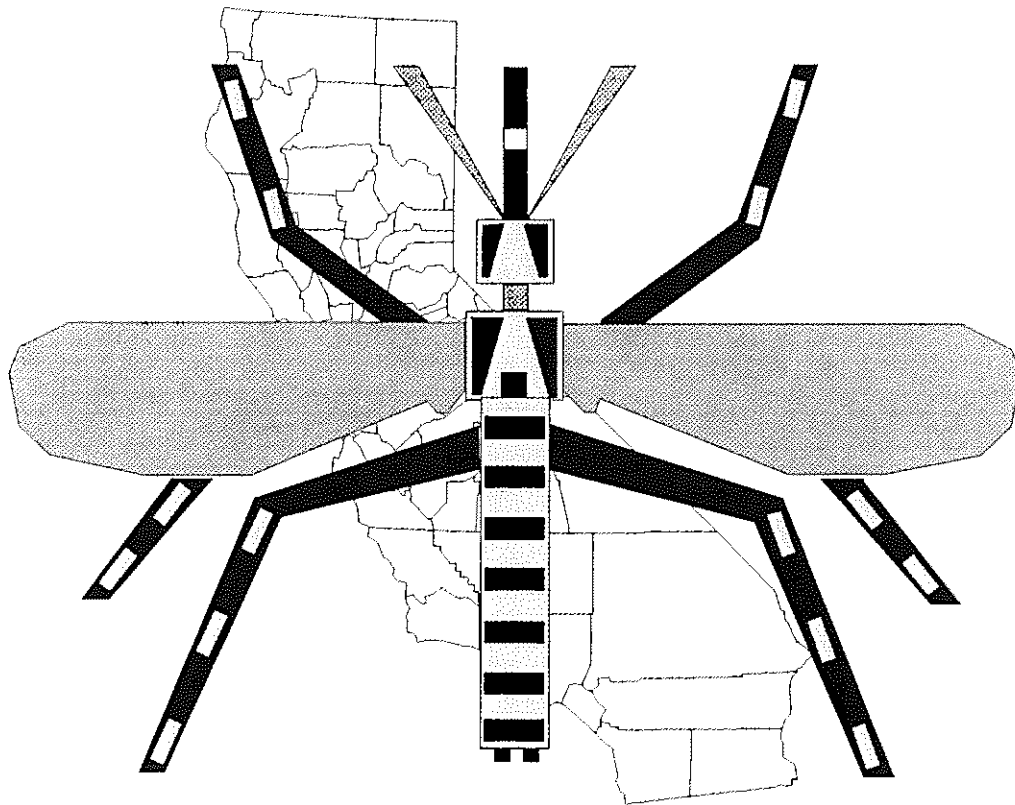


IDENTIFICATION OF THE  
*MOSQUITOES*  
OF  
*CALIFORNIA*

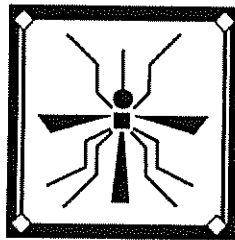


MOSQUITO AND VECTOR CONTROL ASSOCIATION OF CALIFORNIA  
8633 Bond Road  
Sacramento, California 95624  
Revised 1998

***IDENTIFICATION OF THE  
MOSQUITOES  
OF  
CALIFORNIA***

by

**RICHARD P. MEYER, PH.D  
and  
STEPHEN L. DURSO**



**MVC**  

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**ASSOCIATION  
of CALIFORNIA**

MOSQUITO AND VECTOR CONTROL ASSOCIATION OF CALIFORNIA  
8633 BOND ROAD  
SACRAMENTO, CALIFORNIA 95624  
Revised 1998

This is a publication of the  
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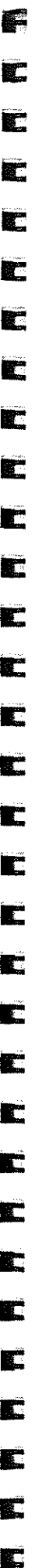
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## PREFACE

The Mosquito and Vector Control Association of California publishes printed materials to assist vector control and health care personnel with the identification of mosquitoes known to occur within the state of California. This manual entitled *Identification of the Mosquitoes of California*, includes fully illustrated adult and larval keys, statewide distributional data, and biological information on all 52 currently recognized mosquito species indigenous to the state of California.

A companion series of four regional guides, entitled *Guide to the Common Mosquitoes of California: Volumes I-IV*, provides similar information for the most commonly encountered mosquitoes in each of four regions of the state. The four regional guides include: I. Coastal California, II. Cascades and Eastern Sierras, III. Central Valley and Western Sierras, and IV. Southern California.

The Mosquito and Vector Control Association of California recommends that both the statewide identification manual and appropriate regional guides be available to personnel involved with routine mosquito identifications.



## INTRODUCTION

Vector control agencies throughout California are extending their services to rural environs in response to urban and periurban increases in population growth. Rural environs characteristically support a greater diversity of mosquitoes and other vectors of human and veterinary disease agents than do urban situations. In response to the necessity of increased rural surveillance, vector control agencies will be encountering vectors not normally associated with previous service demands. The current mosquito identification manual, *A Field Guide to the Common Mosquitoes of California* published in 1959, identifies a select group of common species and does not include some of those species that will be encountered as surveillance efforts are expanded. Therefore, a revised mosquito identification manual was needed to provide vector control personnel with the means to identify "new" species as they are encountered.

This manual was created to provide up-to-date and fully illustrated keys to all of the mosquitoes of California. Keys in this manual were prepared to be used by entomologists or technical staff using adult and larval characters that can be examined with a dissecting microscope under a magnification range of 10 to 100X. The couplets used in the keys are illustrated and show the character or array of characters commonly used to separate species into either common groups or from one another. Users of this manual should be aware that it is nearly impossible to produce keys that can "identify" all the specimens they encounter. Within any species population, there are individuals that exhibit morphological characters that vary dramatically from those that typify normal individuals. These specimens may be misidentified or unidentifiable using the keys in this manual. Therefore, when faced with a questionable determination, the user should refer to other references to assist with the identification process or have the specimen examined by an experienced mosquito taxonomist.

Before attempting to identify specimens, it is recommended that the user become familiar with the anatomical characters and terms used in the keys. Figures of a stylized adult female and a mature culicine larva have been included at the beginning of the adult female and larval keys to illustrate the anatomical terms used in the keys. Also, there is an in-depth glossary of terms used in the keys at the back of the manual to assist the user with definitions and descriptions of anatomical terminology. For individuals using these keys for the first time, it is recommended that they begin by attempting to identify familiar genera (e.g., *Aedes*, *Anopheles*, *Culex*, etc.) that are easily recognized without the aid of a microscope. This will build confidence in learning the terminology and style of the keys. After examining several different genera, the first time user should practice by identifying species common to their area (e.g., *Anopheles freeborni* Aitken, *Aedes melanimon* Dyar, *Culex tarsalis* Coquillett, etc.).

Additional features of this manual are the inclusion of distributional and taxonomic notes among the key couplets, expanded taxonomic and biological notes on all species, and updated and regrouped species distribution tables. These features should aid in identification of questionable or suspect specimens by allowing the identifier to check both the known or probable distribution and biological habitat of a species with the collection locale.

The 1959 identification manual and its 1963 revision entitled *A Field Guide to the Common Mosquitoes of California* indicated that there were 43 species known to occur in the state, of which 25 were selected for inclusion in the keys. That revision included a number of changes in nomenclature and taxonomic revisions since the publication of *The Mosquitoes of California* by Freeborn and Bohart in 1951. These included changing the name of the "banded foul water mosquito", *Culex stigmatosoma* Dyar, to *Culex peus* Speiser and the renaming of *Culiseta maccrackena* Dyar and Knab to *Culiseta particeps* (Adams). Also, the western subspecies of the *Anopheles pseudopunctipennis* Theobald complex, *Anopheles franciscanus* McCracken, was listed as a distinct species.

Significant changes in the nomenclature and taxonomy of California's mosquitoes were incorporated in the 1978 publication of *Mosquitoes of California* by Bohart and Washino. That publication increased the number of known California species to 47 including the record of a single female *Aedes atropalpus*

(Coquillett) from Folsom in 1969. Among the changes incorporated into that publication were: 1) the formal acceptance of *Anopheles franciscanus* as a distinct species. 2) *Orthopodomyia californica* Bohart was considered to be conspecific and therefore synonymized with *Orthopodomyia signifera* (Coquillett), 3) Southern California populations of the *Psorophora confinnis* (Lynch Arribalzaga) complex were changed to *Psorophora columbiae* (Dyar and Knab), 4) a change in the generic nomenclature of *Mansonia* resulted in the renaming of *Mansonia perturbans* (Walker) as *Coquillettidia perturbans* (Walker), and 5) *Aedes hemiteus* Dyar was challenged as not being taxonomically distinct from *Aedes cinereus* Meigen, but was successfully defended and to date retains its name. Taxonomic studies of desert populations of the western treehole mosquito, *Aedes sierrensis* (Ludlow), revealed the existence of a "new" species that was subsequently given full species status as *Aedes deserticola* Zavortink.

Ongoing taxonomic changes within the *Culex pipiens* complex have created confusion as to the species status of the "northern and southern house mosquitoes". At various times and according to different publications, both taxa have been treated as either subspecies of a single complex under the names *Culex pipiens pipiens* Linnaeus and *Culex pipiens quinquefasciatus* Say or as separate species under the names *Culex pipiens* Linnaeus and *Culex quinquefasciatus* Say. It is not unusual for both sets of nomenclature to be used in contemporary publications or even within the same publication. Today, however, most taxonomists favor presenting the "northern and southern house mosquitoes" as separate species under the names *Culex pipiens* and *Culex quinquefasciatus*, respectively.

California currently supports 53 recognized species of mosquitoes that are distributed among four major and four minor genera with over one-half of the species in the genus *Aedes*. A review of the literature and examination of museum material has recently resulted in name changes of two widely recognized species. The name *Aedes tahoensis* Dyar now applies to the Sierra Nevada populations of *Aedes communis* (De Geer) and *Culex peus* has been changed back to *Culex stigmatosoma*. Recent additions to the state's mosquito fauna include the discovery of *Aedes thelcter* Dyar, *Aedes purpureipes* Aitken, and *Culex erraticus* (Dyar and Knab) from the lower Colorado River and Salton Sea. Chromosomal studies of *Anopheles freeborni* populations revealed the existence of a closely related sibling, *Anopheles hermsi* Barr and Guptavanji, in southern California and statewide electrophoretic studies of *Aedes increpitus* Dyar populations indicate that this species actually consists of a complex of three species. Geographically, *Aedes washinoi* Lanzaro and Eldridge is restricted to the Pacific coastal regions and along the Cascades southward to Nevada County, *Aedes clivis* Lanzaro and Eldridge to the western slopes of the Sierra Nevadas and Cascades, and *Aedes increpitus* to the eastern slopes of the Sierra Nevadas, Cascades, and Modoc Plateau. In addition, an unpublished electrophoretic study comparing different North, Central, and South American populations of the *Psorophora confinnis* complex suggests that *Psorophora columbiae* from the deserts of southeastern California may be a northern extension of the Mexican *Psorophora toltecum* Dyar and Knab. Future genetic studies (whether they be cytological, hybridization, or electrophoretic) may result in still "newer" findings and subsequent changes in the taxonomic status of California's mosquitoes.

The discovery of *Ae. purpureipes* and *Ae. thelcter* along the lower Colorado River demonstrates that our border areas should not be overlooked and should, indeed, be collected more thoroughly for new records and range extensions. Intensive searches in northern Siskiyou and Del Norte Counties will likely result in the discovery of *Culiseta minnesotae* (Barr). To the south along our borders with Arizona and Baja California, there exists the possibility of encountering locally sparse populations of *Aedes sollicitans* (Walker), *Aedes trivittatus* (Coquillett), and *Psorophora howardi* Coquillett. Some populations of these species are found just to the east in western and south-central Arizona and to the south in northern Sonora and Baja California, Mexico.

Human activity, changes in agricultural practices, and changes in global climatic patterns could result in the establishment of other species "fortuitously" introduced into California similar to the record of a single female *Aedes atropalpus* collected near Folsom in 1969. Coastal vector control agencies should be prepared for the possible introduction of foreign or exotic species such as the "Asian tiger mosquito", *Aedes albopictus* (Skuse), and the "yellow fever mosquito", *Aedes aegypti* (Linnaeus).

## ACKNOWLEDGEMENTS

The completion of this manual was achieved through the cooperative efforts of many individuals. The authors extend our sincerest thanks and appreciation to the following individuals for their efforts in making the publication of this manual a reality:

Members of the Mosquito and Vector Control Association of California Entomology and Publications Committees, both past and present, who have offered helpful comments throughout the many drafts, especially Dr. M.S. Dhillon who initiated this work and Drs. B.L. Eldridge, W.K. Reisen, J.P. Webb, and V.L. Kramer who provided constructive critical reviews of the final draft.

Numerous workers from various California Mosquito and Vector Control Districts, County Health Departments, University of California research laboratories, and Environmental Management Branch of the State Department of Health Services provided critical information needed to update the species distribution tables. We are especially grateful to Drs. G.C. Lanzaro and B.L. Eldridge for clarifying the current status of the *Aedes increpitus* complex in California.

The Board of Directors and Officers of the American Mosquito Control Association graciously granted their permission to reprint figures from *Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico* by R.F. Darsie and R.A. Ward. The Regents of the University of California similarly granted their permission to reprint figures from *Mosquitoes of North America (North of Mexico)* ©1955 by S.J. Carpenter and W.J. LaCasse. Drs. R.M. Bohart and R.K. Washino and the University of California Division of Agricultural and Natural Resources also allowed the use of figures from their *Mosquitoes of California*.

The Board of Directors and Officers of the Mosquito and Vector Control Association of California who recognized the need for and supported revision of the aging identification manual. Finally, the Boards of Trustees and Managers of our respective Districts were likewise quite supportive in our efforts to do so.

## ADDITIONAL READING

For advanced study, more definitive identification, and increased biological histories, reference may be made to the publications listed below:

- Bohart, R.M. and R.K. Washino. 1978. *Mosquitoes of California*. Third Edition. Univ. Calif. Div. Agr. Sci., Berkeley, Publ. 4084, 153 pp.
- Carpenter, S.J. and W.J. LaCasse. 1955. *Mosquitoes of North America (North of Mexico)*. Univ. Calif. Press, Berkeley, vi + 360 pp., 127 pl.
- Darsie, R.F., Jr. and R.A. Ward. 1981. *Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico*. Mosq. Syst. Suppl. 311 pp.
- Harbach, R.E. and K.L. Knight. 1980. *Taxonomist's Glossary of Mosquito Anatomy*. Marlton, Plexus Publ. Inc., xi + 415 pp.
- Knight, K.L. 1978. *Supplement to a Catalog of the Mosquitoes of the World (Diptera: Culicidae)*. Thomas Say Found. Vol. 6, Suppl., 107 pp.
- Knight, K.L. and A. Stone. 1977. *A Catalog of the Mosquitoes of the World (Diptera: Culicidae)*. Thomas Say Found. Vol. 6, 611 pp.
- Loomis, E.C. (Editor) 1959. *A Field Guide to Common Mosquitoes of California*. Calif. Mosq. Control Assoc., Entomol. Comm., 26 pp.
- Wood, D.M., P.T. Dang, and R.A. Ellis. 1979. *The Mosquitoes of Canada (Diptera: Culicidae)*. Series: *The Insects and Arachnids of Canada. Part 6*. Biosystematics Research Institute, Canada Dept. Agr. Publ. 1686, 390 pp.

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 THE MOSQUITOES OF CALIFORNIA
 

---

Genus *Aedes* MeigenSubgenus *Ochlerotatus* Lynch Arribalzaga

- \* *atropalpus* (Coquillett)
  - bicristatus* Thurman and Winkler
  - campestris* Dyar and Knab
  - cataphylla* (Dyar)
  - clivis* Lanzaro and Eldridge
  - deserticola* Zavortink
  - dorsalis* (Meigen)
  - fitchii* (Felt and Young)
  - flavescens* (Muller)
  - hexodontus* Dyar
  - increpitus* Dyar
  - melanimon* Dyar
  - nigromaculis* (Ludlow)
  - niphadopsis* Dyar and Knab
  - pullatus* (Coquillett)
  - schizopinax* Dyar
  - sierrensis* (Ludlow)
  - squamiger* (Coquillett)
  - sticticus* (Meigen)
  - taeniorhynchus* (Wiedemann)
  - tahoensis* Dyar
  - thelcter* Dyar
  - ventrovittis* Dyar
  - washinoi* Lanzaro and Eldridge
- Subgenus *Kompia* Aitken
- purpureipes* Aitken
- Subgenus *Aedimorphus* Theobald
- vexans* (Meigen)
- Subgenus *Aedes* Meigen
- hemiteleus* Dyar

Genus *Anopheles* MeigenSubgenus *Anopheles* Meigen

- franciscanus* McCracken
- freeborni* Aitken
- hermsi* Barr and Guptavanji
- occidentalis* Dyar and Knab
- punctipennis* (Say)

Genus *Culex* LinnaeusSubgenus *Culex* Linnaeus

- erythrothorax* Dyar
  - pipiens* Linnaeus
  - quinquefasciatus* Say
  - restuans* Theobald
  - stigmatosoma* Dyar
  - tarsalis* Coquillett
  - thriambus* Dyar
- Subgenus *Melaniconion* Theobald
- anips* Dyar
  - erraticus* (Dyar and Knab)
- Subgenus *Neoculex* Dyar
- apicalis* Adams
  - boharti* Brookman and Reeves
  - reevesi* Wirth
  - territans* Walker

Genus *Culiseta* FeltSubgenus *Culiseta* Felt

- impatiens* (Walker)
- incidens* (Thompson)
- inornata* (Williston)
- particeps* (Adams)

Genus *Coquillettidia* DyarSubgenus *Coquillettidia* Dyar

- perturbans* (Walker)

Genus *Orthopodomyia* Theobald

- signifera* (Coquillett)

Genus *Psorophora* Robineau-DesvoidySubgenus *Grabhamia* Theobald

- columbiae* (Dyar and Knab)
- signipennis* (Coquillett)

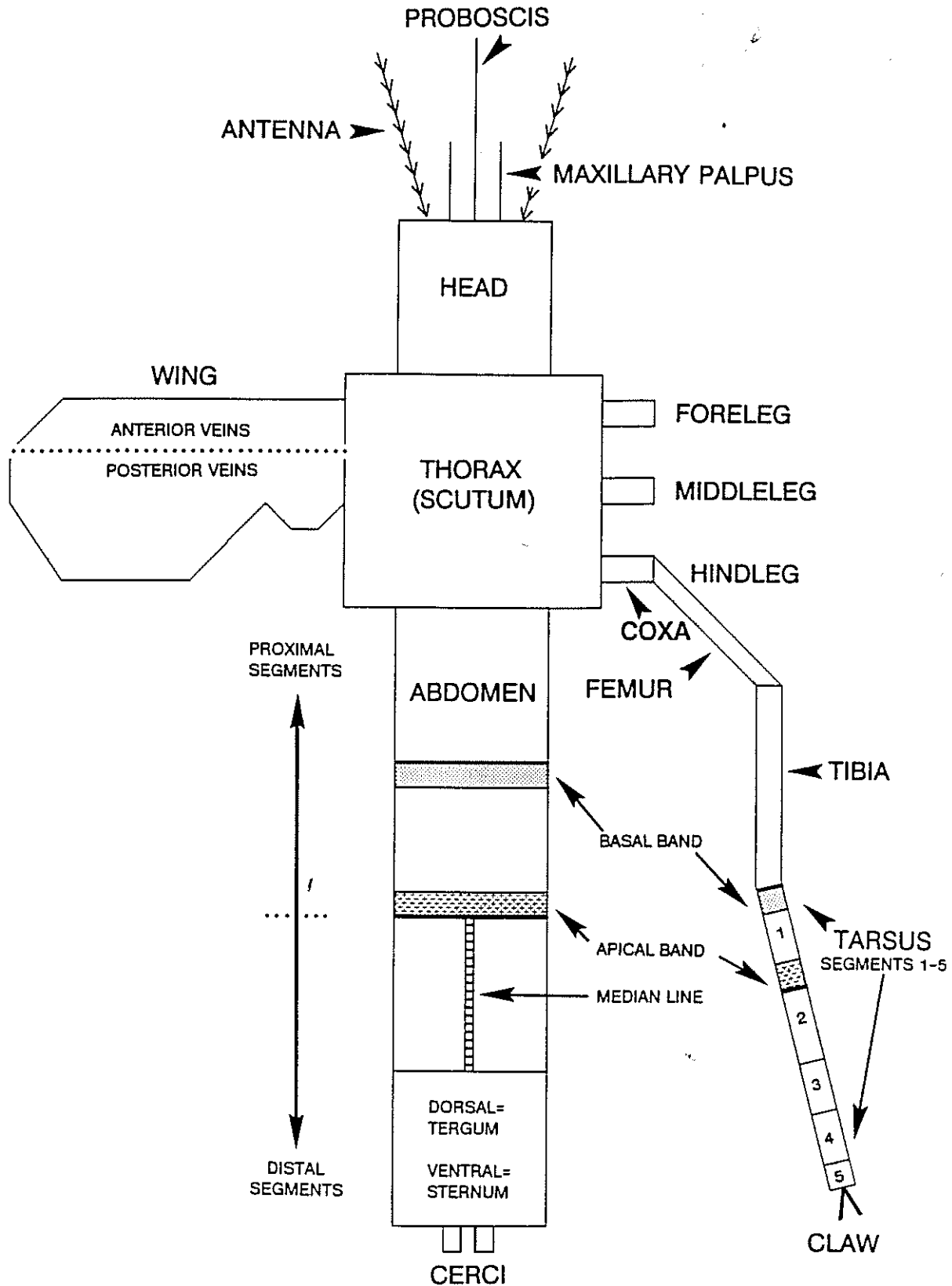
Genus *Uranotaenia* Lynch ArribalzagaSubgenus *Pseudoficalbia* Theobald

- anhydor* Dyar
- 

\* Excluded from the keys, only one record of a single female collected from Folsom, Sacramento County on July 8, 1969. Probable fortuitous introduction that failed to become established.

KEYS TO ADULT  
FEMALES

### ADULT MOSQUITO MORPHOLOGY (TERMS USED IN ADULT KEYS)



### DISTINGUISHING BETWEEN ADULT MALE AND FEMALE MOSQUITOES

- 1. SEGMENTS OF ANTENNA WITH LONG RADIAL FILAMENTS (RF) GIVING IT A FEATHER-LIKE OR PLUMOSE APPEARANCE, MAXILLARY PALPUS (MPLP) USUALLY AS LONG AS PROBOSCIS WITH NUMEROUS HAIRS ON APICAL SEGMENTS (Figs. A,B); APICAL ABDOMINAL SEGMENT WITH A PAIR OF CLASPERS CONSISTING OF 2 ARTICULATING SEGMENTS - GONOCOXITE (GC) AND GONOSTYLUS (GS) (Fig. E) ..... males

- SEGMENTS OF ANTENNA WITH SHORT RADIAL FILAMENTS GIVING IT A SLIGHTLY PLUMOSE APPEARANCE, MAXILLARY PALPUS AS LONG AS OR SHORTER THAN PROBOSCIS WITH FEW HAIRS ON APICAL SEGMENTS (Figs. C,D); APICAL ABDOMINAL SEGMENT WITHOUT CLASPERS BUT BEARING A PAIR OF CERCI WHICH ARE EITHER PROMINENT (ABDOMEN POINTED) (Fig. F) OR MOSTLY CONCEALED (ABDOMEN BLUNT) (Fig. G) ..... females

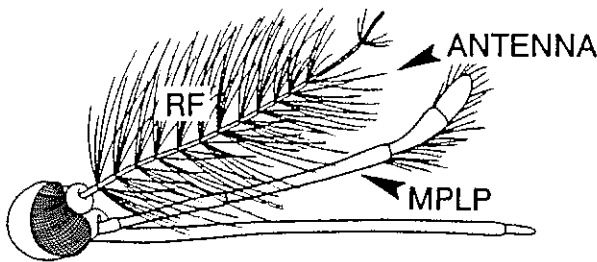


FIG. A

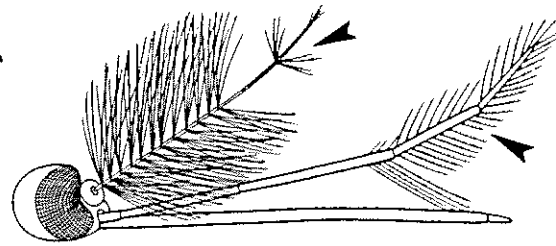


FIG. B

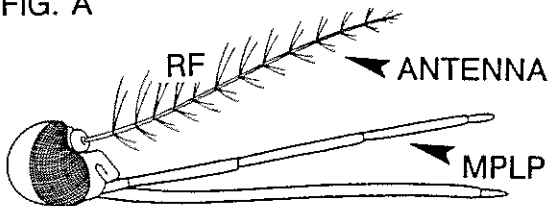


FIG. C

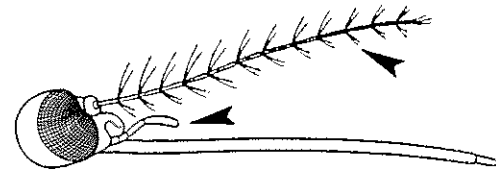
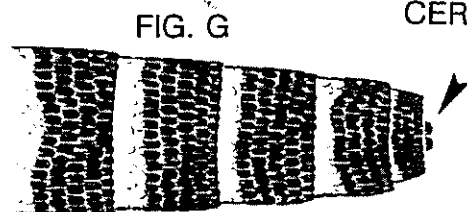
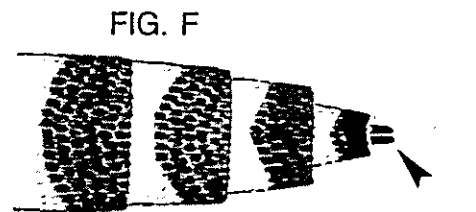
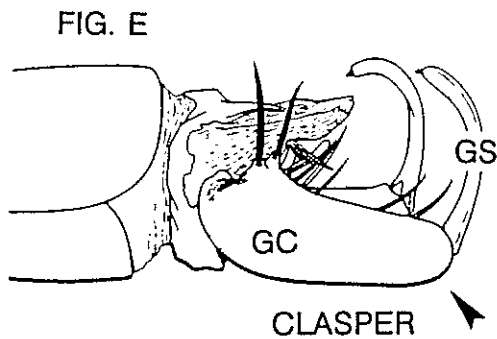


FIG. D

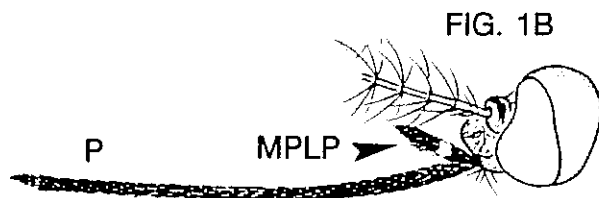
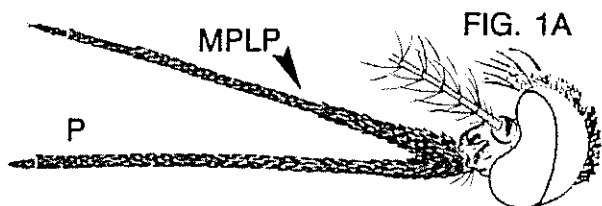


KEY TO FEMALES OF CALIFORNIA MOSQUITOES

**GENERA**

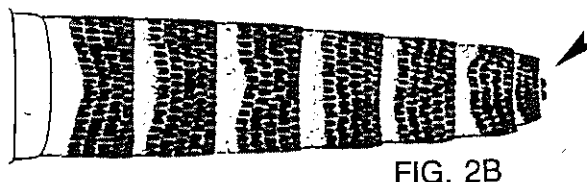
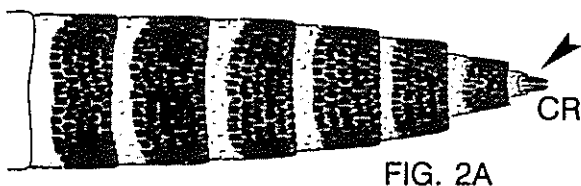
1. MAXILLARY PALPUS (MPLP) NEARLY AS LONG AS PROBOSCIS (P) (Fig. 1A) ..... *Anopheles*  
(Page 10)

MAXILLARY PALPUS 1/3 OR LESS AS LONG AS PROBOSCIS (Fig. 1B), ..... 2



2. TIP OF ABDOMEN POINTED AND CERCI (CR) PROMINENT (Fig. 2A) ..... 3

TIP OF ABDOMEN BLUNT AND CERCI MOSTLY CONCEALED (Fig. 2B) ..... 4



3. HINDFEMUR (HF) WITH A SUBAPICAL BAND OF PALE SCALES, FIRST HINDTARSAL SEGMENT (T1) WITH A MEDIAN RING OF PALE SCALES (Fig. 3A); ABDOMINAL TERGA WITH APICAL BANDS (Fig. 3C) OR WING FRINGE WITH A CHECKERED PATTERN (Fig. 3E) ..... *Psorophora*  
(Page 14)

HINDFEMUR WITHOUT A SUBAPICAL BAND OF PALE SCALES, FIRST HINDTARSAL SEGMENT WITHOUT A MEDIAN RING OF PALE SCALES (Fig. 3B); ABDOMINAL TERGA WITH LATERAL SPOTS (Fig. 3D) OR BASAL BANDS (Fig. 3F) ..... *Aedes*  
(Page 15)

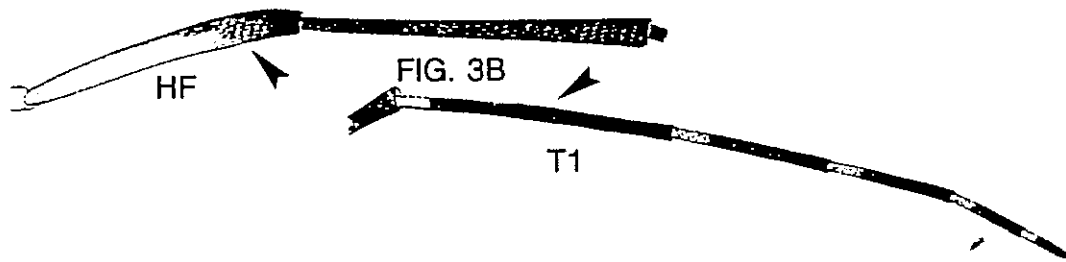
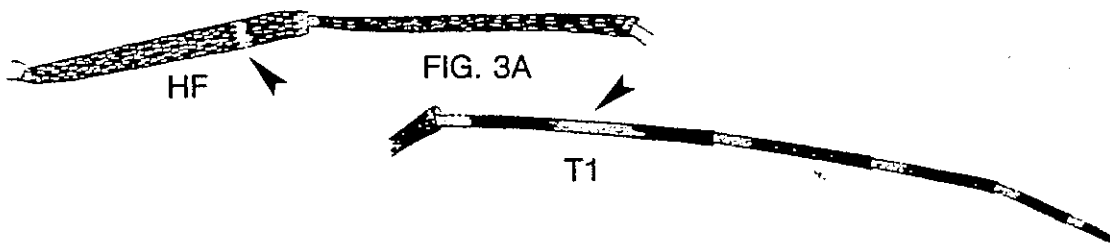


FIG. 3C

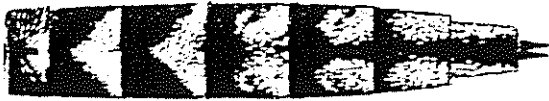


FIG. 3D



FIG. 3E

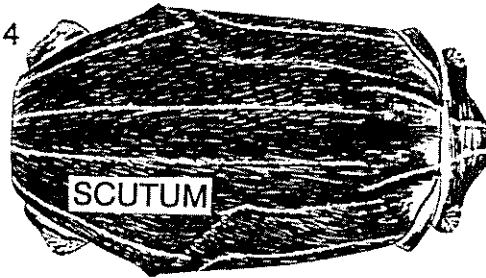


FIG. 3F



- 4. SCUTUM WITH A PATTERN OF LONG PARALLEL LINES OF SILVERY-WHITE SCALES (Fig. 4) (TREEHOLE SPECIES) ..... *Orthopodomyia signifera*
- SCUTUM WITHOUT A PATTERN OF LONG PARALLEL LINES OF SILVERY-WHITE SCALES ..... 5

FIG. 4



- 5. SIDES OF SCUTUM WITH A PATCH OF IRIDESCENT BLUE-WHITE SCALES (Fig. 5A); SECOND MARGINAL CELL (R2) SHORTER THAN ITS PETIOLE (R 2+3) (Fig. 5B) (SMALL DESERT SPECIES) ..... *Uranotaenia anhydor*
- SIDES OF SCUTUM WITHOUT A PATCH OF IRIDESCENT SCALES; SECOND MARGINAL CELL LONGER THAN ITS PETIOLE (Fig. 5C) ..... 6

FIG. 5A

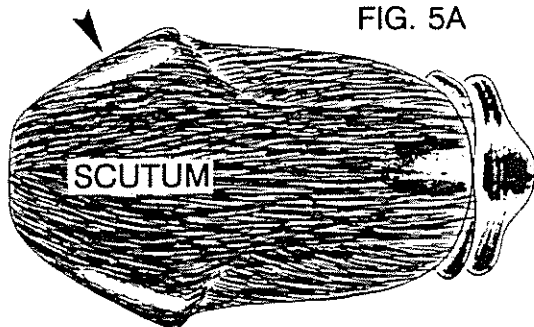


FIG. 5B

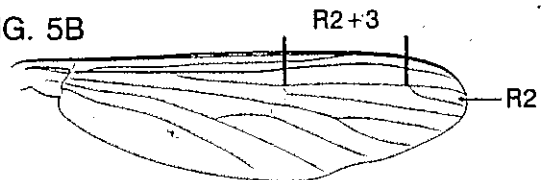
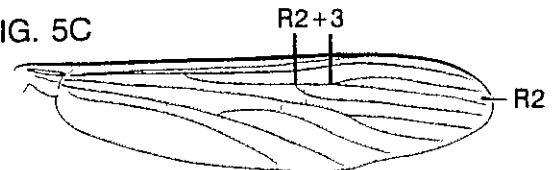


FIG. 5C



6. WING SCALES WIDE AND SPATULATE (Fig. 6A),  
 WING APPEARING CONSPICUOUSLY SPECKLED ..... *Coquillettia perturbans*

WING SCALES NOT WIDE AND SPATULATE, SCALES  
 GENERALLY NARROW OR IF EXPANDED THEN SMALL  
 CONCEALING WING VEINS (Fig. 6B) ..... 7



FIG. 6A

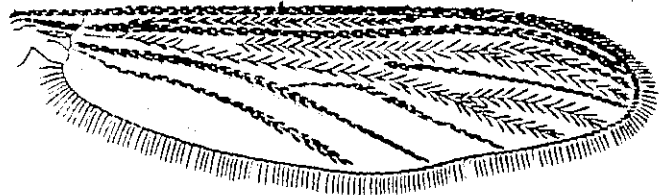
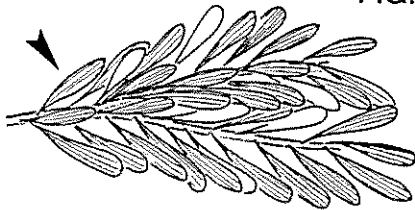


FIG. 6B



7. RADIAL (R) AND MEDIAN (M) CROSS-VEINS NEARLY IN A LINE (Fig. 7A);  
 SPIRACULAR BRISTLES (SB) USUALLY PRESENT (Fig. 7C) (LARGE SPECIES) ..... *Culiseta*  
 (Page 12)

RADIAL AND MEDIAN CROSS-VEINS OFFSET (Fig. 7B); SPIRACULAR  
 BRISTLES ABSENT (Fig. 7D) (SMALL TO MEDIUM SPECIES) ..... *Culex*  
 (Page 27)

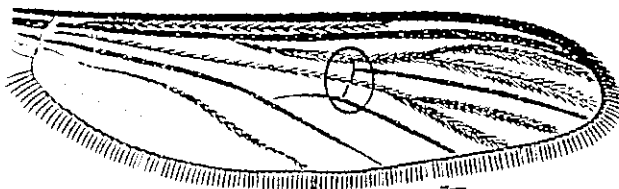


FIG. 7A

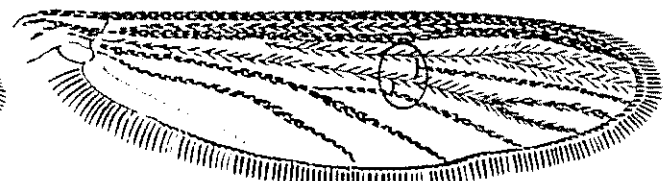


FIG. 7B

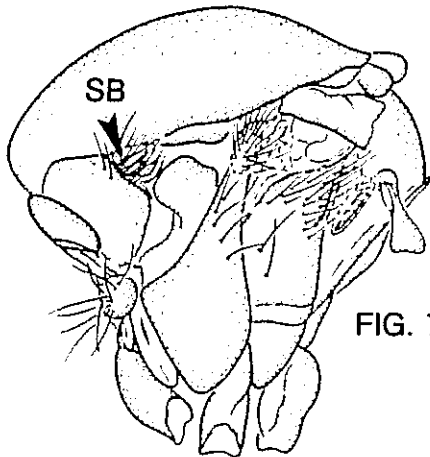
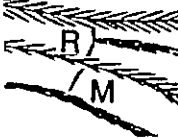


FIG. 7C

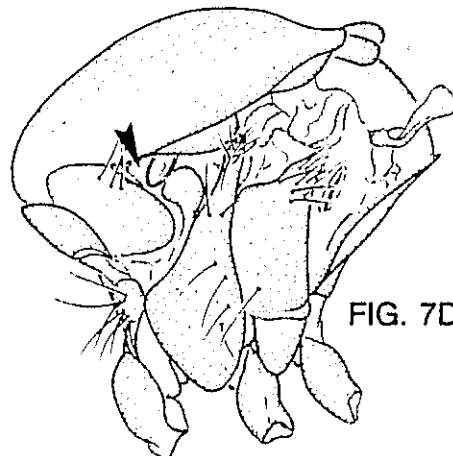
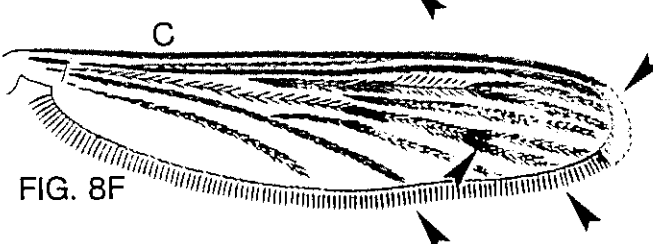
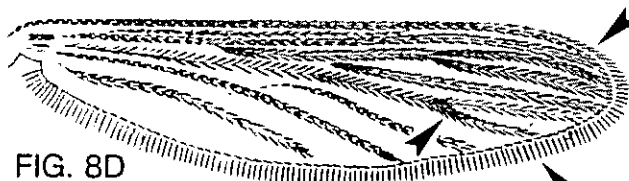
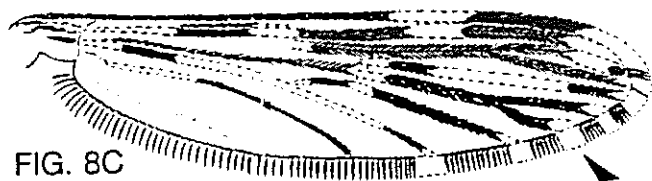
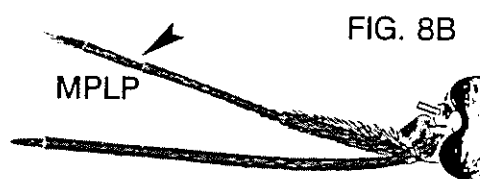
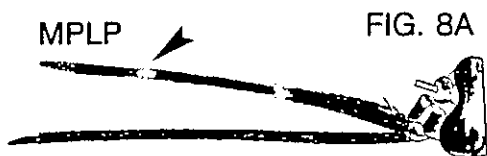


FIG. 7D

## KEY TO FEMALES *ANOPHELES*

1. MAXILLARY PALPUS (MPLP) WITH RINGS OF PALE SCALES (Fig. 8A);  
WING FRINGE WITH PALE SCALES AT THE END OF EACH POSTERIOR  
WING VEIN (Fig. 8C) (WIDESPREAD) ..... *franciscanus*

- MAXILLARY PALPUS MOSTLY DARK-SCALED (Fig. 8B); WING FRINGE  
WITH DARK SCALES AT THE END OF EACH POSTERIOR WING VEIN  
(Figs. 8D, 8E, 8F) ..... 2



2. WING AND WING FRINGE ENTIRELY DARK-SCALED, WING  
WITH DISTINCT PATCHES OF DARKER SCALES (Fig. 8D) ..... *freeborni / hermsi*

NOTE: FEMALE *freeborni* AND *hermsi* ARE MORPHOLOGICALLY INSEPARABLE.  
SEE BIOLOGICAL NOTES SECTION (PAGE 66) FOR DETAILS.

