀, VII-24-55 (J. C. Downey, UCD). Lake Tahoe, 1 ♂, 3 ♀♀,



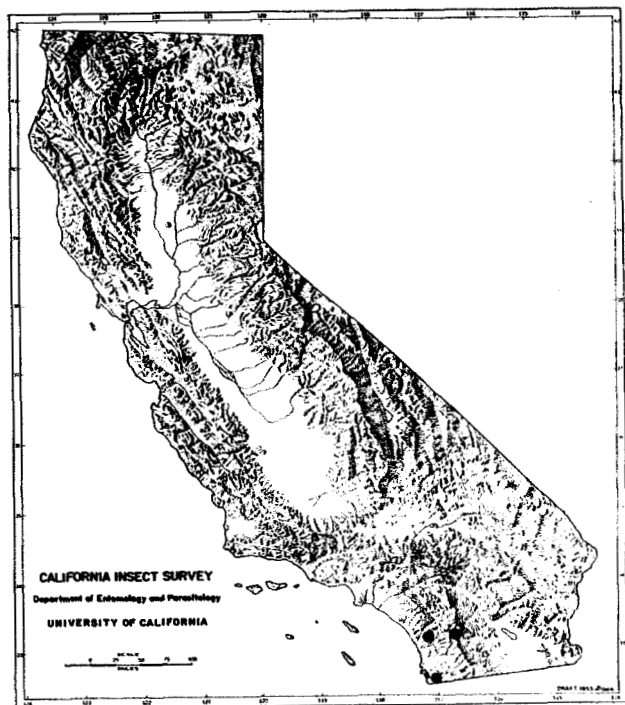
Map 90. Distribution in California of *Trupanea jonesi* Curran

VIII-11-40 (Lepovsky, UK). Meyers, 2 mi. S., 1 ♀, VII-24-55 (E. I. Schlinger, UCD). Pollock Pines, 1 ♂, V-3-52 (E. I. Schlinger, UCD); 1 ♂, IV-22-56 (E. I. Schlinger, UCD). FRESNO Co.: Auberry, 1 ♀, IV-12-52 (R. G. Craig, CIS). Coalinga, 5 ♂♂, 7 ♀♀, swept from *Layia platyglossa*, IV-24-56 (F. L. Blanc, CDA); 20 ♂♂, 16 ♀♀, *Layia platyglossa*, V-4-56 (H. L. Wilson, CDA); 1 ♂, swept from *Atriplex polycarpa*, XI-8-56 (H. L. Wilson, CDA); 1 ♂, 9 ♀♀, swept from *Erodium cicutarium*, II-26-57 (H. L. Wilson, CDA); 1 ♂, *Erodium cicutarium*, III-5-57 (H. L. Wilson, CDA); 7 ♀♀, swept from *Erodium cicutarium*, III-2-56 (H. L. Wilson, FLB); 2 ♀♀, swept from *Erodium cicutarium* III-25-57 (H. L. Wilson, CDA); 6 mi. W., 2 ♀♀, ex *Lepidospartum squamatum*, XI-1-57 (H. L. Wilson, CDA); 6 mi. S. 1 ♀, *Lepidospartum squamatum*, XI-12-57 (H. L. Wilson, CDA); 15 mi. N., 1 ♀, swept from blossom of *Coreopsis calliopsidea*, III-28-56 (H. L. Wilson, FLB). Double Meadow, 1 ♀, IX-1-52 (E. I. Schlinger, UCD). Helm, 1 ♂, VII-24-55 (H. Michalk, UCD). Jacalitos Canyon, 1 ♀, swept from composite, V-15-56 (H. L. Wilson, CDA). McClure Valley, meadow, 1 ♀, III-6-53 (J. C. Hall, UCD). Mendota, 1 ♂, IV-25-32 (E. P. Van Duzee, CAS). Mono Hot Springs, 1 ♂, VIII-8-56 (R. O. Schuster, CIS). Orange Cove, 1 ♀, IV-5-59 (R. P. Allen, CDA). IMPERIAL Co.: Niland, 1 ♂, ex *Chenopodium album*, VI-10-18 (H. H. Severin, CIS). INYO Co.: Bishop, 1 ♂, 22 ♀♀, VII-28-40 (D. E. Hardy, UK). Deep Springs, 2 ♀♀, X-13-51 (E. L. Kessel, CAS). Lone Pine, 7 ♀♀, VII-28-40 (D. E. Hardy, UK); 1 ♀, V-16-37 (N. W. Frazier, AMNH). Surprise Canyon, Panamint Mountains, 1 ♂, 9 ♀♀, *Encelia farinosa*, IV-24-57 (G. I. Stage, CIS); 2 ♂♂, 1 ♀, IV-24-57 (J. A. Powell, CIS). KERN Co.: Arvin, 1 ♂, IV-20-60 (G. Beevor, CDA). Frazier Park, 1 ♂, swept from *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, CDA). Kernville, 3 ♀♀, III-30-52 (E. I. Schlinger, UCD). Monolith, 1 ♀, swept from *Chryso-*

*thamnus nauseosus*, IV-25-56 (F. L. Blanc, CDA). Taft, 1 ♀, ex *Isomeris arborea*, I-7-59 (H. L. Wilson, CDA). LASSEN Co.: Bridge Creek Camp, 1 ♀, VII-14-54 (R. C. Blaylock, UCD). Hallelujah Junction, 1 ♀, VI-27-49 (C. I. Smith, CIS). LOS ANGELES Co.: Claremont, 1 ♀ (Baker, USNM). Gorman, 1 ♂, reared from *Wyethia* sp., IV-29-59 (F. L. Blanc, FLB). Lake Hughes, 1 ♀, swept from *Lepidospartum squamatum*, XI-24-56 (H. L. Wilson, CDA). Lancaster, 8 mi. E., 1 ♀, II-25-57 (E. I. Schlinger, UCD). Los Angeles, 1 ♀, IX-30-56 (T. R. Haig, UCD). Mint Canyon, 1 ♀, V-17-37 (E. P. Van Duzee, CAS). Pasadena, 1 ♀, IV-6-09 (F. Grinnell, Jr., USNM). Saugus, 5 mi. E., Mint Canyon, 1 ♂, IV-20-32 (E. P. Van Duzee, CAS). Sawmill Canyon, 1 ♀, VI-21 (Banks, MCZ). Studio City, 1 ♂, in automobile, I-5-60 (F. L. Blanc, FLB). Tanbark Flat, 1 ♀, VI-24-52 (E. M. Evans, UCD); 1 ♂, VI-17-56 (C. L. Wiley, CIS). MADERA Co.: Madera, 6 mi. N.W., 1 ♀, *Salsola kali*, V-24-56 (H. L. Wilson, CDA). San Joaquin Experiment Station, 1 ♂, II-22-53 (P. D. Hurd, CIS). MARIPOSA Co.: Yosemite Valley, 2 ♂♂, V-22-08 (ANSP). MENDOCINO Co.: Ukiah Grade, 1 ♀, V-10-26 (E. P. Van Duzee, CAS). MERCED Co.: Pacheco Pass, 1 ♂, VI-6-51 (W. H. Lange, UCD). MODOC Co.: Cedar Pass, 2 ♀♀, VI-29-55 (J. W. MacSwain, CIS). MONO Co.: Ellery Lake, 1 ♀, 9,400 ft., VII-3-27 (J. M. Aldrich, USNM). Leavitt Meadow, 1 ♀, VII-6-51 (R. W. Morgan, UCD); 2 ♀♀, VII-6-51 (A. T. McClay, UCD); 1 ♀, VII-6-51 (C. A. Downing, CIS); 3 ♀♀, VI-28-51 (T. R. Haig, CIS); 1 ♀, VI-24-37 (J. H. Mitchell, AMNH); 1 ♀, VII-3-51 (P. D. Ashlock, PDA); 1 ♀, VIII-8-51 (P. D. Ashlock, PDA). McGee Creek, 1 ♀, *Crepis* sp., VI-28-38 (C. A. Fleschner, LAM). Mammoth Lakes, 13 ♀♀, VII-29-40 (Lipovsky, UK). Mono Lake, 1 ♀, VII-31-40 (D. E. Hardy, UK). Saddlebag Lake, 1 ♀, miscellaneous sweeping, VII-22-56 (J. A. Powell, JAP). Sardine Creek, 1 ♂, 9 ♀♀, VII-12-51 (A. T. McClay, UCD); 12 ♀♀, VII-11-51 (A. T. McClay, UCD); 4 ♀♀, VII-17-51 (A. T. McClay, UCD); 6 ♀♀, VII-18-51 (A. T. McClay, UCD); 4 ♀♀, VI-28-51 (A. T. McClay, UCD); 1 ♀, VI-28-51 (J. W. MacSwain, CIS); 2 ♀♀, VII-6-51 (A. T. McClay, UCD); 2 ♀♀, 8,500 ft., VI-28-51 (C. A. Downing, CIS); 1 ♀, 8,500 ft., VI-28-51 (P. D. Ashlock, PDA); 1 ♀, VI-28-51 (P. D. Ashlock, PDA). Sonora Pass, 3 ♀♀, VII-17-51 (A. T. McClay, UCD); 2 ♀♀, VII-11-51 (A. T. McClay, UCD). Tioga Pass, 1 ♂, VII-31-40 (D. E. Hardy, UK). MONTEREY Co.: Big Sur, 13 mi. N., 1 ♀, VI-19-52 (6 collectors, UK). King City, 1 ♀, swept from *Baeria chrysostoma*, III-26-57 (H. L. Wilson, CDA). NAPA Co.: Napa, 1 ♂, 1 ♀, parsnip, XI-10-43 (Weimer, CDA). NEVADA Co.: Boca 1 ♀, VII-5-54 (A. A. Grigarick, UCD). Sagehen, nr. Hobart Mills, 2 ♀♀, VII-21-54 (J. A. Powell, JAP). ORANGE Co.: Silverado, 1 ♀, McPhail trap (SIB-7) in grapefruit, X-13-59 (C. Johnson, CDA). PLACER Co.: Big Bend Camp, 1 ♀, cherry tree, VII-28-40 (G. Beevor, CDA). PLUMAS Co.: Johnsville, 10 mi. W., 1 ♀, reared from *Erigeron* sp., VIII-8-59 (J. S. Buckett, CDA). RIVERSIDE Co.: Andreas Canyon, nr. Palm Springs, 1 ♀, on *Encelia farinosa*, III-8-56 (P. H. Timberlake, UCR). Corona, 1 ♀, McPhail trap in orange, X-9-57 (J. M. Johnson, CDA). Devil's Garden, 1 ♂, I-29-39 (W. D. Pierce, LAM). Hopkins Well, 2 ♀♀, IV-16-58 (J. A. Powell, CIS). Indio, 1 ♂, XI-12-32 (P. H. Timberlake, UCR). Palm Springs, 1 ♂, II-2-48 (R. Coleman, USNM). Palm Springs Station, 2 ♂♂, VII-29-52 (J. C. Hall, UCD). Whitewater Canyon, 6 ♂♂, 2 ♀♀, III-3-56 (E. I. Schlinger, UCD). SACRAMENTO Co.: Carmichael, 1 ♂, at light in house, X-3-56 (R. F. Wilkey, FLB). SAN BENITO Co.: Penoche Valley, 1 ♀, swept from cotton, X-20-59 (T. R. Haig, CDA). SAN BERNARDINO Co.: Adelanto, 1 ♂, X-3-33 (C. N. Ainslee, USNM). Barstow 2 ♀♀, on alfalfa, VII-15-57 (J. A. Turney, CDA). Hinkley, 1 ♂, swept from alfalfa, II-17-54 (R. Camblin and G. Harper, CDA). Kramer Hills, 1 ♀, V-1-53 (R. Schuster, CIS); 1 ♂, IV-25-57 (G. I. Stage, CIS). Mill Creek Canyon, 1 ♀, IX-24-23 (F. R. Cole, CIS). Mule Canyon, Calico Mountains, 1 ♀, III-17-55 (M. Wasbauer, CIS). San Bernardino, 1 ♀, in multi-purpose fruit fly trap (Steiner), III-15-57 (G. Harper, CDA); 1 ♂, 1 ♀, (O. Sacken, MCZ). San Bernardino, N. of Shandon Hills, 1 ♂, 1 ♀, on *Ceanothus crassifolius*, II-28-36 (P. H. Timberlake, UCR). Victorville, 1 ♂, V-2-53 (G. A. Marsh and R. O. Schuster, CIS). SAN DIEGO Co.: Borrego, 1 ♀, from *Croton californicus*, IV-25-54 (P. D. Hurd, CIS); 1 ♀, IV-28-55 (P. D. Hurd, CIS). Coronado, 3 ♂♂, 1 ♀, reared from *Coreopsis* sp., V-15-50 (USNM). San Diego, 1 ♂, 1 ♀, X-13-13 (E. P. Van Duzee, CAS); 1 ♂, Oriental fruit fly trap, I-16-51 (CDA); 1 ♂, XI-23-57 (Ron Ireland, CDA). SAN FRANCISCO Co.: San Francisco Beach, 1 ♀, II-15-51 (E. I. Schlinger and R. C. Bechtel, UCD). SAN LUIS OBISPO Co.: Shandon, 2 ♀♀, swept from *Monolopia major*, IV-2-57 (H. L. Wilson, CDA); 5 ♀♀, swept from *Baeria chrysostoma*, IV-2-57 (H. L. Wilson, CDA); 1 ♀, swept from *Haplopappus linearifolius*, IV-4-57 (H. L. Wilson, CDA). Simmler, 2 ♀♀, III-21-40 (J. W. Tilden and G. S. Mansfield, SJS). Templeton, 1 ♀, III-22-31 (E. P. Van Duzee, CAS). SANTA BARBARA Co.: Cuyama, 3 ♂♂, swept from *Monolopia major*, III-19-58 (F. L. Blanc, FLB). Montgomery Potrero, 1 ♀, 1 (abdomen missing), wept from grasses, IV-11-57 (G. Beevor, CDA). New Cuyama, 1 ♀, swept from wheat, V-3-56 (H. T. Osborn, CDA); 1 ♀, swept from wheat, III-22-56 (H. T. Osborn, CDA); 1 ♀, III-3-60 (R. P. Allen, CDA); 10 mi. W., 2 ♀♀, general sweeping, III-28-57 (F. L. Blanc, CDA). Solvang, 1 ♀, on *Lepidospartum squamatum*, XII-15-59 (H. L. Wilson, CDA). Ventucopa, 1 ♀, general sweeping, III-27-57 (F. L. Blanc, CDA). SANTA CLARA Co.: Pacheco Pass, 1 ♀, IV-14-49 (R. S. Beal, CIS). SHASTA Co.: Kings Creek Meadow, 1 ♀, VII-23-50 (L. W. Quate, CDA). Mount Lassen National Park, 1 ♂, 2 ♀♀, swept from *Wyethia* sp., VIII-11-42 (S. C. Jones, SCJ); 1 ♂, swept from *Wyethia* sp., VIII-11-42 (S. C. Jones, SCJ). Summit Lake, 1 ♀, VII-23-50 (L. W. Quate, CDA). SISKIYOU Co.: Mount Shasta City, 1 ♂, VIII-12-58 (J. A. Powell, CIS). SIERRA Co.: Loyalton, 4 mi. S., 1 ♀, *Agropyron cristatum*, V-16-56 (W. W. Wiard, CDA). Weber Lake, 1 ♀, VII-5-51 (E. I. Schlinger, UCD); 1 ♀, VIII-2-58 (P. H. Arnaud, PHA). Yuba Pass, 1 ♀, VII-31-58 (F. E. Strong, UCD). SONOMA Co.: Trinity, 5 ♀♀, XII-20-37 (N. W. Frazier, CIS). TEHAMA Co.: Corning, 5 ♀♀, swept from *Baeria chrysostoma*, III-15-52 (F. L. Blanc, CDA). TULARE Co.: Alta Meadows, Sequoia National Park, 1 ♀, VII-19-07 (J. C. Bradley, ANSP). TUOLUMNE Co.: Dardanelles, 1 ♀, VI-26-51 (A. T. McClay, UCD). Sonora Pass, 1 ♂, 3 ♀♀, swept from *Wyethia* sp., VII-21-56 (J. A. Powell, JAP). Strawberry, 1 ♂, VI-2-53 (J. G. Rozen, CIS); 1 ♀, VI-2-53 (J. G. Rozen, CIS). Tioga, 1 ♀, 9,941 ft., VIII-4-37 (Rehn, Pate, and Relvin, ANSP). Tuolumne Meadows, 1 ♀, VIII-9-46 (CIS); 2 ♀♀, VII-1-40 (D. E. Hardy, UK). Chuchupate Ranger Station, base of Frazier Mountain, 1 ♂, V-5-59 (G. I. Stage, CIS). YOLO Co.: Woodland, 1 ♀, II-15-53 (J. C. Hall, UCD).

Females of *jonesi* and *pseudovicina* Her. are similar in having a large, clearly delimited hyaline

spot in the base of cell  $R_3$ ; *jonesi* is readily distinguished from *pseudovicina* in both sexes by the elongate nature of the dark spot near the center of vein  $M_3+Cu_1$ ; males of *jonesi* lack the apical Y-shaped mark and narrow ray from the stigma to vein  $m$  that are characteristic of males of *pseudovicina*.



Map 91. Distribution in California of *Trupanea maculigera* Foote

### *Trupanea maculigera* Foote

(Fig. 104; Map 91)

*Trupanea maculigera* Foote, 1960, U. S. Dept. Agric., Tech. Bull. 1214:13, fig. 9. Holotype ♀; Otay, Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—SAN DIEGO CO.: Bonsall, 1 ♀, VI-19-56 (E. I. Schlinger, UCD). Otay (paratype), 1 ♀, reared from gall on *Gnaphalium* sp., XI-4-50 (CDA); (holotype and paratypes), 1 ♂, 5 ♀♀ (E. D. Algert, USNM). Warner Springs (paratype), 1 ♀, VIII-30-51 (E. I. Schlinger, UCD).

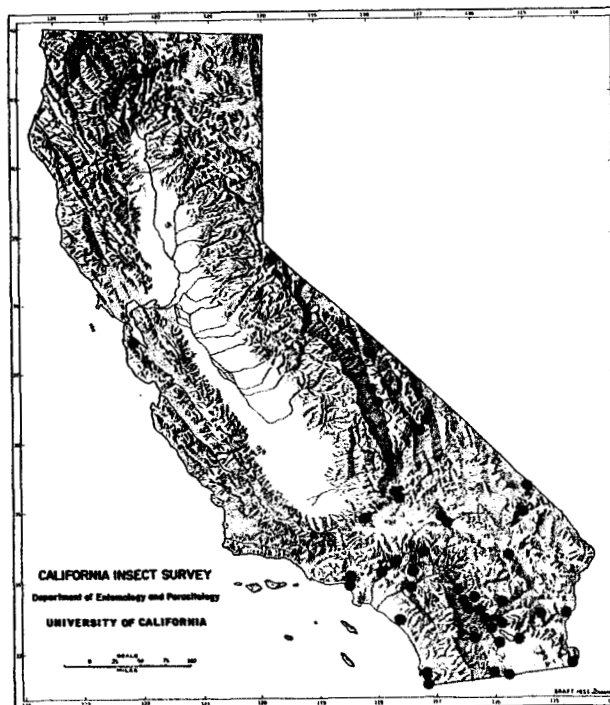
*T. maculigera* is similar in many respects to *arizonensis* but is larger, the marginal hyaline spot at the apex of vein  $R_{2+3}$  is more apically positioned in the surrounding dark area, and the costa is distinctly marked with brown immediately basad of the apex of the subcostal vein.

### *Trupanea nigricornis* (Coquillett)

(Fig. 105; Map 92)

*Urellia nigricornis* Coquillett, 1899, Jour. N. Y. Ent. Soc., 7:266. Holotype ♂; Colorado (USNM).

