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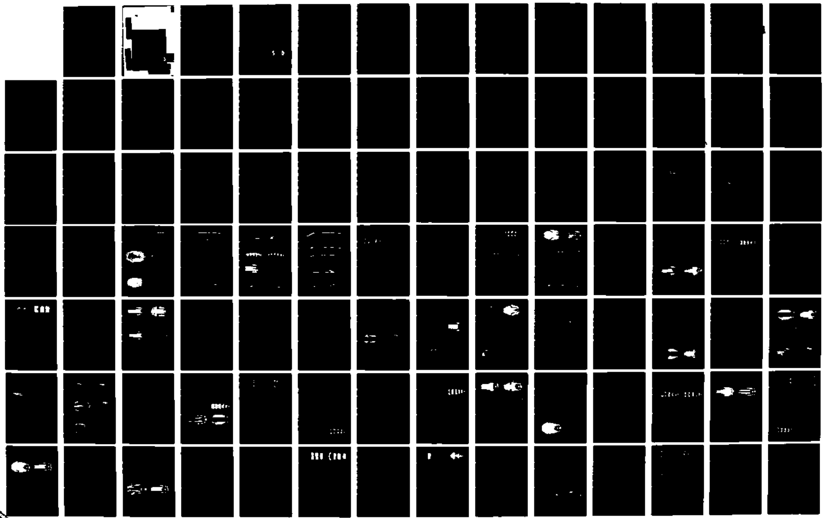

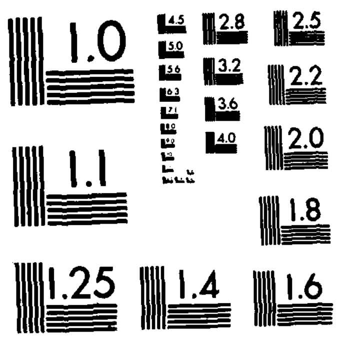

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

of the

Mosquitoes of North America, North of Mexico

Richard F. Darsie, Jr.
Ronald A. Ward

ABBREVIATIONS OF THE STATES OF THE UNITED STATES OF AMERICA AND THE PROVINCES OF CANADA

United States

AL —	Alabama
AK —	Alaska
AR —	Arkansas
AZ —	Arizona
CA —	California
CO —	Colorado
CT —	Connecticut
DC —	District of Columbia
DE —	Delaware
FL —	Florida
GA —	Georgia
IA —	Iowa
ID —	Idaho
IL —	Illinois
IN —	Indiana
KS —	Kansas
KY —	Kentucky
LA —	Louisiana
MA —	Massachusetts
MD —	Maryland
ME —	Maine
MI —	Michigan
MN —	Minnesota
MO —	Missouri
MS —	Mississippi
MT —	Montana
NE —	Nebraska
NC —	North Carolina
ND —	North Dakota
NH —	New Hampshire
NJ —	New Jersey
NM —	New Mexico
NV —	Nevada
NY —	New York
OH —	Ohio
OK —	Oklahoma
OR —	Oregon
PA —	Pennsylvania
RI —	Rhode Island
SC —	South Carolina
SD —	South Dakota
TN —	Tennessee
TX —	Texas
UT —	Utah
VA —	Virginia
VT —	Vermont
WA —	Washington
WI —	Wisconsin
WV —	West Virginia
WY —	Wyoming

Canada

ALTA —	Alberta
BC —	British Columbia
LAB —	Labrador*
MAN —	Manitoba
NB —	New Brunswick
NFLD —	Newfoundland
NS —	Nova Scotia
NWT —	Northwest Territories
ONT —	Ontario
PEI —	Prince Edward Island
PQ —	Quebec
SASK —	Saskatchewan
YUK —	Yukon

* Although Labrador is now part of Newfoundland, mosquito records are here listed separately.

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MOSQUITOES, CULICIDAE, NORTH AMERICA

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

CORRECTIONS AND ADDITIONS ARE PROVIDED AS A SUPPLEMENT TO THE PUBLICATION, IDENTIFICATION AND GEOGRAPHICAL DISTRIBUTION OF THE MOSQUITOES OF NORTH AMERICA, NORTH OF MEXICO.

Corrections and Additions to the Publication, *Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico*

Ronald A. Ward[1] and Richard F. Darsie, Jr.[2]

ABSTRACT. Corrections and additions are provided as a supplement to the publication, *Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico*.

INTRODUCTION

Following the publication of Darsie and Ward (1981), certain errors and corrections have been brought to our attention and are appended below in an Errata section. As the chapters, Bibliography of Mosquito Taxonomy and Geographical Distribution, and Addendum to Bibliography in Darsie and Ward (1981) surveyed the relevant literature through most of 1979, we are providing annotated references from 1979 to mid-1982. In addition, several pre-1979 publications are cited that were earlier omitted. Certain species merit comment and are noted along with new distribution records at the state (U.S.A.) and province (Canada) level.

We wish to thank Peter Belton, Alain Maire and Lewis T. Nielsen who have provided data for our use and Bruce Harrison for his advice on an earlier draft.

ERRATA

Page 7, line 19
For Interocular setae (IS), read Interocular setae (ISe)

Page 8, lines 39, 43, 48
For meskatepisternum, read mesokatepisternum

Page 9, line 39
For Fig. 15, read Fig. 38

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Page 9, line 41
For Fig. 221, read Fig. 222

Page 10, line 49
For the, read The

Page 14, In list of abbreviations for Plate 4, add PMe-pleural membrane

Page 27, Couplet 1, lines 1 and 2
For hindtarsomere, read hindtarsomeres

Page 30, Figs. 59, 61
For Hindtarus, read Hindtarsus

Page 44, Fig. 140
For *candensis*, read *canadensis*

Page 51, line 2
For posterior, read anterior

Page 115, line 44
For Fig. 789, read Fig. 815

Page 115, line 45
For Fig. 815, read Fig. 784

Page 116, line 25
For Figs. 514, 516, read Figs. 514, 516, 855

Page 119, line 7
For mesurement, read measurement

Page 132, Couplet 11
Should read:
11 (10). Saddle completely encircling segment X (Fig. 538), or if not, siphon aciculate (Fig. 824) . . . . *Culex*

Saddle not completely encircling segment X (Fig. 539); siphon not aciculate . . . . (in part) *Aedes*

Page 133, Couplet 14, lines 2 and 3
For tergum on VII, read segment VII

Page 182, Figs. 790, 792
For 1-I-IV, read 1-IV

Page 199, Figs. 878, 880
For Ventral view, read Dorsal view

Page 202, Fig. 895
For *inornator*, read *inornata*

Page 214, Couplet 8
For *johnstonni*, read *johnstonii*

Page 215, Fig. 958
For abdomen *Ps.*, read abdomen - *Ps.*

Page 220, Fig. 983
For thorax *Wy.*, read thorax - *Wy.*

Pages 226 and 233, column 1
Heading should read Mosquito Species

Page 241, line 8
For MAN (470), read MAN (70, as *Ae. triseriatus*)

Page 258, line 5
For NE (164), read NE (373)

Page 260, Plate 35, line 2
For NM 3/8K_!(, read (502)

Page 260, Plate 35, line 3
For MQ, read MO

Page 287, ref. 311
For *silvertris*, read *silvestris*

Page 290, ref. 398
For Schyler, read Schuyler

Page 297, line 12
For 57, 60, read 57-60

Page 305, Fig. 670
For Pina, read Pima

Page 312, line 46
For *mulrennai*, read *mulrennani*

Page 313, line 4
For *s. spenceri*, read *s. spencerii*

COMMENTS ON CERTAIN SPECIES

Aedes (Aedes) hemiteleus Dyar. Bickley (1980) studied the adult morphological characters of the North American members of the Cinereus Group (sensu Peus 1972) and found them too variable to discriminate *Ae. hemiteleus* from *Ae. cinereus* Meigen, or other members of the group. However, in the absence of adequate North American specimens with associated immature skins, we feel it is not advisable to synonymize *Ae. hemiteleus* with *Ae. cinereus*.

Aedes (Finlaya) togoi (Theobald). Belton (1980) presented conclusive evidence that *Ae. togoi* is now established south of Anacortes, Washington, in rock pools along the coastline. He indicated that *Ae. togoi* is probably a recent introduction from Asia (within the past 40 years) and may have been dispersed through the agency of ferry traffic among islands. Since this species is already included in Darsie and Ward (1981), no modifications to the keys are required.

Culex (Melanoconion) taeniopus Dyar and Knab. The new synonomy of *Cx. (Mel.) opisthopus* Komp with *taeniopus* by Sirivanakarn and Belkin (1980) will undoubtedly cause consternation among some North American mosquito workers. Through the proper examination of type-specimens and the application of the principle of priority, Sirivanakarn and Belkin (l.c.) have resolved a difficult problem of nomenclature.

Culex (Tinolestes) latisquama (Coquillett). The presence of this species in the U. S. is based on one male supposedly collected in 1906 from Estero, Lee county, Florida (Stone 1968). Since additional specimens have not been collected north of Honduras, Berlin and Belkin (1980) believed the Florida record is erroneous. They attribute this to an incorrect label on specimens collected for the "Mosquitoes of North and Central America and the West Indies" (Howard, Dyar and Knab 1915). As we do not wish to perpetuate the error, *Cx. latisquama* is removed from the list for the subject area. This reduces the list of species and subspecies known to occur in North America, north of Mexico, from 167 to 166.

Culiseta (Culiseta) annulata (Schrank). Faran and Bailey (1980) collected a single adult female *Cs. annulata* at Fort McHenry, Baltimore, Maryland, from the inner walls of an old munitions bunker. This female was collected in association with overwintering *Cx. pipiens* Linn. females and survived 20 days in the laboratory. Due to the proximity of Fort McHenry to Baltimore harbor, it is probable that this specimen or its ancestors were introduced into the area by a ship travelling from Europe. Since further specimens have not been reported, *Cs. annulata* is not yet an established faunal component.

Wyeomyia (Wyeomyia) smithii (Coquillett) and *Wy. (Wyo.) haynei* Dodge. Bradshaw and Lounibos (1977) examined the effects of latitude, altitude and longitude on photoperiodicity, morphology of larval anal papillae, stage of dormancy and response of F_1 hybrids of pitcher-plant mosquitoes of the genus *Wyeomyia* from eastern North America. They conclude that *Wy. smithii* is probably a polytypic species which includes *Wy. haynei* as a geographic subspecies. Their observation that *Wy. haynei* populations from the Gulf Coast possess four long anal papillae is of interest and indicates the need for a rigorous taxonomic analysis of extensive series of reared specimens of both species throughout the entire range. These should be complemented by a series of cross-breeding experiments from various critical populations. Until these studies have been accomplished, *haynei* and *smithii* should be retained as discrete species.

CHANGES TO STATE AND PROVINCE DISTRIBUTION RECORDS

The following new United States and Canada distribution records have come to our attention since Darsie and Ward (1981) was submitted to the printer. Changes in distribution such as county records are included in the Annotated References.

SPECIES	POLITICAL UNIT	REFERENCE
Ae. atropalpus	IN	Restifo and Lanzaro (1980)
Ae. atropalpus	NFLD	Nielsen and Mokry (1982b)
Ae. cinereus	WV	Butler and Amrine (1980)
Ae. decticus	NFLD	Nielsen and Mokry (1982b)
Ae. diataeus	NFLD	Nielsen and Mokry (1982b)
Ae. dorsalis	NH	Burger (1981)
Ae. euedes	WY	Nielsen (1982)
Ae. grossbecki	MI	Cassani and Newson (1980)
Ae. hendersoni	FL	Zavortink and Belkin (1979)
Ae. hexodontus	NFLD	Nielsen and Mokry (1982b)
Ae. nevadensis	BC	Belton and Belton (1981)
Ae. pionips	NFLD	Nielsen and Mokry (1982b)
Ae. sollicitans	WV	Butler and Amrine (1980)
Ae. sticticus	NFLD	Nielsen and Mokry (1982b)
Ae. togoi	WA	Belton (1980)
Cs. alaskaensis	UT	Bickley (1979)
Cs. melanura	NFLD	Nielsen and Mokry (1982a)
Or. alba	WV	Heaps (1980)
Ps. cyanescens	IA	Ritchie and Rowley (1980)
Ps. mathesoni	MI	Cassani and Newson (1980)
Ur. sapphirina	CO	Maloney (1980)

Four species were deleted from the list of Nebraska species by Lunt and Rapp (1981) as they were unable to verify their presence within the state on the basis of valid collection records. These include: *Aedes fitchii* (Felt and Young), *Ae. implicatus* Vockeroth, *Culex quinquefasciatus* Say and *Culiseta melanura* (Coquillett).

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Belton, P. and E. M. Belton. 1981. A revised list of the mosquitoes of British Columbia. J. Entomol. Soc. B. C. 78:55-64. (New country record for *Ae. nevadensis* and additional locality records for numerous species.)

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Breeland, S. G. 1980. A bibliography to the literature of *Anopheles albimanus* (Diptera: Culicidae). Mosq. Syst. 12:50-150.

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Brust, R. A. 1979. Occurrence of *Aedes hendersoni* in Manitoba. Mosq. News 39: 395-396. (Not a new provincial record.)

Burger, J. F. 1981. New records of mosquitoes (Diptera: Culicidae) from New Hampshire. Entomol. News 92:49-50. (New state record of *Ae. dorsalis*.)

Butler, L. and J. W. Amrine. 1980. New state and county records for mosquitoes in West Virginia. Mosq. News 40:347-350. (New state records for *Ae. cinereus* and *Ae. sollicitans*.)

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Cassani, J. R. and H. D. Newson. 1980. An annotated list of mosquitoes reported from Michigan. Mosq. News 40:356-367. [Includes new state records for *Ae. grossbecki* and *Ps. Mathesoni* (as *varipes*); repeats several older species records that require verification.]

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Heaps, J. W. 1980. Occurrence of *Orthopodomyia* in West Virginia. Mosq. News 40:452. (New record for *Or. alba*.)

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SUPPLEMENTS TO MOSQUITO SYSTEMATICS

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IDENTIFICATION AND GEOGRAPHICAL DISTRIBUTION OF THE MOSQUITOES OF NORTH AMERICA, NORTH OF MEXICO

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PREFACE

This publication was conceived by Harold D. Chapman in 1975 while he was serving as President of the American Mosquito Control Association. Since that time it has been supported by Presidents D. Bruce Francy, Lewis T. Nielsen, Paul A. Hunt, Glenn W. Stokes and Robert K. Washino, their respective Boards of Directors, the publications committees and Executive Directors Thomas A. Mulhern and W. Donald Murray. The publication's Editorial Board was composed of William E. Bickley, John D. Edman, Lewis T. Nielsen and the authors.

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CONTENTS

INTRODUCTION

In 1955 Carpenter and LaCasse published a monograph entitled *Mosquitoes of North America, North of Mexico* (106).* They included 143 species and subspecies in 11 genera and 19 subgenera, identification keys to genera and species, and descriptions of the known adult female and male and larval stages. Their geographical distribution information consisted of lists of the states of the United States of America (USA) and provinces of Canada in which each taxon had been collected, with substantiating references.

There are now known from the same region 167 species and subspecies in 13 genera and 27 subgenera. The additions and changes in the names of the North American mosquito fauna have been reviewed by Carpenter (91, 95, 104) and Darsie (140, 142). The principal objective of this volume purports to be the revision of the identification keys to adult female and larval stages which incorporate all 167 taxa. Each key is preceded by a detailed description of the morphology of that stage, which is needed to use the key successfully. In addition, each couplet of the two keys is illustrated to assist the user in interpreting the characters employed.

A second purpose is to present up-to-date information on the geographical distribution of the mosquito taxa. We are continuing the arrangement used by Carpenter and LaCasse (106), listing the states and provinces from which each taxon has been reported with substantiating references. In addition, we are depicting the distribution on maps; actually the captions of the map plates (Plates 9-49) contain the specific states/provinces in which each taxon is found. Using Carpenter and LaCasse's monograph (106) as a starting point and listing the state/province data given by them, we are adding a total of 574 new state/province records which encompasses the 16 new species described since 1955. Detailed also are 37 instances in which species once reported as occurring in particular states/provinces are deleted.

The morphological terms employed in this volume are substantially changed from those used by Carpenter and LaCasse (106). In 1970 Kenneth L. Knight and the late Jean L. Laffoon started an extensive study of mosquito morphology, the ultimate aim of which was to produce a standardized set of morphological terms, adequately defined. Knight and his associates prepared 16 scientific articles in the "mosquito taxonomic glossary" series, i.e., Harbach & Knight (1977 A, B, C, D; 1978 A, B, C; 1980), Knight (1970, 1971 A), Knight & Laffoon (1970 A, B, C; 1971 A, B) and Laffoon & Knight (1971, 1973). The terms proposed by them and used in this volume take into consideration homology, phylogeny, and their use generally among the dipterous insects. There is one exception: we continue to use "claw" instead of "unguis" as proffered. To assist in the transition, the older terms have been given after the new ones in the sections on morphology.

Another modification from the 1955 monograph is the adoption of the chaetotaxical nomenclature espoused by John N. Belkin (1950, 1952, 1953, 1954, 1960, 1962) and the abbreviations he used to designate parts of the body and setae borne on them, especially in the immature stages, e.g., T for metathorax and 6-T for seta 6 on that segment. This practice has been used by Belkin and his associates (1, 6, 7, 8, 34, 305, 306, 508, 511, 514) and by many other taxonomists (167, 174, 405, 501, 524).

This volume contains illustrated keys to adult females and fourth stage larvae. We strongly recommend that the user study the sections on morphology before starting to identify specimens. Wherever possible we have used adult characters which are the least disturbed by the mechanical light trapping process; but in some couplets, especially in the genus *Aedes*, the use of traits disrupted by trapping was unavoidable. The user should be familiar with the proper method of preserving mosquito larvae because the presence of a full complement of the appendages and setae is essential for their identification in our larval keys. We have also tried to quantify insofar as practicable all characters to reduce the guesswork in dealing with "relative" terms.

Below each species when it is named in the keys will be found the plate number on which its distribution is shown. The user can immediately ascertain if a determined species has been reported from the locality where it was collected. One taxon shown on a map (Plate 46) is not included in the keys, i.e., *Toxorhynchites* sp., see discussion below.

An appendix provides locality data for the voucher specimens selected for illustration in the keys. These mosquitoes (or slides) have a "Fig. __" label and are largely from the U.S. National Museum collection.

*References cited by year are found in the Selected Bibliography of Mosquito Morphology at the end of the Morphology of Adult Female section; those cited by numbers are found in the Bibliography of Mosquito Taxonomy and Geographical Distribution at the end of the volume.

SYSTEMATICS

Mosquitoes belong to the phylum Arthropoda, class Insecta, order Diptera. They are bilaterally symmetrical insects, adults of which are covered with an exoskeleton, bearing jointed legs and two functional wings. A second pair of wings is represented by knobbed halteres. Mosquitoes may be distinguished from other dipterous insects by the presence of scales on the wing veins and by their mouthparts in the form of an elongate proboscis, adapted for piercing and sucking. They are holometabolous; therefore they have four dissimilar stages in their life cycle, i.e., egg, larva, pupa and adult. This volume deals with the adult female and fourth stage larva, which are so different in appearance that they seem not to be related.

It is assumed that the user can already recognize species belonging to the order Diptera and family Culicidae. If not, general references such as Borror et al. (1976) should be consulted.

In this volume we follow the classification of the family Culicidae as given by Knight and Stone (519) and Knight (518). We do not deal with suprageneric categories except to relate certain morphological structures as belonging to anophelines, referring to members of the subfamily Anophelinae, or culicine, meaning members of the subfamilies Culicinae and Toxorhynchitinae, as interpreted by Knight and Stone (*loc. cit.*). Also no infrasubspecies are considered in this work.

In Table 1 is the systematic index of the species of Culicidae now known from North America, north of Mexico, and after each taxon is given the zoogeographical region, area or specific country in which each is found outside the region being considered, if applicable. Those marked as indigenous are confined to the region.

Table 1. Systematic Index of the Culicidae of North America, North of Mexico and Distribution in other Regions, Areas or Specific Countries

Taxon	Extralimital Distribution
Genus AEDES Meigen	
Subgenus *Abraedes* Zavortink	
papago Zavortink	Indigenous*
Subgenus *Aedes* Meigen	
cinereus Meigen	Palearctic
hemiteleus Dyar	Indigenous
Subgenus *Aedimorphus* Theobald	
vexans (Meigen)	Worldwide
Subgenus *Finlaya* Theobald	
togoi (Theobald)	Palearctic Oriental
Subgenus *Kompia* Aitken	
purpureipes Aitken	Mexico
Subgenus *Ochlerotatus* Lynch Arribalzaga	
aboriginis Dyar	Indigenous
abserratus (Felt & Young)	Indigenous
aloponotum Dyar	Indigenous
atlanticus Dyar & Knab	Indigenous
atropalpus (Coquillett)	Indigenous
aurifer (Coquillett)	Indigenous
bicristatus Thurman & Winkler	Indigenous
bimaculatus (Coquillett)	Neotropical
campestris Dyar & Knab	Mexico
canadensis canadensis (Theobald)	Mexico
canadensis mathesoni Middlekauff	Indigenous
cantator (Coquillett)	Indigenous
cataphylla (Dyar)	Palearctic
churchillensis Ellis & Brust	Indigenous
communis (De Geer)	Palearctic
decticus Howard, Dyar & Knab	Indigenous
deserticola Zavortink	Indigenous
diantaeus Howard, Dyar & Knab	Palearctic
dorsalis (Meigen)	Palearctic, Mexico
dupreei (Coquillett)	Mexico
epactius Dyar & Knab	Neotropical
euedes Howard, Dyar & Knab	Palearctic
excrucians (Walker)	Palearctic
fitchii (Felt & Young)	Palearctic
flavescens (Müller)	Palearctic
fulvus pallens Ross	Cuba
grossbecki Dyar & Knab	Indigenous
hexodontus Dyar	Palearctic
impiger (Walker)	Palearctic
implicatus Vockeroth	Palearctic
increpitus Dyar	Indigenous
infirmatus Dyar & Knab	Mexico

* Indigenous means no extralimital distribution.

Taxon	Extralimital Distribution
intrudens Dyar	Palearctic
melanimon Dyar	Indigenous
mercurator Dyar	Palearctic
mitchellae (Dyar)	Mexico
monticola Belkin & McDonald	Mexico
muelleri Dyar	Mexico
nevadensis Chapman & Barr	Indigenous
nigripes (Zellerstedt)	Palearctic
nigromaculis (Ludlow)	Mexico
niphadopsis Dyar & Knab	Indigenous
pionips Dyar	Palearctic
provocans (Walker)	Indigenous
pullatus (Coquillett)	Palearctic
punctodes Dyar	Palearctic
punctor (Kirby)	Palearctic
rempeli Vockeroth	Palearctic
riparius Dyar & Knab	Palearctic
scapularis (Rondani)	Neotropical
schizopinax Dyar	Indigenous
sierrensis (Ludlow)	Indigenous
sollicitans (Walker)	Caribbean, Mexico
spencerii idahoensis (Theobald)	Indigenous
spencerii spencerii (Theobald)	Indigenous
squamiger (Coquillett)	Mexico
sticticus (Meigen)	Palearctic, Mexico
stimulans (Walker)	Indigenous
taeniorhynchus (Wiedemann)	Neotropical
thelcter Dyar	Mexico
thibaulti Dyar & Knab	Palearctic
tormentor Dyar & Knab	Neotropical
tortilis (Theobald)	Neotropical
trivittatus (Coquillett)	Mexico
varipalpus (Coquillett)	Indigenous
ventrovittis Dyar	Indigenous
Subgenus *Protomacleaya* Theobald	
brelandi Zavortink	Indigenous
burgeri Zavortink	Mexico
hendersoni Cockerell	Indigenous
triseriatus (Say)	Mexico
zoosophus Dyar & Knab	Mexico
Subgenus *Stegomyia* Theobald	
aegypti (Linnaeus)	Cosmotropical
Genus ANOPHELES Meigen	
Subgenus *Anopheles* Meigen	
atropos Dyar & Knab	Caribbean
barberi Coquillett	Indigenous
bradleyi King	Mexico
crucians Wiedemann	Neotropical
earlei Vargas	Indigenous
franciscanus McCracken	Mexico
freeborni Aitken	Mexico
georgianus King	Indigenous
judithae Zavortink	Mexico
occidentalis Dyar & Knab	Indigenous
perplexens Ludlow	Indigenous
pseudopunctipennis Theobald	Neotropical
punctipennis (Say)	Mexico
quadrimaculatus Say	Mexico
walkeri Theobald	Mexico
Subgenus *Nyssorhynchus* Blanchard	
albimanus Wiedemann	Neotropical
Genus COQUILLETTIDIA Dyar	
Subgenus *Coquillettidia* Dyar	
perturbans (Walker)	Mexico
Genus CULEX Linnaeus	
Subgenus *Culex* Linnaeus	
bahamensis Dyar & Knab	Caribbean
chidesteri Dyar	Neotropical
coronator Dyar & Knab	Neotropical
declarator Dyar & Knab	Neotropical
erythrothorax Dyar	Mexico
interrogator Dyar & Knab	Neotropical
nigripalpus Theobald	Neotropical
peus Speiser	Neotropical
pipiens Linnaeus	Palearctic, S. Neotropical, S. Ethiopian
quinquefasciatus Say	Cosmotropical
restuans Theobald	Mexico
salinarius Coquillett	Mexico
tarsalis Coquillett	Mexico
thriambus Dyar	Neotropical
Subgenus *Melanoconion* Theobald	
abominator Dyar & Knab	Indigenous
anips Dyar	Mexico
atratus Theobald	Neotropical
erraticus (Dyar & Knab)	Neotropical
iolambdis Dyar	Neotropical
mulrennani Basham	Caribbean
opisthopus Komp	Neotropical

Taxon	Extralimital Distribution
peccator Dyar & Knab	Caribbean, Mexico
pilosus (Dyar & Knab)	Neotropical
Subgenus *Neoculex* Dyar	
apicalis Adams	Mexico
arizonensis Bohart	Mexico
boharti Brookman & Reeves	Indigenous
reevesi Wirth	Mexico
territans Walker	Palearctic
Subgenus *Tinolestes* Coquillett	
latisquama (Coquillett)	Neotropical
Genus CULISETA Felt	
Subgenus *Climacura* Howard, Dyar & Knab	
melanura (Coquillett)	Indigenous
Subgenus *Culicella* Felt	
morsitans (Theobald)	Palearctic
minnesotae Barr	Indigenous
Subgenus *Culiseta* Felt	
alaskaensis (Ludlow)	Palearctic
impatiens (Walker)	Indigenous
incidens (Thomson)	Mexico
inornata (Williston)	Mexico
particeps (Adams)	Neotropical
Genus DEINOCERITES Theobald	
cancer Theobald	Neotropical
mathesoni Belkin & Hogue	Mexico
pseudes Dyar & Knab	Neotropical
Genus HAEMAGOGUS Williston	
Subgenus *Haemagogus* Williston	
equinus Theobald	Neotropical
Genus MANSONIA Blanchard	
Subgenus *Mansonia* Blanchard	
dyari Belkin, Heinemann & Page	Neotropical
titillans (Walker)	Neotropical
Genus ORTHOPODOMYIA Theobald	
alba Baker	Indigenous
kummi Edwards	Neotropical
signifera (Coquillett)	Caribbean, Mexico

Taxon	Extralimital Distribution
Genus PSOROPHORA Robineau-Desvoidy	
Subgenus *Grabhamia* Theobald	
columbiae (Dyar & Knab)	Caribbean, Mexico
confinnis (Lynch Arribalzaga)	Neotropical
discolor (Coquillett)	Mexico
pygmaea (Theobald)	Caribbean
signipennis (Coquillett)	Mexico
Subgenus *Janthinosoma* Lynch Arribalzaga	
cyanescens (Coquillett)	Neotropical
ferox (von Humboldt)	Neotropical
horrida (Dyar & Knab)	Indigenous
johnstonii (Grabham)	Caribbean
longipalpus Randolph & O'Neill	Indigenous
mathesoni Belkin & Heinemann	Indigenous
mexicana (Bellardi)	Mexico
varipes (Coquillett)	Neotropical
Subgenus *Psorophora* Robineau-Desvoidy	
ciliata (Fabricius)	Neotropical
howardii Coquillett	Neotropical
Genus TOXORHYNCHITES Theobald	
Subgenus *Lynchiella* Lahille	
rutilus rutilus (Coquillett)	Indigenous
rutilus septentrionalis (Dyar & Knab)	Indigenous
sp.	Indigenous
Genus URANOTAENIA Lynch Arribalzaga	
Subgenus *Pseudoficalbia* Theobald	
anhydor anhydor Dyar	Mexico
anhydor syntheta Dyar & Shannon	Mexico
Subgenus *Uranotaenia* Lynch Arribalzaga	
lowii Theobald	Neotropical
sapphirina (Osten Sacken)	Mexico
Genus WYEOMYIA Theobald	
Subgenus *Wyeomyia* Theobald	
haynei Dodge	Indigenous
mitchellii (Theobald)	Caribbean, Mexico
smithii (Coquillett)	Indigenous
vanduzeei Dyar & Knab	Caribbean

In order for the user to have a better understanding of our position on certain taxa included herein, the following comments are offered.

Aedes—We recognize *Ae. hemiteleus* Dyar as distinct from *Ae. cinereus* Meigen which was proposed by Bohart and Washino (54). However, they point out that at present only the adult males can be differentiated with certainty; so in our keys the two species are grouped together. Peus (356) and Bohart and Washino (*loc. cit.*) have called attention to the presence of two subdorsal setae, in addition to setae la-S and 2-S on the siphon, not mentioned by Carpenter and LaCasse (106) nor in many other mosquito publications (e.g., 192, 212, 245, 298, 339, 350, 444). Their presence enables the larvae of these two species to be linked in the larval identification key with *Ae. bicristatus* and *Ae. provocans*, the other two North American aedines with two or more setae on the siphon. These two extra siphonal setae in *cinereus* and *hemiteleus* are very tiny and require a compound microscope with 400X magnification to see them clearly.

Only *Ae. togoi* (Theobald) is placed in the subgenus *Finlaya* here. This Asian disease vector has apparently been recently introduced into coastal British Columbia. Those species formerly assigned to subgenus *Finlaya* by Carpenter and LaCasse (106) were transferred to subgenus *Protomacleaya*, except for *Ae. atropalpus* and *Ae. varipalpus*, which were placed in subgenus *Ochlerotatus;* see Zavortink (514) and Arnell & Nielsen (9).

We agree with and so treat here the three new names of *Aedes* species proposed by Wood (504): *Ae. barri* Rueger = *Ae. euedes* Howard, Dyar & Knab, *Ae. trichurus* (Dyar) = *Ae. provocans* (Walker) and western North American populations of *Ae. stimulans* (Walker) = *Ae. mercurator* Dyar.

Ae. dorsalis (Meigen) was reduced to a subspecies of *Ae. caspius* (Pallas) by Gutsevich et al. (205) and so listed by Knight (518). The characters employed for separating the two taxa appear to us sufficient to retain *dorsalis* as a full species.

Following Nielsen and Rees (338) we recognize two subspecies under *Ae. spencerii* (Theobald), the typical subspecies which inhabits the central plains of North America, and subspecies *idahoensis* (Theobald), a more westerly and northwesterly form, also reported from southern British Columbia (135).

Coquillettidia—The elevation of the subgenus *Coquillettidia* Dyar to generic rank by Ronderos & Bachmann (389) has *not* been universally accepted, but we do recognize it here.

Culex—The taxonomic status of the important disease bearing and pestiferous taxa, *Cx. pipiens* Linnaeus and *Cx. quinquefasciatus* Say has been highly controversial. *Cx. quinquefasciatus* has been considered a subspecies of *Cx. pipiens* because the only reliable characters for separating them are structures of the male palpi and genitalia. Yet they do maintain themselves as recognizable taxa through their behavior and geographical distribution, although intergrades are known at least in parts of the USA where their ranges overlap (Barr, 14). We are adopting the positions of Sirivanakarn (524) and Knight (518) by considering them as separate, full species.

Culiseta *Cs. minnesotae* Barr was described in 1957 (15) and used by that name until 1964 when Maslov (295) reduced it to a subspecies of *silvestris* Shingarev. In this new status it appears to have been first used in North American literature by Siverly and DeFoliart (420) and subsequently in references 50, 121, 126, 198, 308, 352, 421, 519. Means & Thompson (198) referred to it simply as *Cs. silvestris*. In 1979 Wood et al. (505) presented good reasons for returning *minnesotae* to full specific rank. They pointed out that Maslov's decision was based on the examination of but a single male and that the validity of the name *silvestris* was in question. Therefore we are using here the name *Cs. minnesotae* Barr.

Likewise, the name for *Cs. morsitans* (Theobald) in North America was changed to *Cs. m. dyari* Coquillett by Maslov (295), and widely used that way in the literature of the region, e.g., 50, 68, 121, 140, 249, 301, 330, 352, 362, 468, 519, 529. Wood et al. (505) believed that this designation was unwarranted because the characters used to separate subsp. *morsitans* from subsp. *dyari* were inconsequential. Following him we have dropped the trinomial and recognize only *Cs. morsitans* (Theobald).

Psorophora—Belkin et al. (34) proposed changing the name of the common pest, *Ps. confinnis* Lynch Arribalzaga, to *Ps. columbiae* (Dyar & Knab) and applied it to the populations in the eastern and southern USA. That left the name for the populations found in the southwestern states of New Mexico, Arizona and California in doubt. Subsequently, Bohart and Washino (54) have called the California "*confinnis*", *Ps. columbiae*. We are calling the *Ps. confinnis* of Carpenter and LaCasse (106), *Ps. columbiae* in all states except New Mexico and Arizona; these are simply designated as belonging to the *Ps. confinnis* complex.

Similarly, *Ps. varipes* (Coquillett) populations of southeastern USA have been renamed *Ps. mathesoni* Belkin and Heinemann (33). But these authors are uncertain about those occurring in central and southwestern USA. Since their geographical distribution extends over a contiguous area ranging from New Jersey to southern Illinois and from northern Florida to Oklahoma and Texas (see Plate 46), it appears more likely to constitute a single species, i.e., *Ps. mathesoni*, than if it were more widespread or discontinuous in its distribution. Therefore, it is so considered here, although *Ps. varipes* remains in our systematic index awaiting further study.

Toxorhynchites—Zavortink (512) reported finding a third taxon of this genus in southeastern Arizona. He believes it to be either *Tx. theobaldi* (Dyar & Knab) or its synonym, *Tx. moctezuma* (Dyar & Knab). He stated that it definitely is not one of the subspecies of *Tx. rutilus* (Coquillett), the common species of the region. We are listing it as *Tx.* sp. and not including it in the identification keys as specimens were not available for study.

MORPHOLOGY OF ADULT FEMALE

The morphological descriptions below deal mostly with the structures used in the keys. For a more detailed account of mosquito anatomy, consult the references listed in the bibliography at the end of this section.

Basic Structures

The body of the adult mosquito is composed of hardened plates, called **sclerites,** separated from each other by lines, known as **sutures,** or by membranes of various sizes. These structures comprise the integument, or outer covering of the body and those important in identification of the female will be discussed below.

Since scales are common on adult females and indeed constitute one of the principal structures of recognition, they must be distinguished from setae. Setae (hairs, hair tufts, bristles and spiniforms) are usually round in cross section, tapering from base to apex, and arise in a relatively large, movable socket, called an **alveolus** (pl. alveoli). Scales, on the other hand, are flat in cross-section, usually widening from base to apex, with longitudinal ridges, attached to minute alveoli on the integument. They occur in three basic forms, broad and flat, narrow and curved and erect and apically forked. The scales on the fringe of the mosquito wing are fusiform in shape (see Harbach and Knight, 1978C).

The color of scales varies from black and brown to golden, shades of yellow, such as dingy yellow in *Cx. salinarius*, to white and silvery. The white color can be brownish white, as in *Cs. minnesotae*, to grayish white. The colors tend to fade somewhat as the pinned adult ages, so in the keys herein, pale has been used to mean shades of white and dark, black or brown.

The body of the adult female is divided into three principal regions, the head, thorax and abdomen, Plate 1. Each will be discussed in detail.

HEAD

The structure of the head is shown in Plates 1, 2C. It is ovoid in shape and a large proportion is occupied by the **compound eyes** (CE). They are composed of circular, morphological units called **corneal facets** (CoF). The **antennae** (A) arise between the eyes. The sclerite ventrad to their bases is the convex **clypeus** (Clp). Dorsad is a sclerite between and above the antennae, the **frons** (Fr), above which is the dorsum of the head, made up of the **vertex** (V) anteriorly and the **occiput** (Occ) posteriorly. Since there is no dividing suture between them, it is customary to refer to the whole dorsum simply as the occiput. The anterior border along the dorsal edge of the compound eye is known as the **ocular line** (OL).

The head bears the following five appendages: two antennae, two palpi and the proboscis (Plate 2A, B). The two antennae are composed of a narrow, basal ring, the **scape** (Sc), the bulbous **pedicel** (=torus) (Pe), and the **flagellum** (Fl), which contains 13,14 **flagellomeres** (=flagellar segments) (Flm), each bearing a whorl of setae. A pair of **maxillary palpi** (MPlp), called simply palpi (sing. palpus), is located ventrolateral to the clypeus and each consists of five **palpomeres** (Plp); however, in some females the basal palpomere is small or rudimentary so that the palpi appear to be 4-segmented. The **proboscis** (P) extends forward from the anteroventral base of the head.

Normally, only the outer scaled covering of the proboscis, known as the **labium** (Lb), and the two terminal lobes, the **labella** (La) (sing. labellum), can be seen. Inside the labium are thin stylets for piercing the host's skin.

Nine characters of the head are used in the keys as follows: (1) Shape of proboscis—it is usually nearly straight, but in genus *Toxorhynchites*, it is decidedly curved downward (Fig. 1). (2) Scales on proboscis—sometimes the proboscis has a definite pale-scaled ring near the middle, as in *Ae. sollicitans* (Fig. 49), or it is variously marked with pale scales; however in most species it is dark-scaled throughout. (3) Length of palpi—this character is used to differentiate anopheline and culicine females. In the former, the palpi are as long as the proboscis while in the latter, they are not more than 0.4 as long as that organ. Within the culicine species, *Ps. longipalpus* (Fig. 493) has rather long palpi, i.e., more than 0.33 as long as the proboscis; and in some species of subgenus *Neoculex*, the length is compared to the length of flagellomere 4 of the antenna (Fig. 396). (4) Scales of palpi—apices of some or all of segments 2-5 may have pale-scaled rings, as in *An. walkeri* (Fig. 341), scattered pale among dark scales or only dark scales. (5) Scales on antennal pedicel—the numbers and color are diagnostic, e.g., *Ae. fitchii* (Fig. 111). (6) Length of antenna and flagellomere 1—flagellomere 1 is unusually long in genus *Deinocerites* (Fig. 39), and also the entire antenna is longer than the proboscis.(7) Width of frons—the width of the frons medially between the eyes, called the interocular distance, can be measured by comparing the distance with the diameter of a corneal facet, e.g., *Ae. epactius* (Fig. 153). (8) **Interocular setae** (IS)—they are located on the dorsal part of the frons and medioanterior area of the vertex and are long and usually dark, but in some species they are pale, e.g., *An. freeborni* (Fig. 339). (9) Scales on dorsum of head—posteriorly the scales are erect, usually forked, while anteriorly and laterally they are decumbent and either narrow and curved, e.g., subgenus *Culex* (Fig. 352) or broad and flat, e.g., subgenus *Melanoconion* (Fig. 354).

THORAX

The thorax (Plates 3,4), the body region between the head and abdomen, is divided into three segments, the prothorax, mesothorax, and metathorax. Each bears a pair of legs; in addition, the mesothorax has a pair of functional wings, and the metathorax, a pair of knobbed **halteres** (Hl). The dipteran mesothorax is typically greatly enlarged to accommodate the flight muscles associated with the mesothoracic wings. The pro-and metathorax are correspondingly reduced in size.

In dorsal view (Plate 3A,B) and proceeding from anterior to posterior, the **antepronota** (=anterior pronotal lobes) (Ap), parts of the prothorax, are found laterally just posterior to the head. The size and scalation of this structure are used in the keys. Two genera, *Haemogogus* and *Wyeomyia*, have enlarged antepronota, approaching each other middorsally (Fig.31).

The next three structures are mesothoracic, starting with the **scutum** (Scu), the largest sclerite of the mosquito body and rather spheroid. The anterolateral depressions in the sphere are known as the **scutal fossae** (SF) and the slightly depressed, usually unscaled, area posteromedially, is the **prescutellar area** (PrA). The scutum has setae arranged in three, somewhat irregular, rows in the middle 0.33. The central one is composed of the **acrostichal setae** (AcS), and the row on either side, of the **dorsocentral setae** (DS). In addition, there is a group in front of and superior to the wing root, the **supraalar setae** (SaS). Those anterolateral setae occurring around and in the scutal fossa are the **scutal fossal setae** (SFS, Plates 3A, 4A). In some species the scutal setae are quite numerous and long, e.g., *An. barberi* (Fig. 334), while in others they are shorter and fewer. In the subgenus *Melanoconion* (Fig. 353) the acrostichal setae are absent, and in some species the acrostichal and dorsocentral setae are absent anteriorly, a condition which has been termed the "acrostichal gap" and the "dorsocentral gap" by Lunt and Nielsen (1971, p. 103). The color of some of these setae, particularly the supraalars, is diagnostic for several species, e.g., *Ae. hexodontus* (Fig. 305). The scutal integument may have spots or be a distinctive color e.g., reddish brown in *Cx. erythrothorax* (Fig. 371). The patterns made by the scutal scales are extensively employed in culicine mosquito identification, see *Ae. atlanticus*, Fig. 175, and usually have the same names as the setae just described when they occur in the same location. One difficulty commonly encountered is rubbed specimens in which the scutum is devoid of scales and setae. This is particularly true of those collected in mechanical light traps. By examining such specimens under the high power of the stereoscopic microscope the color of some few scales still attached may give a clue about the pattern of that species. Likewise the presence of alveoli will indicate the presence of setae in the specimen.

Posterior to the scutum is a transverse, linear sclerite, the **scutellum** (Stm). In the subfamily Anophelinae (Fig. 5) it is arcuate and bears an even row of setae, the **scutellar setae** (MSS, LSS). In the subfamily Culicinae the scutellum is trilobate with a group of setae on each lobe (Fig. 7). Also, the kind and color of scales and setae on this sclerite may be important.

The shiny, dome shaped structure posterior to the scutellum is the **mesopostnotum** (Mpn). In most species it is nude, but in the sabethine mosquitoes (*Wyeomyia*) a group of setae occurs near its attachment to the **metanotum** (Mtn) and **abdominal tergum I** (Ab-I) (Fig. 9), known as the **mesopostnotal setae** (MpnS).

Posteriorly is the **metanotum** (Mtn), a thin sclerite which enlarges laterally and there bears the halteres, the organs of balance. Next the intersegmental cleft separates the thorax from abdominal segment I, then there is a second, very thin, metathoracic element, the **metapostnotum** (Mtpn). It actually adheres to the first abdominal tergum, but extends lateroventrally as a thin strip to touch the metameron, see Plate 4A. The halteres are usually dark-scaled, but generally have pale scales in *An. walkeri* (Fig. 345).

The three thoracic segments are also represented in the structures of the thoracic pleuron, Plate 4A. Two of the sclerites visible laterally, the **antepronotum** (Ap) and the **postpronotum** (Ppn), are components of the tergum of the prothorax, not of its pleuron. Starting anteriorly, the prothoracic elements consist of the antepronotum (Ap) which is connected ventrally by a straplike piece to the **proepisternum** (Ps); both of these bear setae, i.e., **antepronotal setae** (ApS) and **upper proepisternal setae** (PeSU), and sometimes scales. The proepisternum bends around medially to cover the ventroanterior face of the thorax below the head and neck, see Plate 3A, and lobes from each side extend ventrally between the two forecoxae. This anterior face of the proepisternum is sometimes covered with scales, the **lower proepisternal scales** (PScl), e.g., *Ae. hexodontus* (Fig. 296). The last prothoracic sclerite, the postpronotum (Ppn) is found posterior to the antepronotum and lateral to the scutum at the level of the scutal fossa. It bears scales, which sometimes have a distinctive pattern; and a number of setae (PpS), usually confined to the posterior margin, but sometimes scattered over the posterior 0.5, e.g., *Ae. impiger* (Fig. 284).

The mesothoracic pleuron has five, large and important sclerites. Just posterior to the postpronotum is an opening in the thorax. This is the **mesothoracic spiracle** (MS) and it is surrounded by a large sclerite, the **anterior mesanepisternum** (AMas). It is subdivided into four areas: (1) The **prespiracular area** (PsA) is the small triangle dorsoanterior to the spiracle. It adjoins the posterior border of the postpronotum, and sometimes bears setae, the **prespiracular setae** (PsS), e.g., genus *Culiseta* (Fig. 18). (2) The **postspiracular area** (PA) is a rather large expanse posterior to the spiracle with or without setae and scales; when present, they are the **postspiracular setae** (PS), e.g., genus *Psorophora* (Fig. 17), and **postspiracular scales** (PoSc), e.g., *Ae. brelandi* (Fig. 186). (3) The **hypostigmal area** (HyA) is immediately ventral to the spiracle and at times has scales, the **hypostigmal scales** (HySc), e.g., *Ae. pullatus* (Fig. 227), or a dark integumental spot, as in *Ae. fulvus pallens* (Fig. 169). (4) The **subspiracular area** (SA) is that portion ventral to the hypostigmal area, adjoining the meskatepisternum ventrally, with or without **subspiracular setae** (SuS) and **scales** (SSc), e.g., *Ae. varipalpus* (Fig. 161). The largest of the mesopleural sclerites, the **mesokatepisternum** (= sternopleuron) (Mks) is rather pear-shaped, bulging ventroanteriorly. It is united with a dorsal, narrow, linear area, the **posterior mesanepisternum** (PMas), which bears a dense group of setae, the **prealar setae** (PaS). The meskatepisternum has two groups of setae, the **upper** (MkSU) and **lower** (MkSL) **mesokatepisternal setae.** These are often combined into a single line of setae, the **mesokatepisternal setae** (MkS). The **mesokatepisternal scales** (MkSc) are sometimes arranged in distinctive patterns, e.g., narrow lines of scales, as in *Ae. papago* (Fig. 64), or more frequently an extensive scale patch which may or may not reach the anterior angle, as in *Ae. provocans* (Fig. 239). Between the forecoxa and the ventroanterior border of the meskatepisternum there is a membrane, the **postprocoxal membrane** (PM). In some species of *Aedes* it bears a small patch of scales the **postprocoxal scales** (PSc) e.g., *Ae. punctor* (Fig. 254).

The rectangular sclerite just posterior to the meskatepisternum and ventral to the root of the wing (W) is the **mesanepimeron** (Mam). It bears a group of setae in the dorsoposterior corner, the **upper mesanepimeral setae** (MeSU). Sometimes, another group, usually with not more than 1-6 setae in a single row occurs along the anteroventral border, the **lower mesanepimeral setae** (MeSL). They are often used to separate groups of species in the genus *Aedes*, e.g., *Ae. riparius* (Fig. 91) from *Ae. stimulans* (Fig. 92). It may also have varying amounts of scaling. In some species of the subgenus *Melanoconion* the mesanepimeron has a definite pale spot or light- and dark-colored integumental areas, which provide specific differentiation (Fig. 408). Just ventral to the mesanepimeron is the fifth and smallest, mesopleural sclerite, the **mesomeron** (Msm). It is triangular and is situated between mid - (C-II) and hindcoxae (C-III). The relation of the base of the mesomeron to the base of the hindcoxa is a generic character. Usually the base of the hindcoxa is distinctly ventral to the base of the mesomeron, but in the sabethine females the base of the hindcoxa is about even with the base of the mesomeron, see Figs. 10, 12.

The metathoracic pleuron is much reduced, (Plate 4A). The largest element is the **metepisternum** (Mts) and is located just posterior to the mesanepimeron. It is strapshaped, has dorsoventral axis and surrounds in its dorsal half the **metathoracic spiracle** (MtS), the other opening in the thorax. Posteriorly below the halter is the **metepimeron,** (Mtm), another narrow sclerite. Ventral to the metepisternum is a small sclerite, the **metameron** (Mem) articulating with the hindcoxa posteriorly and with the ventroposterior border of the mesanepimeron. Rarely it bears scales (see Fig. 265). Dorsoposterior to the metepimeron is the metanotum, already discussed.

The sternal elements of the thorax are not included in this discussion since they have not been used as identifying characters, except for one, the intersegmental membrane connecting the metasternum with abdominal sternum I. It sometimes bears **postmetasternal scales** (MScP), e.g., *Ae. pionips* (Fig. 304).

APPENDAGES OF THE THORAX

Wings- The two functional wings (W) of adult mosquitoes are attached to the mesothorax, see Plate 3C. Each is composed of a network of longitudinal thickenings, called **veins.** Between the veins are stretched transparent membranes, known as **cells.** The veins are clothed with scales dorsally and ventrally. The apical and posterior margin of the wing is bordered by long, fusiform scales, the **wing fringe** (FS). It may have pale and dark sections, best exemplified in *Ps. signipennis* (Fig. 465), or there may be a coppery or silvery, apical spot, e.g., *An. earlei* (Fig. 314).

The veins and cells have names, as shown in Plate 3C. The system of nomenclature used here is the Comstock-Needham system. There are six major longitudinal veins, i.e., costa (C), subcosta (Sc), radius (R), media (M), cubitus (Cu) and anal (A). If the veins are traced from base to apex, several of them have one or more subdivisions. For example, the radius has the basal vein R, with primary branches, R_1 and radial sector R_s. The latter further divides into R_{2+3} and R_{4+5}. The R_{2+3} separates into R_2 and R_3 apically. There are several crossveins, short connectors between major veins. The humeral crossvein (h) joins the costa with the subcosta, the radiomedial crossvein (r-m), the radius with the media, and the mediocubital crossvein (m-cu), the media with the cubital veins.

The cells likewise have names, per Plate 3C (letters in italics). An important one to know is cell R_2 because it is shortened in the genus *Uranotaenia* (Fig. 13). In the key character its length is compared to the length of the vein R_{2+3}, a short portion of vein R_s between the branching of R_{4+5} and the junction of veins R_2 and R_3. This section of vein is called the "petiole" by some authors.

The wing scales provide many useful key characters. They can be broad and numerous, e.g., *Cq. perturbans* (Fig. 37), triangular shaped, e.g., *Ae. grossbecki* (Fig. 77), or narrow and filiform, e.g., *Cx. pipiens* (Fig. 15). Colors are important, too. Many species have the wing scales entirely dark, or they may vary in number of pale scales from a small patch at the base of the costa, e.g., *Ae. atropalpus* (Fig. 127), to scattered pale scales on the anterior veins, e.g., *Ae. cataphylla* (Fig. 221), to generally intermixed pale and dark scales, e.g., *Ae. sollicitans* (Fig. 54), to alternating mostly dark with mostly pale-scaled veins, e.g., *Ae. s. idahoensis* (Fig. 207), to mainly pale-scaled, e.g., *Ae. dorsalis* (Fig. 125). Furthermore, there are wings with unicolorous spots produced by the occurrence of dense clusters of scales along some veins, e.g., *An. quadrimaculatus* (Fig. 313). The costa, subcosta and radial veins in some anophelines possess spots of pale scales which are named. The area of pale scales at or near the apex of the wing is called the apical spot, and the subcostal spot is found where the subcostal vein joins the costal vein. Although they are called "spots," they are really patches of pale scales extending over several veins, e.g., *An. punctipennis* (Fig. 318). Most mosquito wings do not bear prominent setae, but in the genus *Culiseta* (Fig. 28), a row occurs ventrally near the base of the subcosta.

Legs- There are 3 pairs of legs, one attached to each thoracic segment. The leg consists of five main parts: **coxa** (C-I, C-II, C-III), **trochanter** (Tr), **femur** (Fe), **tibia** (Ti) and **tarsus** (Ta); Plate 2D. The tarsus is composed of five segments, known as **tarsomeres.** The fifth tarsomere (Ta_5)

bears two **claws** (=unguis, U) (Cl) which, in most species, have a secondary element, the tooth. The tarsal claws are used frequently in the *Aedes* key, e.g., *Ae. excrucians* (Fig. 89). They can best be studied under the stereoscopic microscope by shining the light on the stage below the specimen and viewing the claws in silhouette. Tarsomere 4(Ta_4) is unusually small in the fore- and midlegs of the genus *Orthopodomyia* (Fig. 34).

Scale patterns on the various segments of the legs are extensively employed as key characters. The scales on coxa I can be brown or pale, e.g., *Ae. cinereus* (Fig. 261). The femora may have the basal half all pale, e.g., *Ae. zoosophus* (Fig. 69); or with subapical pale rings, e.g., *Ps. columbiae* (Fig. 456); or with apical pale rings (=knee spots), e.g., *Ae. implicatus* (Fig. 238). The foretibiae sometimes bear a line of pale scales, e.g., *Cx. tarsalis* (Fig. 363). The femora and tibiae of some *Psorophora* species have long, erect scales apically, giving them a shaggy appearance (Fig. 467). The tarsomeres, especially on the hindleg, may have basal, pale rings, which are narrow, as in *Ae. vexans* (Fig. 71), or broad as in *Ae. excrucians* (Fig. 45), both apical and basal pale rings, as in, *Ae. canadensis* (Fig. 48), or with tarsomeres 4, 5 and part of 3 all pale, as in *Ps. ferox* (Fig. 469).

ABDOMEN

The abdomen is composed of 10 segments, of which the first seven are quite similar in external structure. The three terminal segments are specialized for reproduction and excretion. It has become customary to refer to the abdominal segments by Roman numerals, e.g., abdominal segment III.