- WING EITHER WITH PATCHES OF PALE SCALES ON ALL MAJOR  
VEINS, COSTA (C) AND WING TIP FRINGE WITH A PATCH OF  
PALE SCALES (Fig. 8E); OR COSTA DARK-SCALED AND  
WING TIP FRINGE WITH A PATCH OF PALE TO LIGHT  
GOLDEN SCALES (Fig. 8F) ..... 3

3. WING WITH PATCHES OF PALE SCALES ON COSTA AND MOST ANTERIOR AND POSTERIOR VEINS, WING TIP FRINGE WITH A PATCH OF PALE SCALES (Fig. 8E) (WOODLAND SPECIES) ..... *punctipennis*

WING WITHOUT PATCHES OF PALE SCALES ON VEINS, COSTA DARK-SCALED, WING TIP FRINGE WITH A PATCH OF PALE TO LIGHT GOLDEN SCALES (Fig. 8F) (COASTAL SPECIES) ..... *occidentalis*

## KEY TO FEMALES *CULISETA*

1. WING WITH DISTINCT PATCHES OF DARK SCALES (Figs. 9A, 9B) ..... 2
- WING WITHOUT DISTINCT PATCHES OF DARK SCALES (Figs. 9C, 9D) ..... 3

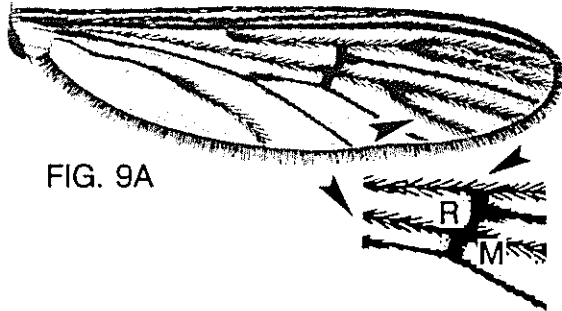


FIG. 9A

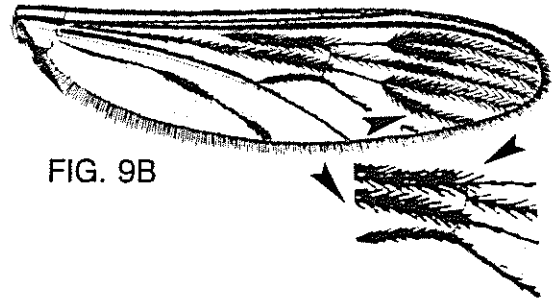


FIG. 9B

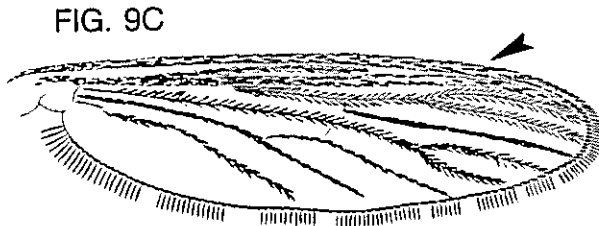


FIG. 9C

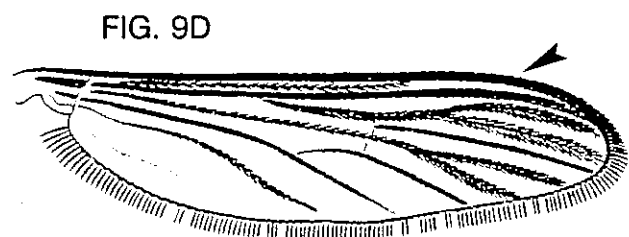


FIG. 9D

2. RADIAL (R) AND MEDIAN (M) CROSS-VEINS WITH SCALES (Fig. 9A);  
HINDFEMUR (HF) WITH A SUBAPICAL BAND OF PALE SCALES  
(Fig. 10A); HINDTARSUS WITH BROAD BASAL BANDS OF PALE  
SCALES (Fig. 11A) ..... *particeps*

- RADIAL AND MEDIAN CROSS-VEINS WITHOUT SCALES (Fig. 9B);  
HINDFEMUR WITHOUT A SUBAPICAL BAND OF PALE SCALES  
(Fig. 10B); HINDTARSUS WITH NARROW BANDS OF PALE  
SCALES OVERLAPPING THE JOINTS (Fig. 11B) ..... *incidens*



FIG. 10A



FIG. 10B

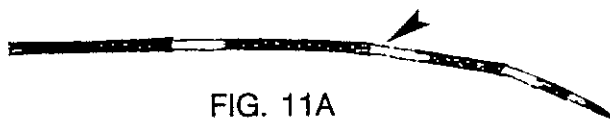


FIG. 11A

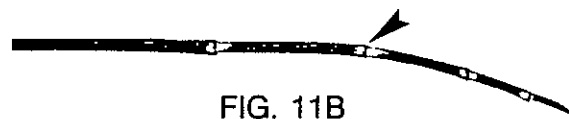


FIG. 11B

3. ANTERIOR WING VEINS WITH INTERMIXED DARK AND PALE SCALES (Fig. 9C); HINDFEMUR AND FIRST TWO HINDTARSAL SEGMENTS (T1 & T2) WITH INTERMIXED DARK AND PALE SCALES (Fig. 12A); ABDOMINAL TERGA WITH WIDE BASAL BANDS OF YELLOWISH SCALES CONTRASTING WITH THE REDDISH BACKGROUND SCALES OF THE TERGA (Fig. 13A) (WIDESPREAD) ..... *inomata*

ANTERIOR WING VEINS DARK-SCALED (Fig. 9D); HINDFEMUR AND FIRST TWO HINDTARSAL SEGMENTS MOSTLY DARK-SCALED (Fig. 12B); ABDOMINAL TERGA WITH NARROW BASAL BANDS OF WHITE SCALES CONTRASTING WITH THE DARK BROWN TO BLACK BACKGROUND SCALES OF THE TERGA (Fig. 13B) (RARE - CENTRAL AND NORTHERN SIERRAS) ..... *impatiens*

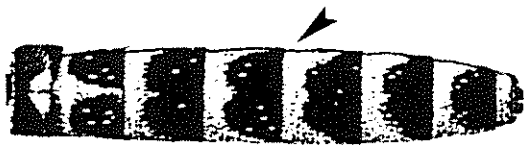
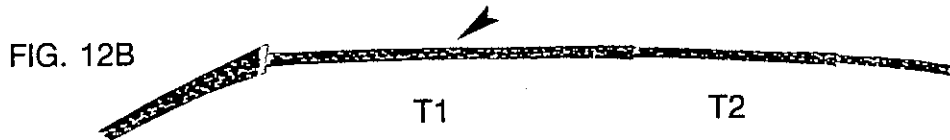
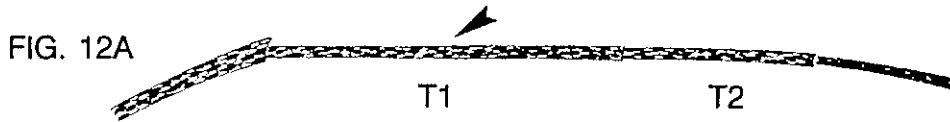


FIG. 13A



FIG. 13B

KEY TO FEMALES  
*PSOROPHORA*

1. WING WITH INTERMIXED DARK AND PALE SCALES (Fig. 14A);  
ABDOMINAL TERGA WITH DISTINCT TRIANGULAR APICAL  
BANDS OF PALE SCALES ON THE PROXIMAL SEGMENTS  
AND PAIRED LATERAL SPOTS OF PALE SCALES ON  
THE DISTAL SEGMENTS (Fig. 15A) ..... *columbiae*

- WING FRINGE AND COSTA WITH A CHECKERED PATTERN OF  
DARK AND PALE SCALES (Fig. 14B); ABDOMINAL TERGA  
MOSTLY PALE-SCALED WITH NARROW DIAGONAL AND  
MEDIAN LINES OF DARK SCALES (Fig. 15B) ..... *signipennis*



FIG. 14A



FIG. 14B



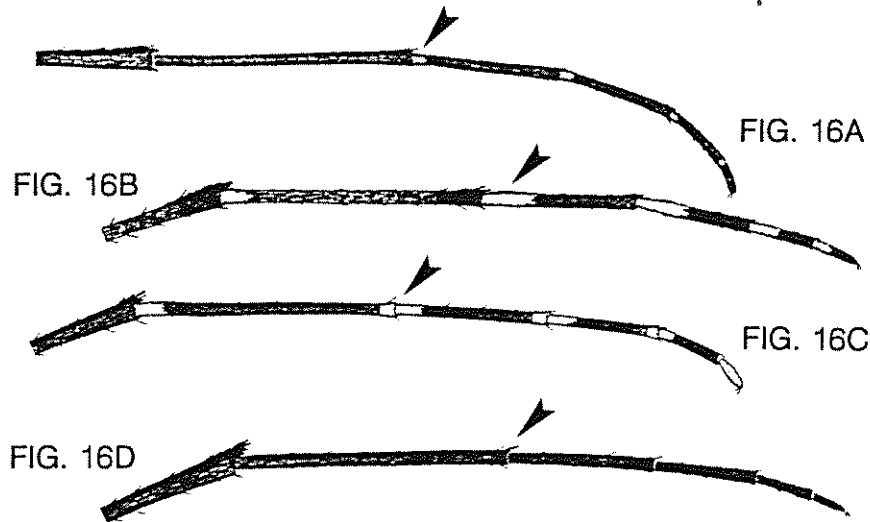
FIG. 15A



FIG. 15B

KEY TO FEMALES  
***AEDES***

- 1. HINDTARSUS WITH BANDS OF PALE SCALES (Figs. 16A, 16B, 16C) ..... 2
- HINDTARSUS WITHOUT BANDS OF PALE SCALES (Fig. 16D) ..... 13



- 2. HINDTARSUS WITH PALE-SCALED BASAL BANDS THAT DO NOT OVERLAP THE JOINTS (Figs. 16A, 16B) ..... 3
- HINDTARSUS WITH PALE-SCALED BANDS OVERLAPPING THE JOINTS (Fig. 16C), BASAL PORTION OF SOME BANDS MAY BE VERY NARROW ..... 8

- 3. PROBOSCIS (P) USUALLY WITH A MEDIAN RING OF PALE SCALES (SOMETIMES ABSENT), MAXILLARY PALPUS DARK-SCALED (Fig. 17A); ABDOMINAL TERGA WITH PALE-SCALED MEDIAN LINES AND PAIRED LATERAL SPOTS OF DARK SCALES (Fig. 17C) (WIDESPREAD) ..... *nigromaculis*

- PROBOSCIS WITHOUT A MEDIAN RING OF PALE SCALES (Fig. 17B); ABDOMINAL TERGA WITH BASAL BANDS OF PALE SCALES (Figs. 17D, 17E) OR DISTAL TERGA WITH IRREGULAR BANDS INCLUDING MEDIAN PATCHES OF PALE SCALES DIVIDING THE APICAL DARK SCALES (Fig. 17F) (SOME *fitchii* FROM CENTRAL AND NORTHERN SIERRAS™ AND GREAT BASIN), OR TERGA NEARLY ENTIRELY GOLDEN-SCALED (Fig. 17G) ..... 4

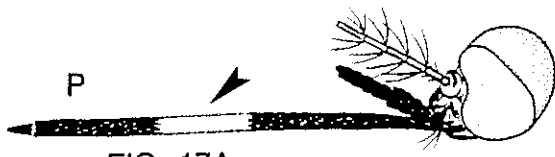


FIG. 17A



FIG. 17B

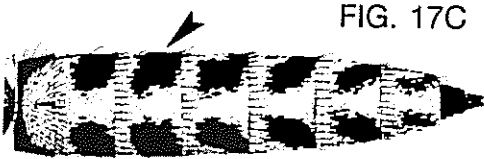


FIG. 17C

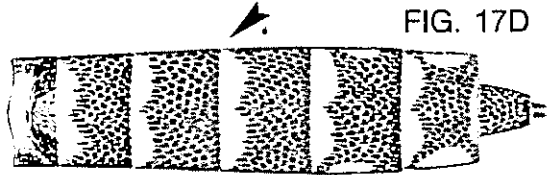


FIG. 17D

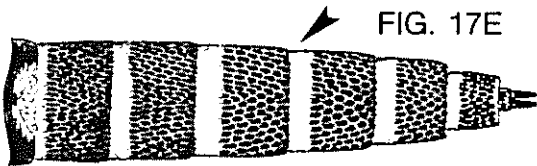


FIG. 17E

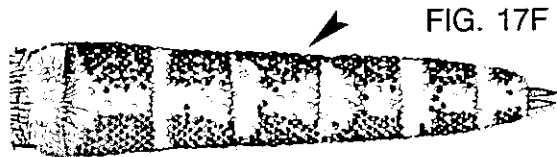


FIG. 17F

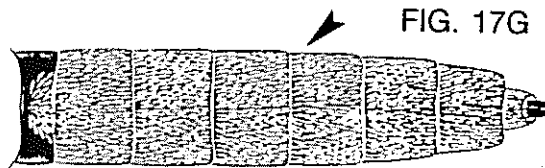


FIG. 17G

4. HINDTARSUS WITH VERY NARROW PALE-SCALED BASAL BANDS (Fig. 16A);  
 BASAL BANDS ON ABDOMINAL TERGA INDENTED MEDIALY (Fig. 17D) ..... *vexans*

- HINDTARSUS WITH WIDE PALE-SCALED BASAL BANDS (Fig. 16B); BASAL  
 BANDS ON ABDOMINAL TERGA NOT INDENTED MEDIALY (Figs. 17E,  
 17F); TERGA NEARLY ENTIRELY GOLDEN-SCALED (Fig. 17G) ..... 5

5. WING WITH BROAD INTERMIXED DARK AND PALE SCALES GIVING IT A  
 SPECKLED APPEARANCE (Fig. 18A) (CENTRAL AND SOUTHERN COASTAL  
 SALT MARSHES) ..... *squamiger*

- WING SCALES NARROW AND LANCEOLATE, SOME MAY BE SLIGHTLY  
 EXPANDED (Fig. 18B) ..... 6

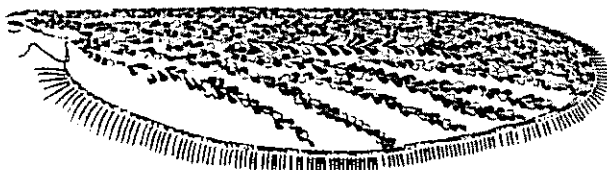


FIG. 18A

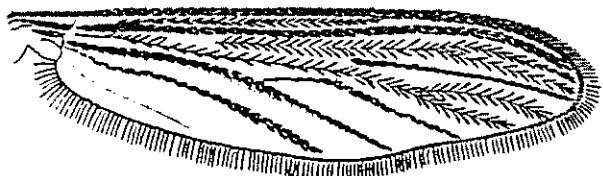


FIG. 18B

6. ABDOMINAL TERGA UNBANDED AND NEARLY ENTIRELY GOLDEN-SCALED (Fig. 17G); WING SCALES MOSTLY PALE (Fig. 19A) (GREAT BASIN NORTH OF LAKE TAHOE) ..... *flavescens*

ABDOMINAL TERGA WITH BASAL BANDS OF PALE SCALES (Figs. 17E, 17F); DISTAL TERGA MAY HAVE MEDIAN PATCHES OF PALE SCALES DIVIDING THE APICAL DARK SCALES (Fig. 17F); WING SCALES MOSTLY DARK WITH NUMEROUS INTERMIXED PALE SCALES ON ANTERIOR AND POSTERIOR VEINS OR WIDELY DISTRIBUTED OVER VEINS (Fig. 19B) ..... 7

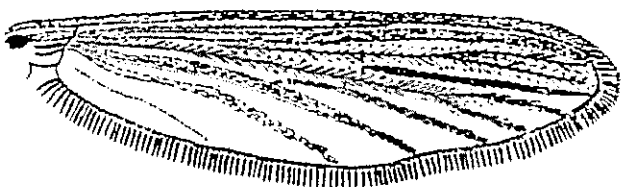


FIG. 19A



FIG. 19B

7. WING WITH PALE SCALES EVENLY DISTRIBUTED ON ANTERIOR AND POSTERIOR VEINS (Fig. 20A); DISTAL ABDOMINAL TERGA WITH MEDIAN PATCHES OF PALE SCALES (Fig. 20C); INNER SURFACE OF TORUS WITH NUMEROUS PALE SCALES (ABOVE 3,500 FEET ALONG CREST OF NORTHERN AND CENTRAL SIERRAS AND GREAT BASIN) ..... *fitchii*

WING WITH PALE SCALES LIMITED TO ANTERIOR VEINS (Fig. 20B); ABDOMINAL TERGA WITH BASAL BANDS OF PALE SCALES (Fig. 20D); INNER SURFACE OF TORUS WITH ONLY A FEW PALE SCALES  
 EASTERN SLOPES OF SIERRAS AND CASCADES, AND MODOC PLATEAU ..... *inreptus*  
 WESTERN SLOPES OF SIERRAS AND CASCADES ..... *clivis*  
 COASTAL AREAS GENERALLY, RARELY IN SIERRA AND CASCADE FOOTHILLS ..... *washinoi*

NOTE: FEMALES OF *inreptus*, *clivis*, AND *washinoi* ARE MORPHOLOGICALLY INSEPARABLE. SEE BIOLOGICAL NOTES SECTION (PAGES 58, 60, 65) FOR DETAILS.

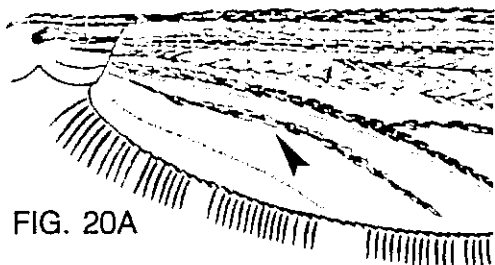


FIG. 20A

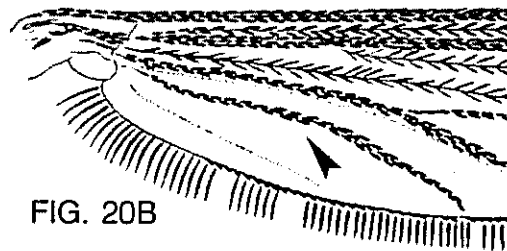


FIG. 20B

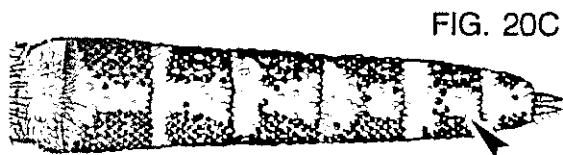


FIG. 20C

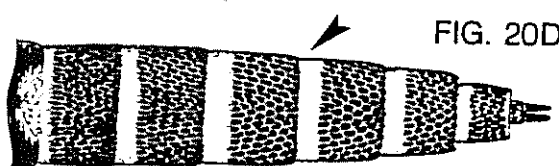


FIG. 20D

- 8. WING SCALES ALL DARK (Fig. 21A) OR ALL DARK WITH A PATCH OF PALE SCALES AT THE BASE OF THE COSTA (C) (Fig. 21B); ABDOMINAL TERGA WITH BASAL BANDS OF PALE SCALES (Fig. 21D) (HIGHLY CONTRASTING "BLACK AND WHITE" SPECIES) ..... 9

WING WITH INTERMIXED DARK AND PALE SCALES ON SOME ANTERIOR AND POSTERIOR VEINS (Fig. 21C); SOME OR ALL ABDOMINAL TERGA DIVIDED BY MEDIAN LINES OF PALE SCALES PRODUCING LATERAL PATCHES OF DARK SCALES (Figs. 21E, 21F); OR LATERAL PATCHES OF DARK SCALES ABSENT, CONSISTING OF A FEW DARK SCALES INTERMIXED WITH PREDOMINANTLY YELLOWISH SCALES (Fig. 21G) (BUFF TO YELLOWISH SPECIES) ..... 11

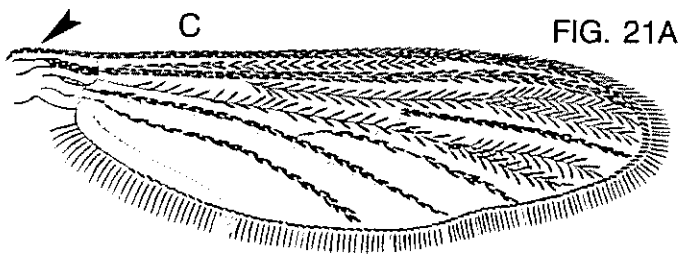


FIG. 21A

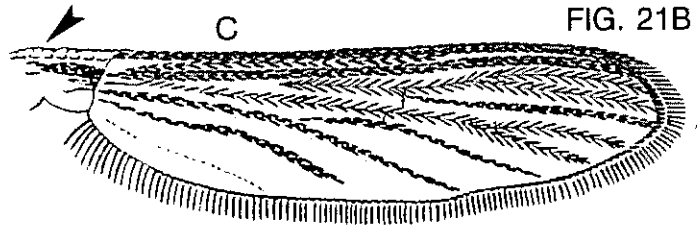


FIG. 21B



FIG. 21C

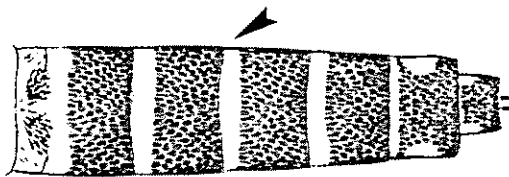


FIG. 21D

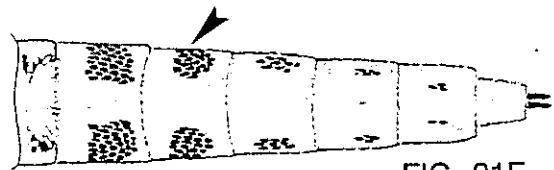


FIG. 21F

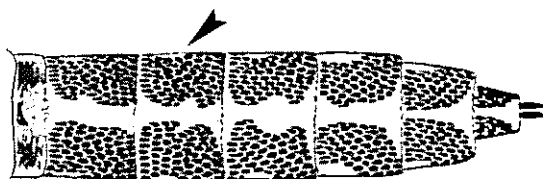


FIG. 21E

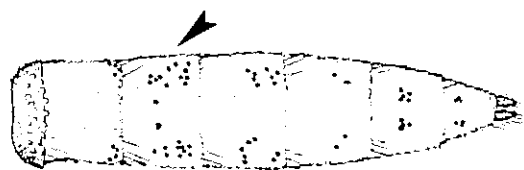


FIG. 21G

9. WING WITH DARK SCALES AT THE BASE OF THE COSTA (C) (Fig. 21A);  
 PROBOSCIS (P) WITH A MEDIAN RING OF PALE SCALES (Fig. 22A)  
 (CENTRAL AND SOUTHERN COASTAL SALT MARSHES AND SOUTHEASTERN  
 DESERTS) ..... *taeniorhynchus*

- WING WITH PALE SCALES AT THE BASE OF THE COSTA (Fig. 21B);  
 PROBOSCIS DARK-SCALED (Fig. 22B) (TREEHOLE SPECIES) ..... 10

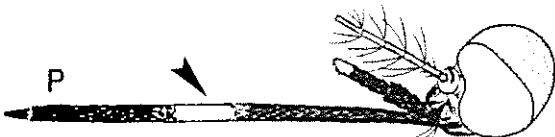


FIG. 22A



FIG. 22B

10. HINDTARSAL SEGMENT IV (T4) WITH A WIDE BAND OF PALE SCALES  
 (Fig. 23A); POSTPRONOTAL (PPN) PATCH OF DARK GOLDEN SCALES  
 AND METAMERAL (MTM) PATCH OF PALE SCALES PRESENT (Fig. 23C)  
 (TREEHOLES WEST OF THE SIERRAS AND IN THE SOUTHERN COASTAL VALLEYS) ..... *sierrensis*

- HINDTARSAL SEGMENT IV WITH A NARROW BAND OF PALE SCALES  
 (Fig. 23B); POSTPRONOTAL AND METAMERAL PATCHES ABSENT  
 (Fig. 23D) (TREEHOLES IN THE MOIST CANYONS BORDERING THE MOJAVE  
 AND COLORADO DESERTS) ..... *deserticola*

FIG. 23A

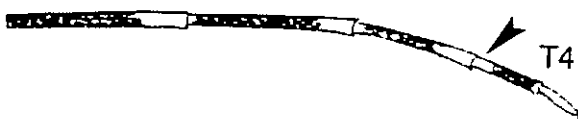


FIG. 23B

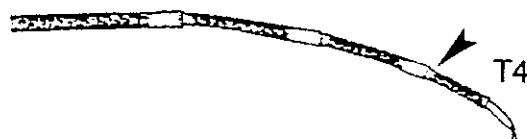


FIG. 23C

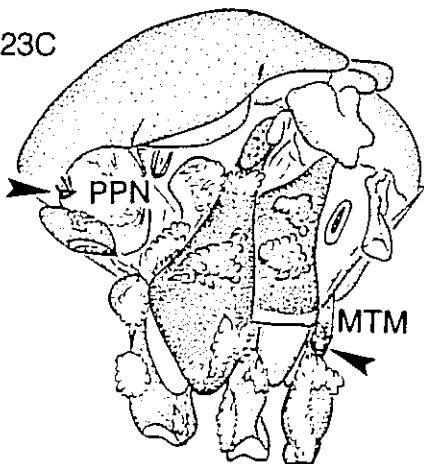
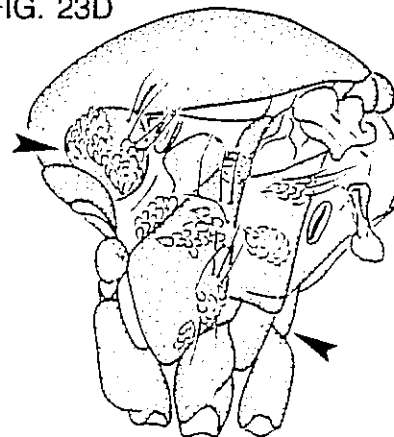


FIG. 23D



11. ALL ABDOMINAL TERGA WITH LATERAL PATCHES OF DARK SCALES (Fig. 21E); COSTA (C) MOSTLY DARK-SCALED (Fig. 24A) ..... *melanimon*

ABDOMINAL TERGA WITH LATERAL PATCHES OF DARK SCALES USUALLY LIMITED TO PROXIMAL SEGMENTS (Fig. 21F) OR REDUCED TO INDISTINCT GROUPS OF SINGLE DARK SCALES (Fig. 21G); COSTA MOSTLY PALE-SCALED (Fig. 24B) ..... 13

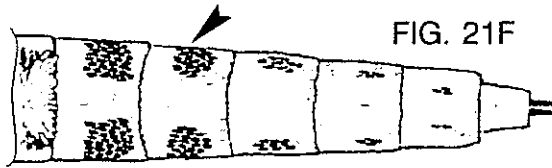


FIG. 21F

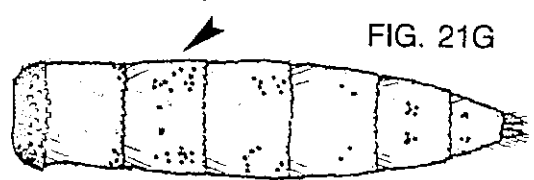


FIG. 21G

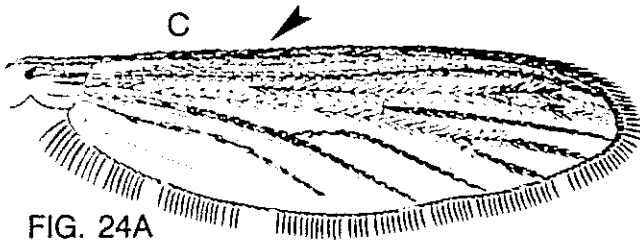


FIG. 24A

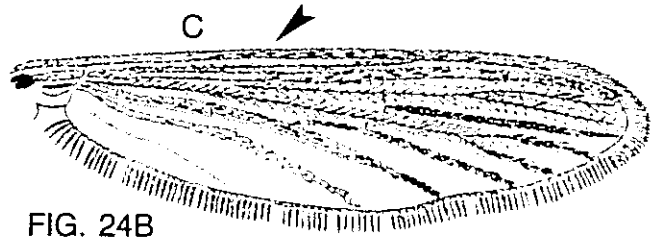


FIG. 24B

12. PROXIMAL ABDOMINAL TERGA WITH LATERAL PATCHES OF DARK SCALES (Fig. 21F); RADIAL WING VEINS (R 2-5) WITH AN UNEQUAL DISTRIBUTION OF DARK AND PALE SCALES (Fig. 25A) ..... *dorsalis*

PROXIMAL ABDOMINAL TERGA WITHOUT LATERAL PATCHES OF DARK SCALES, BUT WITH INDISTINCT PATCHES OF SINGLE DARK SCALES (Fig. 21G); RADIAL WING VEINS WITH EQUAL DISTRIBUTION OF DARK AND PALE SCALES (Fig. 25B) (GREAT BASIN NORTH OF LAKE TAHOE) ..... *campestris*

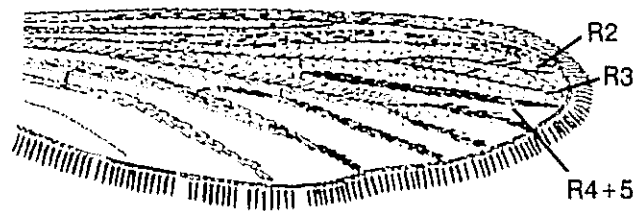


FIG. 25A

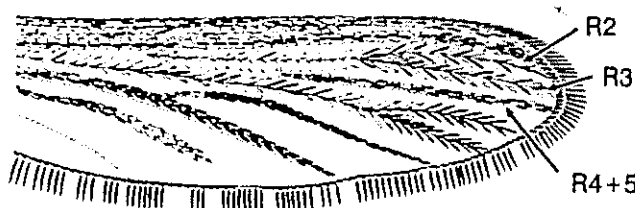
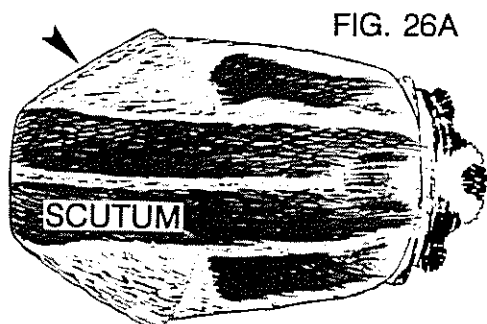