**Geographic range.**—Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming.



Map 92. Distribution in California of *Trupanea nigricornis* (Coquillett)

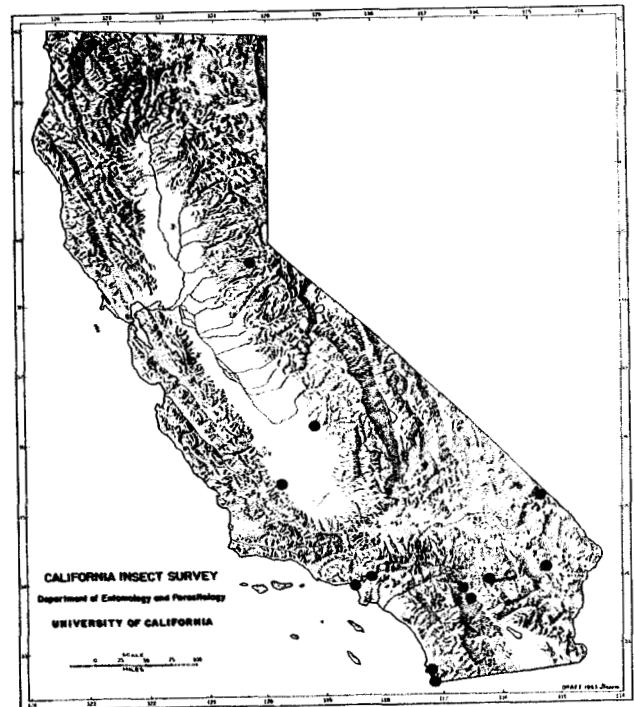
**California records.**—ALPINE CO.: Fredericksburg, 3 ♂♂, swept from *Chrysothamnus*, VI-18-58 (F. L. Blanc, CDA). Woodfords, 1 ♀, swept from *Chrysothamnus* sp., VI-18-58 (W. W. Middlekauff, CIS). IMPERIAL CO.: Bard, 1 ♂, alfalfa, I-19-38 (S. Lockwood, CDA). Coyote Wells, 4 mi. W., 1 ♂, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CAS); 2 ♂♂, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS); 1 ♂, ex *Senecio douglasii*, IV-4-18 (H. H. Severin, CIS). Fish Springs, 1 ♂, desert verbena, IV-5-31 (A. C. Browne, CDA). Niland, 1 ♂, ex *Encelia* sp., apparently *frutescens* var. *actoni*, II-6-57 (H. L. Wilson, CDA). Pinto Wash S., 1 ♀, IV-19-58 (F. X. Williams, SDM). Nr. Signal Mountain, 1 ♂, ex *Tamarix gallica*, IV-14-49 (P. H. Timberlake, UCR). Truckhaven, 1 ♂, "desert flora," IV-5-31 (A. C. Browne, CDA). Winterhaven, 2 ♂♂, 5 ♀♀, ex composite, IV-12-59 (G. Beevor and W. P. Cronk, CDA). INYO CO.: Goodale Creek, N. of Lone Pine, 1 ♂, swept from *Hymenoclea salsola*, IV-3-53 (H. B. Leech, CAS). Independence, 1 ♀, VI-14-29 (E. P. Van Duzee, CIS). Little Lake, 1 ♂, VII-25-40 (D. E. Hardy, UK); 1 ♂, VI-7-29 (E. P. Van Duzee, CIS). Panamint Valley, 1 ♂, on flowers of *Geraea canescens*, V-14-58 (Owen Bryant, CAS). Silver Canyon, White Mountains, 3 ♂♂, V-10-26 (J. O. Martin, CIS). Surprise Canyon, Panamint Mountains, 4 ♂♂, 15 ♀♀, *Encelia farinosa*, IV-24-57 (G. I. Stage, CIS); 1 ♂, V-9-58 (M. A. Stange, UCD). KERN CO.: Johannesburg, 1 ♂, IX-4-58 (E. I. Schlinger, UCD). Mojave, 1 ♂, V-1-52 (S. F. Bailey, UCD); 4 mi. W., 1 ♂, 4 ♀♀, ex composite, V-22-58 (H. L. Wilson, CDA). Walker Pass, 7 mi. E., 2 ♂♂, *Franseria* sp., IV-25-52 (G. A. Marsh, CIS). LOS ANGELES CO.: Tanbark Flat, 2 ♂♂, VII-5-52 (A. T. McClay, UCD); 1 ♂, VII-8-52 (A. T. McClay, UCD); 1 ♂, VII-13-52 (A. T. McClay, UCD); 1 ♂, VII-15-52 (A. T. McClay, UCD); 1 ♂, VII-17-52 (A. T. Mc-



Clay, UCD). Venice, 1 ♂, melon fly trap, XI-9-56 (E. Arnold, CDA). West Los Angeles, 1 ♂, melon fly trap in orange, XII-4-56 (B. L. Chan, CDA); 1 ♂, melon fly trap in plum, XII-10-56 (E. Blakely, CDA). ORANGE Co.: Gavilan, 1 ♂, *Eriogonum gracile*, X-1-52 (P. H. Timberlake, UCR). RIVERSIDE Co.: Andreas Canyon, 1 ♂, IV-21-51 (E. I. Schlinger, UCD). Biskra Palms, 1 ♀, III-29-57 (J. C. Hall, UCD). Blythe, 1 ♂, from composite, IV-9-59 (G. Beevor and W. P. Cronk, CDA). Chino Canyon, nr. Palm Springs, 1 ♂, 10-watt black light, IV-19-60 (J. F. Lawrence, CIS). Coachella Valley, 1 ♂, IV-7-20 (R. S. Woglum, CIS). Cottonwood Spring, 1 ♂, at light, IV-26-49 (L. W. Quate, CIS). Date Palm Beach, 1 ♂, V-10-52 (UCLA). Dead Indian Creek, 1 ♂, V-10-52 (UCLA). Edom, 4 mi. E., 1 ♂, on *Dalea schottii*, IV-17-37 (P. H. Timberlake, UCR). Hopkins Well, 1 ♂, IV-29-52 (J. G. Rozen, CIS); 1 ♂, X-11-58 (J. A. Chemsak, CIS); 9 ♂♂, 4 ♀♀, IV-16-58 (J. A. Powell, CIS). Hunters' Spring, 1 ♂, V-10-52 (UCLA). Indio, 1 ♂, XI-1-53 (J. C. Hall, UCD); 1 ♂, ex *Haplopappus acradenius*, X-28-35 (P. H. Timberlake, UCR); 4 mi. S.E., 1 ♂, ex *Haplopappus acradenius*, XI-1-53 (P. H. Timberlake, UCR); 6 mi. W., 6 ♂♂, 3 ♀♀, *Melilotus* sp., IV-30-49 (E. G. Linsley, J. W. MacSwain, and R. F. Smith, CIS). Oasis, 1 ♂, on *Encelia farinosa*, V-8-36 (P. H. Timberlake, UCR). Palm Canyon, 1 ♂, IV-13-48 (R. Coleman, CIS). Palm Springs, 11 ♂♂, I-5-53 (P. H. Arnaud, PHA); 1 ♂, on *Hymenoclea salsola*, III-14-42 (P. H. Timberlake, UCR). Riverside, 1 ♂, ex flower heads of *Encelia farinosa*, V-10-36 (P. H. Timberlake, UCR); 1 ♂, ex *Baeria chrysostoma gracilis*, IV-6-36 (P. H. Timberlake, UCR); 1 ♂, ex flower heads of *Encelia farinosa*, collected V-16-36, emerged early in June (P. H. Timberlake, UCR). Thousand Palms Canyon, 1 ♂, IV-3-49 (P. H. Timberlake, UCR). Whitewater Canyon, 5 ♂♂, III-3-56 (E. I. Schlinger, UCD). SAN BERNARDINO Co.: Amboy Crater, 1 ♂, *Baccharis glutinosa*, IV-24-60 (J. F. Lawrence, CIS). Atolia, 3 ♂♂, VI-19-52 (A. T. McClay, UCD). Big Pines, 4 mi. S.E., 1 ♂, swept from *Artemisia* sp., VIII-25-44 (S. C. Jones, SCJ). Ivanpah, 25 mi. S., 1 ♂, *Chrysothamnus* sp., X-12-58 (W. E. Ferguson, CIS). Mule Canyon, Calico Mountains, 1 ♂, III-17-55 (M. Wasbauer, CIS). Nipton, 11 mi. N.W., 1 ♂, *Chrysothamnus* sp., X-13-58 (J. A. Chemsak, CIS). Ord Mountain, 1 ♂, 15-watt black light, IV-18-60 (J. R. Powers, CIS); 1 ♂, *Yucca schidigera*, IV-19-60 (J. A. Powell, CIS). Verdmont, 1 ♂, brush land, VI-26-41 (H. Graves, USNM); 1 ♂, 1 ♀, brush land, IV-26-41 (H. Graves, CDA). Verdmont, Cajon Pass, 1 ♂, IV-20-33 (E. P. Van Duzee, CIS). Yermo, 1 ♂, *Taraxacum* sp., IV-28-49 (E. G. Linsley, J. W. MacSwain, and R. F. Smith, CIS). SAN DIEGO Co.: Borrego, 1 ♂, IV-24-54 (J. G. Rozen, CIS); 1 ♂, IV-24-55 (E. I. Schlinger, CIS); 1 ♂, IV-24-55 (P. H. Timberlake, UCR); 2 ♂♂, on *Croton californicus*, IV-27-55 (P. H. Timberlake, UCR). Borrego Valley, 2 ♂♂, 6 ♀♀, IV-18-57 (E. I. Schlinger, UCD); 2 ♂♂, IV-19-57 (E. I. Schlinger, UCD); 1 ♂, 1 ♀, IV-20-57 (R. W. Bushing, UCD). Desert Edge, 1 ♂, IV-14-15 (M. C. Van Duzee, CIS); 2 ♂♂, IV-14-15 (M. C. Van Duzee, CAS). San Diego, 1 ♂, collected from household, III-25-33 (CDA). San Ysidro, 1 ♂, McPhail trap (SIB-7) in sapote, I-7-59 (Williams, CDA). SAN MATEO Co.: Belmont, 1 ♂, on *Baccharis pilularis*, IX-21-52 (P. H. Arnaud, PHA).

The males of this species are closely related to those of *bisetosa* but are easily distinguished by the

dark third antennal segment and the presence of a rounded dark spot near the center of vein  $M_3+Cu_1$ .



Map 93. Distribution in California of *Trupanea pseudovicina* Hering

*Trupanea pseudovicina* Hering

(Fig. 106; Map 93)

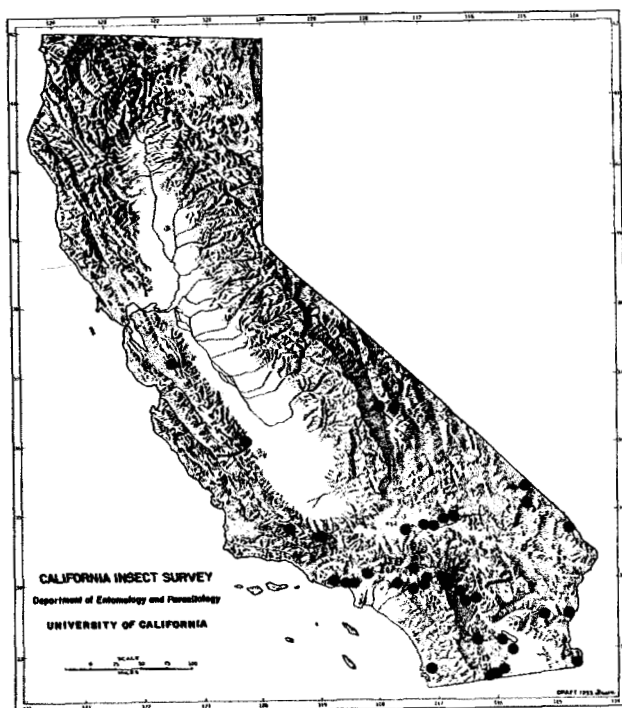
*Trupanea pseudovicina* Hering, 1947, *Siruna Seva*, No. 6:12.  
Holotype ♂; Dallas, Tex. (location of type not known).  
Synonym.—*Trypanea texana* Hering, 1942:29.

**Geographic range.**—Arizona, California, New Mexico, and Texas.

**California records.**—EL DORADO Co.: China Flat, 1 ♀, VI-28-48 (A. Bartel, CIS). KERN Co.: Belridge, 1 ♂, ex *Atriplex polycarpa*, XI-20-58 (H. L. Wilson, CDA). LOS ANGELES Co.: Glendale, 1 ♀, III-30-56 (E. I. Schlinger, UCD). Santa Monica, 1 ♀, anisyl acetone melon fly trap in oleander, III-12-57 (E. Blakely, CDA). Venice, 1 ♀, melon fly trap in *Pittosporum*, I-21-57 (E. Arnold, CDA). RIVERSIDE Co.: Hopkins Well, 2 ♂♂, 1 ♀, IV-16-58 (J. A. Powell, CIS). Palm Springs, 1 ♂, at flowers of *Baccharis sergiloides*, I-2-53 (P. H. Arnaud, PHA); 1 ♂, XII-22-55 (L. Wills, UCD). Whitewater Canyon, 1 ♂, III-3-56 (E. I. Schlinger, UCD). SAN BERNARDINO Co.: Ivanpah, 12 mi. S.E., 1 ♀, V-1-56 (P. D. Hurd, CIS). Oasis Nature Area, Joshua Tree National Monument, 1 ♂, IV-11-56 (R. Coleman, USNM). SAN DIEGO Co.: San Diego, 1 ♀, VI-16-13 (E. P. Van Duzee, CAS); 1 ♂, IV (E. P. Van Duzee, CAS). San Ysidro, 1 ♀, Mexican fruit fly trap, I-16-56 (E. Soukup, CDA). TULARE Co.: Woodlake, 1 ♀, rotary trap, III-22-47 (N. W. Frazier, CIS).

*T. pseudovicina* closely resembles *jonesi* but is separable in both sexes by the triangular dark mark near the center of vein  $M_3+Cu_1$  and in the male by

the complete apical Y-shaped mark and the complete dark ray from stigma to vein m.



Map 94. Distribution in California of *Trupanea radifera* (Coquillett)

*Trupanea radifera* (Coquillett)

(Figs. 107, 108; Map 94)

*Urellia radifera* Coquillett, 1899, Jour. N. Y. Ent. Soc., 7:267.

Holotype ♂; Tucson, Ariz. (USNM).

Synonym.—*Trypanea hebes* Curran, 1932:9.

Geographic range.—Arizona, California, Colorado, Idaho, Kansas, Nevada, New Mexico, South Dakota, Texas, and Wyoming.

California records.—FRESNO CO.: Coalinga, 1 ♂, III-31-48 (H. M. Armitage, USNM). Jacalitos Canyon, Coalinga, 1 ♀, III-18-31 (E. P. Van Duzee, CAS). Jacalitos Canyon, 7 mi. S. of Coalinga, 1 ♀, ex *Erodium*, IV-20-59 (H. L. Wilson, CDA). IMPERIAL CO.: Bard, 1 ♀, alfalfa, I-19-38 (S. Lockwood, CDA). Coyote Wells, 1 ♂, ex *Senecio douglasii*, I-22-18 (H. H. Severin, CIS). Plaster City, 2 mi. N., 1 ♂, on *Ditaxis serrata*, V-3-52 (P. H. Timberlake, UCR). Truckhaven, 1 ♂, IV-8-49 (P. H. Timberlake, UCR). Westmorland, 1 ♀, on *Heliotropium curassavicum*, V-31-30 (P. H. Timberlake, UCR). INYO CO.: Inyo Mountains, 2 ♂♂, 1 ♀, V-23-37 (L. R. Gillylogly AMNH). Lone Pine, 1 ♂, VI-4-37 (N. W. Frazier, AMNH); 2 ♂♂, VI-16-37 (N. W. Frazier, AMNH). LOS ANGELES CO.: Burbank, 1 ♂, VII-31 (K. Wolff, LACO). Santa Monica, 1 ♀, II-20 (O. Sacken, MCZ). Santa Susana Mountains, 1 ♀, XII-24-37 (N. F. Hardman, CAS). Sawtelle, 2 ♀♀, VII-31 (K. Wolff, LACO); 1 ♀, VII-31 (K. Wolff, ANSP). West Los Angeles, 1 ♀, ammonium chloride trap in avocado, III-15-57 (E. Blakely, CDA). RIVERSIDE CO.: Blythe, 9 mi. W., *Pectis papposa*, X-11-58 (J. A. Chemsak, CIS). Cherry Valley, 1 ♂, 4 ♀♀, I-11-38 (Cover, USNM). Date Palm Beach, 1 ♂,

1 ♀, V-10-52 (UCLA). Hopkins Well, 13 ♂♂, 3 ♀♀, IV-16-58 (J. A. Powell, CIS). Palm Canyon, 1 ♀, (UCLA). Palm Springs, 1 ♂, I-16-53 (P. H. Arnaud, PHA); 1 ♀, VII-22-55 (L. Wills, UCD); 5 mi. S., 1 ♂, in shade of leafy plant, VI-8-30 (P. H. Timberlake, UCR). Riverside, 1 ♀, II-6-36 (P. H. Timberlake, UCR). Thousand Palms, 1 ♀, III-30-58 (D. D. Linsdale, CIS). Whitewater Canyon, 1 ♀, III-3-56 (J. C. Hall, UCD). SAN BERNARDINO CO.: Barstow, 1 ♀, ex arrow weed, I-25-18 (H. H. Severin, CIS). Cajon Canyon, 1 ♀, on *Arctostaphylos glauca*, II-28-36 (P. H. Timberlake, UCR). East Highlands, 1 ♂, II-5-23 (CIS). Hinkley, 1 ♀, *Medicago sativa*, II-17-54 (G. Harper, CDA). Ivanpah, 25 mi. S., 1 ♂, *Chrysothamnus* sp., X-13-58 (J. A. Chemsak, CIS). Kramer Hills, 1 ♀, *Malacothrix* sp., V-1-53 (P. D. Hurd, CIS). Manix, 13 mi. N., 2 ♂♂, 1 ♀, *Senecio* sp., IV-25-53 (R. O. Schuster, CIS). Mill Creek, San Bernardino Mountains, 1 ♂, 1 ♀, on *Chrysothamnus* sp., VII-21-50 (P. H. Timberlake, UCR); 1 ♂, on *Chrysothamnus* sp., V-30-38 (P. H. Timberlake, UCR). Mill Creek Falls, 1 ♀, on *Rhamnus californica*, VII-35 (P. H. Timberlake, UCR). Mule Canyon, Calico Mountains, 1 ♂, 2 ♀♀, III-17-55 (M. Wasbauer, CIS). Needles, 2 ♀♀, XII-16-21 (J. A. Kusche, CAS). Nipton, 11 mi. N.W., 1 ♂, *Chrysothamnus* sp., X-13-58 (J. A. Chemsak, CIS). Redlands, 1 ♀, III-14 (CIS). Upland, 1 ♀, XI-10-59 (R. Camblin, CDA). SAN DIEGO CO.: Borrego, 2 ♂♂, 1 ♀, IV-28-55 (R. O. Schuster, CIS); 1 ♀, IV-24-55 (R. O. Schuster, CIS); 2 ♂♂, *Croton californicus*, IV-25-54 (P. D. Hurd, CIS). Desert Edge, 1 ♀, IV-15-15 (M. C. Van Duzee, CAS). Mission Canyon, 1 ♂, on *Lepidospartum*, X-1-32 (P. H. Timberlake, UCR). SANTA BARBARA CO.: Ballinger Canyon, Cuyama, 3 ♂♂, on *Erodium cicutarium*, III-18-59 (H. L. Wilson, CDA). New Cuyama, 1 ♂, III-3-60 (R. P. Allen, CDA). SANTA CLARA CO.: Mount Hamilton, 1 ♀, *Mimulus* sp., IV-15-47 (G. E. Bohart, CIS). SISKIYOU CO.: Montague, 1 ♀, *Artemisia* sp., V-20-36 (Jones and Fosen, CDA). VENTURA CO.: Chuchupate Ranger Station, base of Frazier Mountain, 2 ♂♂, 1 ♀, *Pinus monophylla*, V-5-59 (J. A. Powell, CIS). Corral Canyon, S. of Ventucopa, 2 ♂♂, III-26-59 (F. L. Blanc, CDA).