Each of the first seven segments has a dorsal sclerite, the **tergum** (Te) and a ventral sclerite, the **sternum** (S); see Plate 4B. Laterally, they are connected by expandable, elastic tissue, the **pleural membrane** (PMe). A similar intersegmental membrane separates the terga dorsally and the sterna ventrally. These membranes permit the abdomen to distend during blood feeding and when the female becomes gravid.

Segments VIII-X are shortened and modified. In some genera, e.g., *Culex*, *Culiseta* and *Mansonia* (*Fig. 19*), *these segments are mostly* telescoped inside the terminal segments making the apex of the abdomen appear bluntly rounded. In other genera, e.g., *Aedes* (Fig. 21) and *Psorophora*, parts of these segments protrude posteriorly, giving the abdominal terminus a pointed appearance. Also in those with blunt abdomens, segment VII is almost the same width as VI, but in the pointed abdomens, VII is decidedly smaller than VI. Abdominal segment VIII usually has a larger sternum than tergum. Posterior to tergum VIII can be seen two elongated lobes, the **cerci** (sing. cercus). These structures are long, straight and visible in the genera with pointed abdomens, but are shorter, usually curved medially and not so visible in the genera with blunt abdomens. Ventrally, posterior to sternum VIII is a smaller lobe lying ventral to the cerci, the **postgenital lobe** (PGL). Both of these terminal organs are parts of the female genitalia.

No attempt will be made to describe completely the female genitalia, since their parts are rarely used in the key, but some elements are described above because they should be recognized. For an account of the female genitalia, consult Laffoon and Knight (1971) and Reinert (1974).

The anopheline abdomen, with the exception of *An. albimanus*, is devoid of scales although it bears a number of tergal and sternal setae. In the other genera, both setae and scales are present on the abdomen. The patterns of dark and pale scales are very important in identification. Sometimes the pale scales are located basally on the tergum, i.e., on the part *nearest the base of the abdomen*, where it is attached to the thorax, e.g., *Ae. intrudens* (Fig. 242), and sometimes on the apical part, i.e., nearest the free distal end of the abdomen, e.g., *Cx. territans* (Fig. 356). Likewise, the scales on the sterna may be unicolorous or have distinctive patterns, e.g., *Cx. tarsalis* (Fig. 364). In some cases it is necessary to distinguish shades of the pale scales, for example, the pale band on hindtarsomere 1 in *Ae. sollicitans* is yellow-scaled, while in *Ae. nigromaculis*, when present, is white-scaled; see Figs. 59, 61. In *Mansonia* there are special spiniforms on the posterior border of tergum VII in *Ma. titillans* (Fig. 441), and thick, peglike spiniforms on tergum VIII of all species. the cerci of *De. cancer* (Fig. 439) have specialized spatulate setae.

The following list indicates the changes made in names of adult structures in this publication, adopted from the mosquito taxonomic glossary; see Knight (1970), Knight and Laffoon (1970B, 1970C, 1971A) and Harbach and Knight (1980).

Old Name	New Name
anterior pronotum	antepronotum
flagellar segment	flagellomere
meron	mesomeron
mesanepisternum	anterior mesanepisternum
mesepimeron	mesanepimeron
mesonotum	scutum
ommitidium	corneal facet
palpal segment	palpomere
postcoxal area	postprocoxal area
postnotum	mesopostnotum
prealar area	posterior mesanepisternum
propleuron	proepisternum
prosternum	anterior part of proepisternum
sternopleuron, mesepisternum	mesokatepisternum
tarsal segment	tarsomere

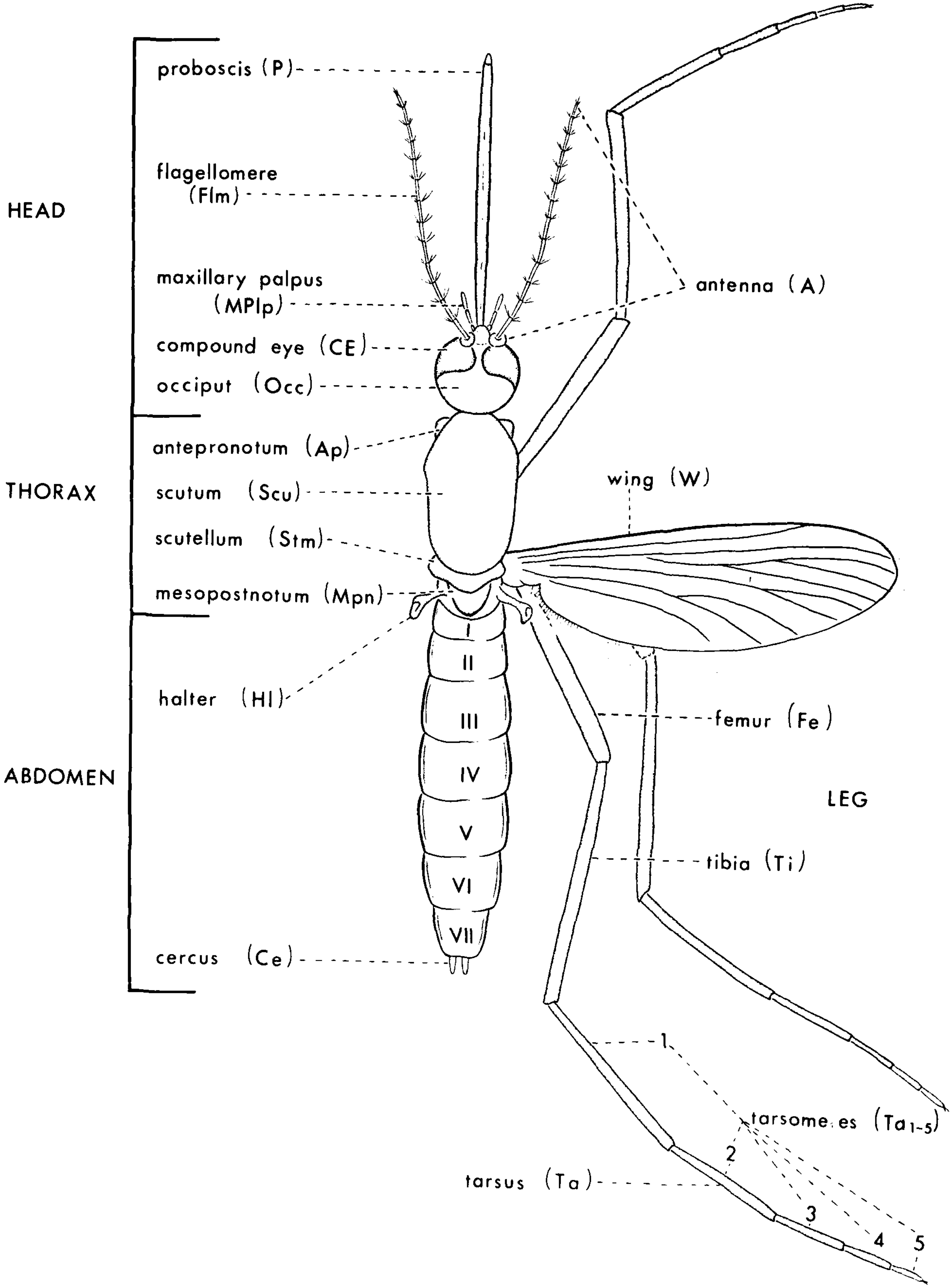

Plate 1. Diagram of adult female mosquito.

ABBREVIATIONS OF ADULT FEMALE MORPHOLOGY IN PLATES

Plate 2

A - antenna
C - coxa
CE - compound eye
Cl - claw
Clp - clypeus
CoF - corneal facet
Fe - femur
Fl - flagellum
Flm - flagellomere
Fr - frons
IS - interocular space
La - labellum
Lb - labium
MPlp - maxillary palpus
Occ - occiput
OL - ocular line
P - proboscis
Pe - pedicel
Plp - palpomere
Sc - scape
Ta - tarsus
Ta_{1-5} - tarsomere
Ti - tibia
Tr - trochanter
V - vertex

Plate 3

Illustrations A and B

AcS - acrostichal setae
Ap - antepronotum
ApS - antepronotal setae
C-I - forecoxa
Cv - cervix
DS - dorsocentral setae
LSS - lateral scutellar setae
Mpn - mesopostnotum
MSS - median scutellar setae
Mtn - metanotum
PeSU - upper proepisternal setae
Ppn - postpronotum
PpS - postpronotal setae
PrA - prescutellar area
Ps - proepisternum
SaS - supraalar setae
Scu - scutum
SF - scutal fossa
SFS - scutal fossal setae
Stm - scutellum
W - wing.

Illustration C (Wing)

A - anal vein
A - anal cell
C - costal vein
C - Costal cell
Cu - cubital vein
Cu_1 - anterior branch of cubital vein
Cu_1 - cubital cell
Cu_2 - posterior branch of cubital vein
Cu_2 - cubital$_2$ cell
FS - fringe scales
h - humeral crossvein
M - medial vein
M - medial cell
M_{1+2} - anterior branch of medial vein
M_2 - medial$_2$ cell
M_{3+4} - posterior branch of medial vein
M_4 - medial$_4$ cell
m-cu - mediocubital crossvein
R - radial vein
R - radial cell
R_1 - anteriormost branch of radial vein
R_1 - radial$_1$ cell
R_s - radial sector vein
R_2 - anterior branch of radial sector vein

R_2 - radial$_2$ cell
R_{2+3} - connector vein (stem) of radial sector vein
R_3 - median branch of radial sector vein
R_3 - radial$_3$ cell
R_{4+5} - posterior branch of radial sector vein
R_5 - radial$_5$ cell
r-m - radiomedial crossvein
Sc - subcostal vein
Sc - subcostal cell

Plate 4

Ab-I - abdominal segment I
AMas - anterior mesanepisternum
Ap - antepronotum
ApS - antepronotal setae
C-I - forecoxa
C-II - midcoxa
C-III - hindcoxa
Ce - cercus
Cv - cervix
DS - dorsocentral setae
H- head
Hl - halter
HyA - hypostigmal area
LSS - lateral scutellar setae
Mam - mesanepimeron
Mem - metameron
MeSL - lower mesanepimeral setae
MeSU - upper mesanepimeral setae
Mks - mesokatepisternum
MkSL - lower mesokatepisternal setae
MkSU - upper mesokatepisternal setae
Mpn - mesopostnotum
MS - mesothoracic spiracle
Msm - mesomeron
MSS - medial scutellar setae
Mtm - metepimeron
Mtn - metanotum
Mtpn - metapostnotum
Mts - metepisternum
MtS - metathoracic spiracle
PA - postspiracular area
PaS - prealar setae
PeSU - upper proepisternal setae
PGL - postgenital lobe
PM - postprocoxal membrane
PMas - posterior mesanepisternum
Ppn - postpronotum
PpS - postpronotal setae
Ps - proepisternum
PS - postspiracular setae
PsS - prespiracular setae
PsA - prespiracular area
S - sternum of abdomen
SA - subspiracular area
SaS - supraalar setae
Scu - scutum
SF- scutal fossa
SFS - scutal fossal setae
Stm - scutellum
Te - tergum of abdomen
W - wing

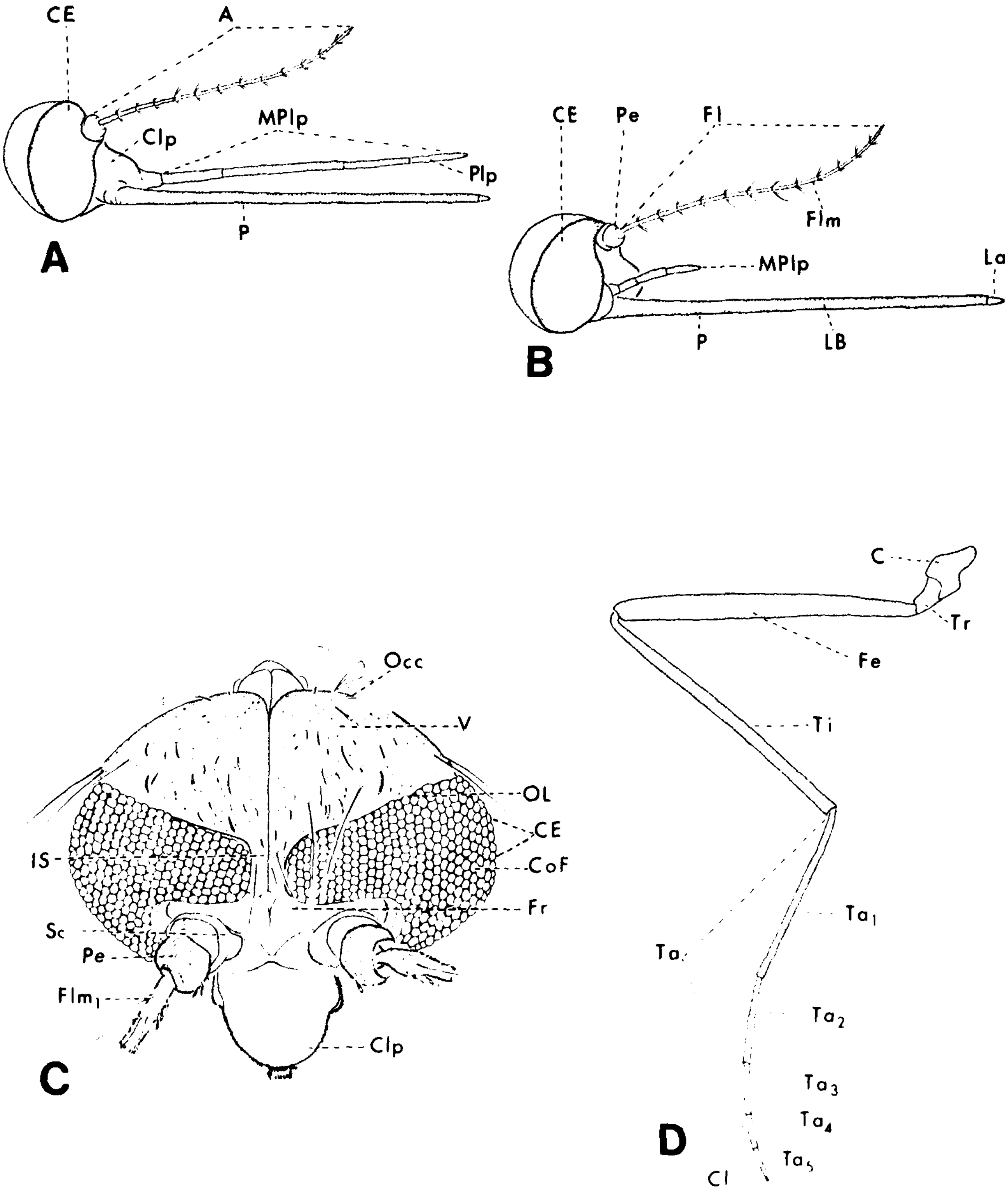

Plate 2. Head and leg of adult female mosquito. A. Lateral view of anopheline head; B. Lateral view of culicine head; C. dorsal view of culicine head; D. lateral view of leg

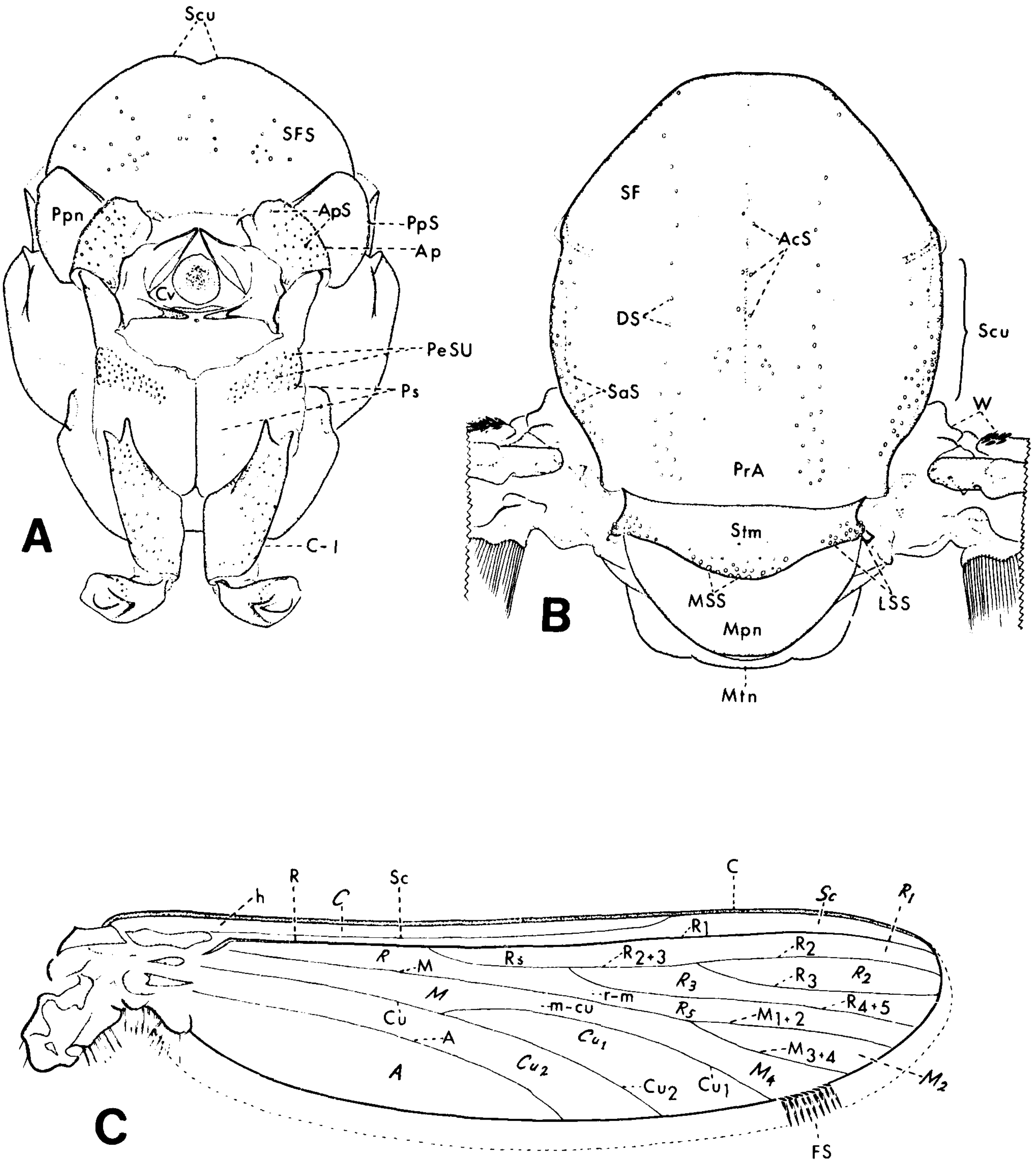

Plate 3. Thorax and wing of adult female mosquito. A. Anterior view of thorax; B. Dorsal view of thorax; C. Dorsal view of wing: longitudinal veins designated by gothic letters, cells by italics.

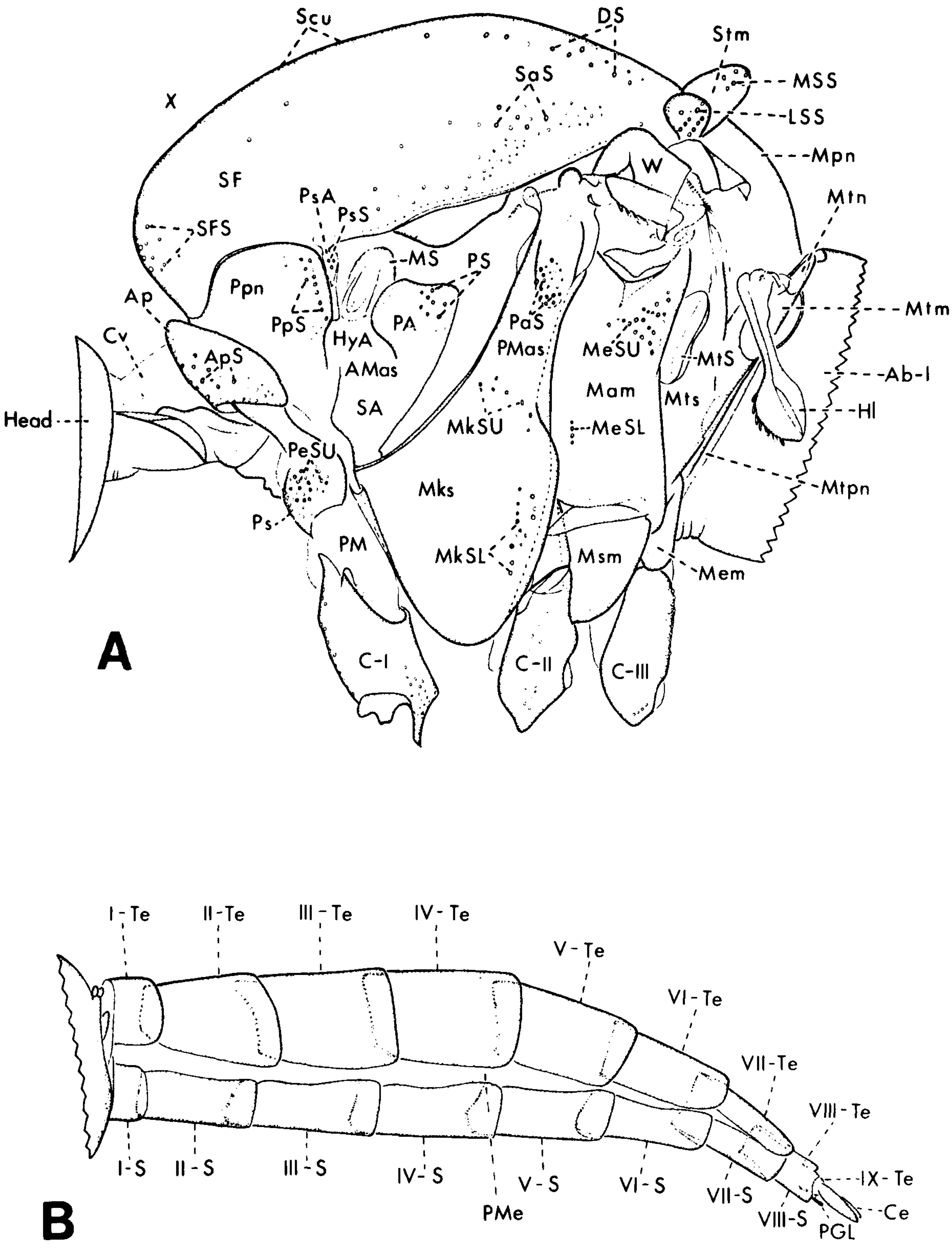

Plate 4. Thorax and abdomen of adult female mosquito. A. Lateral view of thorax; B. Lateral view of abdomen.

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KEY TO GENERA OF ADULT FEMALE MOSQUITOES OF NORTH AMERICA, NORTH OF MEXICO

1. Proboscis long and strongly recurved (Fig. 1); posterior edge of wing strongly emarginated at apex of vein Cu_2 (Fig. 2) . . . . *Toxorhynchites r. rutilus*
Toxorhynchites r. septentrionalis
(Plates 48, 39)*

Proboscis not so long and only slightly recurved, if at all (Fig. 3); wing edge evenly rounded or only slightly emarginated at apex of vein Cu_2 (Fig. 4) 2

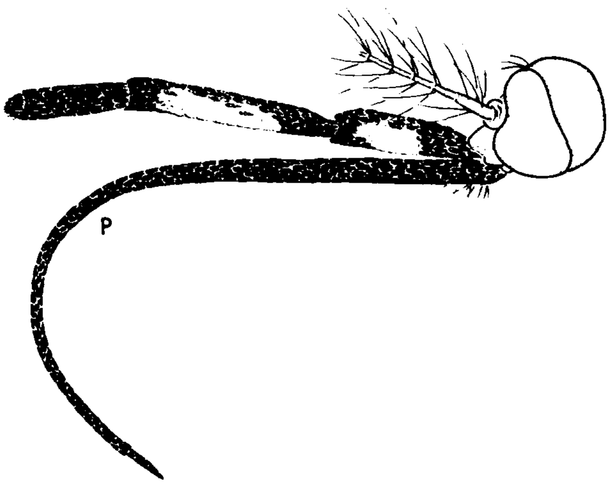


Fig. 1 — *Lateral view of head - Tx. r. septentrionalis*

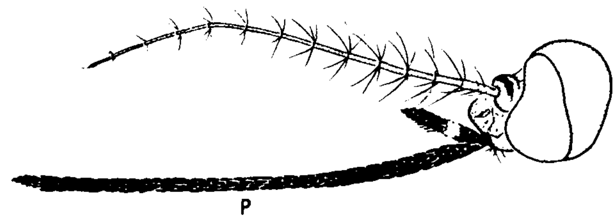


Fig. 3 — *Lateral view of head - Ae. vexans*

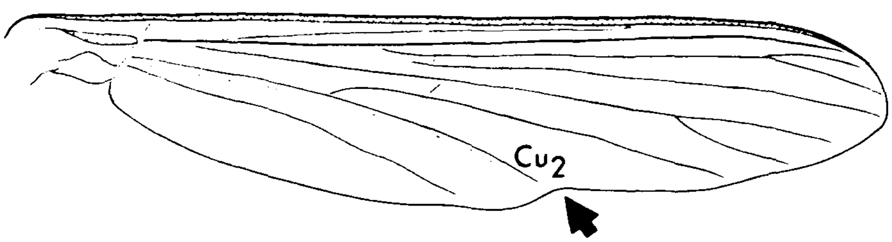


Fig. 2 — *Dorsal view of wing - Tx. r. septentrionalis*

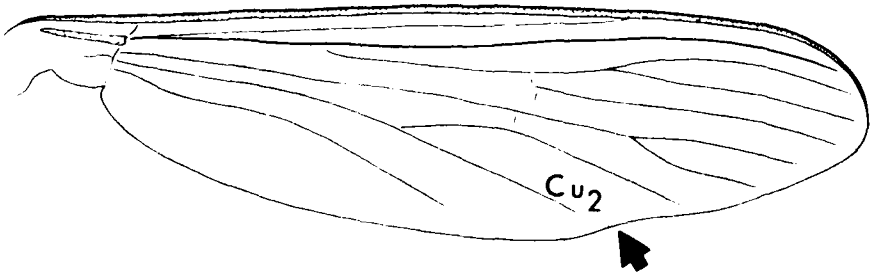


Fig. 4 — *Dorsal view of wing - Ae. vexans*

2(1). Scutellum evenly rounded, with setae more or less evenly distributed (Fig. 5); maxillary palpus about as long as proboscis (Fig. 6) . . . . *Anopheles*

*Refer to Plates containing maps which portray geographical distribution.

Scutellum trilobed, with setae in 3 distinct groups (Fig. 7); maxillary palpus shorter than proboscis (Fig. 8) 3

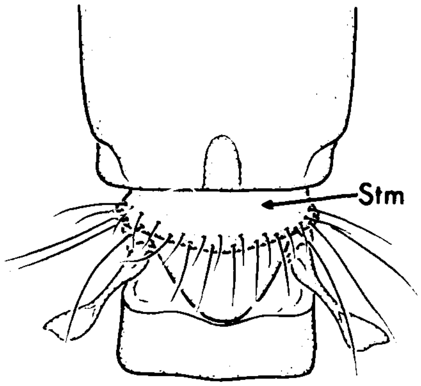


Fig. 5 — *Posterior dorsal view of thorax - An. quadrimaculatus*

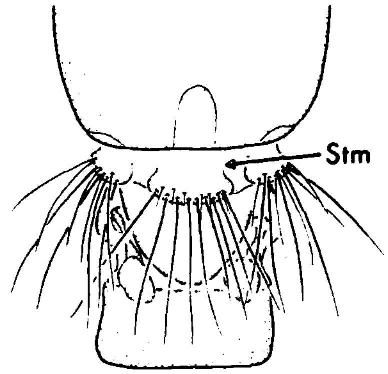


Fig. 7 — *Posterior dorsal view of thorax - Ae. vexans*

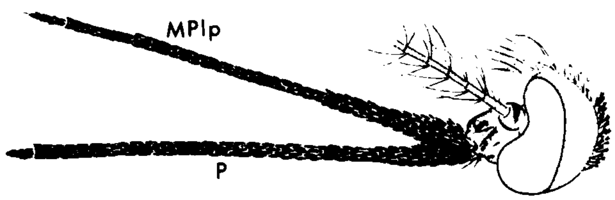


Fig. 6 — *Lateral view of head - An. quadrimaculatus*

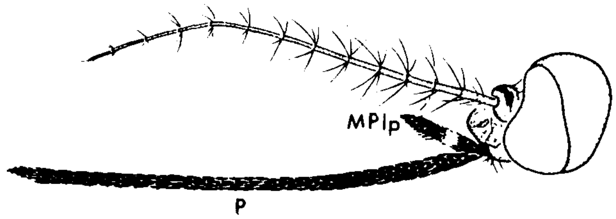


Fig. 8 — *Lateral view of head - Ae. vexans*

3(2). Mesopostnotum with setae (Fig. 9); base of hindcoxa in line with base of mesomeron or slightly dorsad (Fig. 10) . . . . *Wyeomyia*

Mesopostnotum without setae (Fig. 11); base of hindcoxa distinctly ventral to base of mesomeron (Fig. 12) 4

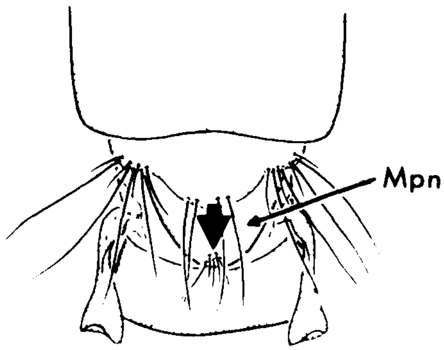


Fig. 9 — *Posterior dorsal view of thorax - Wy. smithii*

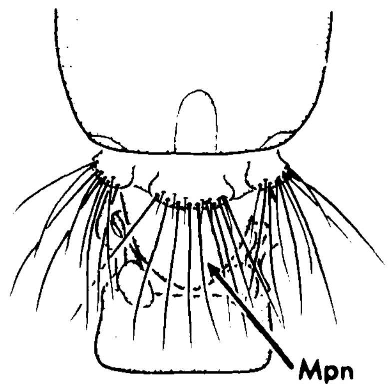


Fig. 11 — *Posterior dorsal view of thorax - Ae. vexans*

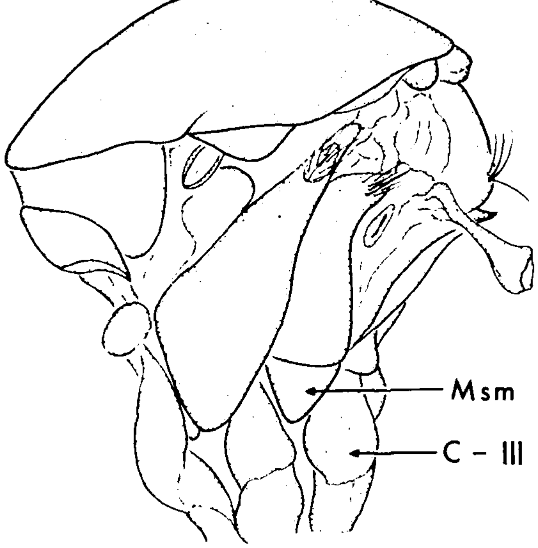


Fig. 10 — *Lateral view of thorax - Wy. smithii*

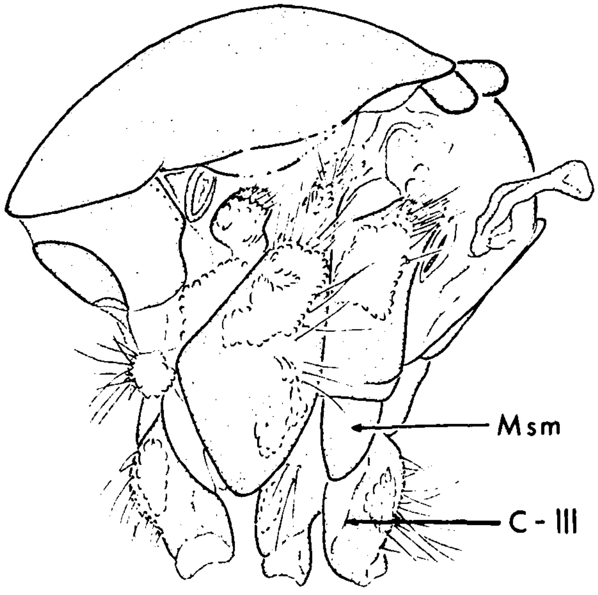


Fig. 12 — *Lateral view of thorax - Ae. vexans*

4(3). Cell R_2 of wing shorter than vein R_{2+3} (Fig. 13); thorax usually with lines of iridescent blue scales (Fig. 14) .... *Uranotaenia*

Cell R_2 at least as long as vein R_{2+3} (Fig. 15); iridescent blue scales absent on thorax (Fig. 16) 5

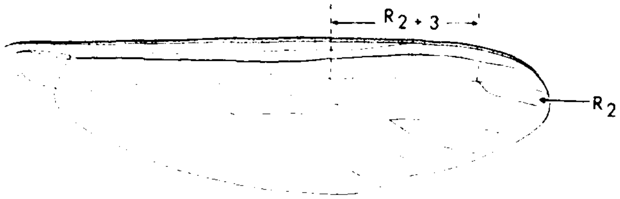


Fig. 13 — *Dorsal view of wing - Ur. sapphirina*

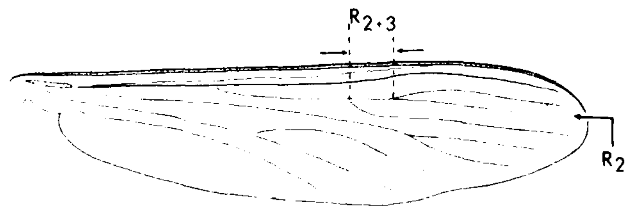


Fig. 15 — *Dorsal view of wing - Cx. pipiens*

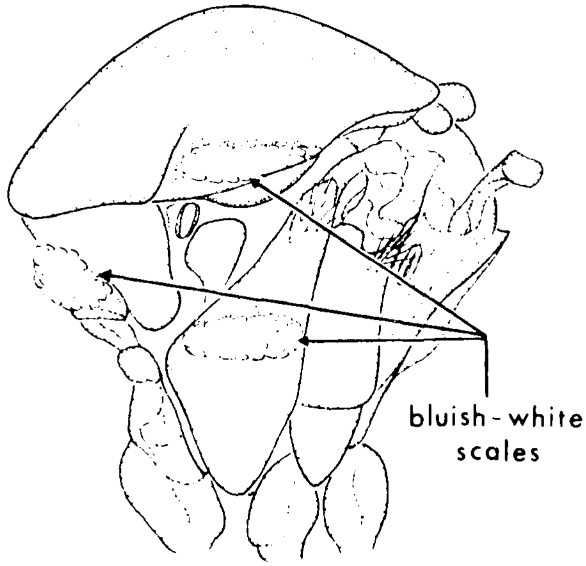


Fig. 14 — *Lateral view of thorax - Ur. sapphirina*

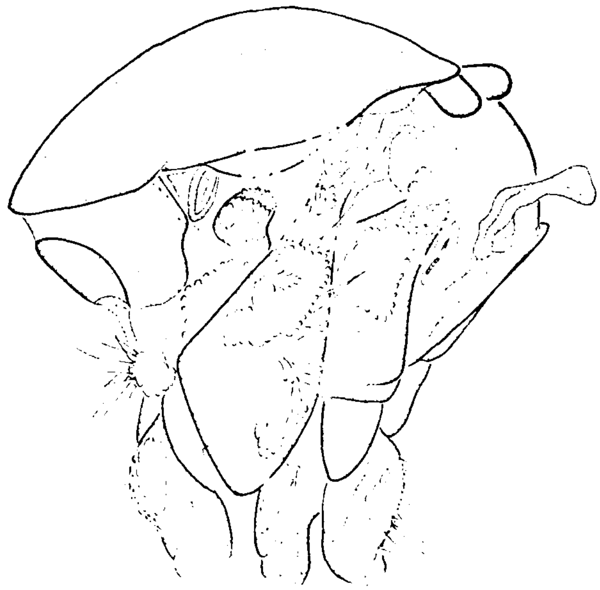


Fig. 16 — *Lateral view of thorax - Ae. vexans*

5(4). **Postspiracular setae present (Fig. 17)** **6**

Postspiracular setae absent (Fig. 18) **8**

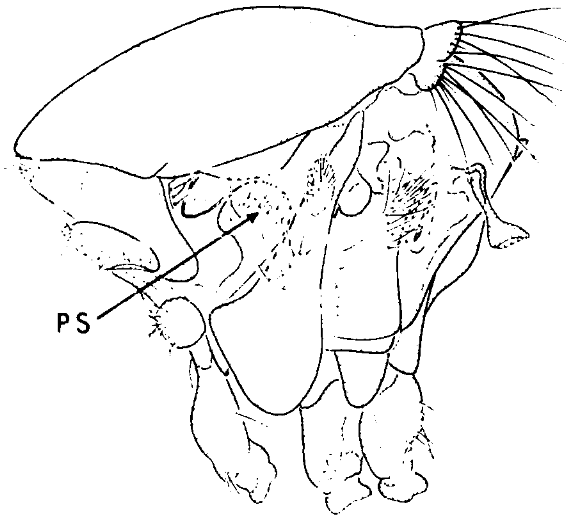


Fig. 17 — *Lateral view of thorax - Ps. ciliata*

Fig. 18 —*Lateral view of thorax - Cs. inornata*

6(5). Apex of abdomen bluntly rounded in dorsal view (Fig. 19); most scales on dorsal surface of wing very broad (Fig. 20) .... *Mansonia*

Apex of abdomen tapering to a point in dorsal view, segment VII markedly narrower than VI (Fig. 21); dorsal wing scales long and slender, at least on veins R_s and M (Fig. 22) 7

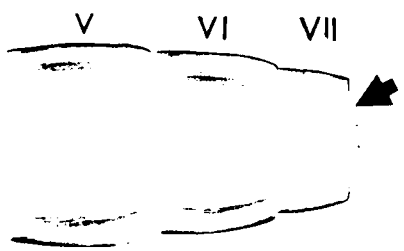


Fig. 19 — *Dorsal view of abdomen - Ma. titillans*

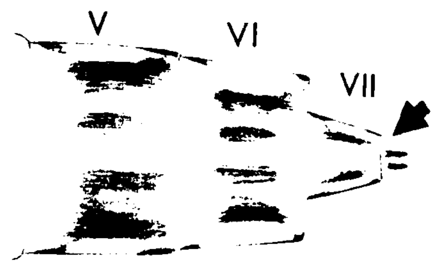


Fig. 21 — *Dorsal view of abdomen - Ae. vexans*

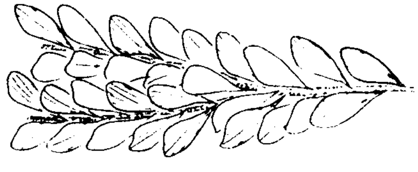


Fig. 20 — *Dorsal view of some veins - Ma. titillans*

Fig. 22 — *Dorsal view of some veins - Ae. vexans*

7(6). Prespiracular setae present (Fig. 23); pale, transverse bands or lateral spots, when present, apical on abdominal terga (Fig. 24) .... *Psorophora*

Prespiracular setae absent (Fig. 25); pale, transverse bands or lateral spots basal on abdominal terga (Fig. 26) .... (in part) *Aedes*

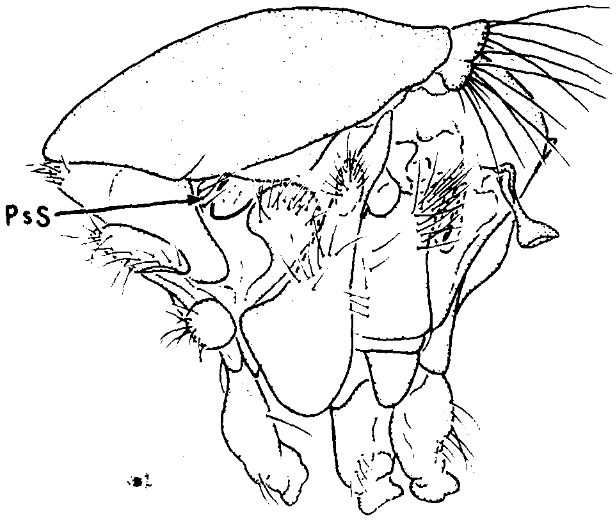


Fig. 23 — *Lateral view of thorax - Ps. ciliata*

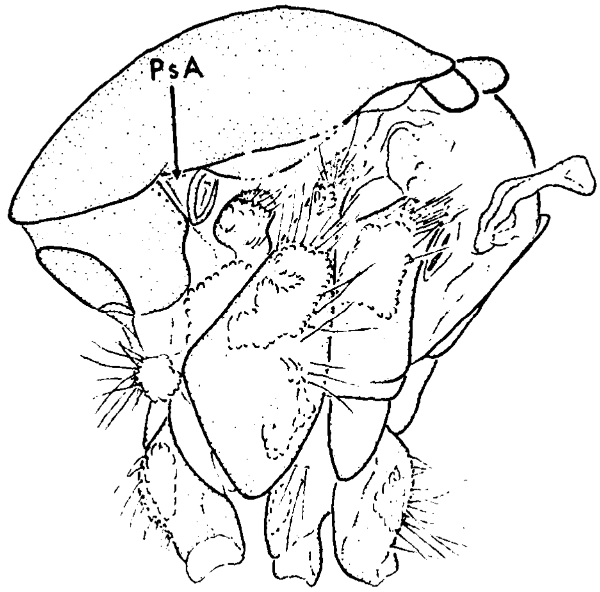


Fig. 25 — *Lateral view of thorax - Ae. vexans*

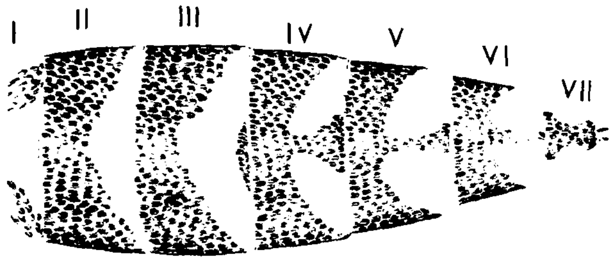


Fig. 24 — *Dorsal view of abdomen - Ps. cyanescens*

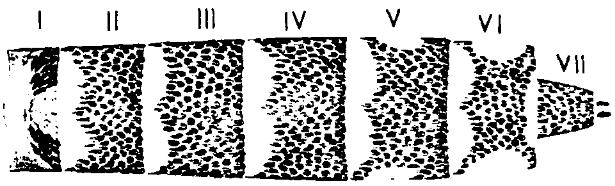


Fig. 26 — *Dorsal view of abdomen - Ae. vexans*

8(5). Prespiracular setae present (Fig. 27); base of wing vein Sc with row of setae ventrally (Fig. 28) . *Culiseta*

Prespiracular and vein Sc setae absent (Figs. 29, 30) 9

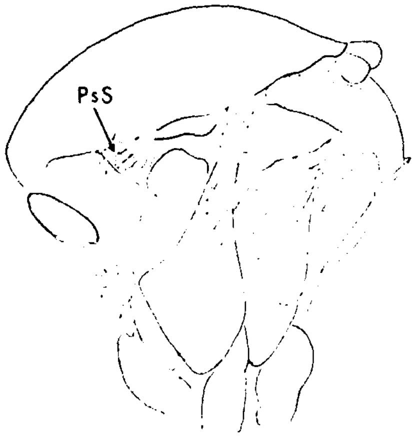


Fig. 27 — *Lateral view of thorax - Cs. inornata*

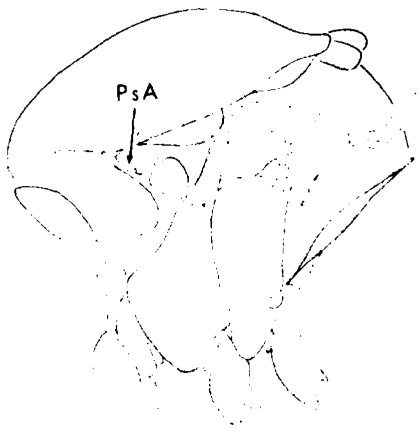


Fig. 29 — *Lateral view of thorax - Cx. pipiens*

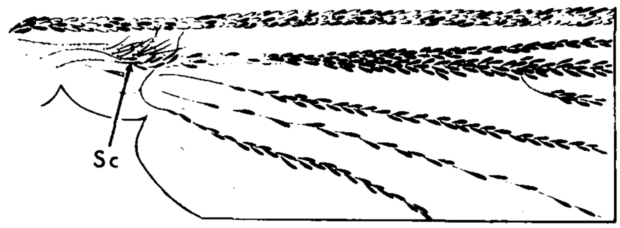


Fig. 28 — *Ventral view of basal half of wing - Cs. inornata*

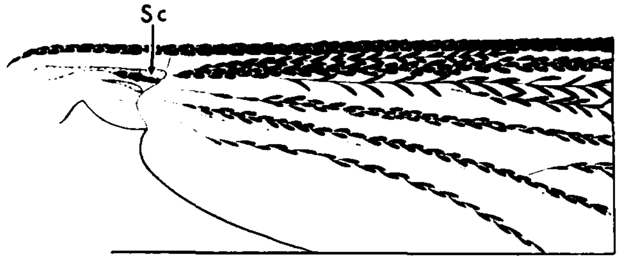


Fig. 30 — *Ventral view of basal half of wing - Cx. pipiens*

9(8). Scutum covered with broad, flat, metallic scales; antepronotum large, approaching middorsally (Fig. 31) .... *Haemagogus equinus* (Plate 40)

Scutal ornamentation not of broad, flat scales; antepronotum small, not approaching middorsally (Fig. 32) 10

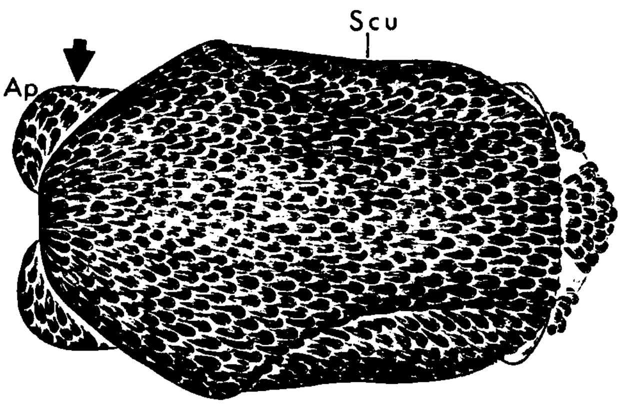


Fig. 31 — *Dorsal view of thorax - Hg. equinus*

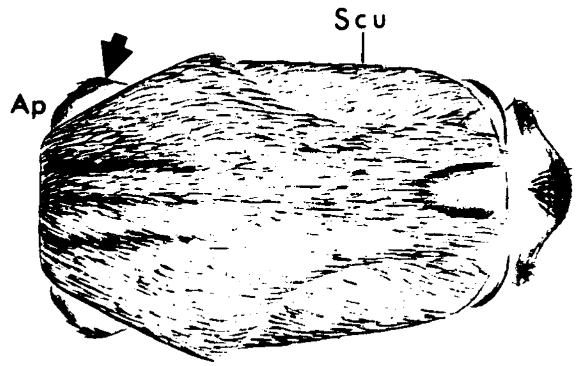


Fig. 32 — *Dorsal view of thorax - Cx. pipiens*

10(9). Scutum with narrow lines of pale scales (Fig. 33); tarsomere 1 of fore-and midlegs longer than other 4 tarsomeres combined, tarsomere 4 very short, about as long as wide (Fig. 34) .... *Orthopodomyia*

Scutum without narrow lines of pale scales (Fig. 35); tarsomere 1 of fore- and midlegs shorter than other 4 combined, tarsomere 4 much longer than wide (Fig. 36) 11

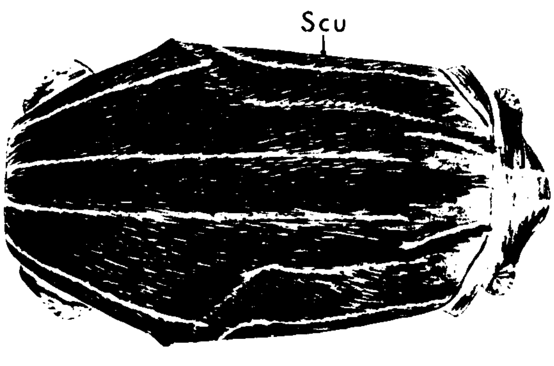


Fig. 33 — *Dorsal view of thorax - Or. signifera*

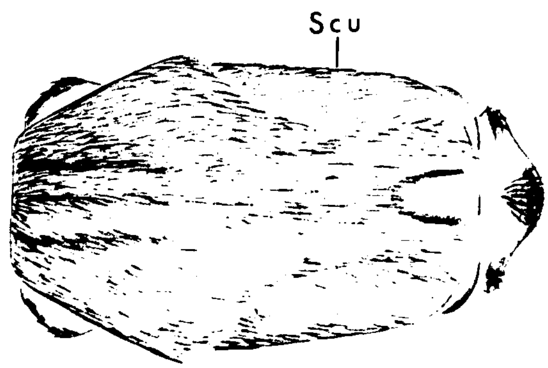


Fig. 35 — *Dorsal view of thorax - Cx. pipiens*

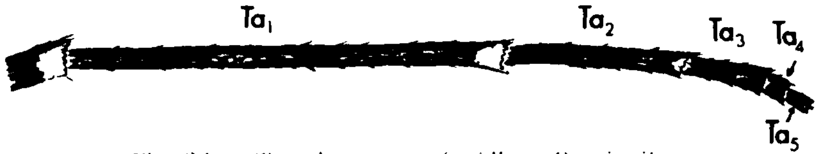


Fig. 34 — *Tarsal segments of midleg - Or. signifera*

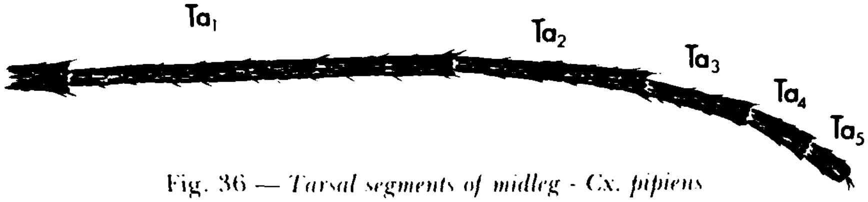


Fig. 36 — *Tarsal segments of midleg - Cx. pipiens*

11(10). Most scales on dorsal surface of wing very broad (Fig. 37) .... *Coquillettidia perturbans* (Plate 32)

Scales on dorsal surface of wing long and narrow, at least on veins R_s and M (Fig. 38) 12


Fig. 37 — *Dorsal view of wing - Cq. perturbans*

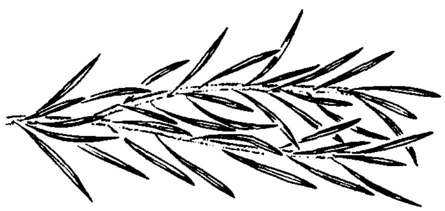


Fig. 38 — *Dorsal view of wing - Cx. pipiens*

12(11). Antenna longer than proboscis, flagellomere 1 longer than Flm 2 (Fig. 39) .... *Deinocerites*

Antenna subequal to, or shorter than proboscis, flagellomere 1 about as long as Flm 2 (Fig. 40) 13

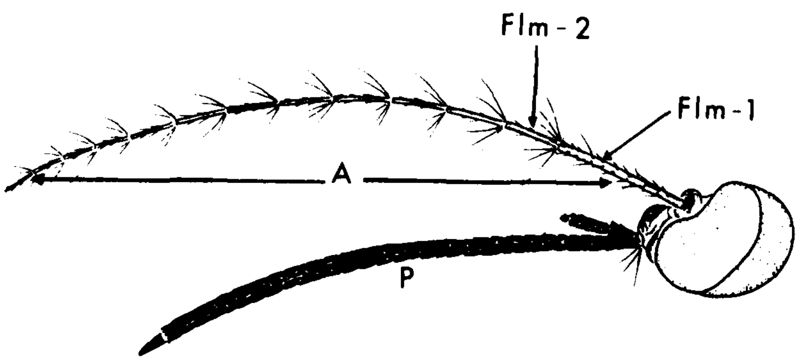


Fig. 39 — *Lateral view of head - De. pseudes*

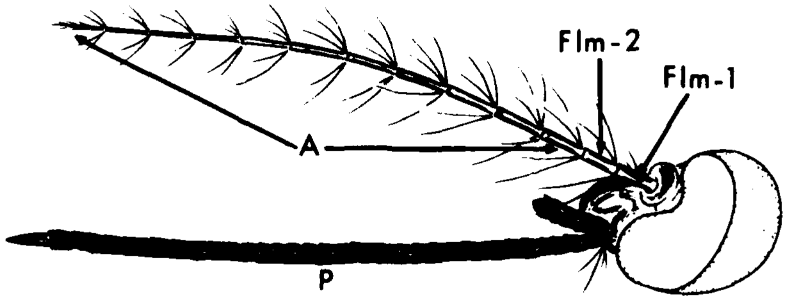


Fig. 40 — *Lateral view of head - Cx. pipiens*

13(12). Apex of abdomen tapering to point in dorsal view, terga with basolateral patches of silvery scales (Fig. 41); scutum with pattern of black, brown and golden scales (Fig. 42) (subgenus *Kompia*) . . . . (in part) *Aedes*

Apex of abdomen bluntly rounded in dorsal view, terga with baso- or apicolateral patches of pale white or dingy yellow scales, never silvery (Fig. 43); scutum with other than pattern of black, brown and golden scales (Fig. 44) . . . . *Culex*