FIG. 25B

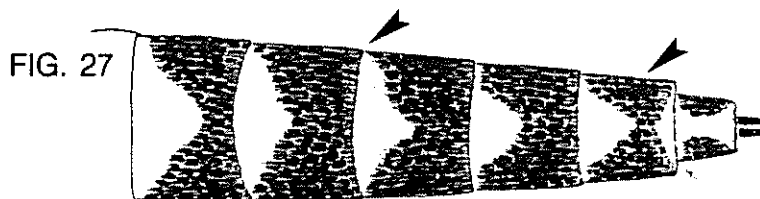
13. SCUTUM AND THORAX BRIGHT ORANGE (Fig. 26A); SIDES OF THORAX WITH PATCHES OF SILVERY SCALES, POST SPIRACULAR BRISTLES ABSENT (Fig. 26B); LEG SCALES JET BLACK WITH IRIDESCENT REFLECTIONS (RARE - LOWER COLORADO RIVER) ..... *purpureipes*

SCUTUM AND THORAX MOSTLY DARK- OR PALE-SCALED; SIDES OF THORAX WITH PATCHES OF WHITISH TO PALE SCALES; POST SPIRACULAR BRISTLES USUALLY PRESENT ..... 14

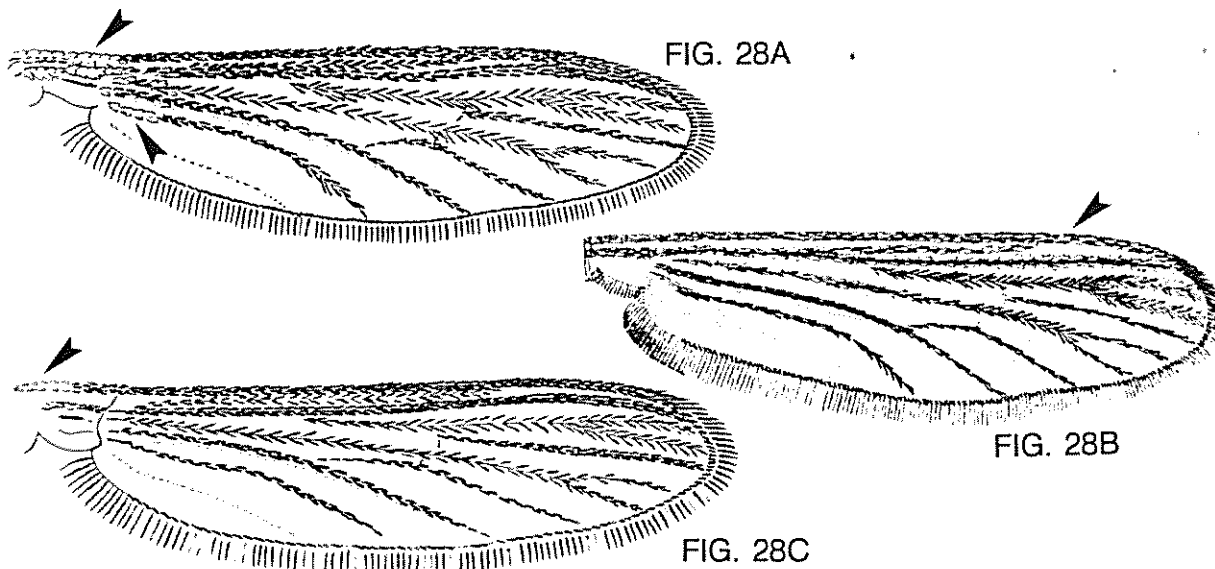


14. PROXIMAL ABDOMINAL TERGA WITH BROAD TRIANGULAR BANDS OF PALE SCALES, DISTAL TERGA WITH "HOUR GLASS"-SHAPED PATCHES OF PALE SCALES (Fig. 27) (LOWER COLORADO RIVER) ..... *theicter*

PROXIMAL ABDOMINAL TERGA WITHOUT BROAD TRIANGULAR BANDS OF PALE SCALES, DISTAL TERGA WITHOUT "HOUR GLASS"-SHAPED PATCHES OF PALE SCALES ..... 15

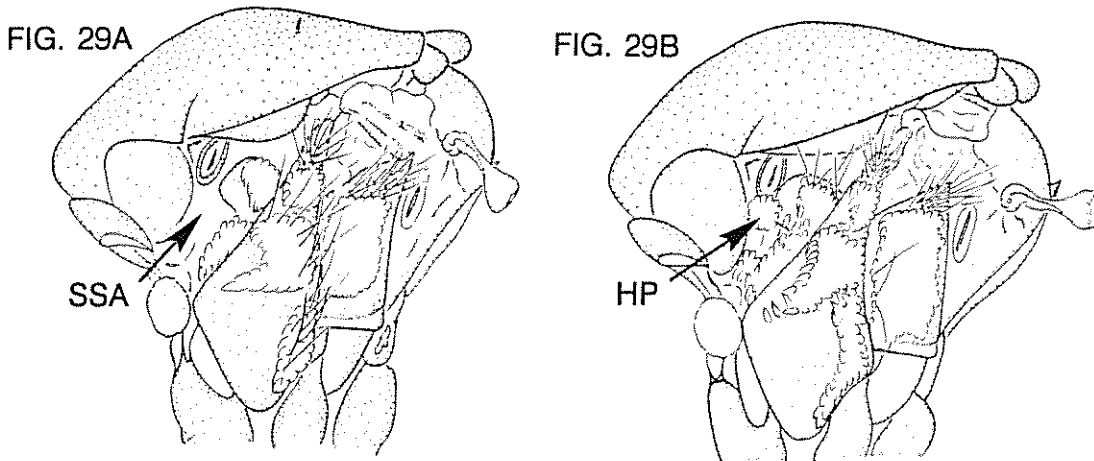


15. WING WITH PALE SCALES DISTRIBUTED HEAVILY ON BASE OF ANTERIOR AND POSTERIOR VEINS (Fig. 28A) OR ANTERIOR VEINS WITH INTERMIXED DARK AND PALE SCALES (Fig. 28B) ..... 16
- WING WITH PALE SCALES LIMITED TO THE EXTREME BASE OF ANTERIOR VEINS (Fig. 28C) ..... 19



16. SUBSPIRACULAR AREA (SSA) WITHOUT A PATCH OF PALE SCALES (Fig. 29A); PROBOSCIS AND MAXILLARY PALPUS (MPLP) MOSTLY DARK-SCALED (Fig. 29C); BASAL BAND ON SECOND ABDOMINAL TERGUM DIVIDED INTO LATERAL PATCHES OF PALE SCALES (Fig. 29E) (SMALL BLACKISH SPECIES ALONG THE CREST OF THE SIERRAS) ..... *ventrovittis*

- SUBSPIRACULAR (HYPOSTIGIAL) PATCH OF PALE SCALES (HP) PRESENT (Fig. 29B); PROBOSCIS AND MAXILLARY PALPUS WITH INTERMIXED DARK AND PALE SCALES (Fig. 29D); ABDOMINAL TERGA WITH COMPLETE BASAL BANDS OF PALE SCALES (Fig. 29F) OR ABDOMINAL TERGA WITH A MEDIAN LINE OF PALE SCALES DIVIDING LATERAL PATCHES OF DARK SCALES (Fig. 29G) ..... 17



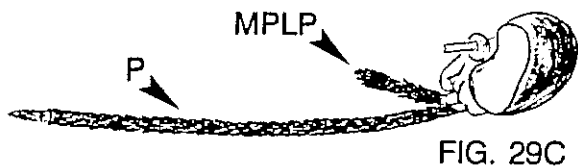


FIG. 29C

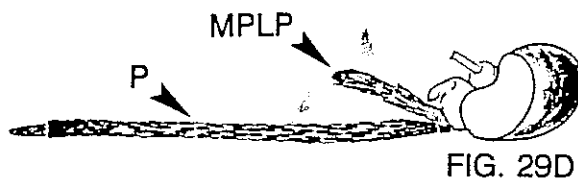


FIG. 29D

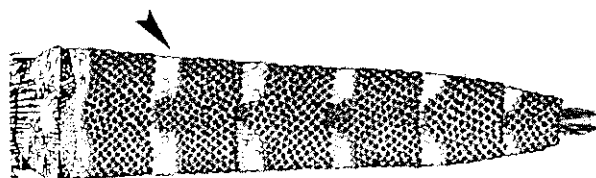


FIG. 29E

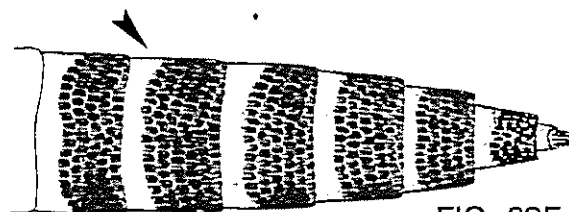


FIG. 29F

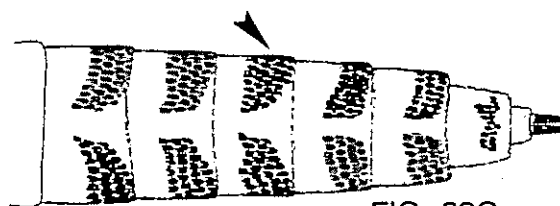


FIG. 29G

17. ABDOMINAL TERGA WITH MEDIAN LINES OF PALE SCALES DIVIDING LATERAL PATCHES OF DARK SCALES (Fig. 29G)  
 (GREAT BASIN NORTH OF LAKE TAHOE) ..... *niphadopsis*

ABDOMINAL TERGA WITH COMPLETE BASAL BANDS OF PALE SCALES (Fig. 29F) ..... 18

18. WING WITH PALE SCALES LIMITED TO THE BASE OF ANTERIOR AND POSTERIOR VEINS (Fig. 28A); DARK SCALES ON SCUTUM ABOVE SPIRACLE ARE BROAD AND CURVED (Fig. 30A)  
 (FOOTHILLS OF CENTRAL AND NORTHERN CALIFORNIA) ..... *bicristatus*

WING WITH INTERMIXED DARK AND PALE SCALES ON ANTERIOR VEINS (Fig. 28B); DARK SCALES ON SCUTUM ABOVE SPIRACLE ARE VERY NARROW (Fig. 30B) (CREST OF SIERRAS AND GREAT BASIN) ..... *cataphylla*

FIG. 30A

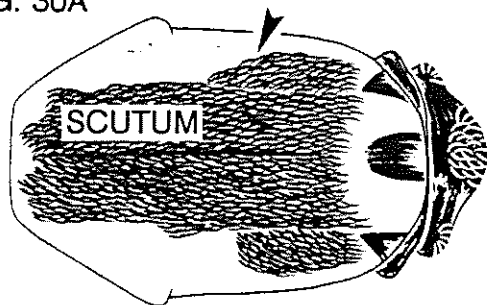
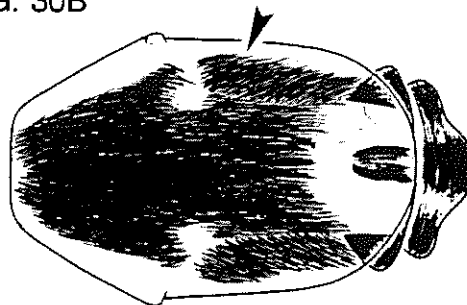


FIG. 30B



- 19. SUBSPIRACULAR AREA WITH A PATCH OF PALE SCALES (HP)  
 (Fig. 31A) (CREST OF THE SIERRAS ABOVE 9,000 FEET) ..... *pullatus*

- SUBSPIRACULAR AREA WITHOUT A PATCH OF PALE SCALES  
 (Fig. 31B) ..... 20

FIG. 31A

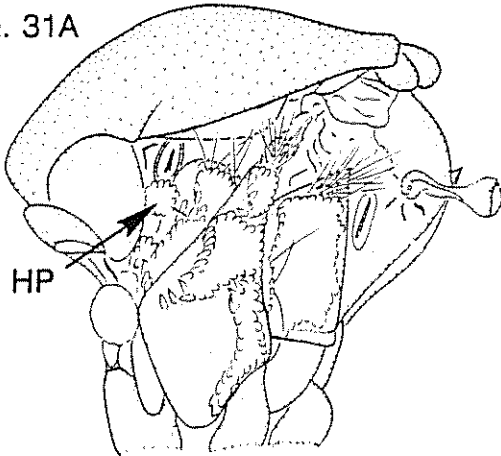
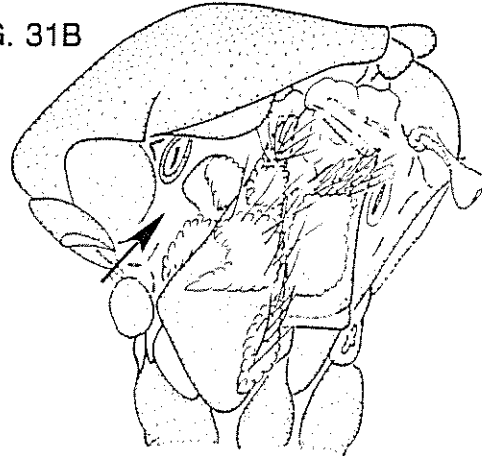


FIG. 31B



- 20. POSTPROCOXAL PATCH (PCP) OF PALE SCALES PRESENT (Fig. 32A) ..... 21
- POSTPROCOXAL PATCH OF PALE SCALES ABSENT (Fig. 32B) ..... 22

FIG. 32A

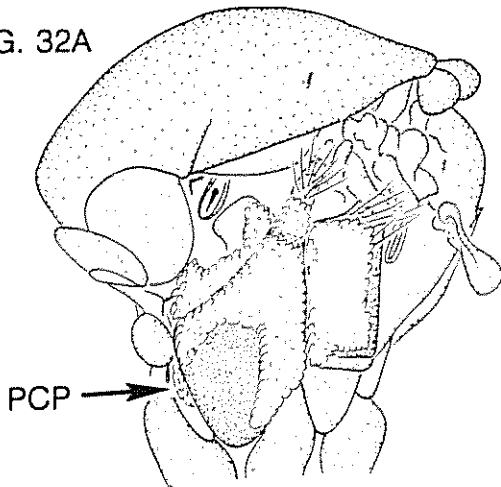
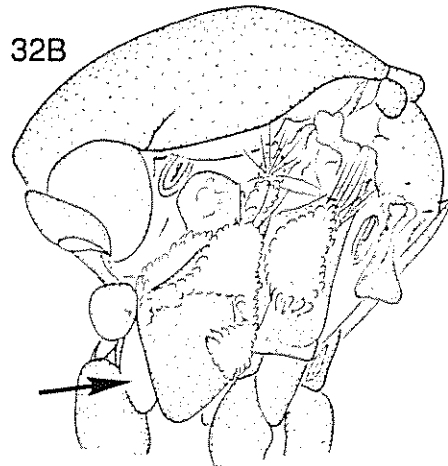
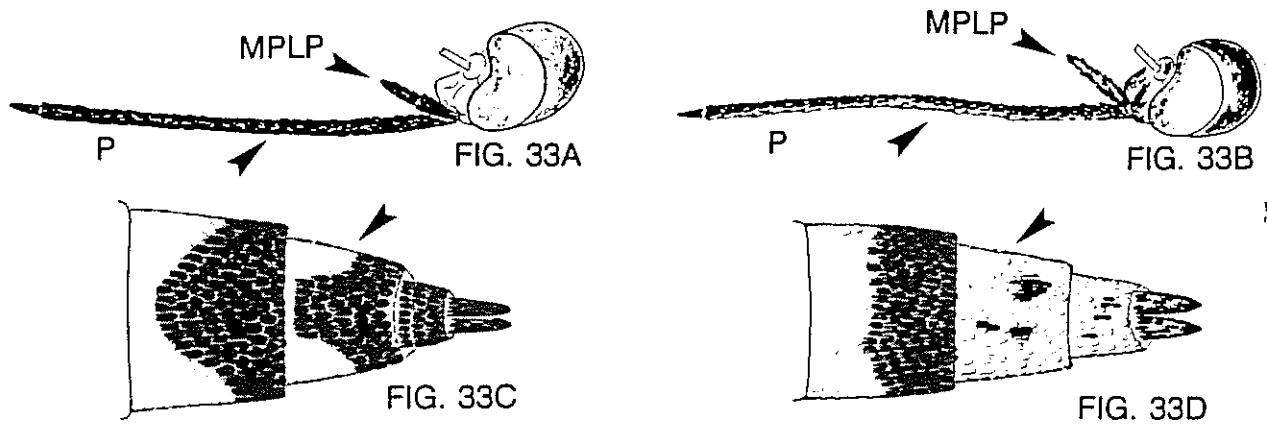


FIG. 32B



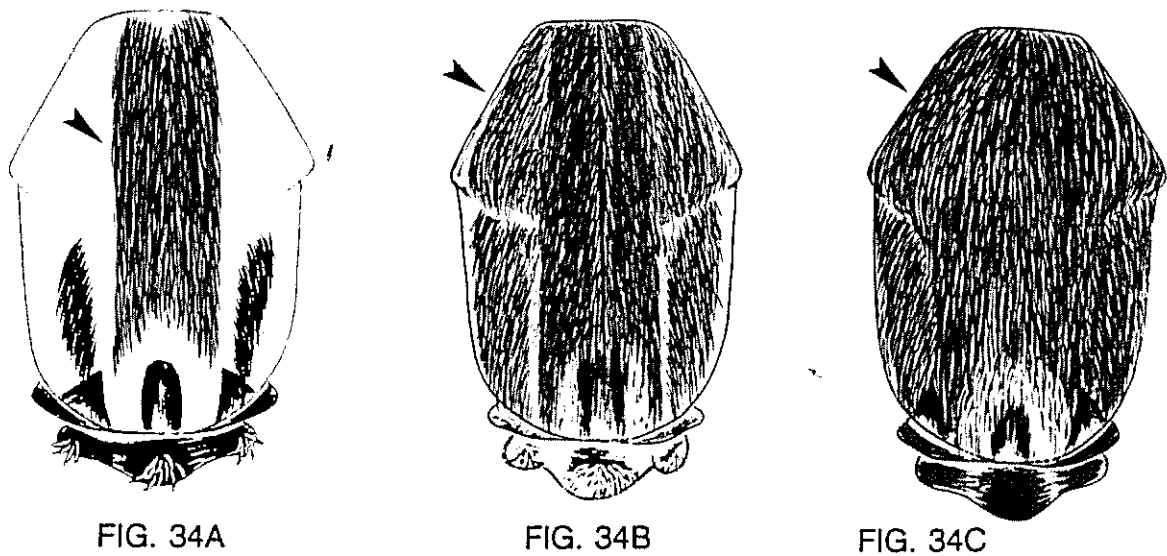
21. MAXILLARY PALPUS (MPLP) AND PROBOSCIS (P) DARK-SCALED (Fig. 33A); NEXT TO LAST TWO ABDOMINAL TERGA WITH EVEN-SIZED BANDS OF DARK AND PALE SCALES (Fig. 33C) ..... *hexodontus*

- MAXILLARY PALPUS WITH INTERMIXED DARK AND PALE SCALES, UNDERSIDE OF PROBOSCIS PALE-SCALED (Fig. 33B); LAST TWO ABDOMINAL TERGA NEARLY ENTIRELY PALE-SCALED (Fig. 33D) ..... *schizopinax*



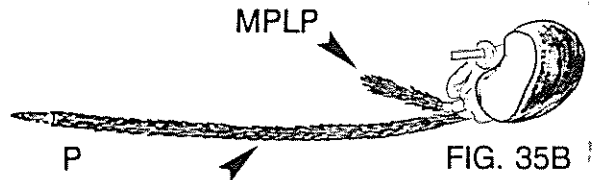
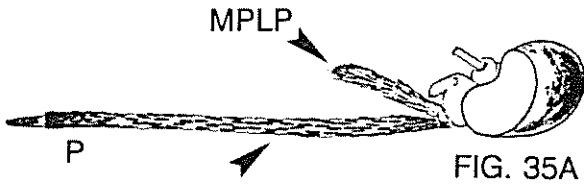
22. SCUTUM WITH A MEDIAN STRIPE OF DARK SCALES BOUNDED BY LARGE PATCHES OF PALE SCALES (Fig. 34A) (MAJOR RIVER AREAS OF THE NORTHERN SAN JOAQUIN AND SACRAMENTO VALLEYS) ..... *sticticus*

- SCUTUM APPEARING UNIFORMLY DARK, COVERED WITH MOSTLY PALE BROWN TO RUST COLORED SCALES (Fig. 34B) OR DARK BROWN SCALES WITH BRONZY REFLECTIONS (Fig. 34C) ..... 23



23. SCUTUM WITH PALE BROWN TO RUST COLORED SCALES  
(Fig. 34B); MAXILLARY PALPUS (MPLP) AND PROBOSCIS (P)  
WITH INTERMIXED DARK AND PALE SCALES (FIG. 35A) ..... *tahoensis*

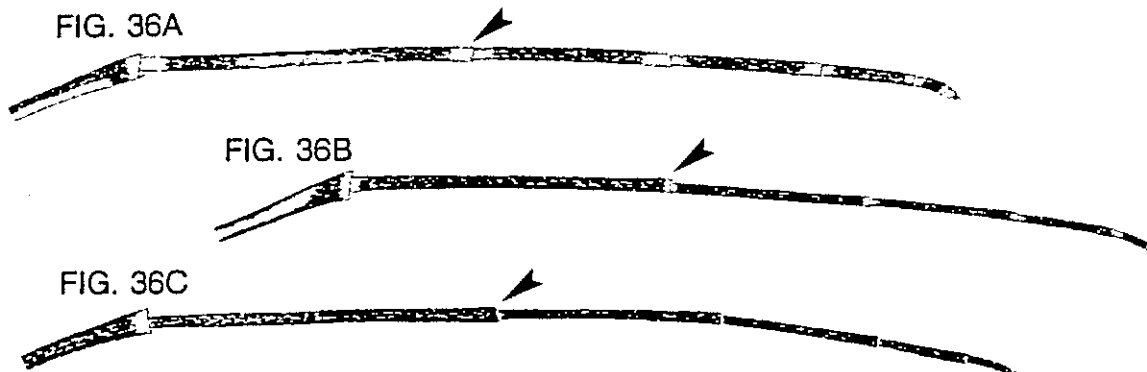
SCUTUM WITH DARK BROWN SCALES WITH BRONZY REFLECTIONS  
(Fig. 34C); MAXILLARY PALPUS AND PROBOSCIS MOSTLY DARK-  
SCALED OR WITH VERY FEW INTERMIXED PALE SCALES (Fig. 35B)  
(SMALL SPECIES FOUND ALONG THE CREST OF THE SIERRAS) ..... *hemiteleus*



KEY TO FEMALES

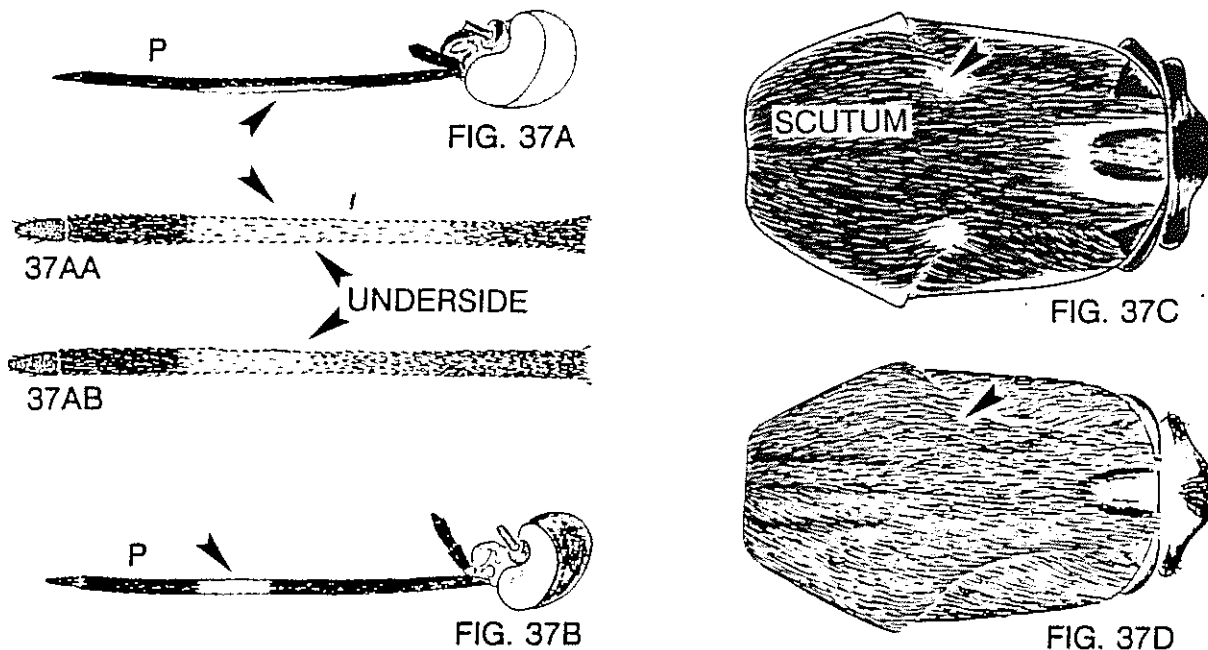
**CULEX**

- 1. HINDTARSUS WITH BANDS OF PALE SCALES OVERLAPPING THE JOINTS (Figs. 36A, 36B); BANDS MAY BE VERY NARROW (Fig. 36B) ..... 2
- HINDTARSUS WITHOUT BANDS OF PALE SCALES (Fig. 36C) ..... 5



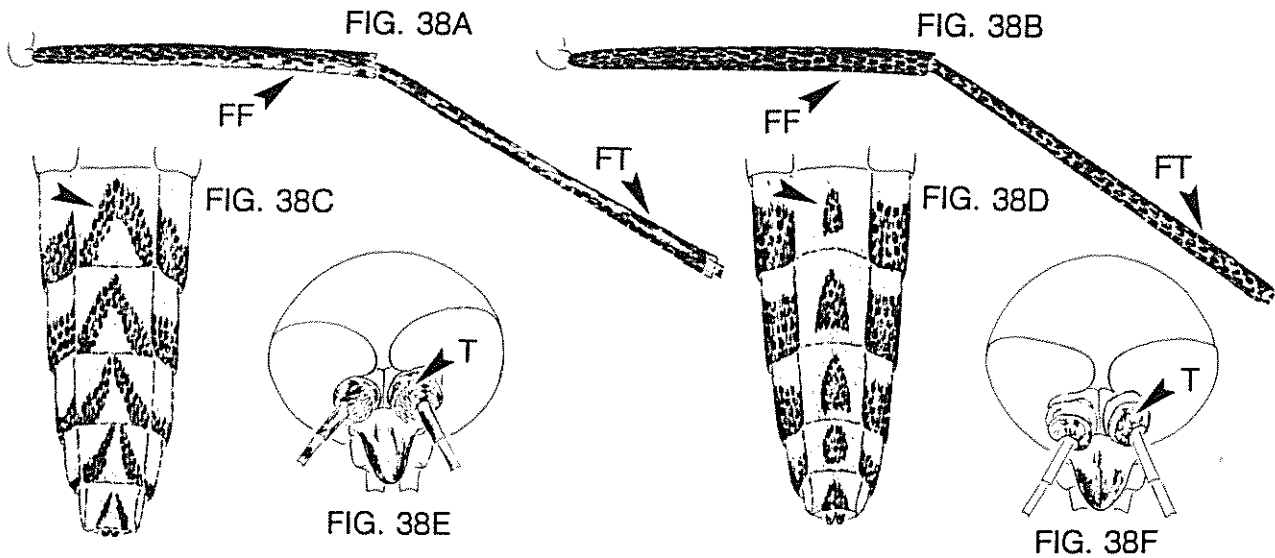
- 2. HINDTARSUS WITH VERY NARROW BANDS OF PALE SCALES (Fig. 36B); PROBOSCIS (P) WITHOUT A MEDIAN RING OF PALE SCALES BUT UNDERSIDE WITH A BROAD AREA OF PALE SCALES (Figs. 37A, 37AA); SCUTUM WITH MEDIOLATERAL SPOTS OF PALE SCALES (Fig. 37C) ..... *restuans*

- HINDTARSUS WITH CONSPICUOUS BANDS OF PALE SCALES (Fig. 36A); PROBOSCIS WITH A DISTINCT MEDIAN RING OF PALE SCALES (Fig. 37B) OR WITH AN INCOMPLETE RING VISIBLE FROM BENEATH AS A EXTENSIVE AREA OF PALE SCALES (Fig. 37A, 37AB); SCUTUM WITHOUT MEDIOLATERAL SPOTS OF PALE SCALES (Fig. 37D) ..... 3



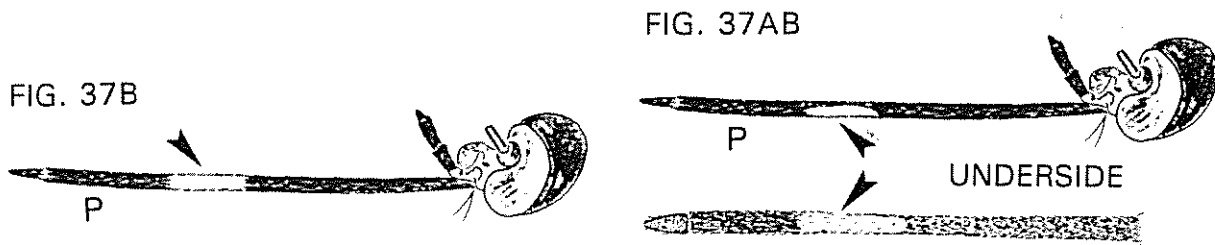
- 3. FOREFEMUR (FF) AND TIBIA (FT) WITH COMPLETE OR INTERRUPTED STRIPE OF PALE SCALES (Fig. 38A); ABDOMINAL STERNA WITH DARK-SCALED CHEVRON PATTERNS (Fig. 38C); INNER SURFACE OF TORUS (T) WITH A PATCH OF PALE SCALES (Fig. 38E) (WIDESPREAD) ..... *tarsalis*

FOREFEMUR AND TIBIA WITHOUT STRIPE OF PALE SCALES (Fig. 38B); ABDOMINAL STERNA WITH OVAL TO TRIANGULAR PATCHES OF DARK SCALES (Fig. 38D); INNER SURFACE OF TORUS WITHOUT A PATCH OF PALES SCALES (Fig. 38F) ..... 4



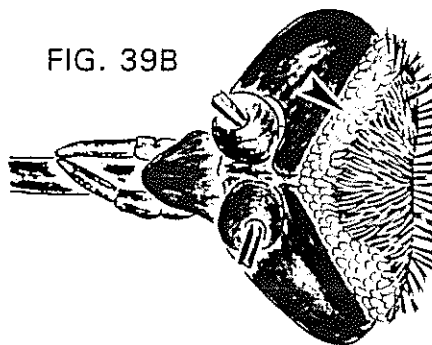
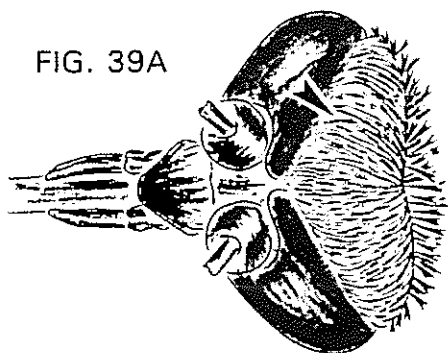
- 4. PROBOSCIS (P) WITH A COMPLETE MEDIAN RING OF PALE SCALES (Fig. 37B) (DARK COLORED SPECIES) ..... *stigmatosoma*

PROBOSCIS (P) WITH AN INCOMPLETE MEDIAN RING OF PALE SCALES USUALLY VISIBLE FROM THE UNDERSIDE (Fig. 37AB) (LIGHT COLORED SPECIES)..... *thriambus*



5. EYES MARGINED WITH NARROW GOLDEN TO DARK BROWN SCALES (Fig. 39A); BODY WITH CONTRASTING PALE SCALES ON THE THORAX, ABDOMEN, AND LEGS; SIDES OF THORAX WITH PROMINENT PATCHES OF PALE SCALES ..... 6

- EYES MARGINED WITH BROAD APPRESSED DARK TO PALE SCALES (Fig. 39B); BODY AND LEGS UNIFORMLY DARK BROWN WITH GREENISH REFLECTIONS; SIDES OF THORAX WITH SMALL PATCHES OF PALE SCALES ..... 11



6. ABDOMINAL TERGA WITH COMPLETE BASAL BANDS OF PALE SCALES, BANDS EITHER NARROW (Fig. 40A) OR CONTOURED WIDEST AT THE SIDES AND MIDDLE (Fig. 40B) ..... 7

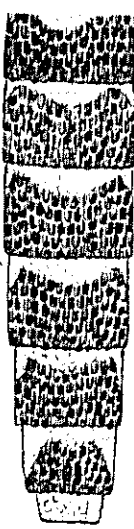
- DISTAL ABDOMINAL TERGA WITH COMPLETE APICAL BANDS OF PALE SCALES (Fig. 40C) OR APICAL LATERAL PATCHES OF PALE SCALES (Fig. 40D) ..... 8

FIG. 40A

FIG. 40B

FIG. 40C

FIG. 40D



- 7. ABDOMINAL TERGA WITH NARROW BASAL BANDS OF PALE YELLOW SCALES CONTRASTING WITH THE REDDISH BROWN SCALES AT THE APEX OF EACH TERGUM (Fig. 40A); SCUTUM REDDISH ORANGE ..... *erythrothorax*

ABDOMINAL TERGA WITH CONTOURED BASAL BANDS OF WHITISH SCALES CONTRASTING WITH THE DARK GREY SCALES AT THE APEX OF EACH TERGUM (Fig.40B); SCUTUM DARK BROWN  
 ..... *pipiens / quinquefasciatus*

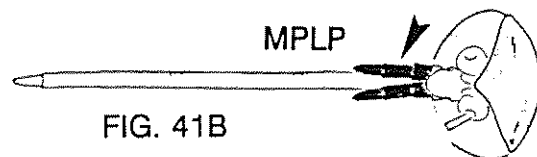
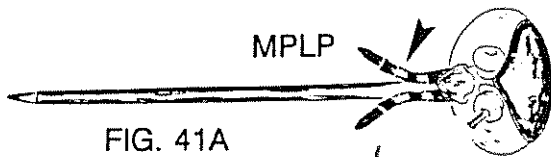
NOTE: FEMALE *pipiens* AND *quinquefasciatus* ARE MORPHOLOGICALLY INSEPARABLE. SEE BIOLOGICAL NOTES SECTION (PAGE 69) FOR DETAILS.