*T. radifera*, *jonesi*, and *pseudovicina* are large species with dark wing markings that contrast strongly with the milky white hyaline areas. All have a large, well-delimited hyaline area in the base of cell R<sub>5</sub>, especially the females. That sex of *radifera* has the dark ray from the stigma to vein m broken in cell R<sub>5</sub>; in males, both that ray and the apical Y-shaped mark are completely absent in *jonesi* and *radifera*. In the latter species, both sexes have only a rounded dark spot near the center of vein M<sub>3</sub>+Cu<sub>1</sub>.

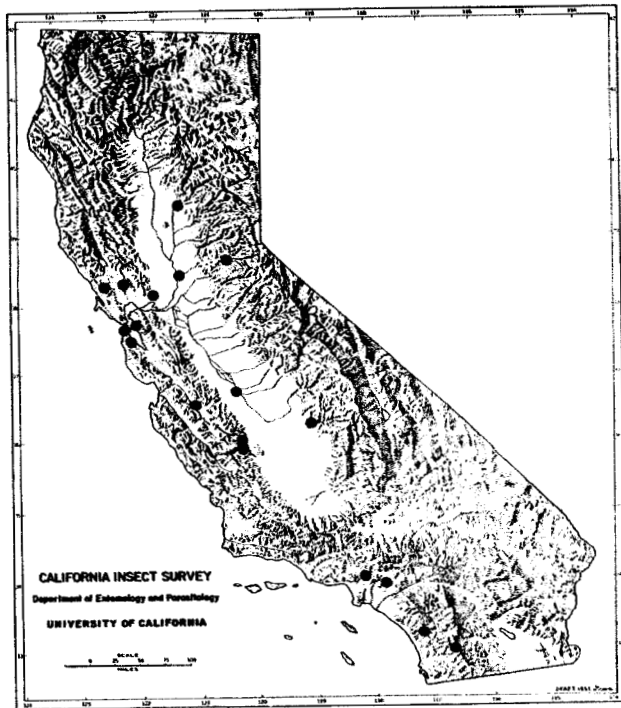
*Trupanea signata* Foote

(Fig. 109; Map 95)

*Trupanea signata* Foote, 1960, U. S. Dept. Agric., Tech. Bull. 1214:22, fig. 23. Holotype ♀; Covina, Calif. (CAS).

Geographic range.—Arizona, California, Oregon, and Texas.

California records.—ALAMEDA CO.: Berkeley, 1 ♀, V-26-07 (H. H. Severin, CIS). Lake Anza, Oakland Hills (paratype), 1 ♀, X-19-50 (H. L. Hansen, CIS). BUTTE CO.: Oroville,

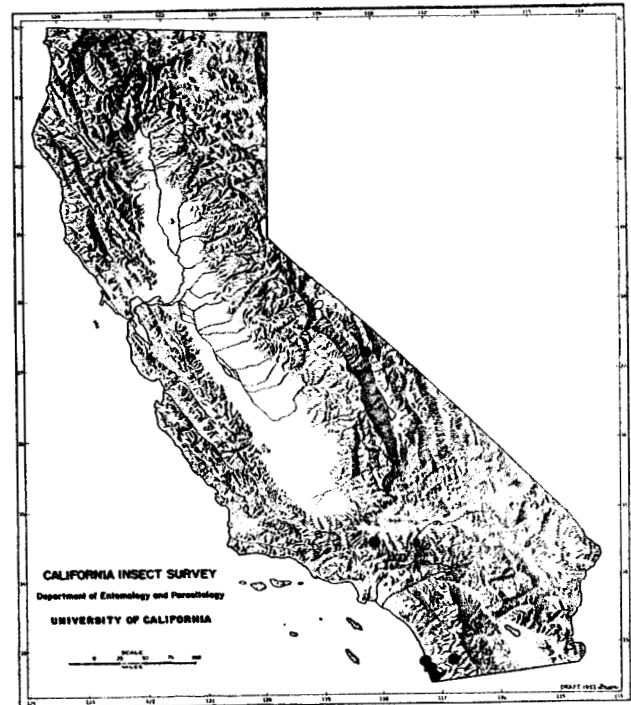


Map 95. Distribution in California of *Trupanea signata* Foote

1 ♀, IV-17-28 (H. H. Keifer, CIS). EL DORADO Co.: Snowline Camp (paratype), 1 ♂, VII-7-48 (A. Bartel, CIS). FRESNO Co.: Coalinga, 1 ♀, swept from flowers of *Lepidospartum squamatum*, XI-4-57 (H. L. Wilson, CDA); 2 ♀♀, on flowers of *Gutierrezia californica*, XI-4-57 (H. L. Wilson, CDA); 6 mi. S., 12 ♂♂, 7 ♀♀, on flowers of *Gutierrezia californica*, X-23-57 (H. L. Wilson, CDA); 8 mi. S., 2 ♀♀, swept from flowers of *Franseria acanthicarpa*, X-23-57 (H. L. Wilson, CDA); 6 mi. S., 2 ♂♂, 2 ♀♀, on *Lepidospartum squamatum*, X-28-57 (H. L. Wilson, CDA). Firebaugh (paratypes), 2 ♂♂, IV-22-48 (R. F. Smith, CIS). Los Gatos Canyon, 10 mi. S. of Coalinga, 1 ♂, 3 ♀♀, swept from *Lepidospartum squamatum*, X-29-57 (H. L. Wilson, CDA). LOS ANGELES Co.: Covina (holotype), 1 ♀, reared from *Gnaphalium chilense*, V-22-51 (C. Henne, LAM); (paratypes), 7 ♂♂, 2 ♀♀, *Gnaphalium chilense*, V-22-51 (C. Henne, LAM); 12 ♂♂, 14 ♀♀, *Gnaphalium chilense*, V-22-51 (C. Henne, LAM); 1 ♀, *Gnaphalium chilense*, IV-26-51 (C. Henne, LAM). Glendale, 1 ♀, VII-30-55 (E. I. Schlinger, UCD). RIVERSIDE Co.: Idyllwild (paratype), 1 ♂, VI-16-40 (CIS). Tahquitz (paratypes), 4 ♂♂, 2 ♀♀, on everlasting, III-14-38 (W. P. Medlar, SDM); 9 ♂♂, 9 ♀♀, on everlasting, III-14-38 (W. P. Medlar, SDM). Tahquitz Canyon, 1 ♂, 1 ♀, emerged III-18-38 (SDM). SACRAMENTO Co.: Sacramento (paratype), 1 ♂, IV-4-29 (H. H. Keifer, CDA). SAN BENITO Co.: San Benito County (paratype), 1 ♀, Frick trap in walnut, VIII-56 (R. P. Allen, CDA). SAN DIEGO Co.: Fallbrook, 1 ♀, McPhail trap (SIB-7), VIII-14-58 (F. W. Pelsue, CDA). SAN FRANCISCO Co.: San Francisco (paratypes), 3 ♂♂, 5 ♀♀, reared from *Anaphalis*, collected IX-16-37, emerged X-5-37 (H. H. Keifer, CDA); 2 ♂♂, 2 ♀♀, reared from *Anaphalis*, collected II-10-34, emerged III-1-34 (H. H. Keifer, CDA); 1 ♂, 2 ♀♀, VIII-27-36 (CDA); 1 ♂, 1 ♀, IV-23-09 (F. X. Williams, CAS); 1 ♂, VI-23-09 (F. X. Williams, CIS); 1 ♂, X-20-19

(E. P. Van Duzee, CIS). SAN MATEO Co.: Burlingame, 1 ♂, Frick trap, VIII-60 (San Mateo County Dept. Agriculture, CDA). SOLANO Co.: Solano County (paratype), 1 ♀, Oriental fruit fly trap (citronella bait), VI-24-50 (CDA). SONOMA Co.: Freestone (paratype), 1 ♀, IX-7-50 (H. H. Keifer, CDA). Trinity (paratype), 1 ♂, I-10-38 (N. W. Frazier, CIS). TULARE Co.: Woodlake (paratype), 1 ♂, rotary trap, V-16-47 (N. W. Frazier, CIS); 1 ♀, rotary trap, XI-3-47 (N. W. Frazier, CIS); 1 ♀, rotary trap, III-31-47 (N. W. Frazier, CIS); 1 ♀, rotary trap, V-26-47 (N. W. Frazier, CIS).

This is a large species resembling *actinobola*, but usually having a distinct dark spot in the apex of cell R. It differs from *actinobola* in that the marginal hyaline spot at the apex of vein  $R_{2+3}$  is very close to the next distal hyaline area.



Map 96. Distribution in California of *Trupanea vicina* (van der Wulp)

*Trupanea vicina* (van der Wulp)

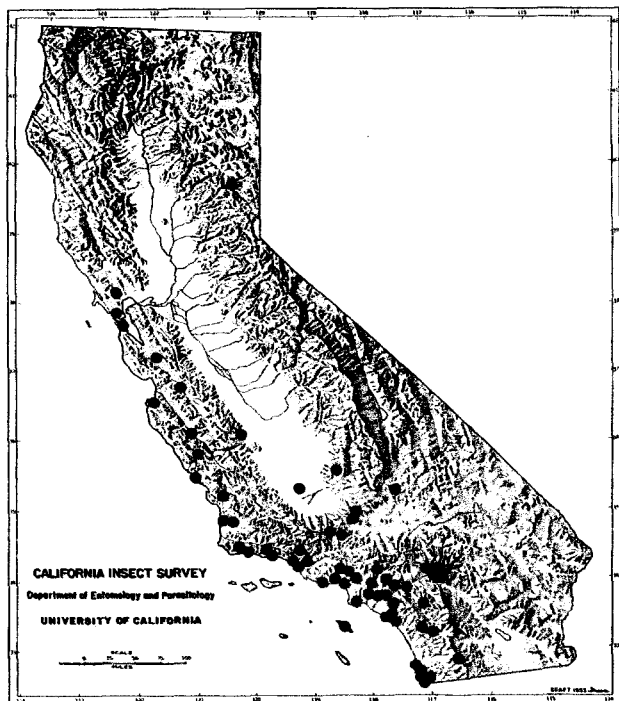
(Fig. 110; Map 96)

*Urellia vicina* van der Wulp, 1899, Biol. Centra.-Amer., Ins., Dipt., 2:427. Syntypes ♀♀; Orizaba, Mexico. (BM).

*Geographic range*.—Arizona, California, New Mexico, and Texas; also Mexico (Baja California and Orizaba).

*California records*.—INYO Co.: Bishop, 1 ♀, VII-28-48 (D. E. Hardy, UK). LOS ANGELES Co.: Palmdale, 1 ♂, VII-22-40 (D. E. Hardy, UK). SAN DIEGO Co.: Alpine, 1 ♀, VII-9-29 (R. H. Beamer, UK). La Jolla, 1 ♀, VII-13-41 (UK). National City, 2 ♂♂, VIII-8-59 (D. Johnson, CDA). San Diego, 1 ♂, 3 ♀♀, reared from marigold, VI-30-53 (K. H. Baker, CDA); 1 ♀, reared from marigold, VI-25-53 (K. H. Baker, CDA); 1 ♀, reared from marigold, VI-20-53 (K. H. Baker, CDA); 1 ♂, 2 ♀♀, reared from marigold, VI-20-56 (K. H. Baker, CDA).

*T. vicina* is easily distinguished by the presence of a large dark area in the apex of cell R contiguous with vein M; the dark ray from the stigma usually runs into this dark area rather than directly to vein m as in most other *Trupanea* species.



Map 97. Distribution in California of *Trupanea wheeleri* Curran

*Trupanea wheeleri* Curran

(Fig. 111; Map 97)

*Trupanea wheeleri* Curran, 1932, Amer. Mus. Novitates, No. 556:7, fig. 1. Holotype ♀; San Diego, Calif. (AMNH).

**Geographic range.**—Arizona, California, New Mexico, and Utah.

**California records.**—FRESNO CO.: Coalinga, Jacalitos, 7 mi. W., 1 ♂, ex *Haplopappus linearifolius*, III-26-58 (H. L. Wilson, CDA). KERN CO.: Glenview, 4 mi. E., 1 ♀, Frick trap in walnut, VIII-22-57 (G. Beevor and H. T. Osborn, CDA). Sand Canyon, 13 ♀♀, swept from *Lepidospartum squamatum* flowers, VIII-26-57 (H. L. Wilson, CDA). Shafter, 1 ♀, VII-13-55 (J. A. Powell, JAP). Tehachapi, 1 ♀, swept from *Lepidospartum squamatum*, VIII-15-56 (H. L. Wilson, CDA); 1 (abdomen missing), 12 ♀♀, ex *Lepidospartum squamatum*, VIII-26-57 (H. L. Wilson, CDA); 10 mi. S., 1 ♂, ex *Senecio douglasii*, VIII-27-57 (H. L. Wilson, CDA). LOS ANGELES CO.: Burbank, 1 ♀, IV-15-38 (J. A. Comstock, LAM). Claremont, 1 ♀ (Baker, CDA); 1 ♂ (Baker, SU). El Monte, 1 ♀, VII-7-33 (H. H. Keifer, CDA). Fisherman's Cove, Catalina Island, 1 ♀, VI-9-38 (W. P. Cockerell, CDA). Hawaiian Gardens, 1 ♀, on *Baccharis* sp., IX-22-34 (CDA). Lake Hughes, 1 ♂, IX-14-30 (K. L. Wolff, LACO). Los Angeles, citronella bait trap, VI-7-50 (CDA); 1 ♂, 2 ♀♀, IX-30-56 (T. R. Haig, UCD); 1 ♂, IV-30-15 (M. C. Van Duzee, CAS).

Malibu, 1 ♀, McPhail trap, VIII-19-57 (C. Sartwell, CDA). Neenach, Antelope Valley, 1 ♀, swept from *Chrysothamnus* sp., IV-28-59 (F. L. Blanc, FLB). Pacific Palisades, 5 ♀♀, ex composite flower, V-22-57 (G. Buxton and G. F. Prole, CDA). Santa Monica, 1 ♀, melon fly trap in lemon tree, XII-7-56 (R. L. Bailey, CDA). Santa Monica Mountains, V-9-51 (UCLA). San Pedro, 1 ♀, X-25-09 (G. P. Pitate, CAS). Tanbark Flat, 1 ♂, 1 ♀, VI-25-52 (D. E. Barcus, UCD); 1 ♂, VI-26-52, (H. L. Mathis, UCD); 1 ♀, VII-11-52 (A. T. McClay, UCD); 1 ♂, 1 ♀, VII-5-52 (A. T. McClay, UCD); 1 ♀, II-22-53 (A. T. McClay, UCD); 1 ♂, VII-4-52, 1 ♀, VII-19-52 (A. T. McClay, UCD); 1 ♂, VII-13-52, 1 ♀, VII-25-52 (A. T. McClay, UCD); 1 ♂, 1 ♀, VII-18-52, 1 ♀, VII-13-52 (S. Miyagawa, UCD); 1 ♀, VII-27-52 (A. T. McClay, UCD); 1 ♂, VII-17-52 (A. T. McClay, UCD); 1 ♂, VI-26-52 (J. K. Hester, UCD). Tarzana, 1 ♀, McPhail trap, IX-25-57 (R. Howell, CDA). Venice, 1 ♀, melon fly trap in magnolia, XII-19-56 (E. Arnokd, CDA). West Los Angeles, 1 ♀, melon fly trap in Citrus, I-7-57 (B. Chan, CDA); 1 ♂, melon fly trap in peach, I-25-57 (B. Chan, CDA); 1 ♀, melon fly trap in orange, XII-21-56 (B. Chan, CDA). Westwood, 1 ♂, melon fly trap in oleander, XII-12-56 (P. Linz, CDA); 1 ♀, melon fly trap in jasmine, X-4-56 (E. Blakely, CDA); 1 ♀, melon fly trap in holly bush, X-12-56 (Phillip Linz, CDA); 1 ♂, melon fly trap in avocado, XII-31-56 (P. Thompson, CDA). Westwood Hills, 1 ♂, IV-27-52 (E. Smith, UCLA); 1 ♀, *Encelia* sp., III-6-37 (N. E. Hardman, CAS). Whittier, 1 ♀, on *Encelia californica*, XII-23 (P. H. Timberlake, UCR); 1 ♀, in flower head of *Encelia* sp., V-4-13 (P. H. Timberlake, UCR); 1 ♂, *Encelia* sp., V-9-13 (P. H. Timberlake, UCR). Los Angeles County, 1 ♀, VI-10-52 (UCLA); 2 ♀♀ (USNM). MARIN CO.: Muir Woods, 1 ♀, VII-10-48 (R. S. Beal, CIS). MONTEREY CO.: Lockwood, 1 ♀, IV-10-56 (R. P. Allen, FLB). King City, 1 ♂, ex *Atriplex semibaccata*, VII-3-18 (H. H. Severin, CIS). Seaside, 1 ♀, VI-4-59 (J. A. Chemsak, CIS). ORANGE CO.: El Toro, 1 (abdomen missing), McPhail trap (SIB-7), IX-15-59 (C. Johnson, CDA). Fullerton, 1 ♀, VIII-2-30 (Bartholomew, CDA). Gavilan, 1 ♂, ex *Sambucus* sp., V-14-48 (P. H. Timberlake, UCR); 1 ♂, 3 ♀♀, ex *Eriogonum gracile*, X-1-52 (P. H. Timberlake, UCR). Green River Camp, Lower Santa Ana Canyon, ex *Encelia*, V-10-33 (E. P. Van Duzee, CAS). Laguna Beach, 1 ♂, diamalt trap in peach, V-10-43 (L. Gillogly, CDA). San Juan Capistrano, 1 ♀, McPhail trap (SIB-7), VII-9-58 (F. W. Pelsue, CDA); 1 ♀, McPhail trap (SIB-7), X-24-59 (C. Johnson, CDA). Silverado, 1 ♀, McPhail trap in grapefruit, X-27-59 (C. Johnson, CDA). PLUMAS CO.: Portola, 1 ♂, VI-5-15 (M. C. Van Duzee, CAS). RIVERSIDE CO.: Riverside, 1 ♀, flower heads of *Haplopappus* sp., XI-25 (P. H. Timberlake, UCR). San Jacinto, 1 ♀, ex alfalfa, IX-26-58 (E. I. Schlinger, UCR); 1 ♂, ex alfalfa, IX-5-58 (E. I. Schlinger, UCR). SAN BENITO CO.: Hollister, 1 ♀, Frick trap, X-56 (R. P. Allen, CDA). San Benito County, 1 ♀, Frick trap, IX-56 (CDA). SAN BERNARDINO CO.: Atolia, 1 ♀, VI-19-52 (A. T. McClay, UCD). Big Bear Lake, 2 ♂♂, 3 ♀♀, aster, VIII-24-43 (S. C. Jones, SCJ). Camp Radford, 1 ♀, VIII-24-57 (E. I. Schlinger, UCD). Chino, 1 ♀, IX-5-30 (A. M. Boyce, ANSP). Crestline, 11 mi. N., 1 ♂, VI-27-52 (6 collectors, UK). Lake Arrowhead, 2 ♀♀, VII-14-35 (P. H. Timberlake, UCR). Mill Creek Canyon, 1 ♀, ex *Gutierrezia* sp., IX-23-23 (E. P. Van Duzee, CAS). Seven Oaks, *Chrysothamnus* sp., VIII-25-43 (S. C. Jones, SCJ). SAN DIEGO CO.: Boulevard, 2 ♀♀, McPhail trap (SIB-7), 1958 (D. Close, CDA). Coronado, 3 ♂♂, 7 ♀♀, reared from young