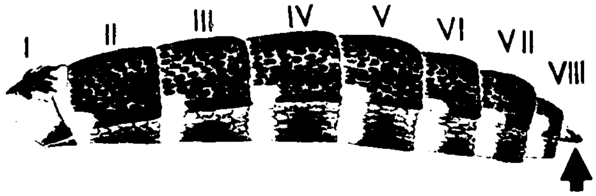


Fig. 41 — *Lateral view of abdomen - Ae. purpureipes*

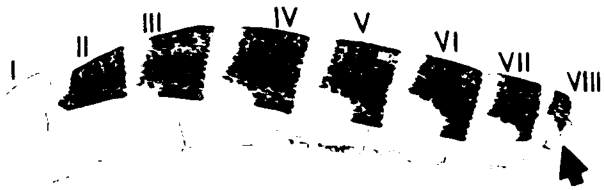


Fig. 43 — *Lateral view of abdomen - Cx. pipiens*

Fig. 42 — *Dorsal view of thorax - Ae. purpureipes*

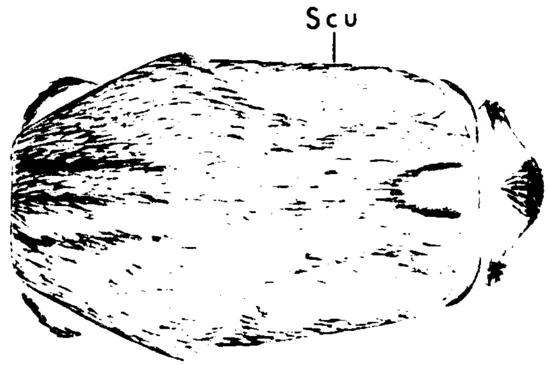


Fig. 44 — *Dorsal view of thorax - Cx. pipiens*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *AEDES*

1. Hindtarsomere with pale bands (Fig. 45) 2

Hindtarsomere without pale bands (Fig. 46) 36

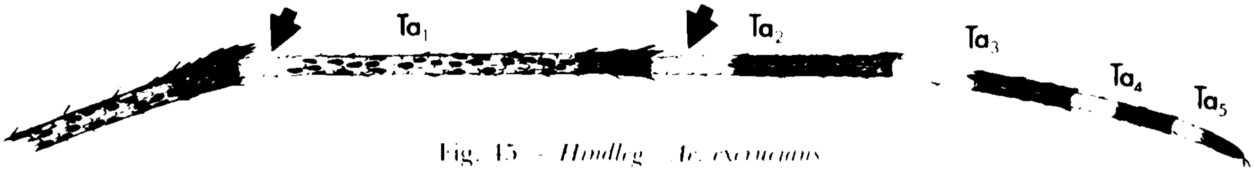


Fig. 45 — *Hindleg - Ae. excrucians*

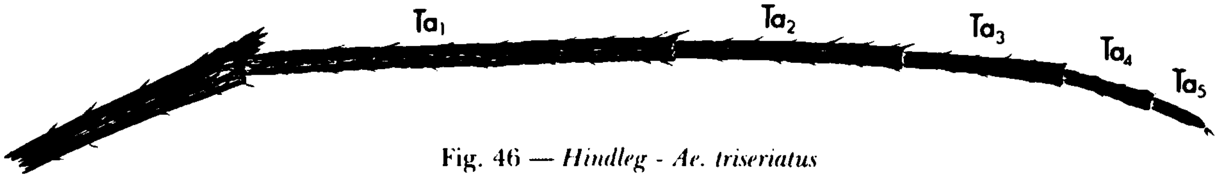


Fig. 46 — *Hindleg - Ae. triseriatus*

2(1). Hindtarsomeres pale-banded on basal part of segment only (Fig. 47) 3

Hindtarsomeres pale-banded both basally and apically, at least on some segments (Fig. 48) 25

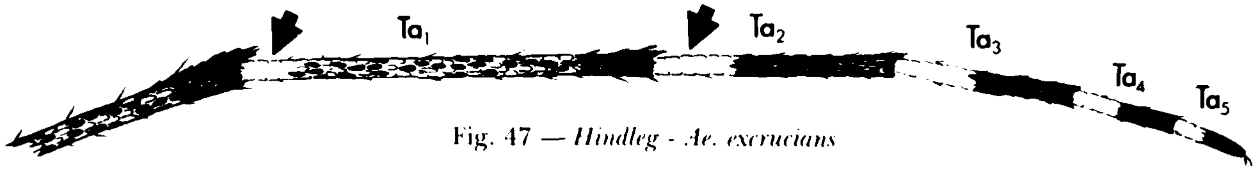


Fig. 47 — *Hindleg - Ae. excrucians*

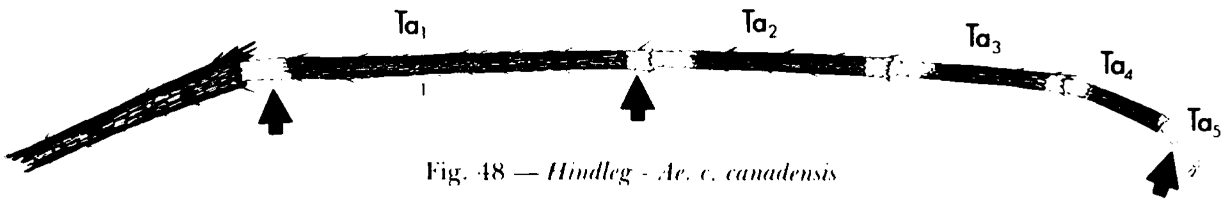


Fig. 48 — *Hindleg - Ae. c. canadensis*

3(2). Proboscis with definite pale-scaled band near middle (Fig. 49) 4

Proboscis lacking definite pale-scaled band near middle (Fig. 50) 7

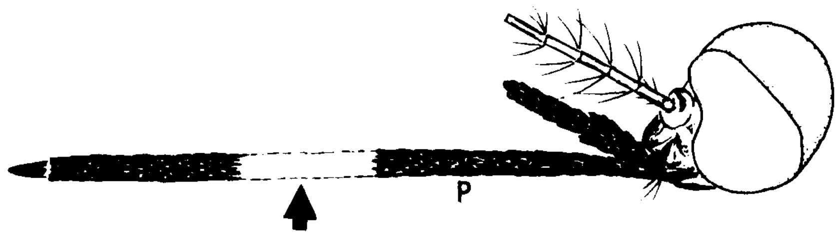


Fig. 49 — *Lateral view of head - Ae. sollicitans*

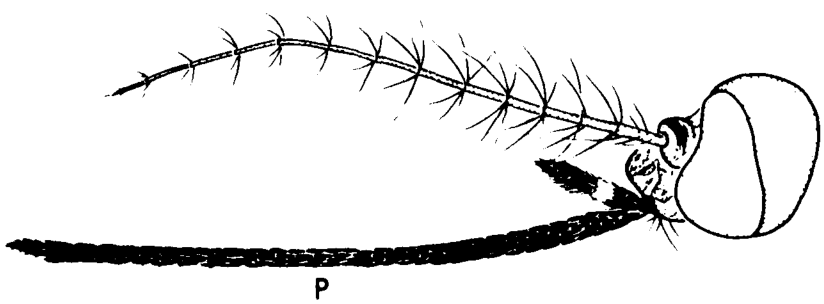


Fig. 50 — *Lateral view of head - Ae. vexans*

4(3). Abdominal terga with transverse, basal, pale bands, but lacking median, longitudinal stripe of pale scales (Fig. 51); wing dark-scaled (Fig. 52) .... *taeniorhynchus* (Plate 9)

Abdominal terga with pale-scaled, median, longitudinal stripe or row of disconnected spots (Fig. 53); wing scales either all dark or intermixed dark and pale (Fig. 54) 5

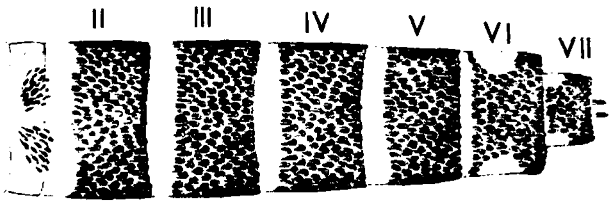


Fig. 51 — *Dorsal view of abdomen - Ae. taeniorhynchus*

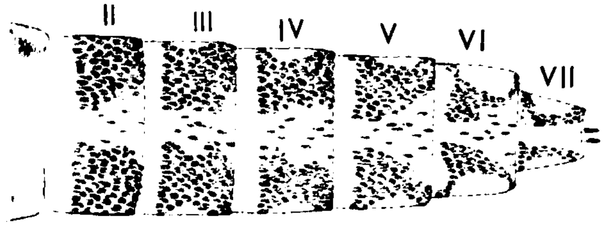


Fig. 53 — *Dorsal view of abdomen - Ae. sollicitans*

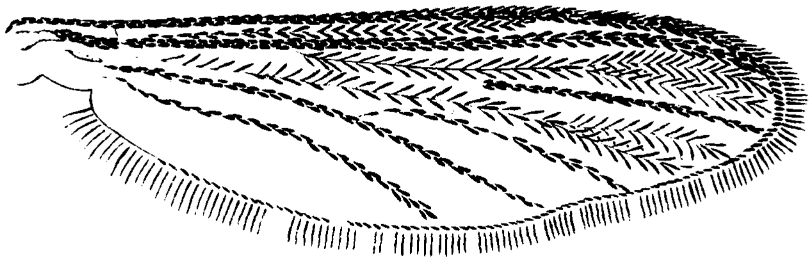


Fig. 52 — *Dorsal view of wing- Ae. taeniorhynchus*

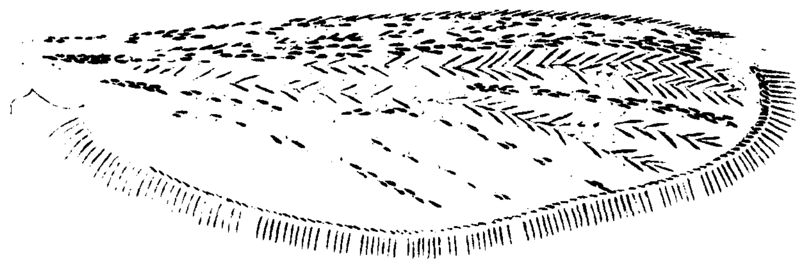


Fig. 54 — *Dorsal view of wing - Ae. sollicitans*

5(4). Wing with scales all dark (Fig. 55); hypostigmal scales absent (Fig. 56) .... *mitchellae* (Plate 15)

Wing with dark and pale scales intermixed (Fig. 57); hypostigmal scales present (Fig. 58) 6

Fig. 55 — *Dorsal view of wing - Ae. mitchellae*

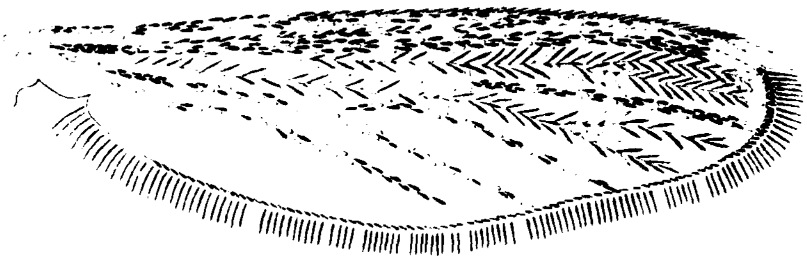


Fig. 57 — *Dorsal view of wing - Ae. sollicitans*

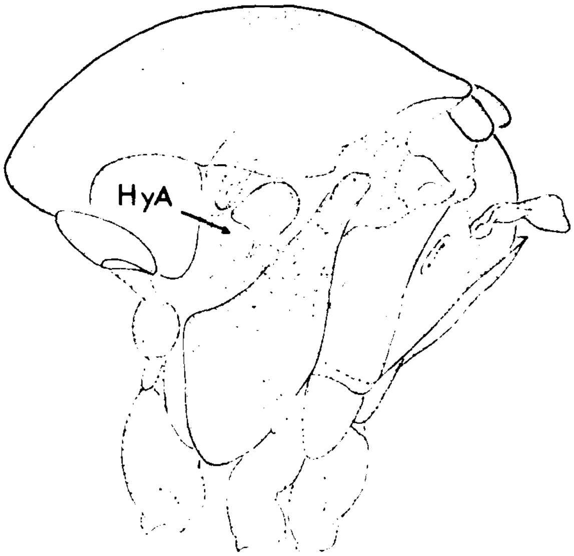


Fig. 56 — *Lateral view of thorax - Ae. mitchellae*

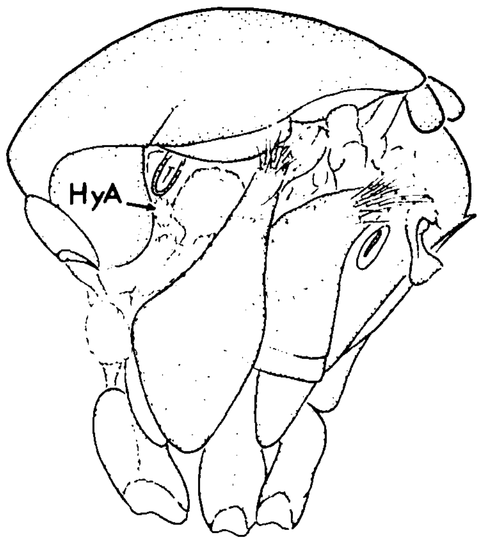


Fig. 58 — *Lateral view of thorax - Ae. sollicitans*

6(5). Hindtarsomere 1 with definite, yellow-scaled, median band (Fig. 59); basolateral patches on abdominal terga whitish (Fig. 60) .... *sollicitans* **(Plate 20)**

Hindtarsomere 1 usually without median, pale band, if present, then scales whitish (Fig. 61); basolateral patches on abdominal terga yellowish-scaled (Fig. 62) .... (in part) *nigromaculis* **(Plate 25)**

Fig. 59 — *Hindtarsus - Ae. sollicitans*

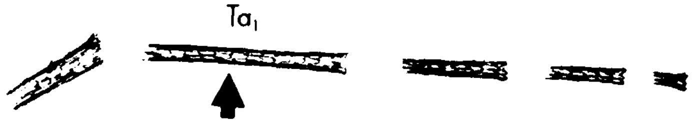


Fig. 61 — *Hindtarsus - Ae. nigromaculis*

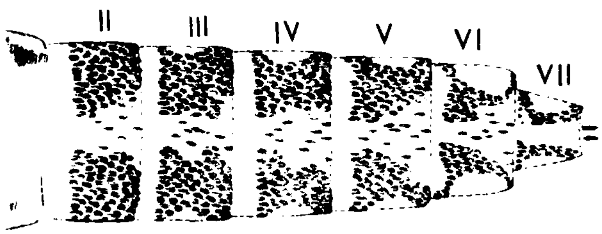


Fig. 60 — *Dorsal view of abdomen - Ae. sollicitans*

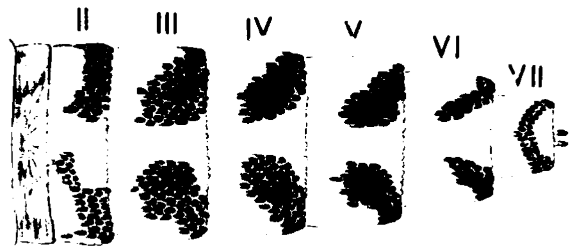


Fig. 62 — *Dorsal view of abdomen - Ae. nigromaculis*

7(3). Abdominal terga VI-VII with large, submedian, scaleless areas containing setae (Fig. 63); mesokatepisternum with 2 narrow, diagonal, median lines of silvery scales (Fig. 64) .... *papago* (Plate 24)

Abdominal terga VI-VII fully scaled (Fig. 65); mesokatepisternum variously scaled, never with 2 narrow, diagonal, median lines (Fig. 66) 8

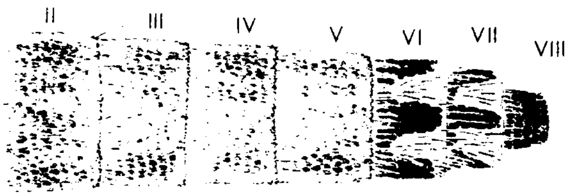


Fig. 63 — *Dorsal view of abdomen - Ae. papago*

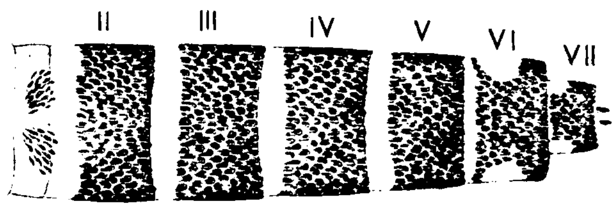


Fig. 65 — *Dorsal view of abdomen - Ae. taeniorhynchus*

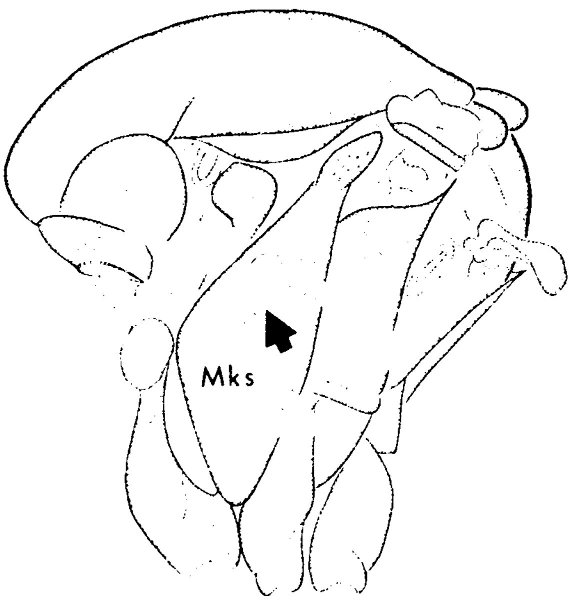


Fig. 64 — *Lateral view of thorax - Ae. papago*

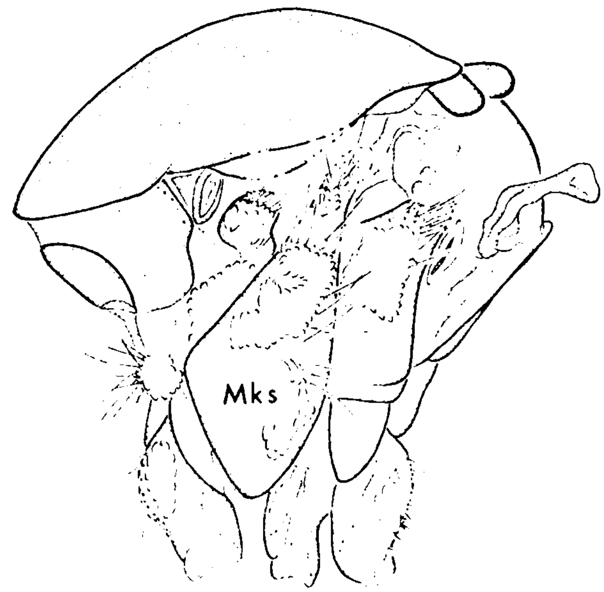


Fig. 66 — *Lateral view of thorax - Ae. vexans*

8(7). Scutum with conspicuous, lyre-shaped marking of silvery scales on background of dark scales (Fig. 67) .... *aegypti* (Plate 10)

Scutum without such markings (Fig. 68) 9

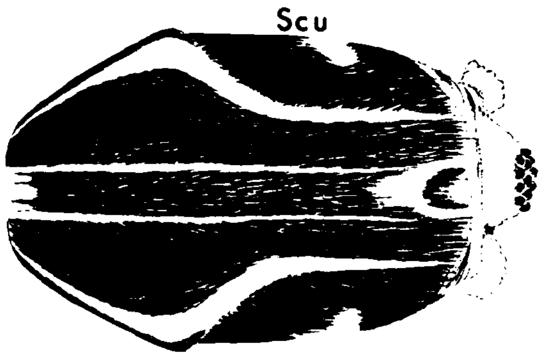


Fig. 67 — *Dorsal view of thorax - Ae. aegypti*

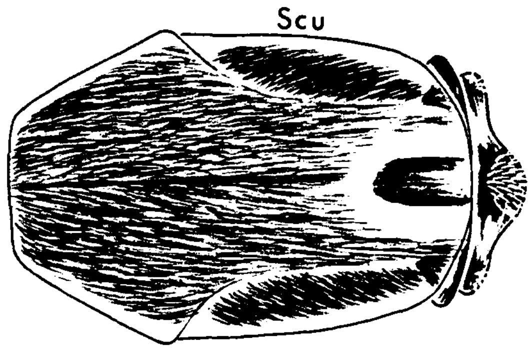


Fig. 68 — *Dorsal view of thorax - Ae. c. canadensis*

9(8). Basal 0.5 of hindfemur entirely pale-scaled (Fig. 69) . . . . *zoosophus* (Plate 24)

Basal 0.5 of hindfemur with anterior surface all dark-scaled or with dark and pale scales intermixed (Fig. 70) 10

Fig. 69 — *Hindleg - Ae. zoosophus*

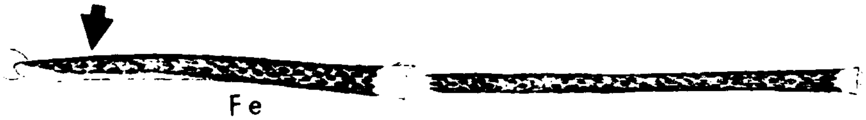


Fig. 70 — *Hindleg - Ae. epactius*

10(9). Basal pale bands of hindtarsomeres narrow, that on tarsomere 2 covering 0.2 or less of segment (Fig. 71) 11

Basal pale bands of hindtarsomeres broad, that on tarsomere 2 covering more than 0.3 of segment (Fig. 72) 12

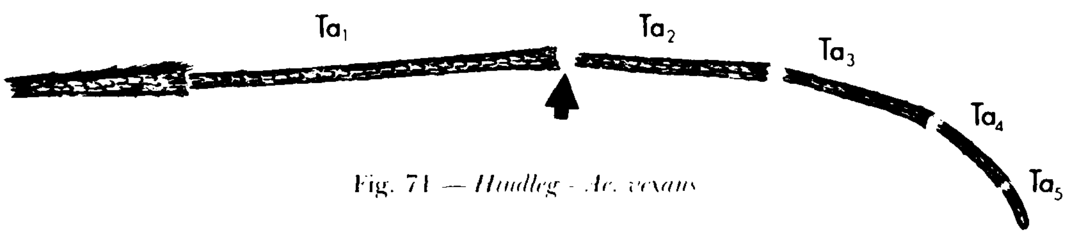


Fig. 71 — *Hindleg - Ae. vexans*

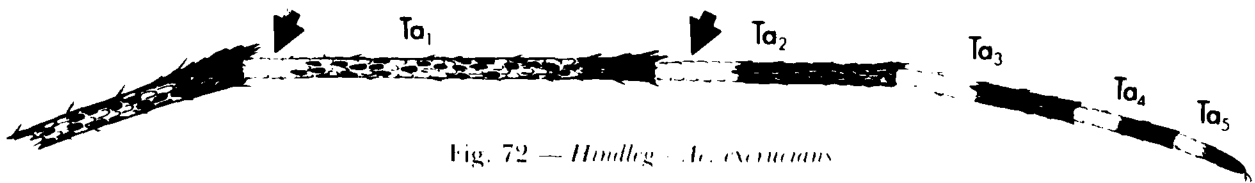


Fig. 72 — *Hindleg - Ae. excrucians*

11(10). Basal pale bands on abdominal terga II-VI with 2 posterior lobes, tergum VII mostly dark-scaled (Fig. 73); lower mesanepimeral setae absent (Fig. 74) .... *vexans* (Plate 26)

Basal pale bands on terga II-VI not bilobed nor clearly defined, tergum VII mostly pale-scaled (Fig. 75); lower mesanepimeral setae present (Fig. 76) .... *cantator* (Plate 19)

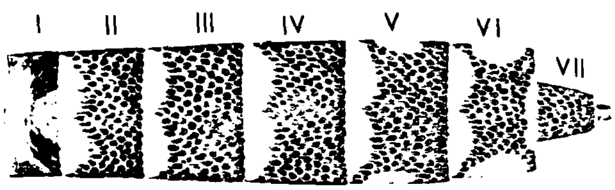


Fig. 73 — *Dorsal view of abdomen - Ae. vexans*

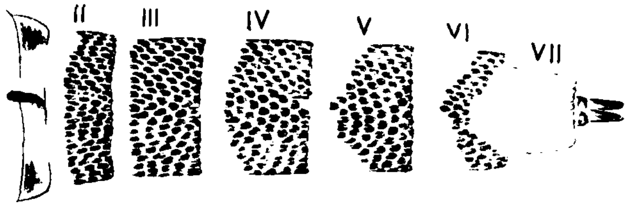


Fig. 75 — *Dorsal view of abdomen - Ae. cantator*

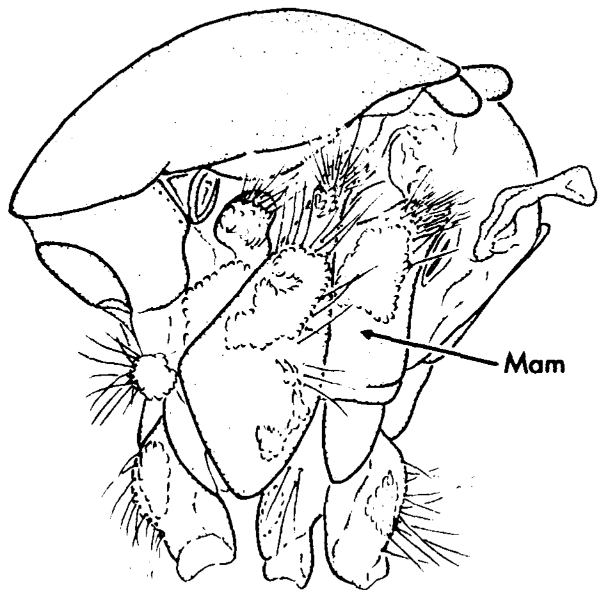


Fig. 74 — *Lateral view of thorax - Ae. vexans*

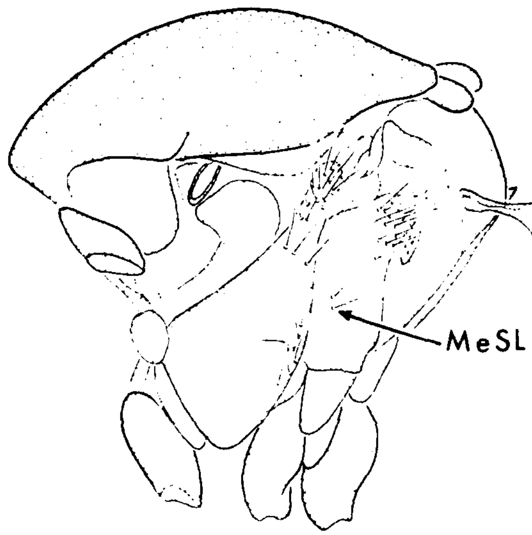


Fig. 76 — *Lateral view of thorax - Ae. cantator*

12(10). Wing with broad, triangular-shaped, dark and pale scales rather evenly intermixed dorsally (Fig. 77) 13

At least some dorsal wing scales narrow, with dark and pale scales usually unevenly distributed (Fig. 78) 14

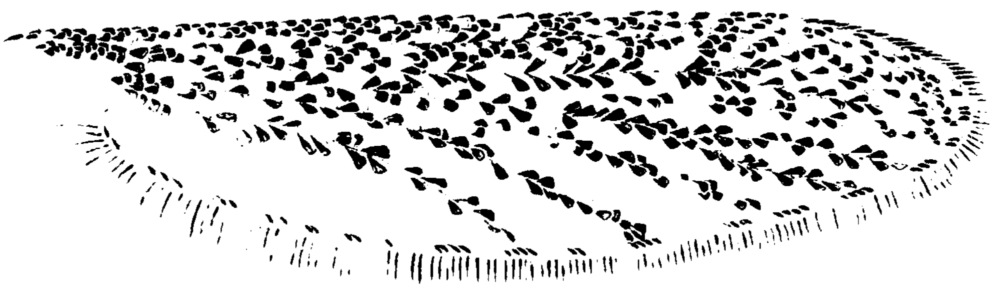


Fig. 77 — *Dorsal view of wing - Ae. grossbecki*

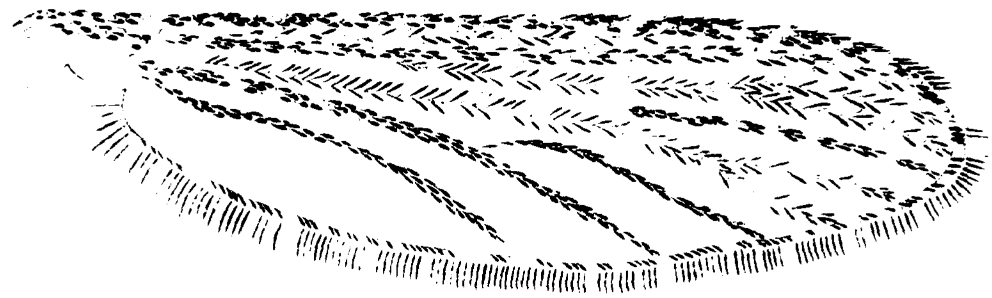


Fig. 78 — *Dorsal view of wing - Ae. stimulans*

13(12). Proboscis with many dark and pale scales intermixed (Fig. 79); scutum with mixed brown and pale scales laterally (Fig. 80) .... *squamiger* (Plate 27)

Proboscis with few scattered pale scales on basal 0.5 (Fig. 81); scutum with mostly pale scales laterally (Fig. 82) .... *grossbecki* (Plate 22)

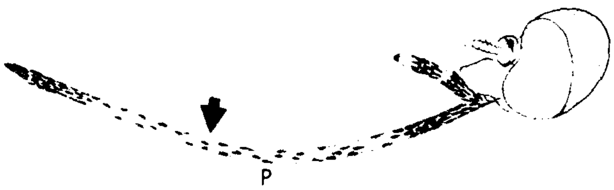


Fig. 79 — *Lateral view of head - Ae. squamiger*

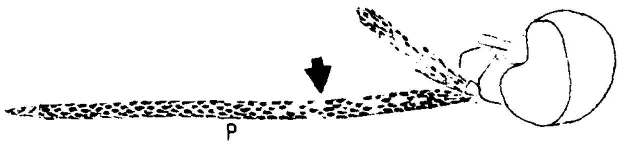


Fig. 81 — *Lateral view of head - Ae. grossbecki*

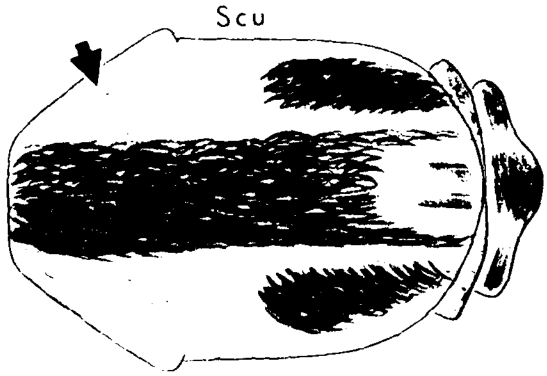


Fig. 80 — *Dorsal view of thorax - Ae. squamiger*

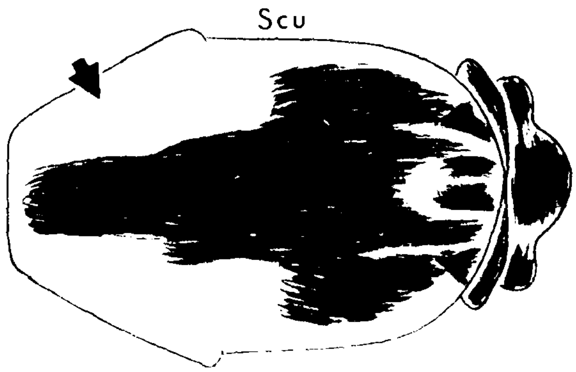


Fig. 82 — *Dorsal view of thorax - Ae. grossbecki*

14(12). Palpus dark-scaled (Fig. 83); abdominal terga with yellowish scales forming median longitudinal stripe (Fig. 84) .... [illegible] (Plate [illegible])

Palpus with some pale scales (Fig. 85); pale scales of abdominal terga never forming distinct and complete, median, longitudinal stripe (Fig. 86) 15

Fig. 83 — *Lateral view of head - Ae. nigromaculis*

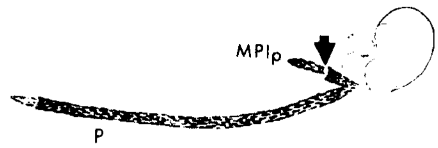


Fig. 85 — *Lateral view of head - Ae. increpitus*

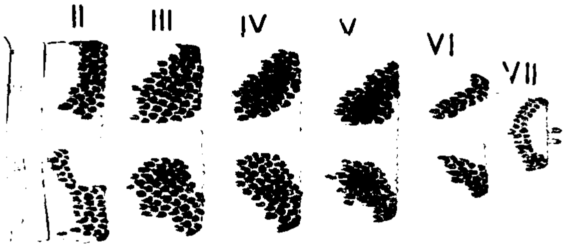


Fig. 84 — *Dorsal view of abdomen - Ae. nigromaculis*

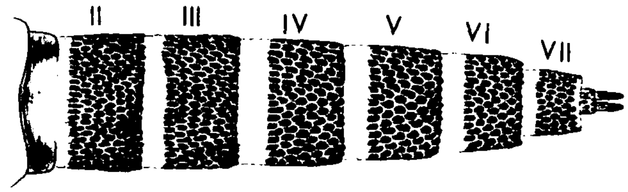


Fig. 86 — *Dorsal view of abdomen - Ae. increpitus*

15(14). Abdominal terga entirely clothed with yellow scales (Fig. 87) .... *flavescens* (Plate 12)

Abdominal terga with some dark scales, usually with pale-scaled, basal bands on some segments (Fig. 88) 16

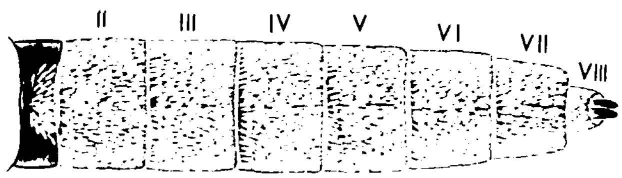


Fig. 87 — *Dorsal view of abdomen - Ae. flavescens*

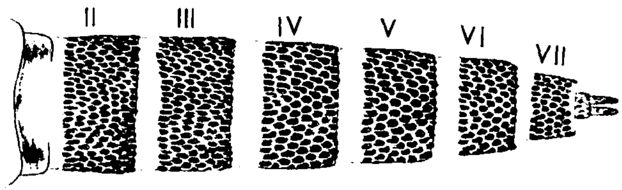


Fig. 88 — *Dorsal view of abdomen - Ae. increpitus*

16(15). Foreclaw sharply bent and subparallel to long tooth (Fig. 89) .... *excrucians* (Plate 15)

Foreclaw not sharply bent nor nearly parallel to shorter tooth (Fig. 90) 17

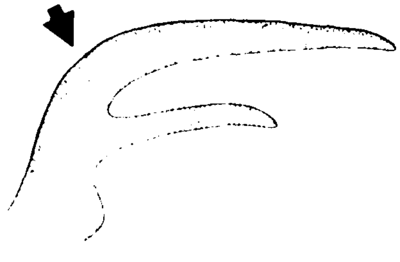


Fig. 89 — *Foreclaw - Ae. excrucians*

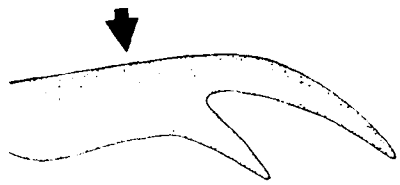


Fig. 90 — *Foreclaw - Ae. increpitus*

17(16). Lower mesanepimeral setae absent; mesomeron bare (Fig. 91) 18

Lower mesanepimeral setae present; mesomeron usually with few scales in dorsoposterior corner (Fig. 92) 21

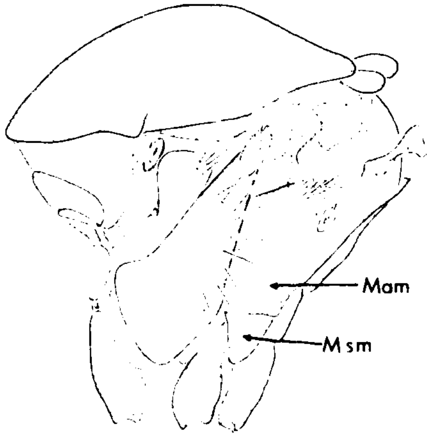


Fig. 91 — *Lateral view of thorax - Ae. riparius*

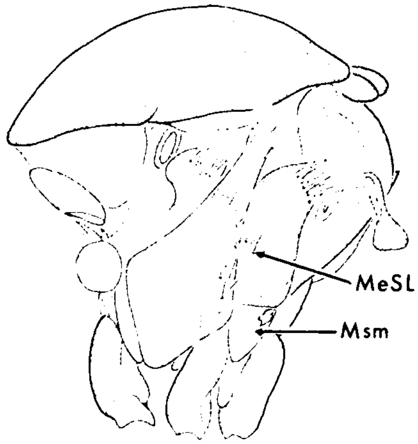


Fig. 92 — *Lateral view of thorax - Ae. stimulans*

18(17). Tooth of foreclaw short, blunt, less than 0.5 as long as claw; claw usually elongate (Fig. 93) 19

Tooth of foreclaw long, thin, 0.5 or more as long as claw; claw markedly curved just distal to attachment of tooth (Fig. 94) 20

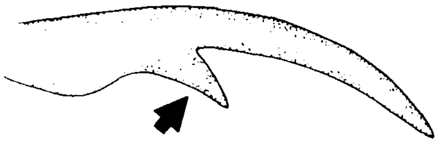


Fig. 93 — *Foreclaw - Ae. riparius*

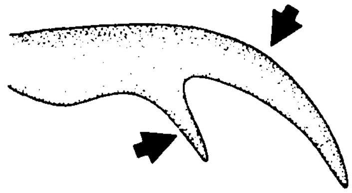


Fig. 94 — *Foreclaw - Ae. fitchii*

19(18). Hypostigmal area usually with patch of scales (Fig. 95); abdominal terga with many scattered yellowish scales in dark-scaled areas (Fig. 96) .... *riparius* (Plate 19)

Hypostigmal area without scales (Fig. 97); abdominal terga with few or no pale scales in dark-scaled areas (Fig. 98) .... *aloponotum* (Plate 11)

Fig. 95 — *Lateral view of thorax - Ae. riparius*

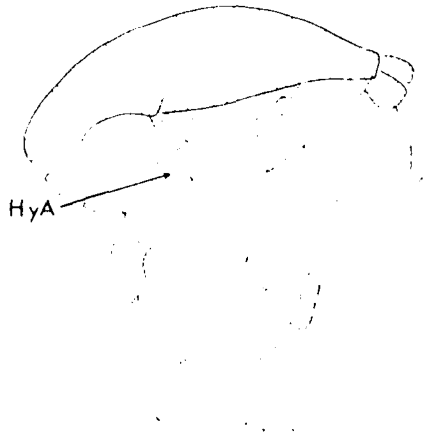


Fig. 97 — *Lateral view of thorax - Ae. aloponotum*

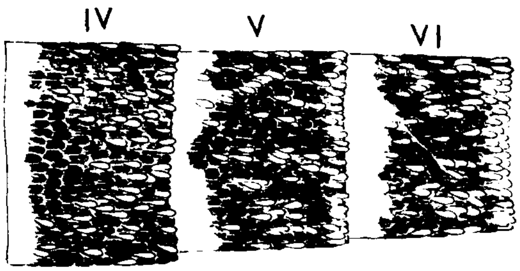


Fig. 96 — *Dorsal view of abdominal segments IV-VI - Ae. riparius*

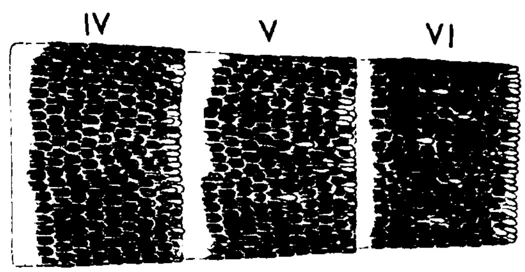


Fig. 98 — *Dorsal view of abdominal segments IV-VI - Ae. aloponotum*

20(18). Proboscis, cercus and tarsomere 1 of all legs with numerous pale scales (Figs. 99, 100, 101); foreclaw long, straight distal to attachment of tooth (Fig. 102) .... (in part) *euedes* (Plate 15)

Proboscis, cercus and tarsomere 1, distal to basal ring, usually dark-scaled (Figs. 103, 104, 105); foreclaw shorter and more strongly curved distal to attachment of tooth (Fig. 106) . (in part) *fitchii* (Plate 16)

Fig. 99 — *Lateral view of head - Ae. euedes*

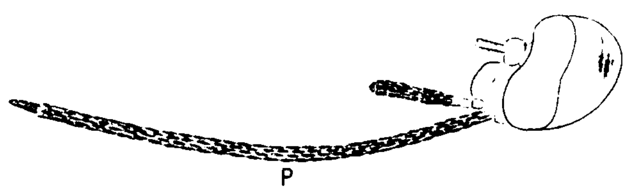


Fig. 103 — *Lateral view of head - Ae. fitchii*

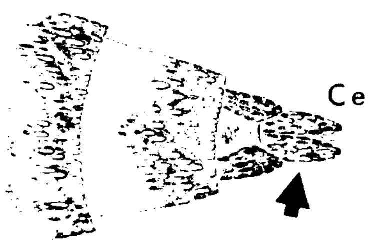


Fig. 100 — *Dorsal view of abdominal segments VII - X - Ae. euedes*

Fig. 104 — *Dorsal view of abdominal segments VII - X - Ae. fitchii*

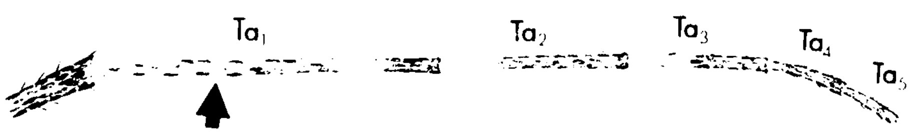


Fig. 101 — *Lateral view of hindleg - Ae. euedes*

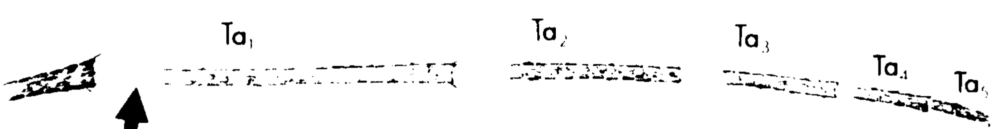


Fig. 105 — *Lateral view of hindleg - Ae. fitchii*

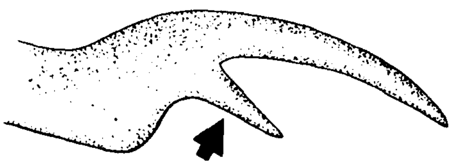


Fig. 102 — *Foreclaw - Ae. euedes*

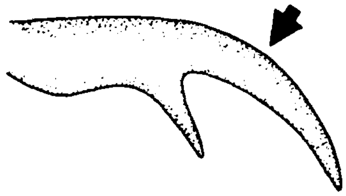


Fig. 106 — *Foreclaw - Ae. fitchii*

21(17). Segments 2,3 of palpus dark-scaled with apical pale-scaled rings (Fig. 107); abdominal sterna IV,V with lateral patches of dark scales (Fig. 108); proboscis dark-scaled (Fig. 107) .... *increpitus* (Plate 14)

Segments 2,3 of palpus with scattered, pale scales (Fig. 109); abdominal sterna IV,V pale-scaled, if dark scales, not as lateral patches (Fig. 110); proboscis usually with some pale scales (Fig. 109) 22

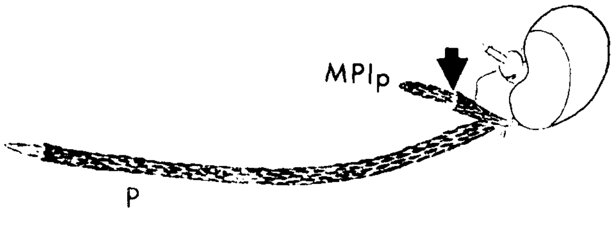


Fig. 107 — *Lateral view of head - Ae. increpitus*

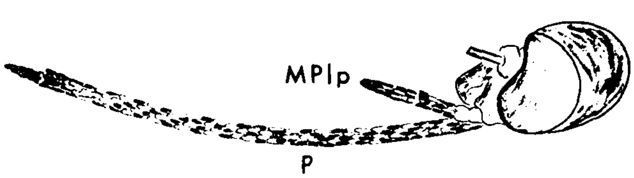


Fig. 109 — *Lateral view of head - Ae. stimulans*

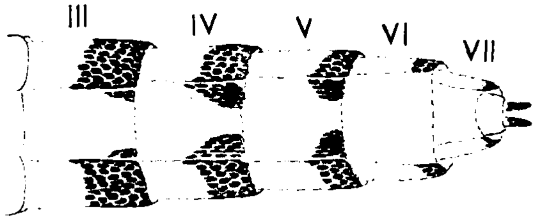


Fig. 108 — *Ventral view of abdomen - Ae. increpitus*

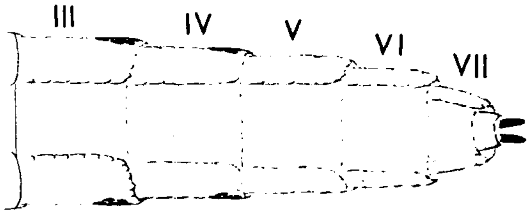


Fig. 110 — *Ventral view of abdomen - Ae. stimulans*

22(21). Scales on antennal pedicel numerous, mostly pale (Fig. 111); scutum with medium to dark brown, median longitudinal stripe (Fig. 112) 23

Scales on antennal pedicel few, mostly dark (Fig. 113); scutum with reddish-brown scales medially, sometimes with stripe (Fig. 114) 24

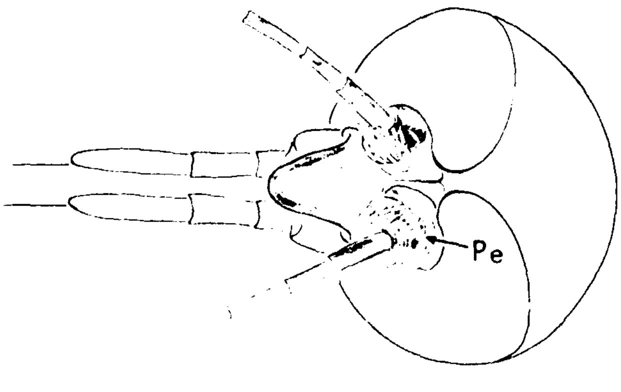


Fig. 111 — *Anterior view of head - Ae. fitchii*

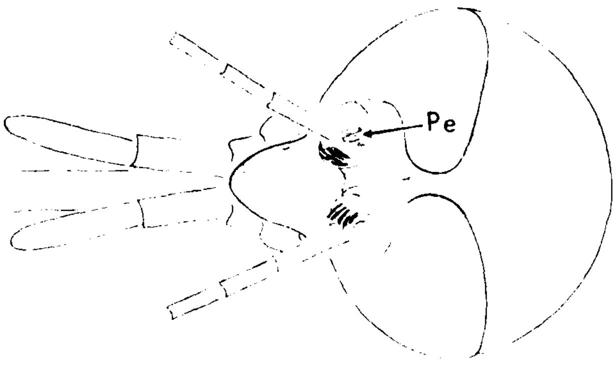


Fig. 113 — *Anterior view of head - Ae. stimulans*

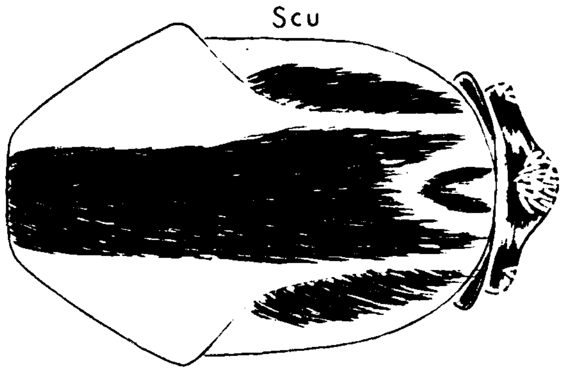


Fig. 112 — *Dorsal view of thorax - Ae. mercurator*

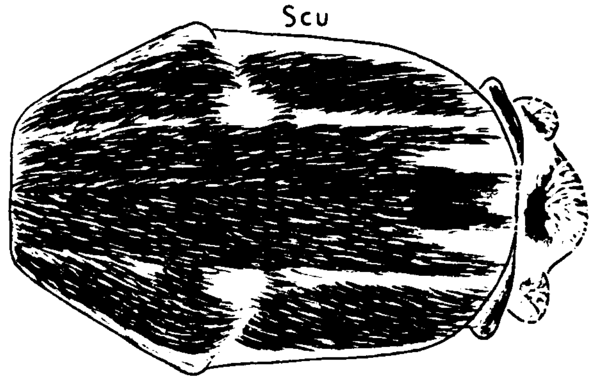


Fig. 114 — *Dorsal view of thorax - Ae. euedes*

23(22). Scutum with pale yellowish scales laterally (Fig. 115); dorsal, brown-scaled area of postpronotum at most 0.5 as large as ventral, pale-scaled area (Fig. 116); foretarsomere 3 with incomplete basal pale ring (Fig. 117) . . . . *mercurator* (Plate 11)

Scutum w h pale white, often mixed with yellow or light brown, scales laterally (Fig. 118); dorsal, brown-scaled area of postpronotum equal to or larger than pale-scaled area (Fig. 119); foretarsomere 3 with complete, basal pale ring (Fig. 120) . . . . (in part) *fitchii* (Plate 16)

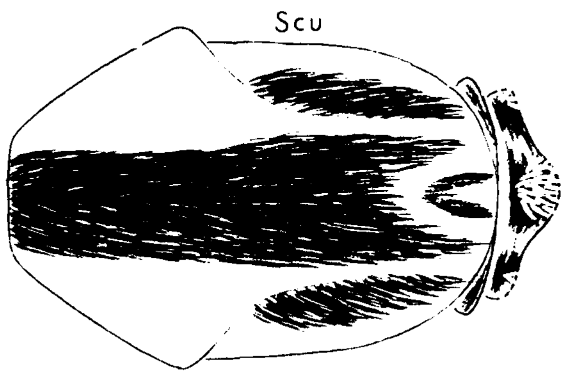


Fig. 115 — *Dorsal view of thorax - Ae. mercurator*

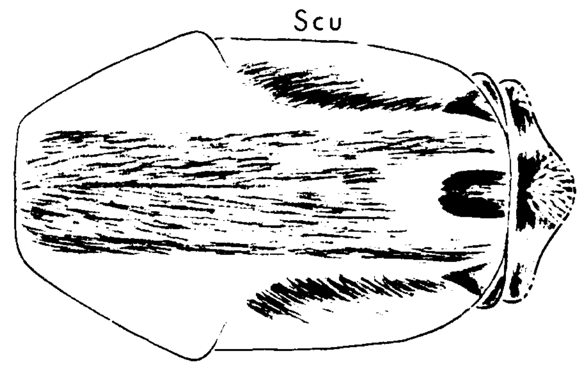


Fig. 118 — *Dorsal view of thorax - Ae. fitchii*

Fig. 116 — *Lateral view of thorax - Ae. mercurator*

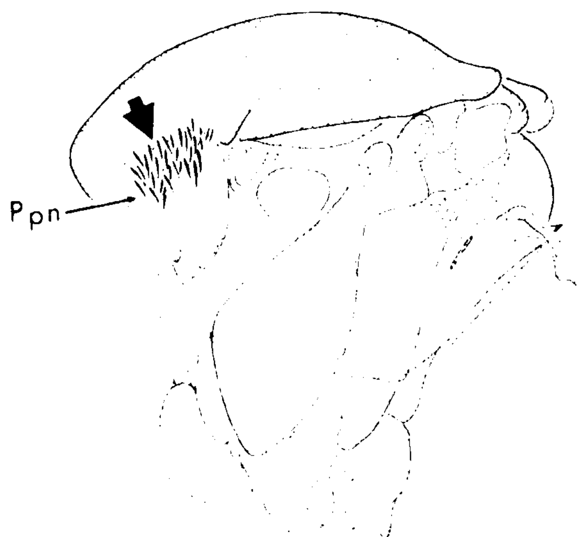


Fig. 119 — *Lateral view of thorax - Ae. fitchii*

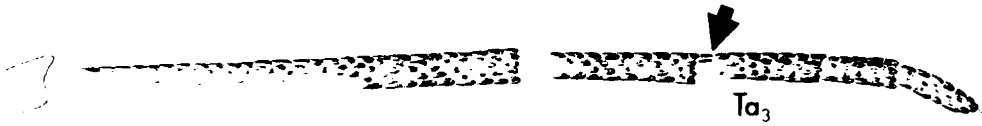


Fig. 117 — *Lateral view of foretarsus - Ae. mercurator*

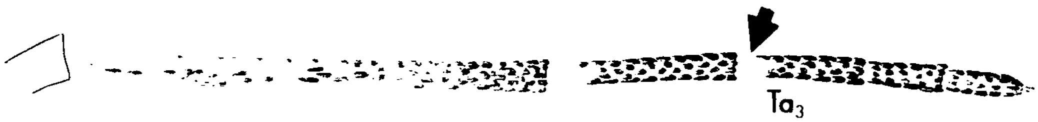


Fig. 120 — *Lateral view of foretarsus - Ae. fitchii*

24(22). Foreclaw markedly bent just distad to tooth (Fig. 121); abdominal sterna VI-VIII pale-scaled or with few dark scales only (Fig. 122) .... *stimulans* (Plate 11)