- 8. ABDOMINAL TERGA WITHOUT COMPLETE APICAL BANDS OF PALE SCALES, DISTAL TERGA WITH APICAL LATERAL PATCHES OF PALE SCALES (Fig. 40D) (COASTAL SPECIES) ..... *reevesi*

ABDOMINAL TERGA WITH COMPLETE APICAL BANDS OF PALE SCALES (Fig. 40C) ..... 9

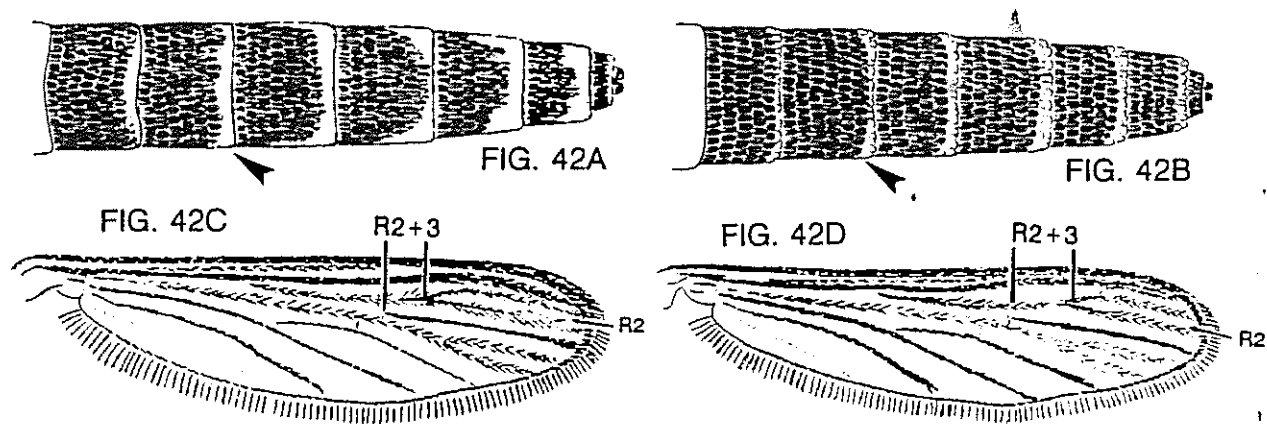
- 9. MAXILLARY PALPUS (MPLP) WITH RINGS OF PALE SCALES (Fig. 41A) ..... *apicalis*

MAXILLARY PALPUS WITHOUT RINGS OF PALE SCALES (Fig. 41B) ..... 10



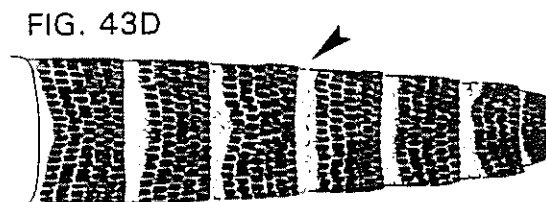
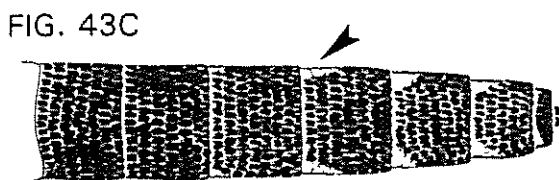
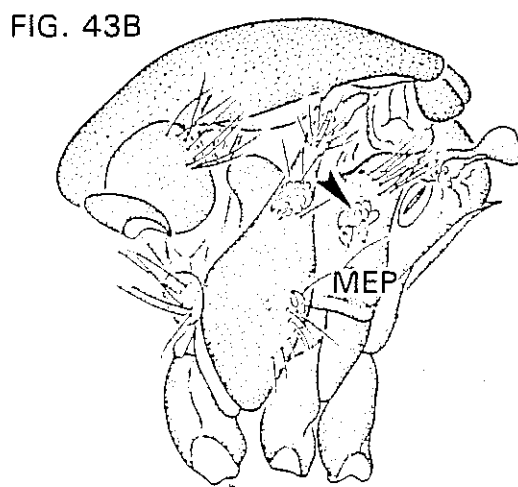
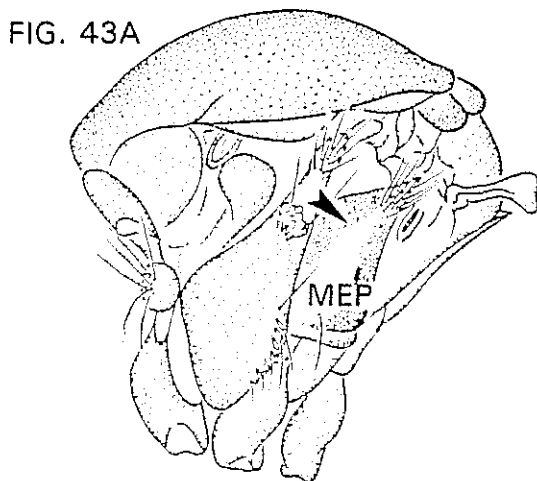
- 10. ABDOMINAL TERGA WITH WHITISH APICAL BANDS (Fig. 42A); WING PETIOLE (R 2 + 3) LESS THAN 1/3 OF THE LENGTH OF THE CELL (R2) (Fig. 42C) ..... *territans*

ABDOMINAL TERGA WITH YELLOWISH APICAL BANDS (Fig. 42B); WING PETIOLE ABOUT 1/2 THE LENGTH OF THE CELL (Fig. 42D) ..... *boharti*



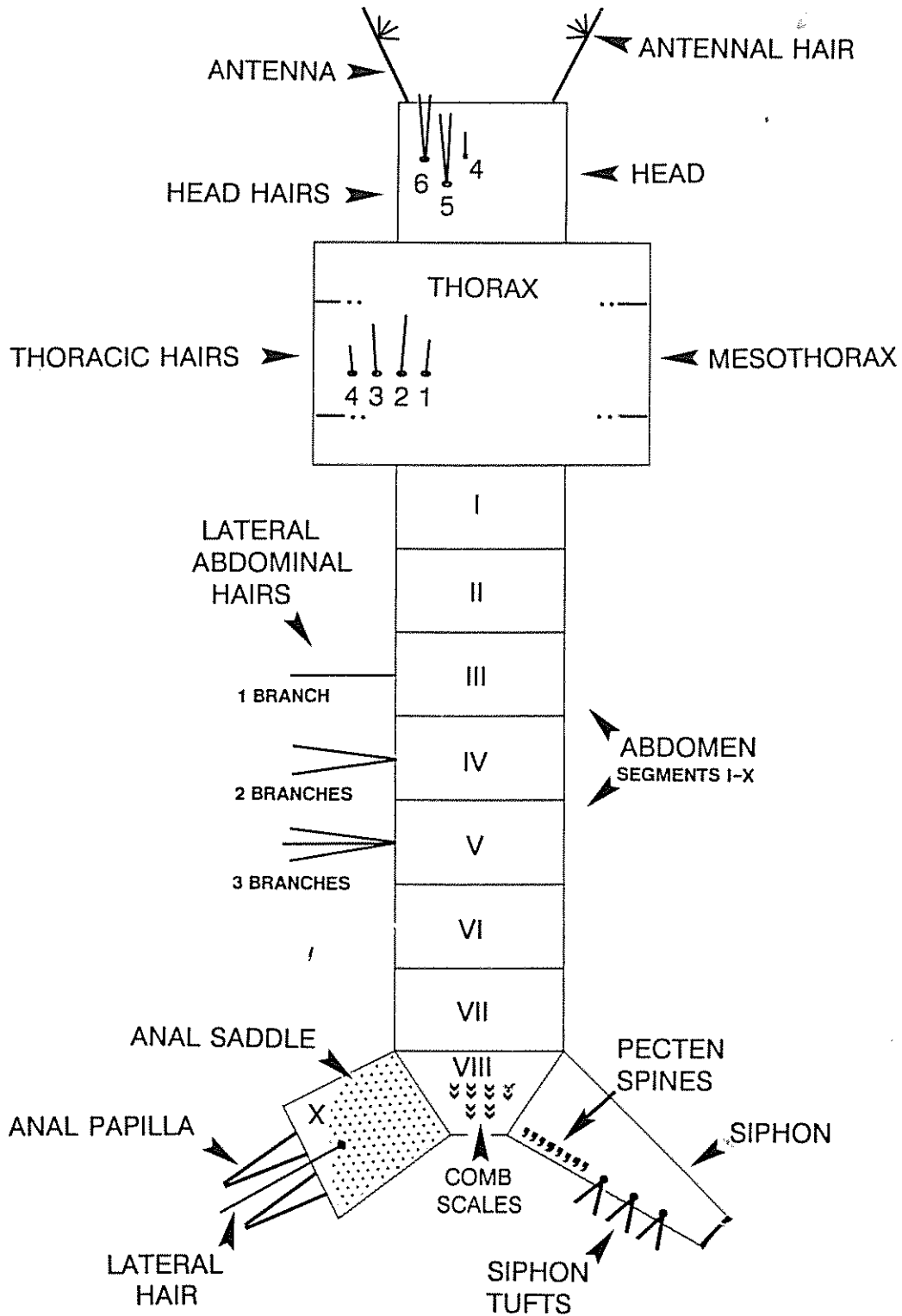
11. MESANEPIMERON (MEP) WITHOUT A PATCH OF PALE SCALES (Fig. 43A); ABDOMINAL TERGA V-VII WITH BASOLATERAL PATCHES OF PALE SCALES (Fig. 43C) (SOUTHWESTERN SAN DIEGO COUNTY) ..... *anips*

MESANEPIMERON WITH A SMALL PATCH OF PALE SCALES (Fig. 43B); ABDOMINAL TERGA WITH COMPLETE NARROW BASAL BANDS OF PALE SCALES (Fig. 43D) (WESTERN SHORE OF SALTON SEA) ..... *erraticus*



KEYS TO MATURE  
LARVAE

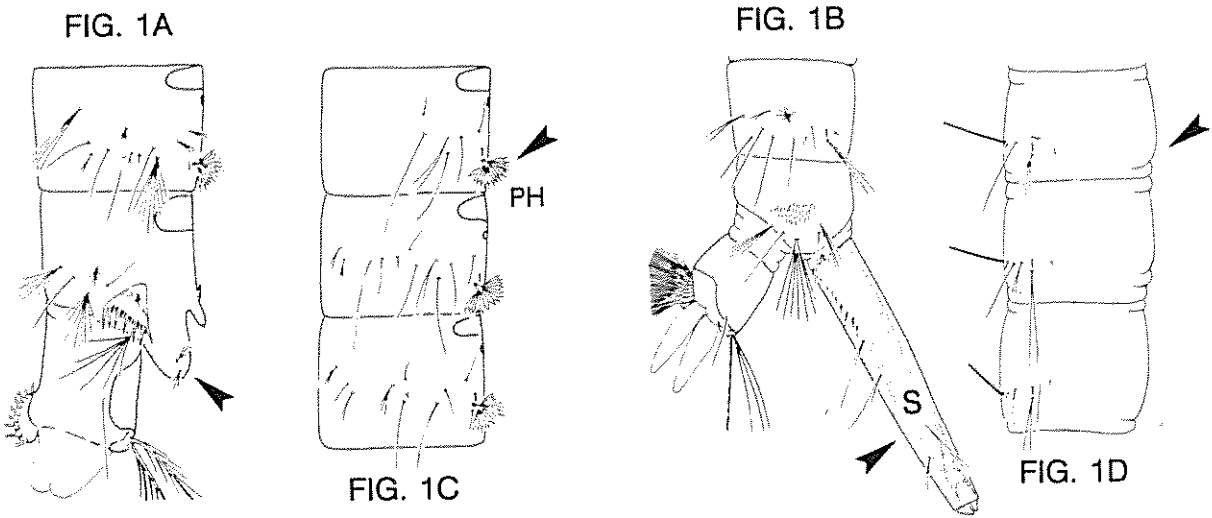
**LARVAL MOSQUITO MORPHOLOGY  
(TERMS USED IN LARVAL KEYS)**



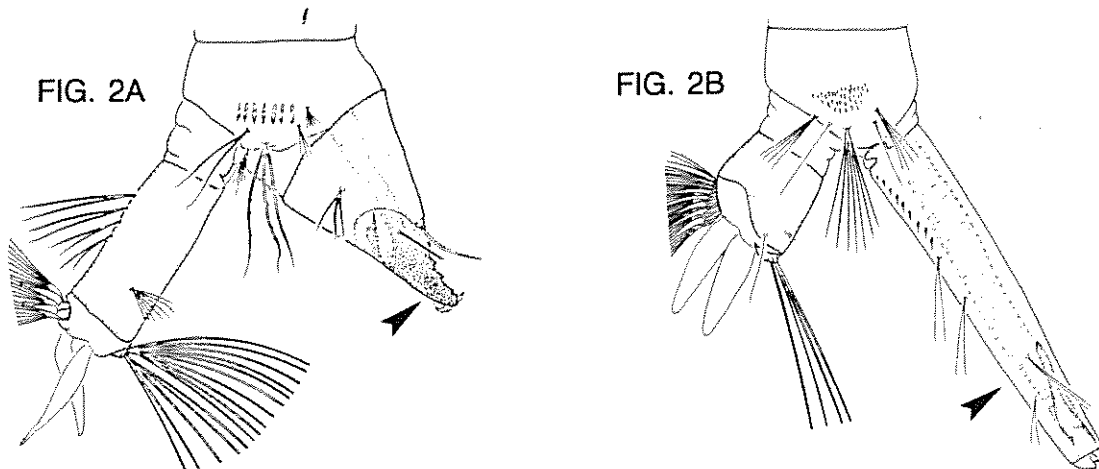
## KEY TO MATURE LARVAE OF CALIFORNIA MOSQUITOES

### GENERA

- 1. ABDOMINAL SEGMENT VIII WITHOUT AN ELONGATED SIPHON (Fig. 1A);  
 ABDOMINAL SEGMENTS WITH PALMATE HAIRS (PH) (Fig. 1C) ..... *Anopheles*  
 (Page 36)
  
- ABDOMINAL SEGMENT VIII WITH AN ELONGATED SIPHON (S) (Fig. 1B);  
 ABDOMINAL SEGMENTS WITHOUT PALMATE HAIRS (Fig. 1D) ..... 2

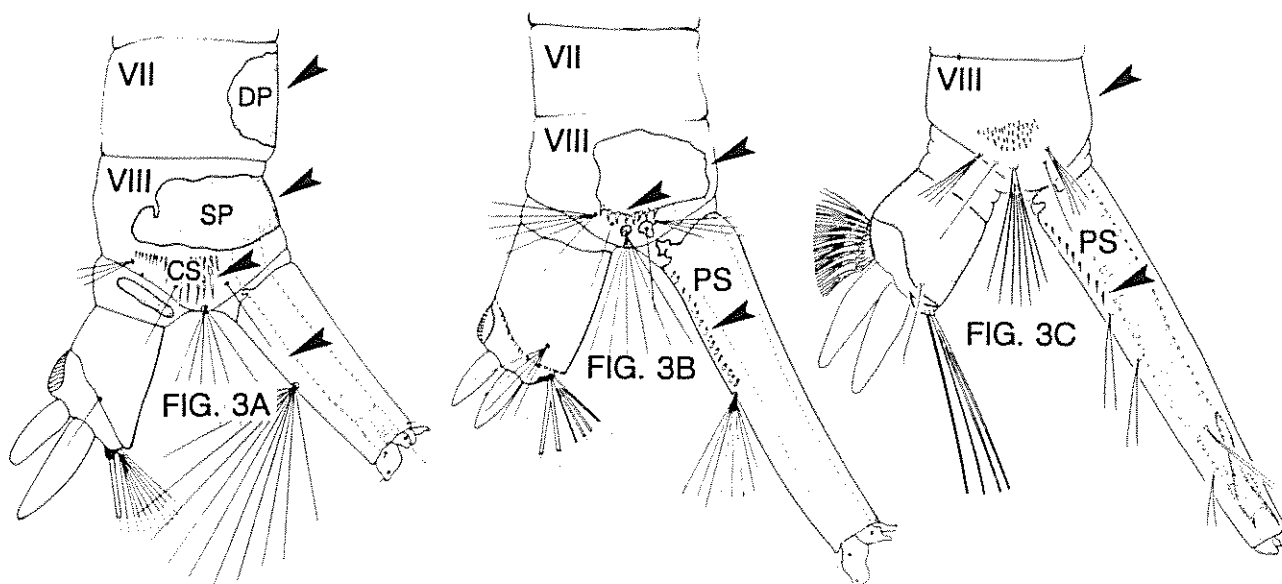


- 2. SIPHON SHORT AND CURVED WITH TIP SERRATED FOR ATTACHMENT TO CATTAILS AND TULES (Fig. 2A) ..... *Coquillettidia perturbans*
  
- SIPHON NOT SPECIALIZED BUT EVENLY TAPERED OR EXPANDED, TIP NOT SERRATED FOR ATTACHMENT TO CATTAILS OR TULES (Fig. 2B) ..... 3



3. ABDOMINAL SEGMENT VIII WITH A PROMINENT SCLEROTIZED PLATE (SP) (Figs. 3A, 3B) . . . . . 4

- ABDOMINAL SEGMENT VIII WITHOUT A PROMINENT SCLEROTIZED PLATE (Fig. 3C) . . . . . 5



4. ABDOMINAL SEGMENT VII WITH A DORSAL SCLEROTIZED PLATE (DP); COMB SCALES (CS) ARRAYED IN 2 ROWS SEPARATE FROM SCLEROTIZED PLATE ON ABDOMINAL SEGMENT VIII (Fig. 3A); SIPHON WITHOUT PECTEN SPINES (Fig. 3A); HEAD HAIRS 5 AND 6 WITH MULTIPLE BRANCHES (Fig. 4A) (TREEHOLE SPECIES) . . . . . *Orthopodomysia signifera*

- ABDOMINAL SEGMENT VII WITHOUT A DORSAL SCLEROTIZED PLATE; COMB SCALES ARRAYED IN SINGLE ROW ATTACHED TO THE SCLEROTIZED PLATE ON ABDOMINAL SEGMENT VIII (Fig. 3B); SIPHON WITH PECTEN SPINES (PS) (Fig. 3B); HEAD HAIRS 5 AND 6 WITH 1-2 BRANCHES (Fig. 4B) (SMALL DESERT SPECIES) . . . . . *Uranotaenia anhydor*

FIG. 4A

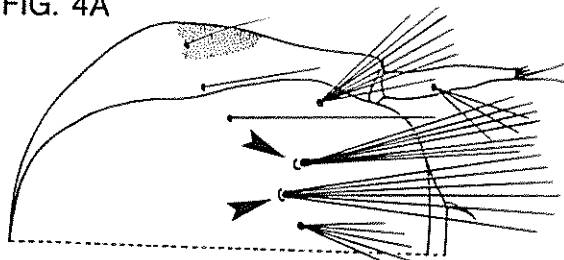
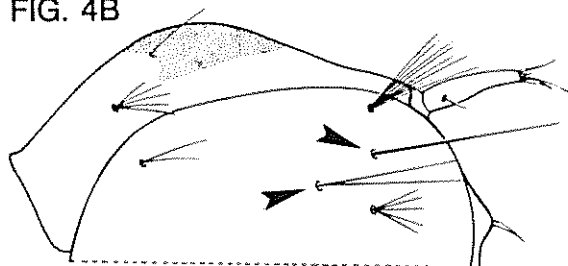


FIG. 4B



- 5. SIPHON WITH MORE THAN 1 TUFT (ST), ALL INSERTED BEYOND THE PECTEN ROW (PS) (Fig. 5A) ..... *Culex* (Page 52)

SIPHON WITH ONLY 1 TUFT EITHER INSERTED VENTRALLY NEAR THE BASE OF THE PECTEN ROW (Fig. 5B), OR INSERTED BEYOND THE PECTEN ROW (Figs. 5C, 5D, 5F), OR INSERTED WITHIN THE PECTEN ROW (Fig. 5E) ..... 6

FIG. 5A

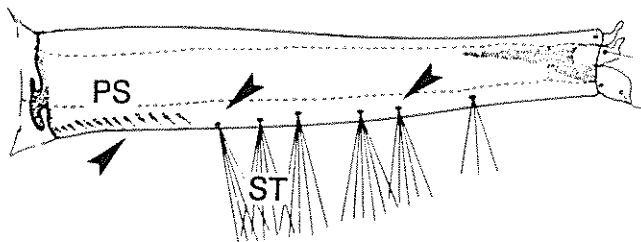


FIG. 5B

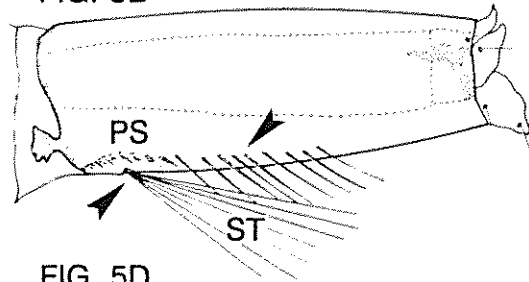


FIG. 5C

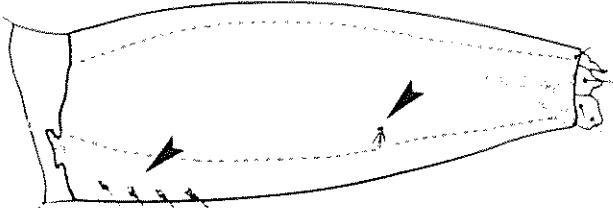


FIG. 5D

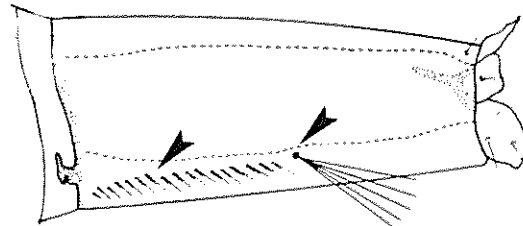


FIG. 5E

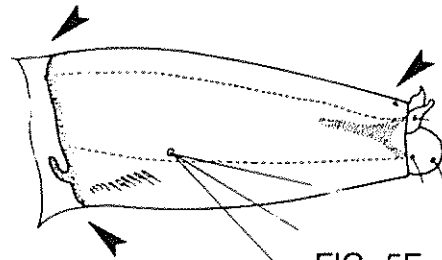
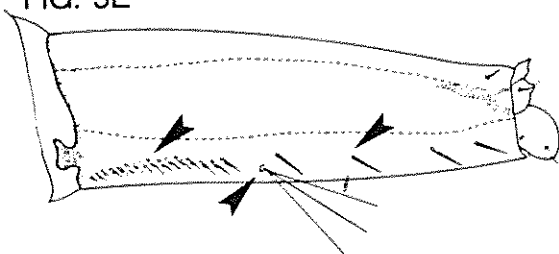


FIG. 5F

- 6. SINGLE SIPHON TUFT INSERTED NEAR THE BASE OF THE PECTEN ROW, BASAL 1/3 OF PECTEN ROW CONSISTING OF SHORT SPINES WITH DISTAL 2/3 CONSISTING OF LONG FINE SPINES (Fig. 5B) ..... *Culiseta* (Page 38)

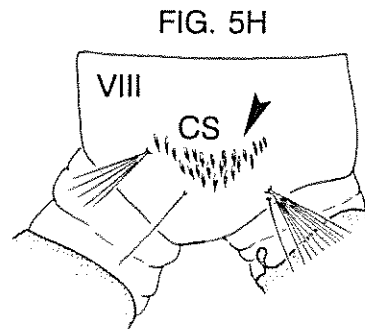
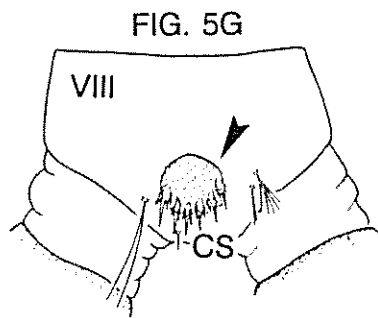
SINGLE SIPHON TUFT INSERTED WITHIN OR BEYOND THE PECTEN ROW, ENTIRE PECTEN ROW CONSISTING OF SHORT SPINES (Figs. 5C, 5D, 5E, 5F) ..... 7

7. SIPHON INFLATED MEDIANLY, PECTEN ROW WITH FEWER THAN 7 SPINES (Fig. 5C); COMB SCALES ATTACHED TO A CIRCULAR SCLEROTIZED PLATE AT THE APEX OF ABDOMINAL SEGMENT VIII (Fig. 5G) .....

*Psorophora*  
(Page 40)

- SIPHON NOT INFLATED (Figs. 5D, 5E), IF SLIGHTLY INFLATED THEN LESS THAN TWICE AS LONG AS WIDE (Fig. 5F); PECTEN ROW WITH MORE THAN 10 SPINES, CIRCULAR SCLEROTIZED PLATE AT THE APEX OF ABDOMINAL SEGMENT VIII ABSENT (Fig. 5H) .....

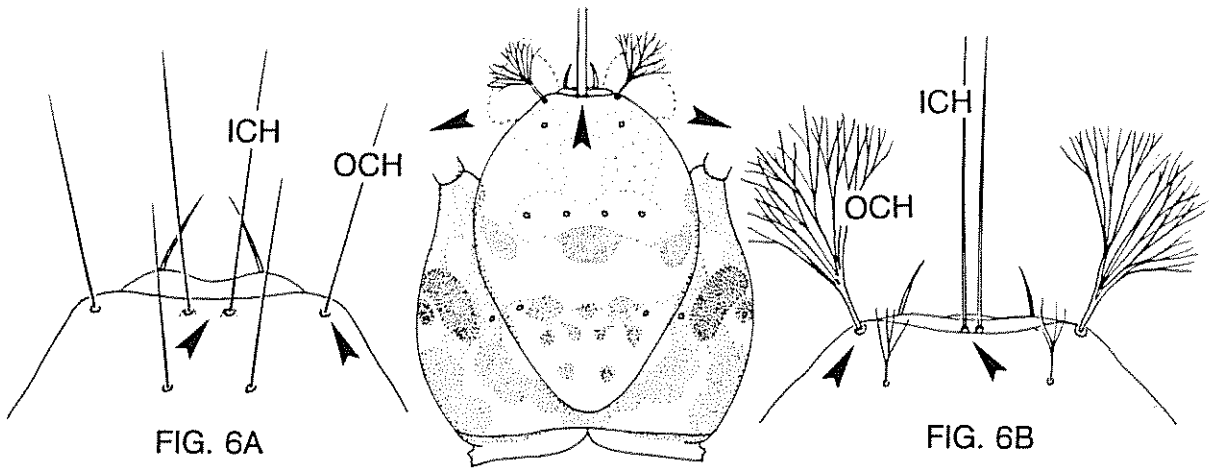
*Aedes*  
(Page 41)



## KEY TO LARVAE *ANOPHELES*

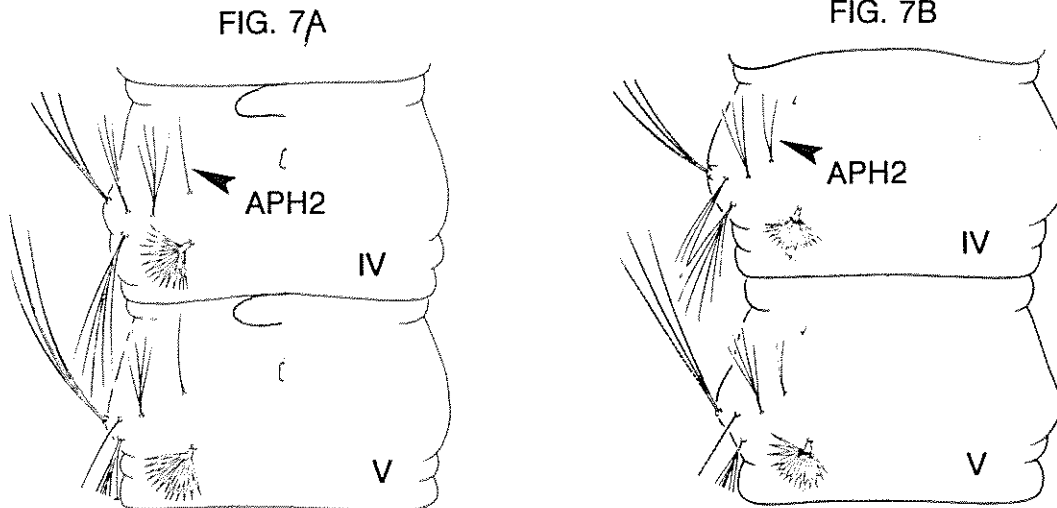
1. INNER CLYPEAL HAIRS (ICH) SEPARATED BY MORE THAN THE WIDTH OF THEIR BASAL TUBERCLES, OUTER CLYPEAL HAIR (OCH) WITH 1 BRANCH (Fig. 6A) (WIDESPREAD) ..... *franciscanus*

INNER CLYPEAL HAIRS SEPARATED BY LESS THAN THE WIDTH OF THEIR BASAL TUBERCLES, OUTER CLYPEAL HAIRS WITH MULTIPLE BRANCHES (Fig. 6B) ..... 2



2. ANTEPALMATE HAIR 2 (APH2) ON ABDOMINAL SEGMENTS IV AND V WITH 1 BRANCH (Fig. 7A) (COASTAL SPECIES) ..... *occidentalis*

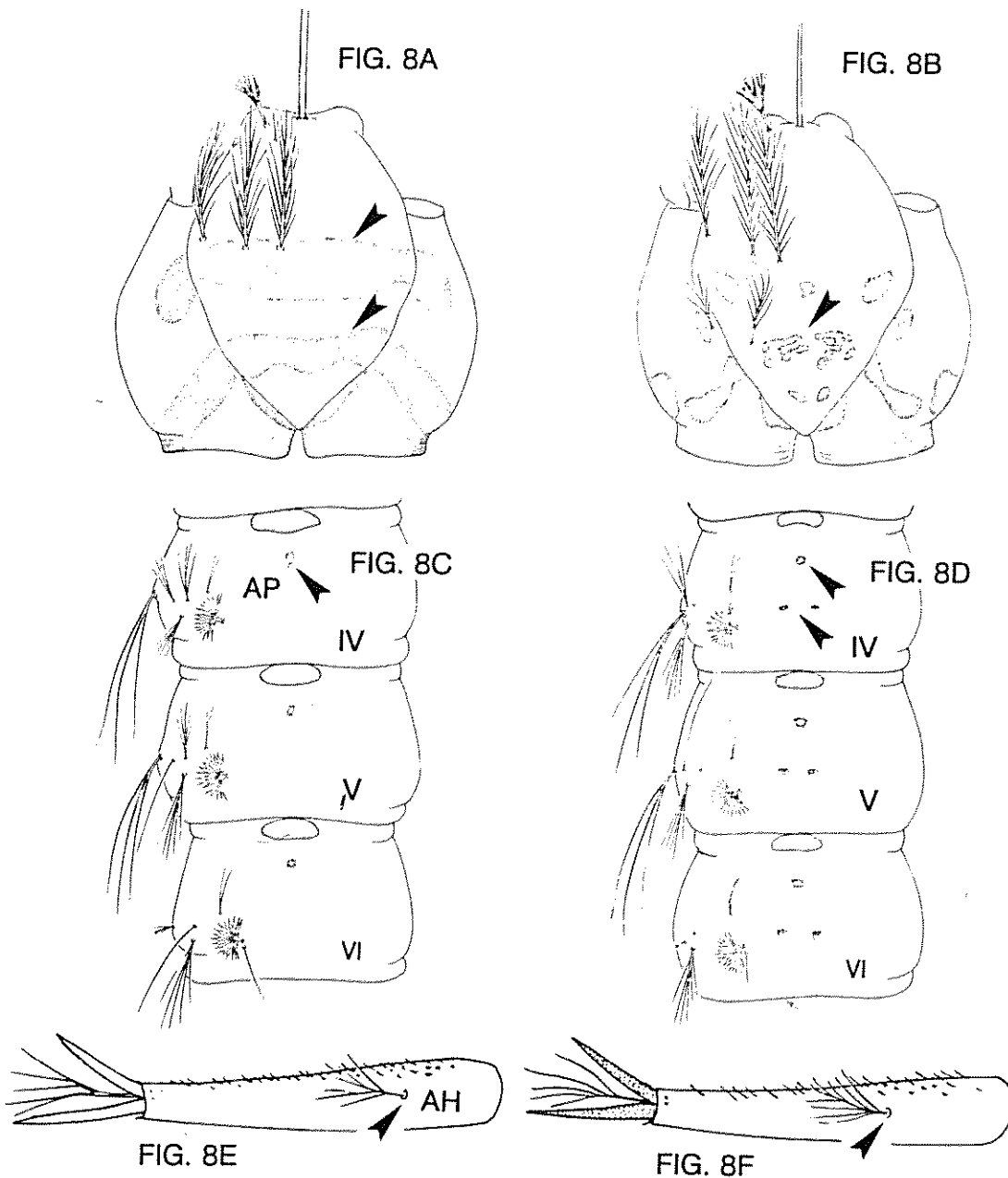
ANTEPALMATE HAIR 2 ON ABDOMINAL SEGMENTS IV AND V WITH 2-3 BRANCHES (Fig. 7B) ..... 3



3. DORSUM OF HEAD WITH 2 DISTINCT CROSS-BANDS (Fig. 8A);  
 ABDOMINAL SEGMENTS IV-VI WITH A SMALL ASSESSORY PLATE  
 (AP) (Fig. 8C); ANTENNAL HAIR (AH) INSERTED ON BASAL  
 1/3 OF ANTENNA (Fig. 8F) (WOODLAND SPECIES) ..... *punctipennis*

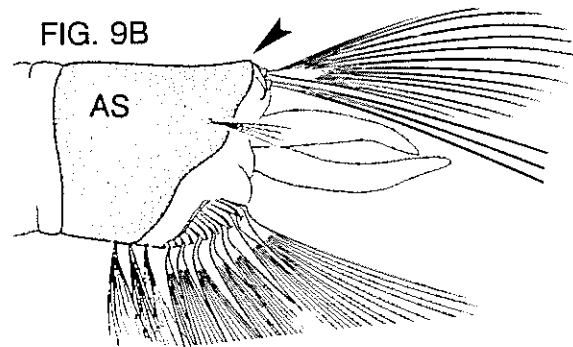
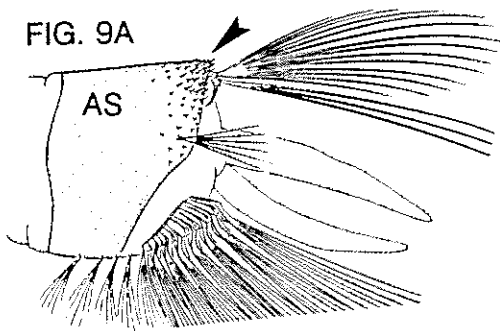
DORSUM OF HEAD WITH PATTERN OF SPOTS LOOSELY FORMING  
 INDISTINCT CROSS-BANDS (Fig. 8B); ABDOMINAL SEGMENTS  
 IV-VI WITH 3 TINY ASSESSORY PLATES (Fig. 8D); ANTENNAL  
 HAIR INSERTED ON DISTAL 2/3 OF ANTENNA (Fig. 8F) ..... *freeborni / hermsi*

NOTE: LARVAL *freeborni* AND *hermsi* ARE MORPHOLOGICALLY INSEPARABLE.  
 SEE BIOLOGICAL NOTES SECTION (PAGE 66) FOR DETAILS.