seeds of *Encelia californica*, collected IV-2-60, emerged IV-7 to IV-16-60 (E. D. Algert, CDA). Guatay, 1 ♀, VII-21-41 (E. L. Todd, UK). La Jolla, 4 ♀♀, III-1-14 (M. C. Van Duzee, CAS); 1 ♀, I-10-14 (M. C. Van Duzee, CAS); 1 ♂, 8 ♀♀, VII-18-41 (E. L. Todd, UK). Otay, 1 ♂, 1 ♀, ex *Encelia* sp., IV-24-48 (E. D. Algert, UCD); 1 ♂, 1 ♀, reared from flower heads of *Haplopappus venetus*, collected VIII-29-60, emerged IX-7 to IX-15-60 (E. D. Algert, CDA). Palomar Mountain, 1 ♀, VII-11-51 (F. L. Blanc, FLB). Rainbow, 1 ♀, McPhail trap, IX-11-59 (C. Johnson, CDA). San Diego, 1 ♀, IV-6-18 (E. P. Van Duzee, CIS); 3 ♀♀, IV-5-15 (M. C. Van Duzee, CAS); 1 ♂, 1 ♀, IV-1-15 (M. C. Van Duzee, CAS); 1 ♂, II-27-1892 (H. C. Fall, MCZ). San Ysidro, 1 ♀, McPhail trap in pepper tree, XII-19-58 (Ramirez, CDA); 3 ♂♂, 4 ♀♀, reared larvae from flowers of *Haplopappus venetus*, X-15-48 (E. D. Algert, USNM); 1 ♂, reared larvae from flowers of *Aster spinus*, VIII-18-48 (E. D. Algert, USNM); 9 ♂♂, 3 ♀♀, reared from flower heads of *Aster spinosus*, collected VII-11-60, emerged VII-15 to VII-22-60 (E. D. Algert, CDA). San Diego County, 1 ♀, *Encelia* sp., II-3-28 (C. C. Searl, SDM); 1 ♂, 1 ♀, *Coreopsis*, IV-14-48 (R. G. Lindberg, USNM). SAN FRANCISCO CO.: San Francisco, 1 (abdomen missing), herbarium, VII-17 (J. I. Carlson, CAS). SAN LUIS OBISPO CO.: Cambria, 1 ♂, I-29-54 (E. M. Evans, USNM). Oso Floca Guadalupe, 1 ♀, *Cirsium* sp., VII-9-56 (H. L. Wilson, CDA). Oso Floca Lake, 1 ♀, VII-13-59 (C. A. Campbell, CIS). San Luis Obispo, 1 ♀, Med. fruit fly trap, IX-18-56 (E. Shakelford, CDA); 10 mi. N.E., 1 ♂, VI-16-49 (R. S. Beal, CIS). SANTA BARBARA CO.: Canada del Venadito, 4 ♀♀, VI-23-59 (F. D. Parker, CGM). East base of San Marcos Peak, 1 ♀, *Baccharis pilularis*, IX-12-56. Gaviota Pass, 1 ♂, 2 ♀♀, VI-17-49 (R. S. Beal, CIS). Santa Barbara, 1 ♂, 1 ♀, VI-16-51 (K. W. Tucker, UCD). Santa Maria, 2 ♂♂, 1 ♀, reared from *Lepidospartum squamatum*, XI-8-57 (J. Jones, CDA). Santa Ynez Mountains, 1 ♀, VI-24-59 (M. Bruck, CGM). SANTA CLARA CO.: Santa Clara County, 1 ♂, (Baker, SU). SONOMA CO.: Petaluma, 1 ♀, Frick trap in walnut, IX-26-55 (R. P. Allen, RFW). VENTURA CO.: Foster Park, 1 ♀, VII-1-59 (M. Bruck, CGM). Santa Paula, 1 ♀, X-1-59 (L. G. Gaschke, CDA). Sespe Gorge, 2 ♂♂, 3 ♀♀, on golden yarrow (*Eriophyllum confertiflorum*), VII-12-56 (H. L. Wilson, CDA). Ventura, 1 ♀, VII-1-59 (R. D. Gehring, CIS).

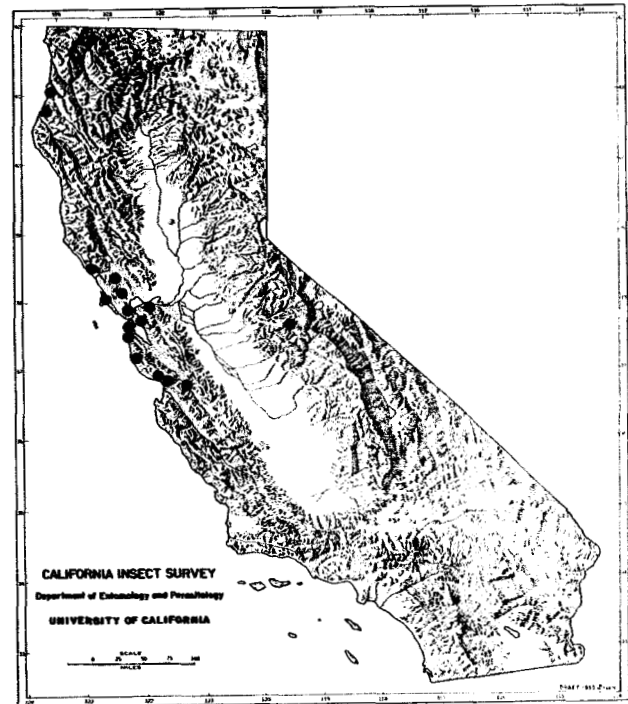
No other species of *Trupanea* having a narrow dark ray from the stigma to vein m has as extensive a dark streak on vein  $M_3+Cu_1$ —this area of infuscation extends from the base of the vein to its midpoint or beyond.

#### Genus *Trypeta* Meigen

The genus is quite similar to *Euleia* and *Chetostoma*. It is distinguished from *Euleia* by the position of the vein r-m, which is very close to the midpoint in cell 1st  $M_2$  in *Trypeta* and distinctly apicad of the midpoint in *Euleia*. It differs from *Chetostoma* in the absence of strong, dark setae at the outer lateral corners of the oral opening. The genus *Trypeta* is Holarctic in distribution. Of the North American species, 5 are known from the northeastern United States, 1 from Alaska and the Pribiloff Islands, and

2 from the Western United States. The habits and biology of the species are not known. Foote (1960c) has recently reviewed the Nearctic species.

**KEY TO THE CALIFORNIA SPECIES OF TRYPETA**  
 In profile, distance between anteroventral margin of eye and margin of face less than one-half the width of third antennal segment . . . *angustigena* Foote (p. 88)  
 In profile, this distance about equal to greatest width of third antennal segment; brown band at wing apex comparatively broad and well separated from next proximal band . . . *fractura* (Coquillett) (p. 89)



Map 98. Distribution in California of *Trypeta angustigena* Foote

#### *Trypeta angustigena* Foote

(Fig. 112; Map 98)

*Trypeta angustigena* Foote, 1960, Ann. Ent. Soc. Amer., 53:258, figs. 5, 12. Holotype ♀, San Simeon, Calif. (USNM).

**Geographic range.**—Known only from California.

**California records.**—ALAMEDA CO.: Alameda, 1 ♀, V-12-29 (E. P. Van Duzee, CIS). Berkeley, 3 ♂♂, 4 ♀♀, II-15-25 (CIS); 1 ♂, 1 ♀, II-28-25 (CIS); 2 ♂♂, X-1-32 (CIS); 2 ♀♀, X-18-32 (CIS); 1 ♂, 2 ♀♀, III-5-25 (CIS); 1 ♀, IX-6-08 (H. H. Severin, CIS); 1 ♀, VIII-19-34 (CAS); 1 ♀, V-5-57 (E. A. Michelbacher, CIS); 1 ♀, IV-18-28 (W. W. Jones, CIS); Oakland, 1 ♀, Frick trap, XI-6-59 (Longergan and Zepeda, CDA). CONTRA COSTA CO.: Martinez, 1 ♀, VI-19-10 (J. G. Grunde, CIS). HUMBOLDT CO.: Eureka, 1 ♀, Frick trap in *Prunus emarginata*, VIII-19-60 (CDA). N. Trinidad, 2 ♂♂, Frick trap in *Prunus emarginata*, VIII-19-60 (CDA). Trinidad, 1 ♀, Frick trap in *Prunus emarginata*, VIII-19-60 (CDA). MARIN CO.: Inverness, 1 ♀, 1 ♂, IV-26-51 (P. D. Ashlock, PDA); 1 ♂, 1 ♀, IV-26-51 (P. D. Ashlock, PDA). Mill Valley, 1 ♀, light trap, V-25-55 (H. L. Mathis,

UCD); 1 ♀, III-19-26 (M. C. Van Duzee, CAS). MARIPOSA Co.: Yosemite National Park, 14 mi. fr. Glacier Point, 1 ♂, 1 ♀, meadow sweeping, IV-15-60 (FLB). SAN BENITO Co.: Hollister, 1 ♀, Frick trap in walnut, IX-26-57 (Ralph Freeman, CDA). SAN FRANCISCO Co.: San Francisco, 1 ♀, fruit fly trap in apple, VI-11-57 (D. Voth, CDA); 2 ♀♀, Frick trap in elderberry, VI-19-59 (T. R. Haig, CDA); 1 ♂, fruit fly trap in apricot, VI-11-58 (D. Voth, CDA); 1 ♂, fruit fly trap in apple, VI-20-58 (D. Voth, CDA). SAN LUIS OBISPO Co.: San Simeon (holotype), 1 ♀, IX-25-38 (M. Cazier, USNM). SAN MATEO Co.: Memorial Park, 1 ♀, VII-15-51 (P. H. Arnaud, PHA). Pacifica, 1 ♀, Frick trap in peach, VI-24-59 (B. Fischer, CDA). SANTA CRUZ Co.: Aptos, 4 ♂♂, 2 ♀♀, Frick trap in walnut, IX-25-57 (Ralph Freeman, CDA). Freedom, 4 ♂♂, Frick trap in walnut, IX-4-57 (Anthony Ross, CDA). SONOMA Co.: Petaluma, 1 ♀, Frick trap in walnut, VII-24-57 (F. K. Jarvinen, CDA). Plantation, 1 ♀, V-1-58 (D. D. Linsdale, CIS). Santa Rosa, 1 ♂, Frick trap in walnut, VII-3-57 (G. Whitmire, CDA).

The species is recognized by the wing pattern and by the characters discussed for the genus. The characters distinguishing it from *fractura* (Coq.) are discussed under that species.



Map 99. Distribution in California of *Trypeta fractura* (Coquillett)

*Trypeta fractura* (Coquillett)

(Fig. 113; Map 99)

*Spilographa fractura* Coquillett, 1902, Proc. U. S. Nat. Mus., 25(1280):125. Holotype ♂; South Fork Eagle Creek, White Mountains, N. Mex. (USNM).

*Geographic range*.—California and New Mexico.

*California records*.—MARIPOSA Co.: Yosemite National Park, 1 ♀, VII-30-38 (C. Tilden, CIS). TULARE Co.: Pothole Meadows, 2 ♀♀, 7,750 ft., VI-22-31 (CIS).

*T. fractura* closely resembles *angustigena*. The

most reliable character separating these species is the very narrow gena of the latter. The wing patterns of the two differ in that the brown area at the tip of the wing of *fractura* is considerably wider than that of *angustigena* and much more widely separated from the next proximal brown area at the costal margin.

Genus *Urophora* Robineau-Desvoidy

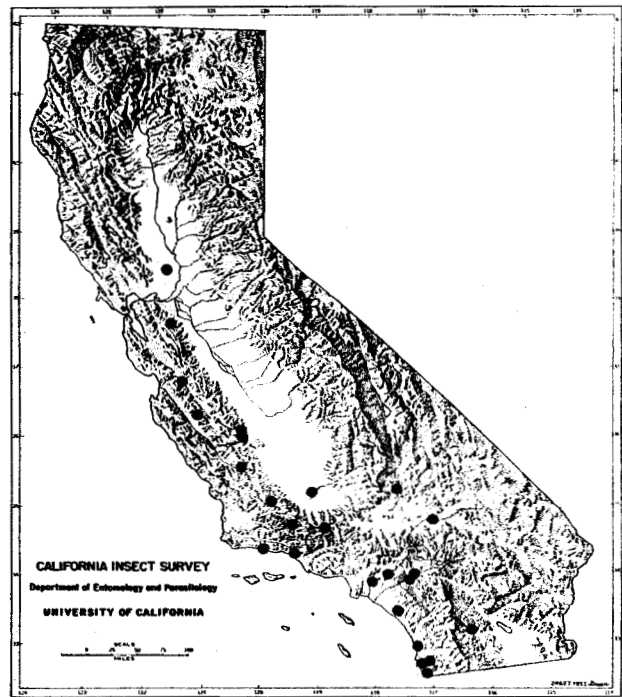
*Urophora* is a genus of small, shiny black species in which vein Cu<sub>2</sub> meets vein 2nd A at right angles without any elongation of cell 1st A. Only one pair of upper fronto-orbitals is present, and the dorso-centrals are situated in the vicinity of the supra-alars. At least 3 Nearctic and a number of Palearctic species have been described. Very little biological information is available. Most host information has been obtained from records of the California specimens presented here. The 3 Nearctic species known at present have never been reviewed as a group. A number of California specimens seen during this study remain unidentified, awaiting a revision of the genus.

KEY TO THE CALIFORNIA SPECIES OF UROPHORA

Stigma yellowish; wing field completely devoid of dark markings; scutellum entirely black

*timberlakei* Blanc and Foote (p. 90)

Stigma covered by a pattern of brown stripes which also mark wing field; scutellum with a central yellow spot dorsally . . . . . *formosa* (Coquillett) (p. 90)



Map 100. Distribution in California of *Urophora formosa* (Coquillett)

*Urophora formosa* (Coquillett)

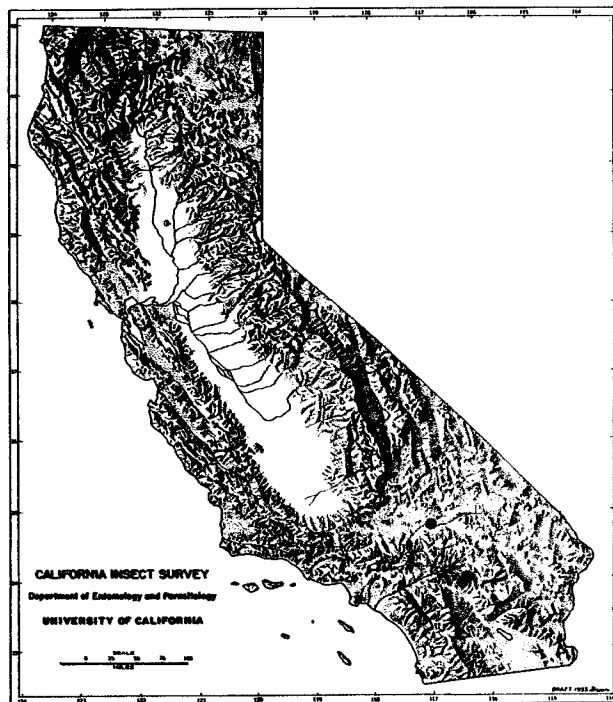
(Fig. 114 and frontispiece; Map 100)

*Trypeta* (*Rhagoletis*) *formosa* Coquillett, 1894, Can. Ent., 26:71. Holotype ♀; Los Angeles, Calif. (USNM).*Synonym*.—*Rhagoletis caurina* Doane, 1899:182.*Geographic range*.—California, Colorado, Oregon, Utah, and Washington.

*California records*.—FRESNO Co.: Coalinga, 4 ♂♂, 6 ♀♀, *Haplopappus venetus*, IX-10-57 (H. L. Wilson, CDA); 8 mi. N., 1 ♂, *Monolopia major*, III-25-57 (H. L. Wilson, CDA); 6 mi. S., 1 ♂, *Gutierrezia sarothrae*, IX-23-18 (H. H. Severin, CAS); 6 mi. S., 2 ♂♂, *Gutierrezia sarothrae*, IX-23-18 (H. H. Severin, CIS). Coalinga, Los Gatos Canyon, 6 mi. S.W., *Haplopappus venetus*, III-18-58 (H. L. Wilson, CDA). Jacalitos Canyon, Coalinga, 2 ♀♀, composite, V-15-56 (H. L. Wilson, CDA); 1 ♀, III-18-31, (E. P. Van Duzee, CAS). Los Gatos Canyon, 13 ♂♂, 4 ♀♀, *Haplopappus venetus*, IX-4-57 (H. L. Wilson, CDA); 1 ♀, *Franseria acanthicarpa*, IX-4-57 (Wilson and Blanc, CDA). KERN Co.: Oildale, 1 ♂, 1 ♀, *Haplopappus venetus*, IX-26-57 (H. L. Wilson, CDA). LOS ANGELES Co.: Claremont, 1 ♀ (Baker, CIS). Gorman, 1 ♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Whittier, 2 ♂♂, *Haplopappus venetus* var. *vernonioides*, VIII-13-20 (P. H. Timberlake, UCR); 1 ♀, in heads of *Grindelia* sp., IV-14-13 (P. H. Timberlake, UCR). Los Angeles County, 1 ♂, 1 ♀ (Coquillett, USNM). ORANGE Co.: Gavilan, 2 ♀♀, *Haplopappus propinquus*, X-1-52 (P. H. Timberlake, UCR); 1 ♀, *Eriogonum gracile*, X-6-56 (P. H. Timberlake, UCR). RIVERSIDE Co.: Riverside, 2 ♂♂, *Haplopappus venetus* var. *vernonioides*, V-26-34 (P. H. Timberlake, UCR); 1 ♂, 1 ♀, *Eriogonum fasciculatum*, V-27-46 (P. H. Timberlake, UCR); 1 ♀, *Gutierrezia californica*, VIII-28-46 (P. H. Timberlake, UCR); 1 ♂, *Eriogonum fasciculatum*, VII-10-25 (P. H. Timberlake, UCR). SAN BENITO Co.: Hollister, 12 mi. S., 1 ♀, wild parsley, IV-25-57 (R. P. Allen, CDA). Pinnoche Hills, 1 ♀, IV-10-38 (E. C. Van Dyke, CAS). SAN BERNARDINO Co.: Atolia, 6 mi. N., 1 ♀, IX-4-58 (E. I. Schlinger, UCD). Barstow, 1 ♂, *Viburnum* sp., I-25-18 (H. H. Severin, CAS). Colton, 1 ♂, V-(26-28)-17 (E. P. Van Duzee, CAS). San Bernardino, 2 ♀♀, window, VI-5-39 (J. P. Coy, CDA). SAN DIEGO Co.: Borrego Valley, 1 ♀, from flower heads of *Haplopappus venetus*, IV-18-57 (E. I. Schlinger, UCD). Chula Vista, 1 ♀, reared from *Haplopappus venetus*, X-10-50 (E. D. Algert, FLB). Del Mar, 3 mi. N.E., 1 ♂, general sweeping, V-16-58 (F. L. Blanc, CDA); 5 mi. N.E., 1 ♂, general sweeping, V-16-58 (F. L. Blanc, CDA). La Mesa, 1 ♂, on deer weed, V-4-57 (H. S. Creeger, CDA). Otay, 7 ♂♂, 5 ♀♀, collected VIII-29-60, emerged IX-7 to IX-15-60 (E. D. Algert, CDA). San Diego, 1 ♂, IV-15-15 (M. C. Van Duzee, CAS); 1 ♂, 1 ♀, V-15-13 (E. P. Van Duzee, CAS); 1 (abdomen missing), 1 ♂, 1 ♀, IV (E. P. Van Duzee, CAS); 1 ♂, 1 ♀, VI (E. P. Van Duzee, CAS); 2 ♂♂, 4 ♀♀ (SU); 1 ♀, VI-12-13 (E. P. Van Duzee, CAS); 2 ♂♂, VI-16-13 (E. P. Van Duzee, CAS); 1 ♂, XII-12-13 (E. P. Van Duzee, CAS); 1 ♀, IV-24-13 (E. P. Van Duzee, CAS); II-9-13 (E. P. Van Duzee, CAS); 1 ♂ (Geo. H. Field, SDM); 1 ♂, 1 ♀, IV-25-20 (E. P. Van Duzee, CAS). San Diego County, 2 ♂♂, 1 ♀, III-11-97 (W. M. Wheeler, AMNH). SAN LUIS OBISPO Co.: Shandon, 18 ♂♂, 10 ♀♀, *Haplopappus venetus*, IV-4-57 (H. L. Wilson, CDA); 2 ♀♀, flowers of *Lomatium utriculatum*, IV-2-57 (H. L. Wilson, CDA). Simmler, 1 ♂, III-21-40 (J. W. Tilden and G. S. Mansfield, SJS). SANTA BARBARA Co.: Goleta, 2 ♂♂,

VI-22 to 23-59 (M. Bruck, CGM). VENTURA Co.: Corral Canyon S. of Ventucopa, 1 ♀, III-26-59 (F. L. Blanc, CDA). Foster Park, 1 ♀, VII-1-59 (F. D. Parker, CGM). YOLO Co.: Davis, V-12-55 (R. M. Bohart, UCD); 1 ♀, VII-5-55 (R. M. Bohart, UCD).