Foreclaw evenly curved distad to tooth (Fig. 123); abdominal sterna VI-VIII pale-scaled with rather broad, medioapical, dark-scaled patches (Fig. 124) .... (in part) *euedes* (Plate 15)

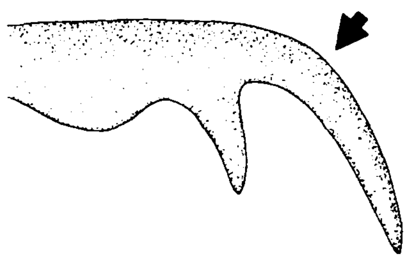


Fig. 121 — *Foreclaw - Ae. stimulans*

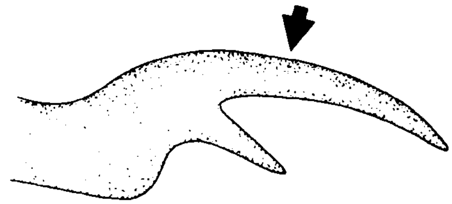


Fig. 123 — *Foreclaw - Ae. euedes*

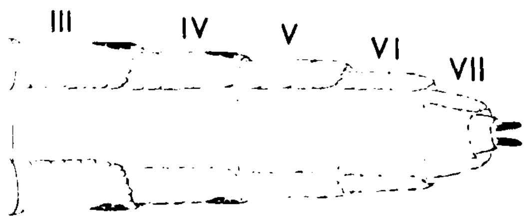


Fig. 122 — *Ventral view of abdomen - Ae. stimulans*

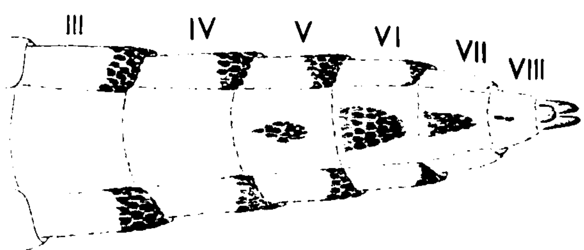


Fig. 124 — *Ventral view of abdomen - Ae. euedes*

25(2). Wing with dark and pale scales intermixed, or mostly pale-scaled (Fig. 125); postprocoxal scale patch present (Fig. 126) 26

Wing with scales all dark, or with some pale scales on anterior veins dorsally (Fig. 127); postprocoxal scale patch absent (Fig. 128) 28

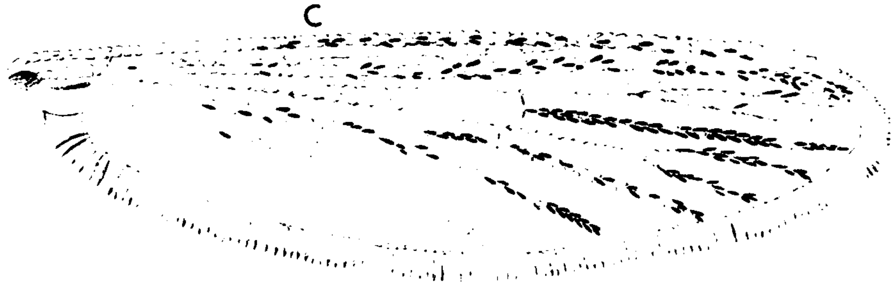


Fig. 125 — *Dorsal view of wing - Ae. dorsalis*

Fig. 127 — *Dorsal view of wing - Ae. atropalpus*

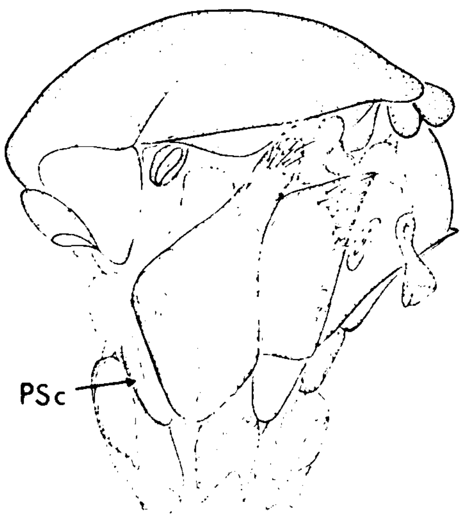


Fig. 126 — *Lateral view of thorax - Ae. dorsalis*

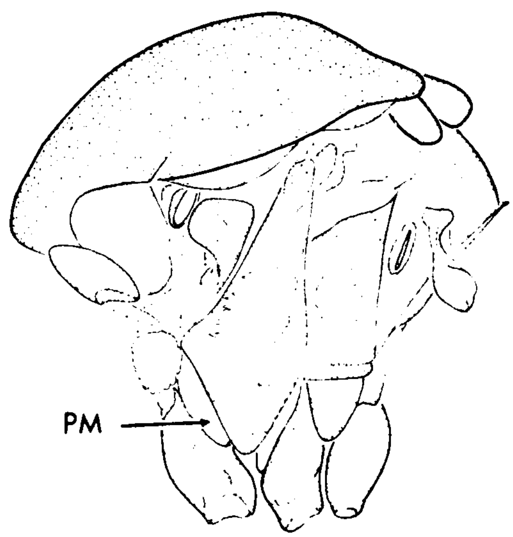


Fig. 128 — *Lateral view of thorax - Ae. atropalpus*

26(25). Wing vein C mostly dark-scaled (Fig. 129); abdominal tergum VII usually with more dark than pale scales (Fig. 130) . . . . *melanimon* (Plate 23)

Vein C mostly pale-scaled (Fig. 131); tergum VII with more pale than dark scales (Fig. 132) 27

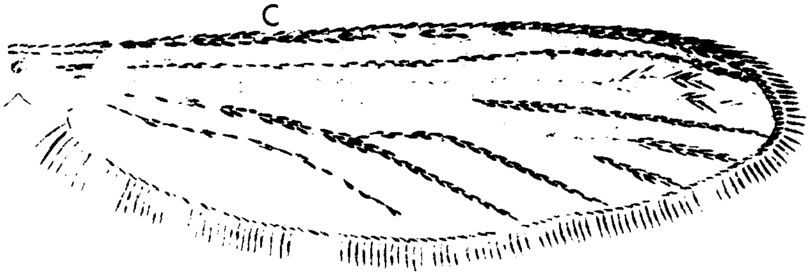


Fig. 129 — *Dorsal view of wing - Ae. melanimon*

Fig. 131 — *Dorsal view of wing - Ae. dorsalis*

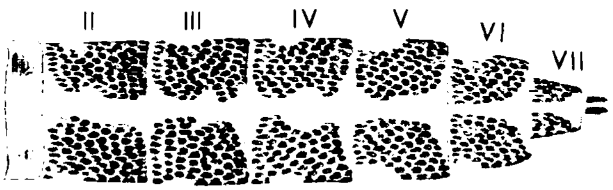


Fig. 130 — *Dorsal view of abdomen - Ae. melanimon*

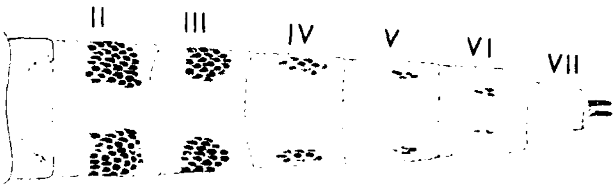


Fig. 132 — *Dorsal view of abdomen - Ae. dorsalis*

27(26). Wing vein R_{4+5} with more dark scales than veins R_2 and R_3 (Fig. 133); foreclaw almost straight in middle (Fig. 134) . . . . *dorsalis* (Plate 18)

Vein R_{4+5} with as many dark scales as R_2 and R_3 (Fig. 135); foreclaw abruptly curving near attachment of tooth (Fig. 136) . . . . *campestris* (Plate 12)

Fig. 133 — *Dorsal view of wing - Ae. dorsalis*

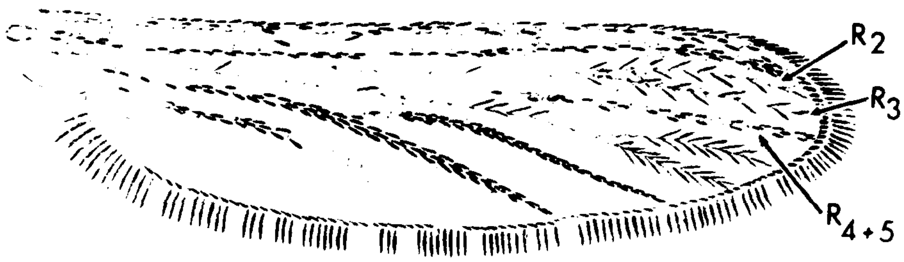


Fig. 135 — *Dorsal view of wing - Ae. campestris*

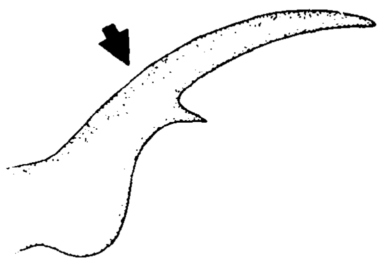


Fig. 134 — *Foreclaw - Ae. dorsalis*

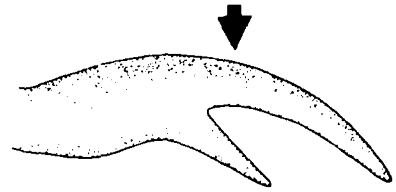


Fig. 136 — *Foreclaw - Ae. campestris*

28(25). Scutum with lyre-shaped pattern of golden scales, usually with 4 median golden stripes (Fig. 137) .... *togoi* (Plate 19)

Scutum without such a lyre-shaped pattern (Fig. 138) 29

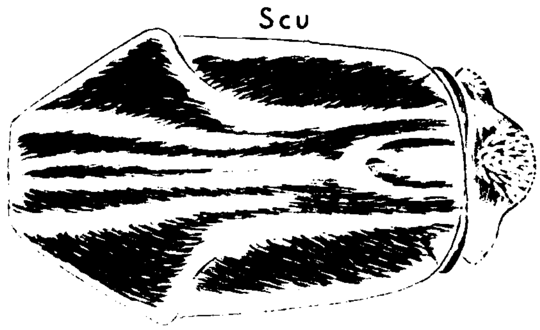


Fig. 137 — *Dorsal view of thorax - Ae. togoi*

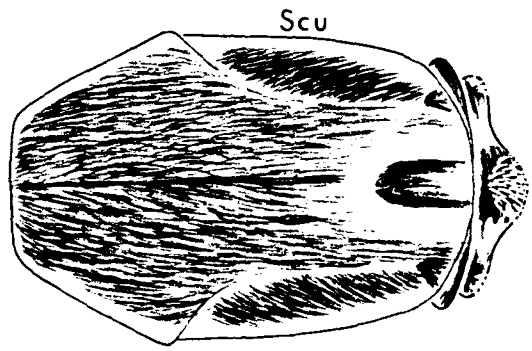


Fig. 138 — *Dorsal view of thorax - Ae. c. canadensis*

29(28). Wing entirely dark-scaled (Fig. 139); scutum without dark, median stripe, usually rather evenly reddish or golden brown (Fig. 140) 30

Wing with prominent patch of pale scales on base of vein C (Fig. 141); scutum with broad, dark brown or golden, median, longitudinal stripe (Fig. 142) 31

Fig. 139 — *Dorsal view of wing - Ae. c. canadensis*

Fig. 141 — *Dorsal view of wing - Ae. atropalpus*

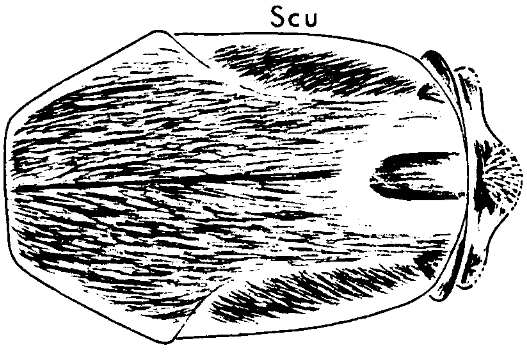


Fig. 140 — *Dorsal view of thorax - Ae. c. canadensis*

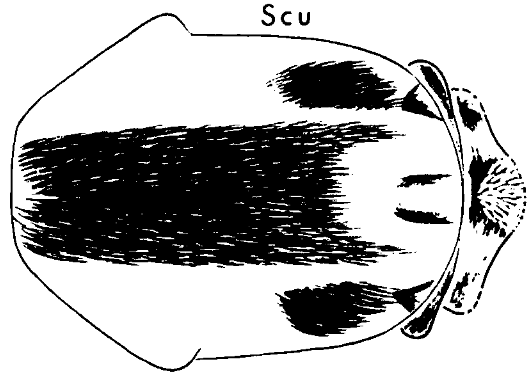


Fig. 142 — *Dorsal view of thorax - Ae. atropalpus*

30(29). Hindtarsomeres 1-4 with broad, pale, basal and apical rings, tarsomere 5 entirely pale-scaled (Fig. 143); scutum golden brown (Fig. 144) .... *c. canadensis* (Plate 14)

Hindtarsomeres with narrow, pale, basal and apical rings on 1,2, basally only on 3,4, and tarsomere 5 dark-scaled (Fig. 145); scutum with scales mostly dark brown, with indefinite, median stripe of paler scales (Fig. 146) .... *c. mathesoni* (Plate 18)

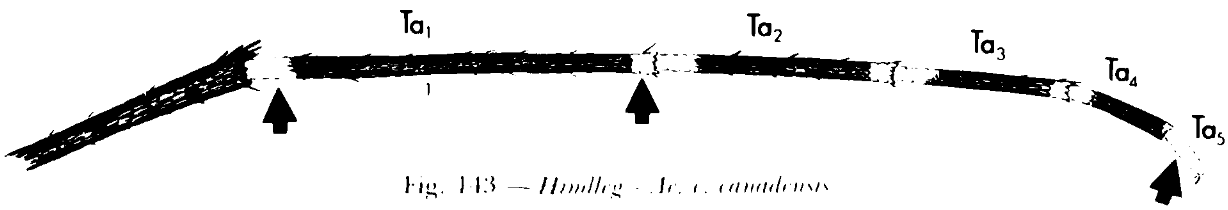


Fig. 143 — *Hindleg - Ae. c. canadensis*

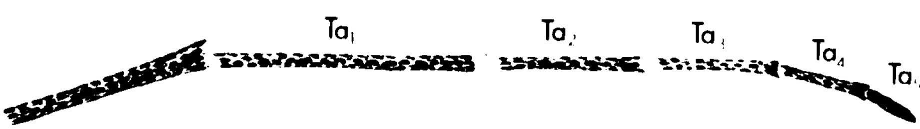


Fig. 145 — *Hindleg - Ae. c. mathesoni*

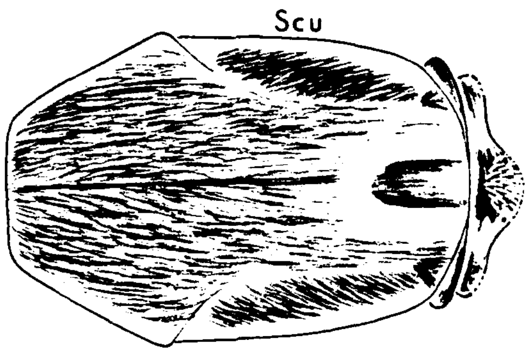


Fig. 144 — *Dorsal view of thorax - Ae. c. canadensis*

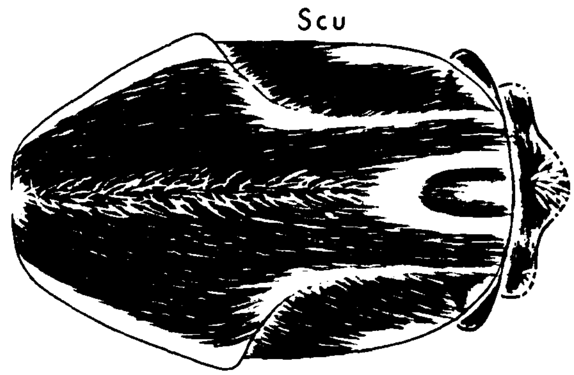


Fig. 146 — *Dorsal view of thorax - Ae. c. mathesoni*

31(29). Palpus almost entirely dark-scaled (Fig. 147); pale rings on hindtarsomeral joint 1-2 subequal on 1 and on 2 (Fig. 148); scutellum with narrow, yellow to brown scales (Fig. 149) 32

Palpus with bands of pale scales (Fig. 150); pale rings on hindtarsomeral joint 1-2 longer on 1 than on 2 (Fig. 151); scutellum with broad, pale scales (Fig. 152) 33

Fig. 147 — *Lateral view of head - Ae. atropalpus*

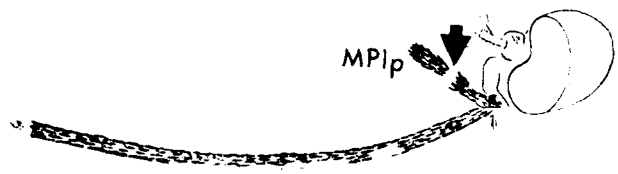


Fig. 150 — *Lateral view of head - Ae. sierrensis*

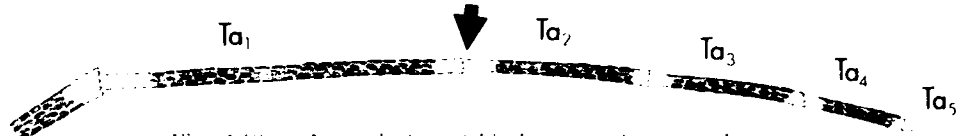


Fig. 148 — *Lateral view of hindtarsus - Ae. atropalpus*

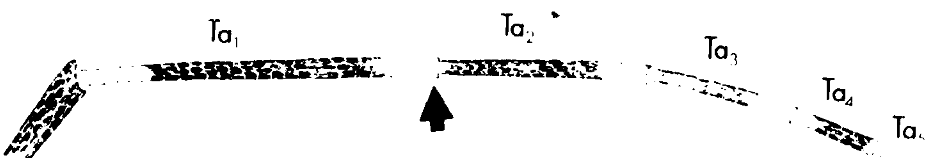


Fig. 151 — *Lateral view of hindtarsus - Ae. sierrensis*

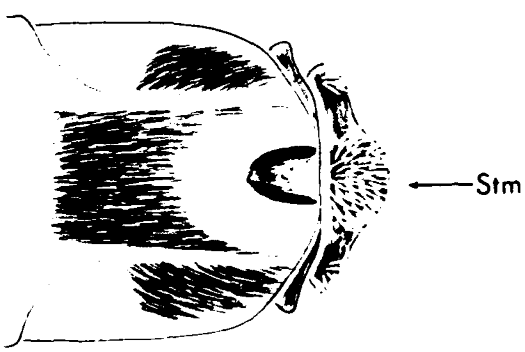


Fig. 149 — *Posterior dorsal view of thorax - Ae. atropalpus*

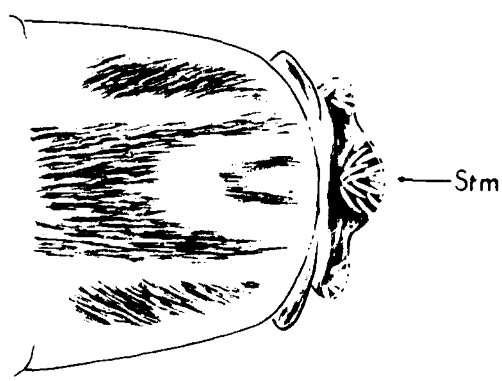


Fig. 152 — *Posterior dorsal view of thorax - Ae. sierrensis*

32(31). Interocular space no wider than 2.0 diameter of single corneal facet (Fig. 153); hindfemur with dark scales to near base anteriorly (Fig. 154); scutal fossa with 1 or more strong, posterior setae (Fig. 155) . . . . *epactius*
(Plate 13)

Interocular space at least 2.5 diameter of single corneal facet (Fig. 156); hindfemur usually entirely pale in basal 0.3-0.5 (Fig. 157); scutal fossa without posterior setae (Fig. 158) . . . . . . *atropalpus*
(Plate 13)

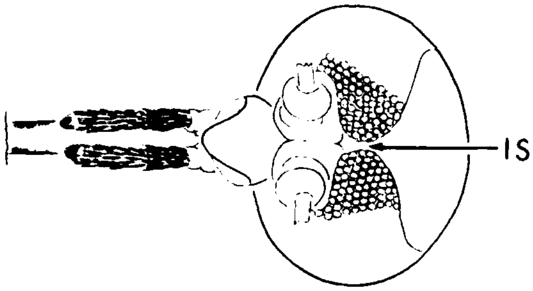


Fig. 153 — *Front view of head - Ae. epactius*

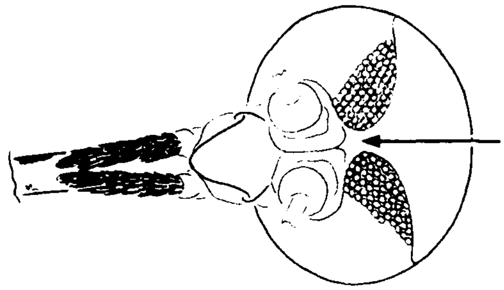


Fig. 156 — *Front view of head - Ae. atropalpus*

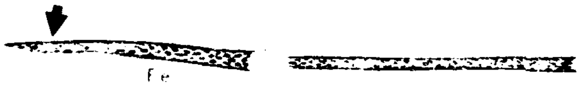


Fig. 154 — *Dorsal view of hindleg - Ae. epactius*

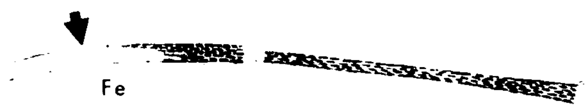


Fig. 157 — *Dorsal view of hindleg - Ae. atropalpus*

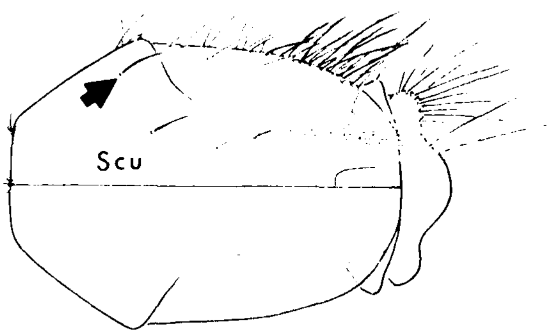


Fig. 155 — *Dorsal view of thorax - Ae. epactius*

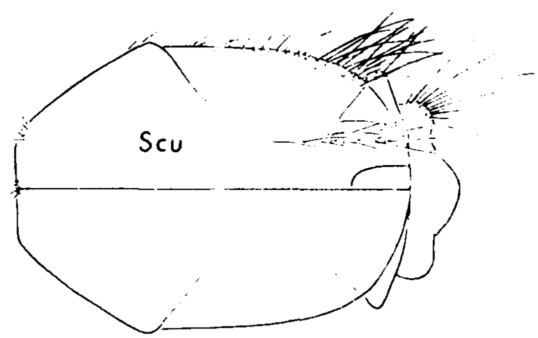


Fig. 158 — *Dorsal view of thorax - Ae. atropalpus*

33(31). Postprocoxal scale patch present (Fig. 159) . . . . *monticola*
(Plate 22)

Postprocoxal scale patch absent (Fig. 160) 34

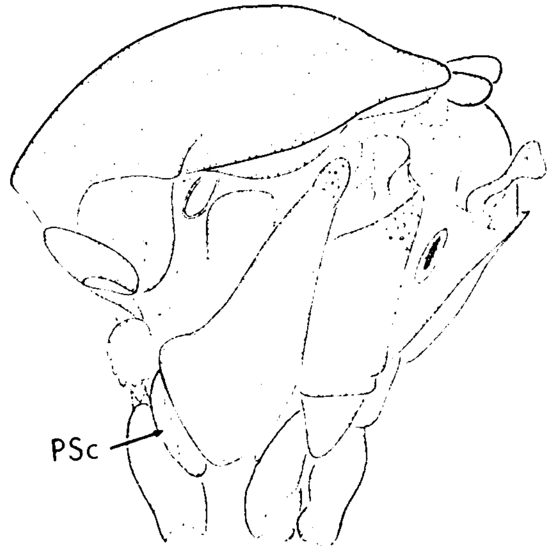


Fig. 159 — *Lateral view of thorax - Ae. monticola*

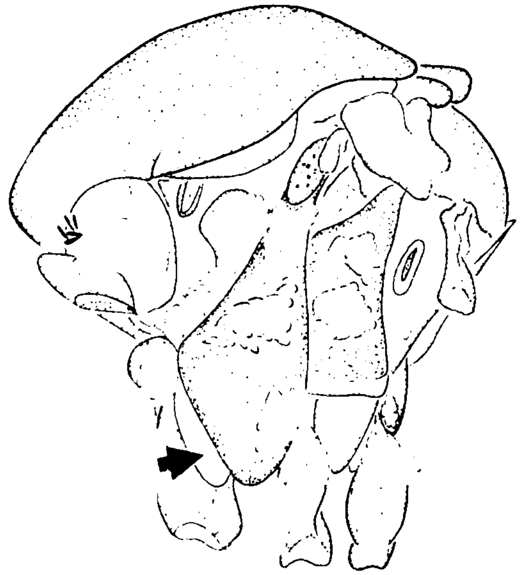


Fig. 160 — *Lateral view of thorax - Ae. sierrensis*

34(33). Subspiracular area with several light-colored setae arising from scale patch (Fig. 161) ..... *varipalpus*
(Plate 22)

Subspiracular area without setae (Fig. 162) 35

Fig. 161 — *Lateral view of thorax - Ae. varipalpus*

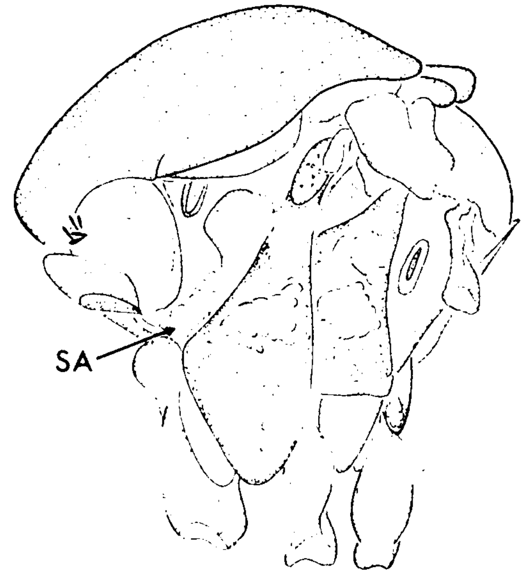


Fig. 162 — *Lateral view of thorax - Ae. sierrensis*

35(34). Base of hindtarsomere 1 with broad ring of pale scales (Fig. 163); metameron with scales; anterodorsal border of postpronotum with dark scales (Fig. 164) .... *sierrensis*
(Plate 22)

Base of hindtarsomere 1 with at most very narrow pale ring (Fig. 165); metameron bare; postpronotum entirely pale scaled (Fig. 166) .... *deserticola*
(Plate 22)

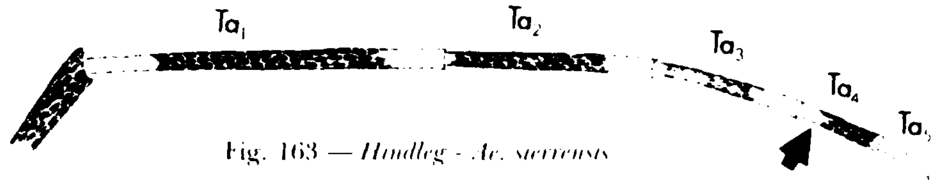


Fig. 163 — *Hindleg - Ae. sierrensis*

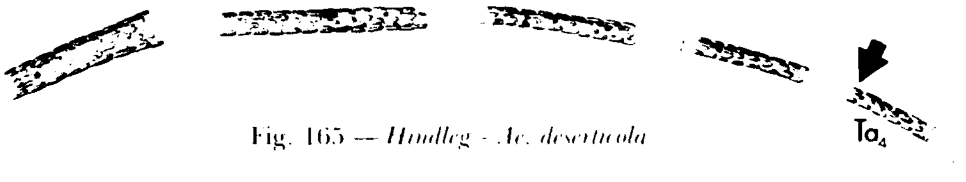


Fig. 165 — *Hindleg - Ae. deserticola*

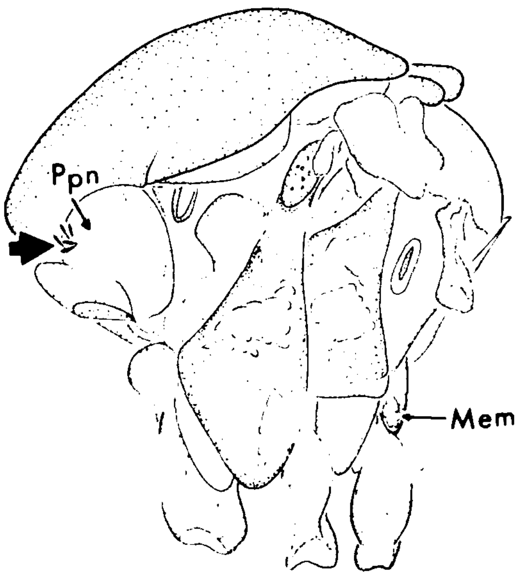


Fig. 164 — *Lateral view of thorax - Ae. sierrensis*

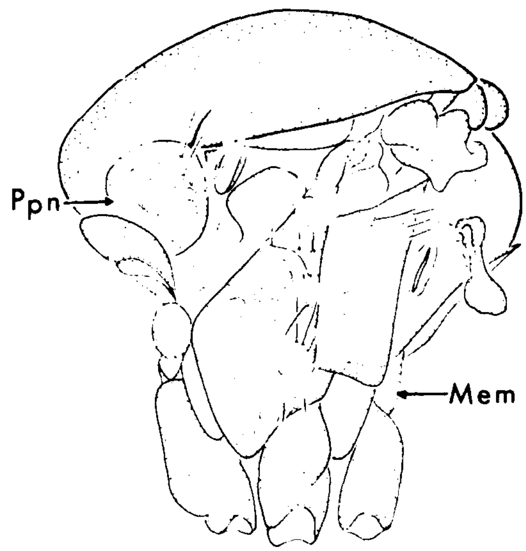


Fig. 166 — *Lateral view of thorax - Ae. deserticola*

36(1). Scutal integument with pair of dark, posterolateral spots (Fig. 167) 37

Scutal integument lacking dark, posterolateral spots (Fig. 168) 38

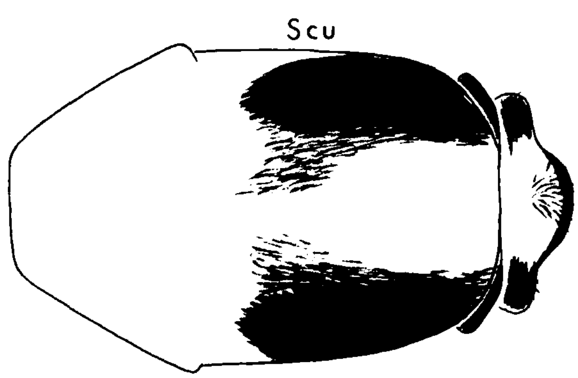


Fig. 167 — *Dorsal view of thorax - Ae. fulvus pallens*

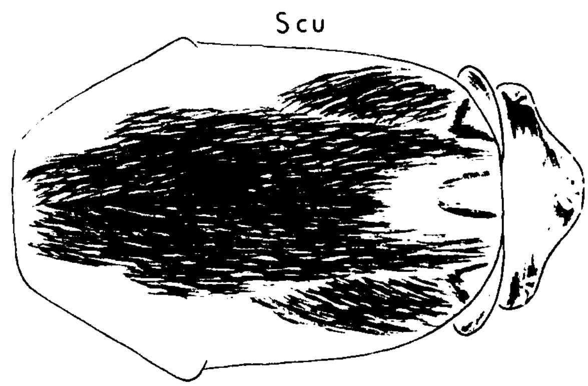


Fig. 168 — *Dorsal view of thorax - Ae. triseriatus*

37(36). Hypostigmal area with dark, integumental spot (Fig. 169); abdominal terga II-VI basally yellow-scaled, apically dark-scaled (Fig. 170) . . . . *fulvus pallens* (Plate 18)

Hypostigmal area without dark spot (Fig. 171); abdominal terga II-VI entirely yellow-scaled (Fig. 172) . . . . *bimaculatus* (Plate 16)

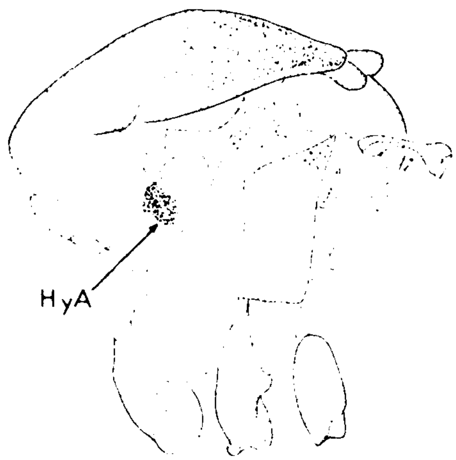


Fig. 169 — *Lateral view of thorax - Ae. fulvus pallens*

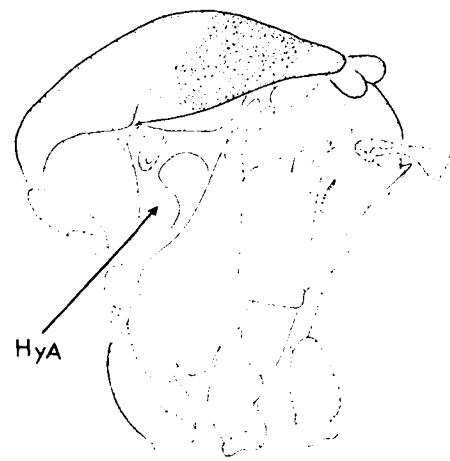


Fig. 171 — *Lateral view of thorax - Ae. bimaculatus*

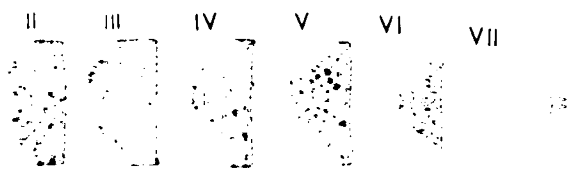


Fig. 170 — *Dorsal view of abdomen - Ae. fulvus pallens*

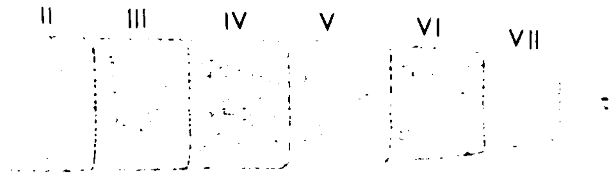


Fig. 172 — *Dorsal view of abdomen - Ae. bimaculatus*

38(36). Postspiracular setae absent (Fig. 173) . . . . *purpureipes* (Plate 21)

Postspiracular setae present (Fig. 174) 39

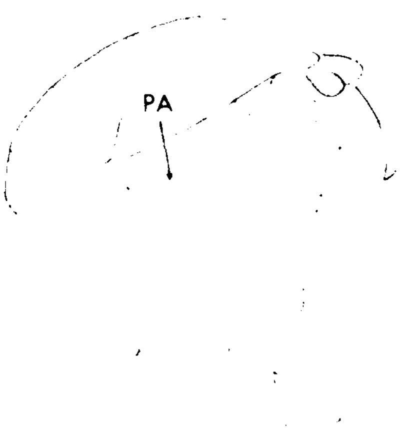


Fig. 173 — *Lateral view of thorax - Ae. purpureipes*

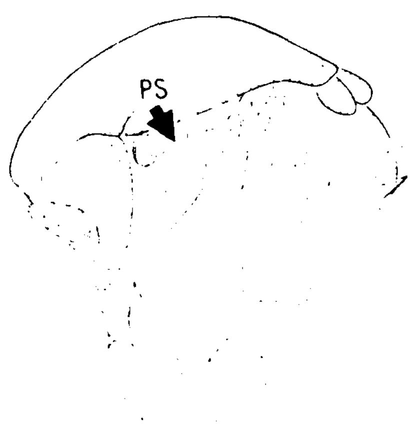


Fig. 174 — *Lateral view of thorax - Ae. hendersoni*

39(38). Scutum with patch or 1,2 median or submedian stripes of silvery white, pale white or pale yellow scales, or with silvery white scales laterally (Figs. 175, 176) 40

Scutum without silvery white scales medially or laterally, or pale white or pale yellow scales medially (Fig. 177) 49

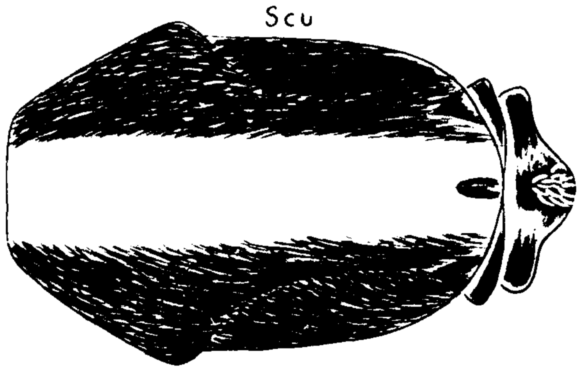


Fig. 175 — *Dorsal view of thorax - Ae. atlanticus*

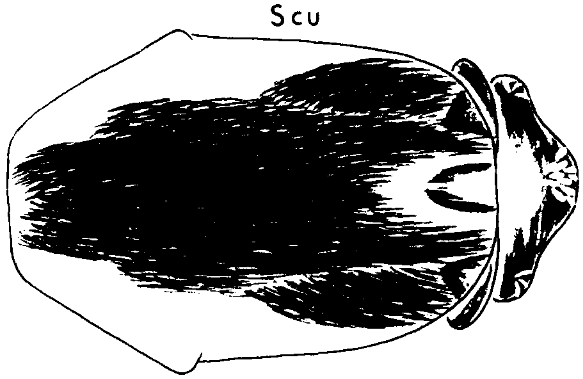


Fig. 176 — *Dorsal view of thorax - Ae. triseriatus*

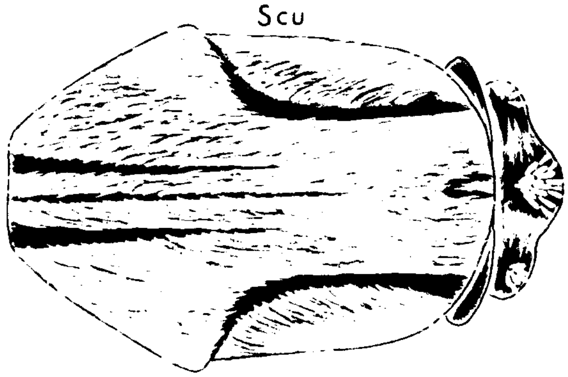


Fig. 177 — *Dorsal view of thorax - Ae. pullatus*

40(39). Scutum with median, longitudinal stripe of dark brown scales and silvery white scales laterally (Fig. 178) 41

Scutum with broad patch or 1,2 stripes of silvery white, pale white, or sometimes pale yellow scales medially (Fig. 179) 43

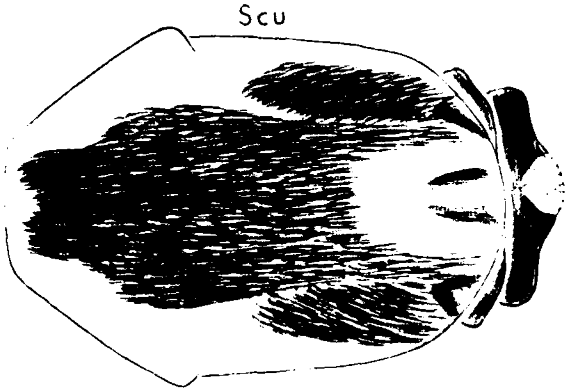


Fig. 178 — *Dorsal view of thorax - Ae. triseriatus*

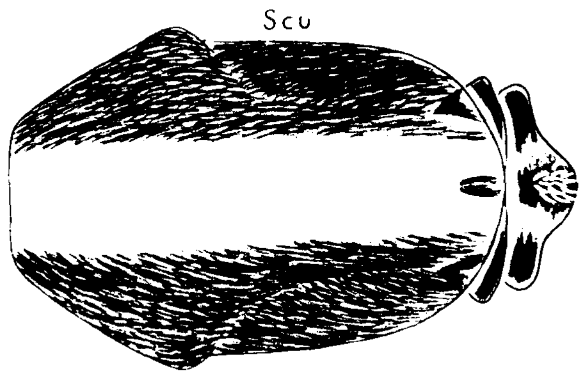


Fig. 179 — *Dorsal view of thorax - Ae. atlanticus*

41(40). Setae of anterior portion of scutum relatively few and weak; silver scaling of scutal fossa usually restricted to lateral and posterior portions (Fig. 180); claws of fore- and midlegs evenly curved, tooth less than 0.3 length of claw (Fig. 181) .... *triseriatus* (Plate 16)

Setae of anterior portion of scutum numerous and well developed; silver scaling usually covering entire scutal fossa (Fig. 182); claws of fore-and midlegs abruptly curving, tooth 0.3-0.5 length of claw (Fig. 183) 42

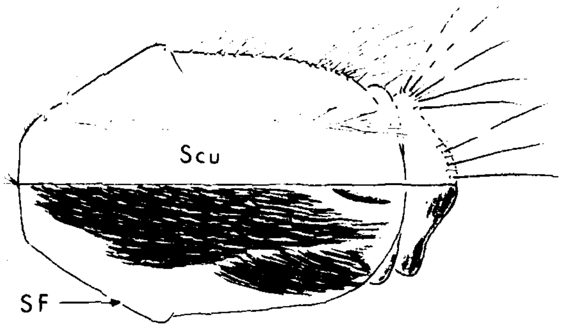


Fig. 180 — *Dorsal view of thorax - Ae. triseriatus*

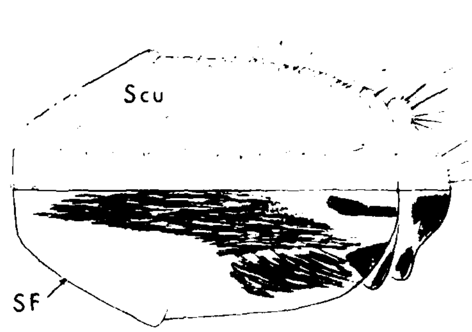


Fig. 182 — *Dorsal view of thorax - Ae. hendersoni*

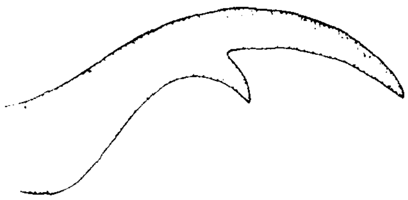


Fig. 181 — *Foreclaw - Ae. triseriatus*

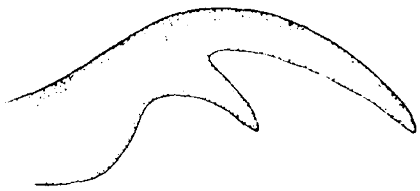


Fig. 183 — *Foreclaw - Ae. hendersoni*

42(41). Postspiracular scale patch small or absent (Fig. 184); setae around scutal fossa light to moderately pigmented (Fig. 185) .... *hendersoni* (Plate 16)

Postspiracular scale patch large (Fig. 186); setae of scutal fossa darkly pigmented (Fig. 187) .... *brelandi* (Plate 10)

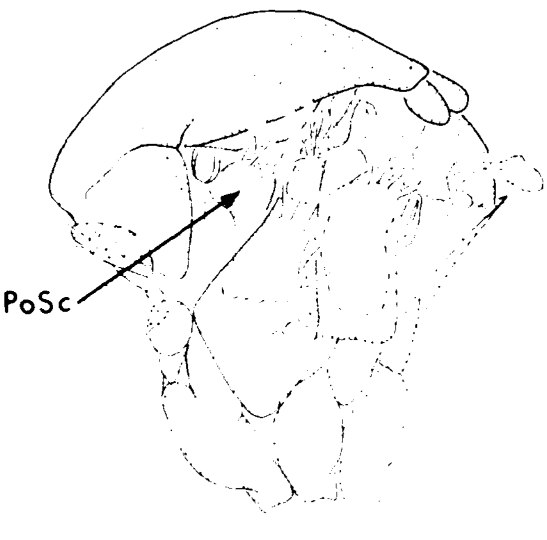


Fig. 184 - *Lateral view of thorax - Ae. hendersoni*

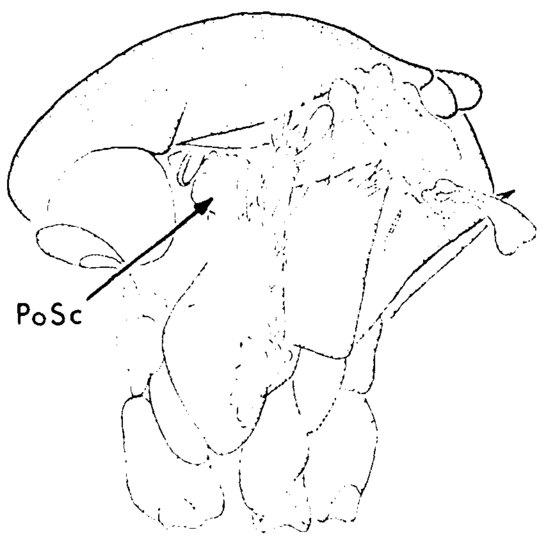


Fig. 186 — *Lateral view of thorax - Ae. brelandi*

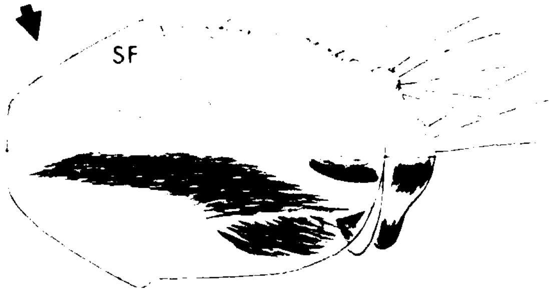


Fig. 185 — *Dorsal view of thorax - Ae. hendersoni*

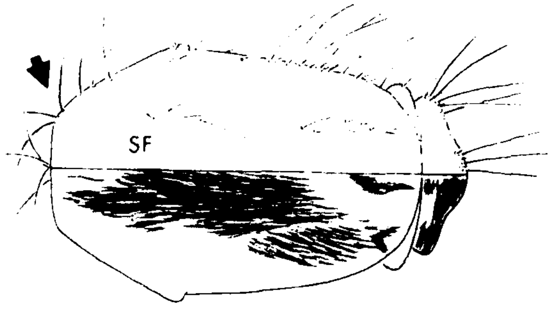


Fig. 187 — *Dorsal view of thorax - Ae. brelandi*

43(40). Scutum with pair of submedian, pale-scaled stripes, separated by dark stripe of about same width (Fig. 188) .... *trivittatus* (Plate 27)

Scutum without pair of submedian, pale stripes (Fig. 189) 44

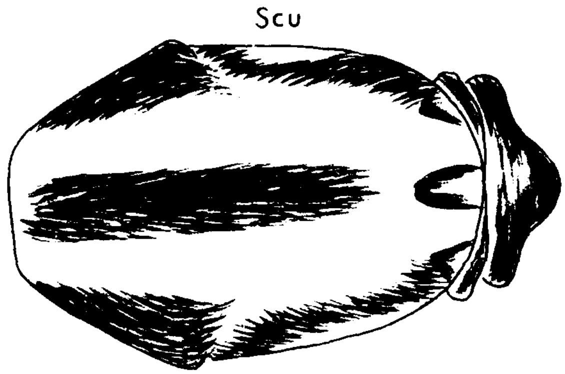


Fig. 188 — *Dorsal view of thorax - Ae. trivittatus*

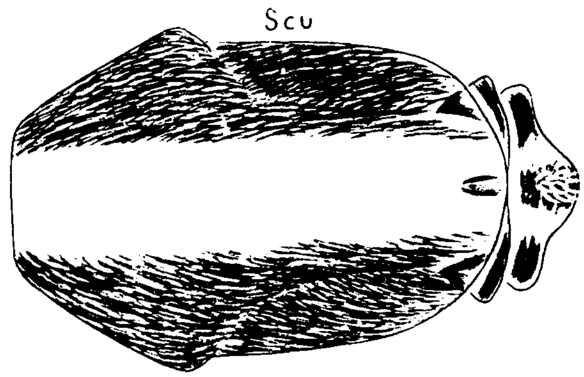


Fig. 189 — *Dorsal view of thorax - Ae. atlanticus*

44(43). Scutum with anteromedian patch of silvery white or pale yellow scales, extending to middle or a little beyond, much broader than lateral, dark-scaled areas (Fig. 190) 45

Scutum with median, longitudinal stripe of silvery scales extending full length, usually narrower than lateral, dark-scaled areas (Fig. 191) 46

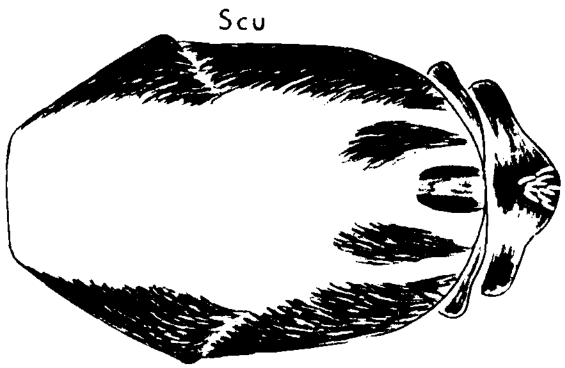


Fig. 190 — *Dorsal view of thorax - Ae. infirmatus*

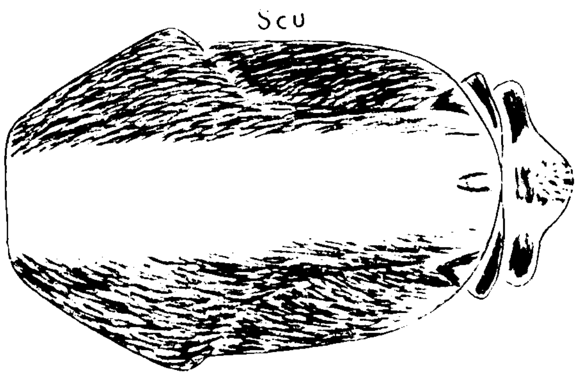


Fig. 191 — *Dorsal view of thorax - Ae. atlanticus*

45(44). Hindtibia with basal and apical dark-scaled bands (Fig. 192); abdominal terga VI-VIII with lighter colored scales medially (Fig. 193) .... *scapularis* (Plate 12)

Hindtibia with dark scales from base to apex (Fig. 194); abdominal terga VI-VIII dark-scaled medially (Fig. 195) .... *infirmatus* (Plate 11)

Fig. 192 — *Hindleg - Ae. scapularis*

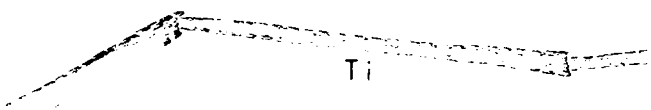


Fig. 194 — *Hindleg - Ae. infirmatus*

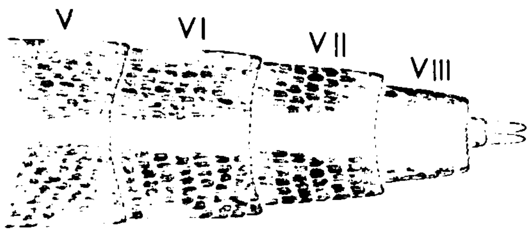


Fig. 193 — *Dorsal view of abdomen - Ae. scapularis*

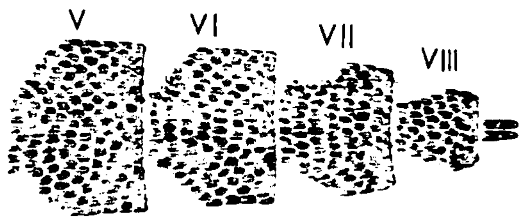


Fig. 195 — *Dorsal view of abdomen - Ae. infirmatus*

46(44). Midtarsomere 1 with broad, pale band (Fig. 196); foretarsomere 1 with pale-scaled patch (Fig. 197) .... *burgeri* (Plate 17)

Tarsomere 1 of fore- and midlegs dark-scaled (Figs. 198, 199) 47

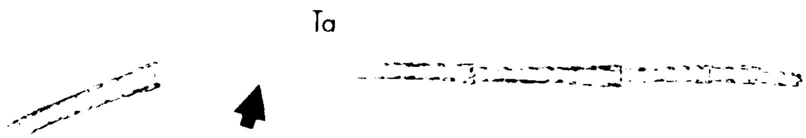


Fig. 196 — *Midleg - Ae. burgeri*

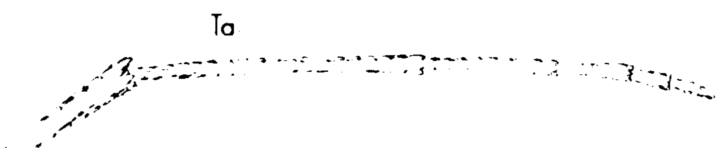


Fig. 198 — *Midleg - Ae. atlanticus*

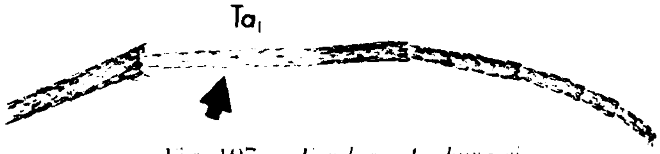


Fig. 197 — *Foreleg - Ae. burgeri*

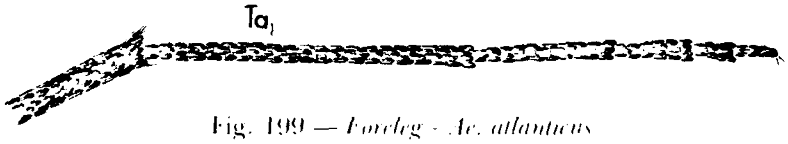


Fig. 199 — *Foreleg - Ae. atlanticus*

47(46). Abdominal terga with basal, pale bands (Fig. 200); scutum with submedian, dark-scaled longitudinal stripes (Fig. 201) .... *muelleri*
(Plate 19)