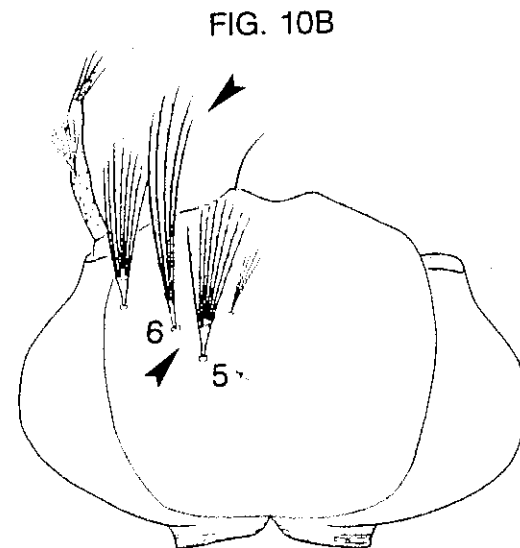
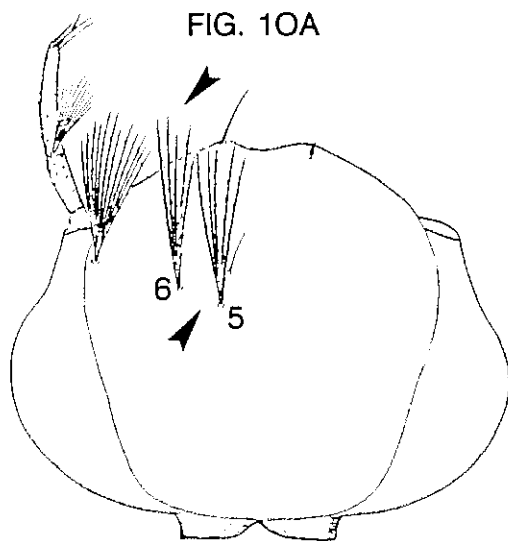


## KEY TO LARVAE *CULISETA*

- 1. DORSAL CREST OF ANAL SADDLE (AS) WITH SMALL SPINES (ACICULAE) (Fig. 9A) ..... *particeps*
- DORSAL CREST OF ANAL SADDLE WITHOUT SMALL SPINES (ACICULAE) (Fig. 9B) ..... 2



- 2. HEAD HAIRS 5 AND 6 OF EQUAL LENGTH AND EQUALLY BRANCHED (Fig. 10A) (RARE- CENTRAL AND NORTHERN SIERRAS) ..... *impatiens*
- HEAD HAIRS 5 AND 6 OF UNEQUAL LENGTH, HAIR 6 LONGER THAN HAIR 5 AND WITH FEWER BRANCHES (Fig. 10B) ..... 3



3. LATERAL HAIR (LH) ON ANAL SADDLE (AS) LONGER THAN THE LENGTH OF THE DORSAL CREST OF SADDLE, LATERAL HAIR WITH 1-2 LONG BRANCHES (Fig. 11A) (WIDESPREAD) ..... *inomata*

LATERAL HAIR ON ANAL SADDLE MUCH SHORTER THAN THE LENGTH OF THE DORSAL CREST OF SADDLE, LATERAL HAIR WITH 3-4 SHORT BRANCHES (Fig. 11B) ..... *incidens*

FIG. 11A

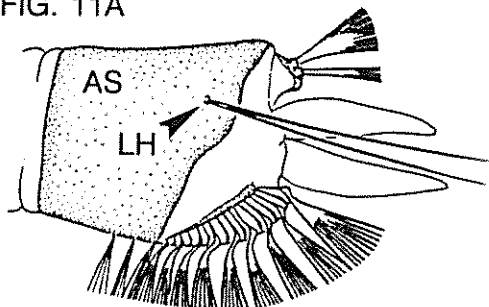
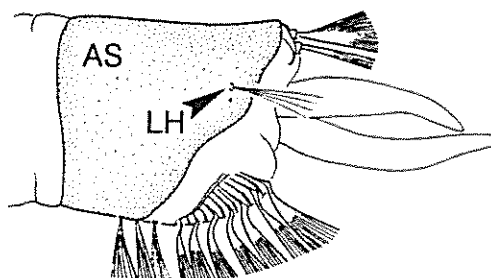
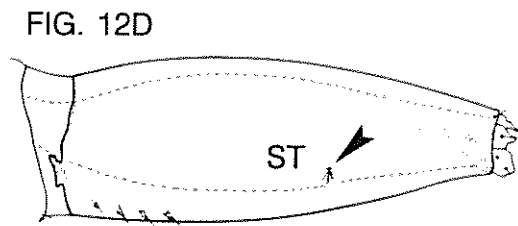
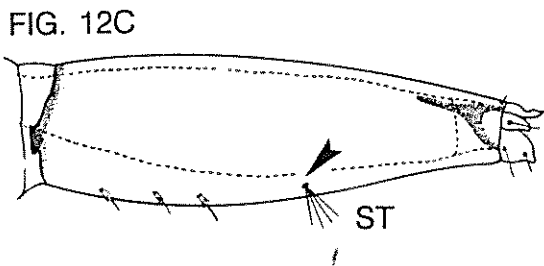
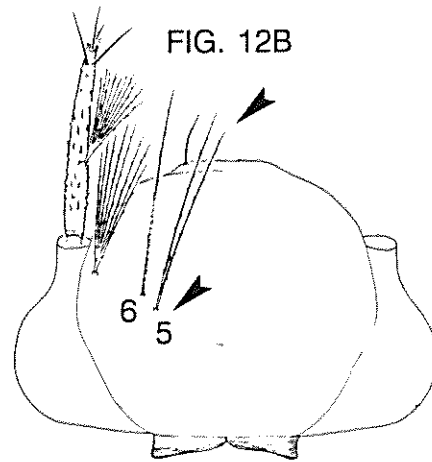
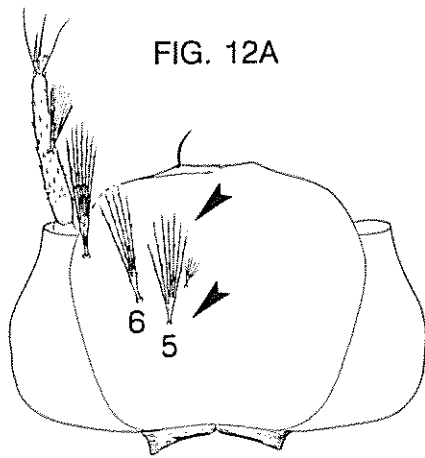


FIG. 11B



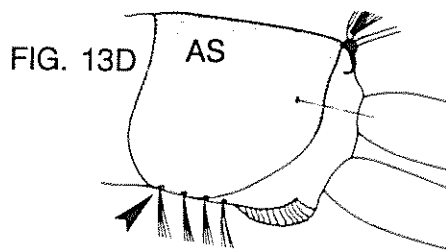
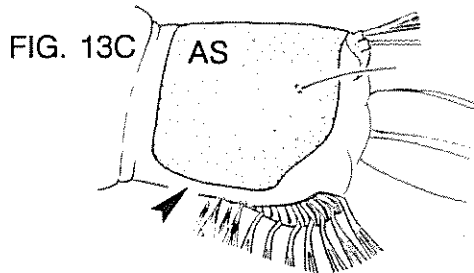
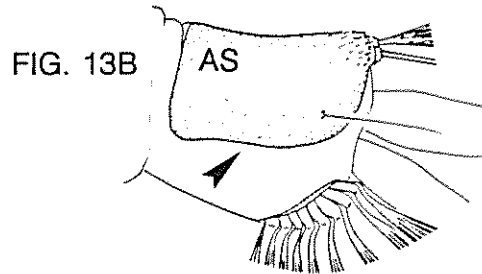
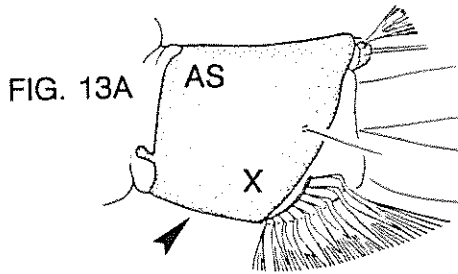
# KEY TO LARVAE *PSOROPHORA*

- 1. HEAD HAIRS 5 AND 6 WITH MULTIPLE BRANCHES, HEAD HAIRS SHORTER THAN LENGTH OF ANTENNA (Fig. 12A); SIPHON TUFT (ST) PROMINENT (Fig. 12C) ..... *columbiae*
- HEAD HAIRS 5 AND 6 WITH 1-2 BRANCHES, HEAD HAIRS LONGER THAN LENGTH OF ANTENNA (Fig. 12B); SIPHON TUFT TINY (Fig. 12D) ..... *signipennis*



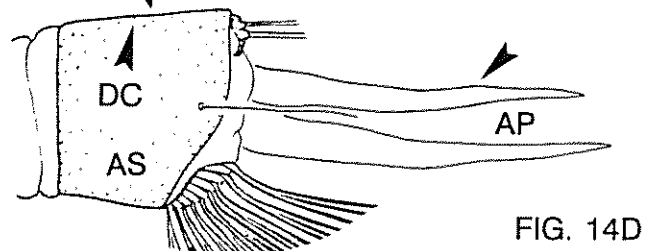
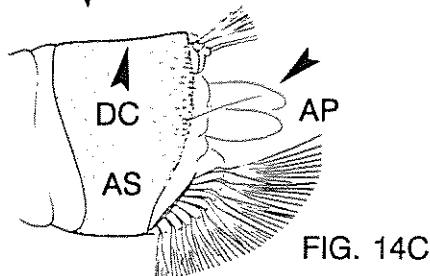
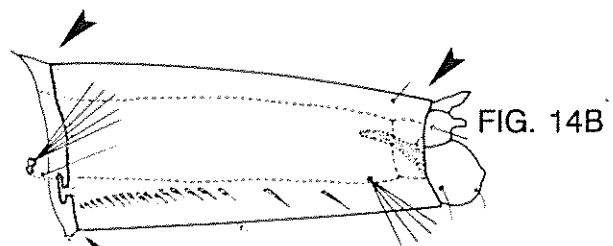
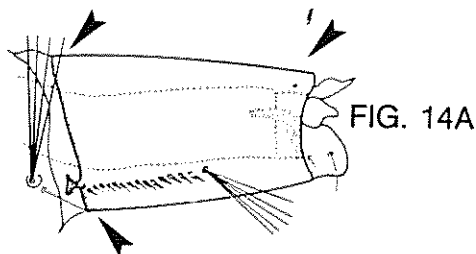
## KEY TO LARVAE *Aedes*

1. ANAL SADDLE (AS) COMPLETELY ENCIRCLING ANAL SEGMENT (X) (Fig. 13A) ..... 2
- ANAL SADDLE NOT COMPLETELY ENCIRCLING ANAL SEGMENT (Figs. 13B, 13C) OR SADDLE MAY BE COMPLETE AT BASE ONLY (Fig. 13D) ..... 5



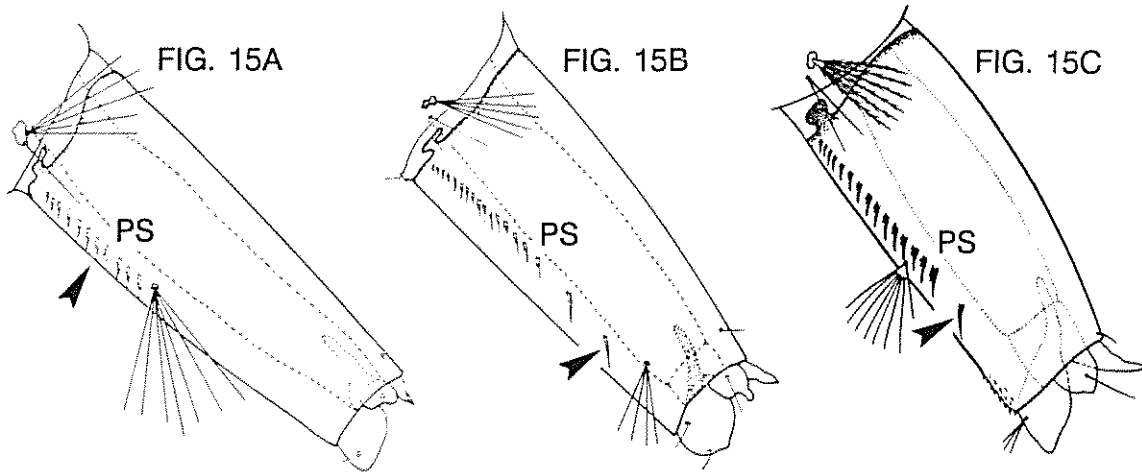
2. SIPHON INDEX ABOUT 1.0 (NEARLY AS LONG AS BASAL WIDTH) (Fig. 14A); ANAL PAPILLA (AP) VERY SHORT OR BUD-LIKE (Fig. 14C) (CENTRAL AND SOUTHERN COASTAL SALT MARSHES AND SOUTHEASTERN DESERTS) ..... *taeniorhynchus*

- SIPHON INDEX MUCH GREATER THAN 1.0 (DISTINCTLY LONGER THAN BASAL WIDTH) (Fig. 14B); ANAL PAPILLA LONGER THAN DORSAL CREST (DC) OF ANAL SADDLE (Fig. 14D) ..... 3



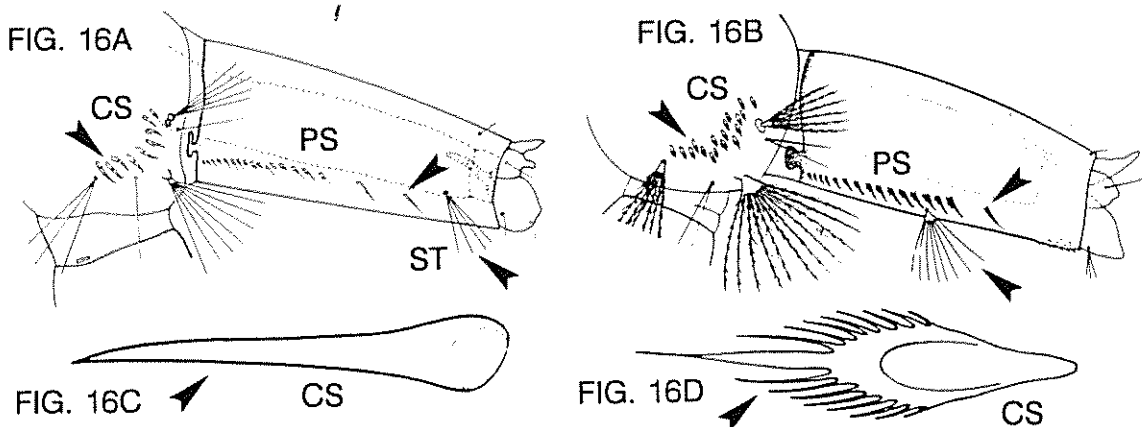
3. PECTEN ROW WITH SPINES (PS) EVENLY SPACED (Fig. 15A);  
 COMB SCALES USUALLY 6-8 AND THORN-LIKE ..... *hexodontus*

- PECTEN ROW WITH 1-4 DISTAL SPINES IRREGULARLY OR MORE  
 WIDELY SPACED (DETACHED) (Figs. 15B, 15C); COMB SCALES  
 VARIABLE ..... 4

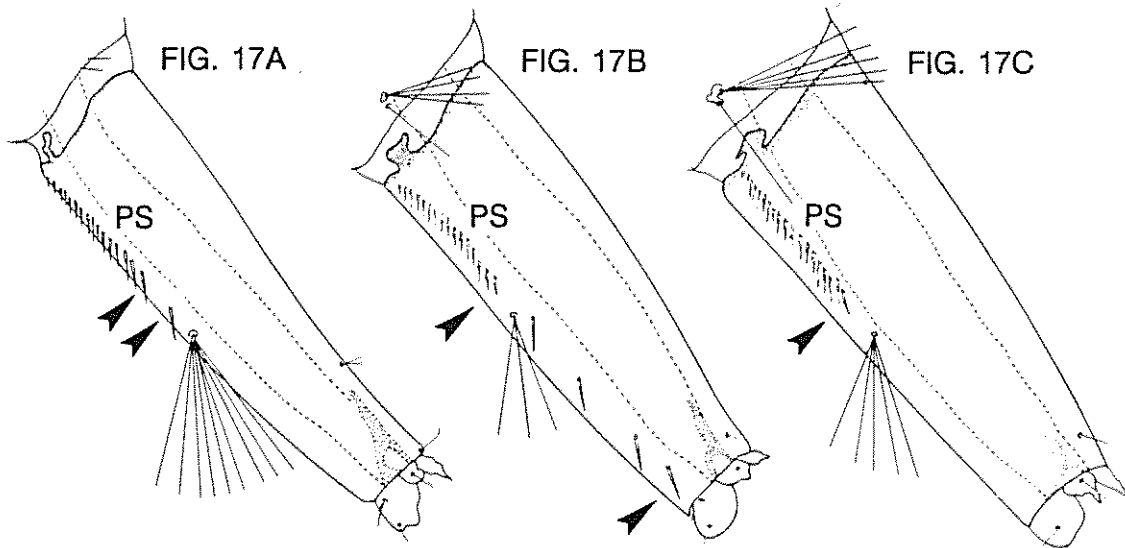


4. SIPHON TUFT (ST) INSERTED AT APICAL 1/3 OF SIPHON,  
 PECTEN ROW WITH 2-4 DISTAL SPINES (PS) DETACHED  
 (Fig. 16A); COMB SCALES (CS) 6-12 AND TOOTH-LIKE  
 (Fig. 16C) (WIDESPREAD) ..... *nigromaculis*

- SIPHON TUFT INSERTED NEAR MIDDLE OF SIPHON WITHIN  
 PECTEN ROW, 1 DISTAL SPINE DETACHED (Fig. 16B);  
 COMB SCALES MORE THAN 15 AND FEATHER-LIKE  
 (Fig. 16D) (LOWER COLORADO RIVER) ..... *thelcter*



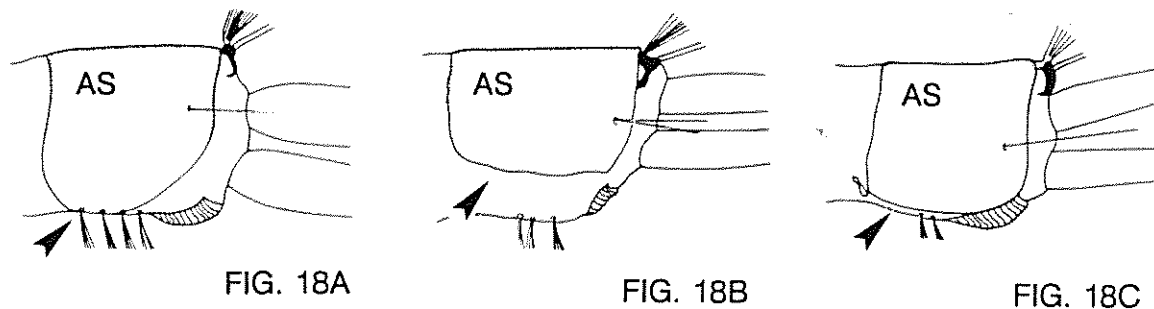
- 5. PECTEN ROW WITH 1 OR MORE DISTAL SPINES (PS) DETACHED (Figs. 17A, 17B) ..... 6
- PECTEN ROW WITH SPINES EVENLY SPACED, DISTAL SPINES NOT DETACHED (Fig. 17C) ..... 13

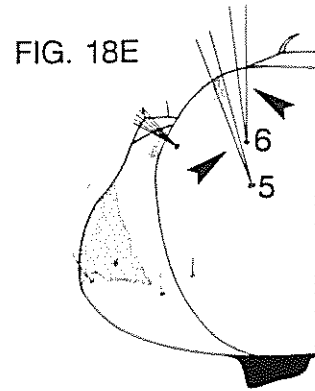
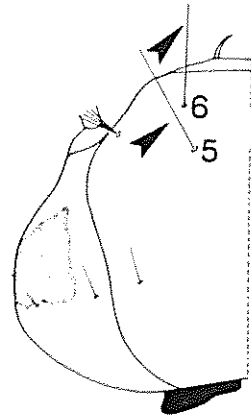
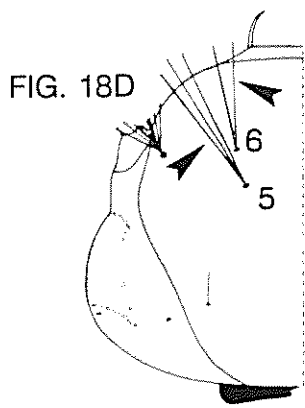


- 6. SIPHON TUFT INSERTED WITHIN PECTEN ROW, SPINES EXTEND NEARLY TO TIP OF SIPHON (Fig. 17B) (CREST OF SIERRAS AND GREAT BASIN) ..... *cataphylla*
- SIPHON TUFT INSERTED BEYOND PECTEN ROW, SPINES EXTEND TO MIDDLE OF SIPHON (Fig. 17A) ..... 7

- 7. ANAL SADDLE (AS) COMPLETELY ENCIRCLING ANAL SEGMENT AT BASE ONLY (Fig. 18A); HEAD HAIR 5 WITH 3 BRANCHES AND HEAD HAIR 6 WITH 2 BRANCHES (Fig. 18D) ..... *vexans*

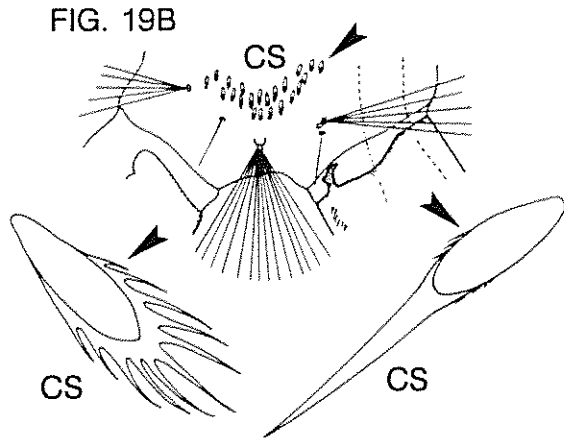
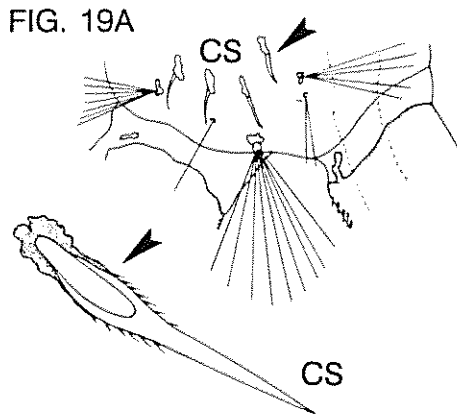
- ANAL SADDLE INCOMPLETE (Fig. 18B) OR NEARLY JOINED ALONG VENTRAL BORDER (Fig. 18C), IF SADDLE NEARLY JOINED THEN HEAD HAIRS 5 AND 6 WITH 1-2 BRANCHES (Fig. 18E) ..... 8





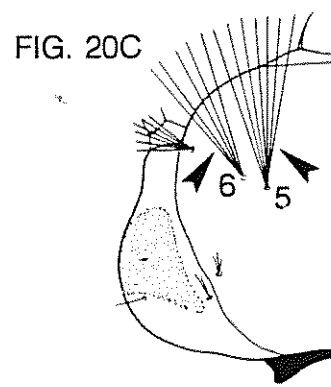
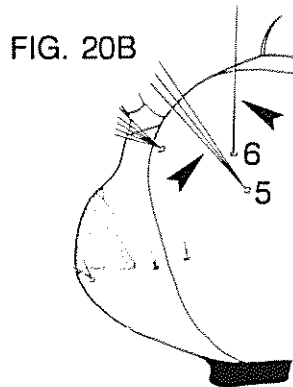
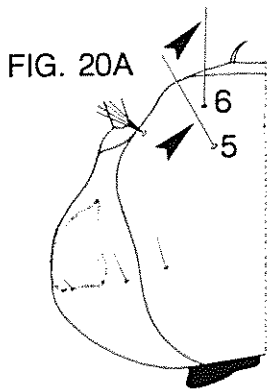
8. COMB SCALES (CS) 3-5 AND TOOTH-LIKE (Fig. 19A)  
 (FOOTHILLS OF CENTRAL AND NORTHERN CALIFORNIA) ..... *bicristatus*

COMB SCALES MORE THAN 8, EITHER TOOTH-LIKE OR  
 FEATHER-LIKE (Fig. 19B) ..... 9



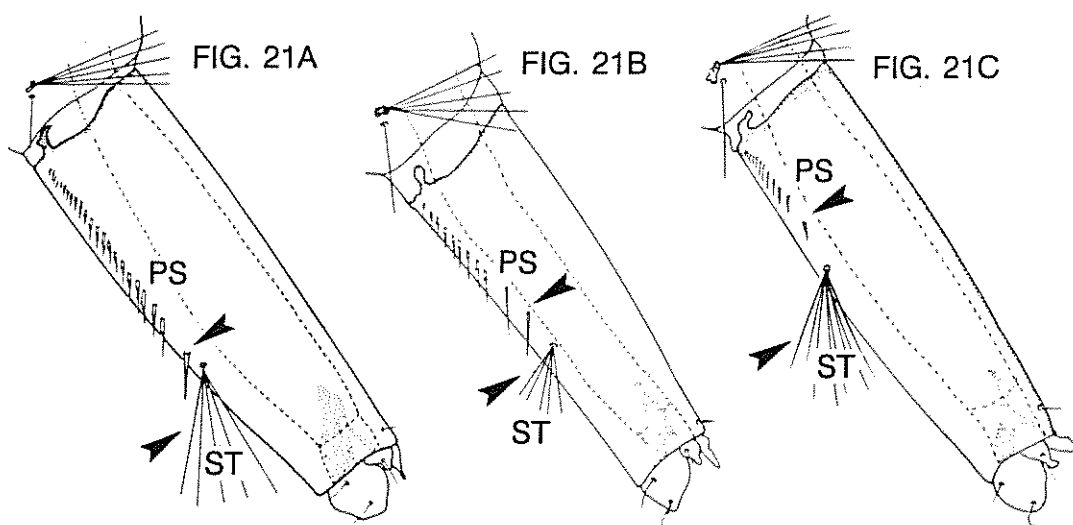
9. HEAD HAIR 5 WITH 1-3 BRANCHES, HEAD HAIR 6 WITH  
 1-2 BRANCHES (Figs. 20A, 20B) ..... 10

HEAD HAIRS 5 AND 6 WITH 3 OR MORE BRANCHES (Fig. 20C) ..... 12



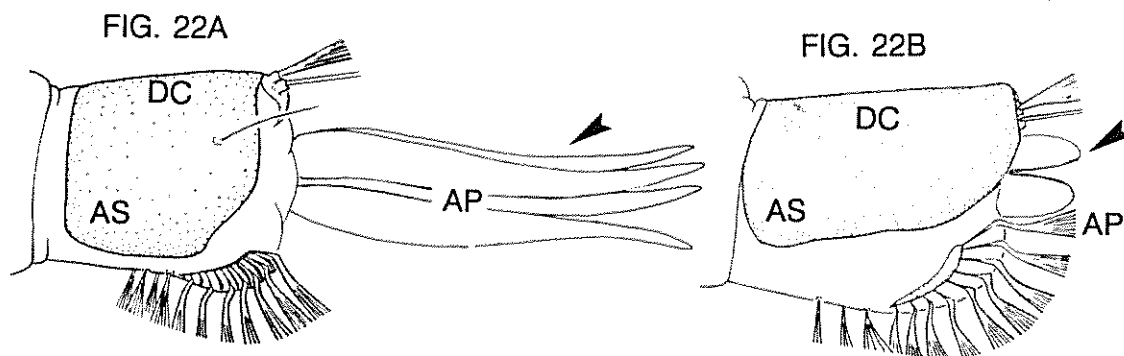
10. HEAD HAIR 5 WITH 3-4 BRANCHES, HEAD HAIR 6 WITH 1 AND RARELY 2 BRANCHES (Fig. 20B); SIPHON TUFT (ST) INSERTED AT APICAL 1/3 OF SIPHON, PECTEN SPINES (PS) EXTEND BEYOND MIDDLE OF SIPHON (Fig. 21A) (GREAT BASIN NORTH OF LAKE TAHOE) . . . . . *campestris*

HEAD HAIRS 5 AND 6 WITH 1 AND RARELY 2 BRANCHES (Fig. 20A);  
EITHER SIPHON TUFT INSERTED JUST BEYOND THE MIDDLE OF  
SIPHON AND PECTEN SPINES EXTEND TO MIDDLE OF SIPHON  
(Fig. 21B) OR SIPHON TUFT INSERTED BEFORE MIDDLE OF  
SIPHON AND PECTEN SPINES LIMITED TO BASAL 1/3 OF  
SIPHON (Fig. 21C) . . . . . 11



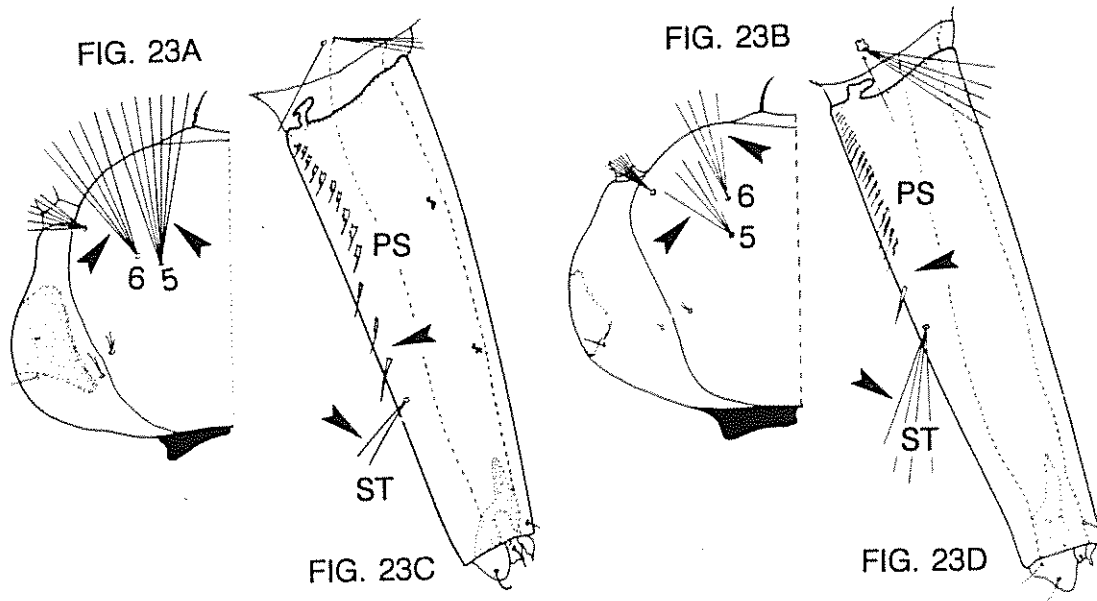
11. SIPHON TUFT (ST) INSERTED JUST BEYOND MIDDLE OF SIPHON,  
PECTEN SPINES (PS) EXTENDING TO MIDDLE OF SIPHON (Fig. 21B);  
ANAL PAPILLA (AP) LONGER THAN DORSAL CREST (DC) OF ANAL  
SADDLE (Fig. 22A) (CREST OF SIERRAS) . . . . . *ventrovittis*

SIPHON TUFT INSERTED BEFORE MIDDLE OF SIPHON, PECTEN SPINES  
LIMITED TO BASAL 1/3 OF SIPHON (Fig. 21C); ANAL PAPILLA  
BUD-LIKE AND MUCH SHORTER THAN DORSAL CREST OF ANAL  
SADDLE (Fig. 22B) (GREAT BASIN NORTH OF LAKE TAHOE) . . . . . *niphadopsis*

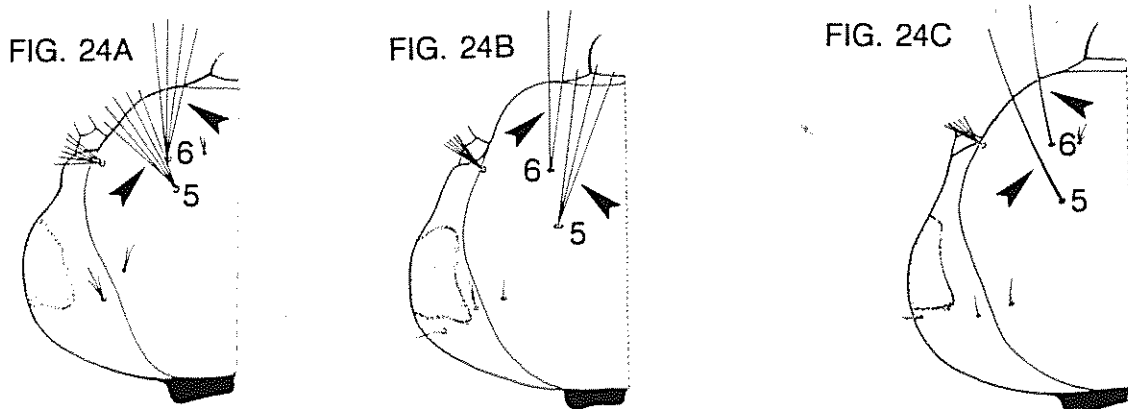


12. HEAD HAIRS 5 AND 6 WITH 5-8 BRANCHES (Fig. 23A); PECTEN ROW WITH 2-3 DISTAL SPINES DETACHED, SIPHON TUFT (ST) INSERTED AT APICAL 1/3 OF SIPHON (Fig. 23C) (CREST OF SIERRAS) ..... *hemiteleus*

HEAD HAIRS 5 AND 6 WITH 3-4 BRANCHES (Fig. 23B); PECTEN ROW WITH 1 DISTAL SPINE DETACHED, SIPHON TUFT INSERTED NEAR MIDDLE OF SIPHON (Fig. 23D) (GREAT BASIN NORTH OF LAKE TAHOE) ... *flavescens*

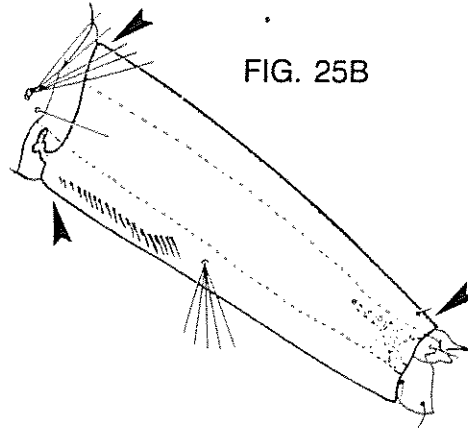
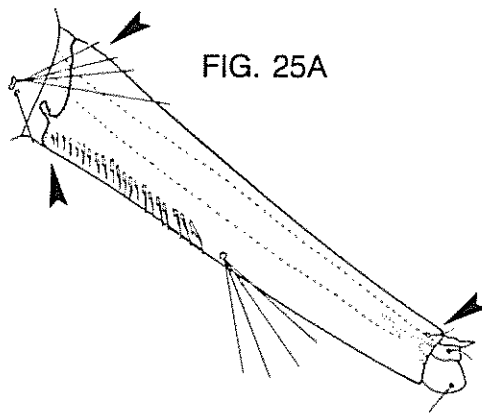


13. HEAD HAIR 5 WITH 3-6 BRANCHES (Figs. 24A, 24B) ..... 14  
 HEAD HAIR 5 AND 6 WITH 1-2 BRANCHES (Fig. 24C) ..... 17



14. SIPHON INDEX 5.0 - 6.0 (MUCH LONGER THAN BASAL WIDTH), SIDES OF SIPHON EVENLY TAPERED, DORSAL CURVATURE CONCAVE (Fig. 25A) (CREST OF CENTRAL AND NORTHERN SIERRAS AND GREAT BASIN) ..... *fitchii*

SIPHON INDEX 3.0 (3 TIMES LONGER THAN BASAL WIDTH), SIDES OF SIPHON NOT EVENLY TAPERED, DORSAL CURVATURE CONVEX (Fig. 25B) ..... 15



15. HEAD HAIR 5 WITH 4-6 BRANCHES, HEAD HAIR 6 WITH 3-5 BRANCHES (Fig. 24A) ..... *pullatus*

HEAD HAIR 5 WITH 3 AND RARELY 2 BRANCHES, HEAD HAIR 6 WITH 2 AND RARELY 3 BRANCHES (Fig. 24B) ..... 16

16. LATERAL HAIR (LH) OF ANAL SADDLE (AS) WITH 2 BRANCHES AND LONGER THAN THE DORSAL CREST (DC) OF SADDLE (Fig. 26A); MESONOTAL HAIR 1 PROMINENT WITH 3-5 BRANCHES (Fig. 26C) ..... *schizopinax*

LATERAL HAIR OF ANAL SADDLE WITH 1 AND RARELY 2 BRANCHES AND SHORTER THAN THE DORSAL CREST OF SADDLE (Fig. 26B); MESONOTAL HAIR 1 SMALL WITH 1-2 BRANCHES (Fig. 26D) (WESTERN SLOPES OF SIERRAS AND CASCADES) ..... *clivis* (in part)

FIG. 26A

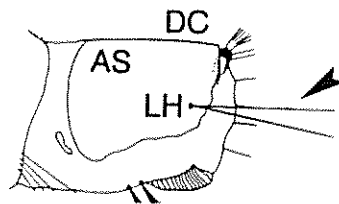
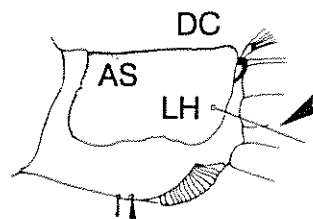
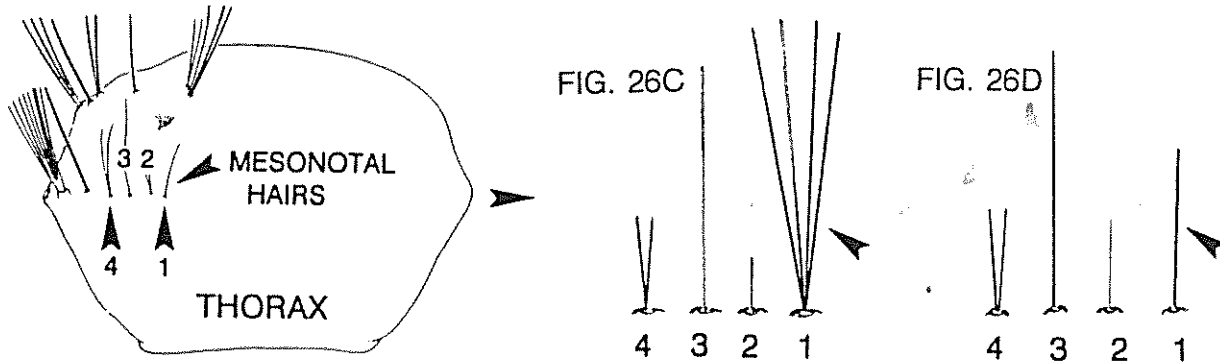