*U. formosa* is easily distinguished from all other California tephritids by the wing pattern and by the characters discussed for the genus. For differences from *timberlakei* Blanc and Foote, see the discussion of that species.



Map 101. Distribution in California of *Urophora timberlakei* Blanc and Foote

*Urophora timberlakei* Blanc and Foote

(Fig. 115; Map 101)

*Urophora timberlakei* Blanc and Foote, 1961, Pan-Pac. Ent., 37:81, fig. 5. Holotype ♀; Summit near Yucca Valley, Calif. (UCR).*Geographic range*.—Known only from California.

*California records*.—INYO Co.: Surprise Canyon, Panamint Mountains, 1 ♀, IV-24-57 (G. I. Stage, CIS). SAN BERNARDINO Co.: Barstow, 1 ♂, *Cleomella obtusifolia*, IX-12-44 (P. H. Timberlake, USNM). Morongo, 1 ♂, *Gutierrezia microcephala*, IX-29-44 (P. H. Timberlake, UCR). Morongo Valley, 1 ♀, *Gutierrezia microcephala*, IX-27-41 (P. H. Timberlake, UCR). Summit of Yucca Valley (holotype), 1 ♀, *Gutierrezia microcephala*, IX-28-44 (P. H. Timberlake, UCR).

This is the only Nearctic tephritid with a geniculate proboscis, an unmarked wing, and vein Cu<sub>1</sub> meeting vein 2nd A without producing a posterior distal elongation of cell 1st A. It may be distinguished

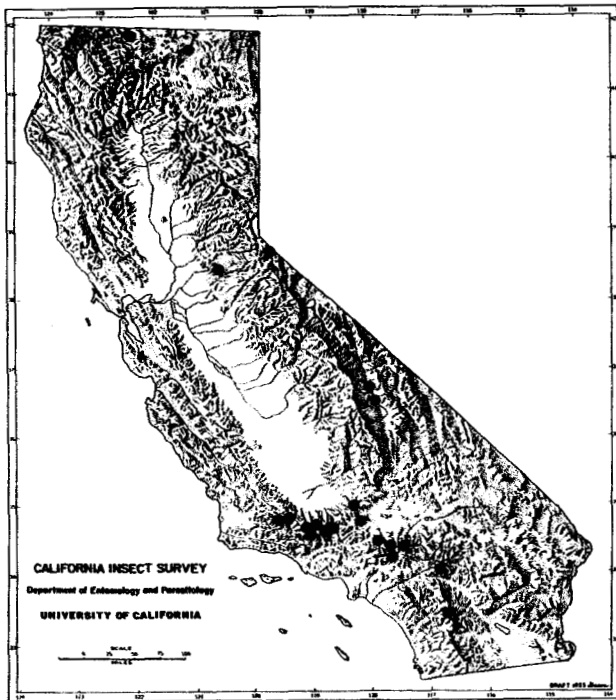
from *formosa* by the clear wing and absence of a central yellow scutellar spot.

#### Genus *Valentibulla* Foote and Blanc

This genus of small flies is characterized by the rather dark wing with highly contrasting hyaline spots; the highly polished, reddish, dark-brown and black abdomen, and the flat, whitish-pollinose face. It may be separated from *Aciurina* by the presence of a marginal hyaline spot in the apex of cell R<sub>5</sub>, and from *Euaresta* by the absence of anal region striations of the male claspers and the presence of only one pair of scutellars. *V. californica* has been reared from *Chrysothamnus* and *Artemisia* in California. Of the 3 species in this strictly Nearctic genus, 2 occur in California. The genus has been reviewed by Foote and Blanc (1959).

#### KEY TO THE CALIFORNIA SPECIES OF VALENTIBULLA

- Dark areas in cells 2nd M<sub>2</sub> and Cu<sub>1</sub> wider than hyaline marks in those cells . . . *thurmanae* Foote (p. 91)  
Dark areas in cells 2nd M<sub>2</sub> and Cu<sub>1</sub> narrower than hyaline marks in those cells . . . *californica* (Coquillett) (p. 91)



Map 102. Distribution in California of *Valentibulla californica* (Coquillett)

#### *Valentibulla californica* (Coquillett)

(Fig. 116; Map 102)

*Trypeta* (*Euaresta*) *californica* Coquillett, 1894, Can. Ent., 26:73. Holotype ♀; Southern California (USNM).

Synonym.—*Euaresta mundula* Coquillett, 1899:265.

Geographic range.—California, Nevada, and Utah.

*California records*.—ALPINE CO.: Fredericksburg, 1 ♂, 3 ♀♀, *Chrysothamnus* sp., VI-18-58 (F. L. Blanc, CDA). Woodfords, 1 ♂, 1 ♀, *Chrysothamnus* sp., VI-18-58 (W. W. Middlekauff, CIS). EL DORADO CO.: Aukum, 4 ♂♂, 4 ♀♀, V-16-59 (T. R. Haig, CDA). INYO CO.: Independence, 2 ♂♂, 1 ♀, VI-15, 29 (E. P. Van Duzee, CIS); 1 ♀, VI-12-29 (E. P. Van Duzee, CIS). LONE PINE, 1 ♀, VI-10-29 (E. P. Van Duzee, CIS). MODOC CO.: Mammoth, 1 ♀, *Chrysothamnus* sp. gall, IV-12-49 (W. Dwight Pierce, LAM). KERN CO.: Cuyama Valley, 1 ♀, IV-8-32 (E. P. Van Duzee, CAS). Frazier Park, 4 ♂♂, 3 ♀♀, *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB); 3 ♂♂, 3 ♀♀, *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB); *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Rosamond, 1 ♂, 2 ♀♀, *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB). Tehachapi, Oak Creek Road, 5 mi. S., 1 ♂, 6 ♀♀, *Chrysothamnus nauseosus*, V-27-58 (H. L. Wilson, CDA); Frazier Park, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). LOS ANGELES CO.: Desert Springs, 1 ♂, V-5-56 (J. A. Powell, CIS). Gorman, 3 ♀♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB); 2 ♂♂, 2 ♀♀, *Chrysothamnus nauseosus*, IV-25-56 (F. L. Blanc, FLB); 4 ♂♂, 1 ♀, *Chrysothamnus nauseosus*, IV-25-56 (R. F. Wilkey, RFW). Neenach, Antelope Valley, 3 ♀♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Quail Lake Guard Station, 1 ♂, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB); 3 ♂♂, 3 ♀♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB). Valyermo, 1 ♂, VI-21-40 (C. Henne, LAM). RIVERSIDE CO.: Horsethief Canyon, 2 ♂♂, 1 ♀, *Salix* sp., IV-21-35 (C. E. Norland, CAS); 1 ♀, IV-21-35 (C. E. Norland, OC). SAN BERNARDINO CO.: Barton Flats, 1 ♂, VII-11-56 (R. M. Bohart, UCD); 2 ♀♀, *Chrysothamnus nauseosus*, VI-14-50 (P. H. Timberlake, UCR). Camp Baldy Road, 6,500 ft., 2 ♀♀, VI-26-56 (A. Menke, Jr., AEM). Oro Grande Wash, 4 mi. S. of Adelanto, 1 ♂, 2 ♀♀, *Chrysothamnus nauseosus*, V-9-49 (P. H. Timberlake, UCR). Seven Oaks, 1 ♀, VI-12-36 (W. C. Reeves, T. G. Aitken, and B. Brockman, CAS). SISKIYOU CO.: Montague, 2 ♂♂, 1 ♀, *Artemisia* sp., V-20-36 (Jones and Fosen, CDA). SANTA BARBARA CO.: New Cuyama, 10 mi. W., 2 ♂♂, wheat, III-28-57 (F. L. Blanc, FLB). Ventucopa, 1 ♂, *Chrysothamnus nauseosus*, III-19-58 (F. L. Blanc, FLB). VENTURA CO.: Chuchupate Ranger Station, base Frazier Mountain, 1 ♀, *Pinus jeffreyi*, V-1-59 (C. W. O'Brien, CIS). Corral Canyon, Ventucopa, 2 ♂♂, 3 ♀♀, *Chrysothamnus nauseosus*, III-26-59 (F. L. Blanc, CDA). Stauffer, 2 ♂♂, 4 ♀♀, *Chrysothamnus* sp., IV-29-59 (F. L. Blanc, FLB).

The narrowly separated hyaline spots in cells 2nd M<sub>2</sub> and Cu<sub>1</sub>, and the even, dark-brown color of the wings, distinguish this species from *thurmanae* Foote.

#### *Valentibulla thurmanae* Foote

(Fig. 117; Map 103)

*Valentibulla thurmanae* Foote in Foote and Blanc, 1959, Pan-Pac. Ent., 35:154, figs. 1, 4. Holotype ♀; Mt. Tamalpais, Calif. (CAS).

Geographic range.—Known only from California.

*California records*.—ALAMEDA CO.: Berkeley, 1 ♀, III-7-50 (W. C. Bentinck, CIS). MARIN CO.: Mt. Tamalpais, 1 ♀, VI-23-18 (E. P. Van Duzee, CAS); 1 ♀, VI-23-50 (E. P. Van Duzee, CAS). SAN FRANCISCO CO.: San Francisco, 1 ♂, 1 ♀, sand dunes, V-30-22 (C. L. Fox, CIS). SANTA CLARA CO.: Mt. View, 1 ♂, 1 ♀ ("Ehrhorn Lot," SU); 2 ♀♀, ("Ehrhorn Lot," SU).



described the genus and *dichromata* and figured the wing, and Foote (1960g) discussed *aurantiaca*, the remaining species.

***Xenochaeta dichromata* Snow**

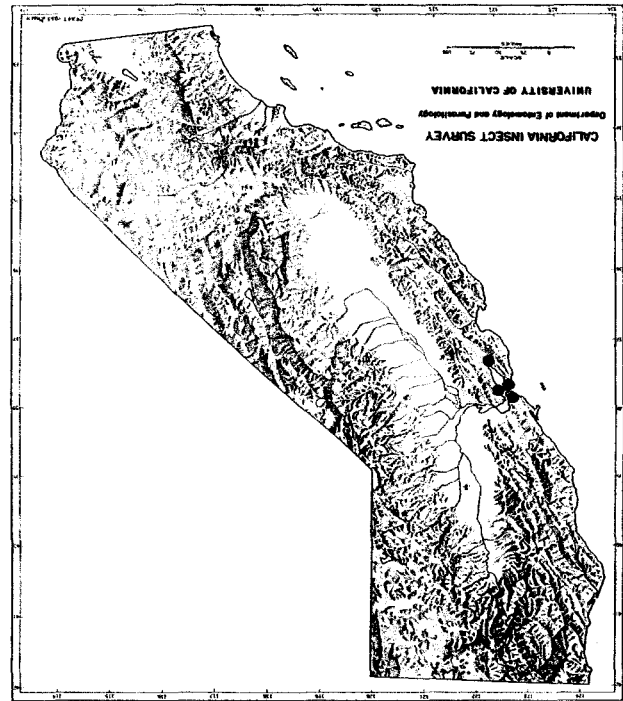
(Fig. 118; Map 104)

*Xenochaeta dichromata* Snow, 1894, Kans. Univ. Quart., 2:166, pl. VII, fig. 2. Holotype ♂, Mt. Hood, Ore. (UK).

**Geographic range.**—California, Oregon, and Washington. Only three specimens of this species are known.

**California records.**—PLUMAS CO.: Meadow Valley, (sex not known), 5,000–6,000 ft., VI-20-24 (E. C. Van Dyke, CAS).

Easily recognized by the characters presented in the key and generic description, *dichromata* is further characterized by the presence of a pair of large black spots on the first abdominal tergum and two pairs on each of the remaining terga. Those on the last segment are coalesced on each side in one specimen.



Map 103. Distribution in California of *Valentibulla thurmanae* Foote

In contrast to *californica*, this species is much larger and has a reddish cast to the head, body, and the head hairs. Cell 2nd A is always more extensively infuscated, and the light-brown area in the posterior third of the wing disc contrasts rather markedly with the darker brown of the anterior two-thirds.

**Genus *Xenochaeta* Snow**

*Xenochaeta* is a unique genus with the wing pattern similar to that of *Tephritis*, but the dorsocentral bristles are in line with the supra-alar bristles rather than close to the suture as in *Tephritis*. The front is very wide, and the third antennal segment is drawn to an apicodorsal point as in *Rhagoletis*; however, *Xenochaeta* may be distinguished from that genus by the characters given in the key. Nothing is known about the biology of *dichromata*. Snow (1894)



Map 104. Distribution in California of *Xenochaeta dichromata* Snow

## HOST LIST

The following list has been compiled from two principal sources. The more important of these is information on host labels accompanying pinned specimens. Literature references to hosts of species of outstanding economic importance have also been drawn upon extensively.

Specimens of the insect species listed below have been collected from their indicated hosts in areas outside California, and are not necessarily reported in the California records in the text. Fruit fly species the names of which are preceded by an asterisk are associated with hosts in various ways as adults, but our records indicate that larvae do not necessarily feed on the plant; for all other species, we have definite rearing records. All plant names have been checked by botanists of the United States Department of Agriculture.

- |                                      |                                  |                                   |
|--------------------------------------|----------------------------------|-----------------------------------|
| <i>Acacia greggi</i>                 | * <i>Trupanea jonesi</i>         | <i>Arctostaphylos</i> sp.         |
| * <i>Euaresta bellula</i>            | <i>Alyssum maritimum</i>         | * <i>Tephritis araneosa</i>       |
| * <i>Euaresta stigmatica</i>         | * <i>Dioxyna picciola</i>        | <i>Arnica chamissonis foliosa</i> |
| * <i>Tomoplagia cressoni</i>         | <i>Amaranthus graecizans</i>     | <i>Euarestoides acutangula</i>    |
| * <i>Trupanea bisetosa</i>           | * <i>Trupanea femoralis</i>      | <i>Tephritis araneosa</i>         |
| <i>Acamptopappus sphaerocephalus</i> | <i>Ambrosia psilostachya</i>     | <i>Arnica longifolia</i>          |
| * <i>Trupanea bisetosa</i>           | * <i>Euaresta aequalis</i>       | * <i>Tephritis candidipennis</i>  |
| <i>Achillea millefolium</i>          | * <i>Eutreta pacifica</i>        | <i>Artemisia californica</i>      |
| * <i>Tephritis araneosa</i>          | <i>Ambrosia</i> sp.              | * <i>Tephritis araneosa</i>       |
| <i>Achillea</i> sp.                  | * <i>Euarestoides acutangula</i> | * <i>Tephritis ovatipennis</i>    |
| * <i>Tephritis stigmatica</i>        | <i>Eutreta pacifica</i>          | * <i>Trupanea bisetosa</i>        |
| * <i>Trupanea jonesi</i>             | <i>Amsinckia</i> sp.             | <i>Artemisia dracunculus</i>      |
| <i>Actinospermum angustifolium</i>   | * <i>Euarestoides acutangula</i> | * <i>Tephritis araneosa</i>       |
| <i>Dioxyna picciola</i>              | <i>Anaphalis margaritacea</i>    | <i>Artemisia heterophylla</i>     |
| <i>Actinospermum</i> sp.             | * <i>Trupanea californica</i>    | * <i>Euarestoides acutangula</i>  |
| <i>Trupanea actinobola</i>           | <i>Anaphalis</i> sp.             | * <i>Tephritis araneosa</i>       |
| <i>Ademeria</i> sp.                  | <i>Trupanea californica</i>      | * <i>Trypeta angustigena</i>      |
| <i>Aciurina trixa</i>                | <i>Trupanea signata</i>          | <i>Artemisia rosea</i>            |
| <i>Adenostoma</i> sp.                | <i>Apium graveolens</i>          | * <i>Trupanea nigricornis</i>     |
| * <i>Orellia occidentalis</i>        | * <i>Tephritis araneosa</i>      | <i>Artemisia tridentata</i>       |
| * <i>Tephritis araneosa</i>          | <i>Arctostaphylos drupacea</i>   | * <i>Aciurina maculata</i>        |
| <i>Agoseris grandiflora</i>          | * <i>Euaresta stigmatica</i>     | <i>Eutreta diana</i>              |
| <i>Paroxyna variabilis</i>           | <i>Arctostaphylos glauca</i>     | <i>Eutreta oregona</i>            |
| <i>Agropyron cristatum</i>           | * <i>Trupanea radifera</i>       | * <i>Neotephritis finalis</i>     |