Abdominal terga with basolateral pale patches only (Fig. 202); scutum without submedian, dark-scaled, longitudinal stripes (Fig. 203) 48

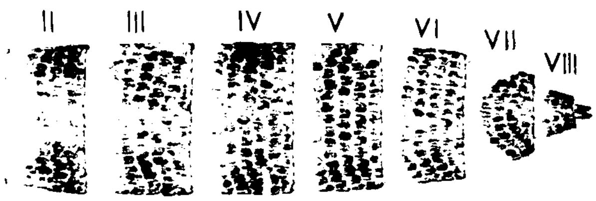


Fig. 200 - *Dorsal view of abdomen - Ae. muelleri*

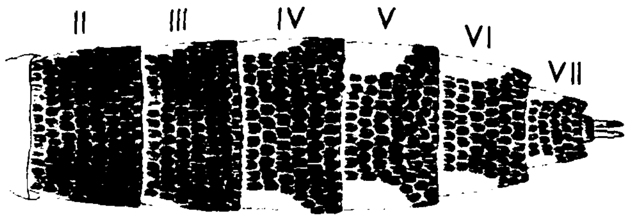


Fig. 202 — *Dorsal view of abdomen - Ae. atlanticus*

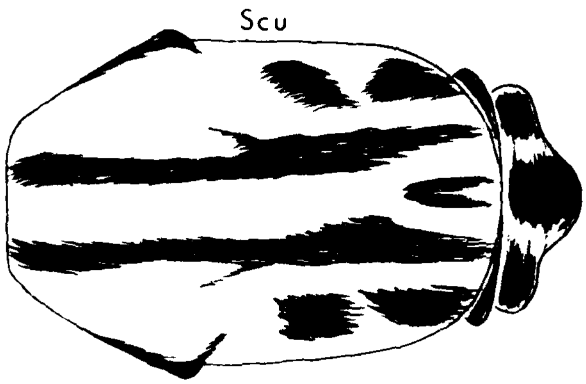


Fig. 201 — *Dorsal view of thorax - Ae. muelleri*

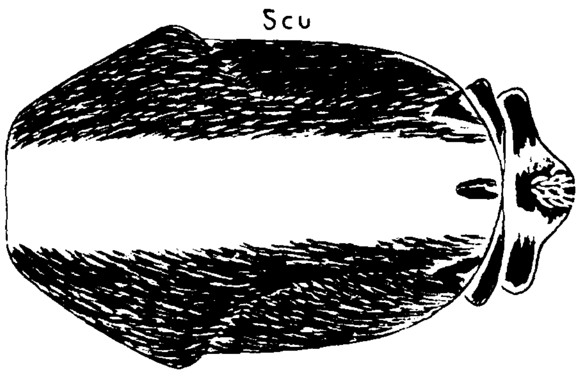


Fig. 203 — *Dorsal view of thorax - Ae. atlanticus*

48(47). Occiput with few or no dark scales laterally (Fig. 204); small species, wing length about 2.5 mm .... *dupreei*
(Plate 17)

Occiput with prominent spot of dark, appressed scales laterally (Fig. 205); medium-sized species, wing length 3.0-4.0 mm .... *atlanticus*
tormentor
(Plates 12, 24)

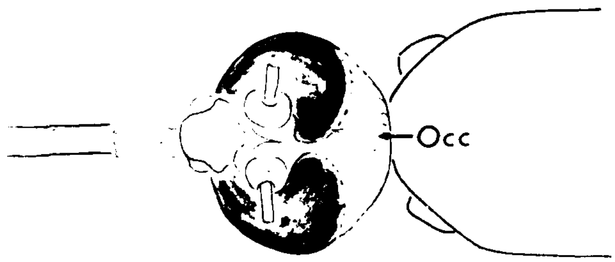


Fig. 204 — *Dorsal view of head - Ae. dupreei*

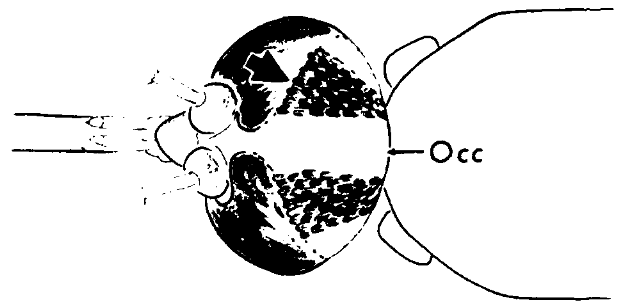


Fig. 205 — *Dorsal view of head - Ae. atlanticus*

19(39). Wing with many pale scales either confined to anterior veins, some on all veins, or veins alternating dark and pale-scaled (Figs. 206, 207) 50

Wing veins entirely dark-scaled or with pale scales at base of vein C and sometimes Sc and R (Fig. 208) 55

Fig. 206 — *Dorsal view of wing - Ae. niphadopsis*

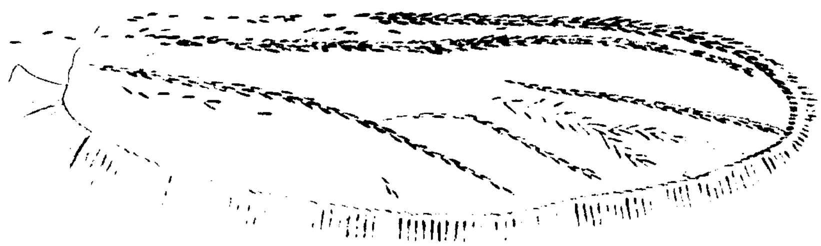


Fig. 207 — *Dorsal view of wing - Ae. s. idahoensis*

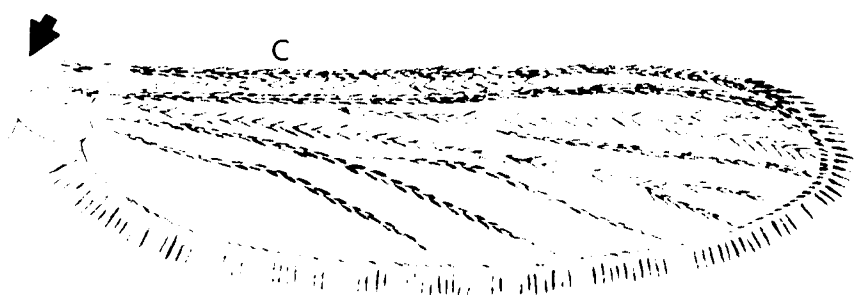


Fig. 208 — *Dorsal view of wing - Ae. pullatus*

50(49). Wing with veins alternating dark and pale-scaled, R_1, R_{4+5}, and Cu dark, others pale (Fig. 209) 51

Wing with pale scales scattered over all veins or confined to anterior veins (Fig. 210) 52

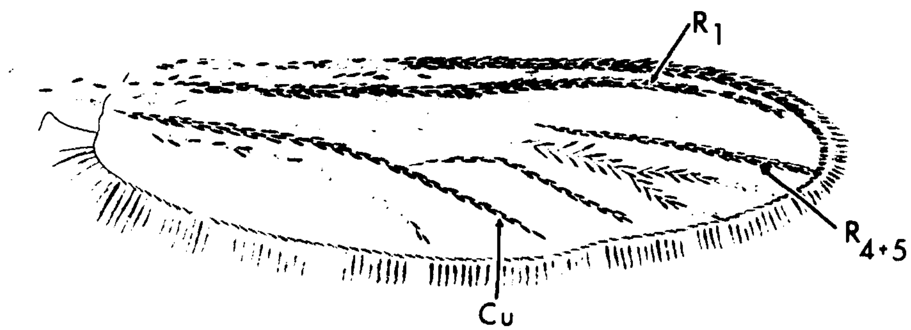


Fig. 209 — *Dorsal view of wing - Ae. s. idahoensis*

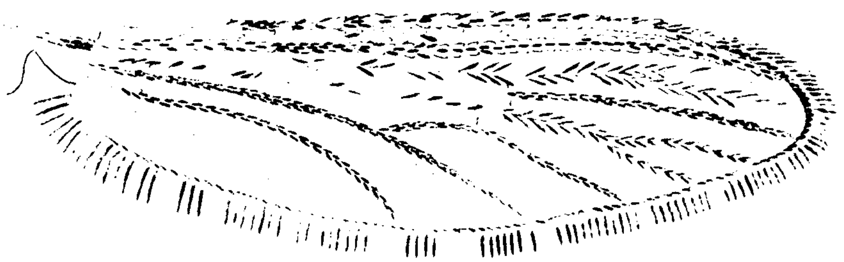


Fig. 210 — *Dorsal view of wing - Ae. niphadopsis*

51(50). Abdominal terga with dorsal, median, longitudinal stripe of pale scales, or almost entirely pale-scaled (Fig. 211); scales on dorsal 0.5 of postpronotum brown (Fig. 212) . . . . *s. spencerii* (Plate 21)

Abdominal terga with only basal bands of pale scales (Fig. 213); dorsal 0.5 of postpronotum with some pale scales (Fig. 214) . . . . *s. idahoensis* (Plate 21)

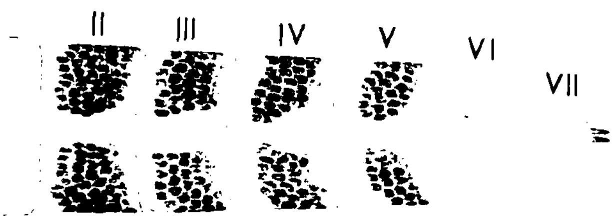


Fig. 211 — *Dorsal view of abdomen - Ae. s. spencerii*

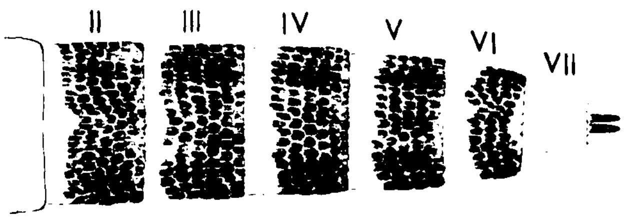


Fig. 213 — *Dorsal view of abdomen - Ae. s. idahoensis*

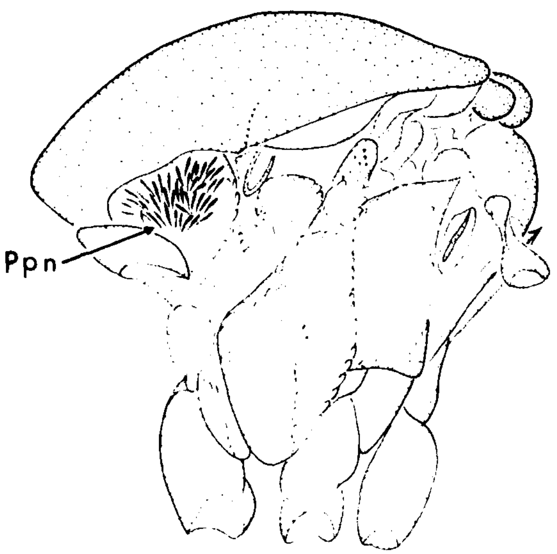


Fig. 212 — *Lateral view of thorax - Ae. s. spencerii*

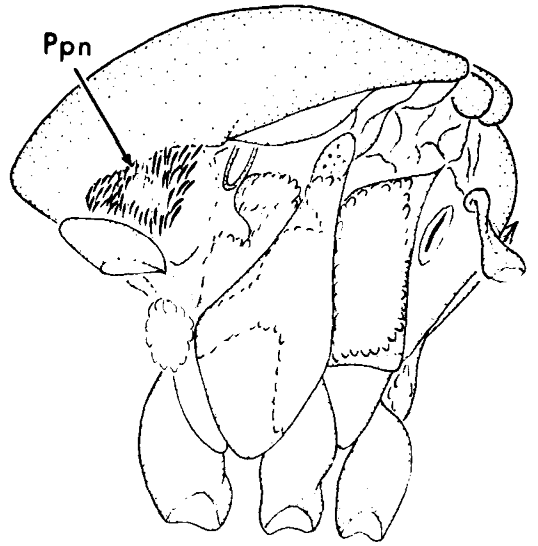


Fig. 214 — *Lateral view of thorax - Ae. s. idahoensis*

52(50). Palpus and proboscis dark-scaled (Fig. 215); lower mesanepimeral setae absent (Fig. 216) .... (in part) *ventrovittis* (Plate 19)

Palpus and proboscis with some pale scales (Fig. 217); lower mesanepimeral setae present (Fig. 218) 53

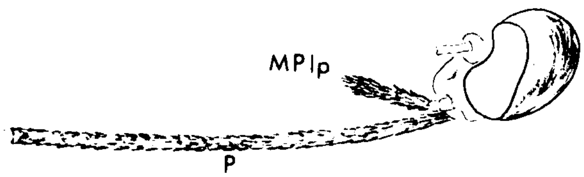


Fig. 215 — *Lateral view of head - Ae. ventrovittis*

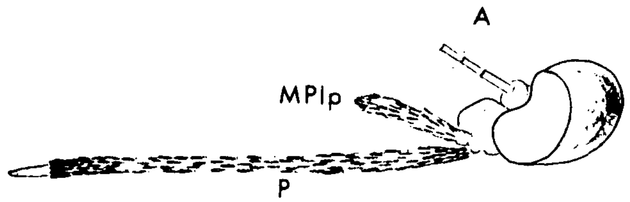


Fig. 217 — *Lateral view of head - Ae. bicristatus*

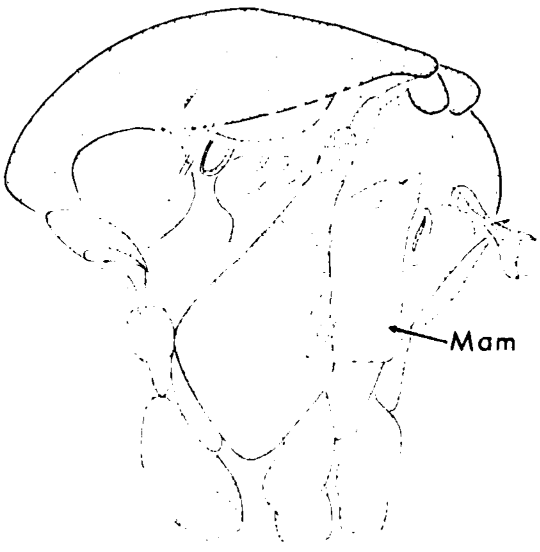


Fig. 216 — *Lateral view of thorax - Ae. ventrovittis*

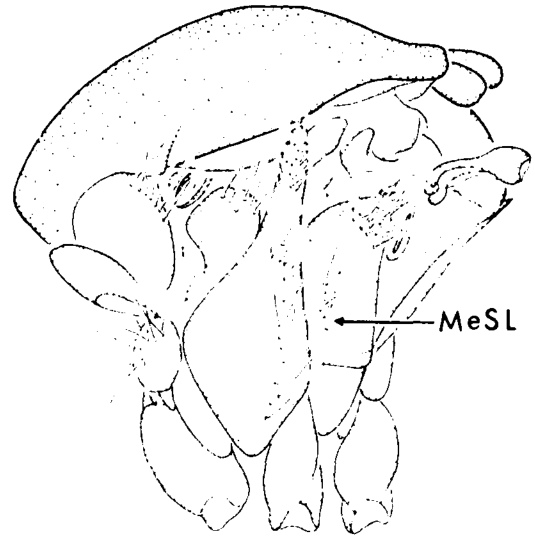


Fig. 218 — *Lateral view of thorax - Ae. cataphylla*

53(52). Abdominal terga with broad, basal, pale bands and apical, pale scales, often forming median, longitudinal stripe (Fig. 219); pale scales numerous on wing veins anterior to Cu (Fig. 220) . . . . *niphadopsis* (Plate 13)

Abdominal terga with narrow, basal, pale bands, without apical, pale scales or longitudinal stripe (Fig. 221); pale scales on wing confined to base of C and a few scattered along C, Sc, and R_1 (Fig. 222) 54

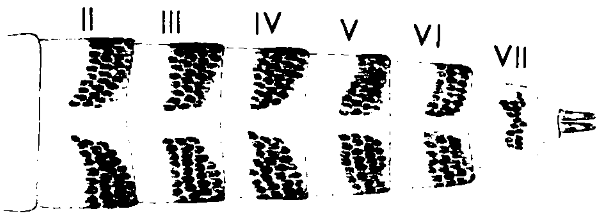


Fig. 219 — *Dorsal view of abdomen - Ae. niphadopsis*

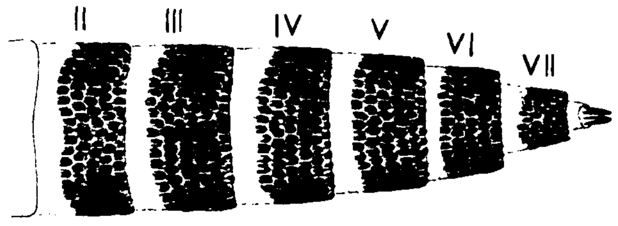


Fig. 221 — *Dorsal view of abdomen - Ae. cataphylla*

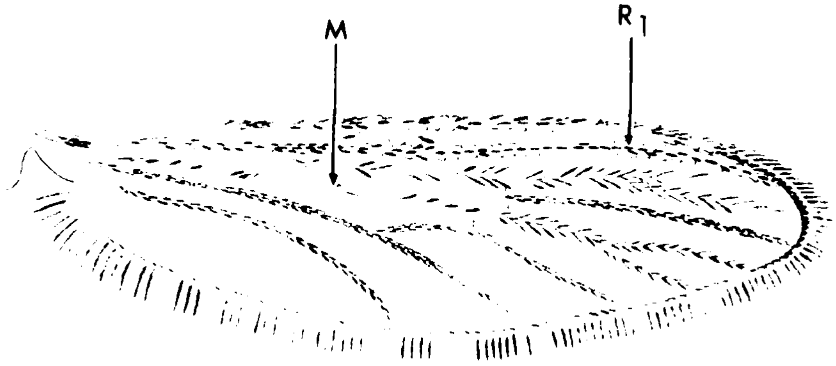


Fig. 220 — *Dorsal view of wing - Ae. niphadopsis*

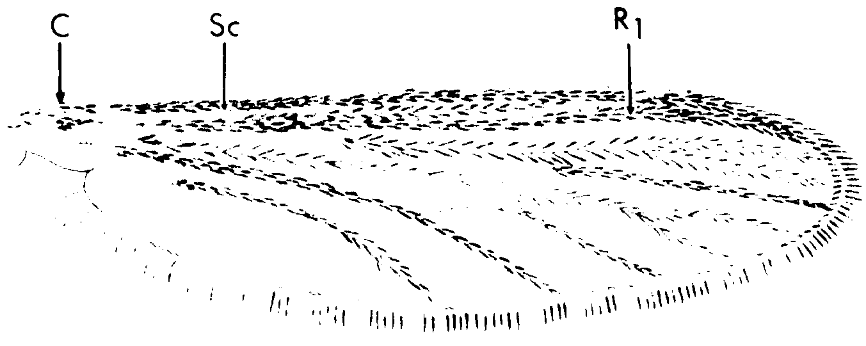


Fig. 222 — *Dorsal view of wing - Ae. cataphylla*

54(53). Scutum with area of broad, curved scales laterally at level of mesothoracic spiracle (Fig. 223); palpus longer than basal 3 antennal flagellomeres (Fig. 224) . . . . *bicristatus* (Plate 15)

Scutum with only narrow scales laterally at level of mesothoracic spiracle (Fig. 225); palpus shorter than basal 3 antennal flagellomeres (Fig. 226) . . . . *cataphylla* (Plate 10)

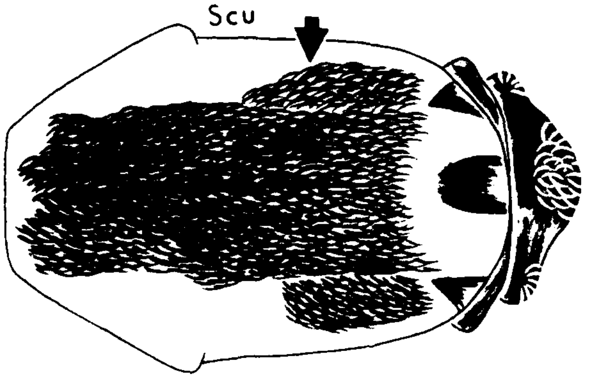


Fig. 223 — *Dorsal view of thorax - Ae. bicristatus*

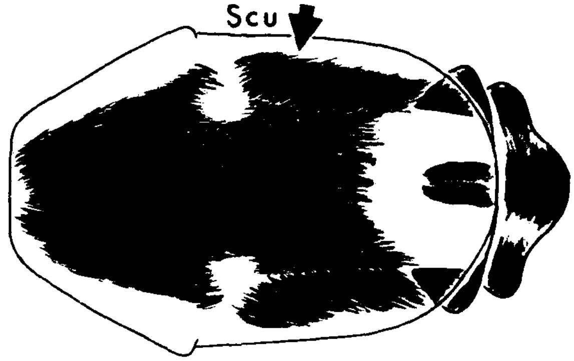


Fig. 225 — *Dorsal view of thorax - Ae. cataphylla*

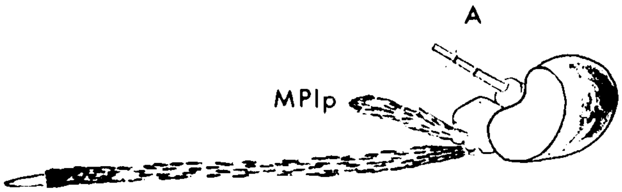


Fig. 224 — *Lateral view of head - Ae. bicristatus*

Fig. 226 — *Lateral view of head - Ae. cataphylla*

55(49). Hypostigmal area with scales (Fig. 227) 56

Hypostigmal area without scales (Fig. 228) 59

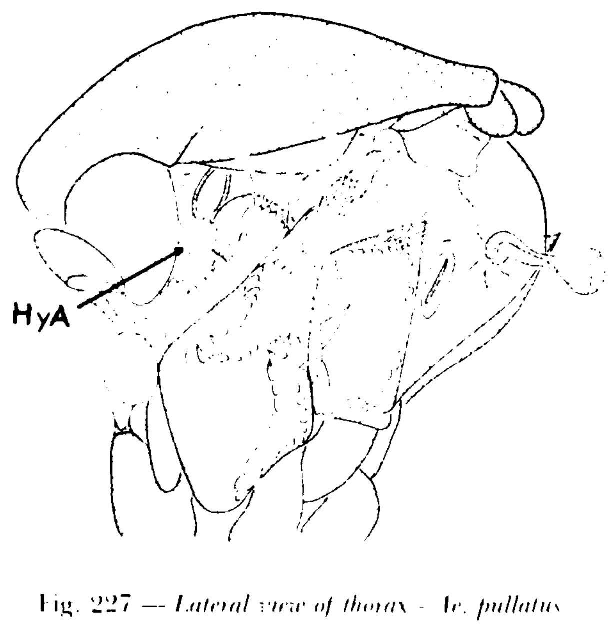


Fig. 227 — *Lateral view of thorax - Ae. pullatus*

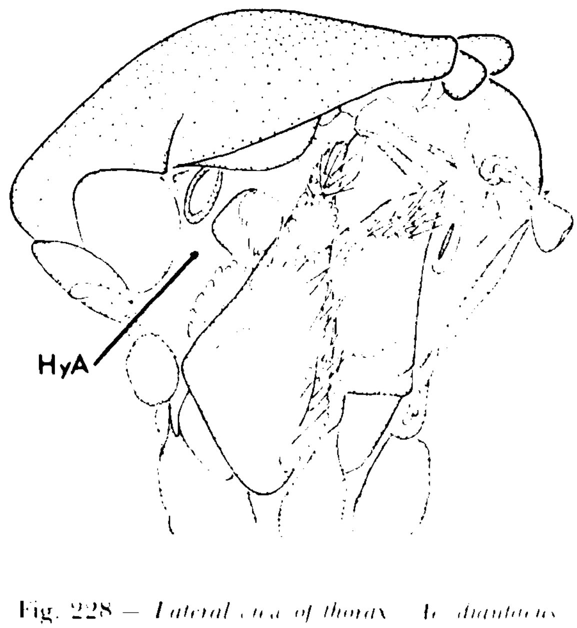


Fig. 228 — *Lateral view of thorax - Ae. diantaeus*

56(55). Postprocoxal scale patch absent (Fig. 229); palpus usually with some pale scales (Fig. 230) 57

Postprocoxal scale patch present (Fig. 231); palpus entirely dark-scaled (Fig. 232) 58

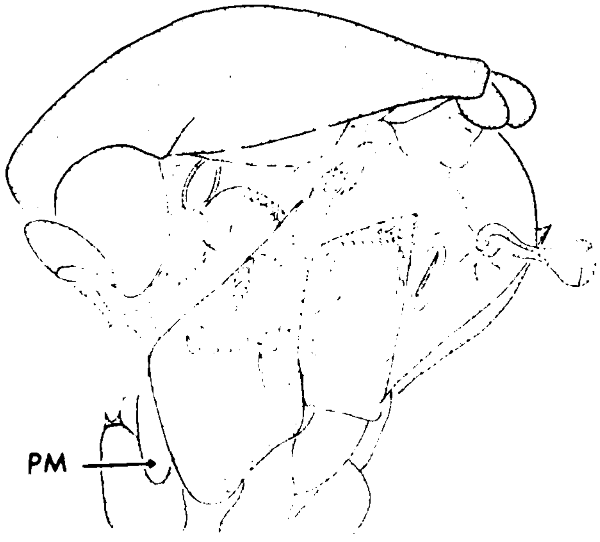


Fig. 229 — *Lateral view of thorax — Ae. pullatus*

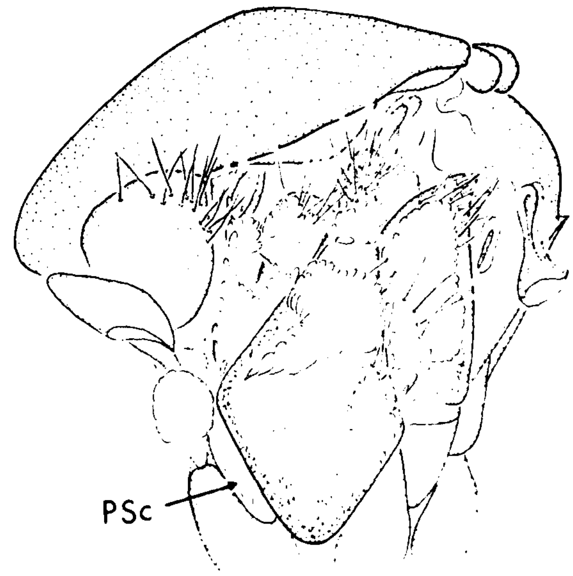


Fig. 231 — *Lateral view of thorax — Ae. implicatus*

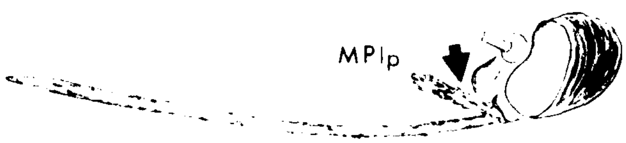


Fig. 230 — *Lateral view of head — Ae. pullatus*

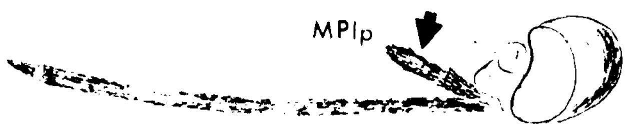


Fig. 232 — *Lateral view of head — Ae. implicatus*

57(56). Scutum with scales nearly all unicolorous (Fig. 233); mesanepimeron sometimes without scales in ventral 0.25 (Fig. 234) . . . . (in part) *intrudens* (Plate 9)

Scutum with pair of median, longitudinal stripes divided by thin line devoid of scales (Fig. 235); mesanepimeron usually with scales near to ventral margin (Fig. 236) . . . . *pullatus* (Plate 27)

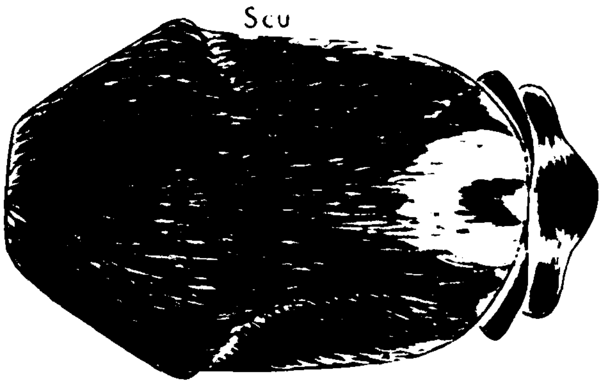


Fig. 233 — *Dorsal view of thorax — Ae. intrudens*

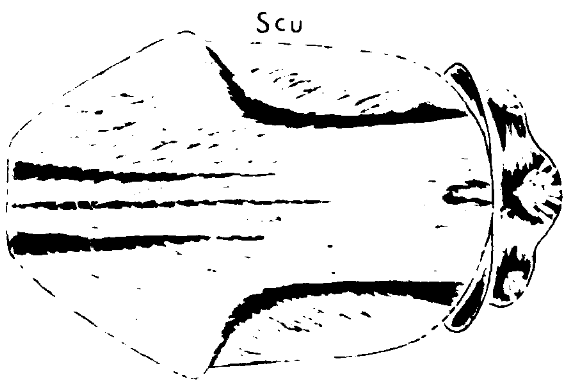


Fig. 235 — *Dorsal view of thorax — Ae. pullatus*

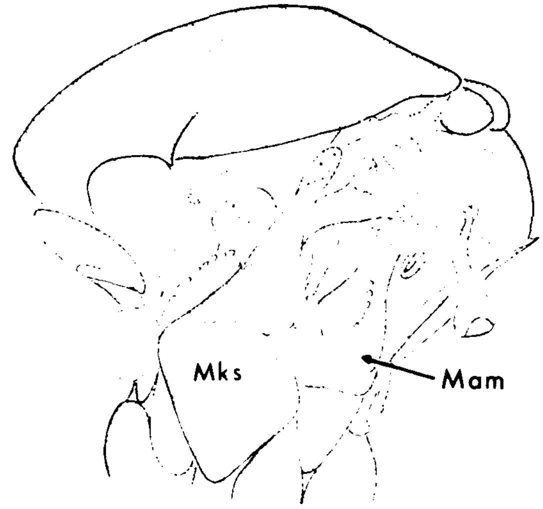


Fig. 234 — *Lateral view of thorax - Ae. intrudens*

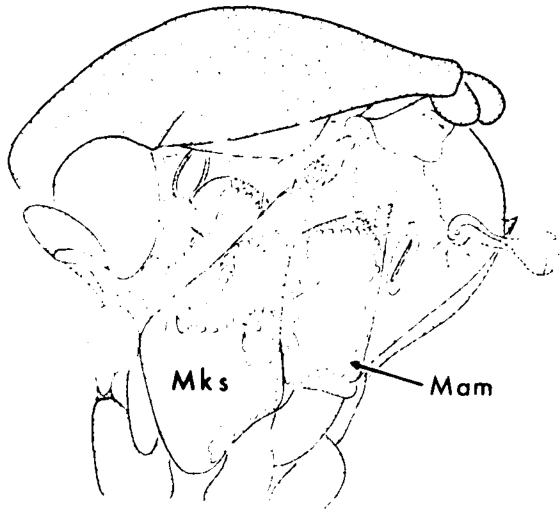


Fig. 236 — *Lateral view of thorax - Ae. pullatus*

58(56). Mesokatepisternum with scales not extending to anterior angle, separated dorsally from posterior mesanepisternal scale patch (Fig. 237); pale-scaled, apical ring on all femora (Fig. 238) .... (in part) *implicatus* (Plate 24)

Mesokatepisternum with scales extending to anterior angle, not separated from posterior mesanepisternal scale patch (Fig. 239); femora without apical, pale ring (Fig. 240) .... *provocans* (Plate 26)

Fig. 237 — *Lateral view of thorax - Ae. implicatus*

Fig. 239 — *Lateral view of thorax - Ae. provocans*

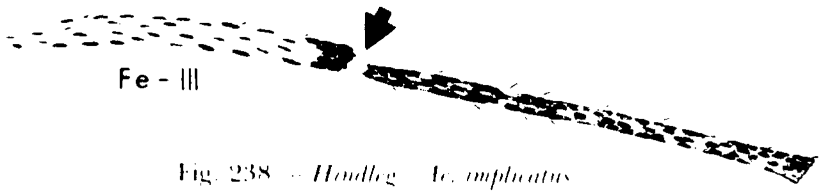


Fig. 238 — *Hindleg - Ae. implicatus*

Fig. 240 — *Hindleg - Ae. provocans*

59(55). Abdominal terga without basal, pale bands, or, if present, on fewer than 0.5 of segments (Fig. 241) 60

Abdominal terga usually with pale, basal bands on segments I-VII, at least on more than 0.5, or if absent, then with lateral stripe of pale scales (Fig. 242) 63

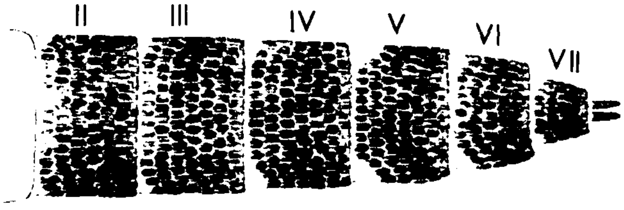


Fig. 241 — *Dorsal view of abdomen - Ae. diantaeus*

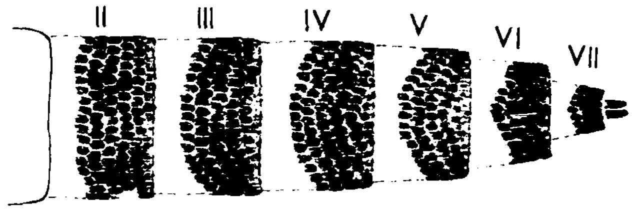


Fig. 242 — *Dorsal view of abdomen - Ae. intrudens*

60(59). Abdominal sterna entirely pale-scaled (Fig. 243); forecoxa with at least some scales brown (Fig. 244) .... *aurifer*
(Plate 14)

At least some abdominal sterna with dark scales apically (Fig. 245); forecoxa with scales pale (Fig. 246) 61

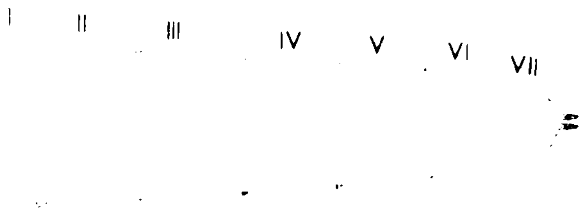


Fig. 243 — *Ventral view of abdomen - Ae. aurifer*

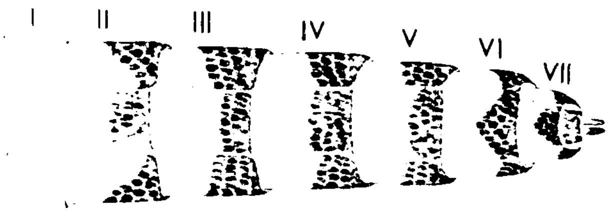


Fig. 245 — *Ventral view of abdomen - Ae. thibaulti*

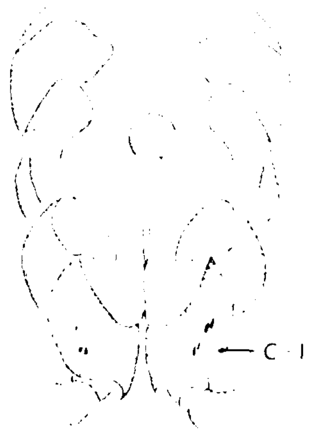


Fig. 244 — *Anterior view of thorax - Ae. aurifer*

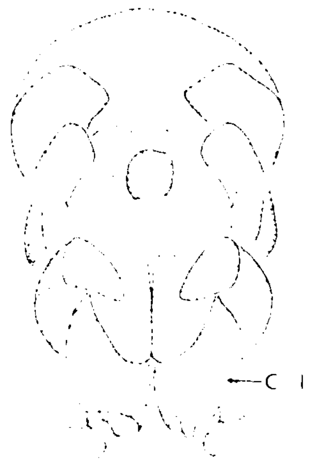


Fig. 246 — *Anterior view of thorax - Ae. thibaulti*

61(60). Scutum with broad, median longitudinal stripe of dark brown scales, broadening abruptly just posterior to scutal angle (Fig. 247) .... *thibaulti*
(Plate 23)

Scutum with 2 narrower, brown-scaled, median, longitudinal stripes, sometimes fused, then not distinctly broadening posteriorly (Fig. 248) 62

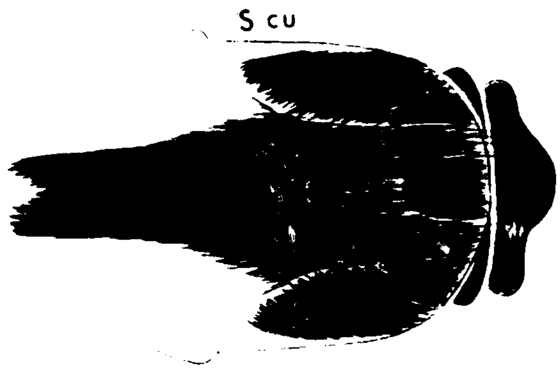


Fig. 247 — *Dorsal view of thorax — Ae. thibaulti*

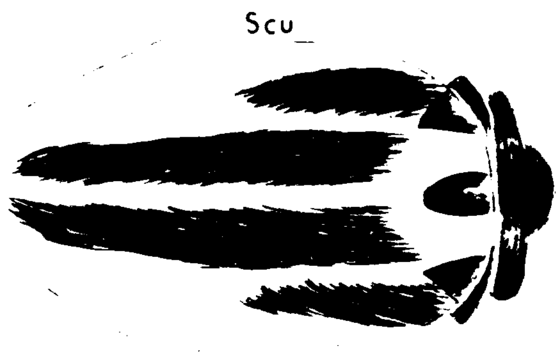


Fig. 248 — *Dorsal view of thorax — Ae. decticus*

62(61). Mesokatepisternum with fewer than 10 setae, usually 5,6 (Fig. 249); occiput with submedian spots of dark scales (Fig. 250); metameron unscaled (Fig. 249) .... *decticus*
(Plate 17)

Mesokatepisternum with 10-20 setae (Fig. 251); submedian spots on occiput lacking (Fig 252); metameron with small scale patch (Fig. 251) .... *diantaeus*
(Plate 23)

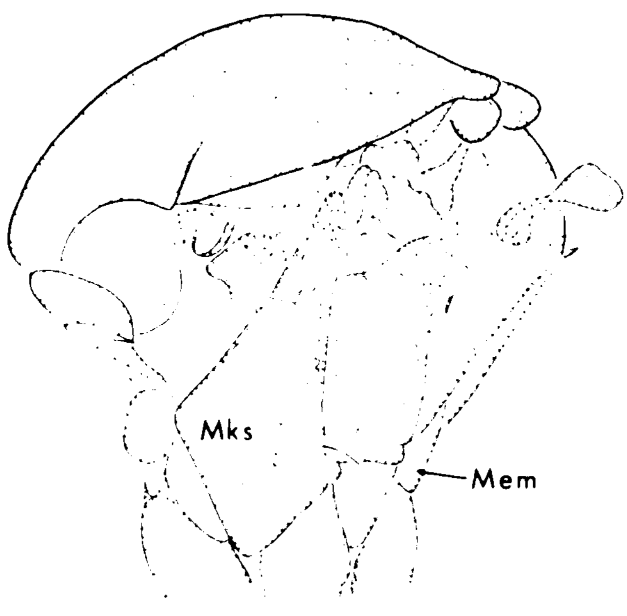


Fig. 249 — *Lateral view of thorax — Ae. decticus*

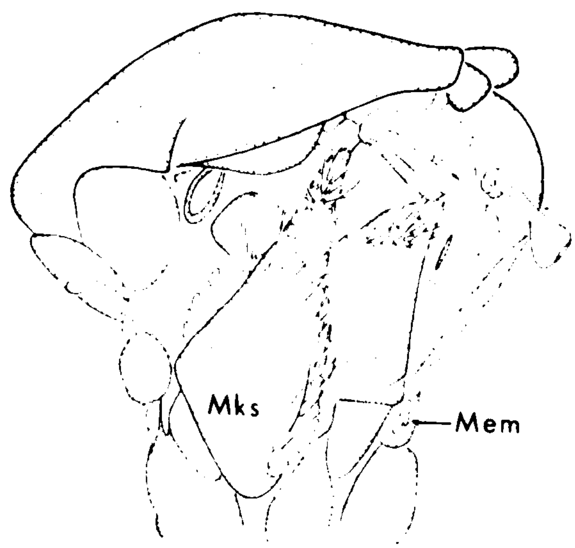


Fig. 251 — *Lateral view of thorax — Ae. diantaeus*

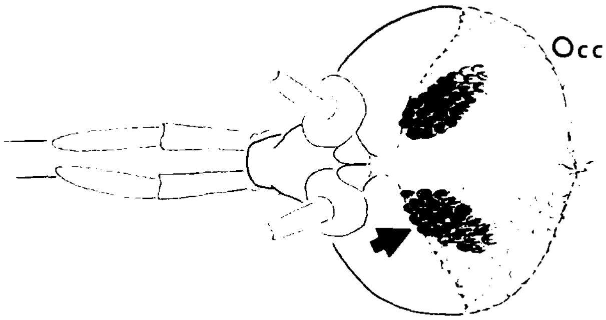


Fig. 250 — *Dorsal view of head - Ae. decticus*

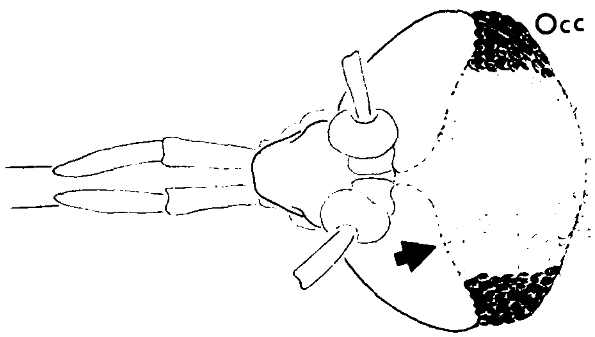


Fig. 252 — *Dorsal view of head - Ae. diantaeus*

63(59). Postprocoxal scale patch absent (Fig. 253) 64

Postprocoxal scale patch present (Fig. 254) 72

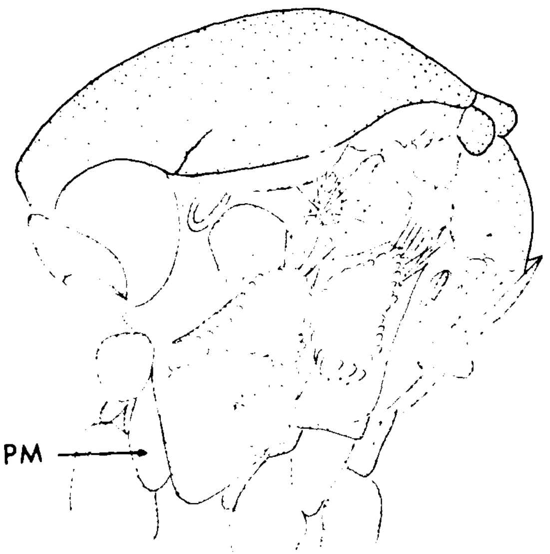


Fig. 253 — *Lateral view of thorax - Ae. sticticus*

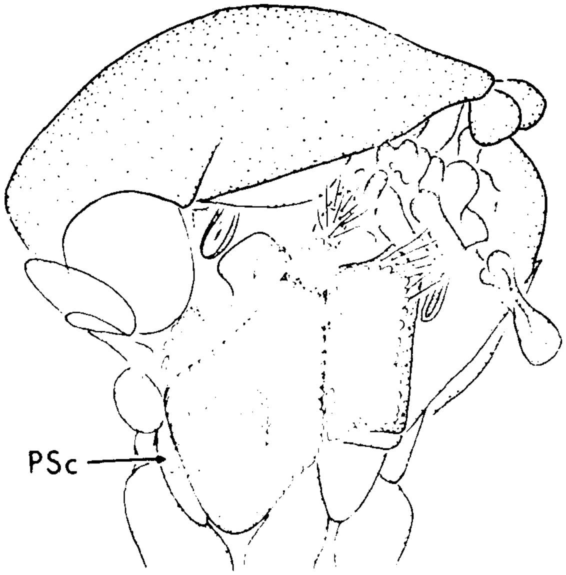


Fig. 254 — *Lateral view of thorax - Ae. punctor*

64(63). Abdominal terga II-VI with median, basal, triangular patches of pale scales (Fig. 255) . . . . *thelcter* (Plate 23)

Abdominal terga II-VI with basal, pale scales in other pattern (Fig. 256) 65

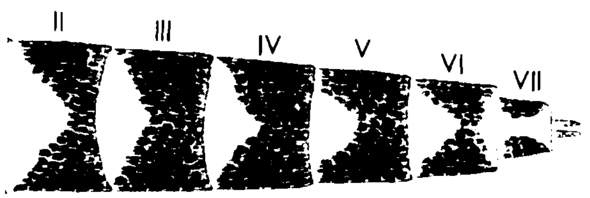


Fig. 255 — *Dorsal view of abdomen - Ae. thelcter*

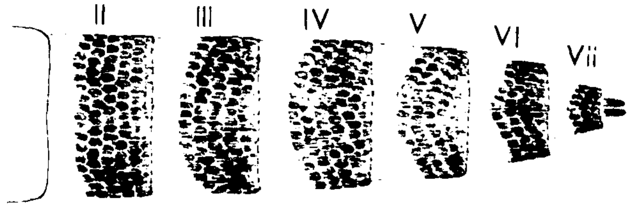


Fig. 256 — *Dorsal view of abdomen - Ae. intrudens*

65(64). Scutum with unicolorous scales, or if median longitudinal stripe, its scales lighter than those laterally (Fig. 257); mesokatepisternum with scales usually not extending to near anterior angle (Fig. 258) 66

Scutum with dark, median, longitudinal stripe (Fig. 259); mesokatepisternum with scales extending to near anterior angle (Fig. 260) 68

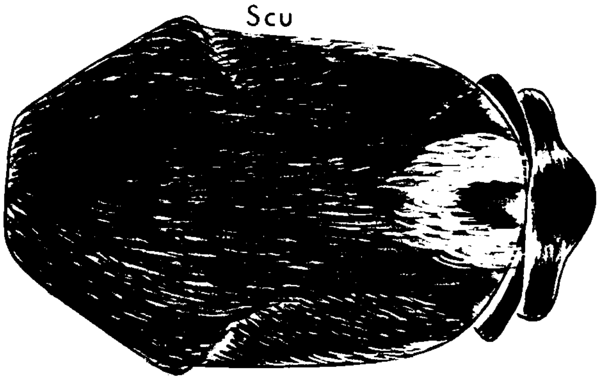


Fig. 257 — *Dorsal view of thorax - Ae. intrudens*

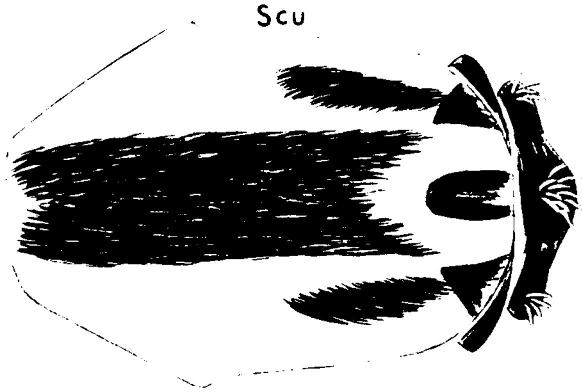


Fig. 259 — *Dorsal view of thorax - Ae. sticticus*

[illegible] — *Lateral view of thorax - Ae. intrudens*

Fig. 260 — *Lateral view of thorax - Ae. sticticus*

[illegible] th patch of brown scales (Fig. 261); subspiracular area bare (Fig. 262) .... *cinereus hemiteleus* (Plate 21)

[illegible] pale, or with few dark scales only (Fig. 263); subspiracular area with 67

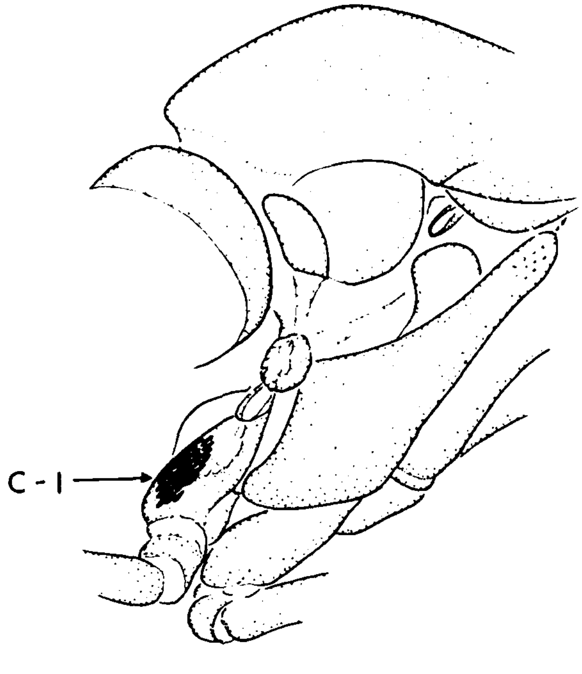


Fig. 261 — *Anterior view of thorax - Ae. cinereus*

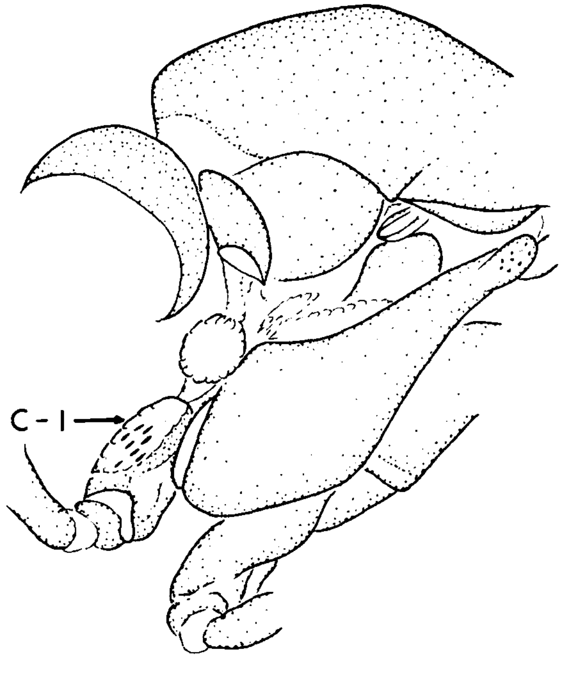


Fig. 263 — *Anterior view of thorax - Ae. intrudens*

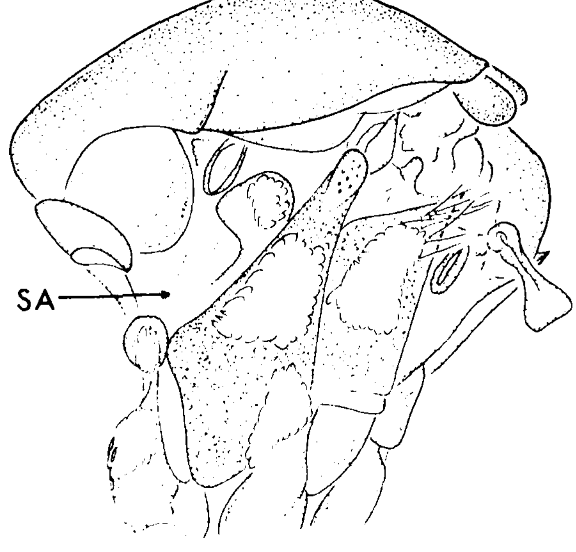


Fig. 262 — *Lateral view of thorax - Ae. cinereus*

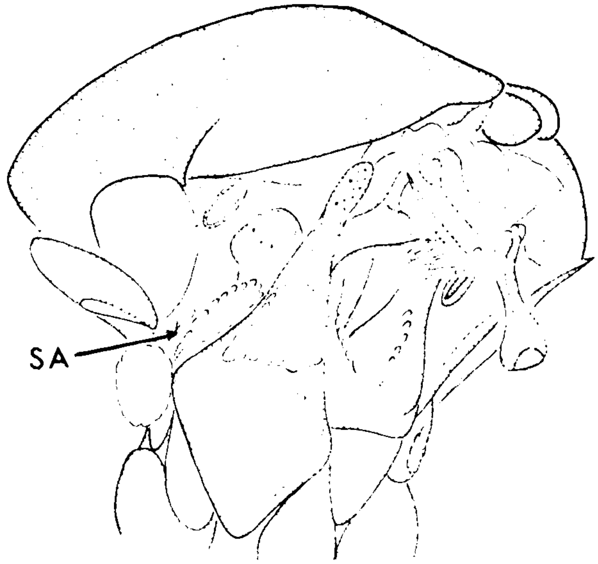


Fig. 264 — *Lateral view of thorax - Ae. intrudens*

67(66). Lower mesanepimeral setae present; metameron with scales (Fig. 265) .... (in part) *intrudens* (Plate 9)