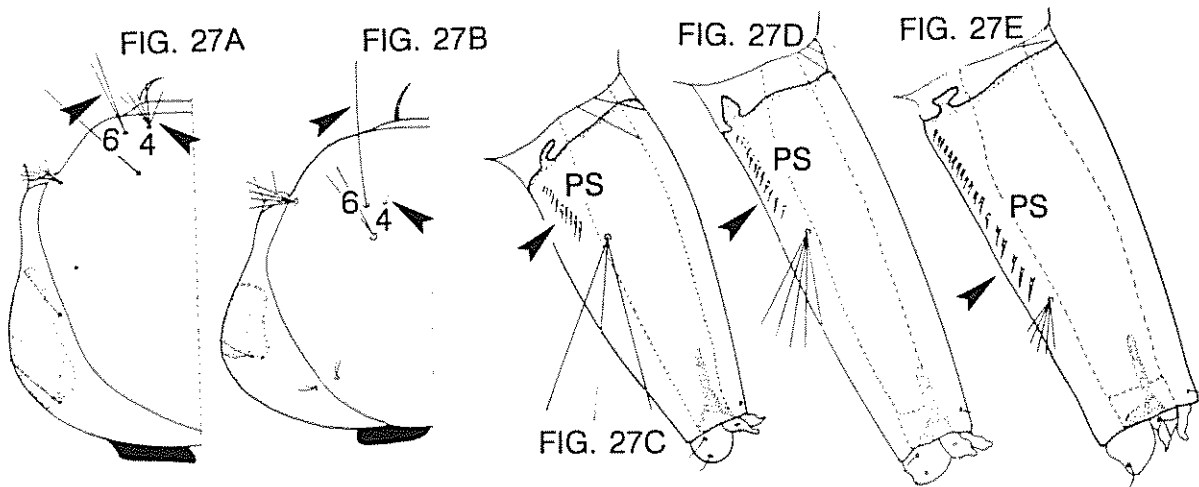
FIG. 26B





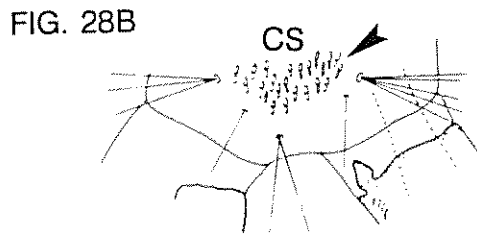
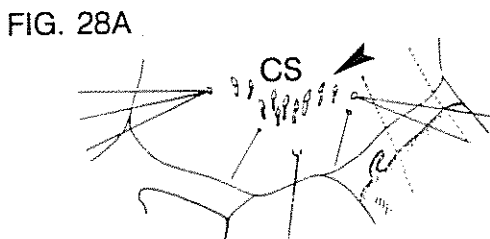
17. HEAD HAIRS 4 AND 6 INSERTED AT EXTREME ANTERIOR END OF HEAD (Fig. 27A); PECTEN ROW WITH LESS THAN 15 SPINES (PS) (Figs. 27C, 27D) (TREEHOLE SPECIES) ..... 18

HEAD HAIRS 4 AND 6 INSERTED BEFORE EXTREME ANTERIOR END OF HEAD (IN LINE WITH BASE OF ANTENNA) (Fig. 27B); PECTEN ROW WITH MORE THAN 15 SPINES (Fig. 27E) ..... 19



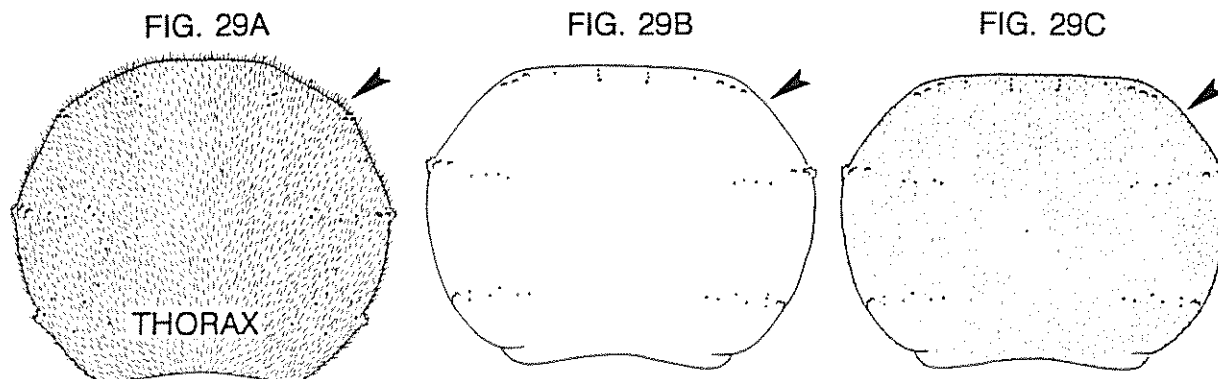
18. SIPHON INDEX 2.0 - 2.5 (SLIGHTLY LONGER THAN TWICE THE BASAL WIDTH), APICAL 1/2 OF SIPHON SHARPLY ANGLED (Fig. 27C); COMB SCALES (CS) 8-15 (Fig. 28A) (TREEHOLES IN MOIST CANYONS BORDERING THE MOJAVE AND COLORADO DESERTS) ..... *deserticola*

SIPHON INDEX 3.0 - 4.0 (3-4 TIMES LONGER THAN THE BASAL WIDTH), SIDES OF SIPHON BROADLY TAPERED (Fig. 27D); COMB SCALES 20-25 (Fig. 28B) (TREEHOLES WEST OF THE SIERRAS AND IN THE SOUTHERN COASTAL VALLEYS) ..... *sierrensis*



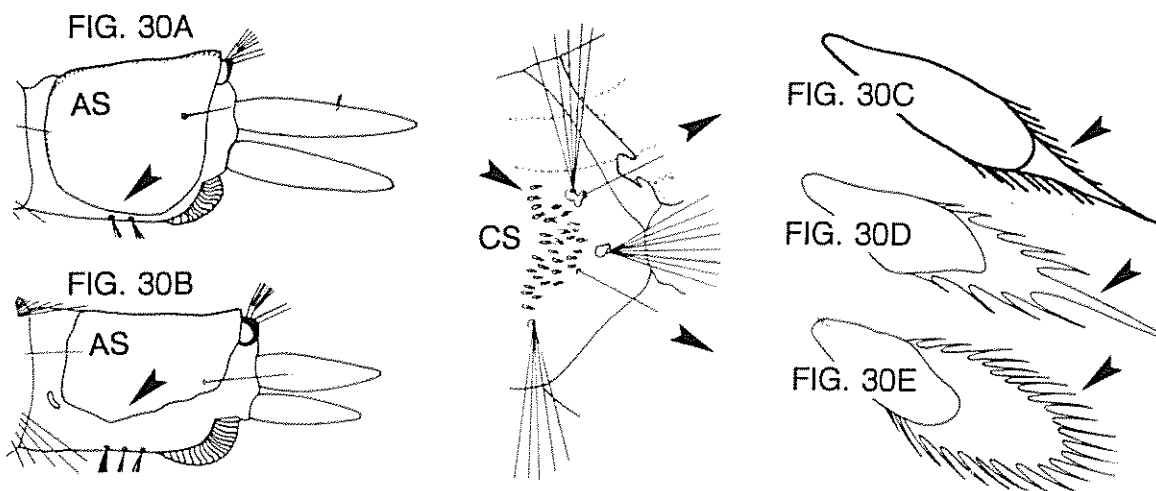
19. CUTICLE VISIBLY VELVETINE, COVERED WITH A CONSPICUOUS LAYER OF FINE HAIRS (MICROTRICHIA) (Fig. 29A)  
 (RARE- LOWER COLORADO RIVER) ..... *purpureipes*

CUTICLE NOT VISIBLY VELVETINE, NOT COVERED WITH A LAYER OF FINE HAIRS (Fig. 29B), SOME FINE HAIRS MAY BE PRESENT BUT NOT FORMING A DENSE COVERING (Fig. 29C) ..... 20

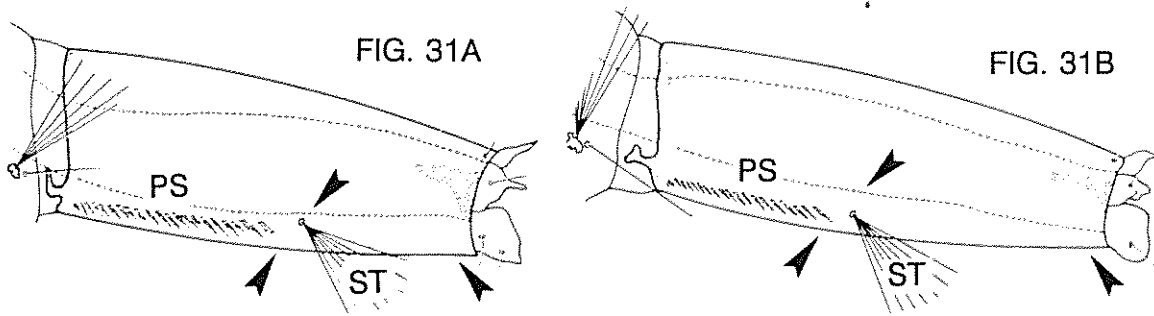


20. ANAL SADDLE (AS) NEARLY COMPLETE ALONG VENTRAL EDGE OF ANAL SEGMENT (Fig. 30A); COMB SCALES (CS) TOOTH-LIKE AND WITH A FINE FRINGE (Fig. 30C) (MAJOR RIVER AREAS OF THE NORTHERN SAN JOAQUIN AND SACRAMENTO VALLEYS) ..... *sticticus*

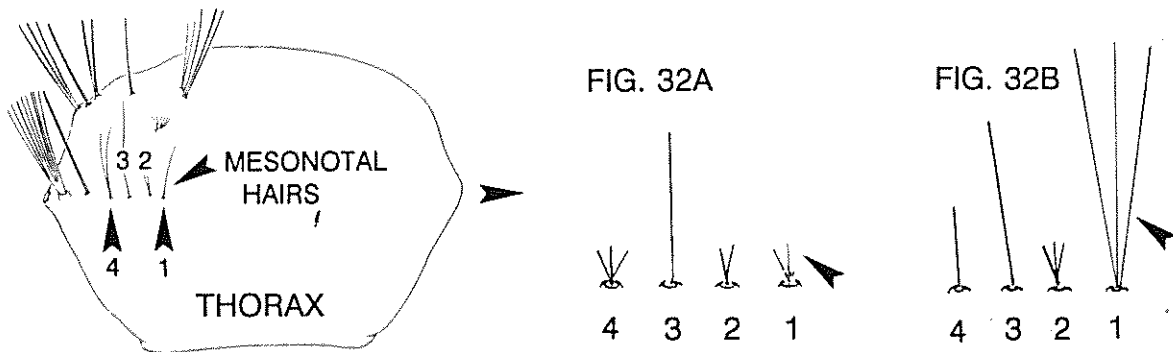
ANAL SADDLE INCOMPLETE ENCIRCLING ONLY 1/2 - 3/4 OF ANAL SEGMENT (Fig. 30B); COMB SCALES WITH A PROMINENT APICAL SPINELET (Fig. 30D) OR FEATHER-LIKE (Fig. 30E) ..... 21



- 21. SIPHON TUFT (ST) INSERTED AT APICAL 1/3 OF SIPHON, PECTEN SPINES (PS) EXTEND TO MIDDLE OF SIPHON (Fig. 31A) ..... 22
- SIPHON TUFT INSERTED NEAR MIDDLE OF SIPHON, PECTEN SPINES LIMITED TO BASAL 1/3 OF SIPHON (Fig. 31B) ..... 23



- 22. COMB SCALES (CS) WITH A DISTINCT APICAL SPINELET (Fig. 30D); MESONOTAL HAIR 1 TINY WITH 1-2 BRANCHES (Fig. 32A) ..... *melanimon*
- COMB SCALES WITHOUT A DISTINCT APICAL SPINELET, MORE FEATHER-LIKE (Fig. 30E); MESONOTAL HAIR 1 PROMINENT WITH 3-4 BRANCHES (Fig. 32B) ..... *dorsalis*



23. LATERAL HAIR (LH) OF ANAL SADDLE (AS) LONGER THAN DORSAL CREST (DC) OF SADDLE, ANAL PAPILLA (AP) VERY SHORT AND BUD-LIKE (Fig. 33A) (CENTRAL AND SOUTHERN COASTAL SALT MARSHES) . . . . . *squamiger*

LATERAL HAIR OF ANAL SADDLE SHORTER THAN DORSAL CREST OF SADDLE, ANAL PAPILLAE LONGER THAN DORSAL CREST OF SADDLE (Fig. 33B) . . . . . 24

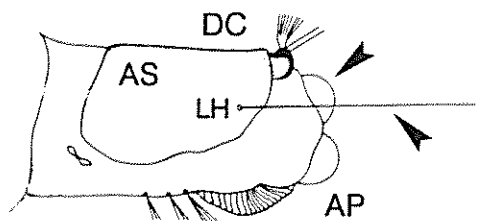


FIG. 33A

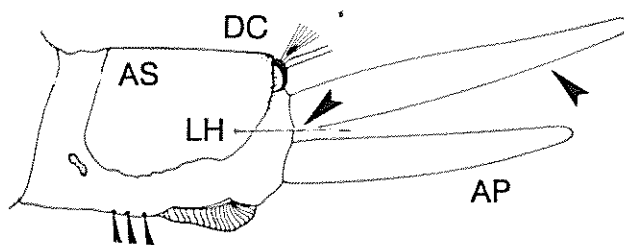


FIG. 33B

24. APEX OF DORSAL CREST (DC) OF ANAL SADDLE (AS) WITH FINE SPINES (SPICULES) WHICH ARE STOUTER AND LONGER THAN THOSE ON THE REST OF THE SADDLE (Fig. 34A); HEAD HAIR 5 WITH 2 BRANCHES (Fig. 34C); MESONOTAL HAIR 4 WITH 2 BRANCHES (Fig. 34E)  
 EASTERN SLOPES OF SIERRAS AND CASCADES, AND MODOC PLATEAU . . . . . *increpitus*  
 WESTERN SLOPES OF SIERRAS AND CASCADES . . . . . *clivis* (in part)  
 COASTAL AREAS GENERALLY, RARELY IN SIERRA AND CASCADE FOOTHILLS . . . . . *washinoi*

NOTE: LARVAL *increpitus* AND *washinoi* ARE MORPHOLOGICALLY INSEPARABLE.  
 SEE BIOLOGICAL NOTES SECTION (PAGES 60 AND 65) FOR DETAILS.

ANAL SADDLE WITH FINE SPINES OF UNIFORM THICKNESS AND LENGTH (Fig. 34B); HEAD HAIR 5 USUALLY WITH 1 BRANCH (Fig. 34D); MESONOTAL HAIR 4 WITH 1 BRANCH (Fig. 34F) . . . . . *tahoensis*

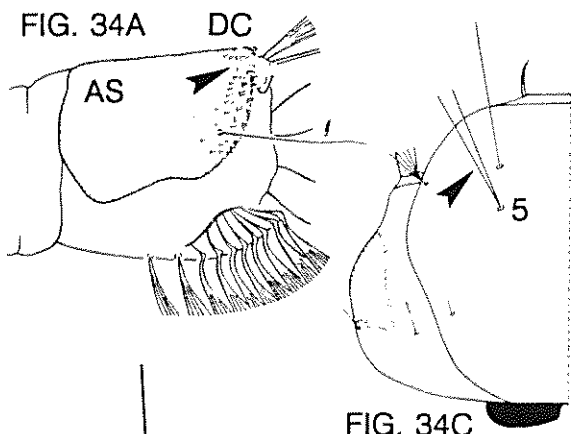


FIG. 34C

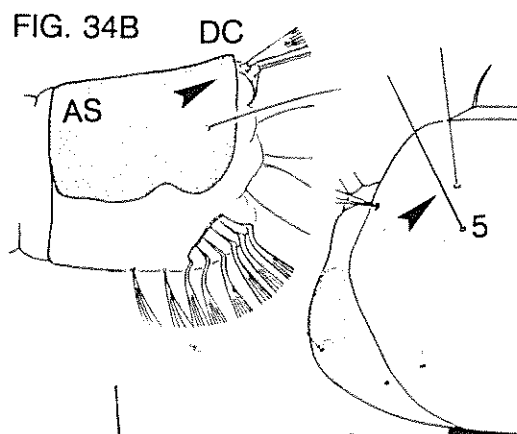


FIG. 34D

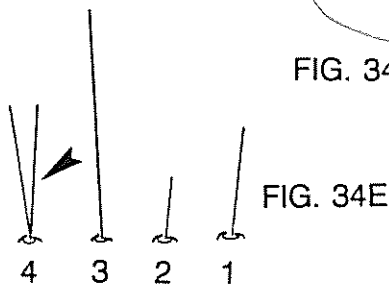


FIG. 34E

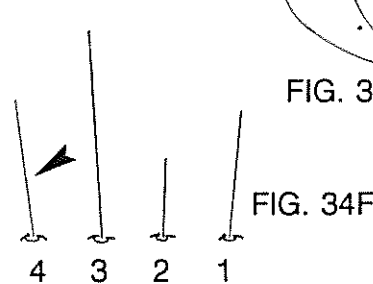
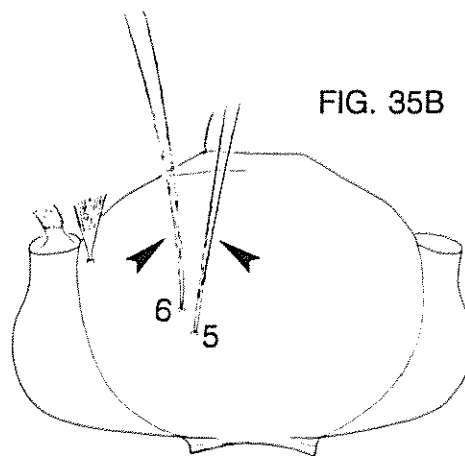
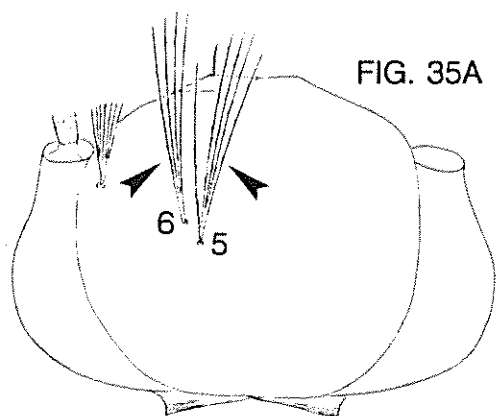


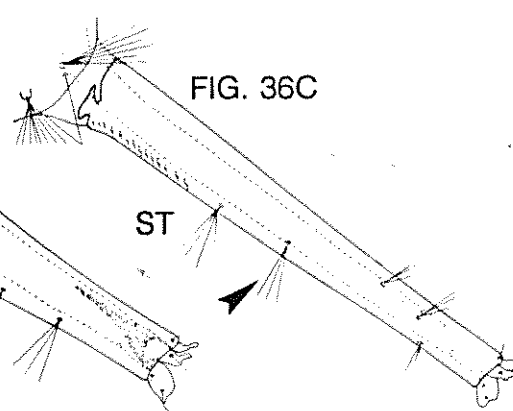
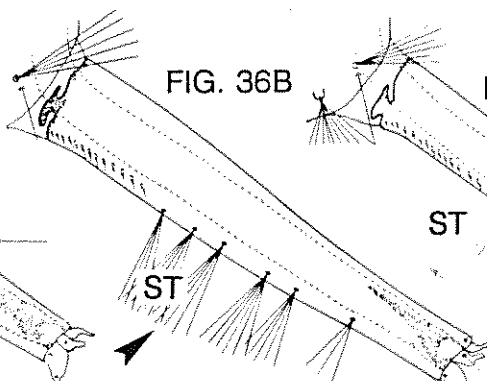
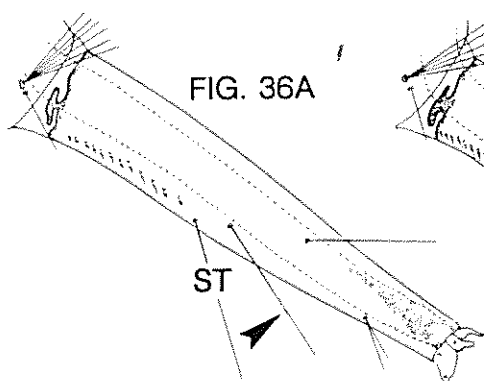
FIG. 34F

## KEY TO LARVAE *CULEX*

- 1. HEAD HAIRS 5 AND 6 WITH 3 OR MORE BRANCHES (Fig. 35A) ..... 2
- HEAD HAIRS 5 AND 6 WITH 1-2 BRANCHES (Fig. 35B), HEAD HAIR 5 SOMETIMES WITH 3 BRANCHES ..... 7

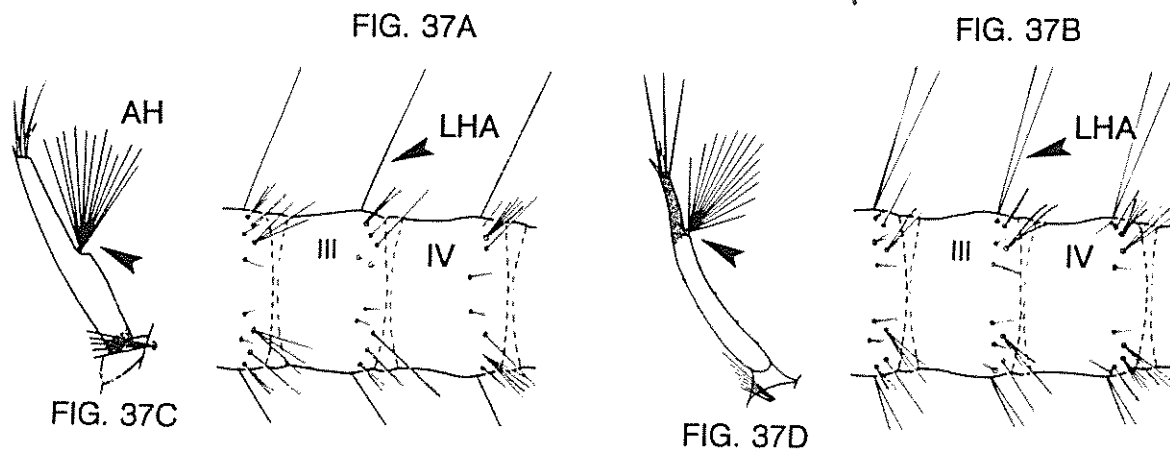


- 2. SIPHON TUFTS (ST) USUALLY WITH 1 AND RARELY 2 BRANCHES (Fig. 36A) ..... 3
- SIPHON TUFTS WITH 2 OR MORE BRANCHES (Figs. 36B, 36C) ..... 4



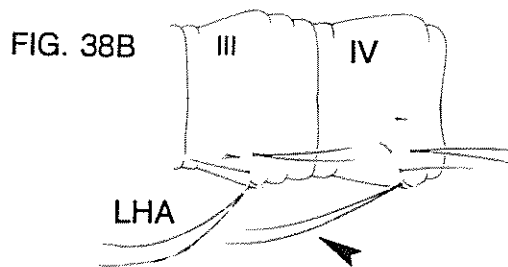
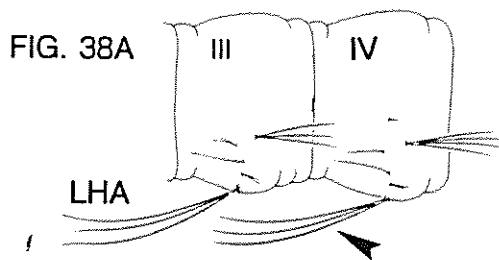
3. LATERAL HAIR (LHA) OF ABDOMINAL SEGMENTS III AND IV WITH 1 BRANCH (Fig. 37A); ANTENNAL HAIR (AH) INSERTED NEAR MIDDLE OF ANTENNA (Fig. 37C) ..... *restuans*

- LATERAL HAIR OF ABDOMINAL SEGMENTS III AND IV WITH 2 BRANCHES (Fig. 37B); ANTENNAL HAIR INSERTED AT APICAL 1/3 OF ANTENNA (Fig. 37D) ..... *thriambus*



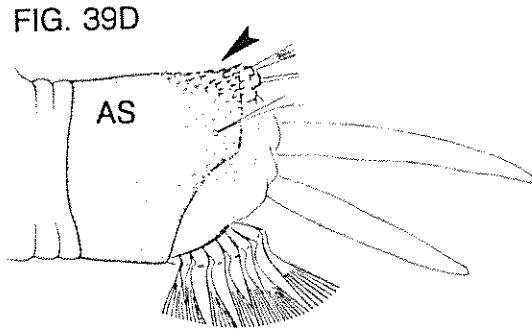
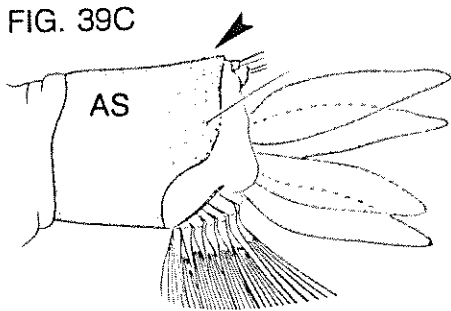
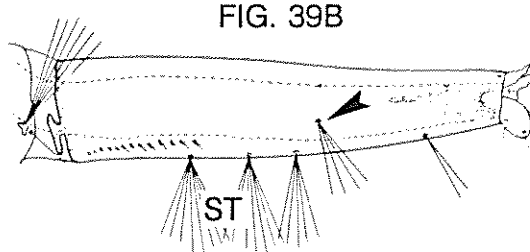
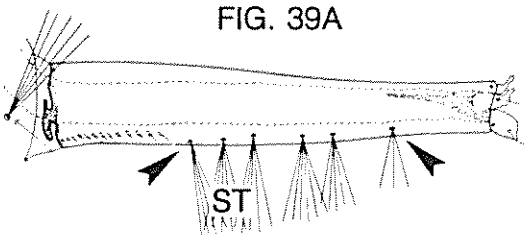
4. LATERAL HAIR (LHA) OF ABDOMINAL SEGMENTS III AND IV WITH 3 BRANCHES (Fig. 38A) ..... 5

- LATERAL HAIR OF ABDOMINAL SEGMENTS III AND IV WITH 2 BRANCHES OR SOMETIMES WITH ONLY 1 BRANCH (Fig. 38B) ..... 6



5. BASE OF SIPHON TUFTS (ST) IN A LINE ALONG POSTERIOR MARGIN OF SIPHON (Fig. 39A); APEX OF DORSAL CREST OF ANAL SADDLE WITH FEW SMALL SPINES (Fig. 39C) (WIDESPREAD) ..... *tarsalis*

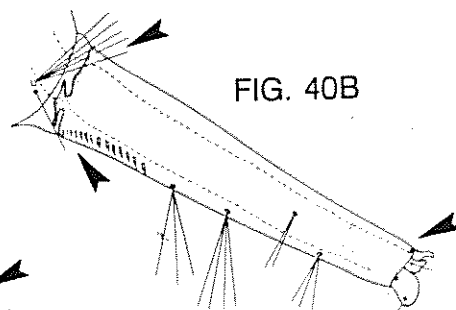
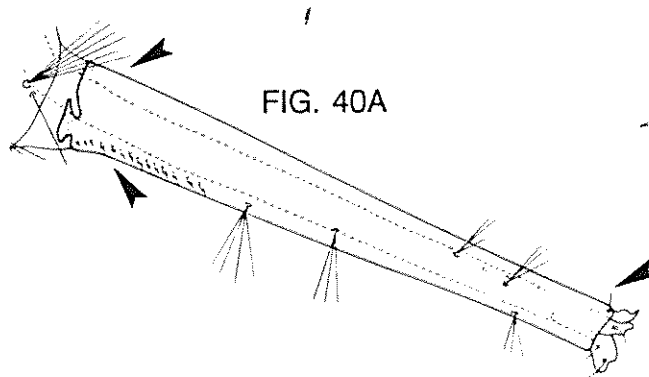
- BASE OF SIPHON TUFTS NOT IN A LINE, AT LEAST 1 TUFT OFFSET (Fig. 39B), APEX OF DORSAL CREST OF ANAL SADDLE WITH A PROMINENT PATCH OF FINE SPINES (ACICULAE) (Fig. 39D) ..... *stigmatosoma*



6. SIPHON INDEX 6.0 - 7.0 (MUCH LONGER THAN BASAL WIDTH) (Fig. 40A) ..... *erythrothorax*

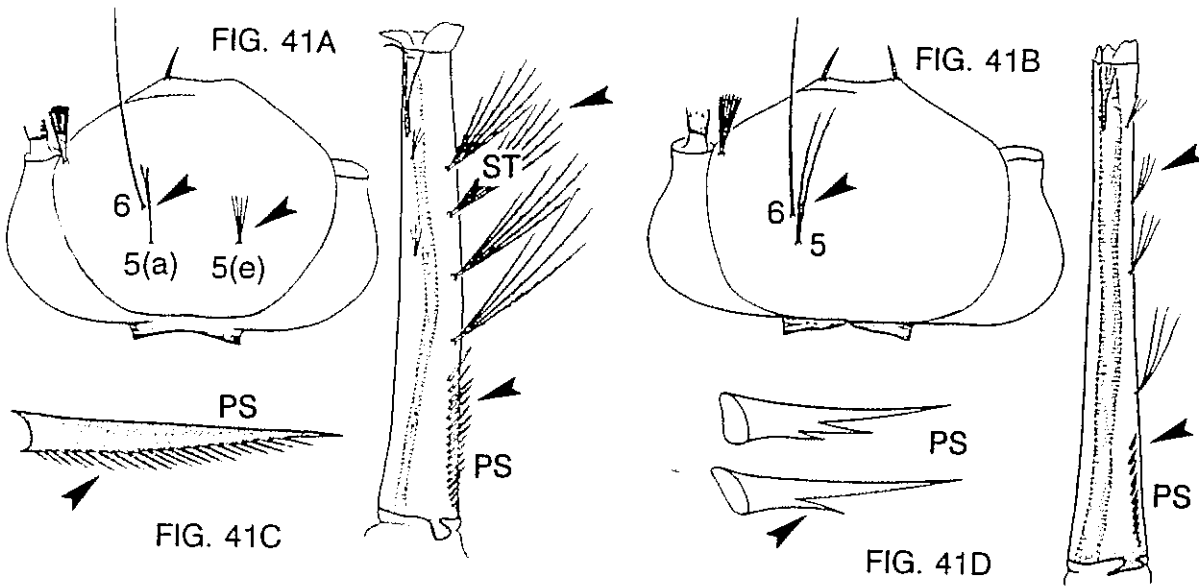
- SIPHON INDEX 4.0 - 5.0 (4-5 TIMES LONGER THAN BASAL WIDTH) (Fig. 40B) ..... *pipiens / quinquefasciatus*

NOTE: LARVAL *pipiens* AND *quinquefasciatus* ARE MORPHOLOGICALLY INSEPARABLE. SEE BIOLOGICAL NOTES SECTION (PAGE 69) FOR DETAILS.



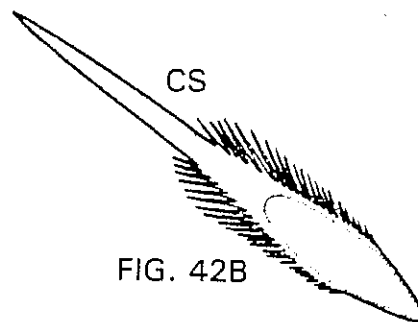
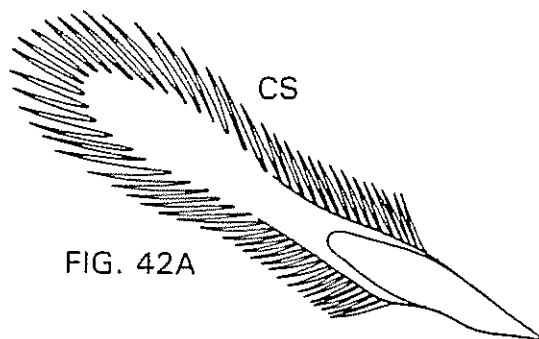
7. HEAD HAIR 5 WEAKLY DEVELOPED, (Fig. 41A); LESS THAN 1/2 LENGTH OF HEAD HAIR 6, AND WITH EITHER 2 (a) OR 4-8 BRANCHES (e); SIPHON TUFTS PROMINENT (ST) WITH 5-7 BRANCHES, PECTEN SPINES WITH A LATERAL FRINGE (Fig. 41C) ..... 8

- HEAD HAIR 5 WELL DEVELOPED AND NEARLY EQUAL IN LENGTH TO HEAD HAIR 6 (Fig. 41B); SIPHON TUFTS (ST) WITH 2-5 BRANCHES, PECTEN SPINES WITH BASAL TEETH (Fig. 41D) ..... 9

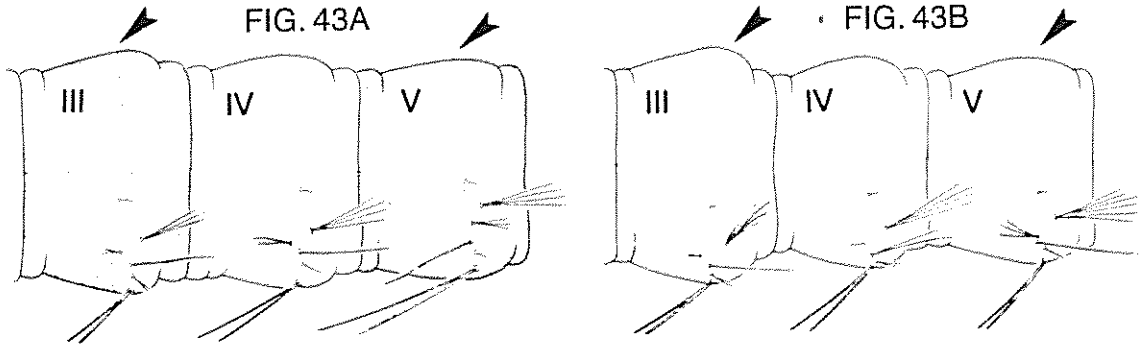


8. HEAD HAIR 5(a) WITH 2 BRANCHES (Fig. 41A), COMB SCALES SPATULATE WITH A NOTICEABLE FRINGE (Fig. 42A) (SOUTHWESTERN SAN DIEGO COUNTY) ..... *anips*

- HEAD HAIR 5(e) SHORT WITH 4-8 BRANCHES (Fig. 41A), COMB SCALES WITH A DISTINCT CENTRAL SPINE (Fig. 42B) (WESTERN SHORE OF SALTON SEA) ..... *erraticus*

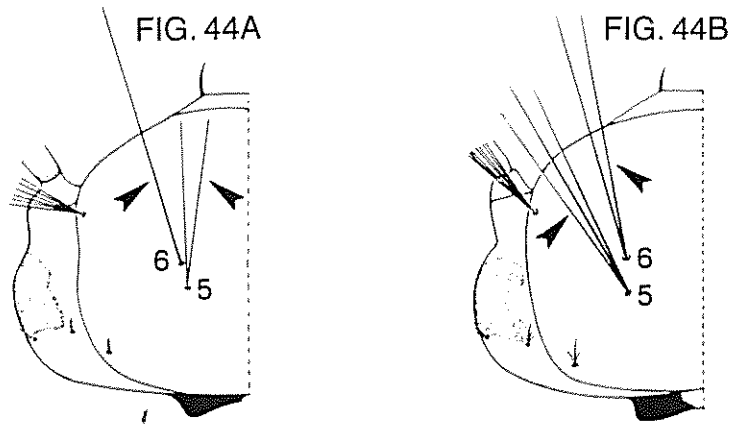


- 9. ABDOMINAL SEGMENT IV TRANSPARENT (UNPIGMENTED), SEGMENTS III AND V OPAQUE (HEAVILY PIGMENTED), PIGMENTATION PATTERN VERY APPARENT IN LIVE SPECIMENS (Fig. 43A) ..... 10
- ABDOMINAL SEGMENTS III-V EVENLY PIGMENTED (Fig. 43B) ..... 11



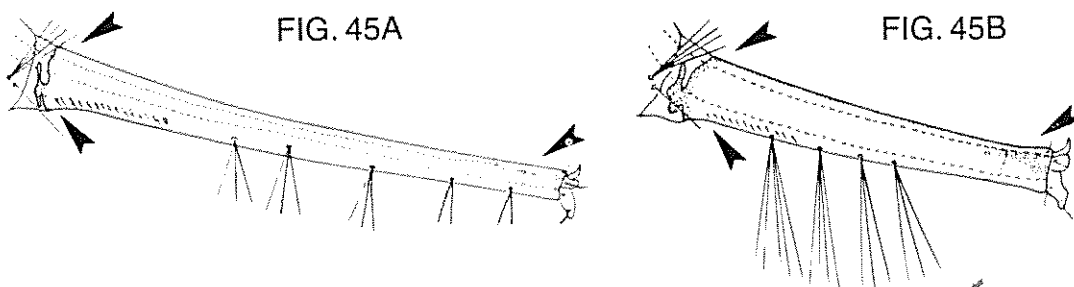
- 10. HEAD HAIR 5 WITH 2 BRANCHES, HEAD HAIR 6 WITH 1 BRANCH (Fig. 44A) ..... *boharti*

- HEAD HAIR 5 WITH 3 BRANCHES, HEAD HAIR 6 WITH 2 BRANCHES (Fig. 44B) (COASTAL SPECIES) ..... *reevesi*



- 11. SIPHON INDEX 7.0 - 9.0 (MUCH LONGER THAN BASAL WIDTH) (Fig. 45A) ..... *apicalis*

- SIPHON INDEX LESS THAN 7.0 (UNDER 7 TIMES LONGER THAN BASAL WIDTH) (Fig. 45B) ..... *territans*



TAXONOMIC  
AND  
BIOLOGICAL NOTES

---

## TAXONOMIC AND BIOLOGICAL NOTES

Natural populations of species exhibit considerable individual variation in morphology which makes the construction of dichotomous keys a difficult process. When keys are developed, the characters selected are those that not only distinguish a species from other closely appearing ones but which typify the average individual of that species and are expressed in most of the individuals examined. However, occasional aberrant or atypical specimens are encountered that will not fit the keys. One should be aware of the possibility of encountering apparent "mutant" specimens and avoid considerable frustration by ideally examining a small number of individuals. Besides the keys, an experienced identifier will also consider other factors such as habitat association, distribution, and seasonality before making a final determination.