- Artemisia tridentata* (cont.)  
 \**Orellia undosa*  
 \**Oxya palpalis*  
 \**Oxya utahensis*  
 \**Trupanea nigricornis*  
*Artemisia* sp.  
 \**Aciurina maculata*  
*Aciurina trixa*  
 \**Euaresta stigmatica*  
*Eutreta diana*  
 \**Neaspilota brunneostigmata*  
 \**Oxya palpalis*  
 \**Procecidochares minuta*  
 \**Tephritis araneosa*  
 \**Trupanea californica*  
 \**Trupanea nigricornis*  
 \**Trupanea radifera*  
 \**Valentibulla californica*  
*Asclepias erosa*  
 \**Eutreta diana*  
*Asclepias* sp.  
 \**Euaresta bellula*  
*Asparagus officinalis*  
 \**Euarestoides acutangula*  
*Asparagus, Mexican*  
 \**Trupanea actinobola*  
*Aster adnatus*  
*Trupanea actinobola*  
*Aster spinosus*  
*Neaspilota brunneostigmata*  
*Neotephritis finalis*  
*Trupanea femoralis*  
*Trupanea wheeleri*  
*Aster* sp.  
 \**Aciurina ferruginea*  
 \**Eutreta pacifica*  
*Procecidochares minuta*  
 \**Trupanea bisetosa*  
 \**Trupanea wheeleri*  
*Aster, Chinese*  
*Eutreta pacifica*  
*Atriplex expansa*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
*Atriplex polycarpa*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
 \**Trupanea pseudovicina*  
 \**Trupanea signata*  
*Atriplex semibaccata*  
 \**Euaresta bullans*  
 \**Tephritis araneosa*  
 \**Trupanea bisetosa*  
 \**Trupanea femoralis*  
 \**Trupanea wheeleri*  
*Atriplex serenana*  
 \**Trupanea actinobola*  
*Atriplex* sp.  
 \**Euarestoides acutangula*  
*Baccharis emoryi*  
 \**Acinia fucata*  
 \**Euaresta aequalis*  
 \**Neaspilota brunneostigmata*  
 \**Tephritis californica*  
*Baccharis glutinosa*  
 \**Euarestoides acutangula*  
*Eutreta baccharis*  
*Trupanea nigricornis*  
*Baccharis pilularis*  
 \**Aciurina thoracica*  
 \**Euarestoides arnaudi*  
 \**Paracantha cultaris*  
 \**Tephritis araneosa*  
 \**Tephritis californica*  
 \**Tephritis rufipennis*  
 \**Trupanea californica*  
 \**Trupanea femoralis*  
 \**Trupanea nigricornis*  
 \**Trupanea wheeleri*  
*Baccharis pilularis consanguinea*  
 \**Euarestoides arnaudi*  
*Tephritis californica*  
 \**Tephritis rufipennis*  
 \**Trupanea californica*  
*Baccharis sarothroides*  
*Aciurina thoracica*  
 \**Euaresta bellula*  
 \**Euaresta stigmatica*  
*Tephritis arizonensis*  
*Baccharis sativa*  
 \**Acinia fucata*  
*Baccharis sergiloides*  
 \**Euaresta stigmatica*  
 \**Euarestoides acutangula*  
 \**Trupanea bisetosa*  
 \**Trupanea jonesi*  
 \**Trupanea pseudovicina*  
*Baccharis viminea*  
*Eutreta baccharis*  
*Baccharis* sp.  
 \**Aciurina alopappi*  
*Aciurina thoracica*  
 \**Euaresta bellula*  
 \**Euarestoides arnaudi*  
 \**Tephritis araneosa*  
 \**Tephritis californica*  
 \**Tephritis ovatipennis*  
 \**Tephritis signatipennis*  
 \**Trupanea wheeleri*  
*Baeria californica*  
 \**Neaspilota signifera*  
*Baeria chrysostoma*  
 \**Neaspilota signifera*  
 \**Trupanea jonesi*  
*Baeria chrysostoma gracilis*  
 \**Neaspilota signifera*  
 \**Trupanea nigricornis*  
*Bahia* sp.  
 \**Dioxya picciola*  
*Baileya pleniradiata*  
 \**Euaresta bellula*  
*Balsamorhiza* sp.  
*Neotephritis finalis*  
*Bassia hyssopifolia*  
 \**Trupanea femoralis*  
*Bebbia junca*  
*Trupanea imperfecta*  
*Bebbia junca aspera*  
 \**Euarestoides acutangula*  
 \**Trupanea imperfecta*  
*Bebbia* sp.  
 \**Euaresta bellula*  
*Berberis nervosa*  
*Rhagoletis berberis*  
*Berberis* sp.  
 \**Rhagoletis berberis*  
*Beta vulgaris*  
 \**Euaresta aequalis*  
 \**Euaresta bellula*  
 \**Euaresta bullans*  
 \**Euarestoides acutangula*  
 \**Trupanea nigricornis*  
*Bidens bipinnata*  
*Dioxya picciola*  
*Bidens frondosa*  
 \**Dioxya picciola*  
*Bidens laevis*  
*Dioxya picciola*  
*Bidens leucantha*  
*Dioxya picciola*  
*Bigelovia hartwegi*  
 \**Neaspilota brunneostigmata*  
*Brassica oleracea*  
 \**Trupanea californica*  
*Brassica* spp.  
 \**Neaspilota signifera*  
 \**Neotephritis finalis*  
*Carduus pycnocephalus*  
 \**Orellia undosa*  
*Cascara* sp.  
 \**Procecidochares anthracina*  
*Catalpa*  
 \**Paraterellia ypsilon*  
*Ceanothus cordulatus*  
 \**Paroxyna clathrata*  
*Ceanothus crassifolius*  
 \**Euaresta stigmatica*  
 \**Euarestoides acutangula*  
 \**Tephritis araneosa*  
 \**Trupanea jonesi*  
*Ceanothus velutinus*  
 \**Paroxyna clathrata*  
*Ceanothus* sp.  
 \**Euaresta stigmatica*  
 \**Neaspilota signifera*  
*Chenopodium album*  
 \**Trupanea jonesi*  
*Chrysanthemum paniculatum*  
 \**Euarestoides acutangula*  
*Chrysanthemum* sp.  
*Eutreta pacifica*  
 \**Paracantha cultaris*  
*Chrysopsis villosa*  
*Neaspilota brunneostigmata*  
*Procecidochares minuta*  
*Trupanea femoralis*  
*Chrysothamnus nauseosus*  
 \**Aciurina alopappi*

- \**Aciurina maculata*  
 \**Aciurina trilitura*  
*Aciurina trixa*  
 \**Euarestoides acutangula*  
 \**Eutreta diana*  
 \**Eutreta hespera*  
 \**Neaspilota brunneostigmata*  
 \**Neotephritis finalis*  
 \**Paracantha gentilis*  
*Procecidochares minuta*  
 \**Tephritis araneosa*  
 \**Tephritis opacipennis*  
 \**Trupanea jonesi*  
 \**Trupanea nigricornis*  
*Valentibulla californica*  
*Chrysothamnus paniculatus*  
 \**Neotephritis finalis*  
 \**Trupanea imperfecta*  
 \**Trupanea nigricornis*  
*Chrysothamnus viscidiflorus*  
*Aciurina ferruginea*  
 \**Paroxyna clathrata*  
*Chrysothamnus viscidiflorus puberulus*  
 \**Aciurina ferruginea*  
 \**Paroxyna murina*  
 \**Trupanea imperfecta*  
*Chrysothamnus viscidiflorus pumilus*  
 \**Paroxyna murina*  
*Chrysothamnus* sp.  
 \**Aciurina aplopappi*  
 \**Aciurina ferruginea*  
*Aciurina maculata*  
 \**Aciurina trilitura*  
*Aciurina trixa*  
 \**Euaresta stigmatica*  
 \**Euaresta tapetis*  
 \**Euarestoides acutangula*  
 \**Euarestoides arnaudi*  
 \**Euarestoides flava*  
 \**Eutreta diana*  
 \**Neotephritis finalis*  
 \**Oxya aterrima*  
 \**Oxya palpalis*  
 \**Oxya utahensis*  
 \**Paroxyna clathrata*  
 \**Paroxyna murina*  
 \**Procecidochares anthracina*  
*Procecidochares minuta*  
*Procecidochares stonei*  
 \**Tephritis araneosa*  
 \**Tephritis labecula*  
 \**Tephritis ovatipennis*  
 \**Tephritis stigmatica*  
 \**Trupanea actinobola*  
 \**Trupanea bisetosa*  
 \**Trupanea nigricornis*  
 \**Trupanea radifera*  
 \**Trupanea wheeleri*  
 \**Urophora formosa*  
*Valentibulla californica*  
*Cirsium acaulescens*  
 \**Orellia occidentalis*  
*Cirsium andersonii*  
 \**Orellia occidentalis*  
*Cirsium arvense*  
 \**Orellia occidentalis*  
*Orellia ruficauda*  
*Cirsium brevistylum*  
 \**Orellia occidentalis*  
 (\*?)*Paracantha genalis*  
 \**Paracantha gentilis*  
*Cirsium californicum*  
 \**Orellia undosa*  
 \**Paracantha gentilis*  
*Cirsium drummondii*  
 \**Orellia occidentalis*  
*Cirsium lanceolatum*  
 \**Orellia occidentalis*  
*Cirsium occidentale*  
*Orellia occidentalis*  
 \**Orellia undosa*  
*Paracantha cultaris*  
*Cirsium quercetorum*  
*Orellia occidentalis*  
*Cirsium sierrae bernardino*  
*Paracantha gentilis*  
*Cirsium* sp.  
 \**Euarestoides acutangula*  
 \**Neotephritis finalis*  
 \**Orellia occidentalis*  
 \**Orellia undosa*  
 \**Paracantha cultaris*  
 \**Paracantha gentilis*  
 \**Paroxyna genalis*  
 \**Trupanea wheeleri*  
*Citrus nobilis* var. *deliciosa*  
 \**Euaresta bellula*  
*Citrus sinensis*  
 \**Eutreta pacifica*  
 \**Tomoplaga cressoni*  
*Cleome serrulata*  
 \**Euaresta tapetis*  
*Cleome* sp.  
 \**Euaresta tapetis*  
*Cleomella obtusifolia*  
 \**Urophora timberlakei*  
*Cnicus parryi*  
*Orellia occidentalis*  
*Compositae*, unidentified  
 \**Aciurina trilitura*  
 \**Euaresta bullans*  
 \**Neaspilota brunneostigmata*  
 \**Neaspilota wilsoni*  
 \**Neotephritis finalis*  
 \**Paroxyna americana*  
 \**Paroxyna variabilis*  
 \**Tephritis stigmatica*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
 \**Trupanea nigricornis*  
 \**Trupanea wheeleri*  
 \**Urophora formosa*  
*Conium maculatum*  
*Euleia fratria*  
*Conyza canadensis* var. *glabrata*  
 \**Euarestoides acutangula*  
*Coreopsis calliopsidea*  
 \**Dioxyna picciola*  
 \**Neaspilota wilsoni*  
 \**Trupanea jonesi*  
*Coreopsis leavenworthii*  
*Dioxyna picciola*  
*Coreopsis nudata*  
*Dioxyna picciola*  
*Coreopsis tripteris*  
*Dioxyna picciola*  
*Coreopsis* sp.  
*Dioxyna picciola*  
*Trupanea jonesi*  
 \**Trupanea wheeleri*  
*Corethrogyne filaginifolia*  
 \**Procecidochares minuta*  
*Cornus* sp.  
*Rhagoletis tabellaria*  
*Cosmos* sp.  
*Dioxyna picciola*  
*Crepis* sp.  
 \**Trupanea jonesi*  
*Croton californicus*  
 \**Acinia lucata*  
 \**Euaresta stigmatica*  
 \**Trupanea bisetosa*  
 \**Trupanea jonesi*  
 \**Trupanea nigricornis*  
 \**Trupanea radifera*  
*Croton longipes*  
 \**Trupanea nigricornis*  
*Crypsis niliacea*  
 \**Neotephritis finalis*  
*Cryptotaenia canadensis*  
*Euleia fratria*  
*Cynara scolymus*  
 \**Paracantha gentilis*  
*Dahlia* sp.  
 \**Neotephritis finalis*  
*Daisy*  
 \**Euaresta tapetis*  
*Dalea californica*  
 \**Trupanea bisetosa*  
*Dalea schottii*  
 \**Trupanea nigricornis*  
*Datura* sp.  
 \**Euaresta bullans*  
*Daucus carota* var. *sativa*  
 \**Orellia ruficauda*  
*Dicoria canescens*  
 \**Trupanea bisetosa*  
 \**Trupanea imperfecta*  
*Dicraurus* sp.  
 \**Euaresta bellula*  
*Dipsacus* sp.  
 \**Procecidochares anthracina*  
*Ditaxis serrata*  
 \**Trupanea radifera*  
*Encelia californica*  
*Neotephritis finalis*  
 \**Trupanea bisetosa*  
 \**Trupanea femoralis*

- Encelia californica* (cont.)  
*Trupanea wheeleri*
- Encelia farinosa*  
 \**Euarestoides acutangula*  
 \**Neaspilota brunneostigmata*  
 \**Neaspilota signifera*  
*Neotephritis finalis*  
*Trupanea bisetosa*  
 \**Trupanea conjuncta*  
 \**Trupanea imperfecta*  
 \**Trupanea jonesi*  
*Trupanea nigricornis*
- Encelia frutescens*  
 \**Euaresta bellula*  
 \**Trupanea bisetosa*
- Encelia frutescens* var. *frutescens*  
 \**Euarestoides acutangula*  
 \**Trupanea bisetosa*
- Encelia* sp.  
 \**Euarestoides acutangula*  
 \**Neotephritis finalis*  
 \**Trupanea bisetosa*  
 \**Trupanea imperfecta*  
 \**Trupanea nigricornis*  
*Trupanea wheeleri*
- Engelmannia pinnatifida*  
 \**Neotephritis finalis*
- Epilobium angustifolium*  
 \**Paroxyna clathrata*
- Erigeron fasciculatus*  
 \**Paroxyna clathrata*
- Erigeron foliosus*  
 \**Neaspilota brunneostigmata*  
 \**Tephritis araneosa*
- Erigeron foliosus* var. *stenophyllus*  
 \**Neaspilota brunneostigmata*
- Erigeron glaucus*  
 \**Tephritis ovatipennis*
- Erigeron quercifolius*  
*Trupanea actinobola*
- Erigeron vernus*  
*Trupanea actinobola*
- Erigeron* sp.  
*Neaspilota brunneostigmata*  
*Trupanea jonesi*
- Eriodictyon crassifolium*  
 \**Trupanea bisetosa*
- Eriodictyon trichocalyx*  
 \**Euaresta stigmatica*  
 \**Euarestoides acutangula*  
 \**Neaspilota brunneostigmata*  
 \**Tephritis araneosa*  
 \**Trupanea californica*
- Eriodictyon* sp.  
 \**Tephritis stigmatica*
- Eriogonum fasciculatum*  
 \**Neaspilota signifera*  
 \**Paroxyna clathrata*  
 \**Paroxyna murina*  
 \**Tephritis araneosa*  
 \**Trupanea bisetosa*  
 \**Urophora formosa*
- Eriogonum fasciculatum polifolium*  
 \**Trupanea bisetosa*
- Eriogonum gracile*  
 \**Euaresta stigmatica*  
 \**Neaspilota brunneostigmata*  
 \**Paroxyna murina*  
 \**Trupanea nigricornis*  
 \**Trupanea wheeleri*  
 \**Urophora formosa*
- Eriogonum inflatum*  
 \**Euarestoides acutangula*  
 \**Trupanea imperfecta*
- Eriogonum thomasi*  
 \**Trupanea bisetosa*
- Eriogonum* sp.  
 \**Neaspilota brunneostigmata*  
 \**Procecidochares minuta*  
 \**Tephritis stigmatica*  
 \**Trupanea jonesi*
- Eriophyllum confertiflorum*  
 \**Trupanea wheeleri*
- Erodium cicutarium*  
 \**Euarestoides acutangula*  
 \**Neaspilota signifera*  
 \**Tephritis araneosa*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
 \**Trupanea radifera*
- Erodium* sp.  
 \**Procecidochares minuta*  
 \**Trupanea radifera*
- Everlasting, *Gnaphalium* sp. or *Anaphalis* sp.  
 \**Trupanea signata*
- Fern  
 \**Eutreta pacifica*  
 \**Paracantha genalis*
- Franseria acanthicarpa*  
 \**Dioxyna picciola*  
 \**Euaresta bellula*  
 \**Euaresta stigmatica*  
 \**Procecidochares minuta*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea signata*  
 \**Urophora formosa*
- Franseria bipinnatifida*  
 \**Euaresta bellula*
- Franseria chamissonis bipinnatisecta*  
 \**Euaresta bellula*  
 \**Euarestoides acutangula*
- Franseria chenopodiifolia*  
*Euaresta bellula*  
*Euarestoides acutangula*
- Franseria* sp.  
 \**Euaresta bellula*  
 \**Euarestoides acutangula*  
*Eutreta pacifica*  
 \**Neaspilota brunneostigmata*  
*Procecidochares minuta*  
 \**Trupanea bisetosa*  
 \**Trupanea nigricornis*
- Gaillardia aristata*  
*Euarestoides acutangula*
- Gaillardia sarothrae*  
 \**Euarestoides acutangula*  
*Geraea canescens*  
 \**Neotephritis finalis*  
 \**Trupanea nigricornis*
- Geraea* sp.  
 \**Euarestoides acutangula*  
 \**Neotephritis finalis*  
 \**Tephritis araneosa*
- Glycyrrhiza lepidota*  
 \**Eutreta pacifica*
- Gnaphalium beneolens*  
 \**Euaresta aequalis*
- Gnaphalium chilense*  
 \**Trupanea californica*  
*Trupanea signata*
- Gnaphalium* sp.  
*Trupanea californica*  
 \**Trupanea imperfecta*  
*Trupanea jonesi*  
*Trupanea maculigera*
- Gossypium* sp.  
 \**Acinia fucata*  
 \**Euaresta bellula*  
 \**Euaresta stigmatica*  
 \**Neotephritis finalis*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*
- Grasses  
 \**Euaresta tapetis*  
 \**Euarestoides acutangula*  
 \**Eutreta pacifica*  
 \**Neotephritis finalis*  
 \**Orellia occidentalis*  
 \**Paracantha cultaris*  
 \**Paroxyna clathrata*  
 \**Procecidochares anthracina*  
 \**Tephritis webbi*  
 \**Trupanea californica*  
 \**Trupanea jonesi*
- Grindelia humilis*  
*Procecidochares grindeliae*
- Grindelia robusta*  
 \**Procecidochares grindeliae*
- Grindelia squarrosa*  
 \**Trupanea signata*
- Grindelia* sp.  
 \**Procecidochares grindeliae*  
*Tephritis araneosa*  
 \**Tephritis stigmatica*  
*Urophora formosa*
- Gutierrezia californica*  
 \**Dioxyna picciola*  
 \**Euaresta stigmatica*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea signata*  
 \**Urophora formosa*
- Gutierrezia microcephala*  
 \**Trupanea actinobola*  
 \**Trupanea imperfecta*  
 \**Urophora timberlakei*
- Gutierrezia sarothrae*  
*Aciurina aplopappi*

- \**Trupanea actinobola*  
 \**Urophora formosa*  
*Gutierrezia* sp.  
 \**Tephritis araneosa*  
 \**Tephritis ovatipennis*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea wheeleri*  
*Hackelia floribunda*  
 \**Orellia occidentalis*  
*Haplopappus acradenius*  
 \**Procecidochares minuta*  
 \**Trupanea nigricornis*  
*Haplopappus bloomeri*  
*Aciurina ferruginea*  
*Paroxyna murina*  
*Trupanea jonesi*  
*Haplopappus cooperi*  
 \**Aciurina aplopappi*  
 \**Procecidochares minuta*  
*Haplopappus ericoides*  
 \**Paroxyna corpulenta*  
*Haplopappus linearifolius*  
 \**Aciurina aplopappi*  
 \**Paroxyna americana*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
 \**Trupanea wheeleri*  
*Haplopappus pinitolius*  
*Aciurina aplopappi*  
*Haplopappus propinquus*  
 \**Urophora formosa*  
*Haplopappus venetus*  
 \**Euaresta aequalis*  
 \**Neaspilota brunneostigmata*  
*Trupanea femoralis*  
*Trupanea wheeleri*  
*Urophora formosa*  
*Haplopappus venetus* var. *vernonioides*  
*Neaspilota signifera*  
*Haplopappus* spp.  
*Aciurina bigeloviae*  
 \**Neotephritis finalis*  
 \**Procecidochares minuta*  
 \**Trupanea wheeleri*  
*Helianthella uniflora*  
*Neotephritis finalis*  
*Helianthus annuus*  
 \**Euarestoides acutangula*  
 \**Eutreta pacifica*  
*Paracantha cultaris*  
 \**Trupanea bisetosa*  
*Helianthus nuttallii*  
*Neotephritis finalis*  
*Helianthus petiolaris*  
 \**Neotephritis finalis*  
*Helianthus tuberosus*  
 \**Neotephritis finalis*  
*Helianthus* spp.  
 \**Euaresta aequalis*  
 \**Euarestoides acutangula*
- \**Eutreta pacifica*  
*Neotephritis finalis*  
*Paracantha cultaris*  
*Strauzia longipennis*  
*Trupanea bisetosa*  
 \**Trupanea californica*  
*Heliotropium curassavicum*  
 \**Trupanea radifera*  
*Hemizonia parryi*  
 \**Neaspilota signifera*  
*Hemizonia pungens*  
 \**Neaspilota signifera*  
*Trupanea bisetosa*  
*Trupanea femoralis*  
*Hemizonia* sp.  
 \**Trupanea femoralis*  
*Heracleum lanatum*  
*Euleia fratria*  
*Heterotheca grandiflora*  
 \**Neaspilota brunneostigmata*  
 \**Procecidochares minuta*  
*Trupanea femoralis*  
*Hieraceum* sp.  
*Trupanea actinobola*  
*Hordeum vulgare*  
 \**Procecidochares minuta*  
*Hosackia glabra*  
 \**Urophora formosa*  
*Hymenoclea salsola*  
 \**Euaresta stigmatica*  
 \**Euarestoides acutangula*  
 \**Trupanea actinobola*  
 \**Trupanea nigricornis*  
*Hyptis emoryi*  
 \**Euarestoides acutangula*  
 \**Trupanea imperfecta*  
*Iris hartwegii*  
 \**Tephritis araneosa*  
*Isomeris arborea*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
*Juglans californica*  
*Rhagoletis completa*  
*Juglans cinerea*  
*Rhagoletis completa*  
*Juglans hindsii*  
*Rhagoletis completa*  
*Juglans nigra*  
*Rhagoletis completa*  
*Juglans regia*  
*Rhagoletis completa*  
 \**Tomoplagia cressoni*  
*Juglans regia* × *hindsii*  
*Rhagoletis completa*  
*Juglans* sp.  
 \**Euaresta stigmatica*  
*Rhagoletis completa*  
*Juniperus occidentalis*  
*Paraterellia varipennis*  
*Juniperus* sp.  
 \**Aciurina ferruginea*  
 \**Orellia occidentalis*  
*Lactuca sativa*
- \**Trupanea femoralis*  
*Larrea divaricata*  
 \**Trupanea nigricornis*  
*Larrea* sp.  
 \**Euarestoides acutangula*  
 \**Neotephritis finalis*  
*Layia platyglossa*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
*Lepidium fremontii*  
 \**Euarestoides acutangula*  
*Lepidospartum squamatum*  
 \**Procecidochares minuta*  
 \**Tephritis araneosa*  
 \**Tephritis stigmatica*  
 \**Trupanea actinobola*  
 \**Trupanea femoralis*  
 \**Trupanea jonesi*  
 \**Trupanea radifera*  
 \**Trupanea signata*  
*Trupanea wheeleri*  
*Lepidospartum* sp.  
 \**Euarestoides acutangula*  
 \**Neaspilota brunneostigmata*  
 \**Trupanea imperfecta*  
 \**Trupanea radifera*  
*Libocedrus decurrens*  
 \**Tephritis ovatipennis*  
*Lomatium utriculatum*  
 \**Urophora formosa*  
*Lupinus* sp.  
 \**Neotephritis finalis*  
*Mahonia aquifolium*  
 \**Rhagoletis berberis*  
*Malacothrix* sp.  
 \**Trupanea radifera*  
*Medicago sativa*  
 \**Acinia fucata*  
 \**Euaresta aequalis*  
 \**Euaresta bellula*  
 \**Euaresta bullans*  
 \**Euaresta stigmatica*  
 \**Euaresta tapetis*  
 \**Euarestoides acutangula*  
 \**Eutreta pacifica*  
 \**Neaspilota signifera*  
 \**Neotephritis finalis*  
 \**Paracantha genalis*  
 \**Procecidochares stonei*  
 \**Tephritis stigmatica*  
 \**Trupanea actinobola*  
 \**Trupanea jonesi*  
 \**Trupanea nigricornis*  
 \**Trupanea radifera*  
 \**Trupanea wheeleri*  
*Melilotus indicus*  
 \**Euarestoides acutangula*  
*Melilotus* sp.  
 \**Trupanea bisetosa*  
 \**Trupanea nigricornis*  
*Mentzelia multiflora*  
 \**Neaspilota brunneostigmata*