Lower mesanepimeral setae absent; metameron unscaled (Fig. 266) .... *tortilis* (Plate 14)

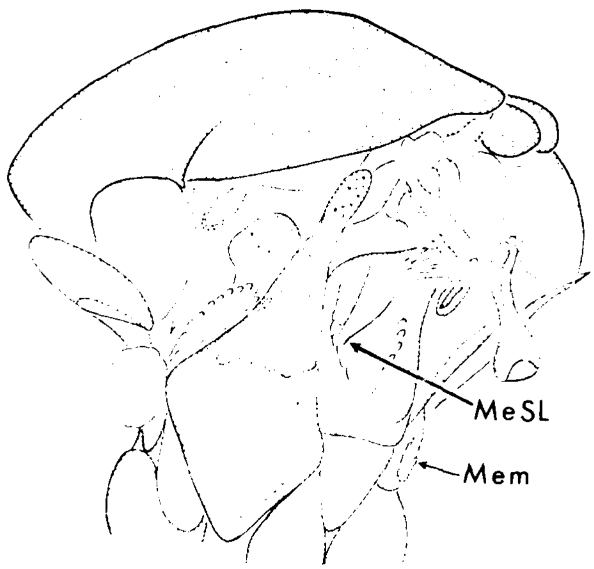


Fig. 265 — *Lateral view of thorax - Ae. intrudens*

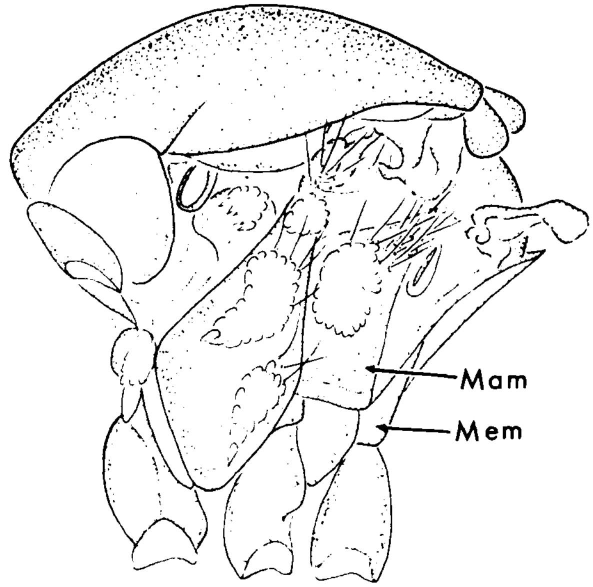


Fig. 266 — *Lateral view of thorax - Ae. tortilis*

68(65). Scutum with submedian, dark-scaled, longitudinal band wide and varying in width, especially with dark scales in scutal fossa (Fig. 267); foreclaw elongated (Fig. 268) .... *rempeli* (Plate 9)

Median or submedian, dark-scaled, longitudinal band, when present, more uniform in width throughout, not covering scutal fossa (Fig. 269); foreclaw usually sharply curved distal to tooth (Fig. 270) 69

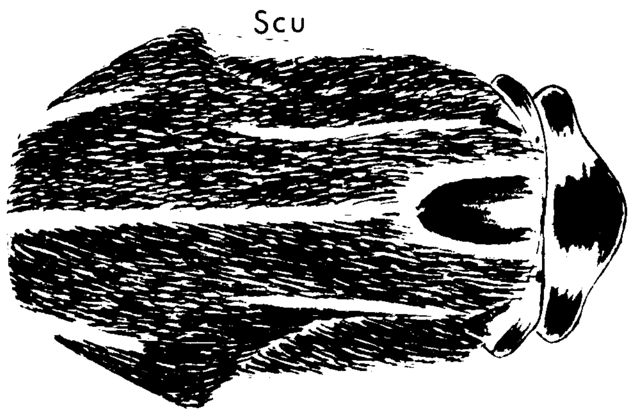


Fig. 267 — *Dorsal view of thorax - Ae. rempeli*

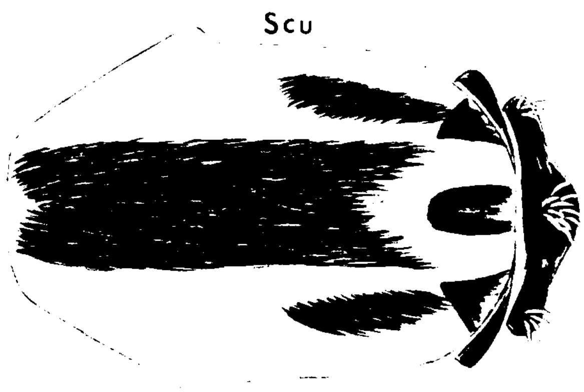


Fig. 269 — *Dorsal view of thorax - Ae. sticticus*

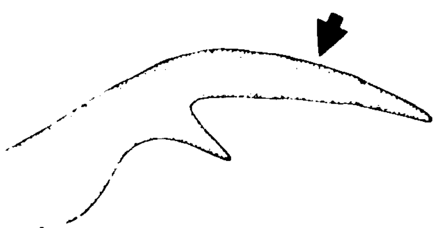


Fig. 268 — *Foreclaw - Ae. rempeli*

Fig. 270 — *Foreclaw - Ae. sticticus*

69(68). Scutellar and supraalar setae yellowish (Fig. 271); mesanepimeron usually without lower setae, ventral 0.25 devoid of scales (Fig. 272) .... *sticticus* (Plate 25)

Scutellar and supraalar setae brown or black (Fig. 273); mesanepimeron with lower setae, ventral 0.25 scaled (Fig. 274) 70

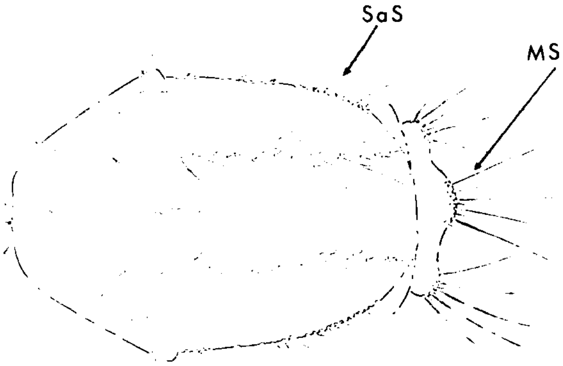


Fig. 271 — *Dorsal view of thorax - Ae. sticticus*

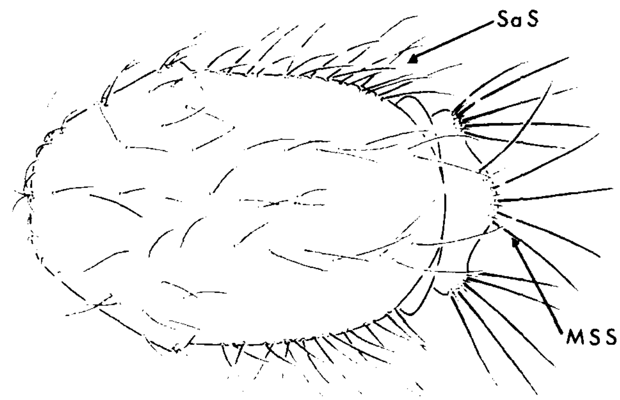


Fig. 273 — *Dorsal view of thorax - Ae. communis*

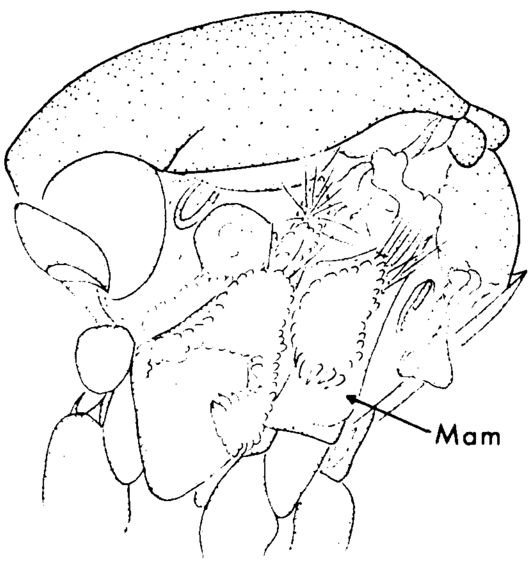


Fig. 272 — *Lateral view of thorax - Ae. sticticus*

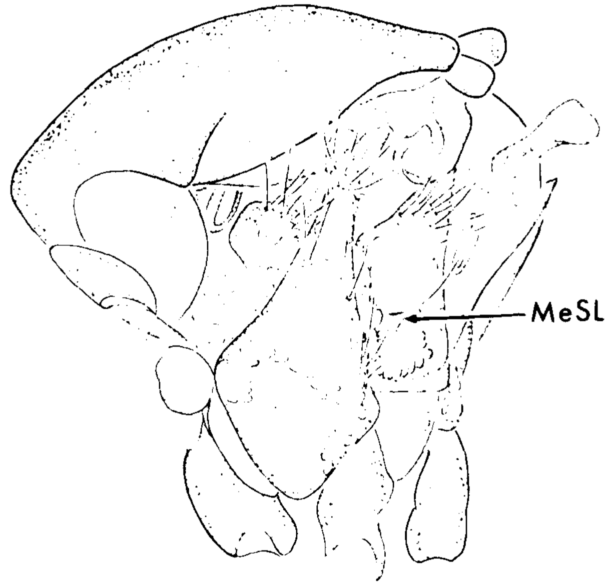


Fig. 274 — *Lateral view of thorax - Ae. communis*

70(69). Tooth of hindclaw long, thin, claw usually curving abruptly distal to tooth (Fig. 275) .... *communis* (Plate 17)

Tooth of hindclaw short, broad, claw usually curving more gradually distal to tooth (Fig. 276) 71

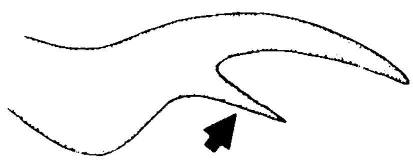


Fig. 275 — *Hindclaw - Ae. communis*

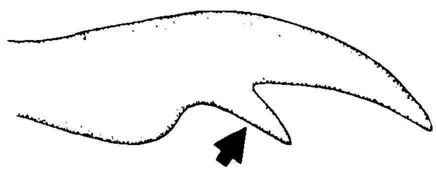


Fig. 276 — *Hindclaw - Ae. nevadensis*

71(70). Usually 17-27 upper mesanepimeral setae, range 14-33; upper mesokatepisternal setae 5-8 (Fig. 277) . . . . . . *nevadensis* (Plate 10)

Usually 12-19 upper mesanepimeral setae, range 10-22; usually 4,5 upper mesokatepisternal setae (Fig. 278) . . . . . . *churchillensis* (Plate 20)

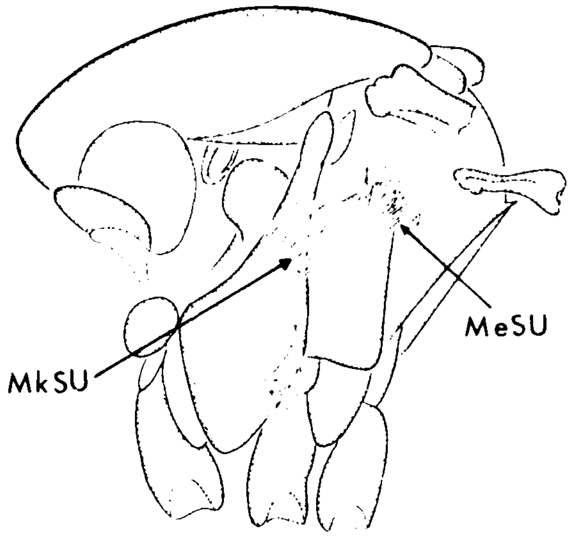


Fig. 277 — *Lateral view of thorax - Ae. nevadensis*

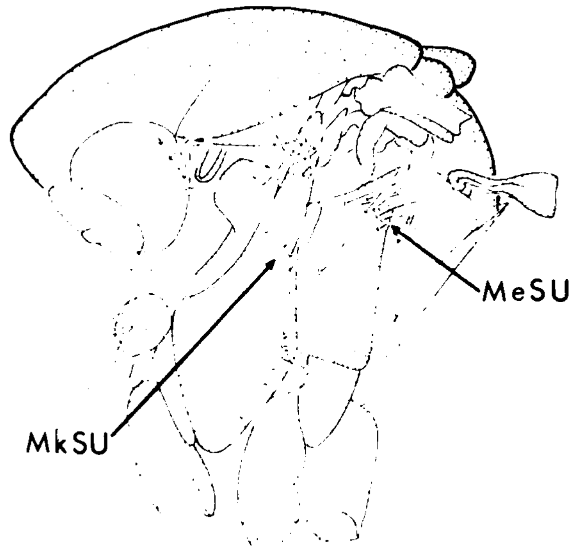


Fig. 278 — *Lateral view of thorax - Ae. churchillensis*

72(63). Lower mesanepimeral setae absent (Fig. 279); pale basal band on abdominal tergum II narrowed, or completely interrupted, medially (Fig. 280) . . . . . . (in part) *ventrovittis* (Plate 19)

Lower mesanepimeral setae present (Fig. 281); pale basal band on II scarcely narrower medially (Fig. 282) 73

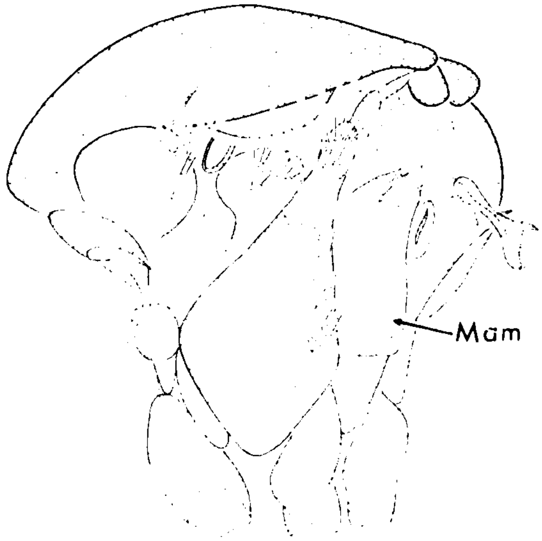


Fig. 279 — *Lateral view of thorax - Ae. ventrovittis*

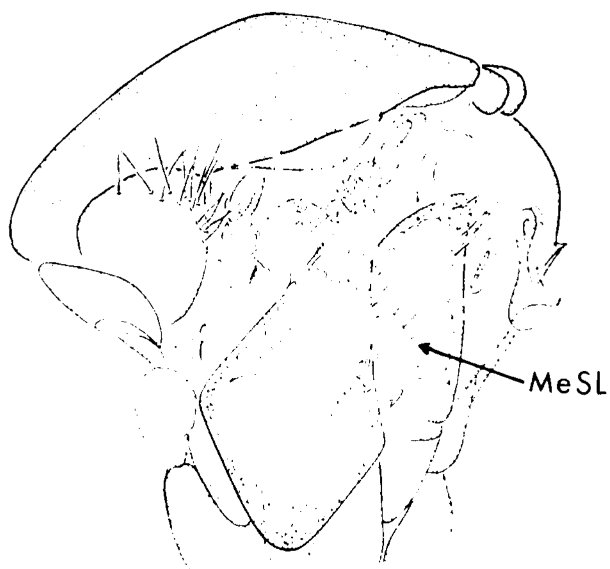


Fig. 281 — *Lateral view of thorax - Ae. implicatus*

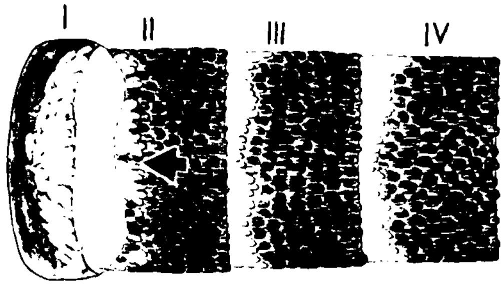


Fig. 280 — *Dorsal view of abdomen - Ae. centrocttus*

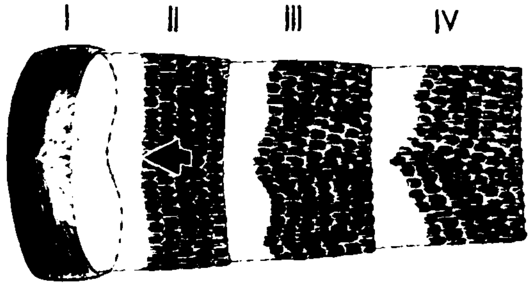


Fig. 282 — *Dorsal view of abdomen - Ae. punctor*

73(72). Scutum with many long, dark setae, hairy in appearance (Fig. 283); postpronotum with setae scattered over posterior 0.5 (Fig. 284) 74

Scutum with few long setae, not hairy in appearance (Fig. 285); postpronotum with setae in single or irregular double row along posterior border (Fig. 286) 75

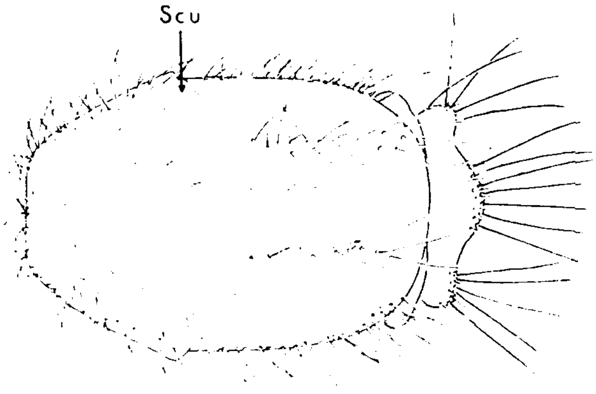


Fig. 283 — *Dorsal view of thorax - Ae. impiger*

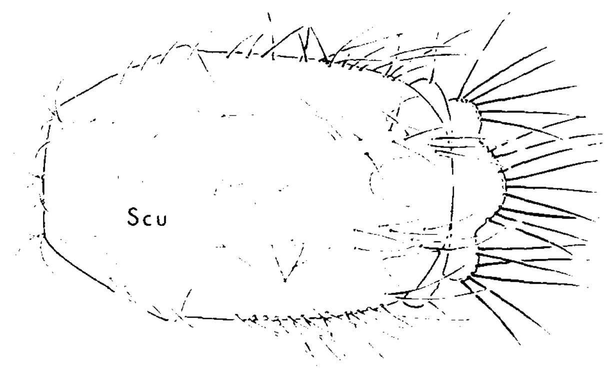


Fig. 285 — *Dorsal view of thorax - Ae. pionips*

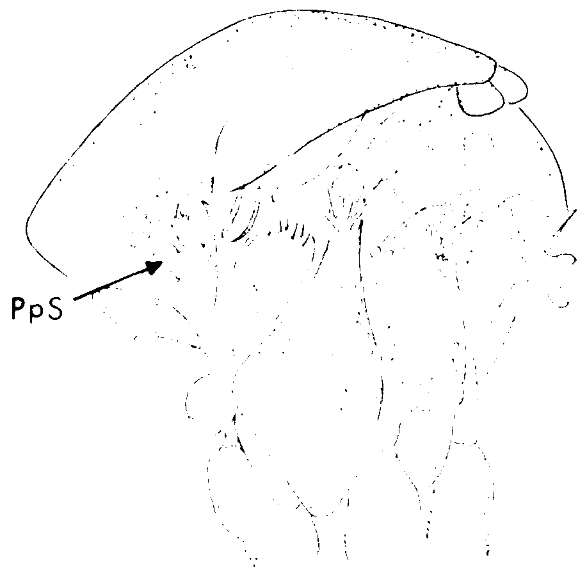


Fig. 284 — *Lateral view of thorax - Ae. impiger*

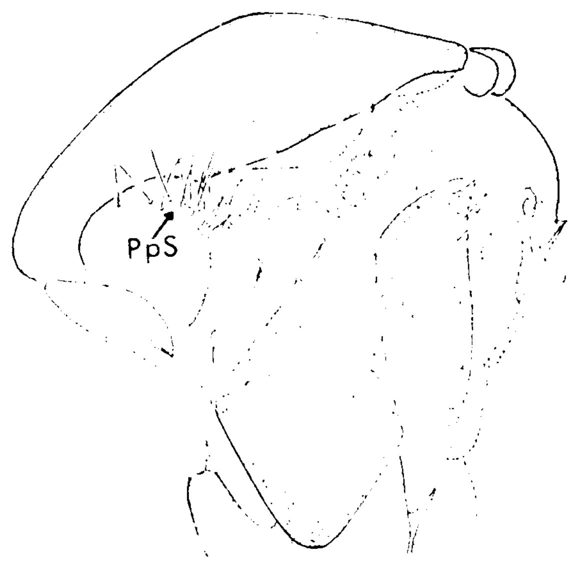


Fig. 286 — *Lateral view of thorax - Ae. implicatus*

74(73). Foreclaw sharply bent apical to long tooth (Fig. 287); postspiracular setae numbering 10 or fewer (Fig. 288) . . . . *impiger*
(Plate 22)

Foreclaw elongate, very gradually curving distal to short tooth (Fig. 289); postspiracular setae numbering 14 or more (Fig. 290) . . . . *nigripes*
(Plate 25)

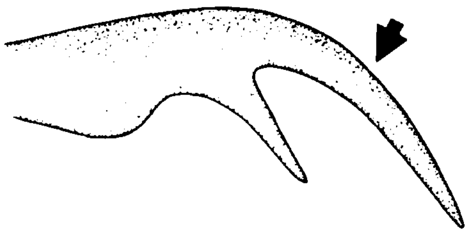


Fig. 287 — *Foreclaw - Ae. impiger*

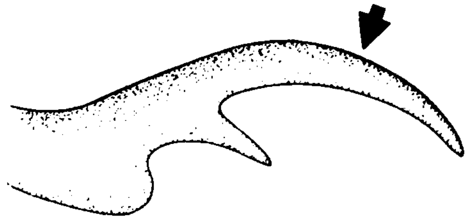


Fig. 289 — *Foreclaw - Ae. nigripes*

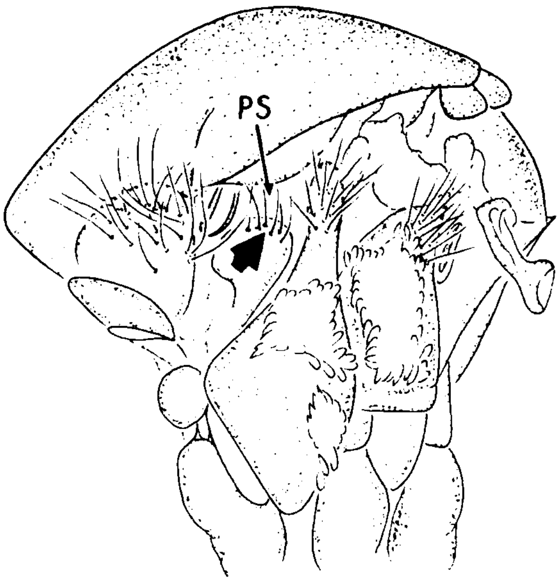


Fig. 288 — *Lateral view of thorax - Ae. impiger*

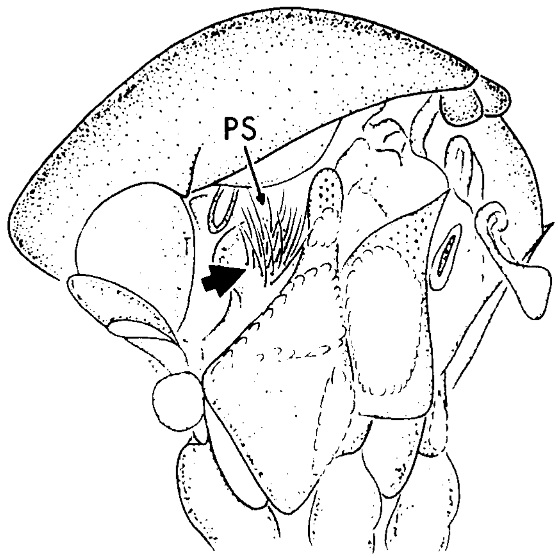


Fig. 290 — *Lateral view of thorax - Ae. nigripes*

75(73). Proboscis with yellow-gray scales ventrally; palpus with scattered, pale scales (Fig. 291); abdominal tergum VII nearly covered with pale scales (Fig. 292) . . . . *schizopinax*
(Plate 26)

Proboscis and palpus dark-scaled (Fig. 293); abdominal tergum VII with no more than 0.5 pale-scaled (Fig. 294) 76

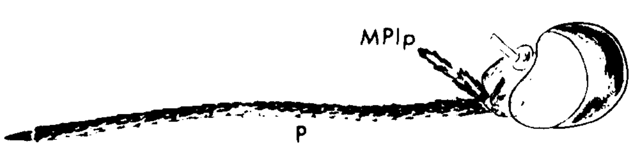


Fig. 291 — *Lateral view of head and proboscis - Ae. schizopinax*

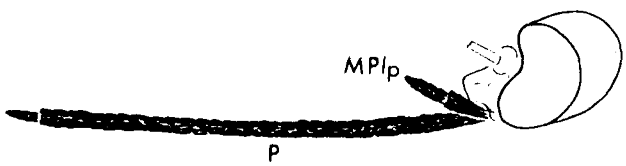


Fig. 293 — *Lateral view of head and proboscis - Ae. punctor*

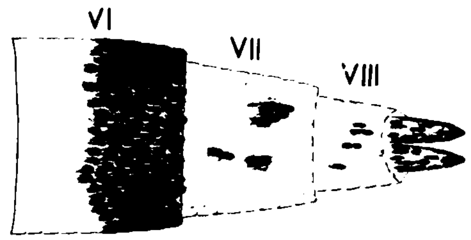


Fig. 292 — *Dorsal view of abdomen - Ae. schizopinax*

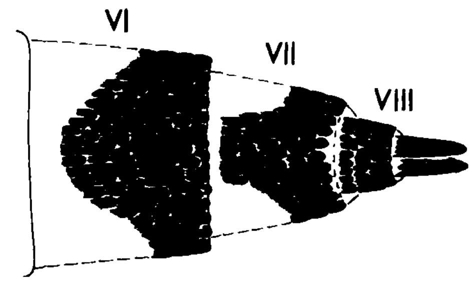


Fig. 294 — *Dorsal view of abdomen - Ae. punctor*

76(75). Proepisternum without scales on anterior face, at least in ventral 0.5 (Fig. 295) 77

Proepisternum fully scaled on anterior face (Fig. 296) 78

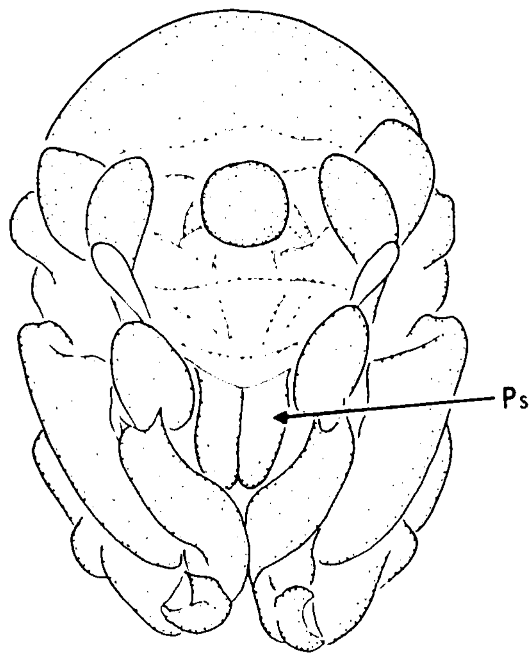


Fig. 295 — *Anterior view of thorax - Ae. implicatus*

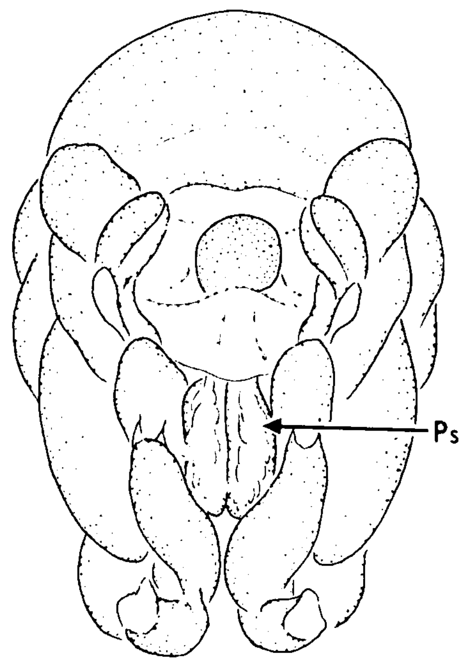


Fig. 296 — *Anterior view of thorax - Ae. hexodontus*

77(76). Foreclaw sharply bent distal to tooth (Fig. 297); mesokatepisternal scales not reaching to anterior angle (Fig. 298); wing with 7 or more pale scales at base of vein C (Fig. 299) .... (in part) *implicatus*
(Plate 24)

Foreclaw elongate, very gradually curving distal to tooth (Fig. 300); mesokatepisternal scales reaching to anterior angle (Fig. 301); wing dark-scaled or with fewer than 7 pale scales at base of vein C (Fig. 302) .... (in part) *punctor*
aboriginis
(Plates 13, 9)

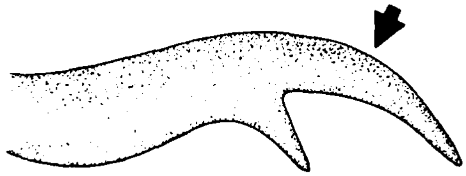


Fig. 297 — *Foreclaw - Ae. implicatus*

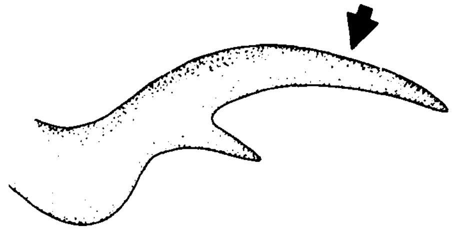


Fig. 300 — *Foreclaw - Ae. punctor*

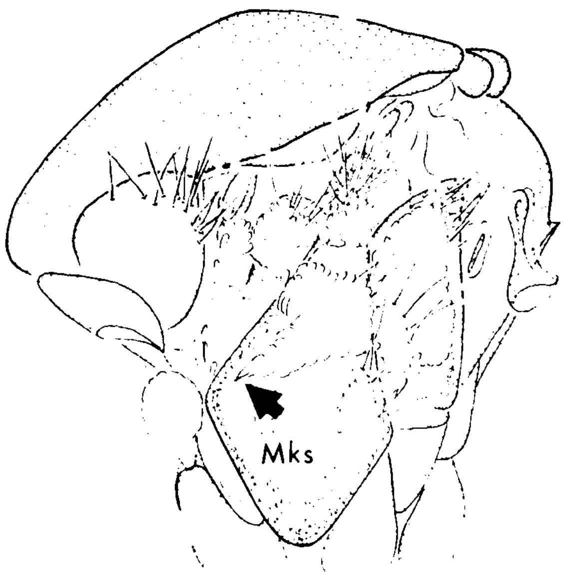


Fig. 298 — *Lateral view of thorax - Ae. implicatus*

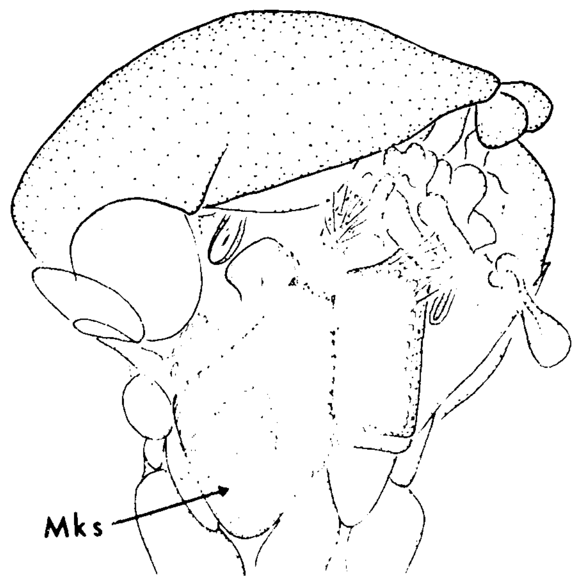


Fig. 301 — *Lateral view of thorax - Ae. punctor*

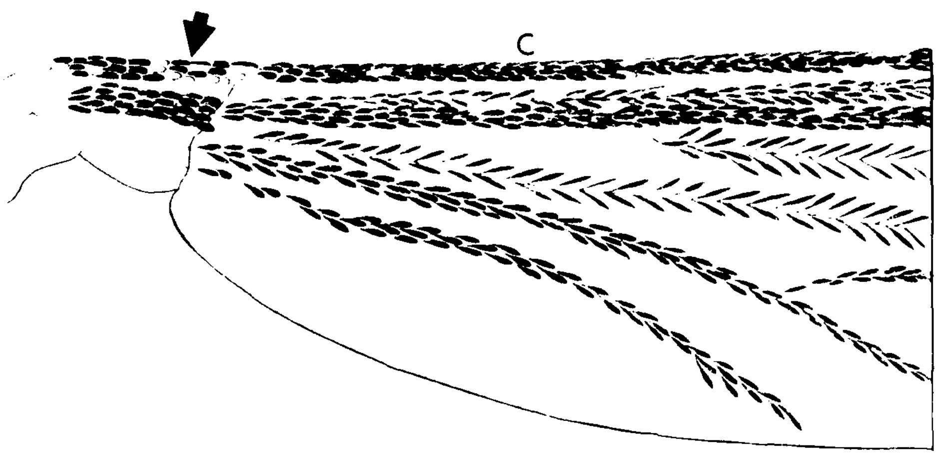


Fig. 299 — *Dorsal view of wing - Ae. implicatus*

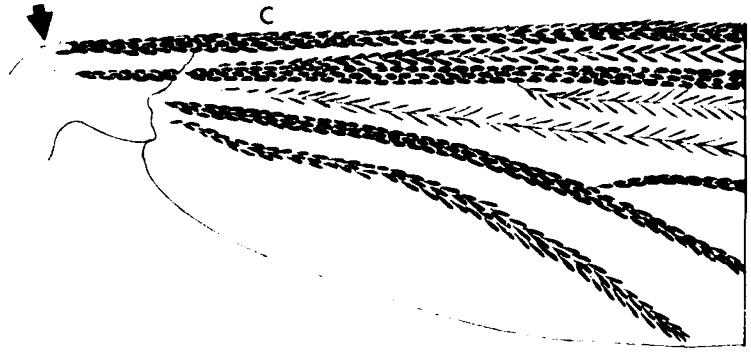


Fig. 302 — *Dorsal view of wing - Ae. punctor*

78(76). Supraalar and scutellar setae dark brown or black (Fig. 303); with 15 or more postmetasternal scales present (Fig. 304) .... *pionips* (Plate 18)

Supraalar and scutellar setae yellow *to* yellow-brown (Fig. 305); postmetasternal scales absent or with 2,3 scales only (Fig. 306) 79

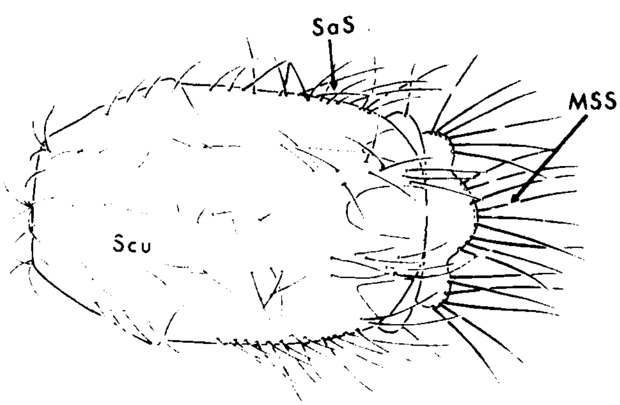


Fig. 303 — *Dorsal view of thorax - Ae. pionips*

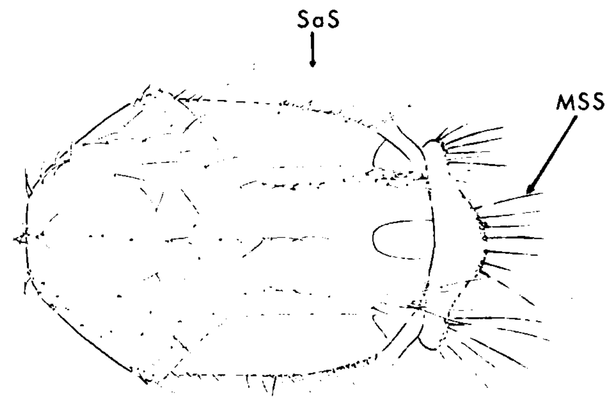


Fig. 305 — *Dorsal view of thorax - Ae. hexodontus*

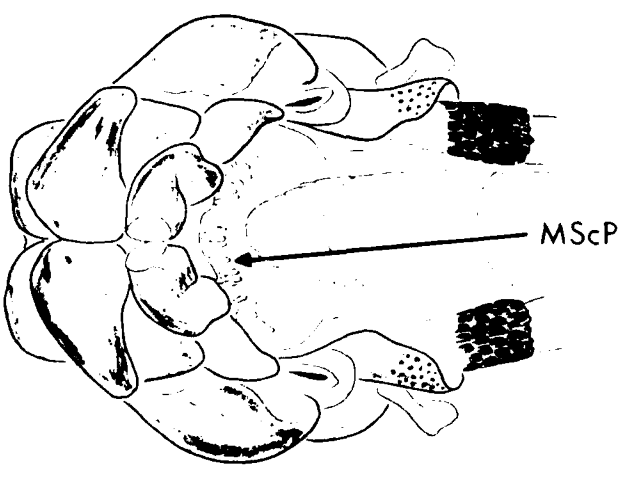


Fig. 304 — *Ventral view of abdomen and part of venter of metathorax - Ae. pionips*

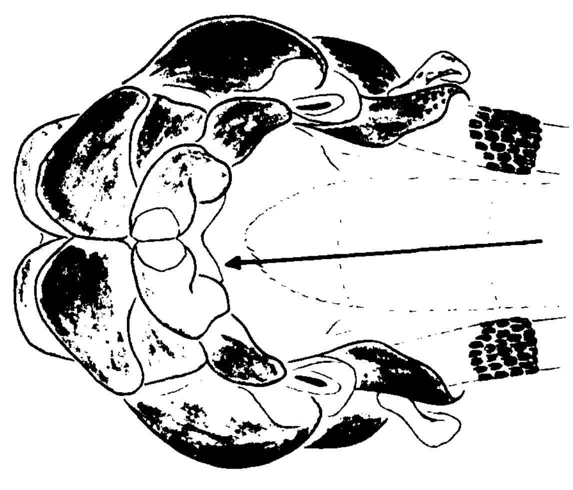


Fig. 306 — *Ventral view of abdomen and part of venter of metathorax - Ae. hexodontus*

79(78). Large patch of pale scales at base of wing vein C (Fig. 307); abdominal sterna III-VI pale-scaled apically, or rarely with few dark scales (Fig. 308) . . . . *hexodontus*
(Plate 20)

Wing dark-scaled or with fewer than 8 pale scales at base of vein C (Fig. 309); abdominal sterna III-VI with many dark scales apically (Fig. 310) . . . . (in part) *punctor*
punctodes
abserratus
(Plates 13, 25, 10)

a. Found in eastern North America (Fig. 311) . . . . *abserratus*
(Plate 10)

aa. Found in Alaska only (Fig. 311) . . . . *punctodes*
(Plate 25)

aaa. Widely distributed in northern North America (Fig. 311) . . . . *punctor*
(Plate 13)

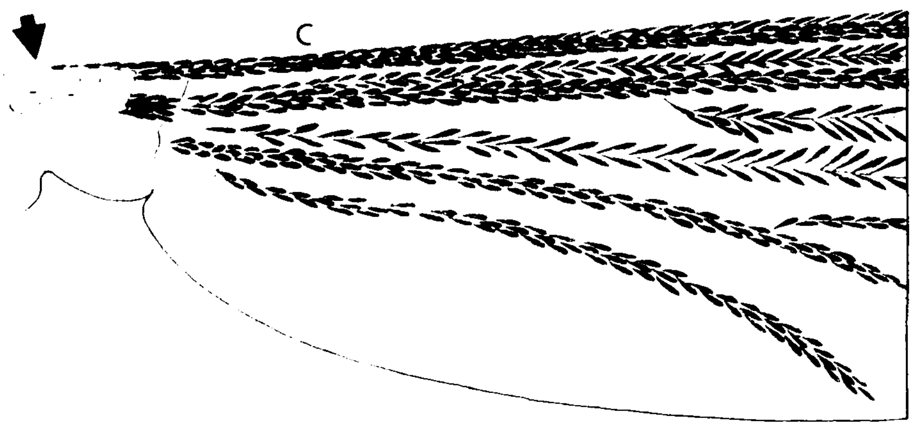


Fig. 307 — *Dorsal view of wing - Ae. hexodontus*

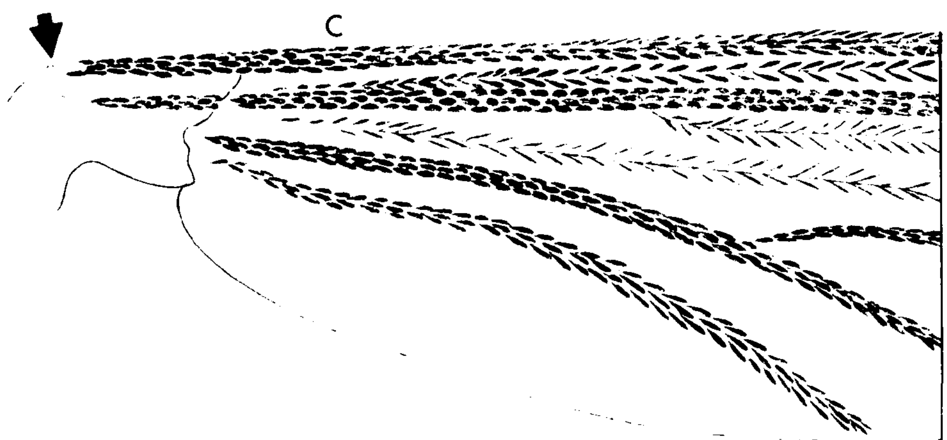


Fig. 309 — *Dorsal view of wing - Ae. punctor*

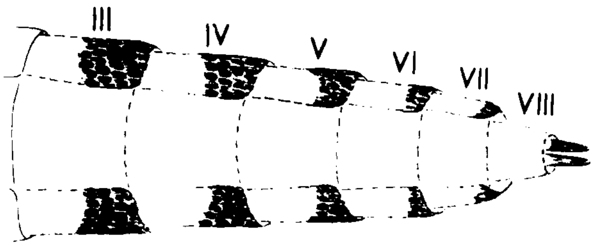


Fig. 308 — *Ventral view of abdomen - Ae. hexodontus*

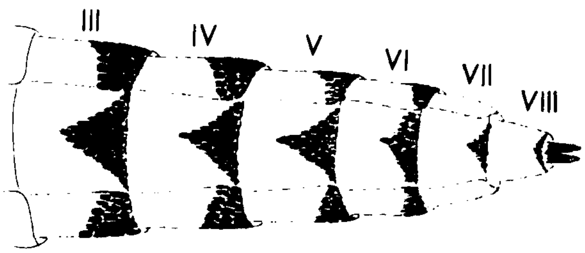


Fig. 310 — *Ventral view of abdomen - Ae. punctor*

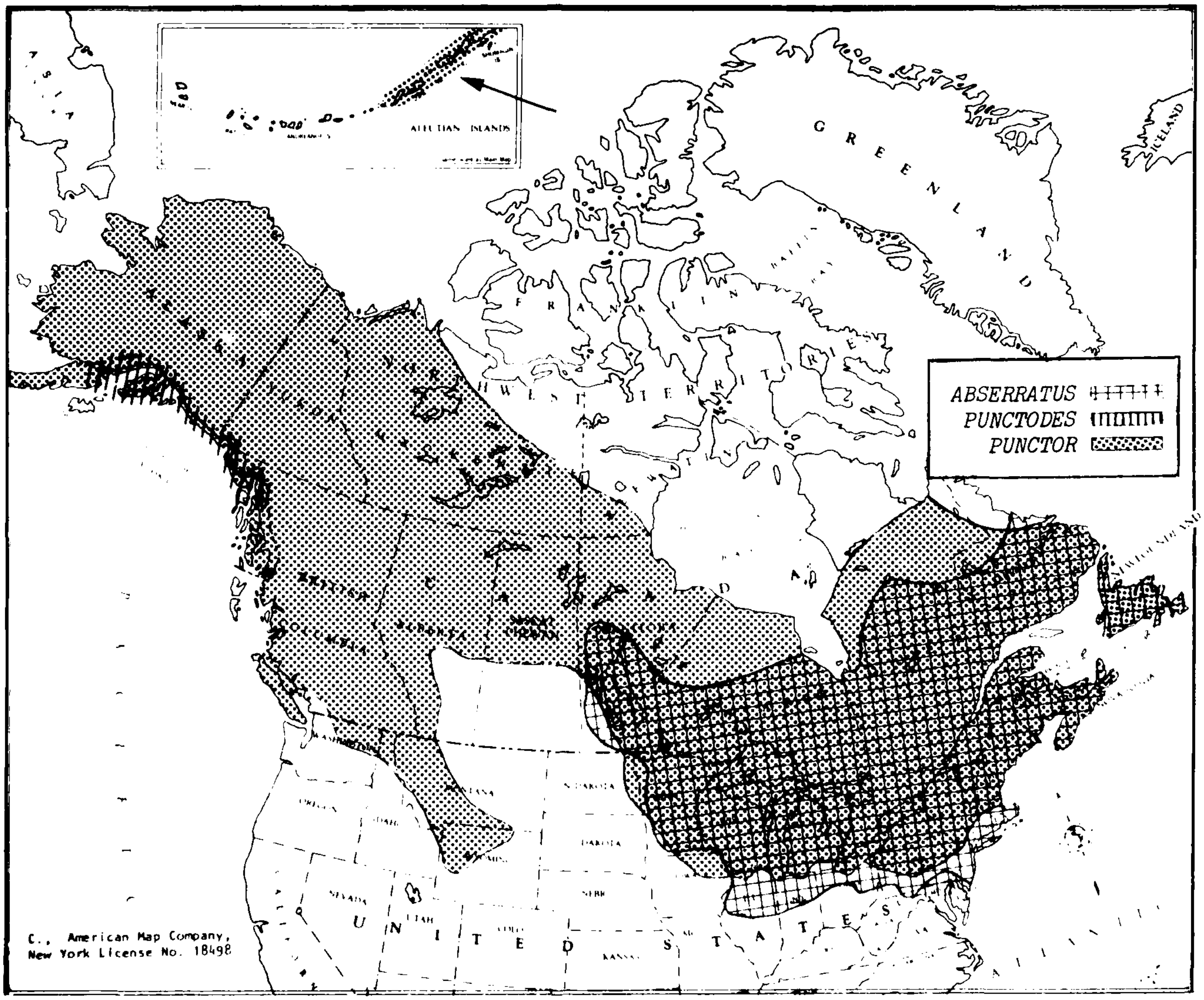


Fig. 311 — *Distributional map*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *ANOPHELES*

1. Wing with pale scaled spots (Fig. 312) 2

   Wing entirely dark-scaled or with silvery or coppery apical fringe spot (Figs. 313, 314) 7

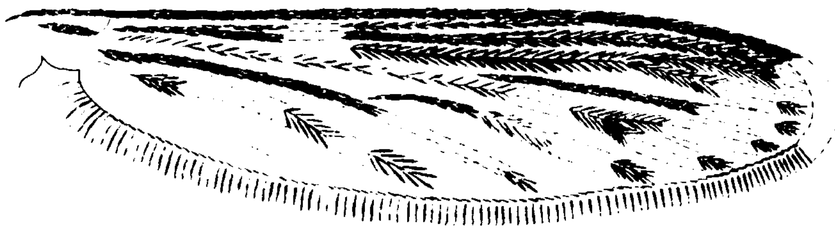


Fig. 312 — *Dorsal view of wing - An. crucians*

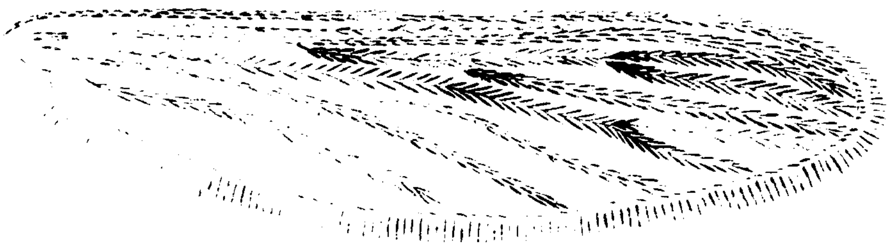


Fig. 313 — *Dorsal view of wing - An. quadrimaculatus*

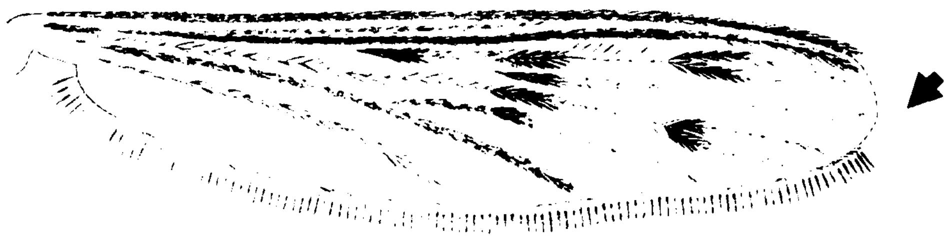


Fig. 314 — *Dorsal view of wing - An. earlei*

2(1). Hindtarsomeres with apical 0.5 of 2, all of 3, 4, and 5 pale-scal[illegible]cept for basal ring of dark scales on 5 (Fig. 315) . . . . *albimanus* (Plate 30)

Hindtarsomeres dark-scaled (Fig. 316) 3

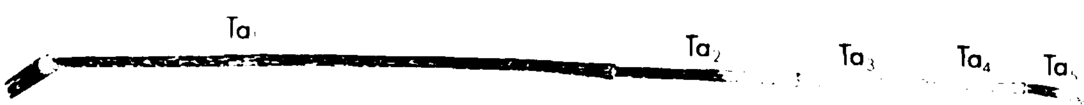


Fig. 315 — *Hindleg - An. albimanus*

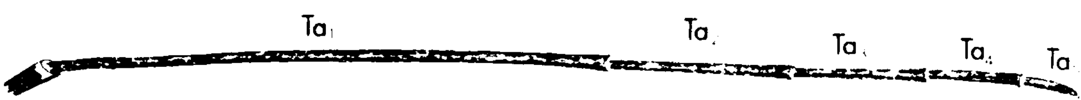


Fig. 316 — *Hindleg - An. punctipennis*

3(2). Wing with apical pale spot, otherwise vein C dark-scaled; vein A with 3 dark spots (Fig. 317) . . . . *crucians*
bradleyi
georgianus
(Plates 31, 29, 30)

Vein C with apical and subcostal pale spots; vein A with 1 or 2 dark-scaled spots or lines (Fig. 318) 4

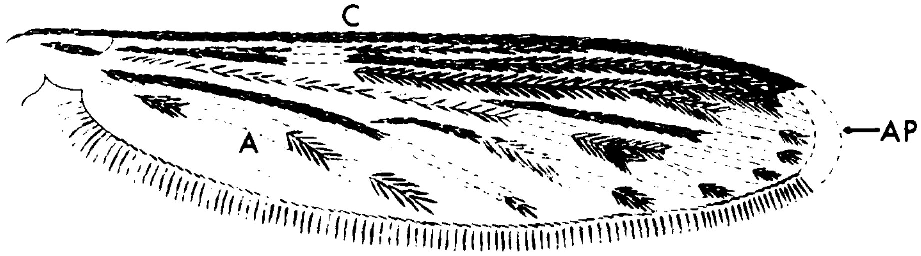


Fig. 317 — *Dorsal view of wing - An. crucians*

Fig. 318 — *Dorsal view of wing - An. punctipennis*

4(3). Palpus entirely dark-scaled (Fig. 319); wing veins R_{4+5} and Cu with only dark scales (Fig. 320) 5

Palpus with rings of pale scales (Fig. 321); veins R_{4+5} and Cu with long sections of pale scales centrally (Fig. 322) 6