The following synoptic overview of the taxonomic characters, geographic distribution, bionomical information and medical importance of the 52 species identified in the keys will provide the user of this manual with additional information to assist them in the identification process.

---

### *Aedes bicristatus* Thurman & Walker

**IDENTIFICATION:** Adult- Tarsi unbanded, maxillary palpi with intermixed dark and pale scales, dark scales on scutum above spiracle are broad and curved, hypostigial patch present, base of wing veins pale-scaled, abdominal terga with complete basal bands of pale scales.

Larva- Head hairs 5 and 6 with 2 branches, anal saddle incomplete, comb with 3-5 tooth-like scales in an uneven row, siphon index 3.0-3.5, pecten with 14-22 spines and last 1-3 distal spines detached, siphon tuft sometimes inserted within the pecten row.

**DISTRIBUTION:** Disjunct with populations along the coastal range found at elevations between 500 and 2,000 feet and those along the western slope foothills of the Sierra Nevadas of central California up to 6,000 feet.

**BIONOMICS:** One of the earliest *Aedes* on the wing each season, this univoltine late winter and early spring species occurs in the shallower areas of pools containing filamentous green algae, including woodland pools, roadside ditches, vernal meadow pools, and shallow temporary ponds. Females are not aggressive biters of man.

---

### *Aedes campestris* Dyar & Knab

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, wing veins with rather evenly intermixed dark and pale scales with white scales predominating, abdominal terga nearly all pale-scaled with indistinct patches of dark scales, tarsal claw on foreleg with a large spur.

Larva- Head hair 5 with 3-4 branches and head hair 6 with 1 branch, anal saddle incomplete, anal papillae bud-like, comb with 19-33 scales in a triangular patch, siphon index 3.0, pecten with 19-32 spines and most distal spine detached and inserted beyond middle of siphon, siphon tuft inserted at apical 1/3 of siphon.

**DISTRIBUTION:** Limited to the Great Basin north of Lake Tahoe (Siskiyou, Modoc, Lassen, and Plumas Counties).

**BIONOMICS:** This univoltine spring species occurs in the alkaline waters of shallow grassy sunlit pools, ponds, and lake margins usually in association with cattails. Females are day or night biters, dispersing great distances to readily feed on large mammals and man.

---

### *Aedes cataphylla* (Dyar)

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis dark-scaled, maxillary palpi with intermixed dark and pale scales, dark scales on scutum above spiracle are narrow, hypostigial patch present, anterior wing veins with intermixed dark and pale scales, abdominal terga with complete basal bands of pale scales.

Larva- Head hair 5 with 1-2 branches and head hair 6 with 1 branch, anal saddle incomplete, comb with 10-24 scales in 2 irregular rows or a patch, siphon index 3.0-3.5, pecten with 15-25 spines and the distal 3-5 spines detached, and extending nearly to the tip of the siphon, siphon tuft inserted medially within pecten row.

**DISTRIBUTION:** Occurs throughout the Sierra Nevadas from Inyo County on the eastern slopes and Fresno County on the western slopes northward into the Great Basin.

**BIONOMICS:** This univoltine spring species occurs in medium-depth grassy snow-melt pools. Females are day or night biters but do not fly far from their larval sources. They prefer to feed on mammals, occasionally including man although not aggressively. This species has been found naturally infected with a CE-like virus.

### *Aedes clivis* Lanzaro & Eldridge

**IDENTIFICATION:** Adults are morphologically inseparable from *Ae. increpitus* and *Ae. washinoi* and larvae are separable from those species using head hair 6.

Adult- Tarsi with broad basal bands of white scales on most joints, inner surface of tori with only a few white scales, wing mostly dark-scaled with pale scales concentrated on the anterior veins, abdominal terga with complete basal bands of pale scales.

Larva- Head hair 5 with 3 and rarely 2 branches, head hair 6 with 1 and rarely 2 branches, anal saddle incomplete with prominent spicules on apical portion, comb with more than 20 scales, siphon index 3.0-3.5, pecten with 16-24 evenly spaced spines.

**DISTRIBUTION:** Common along the western slopes of the Sierra Nevadas and Cascades from foothills to the crest. Distribution overlaps with *Ae. washinoi* at lower elevations.

**BIONOMICS:** This univoltine spring species occurs primarily in grassy snow-melt pools, especially at higher elevations. Although unconfirmed, they may breed in early spring ground pools at lower elevations. Females are aggressive day biters, do not fly far from larval sources and will readily feed on man. No human pathogens have been isolated from this species.

### *Aedes deserticola* Zavortink

**IDENTIFICATION:** Adult- Tarsi with pale bands overlapping the joints and next to last tarsal segment (T4) with a very narrow pale band, proboscis dark-scaled, body color of highly contrasting black, white and golden brown scales, postpronotal patch absent, wing with pale scales at the base of the costa, abdominal terga with complete basal bands of pale scales.

Larva- Head hairs 5 and 6 located at the extreme anterior end of the head capsule, anal saddle incomplete, comb with 8-15 scales, siphon index less than 2.5, sides of apical 1/2 of siphon steeply angled convexly, pecten with 8-12 evenly spaced spines.

**DISTRIBUTION:** Treeholes in the moist canyons bordering the Mojave and Colorado Deserts in Los Angeles, San Bernardino, Riverside, and San Diego Counties.

**BIONOMICS:** This univoltine and occasionally bivoltine species occurs during the spring in rain-filled treeholes and rot cavities in oak, cottonwood, willow, and sycamore trees growing in riparian situations. They are local pests and can adversely impact tourism.

---

***Aedes dorsalis* (Meigen)**

- IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, proboscis dark-scaled, hypostigial patch present, radial wing veins (R 2-5) with unevenly intermixed dark and pale scales with pale scales predominating, proximal abdominal terga with paired spots of dark scales, claw of foreleg usually with a small pointed spur.  
Larva- Head hairs 5 and 6 with only 1 branch, mesonotal hair 1 well developed with 3-4 branches, anal saddle incomplete, comb with 19-33 feather-like scales in a patch, siphon index 2.5-3.0, pecten with 16-23 evenly spaced spines.
- DISTRIBUTION:** Coastal salt marshes from Santa Barbara County northward and inland alkaline areas of the Central Valley, Great Basin, and deserts of southeastern California.
- BIONOMICS:** This multivoltine species occurs during the spring, summer, and fall in alkaline or brackish waters and is commonly associated with tidal salt marshes, ponds, and pools along the coast and alkaline marshes, lakes, and pools inland. Females are vicious day and evening biters, flying great distances to feed on large mammals and man. This species has been found naturally infected with SLE virus and is an efficient laboratory vector of CE virus.
- 

***Aedes fitchii* (Felt & Young)**

- IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, proboscis dark-scaled, inner surface of tarsi with numerous pale scales lower mesanepimeral bristles and postprocoxal patch present, all wing veins with evenly distributed pale scales, distal abdominal terga with irregular median patches of pale scales. Some specimens are very difficult to separate from *Ae. increpitus*.  
Larva- Head hair 5 with 2 branches and head hair 6 with 1 branch, anal saddle incomplete, comb with 12-28 scales in a patch, siphon index 5.0-6.0 with the distal sides of the siphon concave, pecten with 15-24 evenly spaced spines.
- DISTRIBUTION:** Along the crest of the Sierra Nevadas from Fresno County northward into the Great Basin area of Shasta County.
- BIONOMICS:** This univoltine spring species is associated with deep water in large grassy snow-melt pools in sunlit meadows. Females are persistent day and evening biters of large mammals and man, particularly in shaded areas near their larval sources.
- 

***Aedes flavescens* (Müller)**

- IDENTIFICATION:** Adult- Tarsi with basal bands of pale scales, proboscis dark-scaled, postprocoxal patch and lower mesanepimeral bristles present, wing uniformly pale-scaled, abdominal terga unbanded and covered with golden scales.  
Larva- Head hairs 5 and 6 with 3-4 branches, anal saddle incomplete, comb with 20-36 scales in a patch, siphon index 3.2-4.0, pecten with 17-28 spines and last distal spine detached, siphon tuft inserted at the middle of the siphon.
- DISTRIBUTION:** Large but rare mosquito which is found in the Great Basin area north of Lake Tahoe (Modoc and Lassen Counties).
- BIONOMICS:** This univoltine early spring species occurs in deep temporary alkaline pools in meadows and marshes on the open plains. Females are relatively short-lived day and early evening biters of large domestic animals (cattle) and occasionally man.
-

*Aedes hemiteleus* Dyar

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, scales on the scutum with bronzy reflections, wing uniformly dark-scaled with pale scales limited to the base of the anterior veins.

Larva- Head hairs 5 and 6 with more than 5 branches, anal saddle incomplete, comb with 10-16 thorn-like scales in a single or partly double row, siphon index 4.0-4.5, pecten with 11-15 spines and the last 2-3 distal spines detached, siphon tuft inserted at apical 1/3 of the siphon. Larvae are sometimes mistaken for *Culex*.

**DISTRIBUTION:** Small mosquito found along the crest of the Sierra Nevadas from Yosemite Park northward.

**BIONOMICS:** This univoltine late spring species occurs in deep totally or partially shaded grassy pools where water persists well into the summer. Females are day biters and reluctant to feed on man except in well-shaded areas.

*Aedes hexodontus* Dyar

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, postprocoxal patch present, wing uniformly dark-scaled with pale scales limited to the base of the anterior and posterior veins, last 2 abdominal terga with equal-sized bands of dark and pale scales, supraalar setae straw colored.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle complete, comb with 5-9 tooth-like scales in a single row, siphon index 3.0, pecten with 10-20 evenly spaced spines.

**DISTRIBUTION:** Found along the crest of the Sierra Nevadas from Kern County northward.

**BIONOMICS:** This univoltine spring species occurs in a wide variety of snow-melt pools, but are most commonly collected from sunlit grassy pools. Females do not fly far from larval sources and are vicious day biters of large mammals and man, particularly in shaded areas. This species has been found naturally infected with a CE group virus.

*Aedes increpitus* Dyar

**IDENTIFICATION:** Adults and larvae are morphologically inseparable from *Ae. clivis* and *Ae. washinoi* and larvae are inseparable from *Ae. washinoi*.

Adult- Tarsi with broad basal bands of white scales on most joints, inner surface of tori with only a few white scales, wing mostly dark-scaled with pale scales concentrated on the anterior veins, abdominal terga with complete basal bands of pale scales.

Larva- Head hair 5 with 2-4 branches (mostly 2), head hair 6 with 1-3 branches (mostly 1), anal saddle incomplete with prominent spicules on apical portion, comb with more than 20 scales, siphon index 3.0-3.5, pecten with 16-24 evenly spaced spines.

**DISTRIBUTION:** Common along eastern slopes of Sierra Nevadas and Cascades eastward to Modoc Plateau and Great Basin. Distribution overlaps with *Ae. clivis* at higher elevations.

**BIONOMICS:** This univoltine spring species almost always occurs in snow-melt pools. Females are persistent day biters, do not fly far from larval sources and will readily feed on man. This species hybridizes with *Ae. washinoi* in the western portion of its range. No human pathogens have been isolated from this species.

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*Aedes melanimon* Dyar

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, proboscis and maxillary palpi dark-scaled, wing predominantly dark-scaled with some intermixed pale scales, costa mostly pale-scaled, abdominal terga with a basal band and median line of pale scales which divides the large lateral patches of dark scales.

Larva- Head hairs 5 and 6 with 1 branch, mesonotal hair 1 tiny with 2 branches, anal saddle incomplete, comb with 19-33 scales each having a distinct apical spinelet, siphon index 2.5-3.0, pecten with 16-23 evenly spaced spines.

**DISTRIBUTION:** Widespread throughout California's interior, but very abundant in the Central Valley.

**BIONOMICS:** This multivoltine spring, summer, and fall species occurs (sometimes along with *Ae. nigromaculis*) in semi-open sunlit agricultural sources, especially duck club ponds and pastures. Females are persistent early evening biters, dispersing several miles from larval sources to feed on a variety of large mammals, including man. They will also bite during the day when disturbed by the host. It is considered a local pest, a secondary vector of WEE virus, and the primary enzootic vector of CE group virus in the Central Valley.

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*Aedes nigromaculis* (Ludlow)

**IDENTIFICATION:** Adult- Tarsi with basal bands of pale scales, proboscis with a median ring of pale scales (absent in some individuals), wing scales predominantly dark with evenly intermixed pale scales, abdominal terga with oval lateral patches of dark scales.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle complete, comb with 6-12 thorn-like scales in an uneven single row, siphon index 2.0-2.5, pecten with 16-23 spines and the last 2-4 distal spines detached, siphon tuft inserted at apical 1/3 of siphon.

**DISTRIBUTION:** The "irrigated pasture mosquito" is widespread throughout California with abundant populations occurring in the Central Valley.

**BIONOMICS:** This multivoltine spring, summer, and fall species occurs (sometimes along with *Ae. melanimon*) in sunlit agricultural sources, especially irrigated pastures. Females are vicious day and dusk biters, dispersing many miles from larval sources to feed on large domestic mammals and man. Although short-lived, it is the major pest mosquito in the Central Valley.

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*Aedes niphadopsis* Dyar & Knab

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi with intermixed dark and pale scales, postprocoxal patch present, abdominal terga with a broad basal band and median line of pale scales which divides the lateral patches of dark scales.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle incomplete, anal papillae bud-like, comb with 8-14 scales in an irregular single or partly double row, siphon index 3.5-4.0, pecten with 8-14 spines limited to basal 1/3 of siphon and the last 1-2 distal spines detached, siphon tuft inserted before the middle of the siphon.

**DISTRIBUTION:** The Great Basin north of Lake Tahoe (Siskiyou, Modoc, and Lassen Counties).

**BIONOMICS:** This univoltine spring species occurs in a variety of grassy sunlit alkaline pools, ponds, seepage areas, and lake margins. Females are vicious day and early evening biters, migrating many miles from larval sources to feed on large mammals and man. Although relatively short-lived, it sometimes becomes a local pest.

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*Aedes pullatus* (Coquillett)

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi mostly dark-scaled, hypostigial patch present, postprocoxal patch absent, wing with pale scales limited to the base of the anterior veins, abdominal terga with complete basal bands of pale scales.

Larva- Head hairs 5 and 6 usually with 4 or more branches, anal saddle incomplete, anal saddle lateral hair short and with 1 branch, comb with many scales in a large triangular patch, siphon index 3.0-3.5, pecten with 13-25 evenly spaced spines.

**DISTRIBUTION:** Along the crest of the central and northern Sierra Nevadas at elevations above 8,000 feet.

**BIONOMICS:** This univoltine spring species occurs in a variety of deep completely or partially sunlit snow-melt pools at and above the tree line. Females are persistent day biters of large mammals and man. They have a peculiar habit of biting around the shoulders and head.

*Aedes purpureipes* Aitken

**IDENTIFICATION:** Adult- Tarsi unbanded and legs jet black with iridescent reflections, proboscis and maxillary palpi dark-scaled with iridescent blue scaling, integument of thorax bright orange with thoracic pleura having patches of silver scales, wings mostly dark-scaled.

Larva- Integument unique with a velvetine layer of fine hairs (microtrichia), head hairs 5 and 6 with 1 branch, anal saddle incomplete, comb with 5-6 thorn-like scales, siphon index 2.5-3.0, pecten with 15-21 evenly spaced spines.

**DISTRIBUTION:** Along the lower Colorado River from Needles southward to the Bard Valley near Yuma, Arizona (San Bernardino, Riverside, and Imperial Counties).

**BIONOMICS:** Appears to be a univoltine summer "monsoon rain" species in southeastern California with the larvae occurring in rain-filled treeholes and rot cavities in willow and cottonwood trees.

*Aedes schizopinax* Dyar

**IDENTIFICATION:** Adult- Tarsi unbanded, ventral side of proboscis pale-scaled, maxillary palpi with intermixed dark and pale scales, wing mostly dark-scaled, abdominal terga with broad basal bands of pale scales and the distal 2 terga almost completely pale-scaled.

Larva- Head hair 5 with 3 branches and head hair 6 with 2 branches, anal saddle incomplete, anal saddle lateral hair longer than the dorsal crest of the saddle and with 2 branches, comb with many thorn-like scales in a patch, siphon index 3.0, pecten with 14-19 evenly spaced spines.

**DISTRIBUTION:** Along the crest of the Sierra Nevadas from Inyo County northward into the Great Basin.

**BIONOMICS:** This univoltine spring species occurs in shallow snow-melt pools or along the margins of shallow grassy lakes. Females are not known to feed on man.

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***Aedes sierrensis* (Ludlow)**

- IDENTIFICATION:** Adult- Tarsi with pale bands overlapping the joints and next to last tarsal segment (T4) with a wide pale band, proboscis dark-scaled, body color of highly contrasting black, white and golden brown scales, postpronotal patch present, wing with pale scales at the costal base, abdominal terga with complete basal bands of pale scales.  
Larva- Head hairs 5 and 6 located at the extreme anterior end of the head capsule, anal saddle incomplete, comb with 20-25 scales, siphon index >3.0 with apical 1/2 gradually tapered, pecten with 8-12 evenly spaced spines.
- DISTRIBUTION:** The "western treehole mosquito" is a small mosquito found throughout the state except east of the Sierras and in the moist canyon areas along the desert regions of southeastern California where it is replaced by *Ae. deserticola*.
- BIONOMICS:** This univoltine spring species normally occurs in rain-filled treeholes, rot cavities, and occasionally artificial containers with heavy leaf sediment. Summer broods are possible following abnormal rainfall. Females are persistent day and dusk biters, do not fly far from larval sources and prefer to feed on mammals, including man. It is a known vector of canine heartworm and has been found naturally infected with CE group virus.
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***Aedes squamiger* (Coquillett)**

- IDENTIFICATION:** Adult- Tarsi with basal bands of pale scales, postprocoxal patch present, wings distinctly speckled with intermixed broad dark and pale scales, abdominal terga with complete basal bands of pale scales.  
Larva- Head hairs 5 and 6 with 2 branches, anal saddle incomplete with its lateral hair longer than the dorsal crest and 1-branched, anal papillae bud-like, comb with 20-32 scales in a patch, siphon index 3.0-3.5, pecten with 14-22 evenly spaced spines.
- DISTRIBUTION:** The "California salt marsh mosquito" is a medium-sized mosquito found along the Pacific coast from Bodega Bay (Sonoma County) southward.
- BIONOMICS:** Normally univoltine with a single early spring brood occurring in the intertidal areas of coastal salt marshes. However, a second or "fall" brood can occur following unseasonable rains. Females are vicious day and early dusk biters, migrating great distances to feed on large mammals and man. This species has been found naturally infected with a CE group virus.
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***Aedes sticticus* (Meigen)**

- IDENTIFICATION:** Adult- Tarsi unbanded, scutum with a dark-scaled median stripe bordered by large patches of pale scales, hypostigial and postprocoxal patches absent, wings mostly dark-scaled, abdominal terga with medially indented basal bands of pale scales.  
Larva- Head hair 5 with 2 branches and head hair 6 with 1 branch, anal saddle nearly complete, comb with 18-25 scales which are tooth-like and each has a fine lateral fringe, siphon index 2.5-3.0, pecten with 15-20 evenly spaced spines.
- DISTRIBUTION:** The "river mosquito" is found along the major river and stream drainages of the northern San Joaquin and Sacramento Valleys.
- BIONOMICS:** This univoltine spring species occurs (sometimes along with *Ae. vexans*) in pools left by receding rivers and streams and in rain-filled depressions. Females are vicious day and dusk biters, dispersing great distances to feed on large mammals and man.
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***Aedes taeniorhynchus* (Wiedemann)**

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, proboscis with a median ring of pale scales, body color of highly contrasting black and white scales, wing (including base of costa) dark-scaled, abdominal terga with basal bands of pale scales, distal terga also with pale-scaled lateral spots and narrow apical bands.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle complete, anal papillae bud-like, comb with 9-20 scales in a patch, siphon index 1.0-1.5, pecten with 11-17 evenly spaced spines.

**DISTRIBUTION:** The "black salt marsh mosquito" is a medium-sized to small mosquito found along the coast from Santa Barbara County southward and in the desert regions of Riverside and Imperial Counties.

**BIONOMICS:** This opportunistic multivoltine spring, summer, and fall species occurs in brackish waters of coastal salt marsh environments and inland alkaline soils. Females are vicious day or night biters, dispersing great distances to feed on large mammals and man.

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***Aedes tahoensis* Dyar**

**IDENTIFICATION:** California populations of this species were formerly called *Aedes communis* (De Geer).

Adult- Tarsi unbanded, proboscis and maxillary palpi with intermixed dark and pale scales, scutum pale brown to rust colored, subspiracular patch and postprocoxal patch absent, supraalar setae dark, abdominal terga with broad basal bands of cream-colored scales which widen laterally.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle incomplete, saddle apex without small spines (aciculae), comb with many scales in a large triangular patch, siphon index 2.5-3.0, pecten with 14-21 evenly spaced spines.

**DISTRIBUTION:** Common along the crest of the Sierra Nevadas at elevations above 4,500 feet from Tulare and Inyo Counties northward to Tehama and Lassen Counties.

**BIONOMICS:** This univoltine spring species occurs in shaded temporary snow-melt pools with pine needles and clean margins. Females are persistent dusk biters, do not fly far from larval sources, and feed on large mammals, including man. It often becomes a local pest and has been found naturally infected with a CE group virus.

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***Aedes thelcter* Dyar**

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, proximal abdominal terga with broad triangular bands of pale scales and distal terga with distinctive "hour glass"-shaped patches of pale scales.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle complete, comb with 15-24 feather-like scales each with apical spinelets, siphon index 2.0-2.5, pecten with 14-20 spines and the most distal spine detached and inserted beyond the siphon tuft.

**DISTRIBUTION:** Extreme southeastern California along the lower Colorado River in Riverside and Imperial Counties.

**BIONOMICS:** This univoltine summer species occurs in alkaline waters associated with over-flow pools from irrigation ditches and temporary pools which are filled from summer "monsoon" rains.

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***Aedes ventrovittis* Dyar**

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, wing with pale scales restricted to the anterior veins, abdomen with a metallic blackish-brown sheen, abdominal terga with basal bands of pale scales which are medially divided into lateral patches of pale scales.

Larva- Head hairs 5 and 6 with 1 branch, anal saddle nearly complete, comb with 8-12 thorn-like scales in a double row, siphon index 2.5-3.0, pecten with 11-18 spines and the distal 2 spines detached, siphon tuft inserted beyond the middle of the siphon.

**DISTRIBUTION:** The "little black mosquito of the high Sierras" is a small mosquito found widespread along the crest of the Sierra Nevadas at elevations between 4,500 and 11,500 feet.

**BIONOMICS:** This univoltine spring species occurs in shallow grassy meadow pools and gently sloping seepages rich in organic matter. Females do not fly far from larval sources and are vicious day biters of large mammals, including man.

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***Aedes vexans* (Meigen)**

**IDENTIFICATION:** Adult- Tarsi with very narrow basal bands of pale scales, proboscis and maxillary palpi dark-scaled, abdominal terga with medially-indented basal bands of pale scales.

Larva- Head hair 5 with 3 branches and head hair 6 with 2 branches, anal saddle complete at the base only, comb with 9-12 thorn-like scales in a double or single row, pecten with 14-20 spines and the 1-3 most distal spines detached.

**DISTRIBUTION:** The "inland floodwater mosquito" is generally widespread throughout California except the coastal and high mountain areas.

**BIONOMICS:** This multivoltine spring, summer, and fall species occurs in all types of floodwater situations including temporary pools formed along flooded woodland river bottoms, irrigated pastures, roadside ditches, etc. Females are vicious day or evening biters, flying great distances to feed on large mammals, including man. They are considered a local major pest and known vector of canine heartworm.

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***Aedes washinoi* Lanzaro & Eldridge**

**IDENTIFICATION:** Adults and larvae are morphologically inseparable from *Ae. increpitus* and *Ae. clivis* and larvae are inseparable from *Ae. increpitus*.

Adult- Tarsi with broad basal bands of white scales on most joints, inner surface of tarsi with only a few white scales, wing mostly dark-scaled with pale scales concentrated on the anterior veins, abdominal terga with complete basal bands of pale scales.

Larva- Head hair 5 with 1 and rarely 2 branches, head hair 6 with 1 branch, anal saddle incomplete with prominent spicules on apical portion, comb with more than 20 scales, siphon index 3.0-3.5, pecten with 16-24 evenly spaced spines.

**DISTRIBUTION:** Common along coastal California at sea level, ranging eastward as far as the Sierra and Cascade foothills in some areas.

**BIONOMICS:** This univoltine late winter and early spring species occurs in a variety of coastal and inland habitats including shallow ground pools and upland freshwater habitats adjacent to salt marshes. Females are aggressive day biters, do not fly far from larval sources and will readily feed on man. They have been found infected with a CE-like virus. This species hybridizes with *Ae. increpitus* in the eastern portion of its range.

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***Anopheles franciscanus* McCracken**

**IDENTIFICATION:** Adult- Maxillary palpi with rings of pale scales, wing and wing fringe with "checkered" appearance due to patches of pale scales on all veins and at the apical end of each posterior vein.

Larva- Inner clypeal hairs unbranched and separated by more than the width of their basal tubercles, outer clypeal hairs unbranched, antennal hair unbranched and inserted at or near the middle of the antenna.

**DISTRIBUTION:** Widespread throughout California over a range of elevations and associated habitats.

**BIONOMICS:** Larvae occur in shallow, sunlit pools along the margins of receding streams, particularly if there is abundant algal growth. Overwintering is as adult females. Females are active at dusk, are reluctant to enter dwellings, and prefer to feed on small or large mammals, rarely biting man. This species is generally considered to have low potential as a vector of human malaria.

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***Anopheles freeborni* Aitken**

**IDENTIFICATION:** Adults and larvae are inseparable from *An. hermsi* without cytological examination. Adult- Maxillary palpi dark-scaled, wing with distinct patches of darker scales.

Larva- Inner clypeal hairs with 1 branch and closely spaced, outer clypeal hairs multi-branched, antennal hair multi-branched and inserted on the apical 2/3 of the antenna, head capsule marked with an irregular pattern of spots, abdominal segments IV-VI with 3 tiny accessory plates, antepalmar hair 2 on segments IV and V with 2-3 branches.

**DISTRIBUTION:** The "western malaria mosquito" is found throughout the state except in the coastal region and interior valleys bordering the deserts south of the Tehachapi Mountains where it is replaced by *An. hermsi*.

**BIONOMICS:** Larvae occur in clear, seepage water in sunlit algal-laden pools. They are extremely abundant in Central Valley rice fields. Overwintering is as adult females. Females are active at dusk, flying great distances to feed on most mammals. They readily enter houses to attack man. This species is the primary vector of human malaria in the Sacramento Valley.

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***Anopheles hermsi* Barr & Guptavanji**

**IDENTIFICATION:** Adults and larvae are inseparable from *An. freeborni* without cytological examination. Adult- Maxillary palpi dark-scaled, wing with distinct patches of darker scales.

Larva- Inner clypeal hairs with 1 branch and closely spaced, outer clypeal hairs multi-branched, antennal hair multi-branched and inserted on the apical 2/3 of the antenna, head capsule marked with an irregular pattern of spots, abdominal segments IV-VI with 3 tiny accessory plates, antepalmar hair 2 on segments IV and V with 2-3 branches.

**DISTRIBUTION:** Previously known as the southern form of *occidentalis*, this species is found along the coast and interior valleys of southern California south of San Luis Obispo County. However, unexplainable disjunct populations have been identified from northern California.

**BIONOMICS:** Larval habitats, overwintering mechanism, and female behavior are similar to *An. freeborni*. This species is the primary vector of human malaria in the San Diego area.

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*Anopheles occidentalis* Dyar & Knab

- IDENTIFICATION:** Adult- Maxillary palpi dark-scaled, wing with distinct patches of dark scales, wing tip fringe with pale to golden scales.  
Larva- Inner clypeal hairs with 1 branch and closely spaced, outer clypeal hairs multi-branched, antennal hair multi-branched and inserted before or near basal 1/3 of antenna, antepalmar hair 2 on abdominal segments IV and V with 1 branch.
- DISTRIBUTION:** Along the coast from Santa Barbara County northward.
- BIONOMICS:** Larvae occur during May-July in a variety of small pools, slow moving streams, ponds, and lakes. Sources near the coast can be quite brackish. Overwintering is as adult females. Females are very reluctant to enter dwellings and prefer to feed on large mammals, rarely attacking man. This species is generally considered to have low potential as a vector of human malaria.
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*Anopheles punctipennis* (Say)

- IDENTIFICATION:** Adult- Maxillary palpi dark-scaled, wing with patches of pale scales on all veins, costa and wing tip fringe with pale-scaled patches, posterior wing fringe dark-scaled.  
Larva- Inner clypeal hairs with 1 branch and closely spaced, outer clypeal hairs multi-branched, antennal hair multi-branched and inserted near basal 1/3 of antenna, head capsule with 2 distinct cross-bands, abdominal segments IV-VI with a small accessory plate, antepalmar hair 2 on abdominal segments IV and V with 2-3 branches.
- DISTRIBUTION:** The "woodland malaria mosquito" is found along the coast and interior foothill valleys north of the Tehachapi Mountains.
- BIONOMICS:** Larvae occur in clear algal-laden shaded pools along streams and rivers, including the heavily vegetated margins of slow flowing streams. Overwintering is as adult females. Females are night biters mostly on large mammals and will attack man out of doors, but do not readily enter dwellings to do so. This species is the primary vector of human malaria in woodland and foothill situations.
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*Culex anips* Dyar

- IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, abdominal terga unbanded, major body parts (thorax, abdominal terga, and legs) uniformly dark green to brown, sides of thorax with a small patch of pale scales.  
Larva- Head hair 5 with 1-2 branches and head hair 6 with 1 branch, head hair 5 weak and 1/2 the length of head hair 6, lateral abdominal hairs on segments III-VI with 3 branches, siphon index 5.0-7.0, pecten spines blade-like with a lateral fringe, siphon tufts with 5-7 branches.
- DISTRIBUTION:** Rare, small mosquito found only in the coastal and coastal inland sections of southern San Diego County.
- BIONOMICS:** Larvae occur in cattail ponds containing heavy growths of floating algal mats. Overwintering is as adult females.
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***Culex apicalis* Adams**

- IDENTIFICATION:** Adult- Tarsi unbanded, proboscis dark-scaled, maxillary palpi with rings of pale scales, abdominal terga with narrow apical bands of pale scales.  
 Larva- Head hair 5 with 2-3 branches and head hair 6 with 2 branches, abdominal segments III-V evenly pigmented, lateral abdominal hairs on segments III-VI with 2 branches, siphon index 7.0-9.0, siphon tufts with 2-4 relatively short branches.
- DISTRIBUTION:** Common throughout California below 6,000 feet, but rarely found on the Central Valley floor and never in the southeastern deserts.
- BIONOMICS:** Larvae occur in shaded cut-off pools along quiet streams in woodland and riparian environs. Overwintering is as adult females. Females are opportunistic night biters, feeding equally on reptiles, birds, and small mammals.
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***Culex boharti* Brookman & Reeves**

- IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, wing petiole (R<sub>2+3</sub>) 1/2 the length of the cell (R<sub>2</sub>), abdominal terga with narrow apical bands of yellowish to off-white scales.  
 Larva- Head hair 5 with 2 branches and head hair 6 with 1 branch, abdominal segment IV transparent in live larva, lateral abdominal hairs on segments III-VI with 3 branches, siphon index 6.0, siphon tufts with 2-4 branches.
- DISTRIBUTION:** Highly localized in the foothills west of the Great Basin, along the Sierra Nevadas and in the southeastern deserts.
- BIONOMICS:** Larvae occur along the vegetated margins of slow moving streams and in permanent to semipermanent pools in stream beds. Overwintering is as mature larvae. Females are night biters on predominately reptiles and amphibians and are not known to feed on mammals, including man.
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***Culex erythrothorax* Dyar**

- IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, scutum and sides of thorax reddish-orange, abdominal terga with narrow basal bands of yellowish scales, abdominal terga VII and VIII mostly pale-scaled.  
 Larva- Head hair 5 with 4-7 branches and head hair 6 with 3-4 branches, lateral abdominal hairs on segments III and IV with 2 branches, comb with more than 50 scales in a patch, siphon index 6.0-7.0, siphon tufts with 2-4 relatively short branches.
- DISTRIBUTION:** The "tule mosquito" is a medium-sized, rust-colored species widely distributed throughout the lower elevations of California.
- BIONOMICS:** Larvae are usually associated with a variety of permanent and semipermanent sources containing emergent cattails and tules. Overwintering is as mature larvae. Females are night biters, feeding equally on small mammals and birds, but will attack man during the day in shade or in the open after sunset. This species has been found naturally infected with both WEE and SLE viruses, but is generally not considered to be a vector of either one.
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*Culex pipiens* Linnaeus

- IDENTIFICATION:** Adults and larvae are morphologically inseparable from *Cx. quinquefasciatus*. Definitive separation is through microscopic examination of the male terminalia.  
 Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, scutum dark brown, abdominal terga with contoured broad basal bands of pale scales.  
 Larva- Head hairs 5 and 6 with more than 5 branches, lateral abdominal hairs on segments III-VI with 2 branches, siphon index 4.0, siphon gradually tapered to apex, siphon tufts with 2-3 branches and subapical tuft inserted laterally out of line.
- DISTRIBUTION:** The "northern house mosquito" is widely distributed throughout the state north of a line at roughly 39° N (northern San Joaquin Valley) although populations hybridize with *Cx. quinquefasciatus* within 5-10° south of this line.
- BIONOMICS:** Larvae occur in a variety of foul water sources which are high in organic content (i.e., septic tanks, dairy ponds, catch basins, etc.). Overwintering is as adult females. Females feed at dusk or later, readily entering dwellings to do so, prefer avian hosts, although they may feed on large mammals, including man. Some populations may be autogenous or diapausing. This species can serve as a secondary vector of SLE virus.