- Mimulus* sp.  
   \**Trupanea radifera*  
*Monolopia major*  
   \**Euarestoides acutangula*  
   \**Neaspilota brunneostigmata*  
   \**Trupanea femoralis*  
   \**Trupanea jonesi*  
   \**Urophora formosa*  
*Oenanthe sarmentosa*  
   *Euleia fratria*  
*Olea europaea*  
   \**Euaresta bellula*  
*Oryza sativa*  
   \**Euarestoides acutangula*  
*Parsley, wild*  
   \**Urophora formosa*  
*Parthenium argentatum*  
   \**Euaresta bullans*  
   \**Trupanea californica*  
*Pastinaca sativa*  
   \**Euarestoides acutangula*  
   \**Euleia fratria*  
   \**Trupanea jonesi*  
*Pectis papposa*  
   \**Euaresta bellula*  
   \**Trupanea radifera*  
*Pectocarya* sp.  
   \**Tephritis araneosa*  
*Perezia microcephala*  
   *Tomoplagia cressoni*  
*Persea americana*  
   \**Euaresta stigmatica*  
*Peucephyllum schottii*  
   \**Euarestoides acutangula*  
*Phacelia distans*  
   \**Neaspilota signifera*  
*Phacelia* sp.  
   \**Euaresta tapetis*  
   \**Procecidochares minuta*  
   \**Trupanea californica*  
   \**Trupanea jonesi*  
*Phaseolus limensis*  
   \**Trupanea californica*  
*Phaseolus* sp.  
   \**Eutreta pacifica*  
*Phoradendron californicum*  
   \**Euarestoides acutangula*  
*Pinus contorta*  
   \**Neotephritis finalis*  
   \**Paroxyna variabilis*  
*Pinus coulteri*  
   \**Tephritis stigmatica*  
*Pinus jeffreyi*  
   \**Valentibulla californica*  
*Pinus lambertiana*  
   \**Tephritis stigmatica*  
*Pinus monophylla*  
   \**Trupanea radifera*  
*Pittosporum* sp.  
   \**Eutreta pacifica*  
   \**Neotephritis finalis*  
*Pluchea camphorata*  
   \**Euaresta aequalis*  
*Pluchea foetida*  
   *Acinia fucata*  
   *Pluchea imbricata*  
   *Acinia fucata*  
   *Pluchea purpurascens*  
   *Acinia fucata*  
   *Pluchea sericea*  
   *Acinia fucata*  
   \**Eutreta baccharis*  
   \**Trupanea actinobola*  
   \**Trupanea bisetosa*  
   \**Trupanea jonesi*  
   \**Trupanea nigricornis*  
   \**Trupanea radifera*  
   *Pluchea* sp.  
   *Acinia fucata*  
*Poa* sp.  
   \**Tephritis araneosa*  
*Polygonum lapathifolium*  
   \**Euaresta aequalis*  
*Polygonum* sp.  
   \**Euaresta aequalis*  
*Prenanthes canadense*  
   *Euleia fratria*  
*Prosopis juliflora* var. *Torreyana*  
   \**Euaresta stigmatica*  
*Prunus armeniaca*  
   \**Euaresta bullans*  
*Prunus avium*  
   *Rhagoletis cingulata indifferens*  
   *Rhagoletis fausta*  
*Prunus cerasus*  
   *Rhagoletis cingulata indifferens*  
   *Rhagoletis fausta*  
*Prunus emarginata*  
   \**Euaresta stigmatica*  
   \**Neotephritis finalis*  
   \**Paroxyna clathrata*  
   \**Procecidochares minuta*  
   *Rhagoletis cingulata indifferens*  
   *Rhagoletis fausta*  
   \**Rhagoletis ribicola*  
   \**Tephritis araneosa*  
   \**Trupanea californica*  
*Prunus mahaleb*  
   *Rhagoletis fausta*  
*Prunus pennsylvanica*  
   *Rhagoletis fausta*  
*Prunus persica*  
   \**Euaresta bullans*  
   \**Neotephritis finalis*  
   \**Paraterellia varipennis*  
   *Rhagoletis completa*  
   (?) *Tomoplagia cressoni*  
   \**Trupanea femoralis*  
*Prunus serotina*  
   *Rhagoletis fausta*  
*Prunus virginiana*  
   \**Neotephritis finalis*  
   *Rhagoletis fausta*  
*Prunus virginiana* var. *demissa*  
   \**Euarestoides acutangula*  
   \**Procecidochares minuta*  
*Prunus* sp.  
   \**Rhagoletis berberis*  
   *Rhagoletis cingulata indifferens*  
   \**Rhagoletis zephyria*  
   \**Trupanea jonesi*  
*Pyrus communis*  
   \**Euaresta bullans*  
*Quercus agrifolia*  
   \**Eutreta diana*  
*Quercus* sp.  
   \**Aciurina aplopappi*  
*Ranunculus* sp.  
   \**Paroxyna variabilis*  
*Raphanus sativus*  
   \**Eutreta pacifica*  
*Rhamnus californica*  
   \**Neaspilota brunneostigmata*  
   \**Trupanea radifera*  
*Rhus diversiloba*  
   \**Paroxyna variabilis*  
*Ribes* sp. (currant)  
   *Epochra canadensis*  
   *Rhagoletis ribicola*  
*Ribes* sp. (gooseberry)  
   *Epochra canadensis*  
   \**Procecidochares minuta*  
   *Rhagoletis ribicola*  
*Rosa* spp.  
   *Rhagoletis basiola*  
*Rubus* sp.  
   \**Orellia ruficauda*  
*Rumex* sp.  
   \**Euaresta aequalis*  
*Salix exigua*  
   \**Euarestoides acutangula*  
*Salix gooddingii*  
   \**Euaresta bellula*  
*Salix lasiolepis*  
   \**Paracantha gentilis*  
*Salix lemmonii*  
   \**Tephritis araneosa*  
*Salix* sp.  
   \**Euaresta aequalis*  
   \**Euaresta bellula*  
   \**Eutreta pacifica*  
   \**Neaspilota signifera*  
   \**Paracantha cultaris*  
   \**Paroxyna clathrata*  
   \**Procecidochares minuta*  
   \**Valentibulla californica*  
*Salsola altissima*  
   \**Trupanea nigricornis*  
*Salsola kali* var. *tenuifolia*  
   \**Euarestoides acutangula*  
   \**Neotephritis finalis*  
   \**Tephritis araneosa*  
   \**Trupanea bisetosa*  
   \**Trupanea femoralis*  
   \**Trupanea jonesi*  
   \**Trupanea nigricornis*  
*Salsola parviflora*  
   \**Neotephritis finalis*  
   \**Trupanea nigricornis*  
*Salsola* sp.

- \*Neotephritis finalis*  
*\*Trupanea nigricornis*  
*Sambucus* sp.  
*\*Euaresta bullans*  
*\*Procecidochares minuta*  
*\*Trupanea wheeleri*  
*Sapindus saponaria*  
*\*Euaresta stigmatica*  
*Sapindus* sp.  
*\*Euaresta bellula*  
*Schinus molle*  
*\*Euaresta aequalis*  
*\*Tephritis araneosa*  
*Senecio californicus*  
*Paroxyna genalis*  
*Senecio douglasii*  
*\*Aciurina trixa*  
*\*Dioxyna picciola*  
*\*Euaresta bellula*  
*\*Euaresta stigmatica*  
*\*Euarestoides acutangula*  
*\*Neaspilota signifera*  
*\*Neotephritis finalis*  
*\*Procecidochares minuta*  
*\*Tephritis araneosa*  
*Tephritis stigmatica*  
*\*Trupanea actinobola*  
*\*Trupanea bisetosa*  
*\*Trupanea femoralis*  
*\*Trupanea imperfecta*  
*\*Trupanea nigricornis*  
*\*Trupanea radifera*  
*\*Trupanea wheeleri*  
*Senecio integerrimus*  
*Tephritis stigmatica*  
*Senecio mikanioides*  
 (?) *Trypeta angustigena*  
*Senecio numinius*  
*\*Eutreta pacifica*  
*Senecio* sp.  
*Tephritis stigmatica*  
*\*Trupanea bisetosa*  
*\*Trupanea radifera*  
*Sesuvium sessile*  
*\*Euarestoides acutangula*  
*Sida hederacea*  
*\*Neaspilota brunneostigmata*  
*Sidalcea glaucescens*  
*\*Paroxyna clathrata*  
*Silybum marianum*  
*\*Orellia undosa*  
*Sisymbrium* sp.  
*\*Euarestoides acutangula*  
*Solanum douglasii*  
*\*Euaresta aequalis*  
*\*Tomoplagia cressoni*  
*Solanum eleagnifolium*  
*\*Trupanea californica*  
*Solanum tuberosum*  
*\*Euaresta aequalis*  
*\*Euaresta tapetis*  
*\*Paroxyna corpulenta*  
*\*Tephritis araneosa*  
*Solidago canadensis*  
*\*Euaresta aequalis*  
*Solidago canadensis* var. *arizonica*  
*\*Euarestoides acutangula*  
*Solidago chapmanii*  
*Trupanea actinobola*  
*Solidago confinis*  
*\*Euaresta stigmatica*  
*\*Paroxyna clathrata*  
*\*Tomoplagia cressoni*  
*Solidago occidentalis*  
*\*Euarestoides acutangula*  
*Solidago serotina*  
*Trupanea actinobola*  
*Solidago* sp.  
*Aciurina ferruginea*  
*\*Eutreta hespera*  
*\*Eutreta pacifica*  
*\*Procecidochares minuta*  
*Tephritis webbi*  
*Trupanea actinobola*  
*Sphaeralcea angustifolia*  
*\*Euarestoides acutangula*  
*\*Trupanea vicina*  
*Spinacia oleracea*  
*\*Eutreta pacifica*  
*\*Trupanea vicina*  
*Stanleya* sp.  
*\*Trupanea nigricornis*  
*Stephanomeria pauciflora*  
*\*Trupanea bisetosa*  
*Stizolobium* sp.  
*\*Euaresta aequalis*  
*Symphoricarpos albus*  
*Rhagoletis zephyria*  
*Symphoricarpos racemosus*  
*Rhagoletis zephyria*  
*Symphoricarpos* sp.  
*\*Trupanea californica*  
*Tagetes erecta*  
*Dioxyna picciola*  
*Tagetes* sp.  
*Trupanea vicina*  
*Tamarix gallica*  
*\*Euarestoides acutangula*  
*\*Trupanea nigricornis*  
*Tanacetum camphoratum*  
*\*Tephritis californica*  
*Tephritis candidipennis*  
*Tanacetum huronense*  
*Tephritis araneosa*  
*Tanacetum* sp.  
*\*Tephritis araneosa*  
*\*Tephritis candidipennis*  
*Taraxacum* sp.  
*\*Trupanea nigricornis*  
*Thurberia* sp.  
*\*Trupanea californica*  
*Trausversa bipinnatifida*  
*\*Euaresta bellula*  
*Trifolium repens*  
*\*Neaspilota signifera*  
*Triticum aestivum*  
*\*Euarestoides acutangula*  
*\*Procecidochares minuta*  
*\*Trupanea jonesi*  
*\*Valentibulla californica*  
*Vaccinium* sp.  
*Rhagoletis tabellaria*  
*Valeriana edulis*  
*\*Neotephritis finalis*  
*Verbena* sp.  
*\*Euarestoides acutangula*  
*\*Neotephritis finalis*  
*\*Trupanea bisetosa*  
*\*Trupanea nigricornis*  
*Viburnum tinus*  
*\*Euarestoides acutangula*  
*Viburnum* sp.  
*\*Eutreta baccharis*  
*\*Urophora formosa*  
*Viguiera laciniata*  
*Procecidochares minuta*  
*Procecidochares stonei*  
*Vitis* sp.  
*\*Euaresta aequalis*  
*Wislizenia refracta*  
*\*Neaspilota signifera*  
*\*Paroxyna clathrata*  
*Wyethia helenioides*  
*Neotephritis finalis*  
*Wyethia mollis*  
*Neotephritis finalis*  
*Wyethia* sp.  
*Neotephritis finalis*  
*\*Paroxyna clathrata*  
*Trupanea jonesi*  
*Xanthium canadense*  
*\*Euaresta aequalis*  
*\*Euarestoides acutangula*  
*Xanthium pennsylvanicum*  
*\*Euaresta aequalis*  
*\*Eutreta pacifica*  
*Xanthium spinosum*  
*Euaresta bullans*  
*Xanthium* sp.  
*\*Euaresta aequalis*  
*\*Euaresta stigmatica*  
*Euarestoides acutangula*  
*Yucca schidigera*  
*\*Euarestoides acutangula*  
*\*Trupanea nigricornis*  
*Yucca* sp.  
*\*Euaresta stigmatica*  
*Zea mays*  
*\*Euaresta aequalis*  
*\*Neotephritis finalis*



## TRAP RECORD

This record lists species of flies caught in California by the various baits. In many fly trap collections, data on the type of trap is fragmentary; hence, these collections are not included in the following lists.

### Ammonium carbonate (Frick Trap)

*Chetostoma californica*  
*Epochra canadensis*  
*Euaresta aequalis*  
*Euaresta bullans*  
*Euaresta stigmatica*  
*Euarestoides acutangula*  
*Euarestoides arnaudi*  
*Euleia fratria*  
*Eutreta baccharis*  
*Eutreta diana*  
*Eutreta pacifica*  
*Neotephritis finalis*  
*Neotephritis inornata*  
*Orellia occidentalis*  
*Paracantha genalis*  
*Paracantha gentilis*  
*Paraterellia varipennis*  
*Paraterellia ypsilon*  
*Procecidochares anthracina*  
*Procecidocharoides flavissima*  
*Rhagoletis basiola*  
*Rhagoletis berberis*  
*Rhagoletis cingulata indifferens*  
*Rhagoletis completa*  
*Rhagoletis fausta*  
*Rhagoletis ribicola*  
*Rhagoletis tabellaria*  
*Rhagoletis zephyria*  
*Tephritis araneosa*  
*Tephritis californica*

*Tephritis ovatipennis*  
*Tephritis stigmatica*  
*Tomoplagia cressoni*  
*Trupanea actinobola*  
*Trupanea bisetosa*  
*Trupanea californica*  
*Trupanea femoralis*  
*Trupanea signata*  
*Trupanea wheeleri*  
*Trypeta angustigena*

### Ammonium chloride or anisyl acetone (Melon Fly Trap)

*Dioxyina picciola*  
*Epochra canadensis*  
*Euaresta bellula*  
*Euaresta bullans*  
*Euaresta stigmatica*  
*Euarestoides acutangula*  
*Eutreta baccharis*  
*Tephritis araneosa*  
*Trupanea bisetosa*  
*Trupanea femoralis*  
*Trupanea nigricornis*  
*Trupanea pseudovicina*  
*Trupanea radifera*  
*Trupanea wheeleri*

### Anethol-eugenol (Japanese Beetle Trap)

*Paroxyna americana*

### Brown sugar, yeast, pyridine (Mexican Fruit Fly Trap)

*Anastrepha ludens*  
*Chetostoma californica*  
*Dacus cucurbitae*  
*Epochra canadensis*  
*Euaresta aequalis*  
*Euaresta stigmatica*  
*Euarestoides acutangula*  
*Eutreta baccharis*  
*Eutreta pacifica*  
*Neotephritis finalis*  
*Paraterellia ypsilon*  
*Rhagoletis completa*  
*Rhagoletis fausta*  
*Tephritis araneosa*  
*Tephritis californica*  
*Tephritis ovatipennis*  
*Tomoplagia cressoni*  
*Trupanea actinobola*  
*Trupanea jonesi*  
*Trupanea pseudovicina*  
*Trupanea wheeleri*

### Citronella (Oriental Fruit Fly Trap)

*Tephritis californica*  
*Tomoplagia cressoni*  
*Trupanea jonesi*  
*Trupanea signata*  
*Trupanea wheeleri*