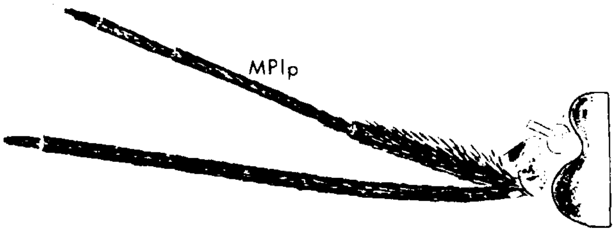


Fig. 319 — *Lateral view of head - An. punctipennis*

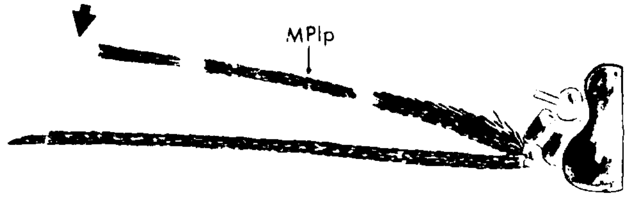


Fig. 321 — *Lateral view of head - An. pseudopunctipennis*

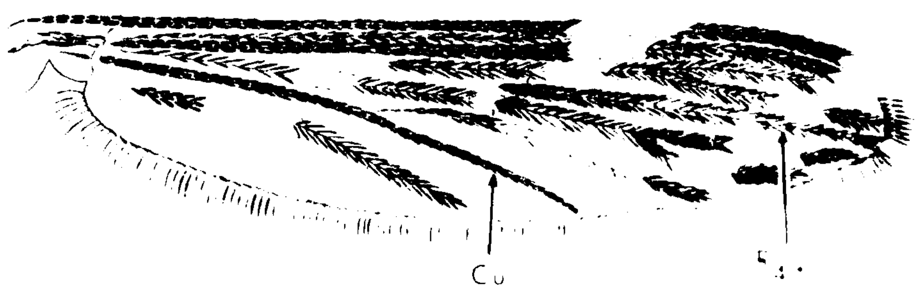
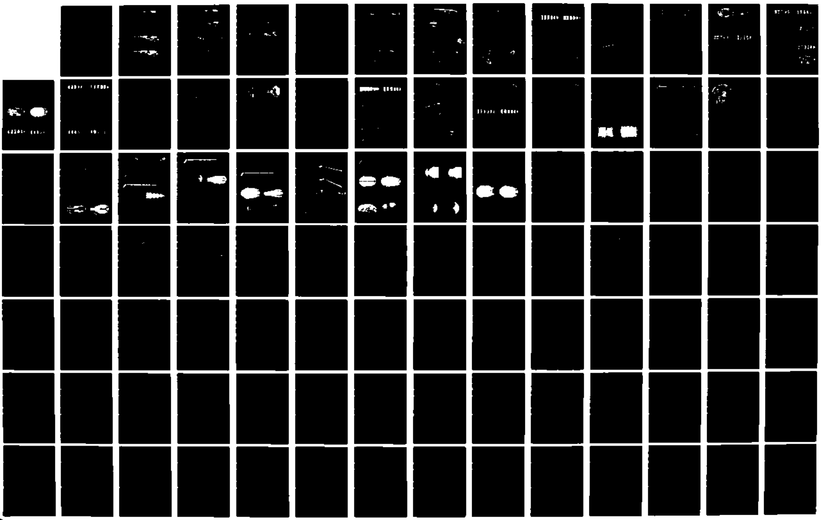
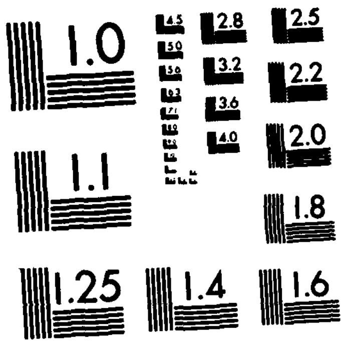


Fig. 320

AD-A125 975 IDENTIFICATION AND GEOGRAPHICAL DISTRIBUTION OF THE MOSQUITOES OF NORTH AMERICA NORTH OF MEXICO(U) WALTER REED ARMY INST OF RESEARCH WASHINGTON DC

UNCLASSIFIED R F DARSIE ET AL. 01 AUG 81 F/G 6/3 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0

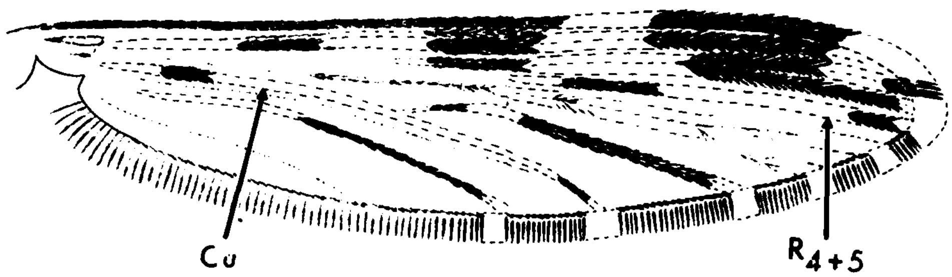


Fig. 322 — *Dorsal view of wing - An. pseudopunctipennis*

5(4). Subcostal pale spot 0.5 or more length of dark-scaled area between subcostal and apical pale spots (Fig. 323) .... *punctipennis* (Plate 29)

Subcostal pale spot much reduced, usually less than 0.33 length of dark-scaled area between subcostal and apical pale spots (Fig. 324) .... *perplexens* (Plate 29)

Fig. 323 — *Dorsal view of wing - An. punctipennis*

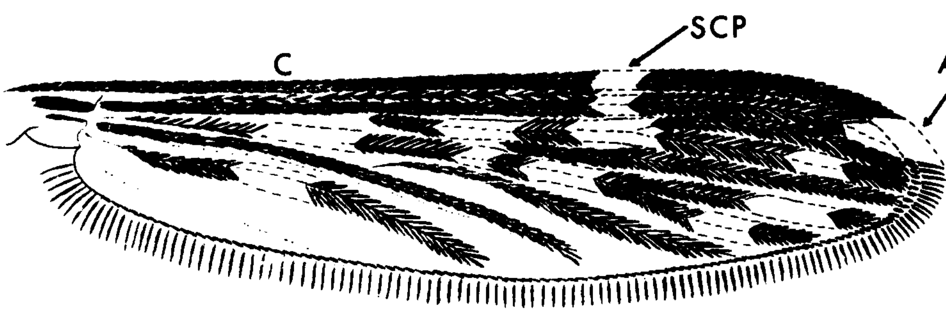


Fig. 324 — *Dorsal view of wing - An. perplexens*

6(4). Wing vein M predominantly pale-scaled (Fig. 325); apical segment of palpus with pale scales (Fig. 326) .... *pseudopunctipennis* (Plate 28)

Vein M mostly dark-scaled (Fig. 327); apical segment of palpus with dark scales (Fig. 328) .... *franciscanus* (Plate 28)

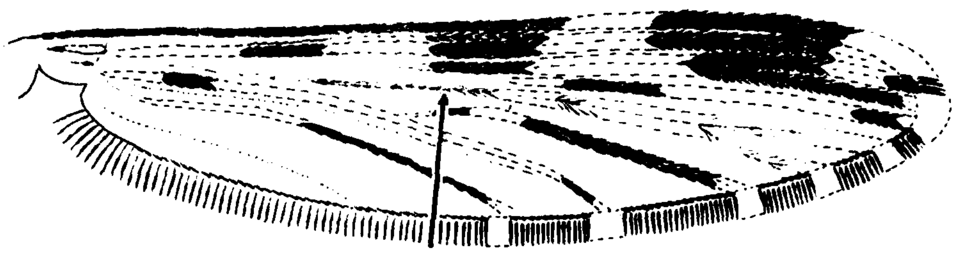


Fig. 325 — *Dorsal view of wing - An. pseudopunctipennis*

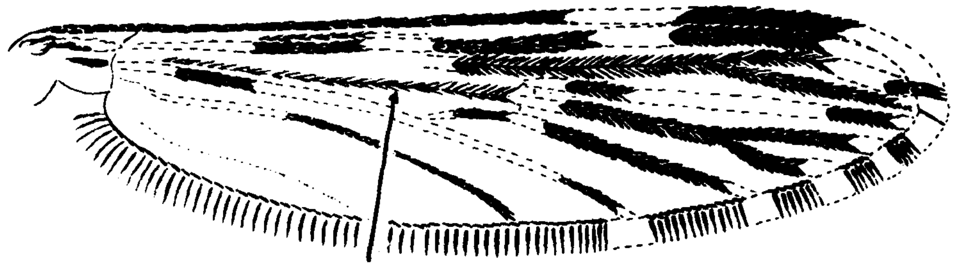


Fig. 327 — *Dorsal view of wing - An. franciscanus*

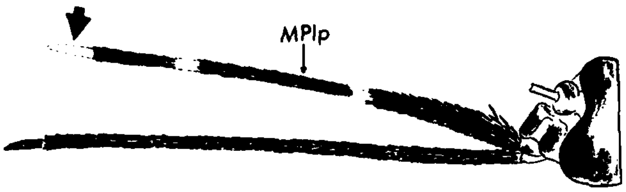


Fig. 326 — *Lateral view of head - An. pseudopunctipennis*

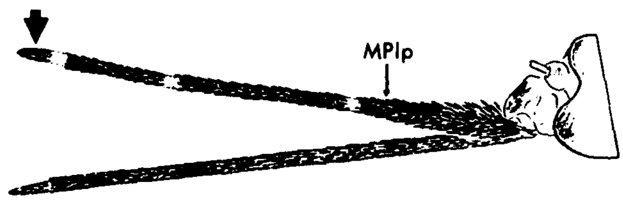


Fig. 328 — *Lateral view of head - An. franciscanus*

7(1). Wing with silvery or coppery apical fringe spot (Fig. 329) 8
Wing entirely dark-scaled (Fig. 330) 9

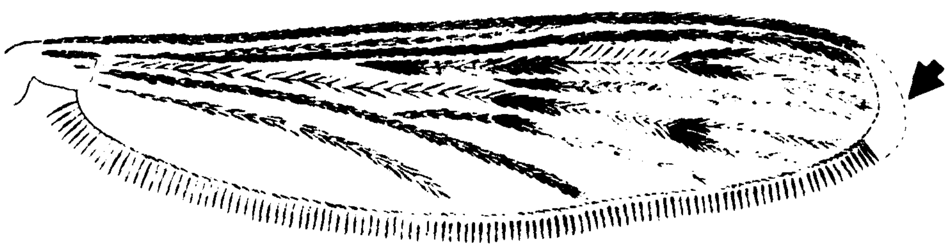


Fig. 329 — *Dorsal view of wing - An. earlei*

Fig. 330 — *Dorsal view of wing - An. quadrimaculatus*

8(7). Numerous erect scales on dorsal surface of wing vein R_{2+3} between its basal dark spot and fork of veins R_2 and R_3, decumbent ventral scales of R_{2+3} not visible from dorsal aspect (Fig. 331) .... *earlei*
(Plate 28)

Vein R_{2+3} bare, or rarely with 1-3 erect scales, on dorsal surface between its basal dark spot and fork of R_2 and R_3, decumbent ventral scales on R_{2+3} visible from dorsal aspect (Fig. 332) .... *occidentalis*
(Plate 30)

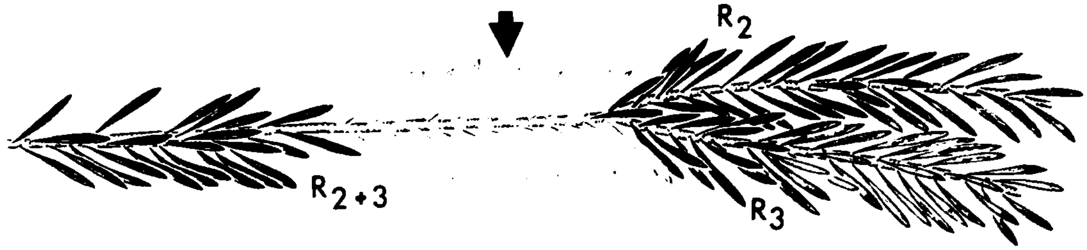


Fig. 331 — *Dorsal view of wing - An. earlei*

Fig. 332 — *Dorsal view of wing - An. occidentalis*

9(7). Wing unspotted (Fig. 333); scutal setae about 0.5 width of scutum (Fig. 334); small species, wing length about 3.0 mm 10

Wing spots of dark scales more or less distinct (Fig. 335); scutal setae mostly shorter than 0.5 width of scutum (Fig. 336); medium to large species, wing length 4.0 mm or more 11

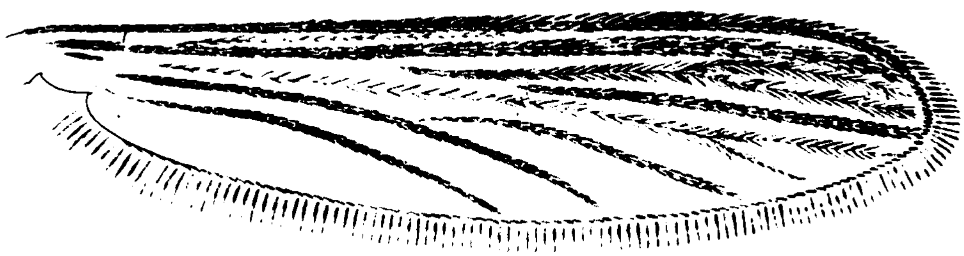


Fig. 333 — *Dorsal view of wing - An. barberi*

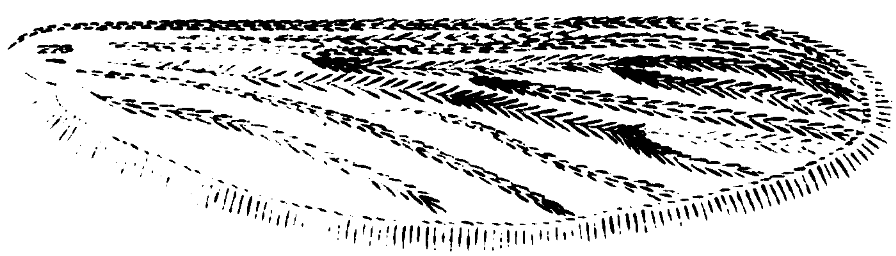


Fig. 335 — *Dorsal view of wing - An. quadrimaculatus*

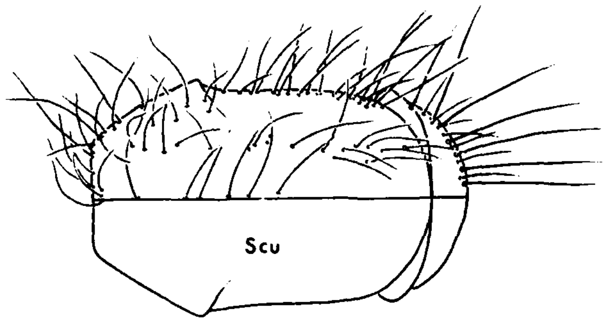


Fig. 334 — *Dorsal view of thorax - An. barberi*

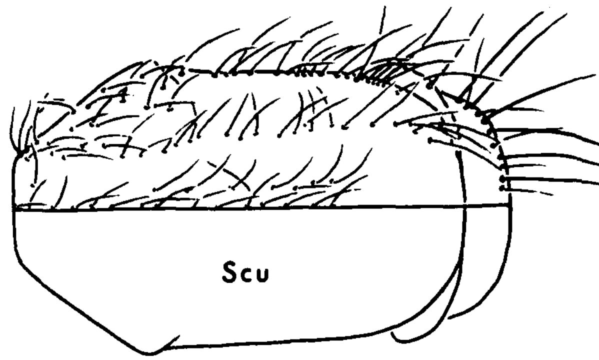


Fig. 336 — *Dorsal view of thorax - An. freeborni*

10(9). Proepisternum with 6-11 setae; forecoxa with 19 or more setae; anterior acrostichal setae dark in color (Fig. 337) .... *barberi* (Plate 30)

Proepisternum with 2-5 setae; forecoxa with 18 or fewer setae; anterior acrostichal setae amber (Fig. 338) .... *judithae* (Plate 30)

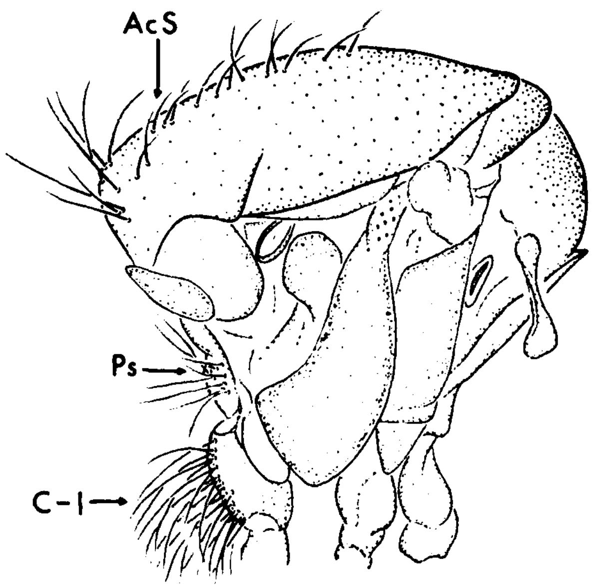


Fig. 337 — *Lateral view of thorax and mesoscutum - An. barberi*

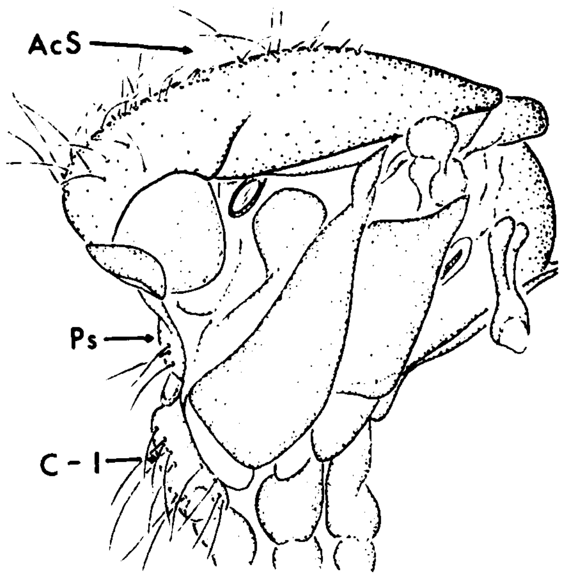


Fig. 338 — *Lateral view of thorax and mesoscutum - An. judithae*

11(9). Interocular tuft with some pale setae (Fig. 339); wing with 4 distinct, dark-scaled spots (Fig. 340); palpus with dark scales (Fig. 339) 12

Interocular tuft with only dark setae (Fig. 341); wing usually with dark-scaled spots indistinct (Fig. 342); segments of palpus with or without distinct pale apical rings (Fig. 341) 13

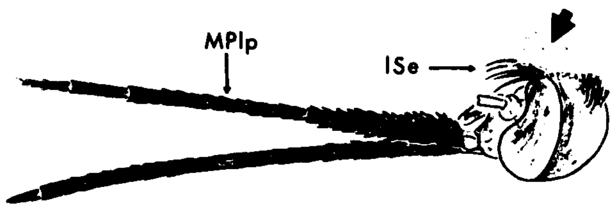


Fig. 339 — *Lateral view of head - An. freeborni*

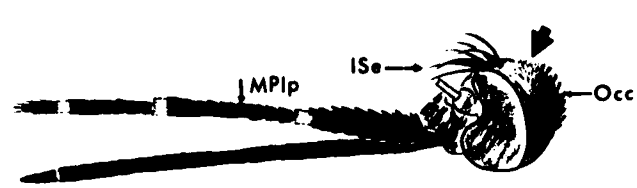


Fig. 341 — *Lateral view of head - An. walkeri*

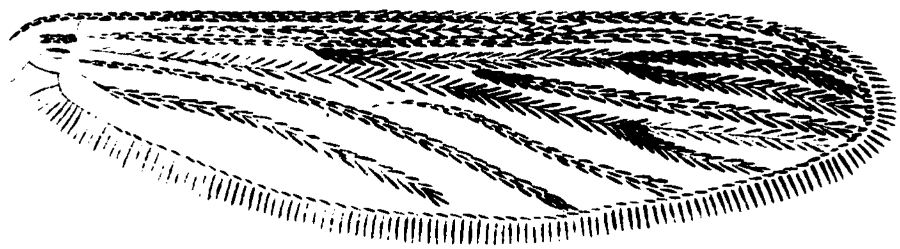


Fig. 340 — *Dorsal view of wing - An. quadrimaculatus*

Fig. 342 — *Dorsal view of wing - An. atropos*

12(11). Scales on basal part of wing vein Cu elongate with apices truncate (Fig. 343); in western USA and Canada .... *freeborni* (Plate 31)

Scales on base of vein Cu obovate with apices rounded (Fig. 344); in eastern USA and Canada .... *quadrimaculatus* (Plate 31)

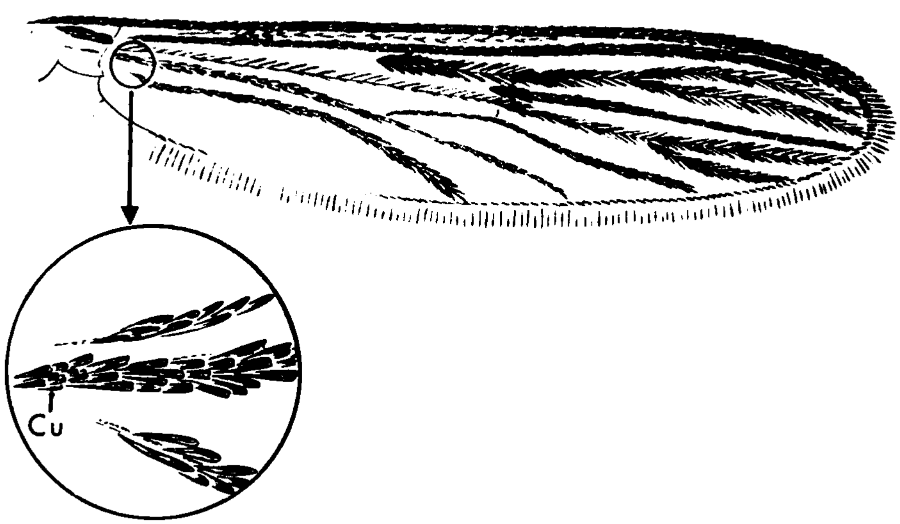


Fig. 343 — *Dorsal view of wing - An. freeborni*

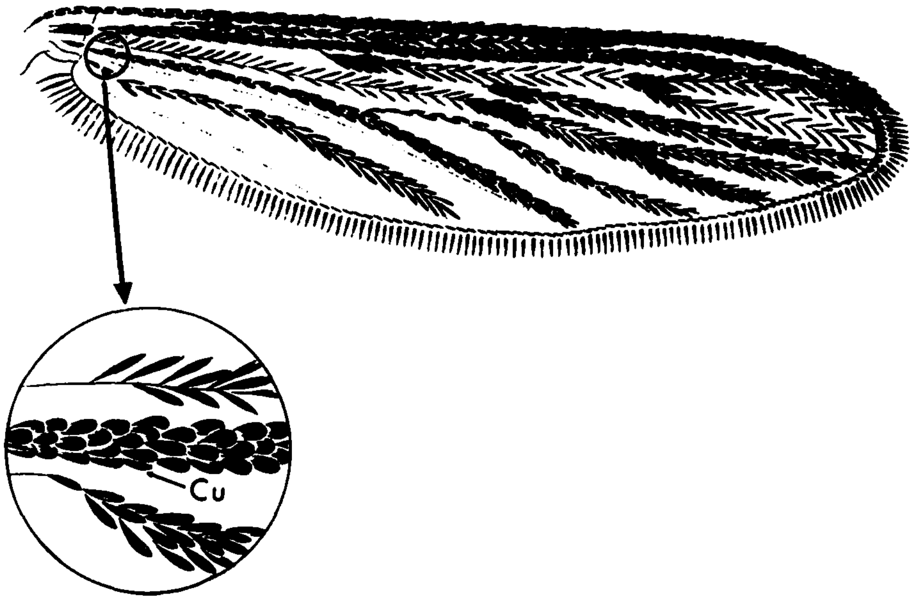


Fig. 344 — *Dorsal view of wing - An. quadrimaculatus*

13(11). Capitellum of halter usually pale-scaled (Fig. 345); occiput with patch of pale scales medioanteriorly (Fig. 346); femur with apical patch of pale scales (Fig. 347) .... *walkeri* (Plate 28)

Capitellum of halter entirely dark-scaled (Fig. 348); occiput without patch of pale scales medioanteriorly (Fig. 349); femur with few or no pale scales apically (Fig. 350) .... *atropos* (Plate 28)

Fig. 345 — *Halter enlarged - An. walkeri*

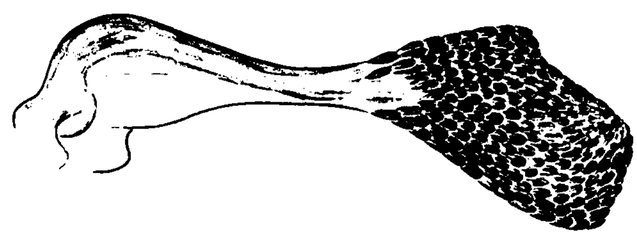


Fig. 348 — *Halter enlarged - An. atropos*

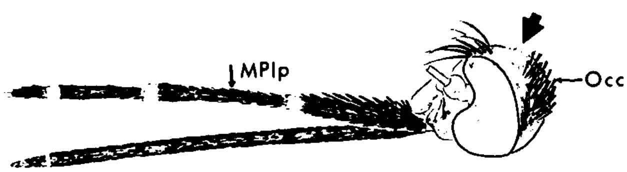


Fig. 346 — *Lateral view of head - An. walkeri*

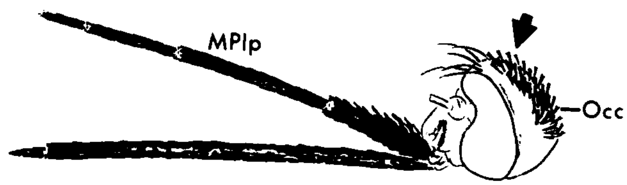


Fig. 349 — *Lateral view of head - An. atropos*

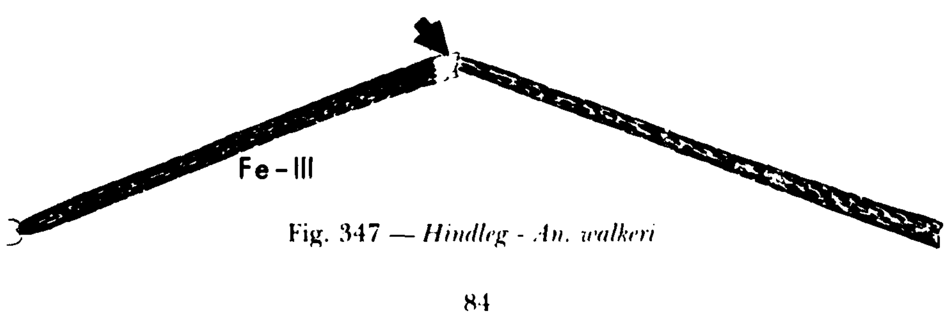


Fig. 347 — *Hindleg - An. walkeri*

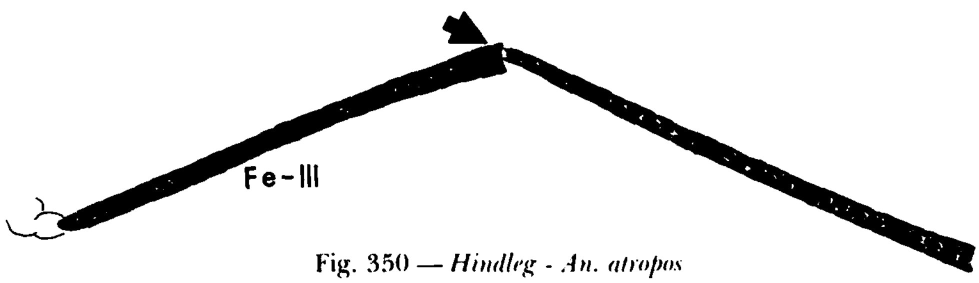


Fig. 350 — *Hindleg - An. atropos*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *CULEX*

1. Scutum with middorsal, acrostichal setae (Fig. 351); occiput with narrow scales dorsally (Fig. 352) 2

   Scutum without middorsal, acrostichal setae (Fig. 353); occiput with broad, appressed scales dorsally, sometimes limited to borders of eyes (Fig. 354) 19

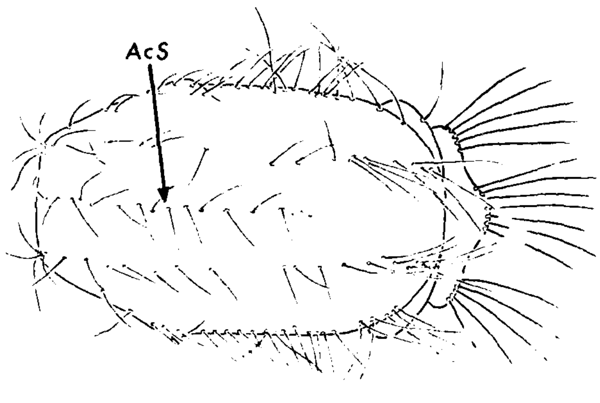


Fig. 351 — *Dorsal view of thorax - Cx. pipiens*

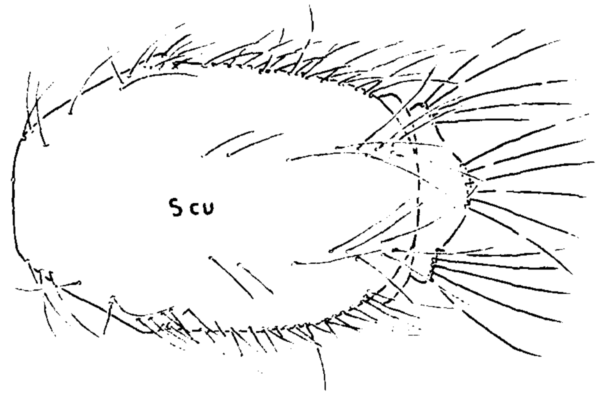


Fig. 353 — *Dorsal view of thorax - Cx. erraticus*

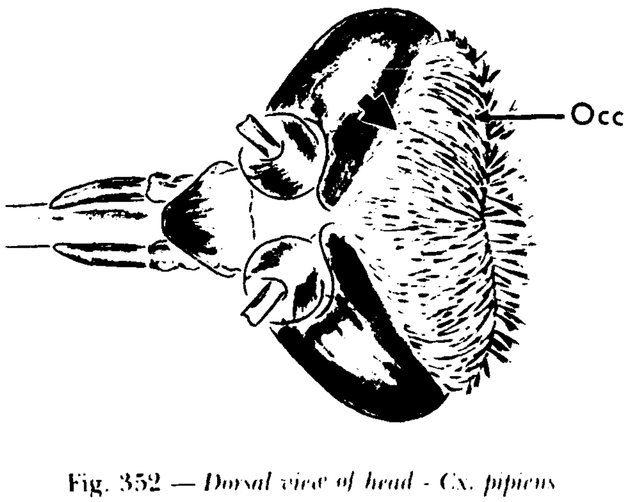


Fig. 352 — *Dorsal view of head - Cx. pipiens*

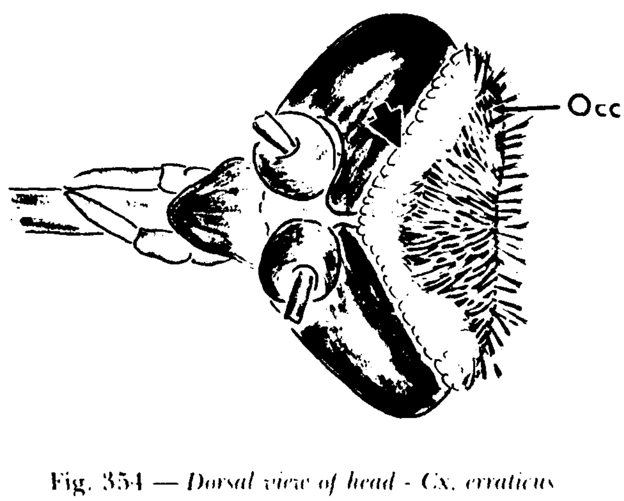


Fig. 354 — *Dorsal view of head - Cx. erraticus*

2(1). **Abdominal terga with bands or lateral spots of pale scales along basal border (Fig. 355) (subgenus *Culex*)** **3**

Abdominal terga with bands or lateral spots of pale scales along apical border, or sometimes all dark-scaled (Fig. 356) (subgenus *Neoculex*) **15**

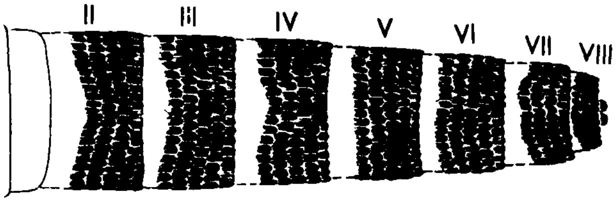


Fig. 355 — *Dorsal view of abdomen - Cx. restuans*

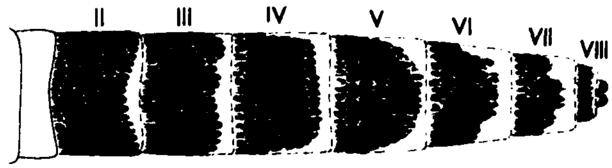


Fig. 356 — *Dorsal view of abdomen - Cx. territans*

3(2). Hindtarsomeres with rather distinct, basal and apical rings of pale scales (Fig. 357) 4

Hindtarsomeres dark-scaled, or if with pale scales, then as very narrow, basal rings (Fig. 358) 9

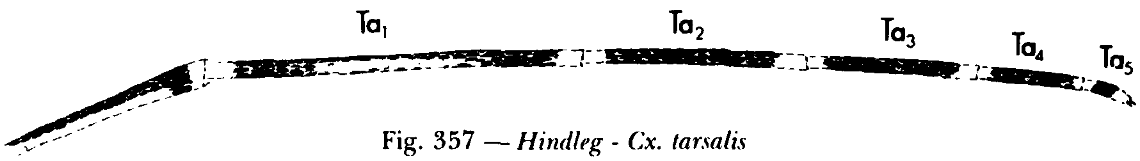


Fig. 357 — *Hindleg - Cx. tarsalis*

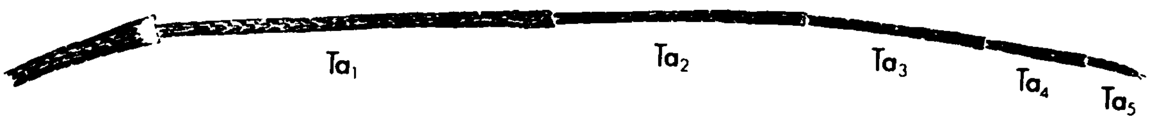


Fig. 358 — *Hindleg - Cx. restuans*

4(3). Proboscis with complete, distinct ring of pale scales (Fig. 359) 5

Proboscis without complete, distinct ring of pale scales (Fig. 360) 7

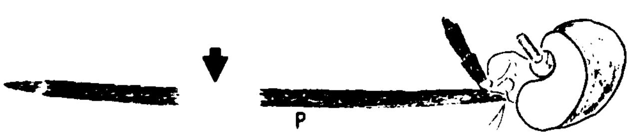


Fig. 359 — *Lateral view of head - Cx. tarsalis*

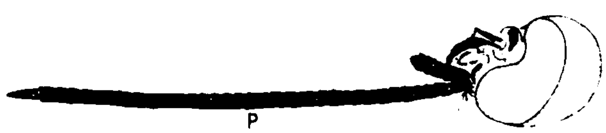


Fig. 360 — *Lateral view of head - Cx. pipiens*

5(4). Hindtarsomeres with basal and apical rings of pale scales narrow (Fig. 361) .... *bahamensis* (Plate 25)

Hindtarsomeres with basal and apical rings of pale scales rather broad (Fig. 362) 6

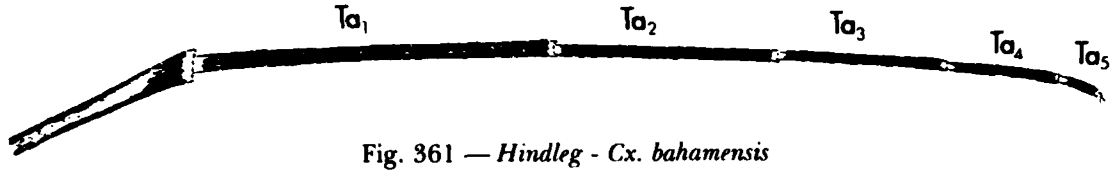


Fig. 361 — *Hindleg - Cx. bahamensis*

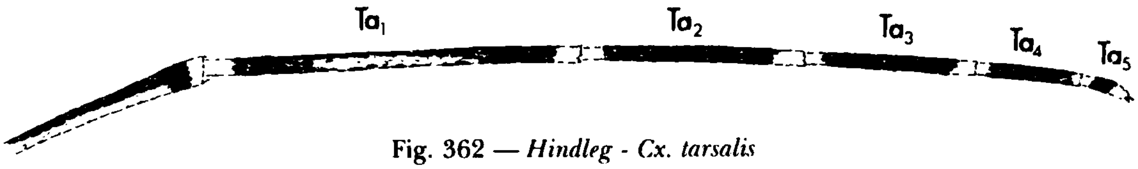


Fig. 362 — *Hindleg - Cx. tarsalis*

6(5). Anterior surface of forefemur and tibia with pale stripe or line of pale-scaled spots (Fig. 363); V-shaped, dark-scaled marks on abdominal sterna (Fig. 364) .... *tarsalis*
(Plate 34)

Forefemur and tibia without pale stripe or line of spots (Fig. 365); sternal dark marks on abdomen oval in shape (Fig. 366) .... *peus*
(Plate 37)

Fig. 363 — *Anterior view of foreleg - Cx. tarsalis*

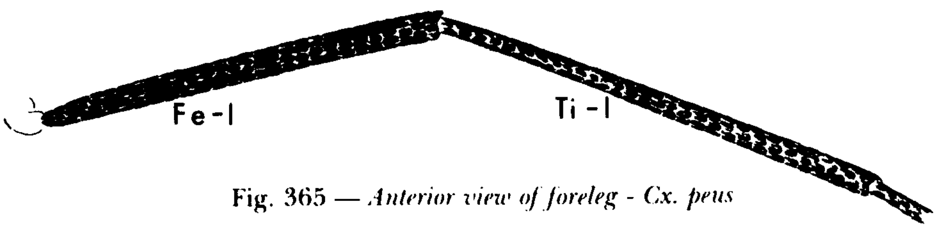
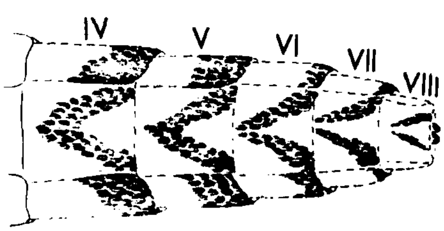


Fig. 365 — *Anterior view of foreleg - Cx. peus*



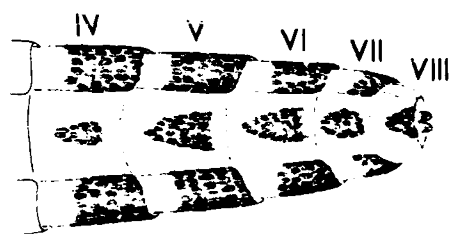


Fig. 364 — *Ventral view of abdomen - Cx. tarsalis*

Fig. 366 — *Ventral view of abdomen - Cx. peus*

7(4). Abdominal sterna with median triangular areas of dark scales (Fig. 367) .... *thriambus*
(Plate 39)

Abdominal sterna without dark triangles, mostly pale-scaled (Fig. 368) 8

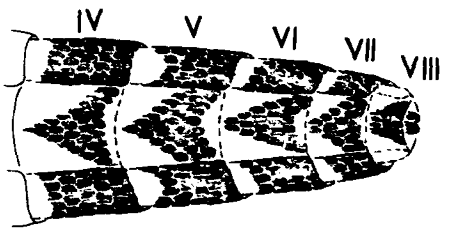


Fig. 367 — *Ventral view of abdomen - Cx. thriambus*

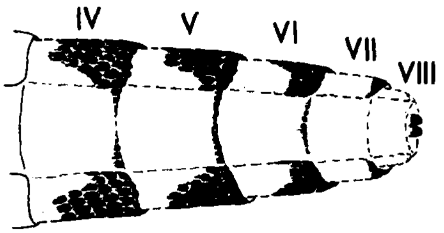


Fig. 368 — *Ventral view of abdomen - Cx. coronator*

8(7). Hindtarsomere 5 with rings of pale scales basally and apically, with dark scales medially (Fig. 369) . . . . *coronator* (Plate 35)

Hindtarsomere 5 with narrow ring of pale scales basally, otherwise dark-scaled (Fig. 370) . . . . . . *declarator* (Plate 36)

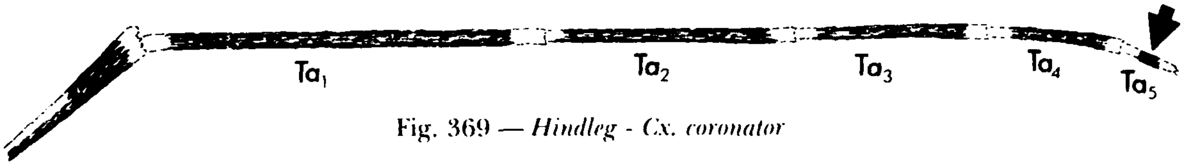


Fig. 369 — *Hindleg - Cx. coronator*

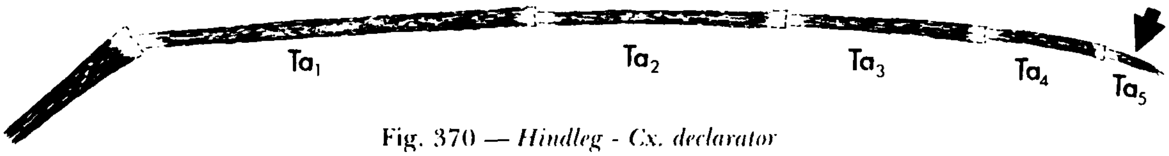


Fig. 370 — *Hindleg - Cx. declarator*

9(3). Integument of scutum, thoracic pleura and coxae reddish brown (Fig. 371); scutum with hair-like, golden brown scales (Fig. 372) . . . . *erythrothorax* (Plate 34)

Integument of scutum, thoracic pleura and coxae shades of brown, never reddish brown (Fig. 373); scales of scutum narrow, curved, not hair-like (Fig. 374) 10

Fig. 371 — *Lateral view of thorax - Cx. erythrothorax*

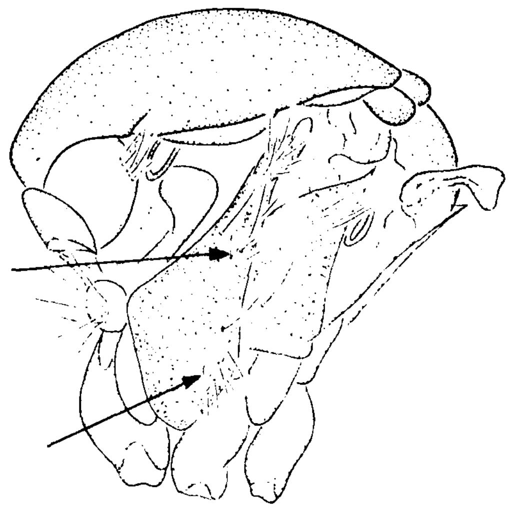


Fig. 373 — *Lateral view of thorax - Cx. nigripalpus*

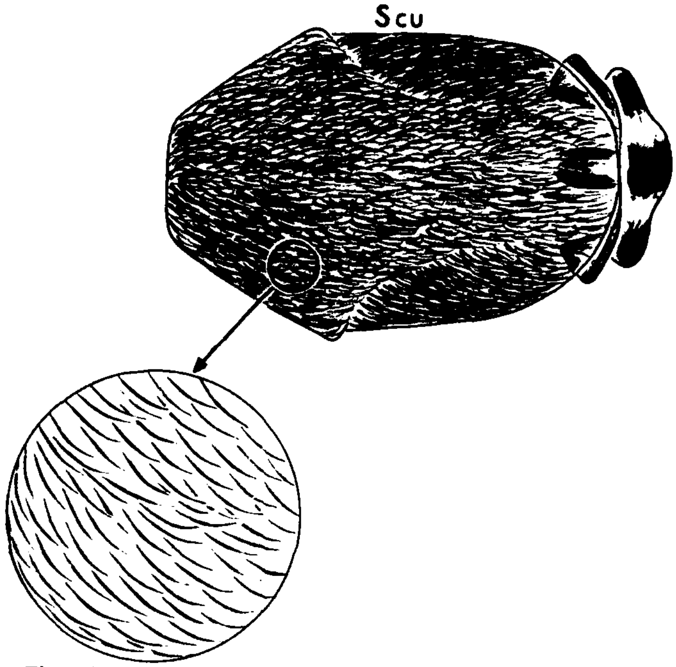


Fig. 372 — *Dorsal view of thorax - Cx. erythrothorax*

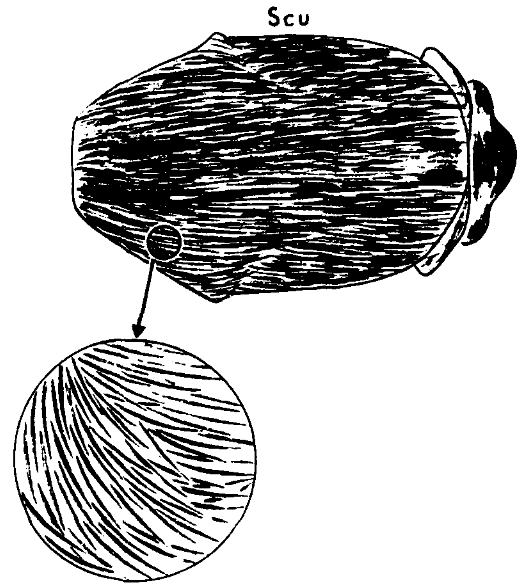


Fig. 374 — *Dorsal view of thorax - Cx. nigripalpus*

10(9). Abdominal terga not banded or with narrow, basal, pale bands, (Fig. 375) 11

Abdominal terga with conspicuous basal bands of pale scales (Fig. 376) 13

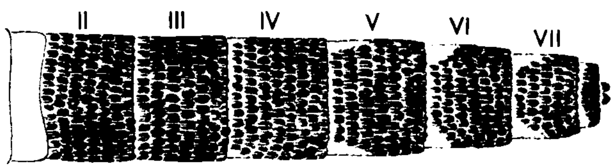


Fig. 375 — *Dorsal view of abdomen - Cx. nigripalpus*

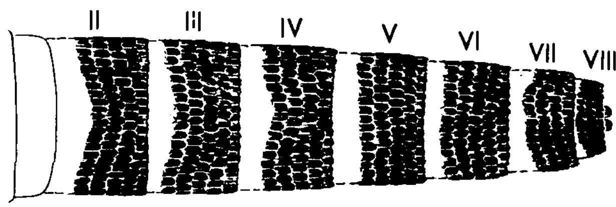


Fig. 376 — *Dorsal view of abdomen - Cx. restuans*

11(10). Scale patches on thoracic pleura absent, or if present, in groups of fewer than 6 scales (Fig. 377); abdominal terga without basal bands of pale scales (Fig. 378) .... *nigripalpus* (Plate 37)

Thoracic pleura with several groups of pale scales with 6 or more scales each (Fig. 379); abdominal terga usually with narrow, basal bands of white or dingy yellow scales (Fig. 380) 12

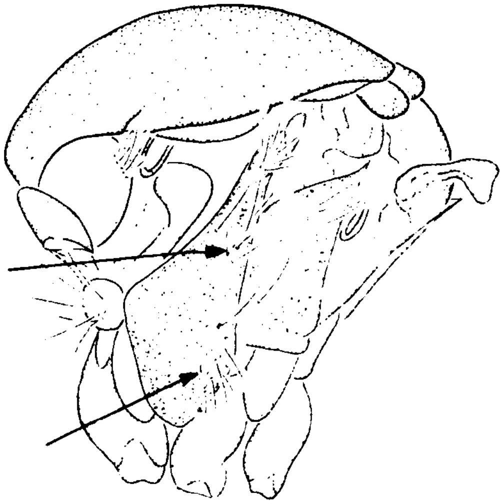


Fig. 377 — *Lateral view of thorax - Cx. nigripalpus*

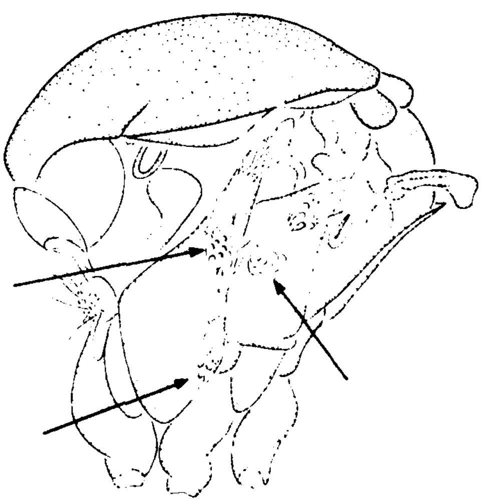


Fig. 379 — *Lateral view of thorax - Cx. salinarius*

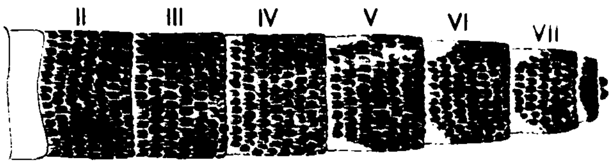


Fig. 378 — *Dorsal view of abdomen - Cx. nigripalpus*

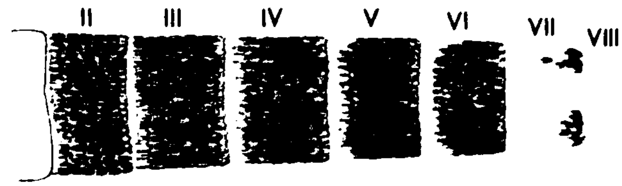


Fig. 380 — *Dorsal view of abdomen - Cx. salinarius*

12(11). Abdominal tergum VII mostly with dingy yellow scales; terga II-VI with only basolateral patches or with narrow, basal bands of dingy yellow scales, sometimes blended with similar scales on apex of previous segment (Fig. 381) .... *salinarius* (Plate 35)

Abdominal tergum VII mostly with dark scales; terga II-VI with only basolateral patches or with basal bands of whitish scales (Fig. 382) .... *chidesteri* (Plate 34)

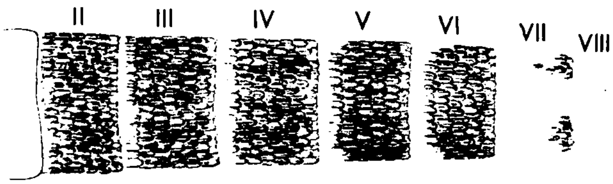


Fig. 381 — *Dorsal view of abdomen - Cx. salinarius*

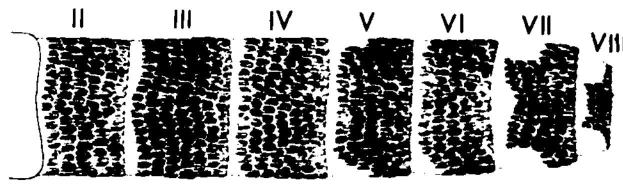


Fig. 382 — *Dorsal view of abdomen - Cx. chidesteri*

13(10). Basal pale bands of abdominal terga rounded posteriorly, with marked sublateral constrictions, narrowly joined to lateral pale patches (Fig. 383); scutum without pale-scaled spots (Fig. 384) .... *pipiens quinquefasciatus* (Plate 36)

Basal pale bands of abdominal terga not rounded posteriorly, broadly joined to lateral pale patches with only slight sublateral constrictions, most evident on tergum IV (Fig. 385); scutum with or without pale-scaled spots (Fig. 386) 14

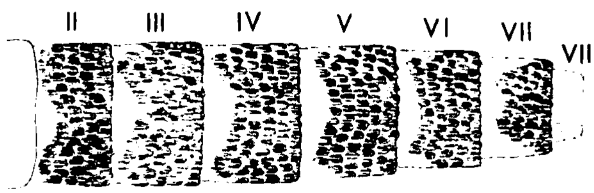


Fig. 383 — *Dorsal view of abdomen - Cx. pipiens*

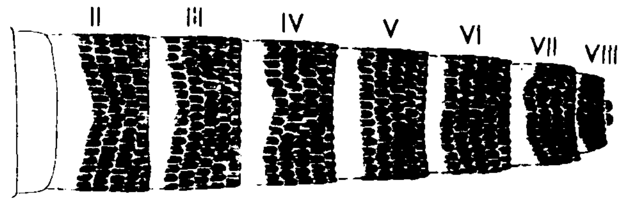


Fig. 385 — *Dorsal view of abdomen - Cx. restuans*

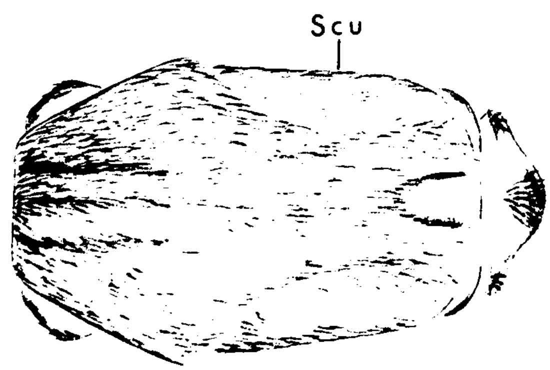


Fig. 384 — *Dorsal view of thorax - Cx. pipiens*

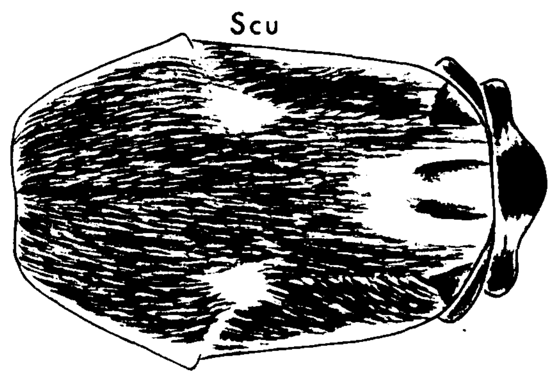


Fig. 386 — *Dorsal view of thorax - Cx. restuans*

14(13). Wing cell R_2 4.5 or more length of vein R_{2+3} (Fig. 387); scutum usually with pair of pale, submedian spots (Fig. 388); medium-sized species, wing length 4.0 mm or greater .... *restuans* (Plate 38)