*Culex quinquefasciatus* Say

- IDENTIFICATION:** Adults and larvae are morphologically inseparable from *Cx. pipiens*. Definitive separation is through microscopic examination of the male terminalia.  
 Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, scutum dark brown, abdominal terga with contoured broad basal bands of pale scales.  
 Larva- Head hairs 5 and 6 with more than 5 branches, lateral abdominal hairs on segments III-VI with 1-2 branches, siphon index 3.8-4.0, siphon with distal 1/2 tapered, siphon tufts with 2-3 branches and subapical tuft inserted laterally out of line.
- DISTRIBUTION:** The "southern house mosquito" is widely distributed throughout the state south of a line at roughly 39° N (northern San Joaquin Valley) although populations hybridize with *Cx. pipiens* within 5-10° north of this line.
- BIONOMICS:** Larvae occur in a variety of foul water sources which are high in organic content (i.e., septic tanks, dairy ponds, catch basins, etc.). Overwintering is as adult females. Females feed at dusk or later, readily entering dwellings to do so, prefer avian hosts, although they may feed on large mammals and man. No populations are autogenous or diapausing. They are suspected secondary vectors of SLE in southern California.

*Culex reevesi* Wirth

- IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, abdominal terga unbanded, but distal terga with lateral apical patches of pale scales.  
 Larva- Head hair 5 with 3 branches and head hair 6 with 2 branches, abdominal segment IV transparent in live larvae, lateral abdominal hairs on segments III-VI with 2 branches, siphon index 5.5-6.0, siphon tufts with 2-4 branches.
- DISTRIBUTION:** Highly localized in moist coastal areas of central California.
- BIONOMICS:** Larvae occur in permanent and semipermanent ponds with thick growths of tules, algae, and duckweed. Overwintering is as adult females. Females seem to prefer to feed on cold-blooded animals (reptiles and amphibians).

*Culex restuans* Theobald

**IDENTIFICATION:** Adult- Tarsi with very narrow bands of pale scales overlapping the joints, proboscis dark-scaled dorsally and pale-scaled ventrally, maxillary palpi dark-scaled, scutum with mediolateral spots of pale scales, abdominal terga with broad basal bands of pale scales.

Larva- Head hairs 5 and 6 with 4-8 branches, antenna shorter than head and antennal hair is inserted near the middle of the antenna, lateral abdominal hairs on segments III-VI with 1 branch, siphon index 4.0-4.5, siphon tufts with 1 and rarely 2 branches.

**DISTRIBUTION:** Rare and sporadic from central California southward in foothill and riparian environs.

**BIONOMICS:** Larvae occur in relatively foul water and other sources high in organic matter. Overwintering is as adult females, but they may also be inactive (estivate) during the hot months of the year. Females are nocturnally active and prefer small birds and mammals, although they may feed on man in shaded areas.

*Culex stigmatosoma* Dyar

**IDENTIFICATION:** Until recently, this species was called *Cx. peus* Speiser.

Adult- Tarsi with pale bands overlapping the joints, foretibia and forefemur dark-scaled, proboscis with complete median ring of pale scales, maxillary palpi white-tipped, antennal tori dark-scaled, abdominal sterna with oval to triangular patches of dark scales.

Larva- Head hairs 5 and 6 with 4-7 branches, lateral abdominal hairs on segments III-VI with 3 branches, apex of dorsal crest of anal saddle with a patch of small spines (aciculae), siphon index 4.0-5.0, siphon tufts multi-branched with subapical tuft inserted laterally out of line.

**DISTRIBUTION:** The "banded foul water mosquito" is common throughout California except for along the crest of the Sierra Nevadas.

**BIONOMICS:** Larvae are most associated with sources highest in organic content (i.e., sewage, dairy, and log ponds). Overwintering is as adult females. Females strongly prefer avian hosts and are not readily attracted to CO<sub>2</sub>-baited traps. They are highly competent vectors of SLE and may act as enzootic amplifiers of that virus.

*Culex tarsalis* Coquillett

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, foretibia and forefemur with a mediolateral stripe or spots of pale scales, proboscis with a complete median ring of pale scales, maxillary palpi white-tipped, inside surface of antennal tori with patches of pale-scales, abdominal sterna usually with chevron patches of dark scales.

Larva- Head hairs 5 and 6 with 3 or more branches, lateral abdominal hairs on segments III-VI with 3 branches, apex of dorsal crest of anal saddle with a very few fine spines (aciculae), siphon index 4.5-5.5, siphon tufts multi-branched with all tufts inserted in a straight line along the ventral edge of the siphon.

**DISTRIBUTION:** The "western encephalitis mosquito" is the most widely distributed mosquito in the state and is found in all counties at elevations from below sea level to 10,000 feet.

**BIONOMICS:** Larvae occur in practically all freshwater sources but are commonly associated with agricultural sources. Overwintering is as adult females. Autogenous and diapausing populations exist. Females are night feeders on predominately birds, but will switch to mammals (including man) after the nesting season. They are widely regarded as the primary enzootic and epidemic vector of SLE and WEE viruses in California.

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*Culex territans* Walker

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis and maxillary palpi dark-scaled, wing petiole (R<sub>2+3</sub>) less than 1/3 the length of the cell (R<sub>2</sub>), abdominal terga with narrow apical bands of white scales.

Larva- Head hairs 5 and 6 usually with 1 and rarely 2 branches, abdominal segments III-V evenly pigmented, lateral abdominal hairs on segments III-VI with 2 branches, siphon index 6.0-7.0, siphon tufts with 2-3 branches.

**DISTRIBUTION:** Highly localized in northern California and in the central Sierra Nevadas between elevations of 4,000 and 6,000 feet.

**BIONOMICS:** Larvae occur in sunlit cut-off pools along shaded woodland creeks. Overwintering is as adult females. Females are active at dawn and dusk and show an intense preference for feeding on frogs, toads, and snakes.

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*Culex thriambus* Dyar

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, foretibia and forefemur dark-scaled, proboscis with a dorsally incomplete (sometimes absent) median ring of pale scales, maxillary palpi dark-scaled, antennal tori dark-scaled, abdominal terga with basal bands of pale scales, abdominal sterna with irregular patches of dark scales.

Larva- Head hairs 5 and 6 with 3 or more branches, antennal hair inserted at the apical 1/3 of the antenna, lateral abdominal hairs on segments III-V with 2 branches, siphon index 6.0, most siphon tufts with only 1 branch.

**DISTRIBUTION:** Locally abundant in the foothills surrounding the Central Valley with some isolated populations found on the valley floor.

**BIONOMICS:** Larvae occur in isolated pools, ponds, hoofprints and rock holes along intermittent creeks and permanent streams. Overwintering is as adult females. Females are night biters and feed predominately on birds.

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*Culiseta impatiens* (Walker)

**IDENTIFICATION:** Adult- Tarsi unbanded, hindfemur and first two hindtarsal segments mostly dark-scaled, proboscis and maxillary palpi mostly dark-scaled, wings uniformly dark-scaled, radial and median veins without scales, abdominal terga with uniformly narrow basal bands of white scales.

Larva- Head hairs 5 and 6 of equal length and equally branched, dorsal crest of anal saddle without small spines (aciculae), lateral hair of anal saddle with 2-4 branches and shorter than the dorsal crest of the saddle, siphon index 2.5-2.8.

**DISTRIBUTION:** This extremely rare mosquito is highly localized along the crest of the central and northern Sierra Nevadas.

**BIONOMICS:** This univoltine spring species occurs in woodland and man-made pools, especially those rich in organic matter. Overwintering is as adult females. Females feed predominately on large mammals, including man.

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*Culiseta incidens* (Thomson)

**IDENTIFICATION:** Adult- Tarsi with narrow bands of pale scales overlapping the joints, hindfemur unbanded, proboscis and maxillary palpi dark-scaled with a few intermixed pale scales, postspiracular bristles absent, wings mostly dark-scaled with distinct patches of darker scales, radial and median cross-veins without scales, abdominal terga with uniform basal bands of pale scales.

Larva- Head hair 5 shorter with more branches than head hair 6, dorsal crest of anal saddle without small spines (aciculae), lateral hair of anal saddle very short with 3-4 branches, siphon index 3.0.

**DISTRIBUTION:** The "cool weather mosquito" is a large mosquito found widespread throughout the state but is most abundant in moist environs.

**BIONOMICS:** Larvae and adults are most abundant during the cooler months of the year. Breeding sources include brackish water, snow pools, artificial containers, etc. Overwintering (mountains) or estivating (valleys) is as adult females. Females actively feed at dawn and dusk on a variety of mammals (including man) and are occasionally considered localized pests.

*Culiseta inornata* (Williston)

**IDENTIFICATION:** Adult- Tarsi unbanded, hindfemur and first two tarsal segments (T1 & T2) with intermixed dark and pale scales, proboscis and maxillary palpi with intermixed dark and pale scales, anterior wing veins with intermixed dark and pale scales, radial and median cross-veins without scales, abdominal terga with laterally expanded basal bands of yellowish scales.

Larva- Head hair 5 shorter with more branches than head hair 6, dorsal crest of anal saddle without small spines (aciculae), lateral hair of anal saddle with 1-2 branches and longer than the dorsal crest of the saddle, siphon index 3.5.

**DISTRIBUTION:** The "winter mosquito" is an unusually large mosquito found both common and widespread throughout the state over a wide range of elevations.

**BIONOMICS:** Larvae occur in a variety of sunlit habitats including duck club ponds, irrigation runoff ditches and canals, rainpools, salt marshes and occasionally artificial containers. Overwintering (mountains) or estivating (valleys) is as adult females. Females feed at dawn and dusk, mainly on large domestic animals and man. This species has been found naturally infected with a CE group virus.

*Culiseta particeps* (Adams)

**IDENTIFICATION:** Adult- Tarsi with wide basal bands of pale scales, hindfemur with a broad preapical ring of pale scales, proboscis and maxillary palpi mostly dark-scaled, wings dark-scaled with distinct patches of darker scales, radial and median cross-veins dark-scaled, abdominal terga with medially expanded narrow basal bands of pale scales.

Larva- Head hair 5 as long as and with more branches than head hair 6, dorsal crest of anal saddle with numerous small spines (aciculae), lateral hair of anal saddle with 1-5 branches and shorter than the dorsal crest of the saddle, siphon index 3.0.

**DISTRIBUTION:** Localized in riparian environs of the foothills surrounding the Central Valley, in southern California west of the deserts, and along the coast south of Del Norte County.

**BIONOMICS:** Larvae occur in shaded clear pools containing algae, leaves, and other debris. Overwintering or estivating is as adult females. Females prefer large mammals and may feed on man in shaded places. Adult populations are seldom abundant enough to create a nuisance problem.

*Coquillettidia perturbans* (Walker)

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, hindfemur with a narrow subapical band of pale scales and first tarsal segments (T1) with a narrow median ring of pale scales, proboscis with a wide median ring of pale scales, palpi short with intermixed dark and pale scales, wing speckled with intermixed dark and pale spatulate scales, abdominal apex blunt and terga with basal bands of pale scales.

Larva- Head hair 5 much shorter and more branched than head hair 6, antenna twice length of head, comb with 8-15 thorn-like scales in an irregular row, siphon short and serrated for attachment to aquatic vegetation, pecten spines absent.

**DISTRIBUTION:** Sporadic throughout California north of the Tehachapi Mountains.

**BIONOMICS:** Larvae occur in permanent freshwater marshes with emergent cattails and tules. Habitat destruction has made this species regionally extinct in many areas. Overwintering is as mature larvae. Females feed on large mammals and will readily attack man after sunset. They are localized pests in some areas.

*Orthopodomyia signifera* (Coquillett)

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, hindfemur and hindtibia with intermixed dark and pale scales, proboscis and maxillary palpi dark-scaled with dorsal longitudinal lines of white scales, scutum with an intricate pattern of narrow white longitudinal lines, wing with median patches of wide white scales, abdominal apex blunt and terga with laterally expanded basal bands of pale scales.

Larva- Head hairs 5 and 6 multi-branched, abdominal segments VII and VIII with sclerotized plates, comb with 2 rows of 8-20 scales inserted separate from sclerotized plate, siphon index 3.0-3.5, pecten spines absent.

**DISTRIBUTION:** Spotty from throughout California but appears restricted to lower elevations.

**BIONOMICS:** Larvae occur (sometimes along with *Ae. sierrensis*) in treeholes and rot cavities containing water year-round (i.e., oaks, cottonwoods, and willows). Overwintering is as eggs or mature larvae. Adults tend to be long-lived with females preferring to feed on small birds.

*Psorophora columbiae* (Dyar & Knab)

**IDENTIFICATION:** Adult- Tarsi with bands of pale scales overlapping the joints, hindfemur with a preapical ring of pale scales and first hindtarsal segment (T1) with a wide median ring of pale scales, foretibia with a row of pale spots, proboscis with a median ring of pale scales, maxillary palpi white-tipped, wings with intermixed dark and pale scales, abdominal apex pointed, proximal abdominal terga with contoured apical bands of pale scales and distal terga with lateral patches of pale scales.

Larva- Head hairs 5 and 6 with 5-7 short barbed branches, abdominal segment VIII with a circular sclerotized plate with 6 attached comb scales, siphon index 3.0, siphon medially inflated, pecten with 3-5 widely spaced spines, siphon tuft with 5-7 branches.

**DISTRIBUTION:** The "dark ricefield mosquito" is restricted to the desert regions of San Bernardino, Riverside, and Imperial Counties.

**BIONOMICS:** This multivoltine summer species occurs in a variety of floodwater and irrigation sources, including pastures, date groves, alfalfa fields, citrus orchards, etc. Immature development can be completed in 2-3 days. Although preferring to feed on livestock, females readily and viciously attack man after sunset and are considered severe pests.

***Psorophora signipennis* (Coquillett)**

**IDENTIFICATION:** Adult- Tarsi wide bands of pale scales overlapping the joints, hindfemur with a wide preapical ring of pale scales, femur and tibia with many intermixed pale scales, proboscis with a wide median ring of pale scales, maxillary palpi with intermixed dark and pale scales, costal vein and wing fringe with a checkered pattern of dark and pale scales, abdominal terga mostly pale-scaled with narrow diagonal lines of dark scales.

Larva- Head hairs 5 and 6 with 1-2 long branches, abdominal segment VIII with a circular sclerotized plate with 4-8 attached comb scales, siphon index 3.0, siphon moderately inflated, pecten with 4-6 widely spaced spines, siphon tuft with 3-5 tiny branches.

**DISTRIBUTION:** Restricted to along the lower Colorado River from Needles southward to the Bard Valley (San Bernardino, Riverside, and Imperial Counties).

**BIONOMICS:** This multivoltine summer species occurs in sunlit alkaline floodwater and irrigation sources. Immature development can be completed in 4-6 days. Females are night biters, opportunistically feeding on rabbits, horses, and man.

***Uranotaenia anhydor* Dyar**

**IDENTIFICATION:** Adult- Tarsi unbanded, proboscis dark-scaled, maxillary palpi dark-scaled and quite short in both sexes, scutum with lateral patches of bright iridescent blue-white scales, second marginal cell (R2) of wing shorter than its petiole (R2 + 3), abdominal apex blunt and terga unbanded.

Larva- Head hair 5 with 2-3 branches and head hair 6 with 1 branch, abdominal segment VII with a large sclerotized plate with an attached single row of 8-11 comb scales, anal saddle complete siphon index 4.5, pecten with 14-20 evenly spaced spines.

**DISTRIBUTION:** This small species is rare and highly localized in Inyo, San Bernardino, and San Diego Counties. Saratoga Springs (Death Valley) supports a large population.

**BIONOMICS:** Larvae occur in alkaline marshes and ponds containing dense emergent vegetation and/or floating mats of the common reed (*Phragmites*). Overwintering is presumably as adult females. Females are largely autogenous (Saratoga Springs population), but will feed to some extent on amphibians.

***Culex erraticus* Dyar and Knab**

**IDENTIFICATION:** Adult- Tarsi unbanded, legs dark brown, margin of eyes with a row of broad appressed pale to dark scales, mesanepimeron with a patch of pale scales, abdominal terga with narrow basal bands of pale scales.

Larva- Head hair 5 short and brush-like with 4-8 branches, pecten spines with a posterior lateral fringe, siphon tufts 4-5, comb scales with a prominent central spine, siphon index 6.0.

**DISTRIBUTION:** Known only from the eastern shore of the Salton Sea in the vicinity of the Wister National Wildlife Refuge. May eventually disperse throughout the Imperial and Coachella Valleys where favorable conditions exist for colonization.

**BIONOMICS:** Larvae occur in shallow grassy to open pools in association with Tamarisk and cattails, and in road side ditches adjacent to permanent wetlands. Adults occasionally bite man, but most commonly feed on available avians. This species represents a rare new find and is considered a nuisance species elsewhere.

DISTRIBUTION OF CALIFORNIA MOSQUITOES BY COUNTY

REGION	COUNTY	Aedes																								
		bicristatus	campestris	cataphylla	deserticola	dorsalis	fitchii	flavescens	hermitaleus	hexodontus	incretipus complex	melanimon	nigromaculis	niphadopsis	pulliatus	purpureipes	schizopinax	sierrensis	squatiger	sticticus	taeniorhynchus	tahoensis	thelcter	ventrovittis	vexans	
COASTAL	Del Norte					X		X		X								X								X
	Humboldt	X				X	X			X								X								X
	Mendocino	X				X				X		X						X								X
	Sonoma	X				X				X	X	X						X	X							X
	Lake	X					X			X	X	X						X								X
	Napa	X				X				X	X	X						X	X							
	Marin	X				X				X	X	X						X	X							
	Solano					X				X	X	X						X	X							X
	San Francisco																	X								
	Alameda					X				X		X						X	X							X
	Contra Costa					X				X	X	X						X	X							X
	Santa Clara					X				X		X						X	X							
	San Mateo	X				X				X								X	X							
	San Benito											X						X	X							
	Santa Cruz					X				X								X								
	Monterey					X				X		X						X	X							
	CASCADES AND EASTERN SIERRA	Siskiyou		X	X		X	X		X	X	X	X	X				X								X
Trinity		X				X			X	X	X	X					X									
Shasta			X	X		X	X	X	X	X	X	X					X	X		X				X	X	
Modoc			X	X		X	X	X	X	X	X	X	X				X	X						X	X	
Lassen			X	X		X	X	X	X	X	X	X	X				X					X		X	X	
Plumas			X	X		X	X		X	X	X	X	X				X	X				X		X	X	
Sierra				X		X	X		X	X	X	X					X	X				X		X	X	
Alpine				X		X	X		X	X	X				X		X	X				X		X		
Mono				X		X	X		X	X	X		X		X		X	X				X		X	X	
Inyo				X		X			X	X	X	X	X		X		X					X		X	X	
CENTRAL VALLEY AND WESTERN SIERRA	Tehama			X		X		X	X	X	X	X					X		X		X				X	
	Butte									X	X	X					X				X				X	
	Glenn										X	X					X								X	
	Colusa					X				X	X	X					X		X						X	
	Sutter					X				X	X	X					X		X						X	
	Yuba									X	X	X					X		X						X	
	Yolo									X	X	X					X		X						X	
	Sacramento	X				X				X	X	X					X		X						X	
	San Joaquin	X				X				X	X	X					X		X						X	
	Stanislaus					X				X	X	X					X		X						X	
	Merced					X				X	X	X					X		X						X	
	Madera									X	X	X	X				X		X		X			X	X	
	Fresno			X		X		X	X	X	X	X		X			X		X		X			X	X	
	Kings									X	X	X					X		X						X	
	Tulare			X						X	X	X	X		X			X				X			X	
	Kern					X				X	X	X					X		X						X	
	Nevada			X		X		X	X	X	X	X				X	X		X		X			X	X	
	Placer	X		X		X		X	X	X	X	X				X	X		X		X			X	X	
	El Dorado	X		X		X		X	X	X	X	X				X	X		X		X			X	X	
Amador	X		X		X	X		X	X	X	X					X		X		X			X	X		
Calaveras	X				X				X	X	X					X		X		X			X	X		
Tuolumne			X		X				X	X	X		X			X		X		X			X	X		
Mariposa			X		X		X	X	X	X						X		X		X			X	X		
SOUTHERN CALIFORNIA	San Luis Obispo					X			X		X						X	X								
	Santa Barbara					X			X	X	X						X	X		X						
	Ventura					X			X		X						X	X		X						
	Los Angeles				X	X			X		X						X	X		X						
	Orange								X	X	X						X	X		X						
	San Diego				X	X			X		X						X	X		X						
	San Bernardino				X	X			X	X	X				X		X		X		X				X	
	Riverside				X	X			X	X	X				X		X	X		X		X			X	
Imperial					X				X		X				X		X		X		X			X		

DISTRIBUTION OF CALIFORNIA MOSQUITOES BY COUNTY

REGION	COUNTY	Anopheles					Culex										Culiseta				Others					
		franciscanus	freeborni	hermsi	occidentalis	punctipennis	arrips	apicalis	boharti	erraticus	erythrorax	pipiens/quingue.	reevesi	restuans	stigmatosoma	tarsalis	tertians	thriambus	impatiens	incidens	inomata	particeps	Cq. perturbans	Or. signifera	Ps. columbiae	Ps. signipennis
COASTAL	Del Norte	X	X		X	X		X	X		X	X			X	X	X		X	X	X	X				
	Humboldt	X	X		X	X		X	X		X	X			X	X	X		X	X	X	X				
	Mendocino	X	X		X	X		X	X		X	X			X	X		X		X	X	X	X			
	Sonoma	X	X		X	X		X	X		X	X			X	X		X		X	X	X	X			
	Lake	X	X		X	X		X	X		X	X			X	X	X		X	X	X	X	X			
	Napa	X	X		X	X		X	X		X	X			X	X		X		X	X	X	X			
	Marin	X	X		X	X		X	X		X	X	X		X	X		X		X	X	X				
	Solano	X	X		X	X		X	X		X	X			X	X		X		X	X	X				
	San Francisco				X						X				X	X		X		X	X	X				
	Alameda	X	X		X	X		X	X		X	X			X	X		X		X	X	X				
	Contra Costa	X	X		X	X		X	X		X	X			X	X	X		X	X	X		X			
	Santa Clara	X	X		X	X		X	X		X	X			X	X		X		X	X	X				
	San Mateo	X	X	X	X	X		X	X		X	X	X		X	X		X		X	X	X		X		
	San Benito	X	X		X			X	X		X				X	X		X		X	X					
	Santa Cruz	X	X		X	X		X	X		X	X			X	X		X		X	X	X				
Monterey	X	X		X	X		X	X		X	X	X	X	X	X		X		X	X	X					
CASCADES AND EASTERN SIERRA	Siskiyou	X	X		X									X	X	X		X	X	X	X					
	Trinity	X	X		X		X	X						X	X	X		X	X	X	X					
	Shasta	X	X		X		X	X		X	X	X		X	X	X	X	X	X	X	X	X				
	Modoc		X		X										X			X	X	X	X	X				
	Lassen	X	X		X									X	X			X	X							
	Plumas	X	X		X		X							X	X	X		X	X			X				
	Sierra		X											X	X	X		X	X	X						
	Alpine	X						X							X			X	X	X						
	Mono		X											X	X			X	X	X						
	Inyo	X	X		X						X	X			X	X		X	X	X	X		X			X
CENTRAL VALLEY AND WESTERN SIERRA	Tehama	X	X		X		X	X		X	X			X	X	X	X	X	X	X	X					
	Butte	X	X		X		X	X		X	X			X	X	X	X	X	X	X	X	X				
	Glenn	X	X				X	X		X	X			X	X		X		X	X						
	Colusa	X	X		X					X	X			X	X			X	X							
	Sutter	X	X		X		X			X	X			X	X			X	X			X				
	Yuba	X	X		X		X	X		X	X			X	X	X	X	X	X	X	X	X				
	Yolo	X	X		X		X			X	X			X	X		X		X	X	X					
	Sacramento	X	X		X		X	X		X	X			X	X		X		X	X	X	X				
	San Joaquin	X	X		X		X			X	X			X	X		X		X	X	X	X				
	Stanislaus	X	X		X		X	X		X	X			X	X		X		X	X	X	X				
	Merced	X	X		X		X	X		X	X			X	X		X		X	X	X	X				
	Madera	X	X		X					X	X			X	X		X		X	X						
	Fresno	X	X		X		X			X	X		X	X	X		X		X	X	X	X				
	Kings	X	X		X		X	X		X	X			X	X		X		X	X						
	Tulare	X	X		X		X	X		X				X	X		X		X	X	X		X			
	Kern	X	X		X		X	X		X	X		X	X	X		X		X	X	X	X				
	Nevada	X	X		X		X	X		X	X			X	X	X	X		X	X						
	Placer	X	X		X		X	X		X	X			X	X	X	X		X	X	X	X				
	El Dorado	X	X		X		X			X				X	X	X	X	X	X	X						
	Amador	X	X		X		X	X		X				X	X			X	X				X			
Calaveras	X	X		X		X	X		X				X	X			X	X	X	X	X					
Tuolumne	X	X		X		X	X		X	X			X	X		X	X	X	X							
Mariposa	X			X		X	X		X				X	X	X	X	X	X								
SOUTHERN CALIFORNIA	San Luis Obispo	X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X						
	Santa Barbara	X		X	X	X		X	X		X	X	X		X		X		X	X	X					
	Ventura	X		X			X	X		X	X			X	X	X		X	X	X						
	Los Angeles	X		X			X	X		X	X			X	X	X	X	X	X	X		X				
	Orange	X		X			X	X		X	X			X	X	X		X	X	X		X				
	San Diego	X		X		X	X	X		X	X			X	X	X	X	X	X	X		X			X	
	San Bernardino	X	X	X	X		X			X	X			X	X	X		X	X	X		X	X	X	X	
	Riverside	X	X	X			X			X	X			X	X	X		X	X	X		X	X	X	X	
Imperial	X	X				X	X	X		X			X	X			X	X	X		X	X	X	X		

# GLOSSARY

**GLOSSARY OF TERMS USED IN THE KEYS**

**ABDOMEN** - Third or most posterior division of the insect body consisting of nine segments (I-VIII, X) in the larva and eight visible segments (I-VIII) in the adult mosquito.

**ABDOMINAL** - Pertaining to the abdomen as in abdominal segments and abdominal terga or sterna.

**ACICULA** (pl. ACICULAE) - A needlelike spine or bristle, generally located at the apical end of the dorsal crest of the anal saddle.

**ANAL** - In the direction of or pertaining to the anus.

**ANAL PAPILLA** (pl. PAPILLAE) - One of four nearly transparent, oval to banner-shaped, projections from the distal end of the larval abdominal segment X; used as osmoregulatory organs for salt balance.

**ANAL SADDLE** - The dorsal plate of the last larval abdominal segment (X); it may completely or incompletely ring that segment along its entire length or at the base only.

**ANAL SEGMENT** - The last larval abdominal segment (X); it bears the anal papillae and may or may not be completely encircled by the anal saddle.

**ANAL VEIN** - The last longitudinal vein along the posterior portion of the wing.

**ANOPHELINE** - Mosquitoes distinct from culicines based upon morphological differences; larval siphon is truncated and adult female's maxillary palpi are as long as the proboscis.

**ANTENNA** (pl. ANTENNAE) - One of paired sensory organs extending anteriorly from each side of the head.

**ANTERIOR** - In front of, toward the front, or before another object.

**APICAL (APEX)** - Of or pertaining to an area of a body part or segment furthest removed or opposite from the base by which it is attached.

**AREA** - A specific location on the external surface of the adult or larval body (i.e., subspiracular area).

**BASAL (BASE)** - Of or pertaining to an area of a body part or segment closest to where it is attached to the nearest main body part.

**CERCUS** (pl. CERCI) - One of paired tubular appendages extending posteriorly from the last visible abdominal segment in female mosquitoes; used in oviposition.

**CLAW** - Hook-shaped structure found at the distal end of the last tarsal segment (T5); foretarsus containing one claw, middle and hindtarsus with two claws.

**CLYPEAL HAIRS** - Two pairs of hairs (inner and outer) located at the front of the head in mosquito larvae.

**COMB (COMB SCALES)** - A group or patch of specialized spicules located on the sides of abdominal segment VIII of culicine larvae.

**COSTAL VEIN (COSTA)** - The first longitudinal vein along the anterior portion of the wing.

**COUPLET** - Unit of a dichotomous (paired) key that presents a choice between two alternative morphological characters; used in identifying adult or larval mosquitoes.

**COXA** (pl. COXAE) - The basal segment of the leg articulating with the thoracic sternum and bearing the femur at its distal end; referred to as fore-, middle-, or hindcoxa as appropriate.

**CROSS-VEINS (RADIAL and MEDIAN)** - Short veins which vertically connect the radial (anterior) and median (middle) wing veins; generally oriented either in line or offset.

**CULICINE** - Mosquitoes distinct from anophelines based upon morphological differences. Larval siphon is elongated and the adult female's maxillary palpi are less than 1/3 the length of the proboscis.

**DARK** - Color range from black to golden brown.

**DISTAL (DISTAD)** - Near or toward the free or apical end of any body part or segment.

**DORSAL (DORSUM)** - Of or pertaining to the upper surface.

**DORSAL CREST** - Region along the uppermost (dorsal) part of the sclerotized anal saddle of larvae.

**FEMUR** - The thigh or stoutest segment of the leg which is attached to the coxa at its base and bearing the tibia at its distal end; referred to as fore-, middle- or hindfemur as appropriate.

**HEAD** - First or most anterior division of the insect body bearing the sensory (antenna, eyes, or maxillary palpi) and feeding (proboscis or mouth brushes) organs.

**HYPOSTIGIAL (SUBSPIRACULAR) PATCH** - Circular patch (spot) of pale scales located on the sides of the adult mosquito's thorax directly beneath the mesothoracic spiracle (see subspiracular area).

**INTEGUMENT** - Enveloping layer of skin or cuticle of any body part or segment; it generally supports a vestiture (outgrowths) of setae or scales.

**KEY (DICHOTOMOUS KEY)** - Organized system of paired couplets based upon morphological differences; used to identify adult or larval mosquitoes to genus and species.

**LANCEOLATE** - Shaped like a lance; tapering to a point at the apex and sometimes at the base.

**LATERAL** - Relating, pertaining, or attached to the side.

**LEG** - One of six locomotory (walking) appendages attached to the ventral side of the adult thorax which is composed of four articulating segments (coxa, femur, tibia, and tarsus); referred to as fore-, middle-, or hindleg as appropriate.

**LOWER MESANEPIMERAL BRISTLES** - Patch of setae located along the lower anterior edge of the adult mesanepimeron (side of the mesothorax below the spiracle and above the middlecoxa).

**MAXILLARY PALPUS** (pl. PALPI) - One of paired appendages extending anteriorly along either side of the proboscis from the adult head.

**MEDIAN** - In, at, or pertaining to the middle.

**METAMERON PATCH** - Small patch of dark scales located on the adult metameron (side of the thorax above the hindcoxa).

**MICROTRICHIIUM** (pl. MICROTRICHIA) - Minute, flexible spicule.

- PALE - Color range from white to straw or light yellow.
- PALMATE HAIRS - Fan-shaped hairs inserted dorsally on abdominal segments IV-VII of anopheline larvae.
- PATCH - Symmetrical or irregular cluster of scales or setae (i.e., dark or pale scales, comb scales, etc.) that form a distinct grouping or spot.
- PECTEN (PECTEN ROW) - Grouping of specialized spicules (pecten spines) located along the basal portion of the larval siphon; generally occurring as regular (all spines evenly spaced apart) or irregular (distal spines spaced farther apart than apical ones).
- PECTEN SPINES - Specialized spicules located in a row along the basal portion of the larval siphon.
- PETIOLE - Slender, stalk-like region of the radial wing veins (R 2+3) before the apical division into the individual veins (R2 and R3).
- POSTERIOR - Behind, towards the rear, or after another object.
- POSTPRONOTAL PATCH - Irregular patch of dark scales located on the adult postpronotum (side of the thorax anterior of the wing and just below the scutum).
- POSTPROCOXAL PATCH - Small oval patch of pale scales located on the posterior surface of the procoxa.
- PROBOSCIS - The single, tubular mouth structure extending anteriorly from the adult head; used for both nectar and blood feeding. It consists of an outer protective sheath (labium) which envelopes fine stylets (mandibles, maxillae, epipharynx, and hypopharynx).
- PROXIMAL - Near or toward the attached or basal end of any body part or segment.
- RING - Encircling patch of pale scales; often found on the proboscis or maxillary palpus.
- SCALE - Flat, one-celled outgrowth of a body segment or appendage of various shapes and colors.
- SCLEROTIZED - Excessively hardened area of the larval cuticle; generally darker and heavier in appearance.
- SCUTUM - The principal dorsal area of the adult thorax belonging to the mesonotum.
- SETA (pl. SETAE) - Slender outgrowth (hair) of a body segment or appendage; usually found unbranched (single) or branched (double, triple, multiple).
- SIPHON - The elongated, sclerotized tube extending from larval abdominal segment VIII; used for breathing.
- SIPHON INDEX - Numeric estimate (ratio) for the overall shape of the larval siphon which is derived by dividing the siphon length by its basal width. Higher index numbers indicate long, thin siphons and lower numbers indicate short, broad siphons.
- SPATULATE - Shaped like a spatula; broadly oval or triangular.
- SPICULE - Thorn-like outgrowth of the body or appendages; ranging from minute (spinule) to large (spine).
- SPIRACLE - Pore-like tracheal aperture of insects; located on each side of the thorax both just behind the wing and above the hindcoxa in adult mosquitoes and at the apex of the siphon in larvae.

- SPIRACULAR BRISTLES - Row of prominent setae situated on the prespiracular area just in front of the mesothoracic spiracles of adult *Culiseta*.
- STERNUM (pl. STERNA) - The bottom sclerotized portion of a body part or segment.
- SUBAPICAL - Less than or not quite reaching the apex or distal end.
- SUBSPIRACULAR AREA - Small triangular area located just below the adult mesothoracic spiracle on which the hypostigial patch is sometimes present.
- TARSUS (pl. TARSI) - The foot or last segment of the leg which is comprised of five separate smaller segments (tarsomeres; T 1-5) and is attached to the tibia at its base and bears the tarsal claw at its distal end; referred to as fore-, middle-, or hindtarsus as appropriate.
- TERGUM (pl. TERGA) - The top sclerotized portion of a body segment; called notum (pl. nota) in the thorax.
- THORAX - Second or middle division of the insect body bearing the legs and wings in the adult and no appendages in the larva; often divided into the pro-, meso-, and metathorax.
- TIBIA (pl. TIBIAE) - The third or shin segment of the leg which is attached to the femur at its base and bears the tarsus at its distal end; referred to as fore-, middle-, or hindtibia as appropriate.
- TORUS (pl. TORI) - Enlarged basal segment of the adult antenna; often bearing setae and/or scales.
- TUBERCLE - Small, knobby prominence of a body segment or appendage; often giving rise to a body hair or setae.
- TUFT - Collection of single or many-branched setae arising from a body part or segment.
- VEIN (WING VEIN) - Rigid rod or tube-like structure which helps support and stiffen the wings.
- VENTRAL (VENTER) - Of or pertaining to the under surface of a body segment or appendage.
- WING - One of two locomotory (flight) appendages attached to the thoracic sides of adult mosquitoes which is composed of clear membranous areas (cells) between numerous supporting longitudinal and interconnecting scaled veins.



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