Dimalt (Codling Moth Trap)	<i>Paroxyna americana</i>	<i>Euaresta aequalis</i>
<i>Neotephritis finalis</i>	<i>Tephritis araneosa</i>	<i>Euaresta bellula</i>
<i>Trupanea wheeleri</i>	<i>Trupanea bisetosa</i>	<i>Euaresta stigmatica</i>
Glycine lye (Walnut Husk Fly Bait Pan)	<i>Trupanea femoralis</i>	<i>Euarestoides acutangula</i>
<i>Euaresta stigmatica</i>	<i>Trupanea pseudovicina</i>	<i>Eutreta baccharis</i>
<i>Rhagoletis basiola</i>	<i>Trupanea wheeleri</i>	<i>Eutreta pacifica</i>
<i>Rhagoletis completa</i>	Rotary	<i>Neotephritis finalis</i>
Light	<i>Euarestoides acutangula</i>	<i>Paracantha cultaris</i>
<i>Euaresta bullans</i>	<i>Trupanea pseudovicina</i>	<i>Paraterellia ypsilon</i>
<i>Euarestoides acutangula</i> (black fluorescent)	<i>Trupanea signata</i>	<i>Rhagoletis completa</i>
<i>Tomoplagia cressoni</i> (black)	Sig lure, anisylacetone, methyl eugenol (Multiple Purpose Fruit Fly Trap)	<i>Rhagoletis zephyria</i>
<i>Trupanea actinobola</i> (argon)	<i>Aciurina thoracica</i>	<i>Tephritis araneosa</i>
<i>Trupanea bisetosa</i> (argon)	<i>Dacus dorsalis</i>	<i>Tephritis californica</i>
<i>Trupanea jonesi</i> (house light)	<i>Paroxyna americana</i>	<i>Tephritis ovatipennis</i>
<i>Trupanea nigricornis</i> (unspecified, black)	<i>Trupanea jonesi</i>	<i>Tomoplagia cressoni</i>
<i>Trypeta angustigena</i> (unspecified)	Staley's Insecticide Bait No. 7 (SIB-7) (Mexican Fruit Fly Trap)	<i>Trupanea bisetosa</i>
Methyl eugenol (Oriental Fruit Fly Trap)	<i>Anastrepha ludens</i>	<i>Trupanea conjuncta</i>
<i>Dacus dorsalis</i>	<i>Chetostoma californica</i>	<i>Trupanea femoralis</i>
Oil of angelica or Sig lure (Mediterranean Fruit Fly Trap)	<i>Cryptotreta pallida</i>	<i>Trupanea jonesi</i>
<i>Euleia fratria</i>	<i>Dacus dorsalis</i>	<i>Trupanea nigricornis</i>
	<i>Dioxyna picciola</i>	<i>Trupanea signata</i>
	<i>Epochra canadensis</i>	<i>Trupanea wheeleri</i>
		Unspecified
		<i>Eutreta baccharis</i>

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- grindeliae* Aldrich, *Procecidochares*, 52  
(*hebes* Curran, *Trypanea*) = *Trupanea radifera* (Coquillett)
- hespera* Banks, *Eutreta*, 29  
(*humilis* Loew, *Trypeta*) = *Dioxya picciola* (Bigot)
- imperfecta* (Coquillett), *Trupanea*, 80  
(*inermis* Robineau-Desvoidy, *Strauzia*) = *Strauzia longipennis* (Wiedemann)
- inornata* (Coquillett), *Neotephritis*, 37
- intermedia* Loew, *Strauzia longipennis* var., 63
- jonesi* Curran, *Trupanea*, 81
- labecula* Foote, *Tephritis*, 69  
(*liogaster* Thomson, *Trypeta*) = *Euleia fratria* (Loew)
- longipennis* (Wiedemann), *Strauzia*, 63
- longitudinalis* Loew, *Strauzia longipennis* var., 63
- ludens* (Loew), *Anastrepha*, 12  
(*lunifera* Hering, *Epochra*) = *Epochra canadensis* (Loew)
- maculata* (Cole), *Aciurina*, 9
- maculigera* Foote, *Trupanea*, 83
- mendax* Curran, *Rhagoletis*, 62  
(*microsetulosa* Malloch, *Trypanea*) = *Trupanea californica* Malloch  
(*microstigma* Curran, *Trypanea*) = *Trupanea jonesi* Curran  
(*mimetica* Malloch, *Paracantha*) = *Paracantha gentilis* Hering
- minuta* (Snow), *Procecidochares*, 52  
(*mundula* Coquillett, *Euaesta*) = *Valentibulla californica* (Coquillett)
- murina* (Doane), *Paroxyna*, 49
- Myoleja* Rondani, 5, 32  
*unifasciata* Blanc and Foote, 32
- Neaspilota* Osten Sacken, 5, 33  
*brunneostigmata* Doane, 33  
*signifera* (Coquillett), 34  
*wilsoni* Blanc and Foote, 35
- Neotephritis* Hendel, 6, 35  
*finalis* (Loew), 35  
*inornata* (Coquillett), 37
- nigricornis* (Coquillett), *Trupanea*, 83
- obliqua* (Say), *Tomoplagia*, 72, 73  
(*occidentalis* Adams, *Urellia*) = *Trupanea femoralis* (Thomson)
- occidentalis* (Snow), *Orellia*, 38
- ochraspis* (Wiedemann), *Rhagoletis*, 55
- opacipennis* Foote, *Tephritis*, 69
- oregona* Curran, *Eutreta*, 30
- Orellia* Robineau-Desvoidy, 5, 38  
*occidentalis* (Snow), 38  
*ruficauda* Fabricius, 39  
*undosa* (Coquillett), 39
- ovatipennis* Foote, *Tephritis*, 69
- Oxya* Robineau-Desvoidy, 6, 40  
*aterrima* (Doane), 40  
*palpalis* (Coquillett), 41  
*utahensis* Quisenberry, 41  
(*obscuripennis* Snow, *Tephritis*) = *Paroxyna snowi* Hering  
(*pacifica* Curran, *Aciurina*) = *Aciurina maculata* (Cole)
- pacifica* Curran, *Eutreta*, 30  
(*pacifica* Doane, *Urellia*) = *Tephritis araneosa* (Coquillett)
- pallida* (Cole), *Cryptotreta*, 14
- palpalis* (Coquillett), *Oxya*, 41
- Paracantha* Coquillett, 6, 41  
*cultaris* (Coquillett), 42  
*genalis* Malloch, 42  
*gentilis* Hering, 43  
*Paraterellia* Foote, 5, 44  
*superba* Foote, 44  
*varipennis* (Coquillett), 45  
*ypsilon* Foote, 45
- Paroxyna* Hendel, 2, 6, 46  
*americana* Hering, 46  
*clathrata* (Loew), 47  
*corpulenta* (Cresson), 48  
*genalis* (Thomson), 48  
*murina* (Doane), 49  
*snowi* Hering, 49  
*variabilis* (Doane), 50
- penelope* (Osten Sacken), *Procecidocharoides*, 54
- perfecta* Loew, *Strauzia longipennis* var., 63
- picciola* (Bigot), *Dioxya*, 16
- pollinosa* Curran, *Eutreta*, 32
- pomonella* (Walsh), *Rhagoletis*, 62, 63
- Procecidochares* Hendel, 2, 5, 50  
*anthracina* (Doane), 51  
*flavipes* Aldrich, 51  
*grindeliae* Aldrich, 52  
*minuta* (Snow), 52  
*stonei* Blanc and Foote, 53
- Procecidocharoides* Foote, 5, 54  
*flavissima* Foote, 54  
*penelope* (Osten Sacken), 54
- pseudovicina* Hering, *Trupanea*, 84
- radifera* (Coquillett), *Trupanea*, 85
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*berberis* Curran, 56  
*cerasi* (Linnaeus), 55  
*cingulata indifferens* Curran, 57  
*completa* Cresson, 58  
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*mendax* Curran, 62  
*ochraspis* (Wiedemann), 55  
*pomonella* (Walsh), 62, 63  
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- signatipennis* Foote, *Tephritis*, 71
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- sparsa* (Wiedemann), *Eutreta*, 29, 30  
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- Strauzia* Robineau-Desvoidy, 5, 63  
*longipennis* (Wiedemann), 63
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*superba* Foote, *Paraterellia*, 44  
(*symplicarcarpi* Curran, *Rhagoletis*) = *Rhagoletis zephyria* Snow
- tabellaria* (Fitch), *Rhagoletis*, 61
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*arizonensis* Quisenberry, 67  
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*candidipennis* Foote, 68  
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*signatipennis* Foote, 71  
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- (*texana* Hering, *Trypanea*) = *Trupanea pseudovicina* Hering
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- thoracica* Curran, *Aciurina*, 9
- thurmanae* Foote, *Valentibulla*, 91
- timberlakei* Blanc and Foote, *Urophora*, 90
- Tomoplagia* Coquillett, 6, 72  
*cressoni* Aczél, 73  
*obliqua* (Say), 72, 73
- trilitura* Blanc and Foote, *Aciurina*, 10  
(*trimaculata* Macquart, *Tephritis*) = *strauxia longipennis* (Wiedemann)
- trixa* Curran, *Aciurina*, 11
- Trupanea* Guettard, 6, 73  
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*arizonensis* Malloch, 75  
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*conjuncta* (Adams), 78  
*femoralis* (Thomson), 79  
*imperfecta* (Coquillett), 80  
*jonesi* Curran, 81  
*maculigera* Foote, 83  
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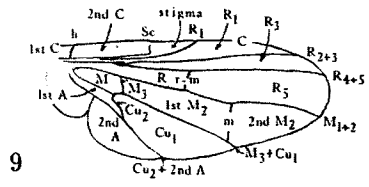
- Trypeta* Meigen, 2, 5, 88  
   *angustigena* Foote, 88  
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*unifasciata* Blanc and Foote, *Myoleja*, 32  
*Urophora* Robineau-Desvoidy, 2, 5, 89  
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*utahensis* Quisenberry, *Oxyna*, 41
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*vittigera* Loew, *Strauzia longipennis* var., 63
- vulnerata* (Loew), *Stenopa*, 63  
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## FIGURES 9-118

## Wing Patterns of California Tephritidae

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Fig. 11. *Aciurina aplopappi* (Coquillett), ♀  
Fig. 12. *Aciurina bigeloviae* (Cockerell), ♀  
Fig. 13. *Aciurina ferruginea* (Doane), ♂  
Fig. 14. *Aciurina maculata* (Cole), ♀  
Fig. 15. *Aciurina thoracica* Curran, ♂  
Fig. 16. *Aciurina trilitura* Blanc and Foote, ♀  
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Fig. 23. *Dioxyna picciola* (Bigot), ♀  
Fig. 24. *Epochra canadensis* (Loew), ♂  
Fig. 25. *Euaresta aequalis* (Loew), ♀  
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Fig. 27. *Euaresta bullans* (Wiedemann), ♂  
Fig. 28. *Euaresta stigmatica* Coquillett, ♀  
Fig. 29. *Euaresta tapetis* (Coquillett), ♂  
Fig. 30. *Euarestoides acutangula* (Thomson), ♂  
Fig. 31. *Euarestoides arnaudi* Foote, ♂  
Fig. 32. *Euleia fratria* (Loew), ♀



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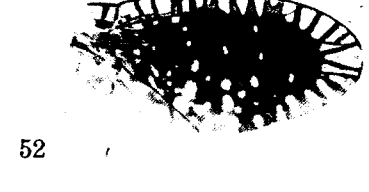
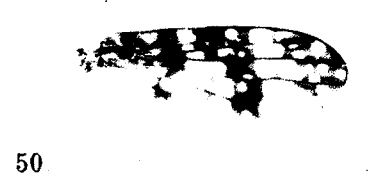
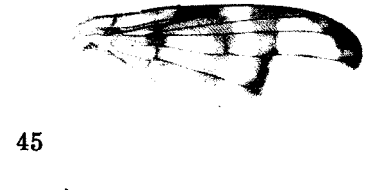
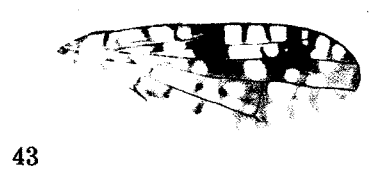
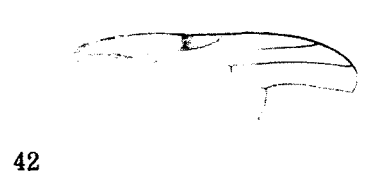
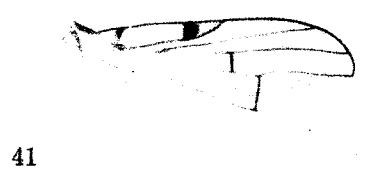
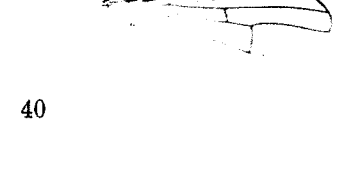
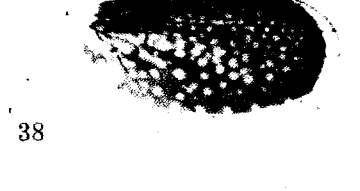
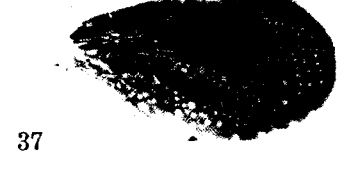
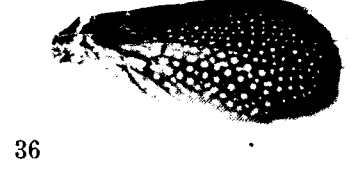
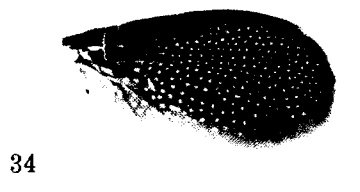
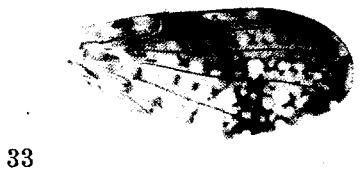
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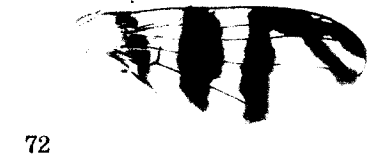
## Wing Patterns of California Tephritidae (Continued)

- Fig. 33. *Eutreta baccharis* (Coquillett), ♀  
Fig. 34. *Eutreta diana* (Osten Sacken), ♀  
Fig. 35. *Eutreta hespera* Banks, ♂  
Fig. 36. *Eutreta oregona* Curran, ♀  
Fig. 37. *Eutreta pacifica* Curran, ♂  
Fig. 38. *Eutreta pollinosa* Curran, ♀  
Fig. 39. *Myoleja unifasciata* Blanc and Foote, ♀  
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Fig. 45. *Orellia occidentalis* (Snow), ♀  
Fig. 46. *Orellia ruficauda* (Fabricius), ♀  
Fig. 47. *Orellia undosa* (Coquillett), ♀  
Fig. 48. *Oxyna aterrима* (Doane), ♀  
Fig. 49. *Oxyna palpalis* (Coquillett), ♂  
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Fig. 51. *Paracantha cultaris* (Coquillett), ♂  
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Fig. 55. *Paraterellia varipennis* (Coquillett), ♀  
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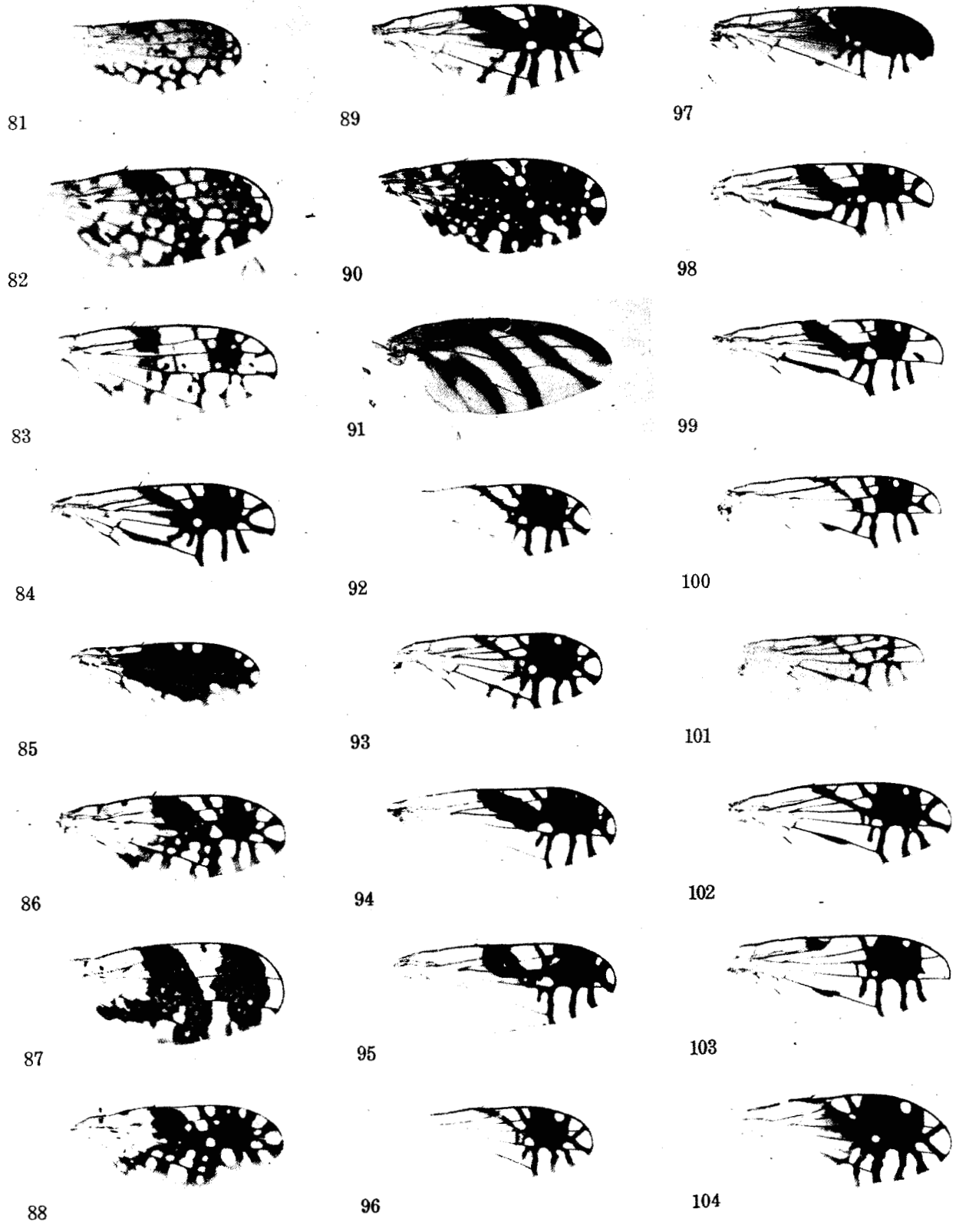
## Wing Patterns of California Tephritidae (Continued)

- Fig. 57. *Paroxyna americana* Hering, ♀  
Fig. 58. *Paroxyna clathrata* (Loew), ♂  
Fig. 59. *Paroxyna corpulenta* (Cresson), ♂  
Fig. 60. *Paroxyna genalis* (Thomson), ♂  
Fig. 61. *Paroxyna murina* (Doane), ♀  
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Fig. 63. *Paroxyna variabilis* (Doane), ♀  
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Fig. 66. *Procecidochores grindeliae* Aldrich, ♀  
Fig. 67. *Procecidochores minuta* (Snow), ♀  
Fig. 68. *Procecidochores stonei* Blanc and Foote, ♀  
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Fig. 75. *Rhagoletis ribicola* Doane, ♀  
Fig. 76. *Rhagoletis tabellaria* (Fitch), ♀  
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Fig. 78. *Stenopa vulnerata* (Loew), ♀  
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Fig. 80. *Tephritis araneosa* (Coquillett), ♀



## Wing Patterns of California Tephritidae (Continued)

- Fig. 81. *Tephritis arizonensis* Quisenberry, ♂  
Fig. 82. *Tephritis californica* Doane, ♀  
Fig. 83. *Tephritis candidipennis* Foote, ♀  
Fig. 84. *Tephritis labecula* Foote, ♀  
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Fig. 92. *Trupanea actinobola* (Loew), ♀  
Fig. 93. *Trupanea arizonensis* Malloch, ♀  
Fig. 94. *Trupanea bisetosa* (Coquillett), ♀  
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Fig. 96. *Trupanea californica* Malloch, ♀  
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Fig. 102. *Trupanea jonesi* Curran, ♀  
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## Wing Patterns of California Tephritidae (Continued)

- Fig. 105. *Trupanea nigricornis* (Coquillett), ♂  
Fig. 106. *Trupanea pseudovicina* Hering, ♀  
Fig. 107. *Trupanea radifera* (Coquillett), ♀  
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Fig. 116. *Valentibulla californica* (Coquillett), ♀  
Fig. 117. *Valentibulla thurmanae* Foote, ♀  
Fig. 118. *Xenochaeta dichromata* Snow, ♂