Wing cell R_2 about 3.0-4.0 length of vein R_{2+3} (Fig. 389); scutum without pale spots (Fig. 390); small species, wing length 2.8 mm or less .... *interrogator* (Plate 32)

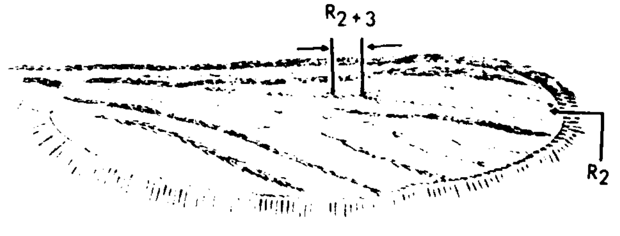


Fig. 387 — *Dorsal view of wing - Cx. restuans*

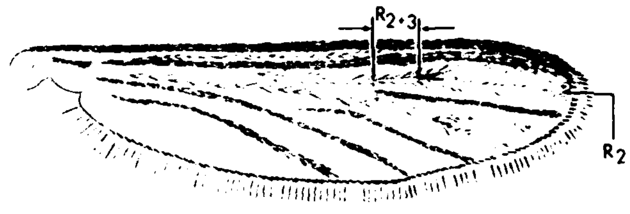


Fig. 389 — *Dorsal view of wing - Cx. interrogator*

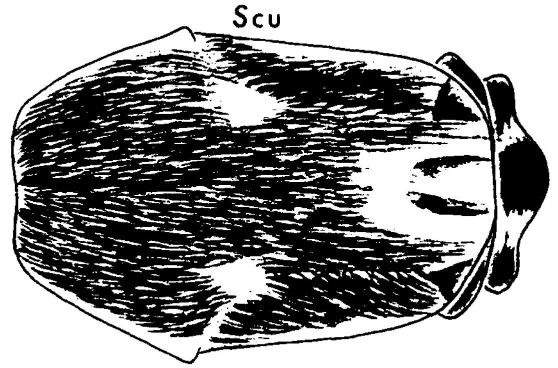


Fig. 388 — *Dorsal view of thorax - Cx. restuans*

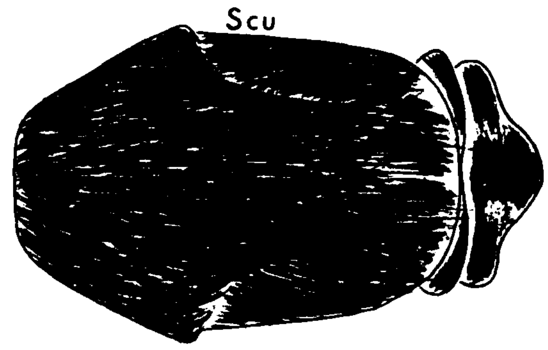


Fig. 390 — *Dorsal view of thorax - Cx. interrogator*

15(2). Abdominal terga II,III with dorsum entirely dark-scaled (Fig. 391) .... *reevesi* (Plate 33)

Abdominal terga II,III with apical bands or apicolateral patches extending onto dorsum (Fig. 392) 16

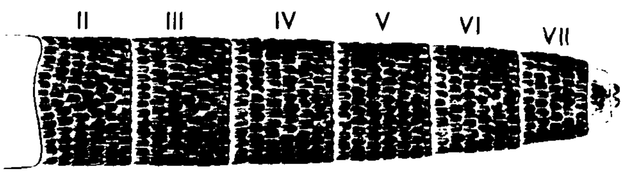


Fig. 391 — *Dorsal view of abdomen - Cx. reevesi*

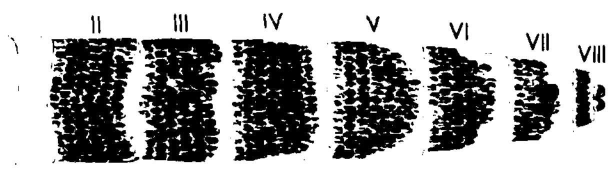


Fig. 392 — *Dorsal view of abdomen - Cx. territans*

16(15). Apicolateral pale patches extending basally at least to 0.5 of tergum on abdominal segments IV-VI, usually connected to dorsoapical pale bands (Fig. 393); palpus about 2.0 length of antennal flagellomere 4 (Fig. 394) 17

Dorsoapical pale bands not markedly wider laterally, not extending basally more than 0.3 of tergum on IV-VI (Fig. 395); palpus about 2.5-3.0 length of flagellomere 4 (Fig. 396) 18

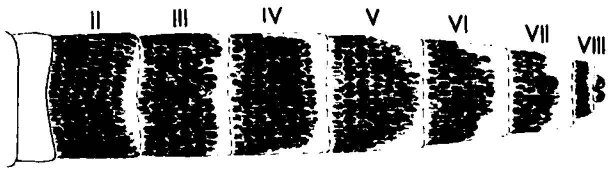


Fig. 393 — *Dorsal view of abdomen - Cx. territans*

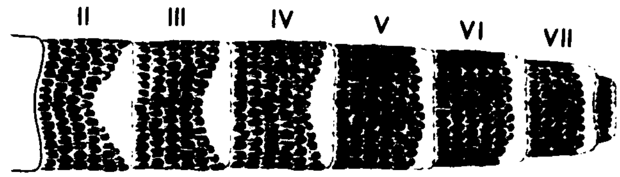


Fig. 395 — *Dorsal view of abdomen - Cx. arizonensis*

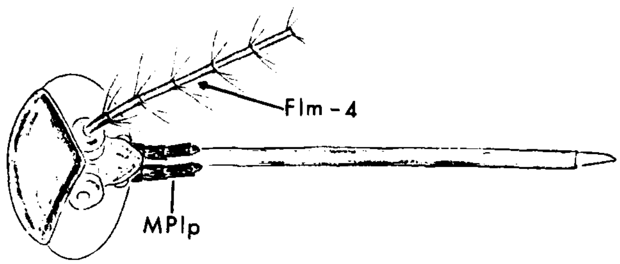


Fig. 394 — *Dorsal view of head - Cx. territans*

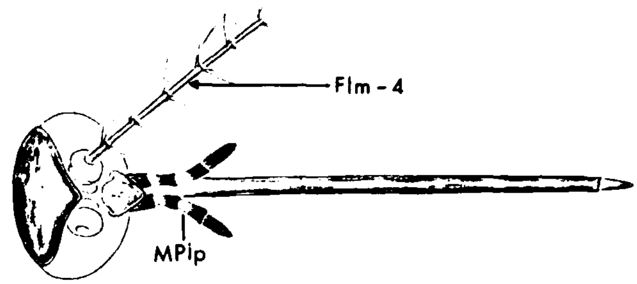


Fig. 396 — *Dorsal view of head - Cx. apicalis*

17(16). Wing cell R_2 about 3.0 length of vein R_{2+3} (Fig. 397); apical and apicolateral scales of abdominal terga II-VII whitish (Fig. 398) . . . . *territans*
(Plate 33)

Wing cell R_2 2.5 or less length of vein R_{2+3} (Fig. 399); apical and apicolateral scales on terga II-VII usually yellowish (Fig. 400) . . . . *boharti*
(Plate 35)

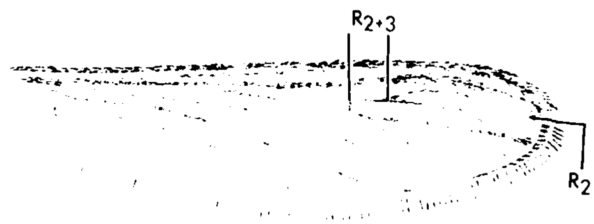


Fig. 397 — *Dorsal view of wing - Cx. territans*

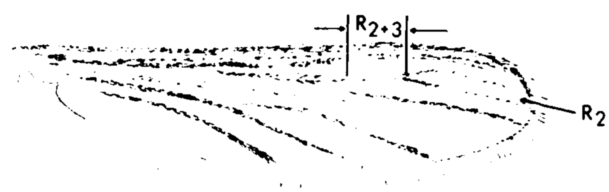


Fig. 399 — *Dorsal view of wing - Cx. boharti*

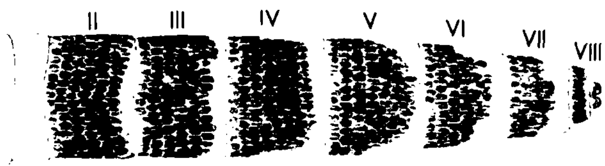


Fig. 398 — *Dorsal view of abdomen - Cx. territans*

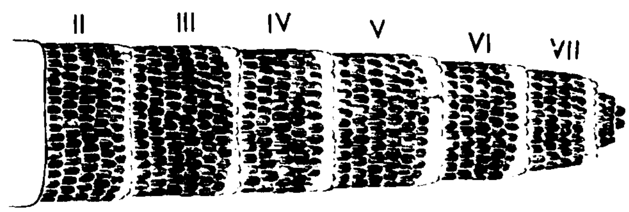


Fig. 400 — *Dorsal view of abdomen - Cx. boharti*

18(16). Palpus with some pale scales (Fig. 401) . . . . *apicalis*
(Plate 33)

Palpus entirely dark-scaled (Fig. 402) . . . . *arizonensis*
(Plate 32)

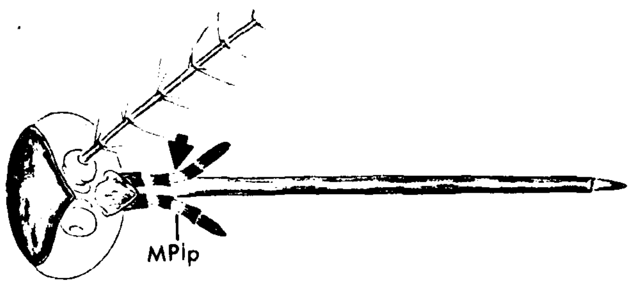


Fig. 401 — *Dorsal view of head - Cx. apicalis*

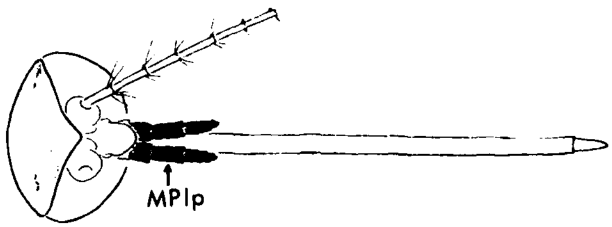


Fig. 402 — *Lateral view of head - Cx. arizonensis*

19(1). Mesokatepisternum with large, vertical patch of pale scales (Fig. 403) (subgenus *Tinolestes*) ..... *latisquama* (Plate 24)

Mesokatepisternum with at most a small scale patch (Fig. 404) (subgenus *Melanoconion*) 20

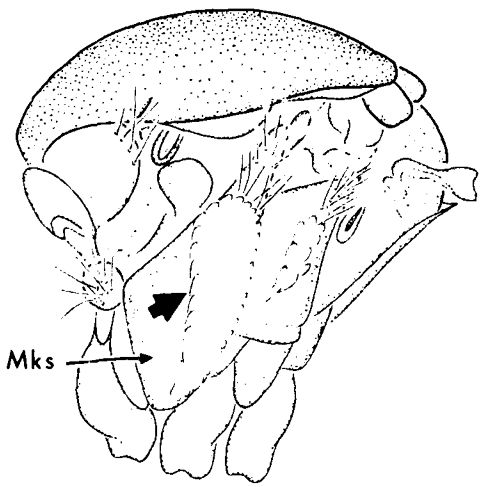


Fig. 403 — *Lateral view of thorax - Cx. latisquama*

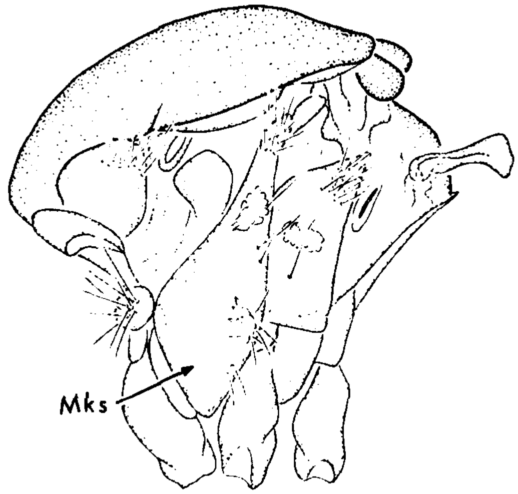


Fig. 404 — *Lateral view of thorax - Cx. pipiens*

20(19). Mesanepimeron with large patch of broad, pale scales (Fig. 405) .... *erraticus* (Plate 37)

Mesanepimeron usually unscaled, or with only few narrow scales (Fig. 406) 21

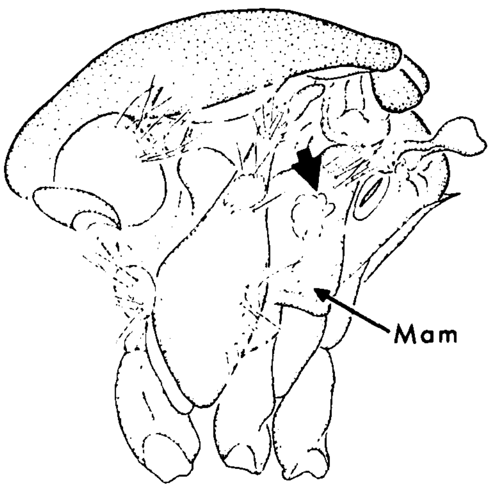


Fig. 405 — *Lateral view of thorax - Cx. erraticus*

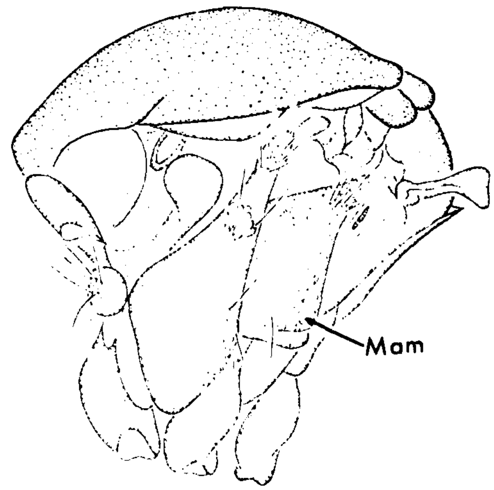


Fig. 406 — *Lateral view of thorax - Cx. peccator*

21(20). **Upper mesokatepisternum with patch of more than 5 pale scales; mesanepimeron with light, integumental area (Fig. 407) 22**

Upper mesokatepisternum without scales or with fewer than 6; mesanepimeron with or without light, integumental area (Fig. 408) 24

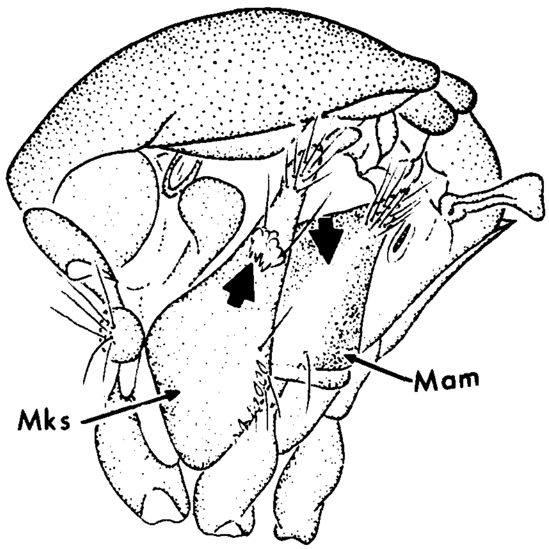


Fig. 407 — *Lateral view of thorax - Cx. peccator*

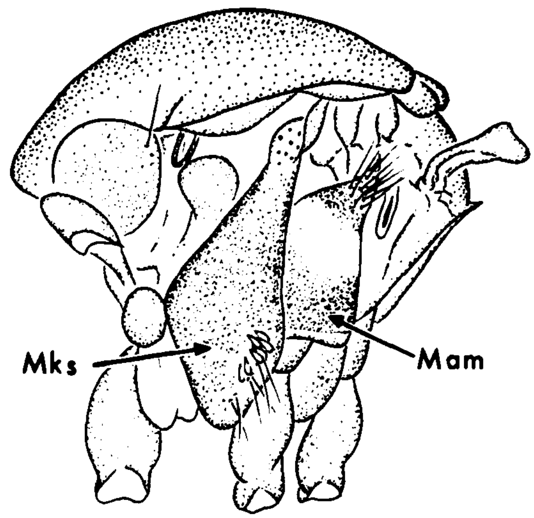


Fig. 408 — *Lateral view of thorax - Cx. atratus*

22(21). Hindleg with pale bands on joints of tarsomeres 1-4 and tarsomere 5 with pale scales from base to apex (Fig. 409) .... *opisthopus*
(Plate 36)

Hindtarsomeres entirely dark-scaled (Fig. 410) 23

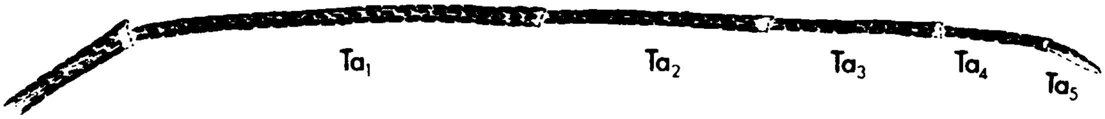


Fig. 409 — *Hindleg - Cx. opisthopus*

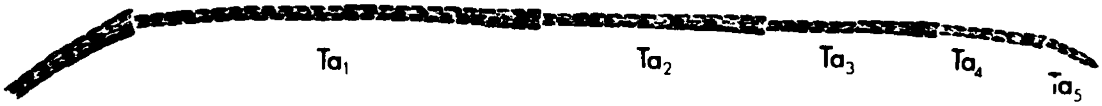


Fig. 410 — *Hindleg - Cx. peccator*

23(22). Occiput with broad, dingy white scales anteromedially (Fig. 411) .... *abominator*
(Plate 32)

Occiput with broad, dark brown scales anteromedially (Fig. 412) .... *peccator*
anips
(Plates 38, 32)

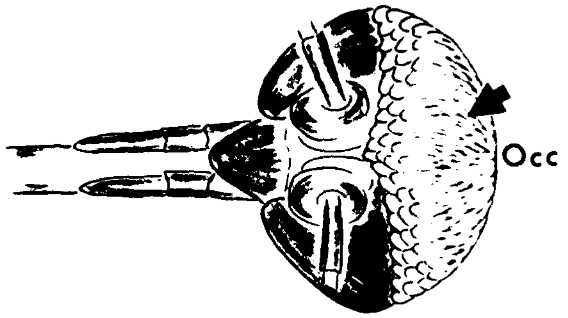


Fig. 411 — *Dorsal view of head - Cx. abominator*

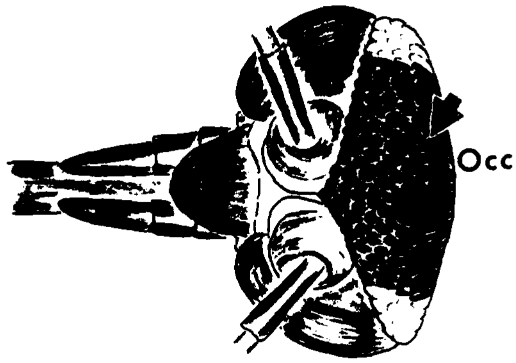


Fig. 412 — *Dorsal view of head - Cx. peccator*

24(21). Mesanepimeron and mesokatepisternum without pale spot or light integumental areas; mesanepimeron with hairlike to ligulate scales (Fig. 413) .... *iolambdis* (Plate 35)

Mesanepimeron and sometimes mesokatepisternum with pale spot or light integumental area; mesanepimeron without scales (Fig. 414) 25

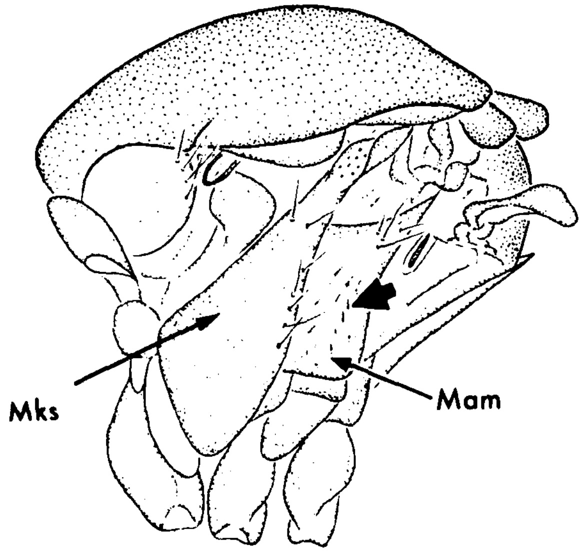


Fig. 413 — *Lateral view of thorax - Cx. iolambdis*

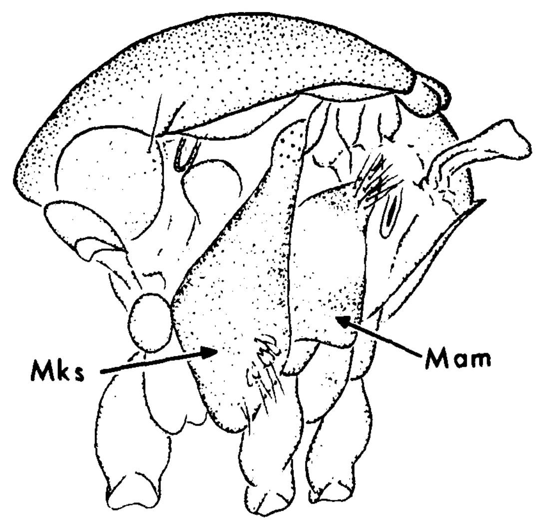


Fig. 414 — *Lateral view of thorax - Cx. atratus*

25(24). Mesanepimeron with distinct pale spot connected with anterior border, with dark area ventrally continuous with dark, central area of mesokatepisternum (Fig. 415) .... *atratus* (Plate 34)

Mesanepimeron without distinct pale spot but with part of integument light in color (Fig. 416) 26

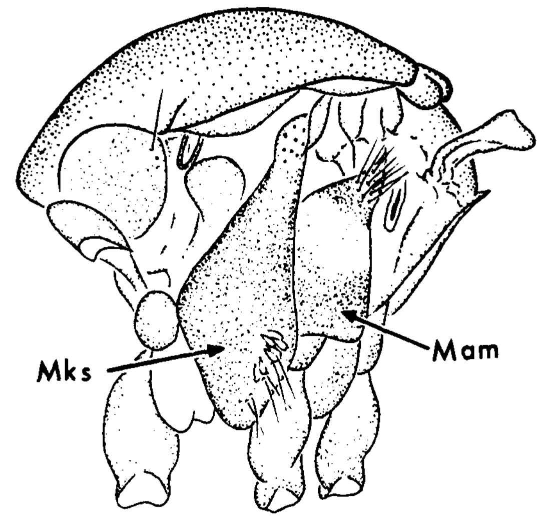


Fig. 415 — *Lateral view of thorax - Cx. atratus*

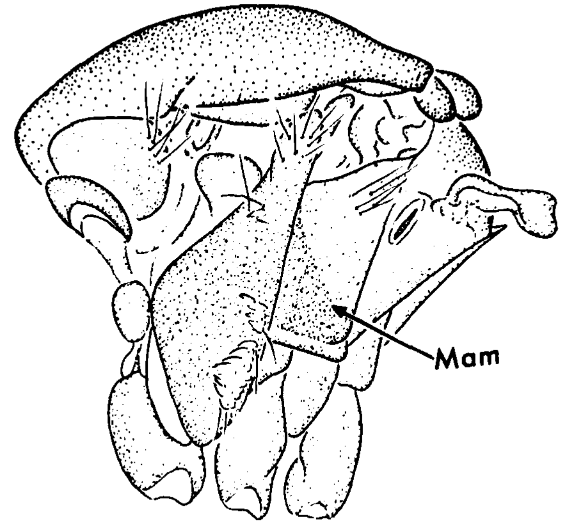


Fig. 416 — *Lateral view of thorax - Cx. pilosus*

26(25). Mesanepimeron with light integumental area covering upper 0.66 of sclerite; part of mesokatepisternum below ventral border of mesanepimeron with width/length ratio of 1.2-1.3 to 1 (Fig. 417) .... *pilosus* (Plate 32)

Mesanepimeron with light integumental area confined to narrow, pale border; part of mesokatepisternum below ventral border of mesanepimeron with width/length ratio of 1 to 1 (Fig. 418) .... *mulrennani* (Plate 38)

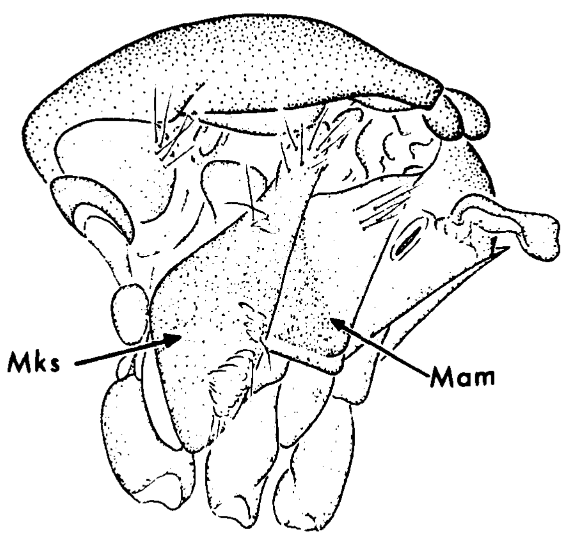


Fig. 417 — *Lateral view of thorax - Cx. pilosus*

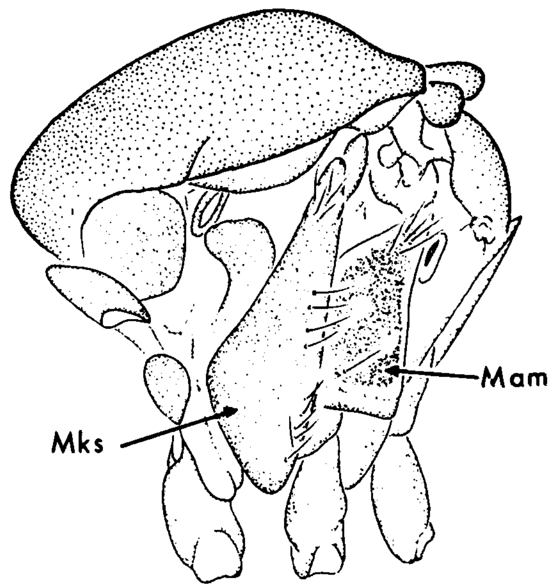


Fig. 418 — *Lateral view of thorax - Cx. mulrennani*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *CULISETA*

1. Dorsum of abdomen without basal, pale bands (Fig. 419) .... *melanura* (Plate 42)

Dorsum of abdomen with distinct basal, pale bands (Fig. 420) 2

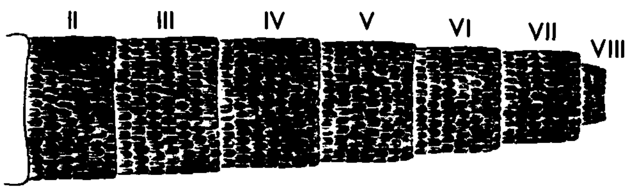


Fig. 419 — *Dorsal view of abdomen - Cs. melanura*

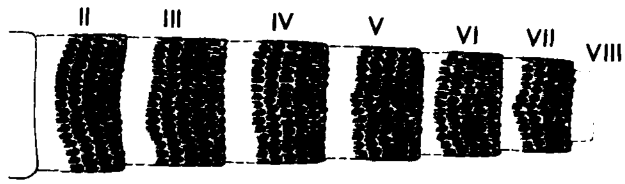


Fig. 420 — *Dorsal view of abdomen - Cs. morsitans*

2(1). Hindtarsomeres with pale-scaled bands on some segments (Fig. 421) 3

Hindtarsomeres unbanded (Fig. 422) 7

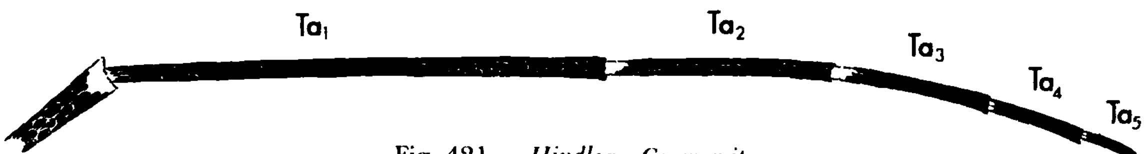


Fig. 421 — *Hindleg - Cs. morsitans*

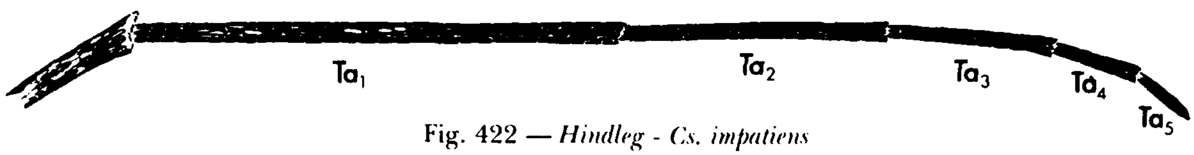


Fig. 422 — *Hindleg - Cs. impatiens*

3(2). Hindleg with broad pale bands, covering 0.25-0.33 of tarsomere 2 (Fig. 423); crossveins of wing with scales (Fig. 424) 4

Hindleg with pale bands narrow, covering 0.1 or less of tarsomere 2 (Fig. 425); crossveins without scales (Fig. 426) 5

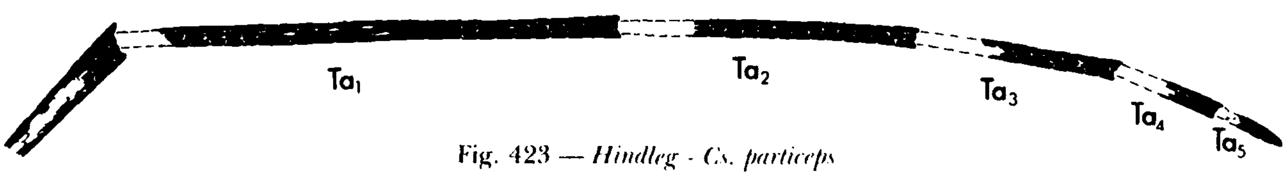


Fig. 423 — *Hindleg - Cs. particeps*

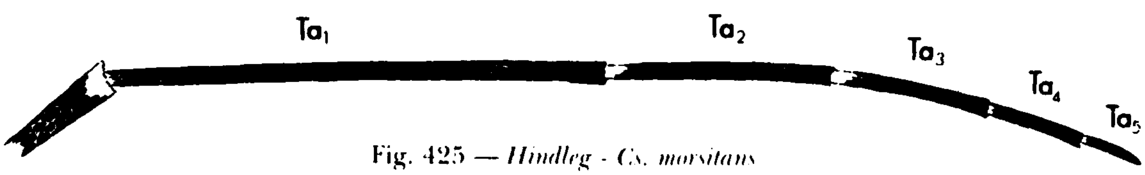


Fig. 425 — *Hindleg - Cs. morsitans*

Fig. 424 — *Dorsal view of wing - Cs. particeps*

Fig. 426 — *Dorsal view of wing - Cs. impatiens*

4(3). Each femur with narrow, subapical pale-scaled band (Fig. 427) .... *particeps* (Plate 41)

Femora without subapical bands (Fig. 428) .... *alaskaensis* (Plate 40)

Fig. 427 — *Lateral view of femur and tibia of hindleg - Cs. particeps*

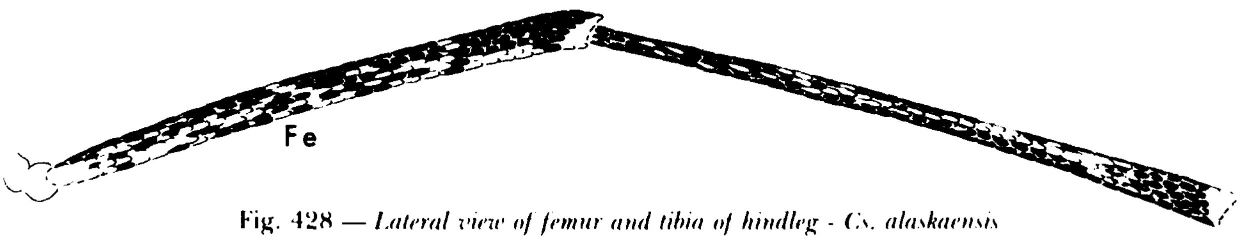


Fig. 428 — *Lateral view of femur and tibia of hindleg - Cs. alaskaensis*

5(3). Wing with dense patches of dark scales (Fig. 429) .... *incidens* (Plate 43)

Wing uniformly scaled, without dense patches (Fig. 430) 6

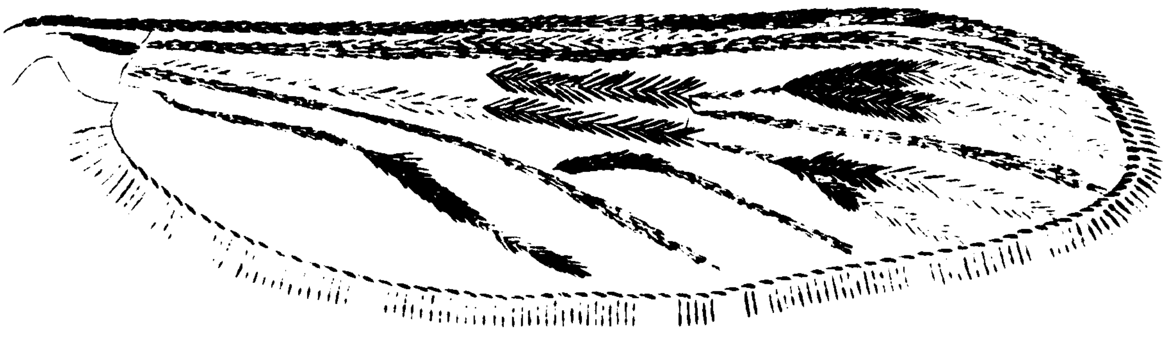


Fig. 429 — *Dorsal view of wing - Cs. incidens*

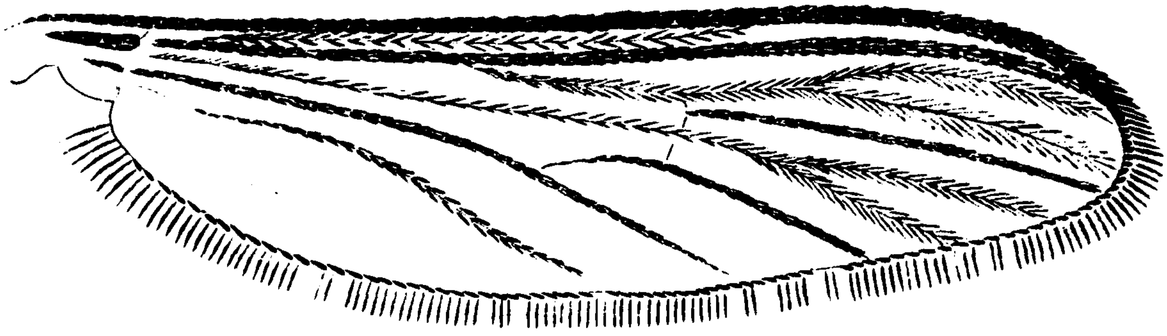


Fig. 430 — *Dorsal view of wing - Cs. impatiens*

6(5). Abdominal terga with pale bands on apices as well as bases, pale scales with brownish tinge, not white (Fig. 431) .... *minnesotae* (Plate 45)

Abdominal terga with pale bands on bases only, pale scales whitish (Fig. 432) .... *morsitans* (Plate 48)

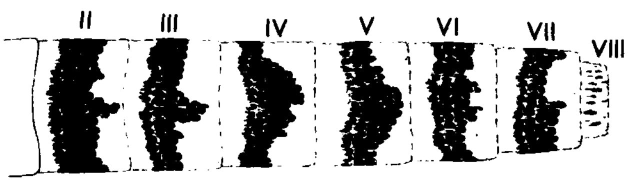


Fig. 431 — *Dorsal view of abdomen - Cs. minnesotae*

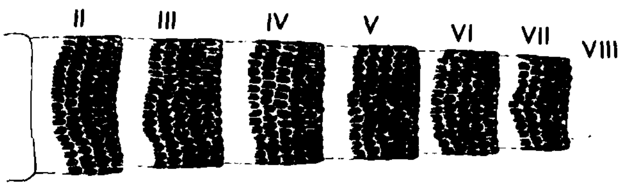


Fig. 432 — *Dorsal view of abdomen - Cs. morsitans*

7(2). Wing with dark and pale scales intermixed on anterior veins (Fig. 433); hindtarsomeres 1,2 with dark and pale scales mixed (Fig. 434) .... *inornata* (Plate 44)

Wing and hindtarsomeres dark-scaled (Figs. 435, 436) .... *impatiens* (Plate 47)

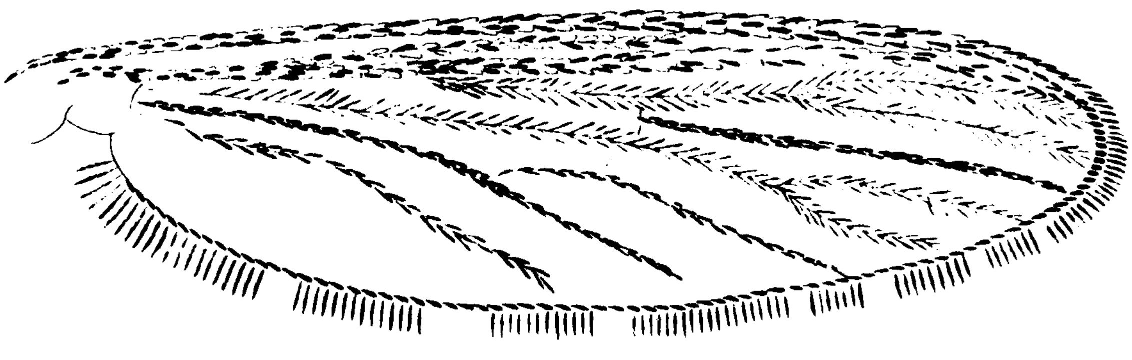


Fig. 433 — *Dorsal view of wing - Cs. inornata*

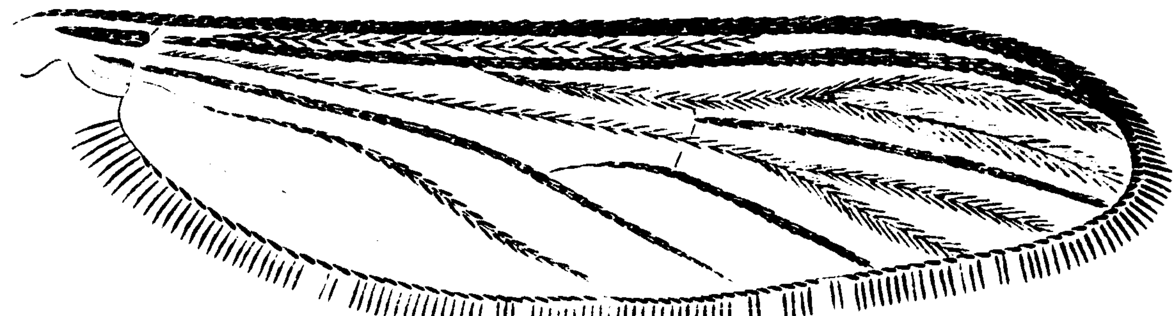


Fig. 435 — *Dorsal view of wing - Cs. impatiens*

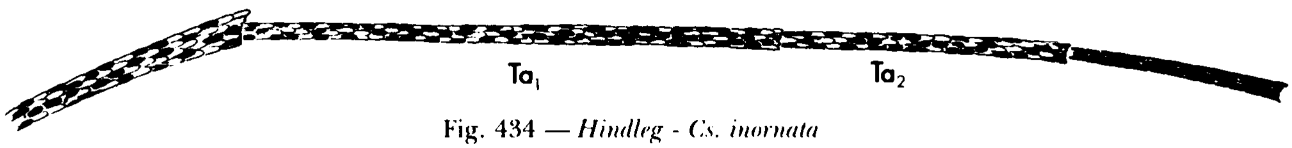


Fig. 434 — *Hindleg - Cs. inornata*

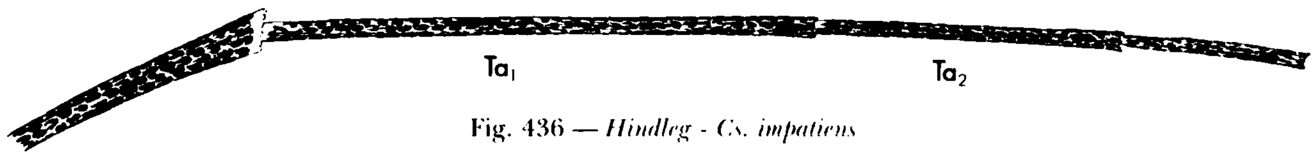


Fig. 436 — *Hindleg - Cs. impatiens*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *DEINOCERITES*

1. Mesanepimeron with patch of translucent scales (Fig. 437) .... *pseudes* (Plate 45)

   Mesanepimeron without scales (Fig. 438) 2

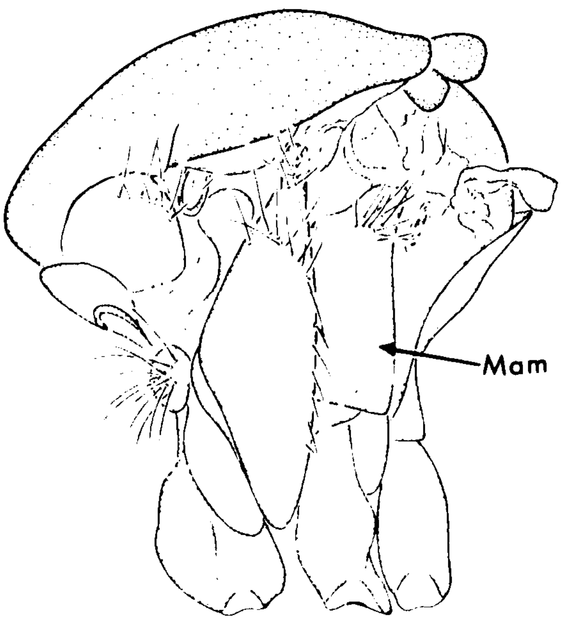


Fig. 437 — *Lateral view of thorax - De. pseudes*

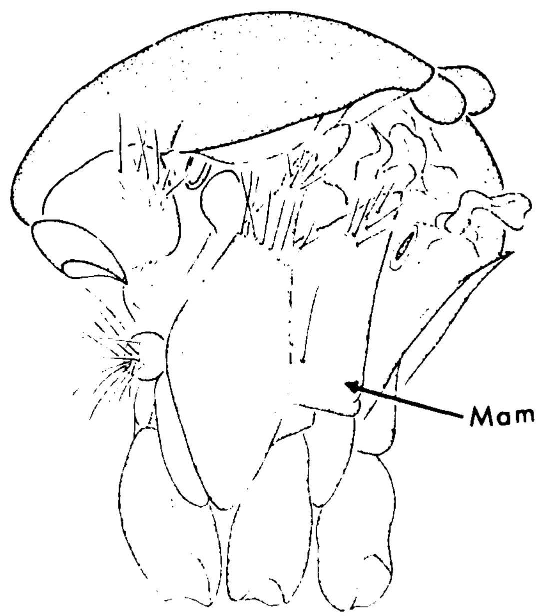


Fig. 438 — *Lateral view of thorax - De. cancer*

2(1). Cercus with 2 long, spatulate, apical or subapical setae (Fig. 439); medium-sized species, wing length about 2.9 mm .... *cancer*
(Plate 27)

Cercus without specialized setae (Fig. 440); small species, wing length about 2.5 mm .... *mathesoni*
(Plate 42)

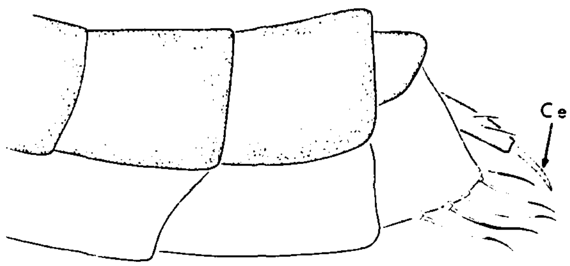


Fig. 439 — *Lateral view of abdominal segments VII-X - De. cancer*

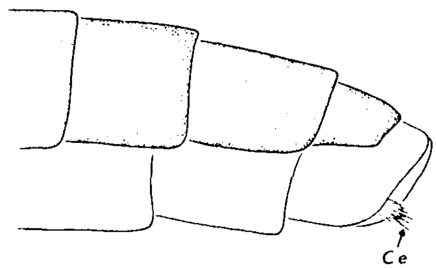


Fig. 440 — *Lateral view of abdominal segments VII-X - De. mathesoni*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *MANSONIA*

Apex of abdominal tergum VII with row of short, dark spiniforms (Fig. 441); ventral surface of proboscis mostly dark-scaled (Fig. 442) .... *titillans*
(Plate 47)

Apex of tergum VII without spiniforms (Fig. 443); ventral surface of proboscis with patch of pale scales (Fig. 444) .... *dyari*
(Plate 46)

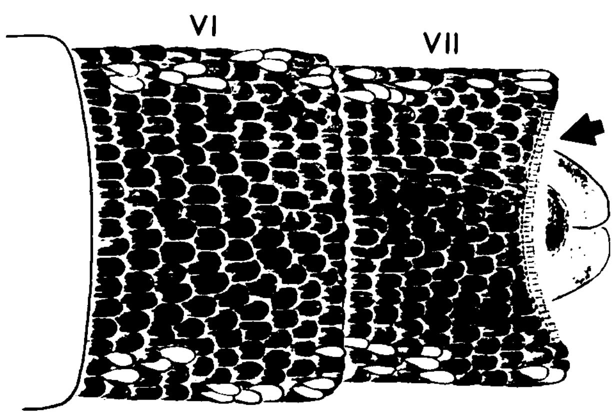


Fig. 441 — *Dorsal view of tergum VII - Ma. titillans*

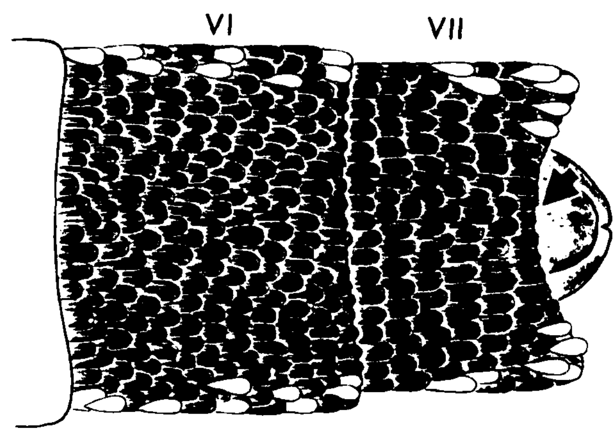


Fig. 443 — *Dorsal view of tergum VII - Ma. dyari*

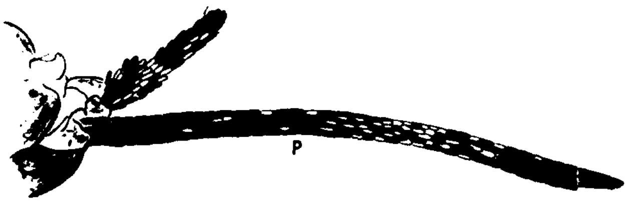


Fig. 442 — *Ventral lateral view of head and proboscis - Ma. titillans*

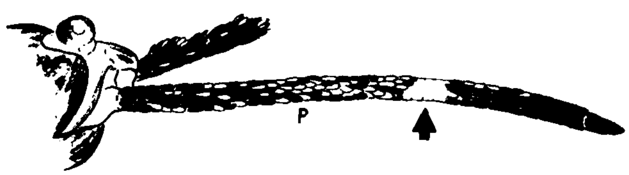


Fig. 444 — *Ventral lateral view of head and proboscis - Ma. dyari*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *ORTHOPODOMYIA*

1. Proepisternum with transverse line of pale scales on anterior face (Fig. 445); base of wing vein A dark-scaled (Fig. 446); lines of scales on thoracic pleuron very narrow (Fig. 447) .... *kummi* (Plate 47)

   Proepisternum with anterior face bare (Fig. 448); base of vein A pale-scaled (Fig. 449); lines of scales on thoracic pleuron broad (Fig. 450) 2

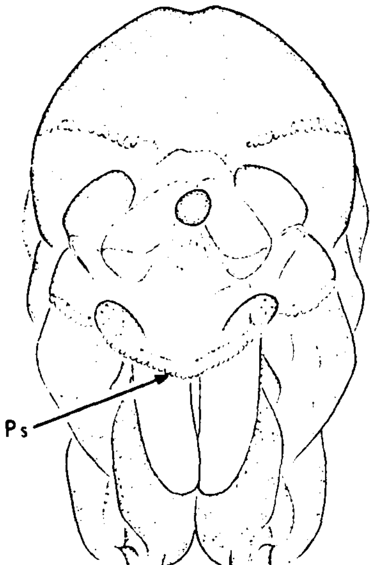


Fig. 445 — *Anterior view of thorax - Or. kummi*

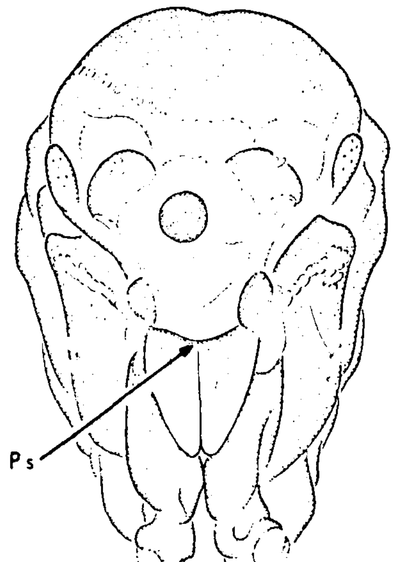


Fig. 448 — *Anterior view of thorax - Or. alba*

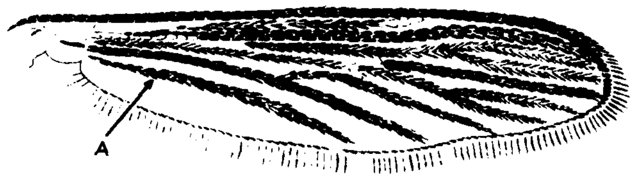


Fig. 446 — *Dorsal view of wing - Or. kummi*

Fig. 449 — *Dorsal view of wing - Or. signifera*

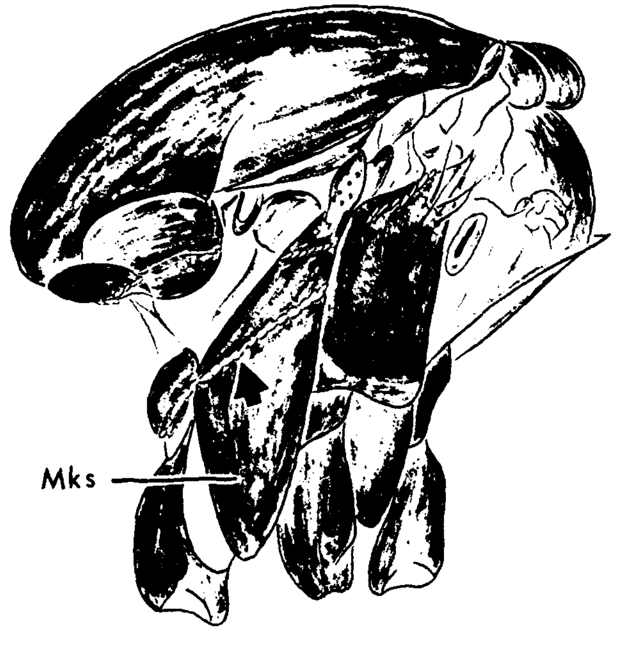


Fig. 447 — *Lateral view of thorax - Or. kummi*

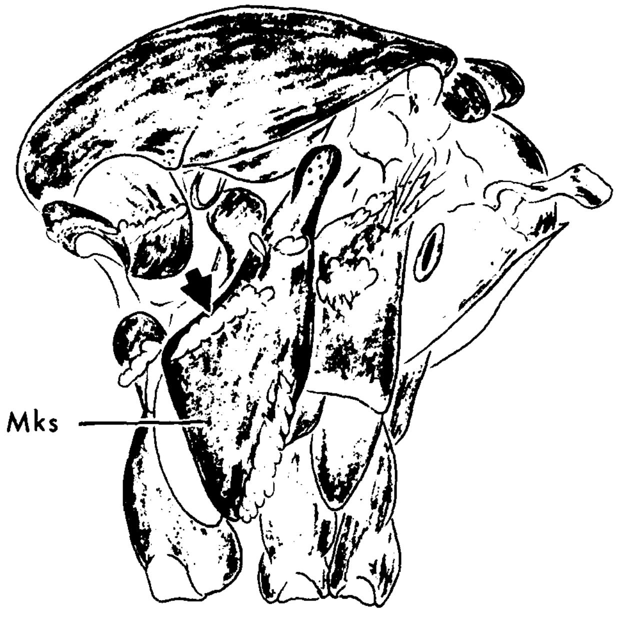


Fig. 450 — *Lateral view of thorax - Or. alba*

2(1). Lower mesokatepisternal setae 4 or more (Fig. 451); base of wing vein R_{4+5} usually with patch of pale scales (Fig. 452) .... *signifera* (Plate 41)

Lower mesokatepisternal setae 0-2 (Fig. 453); base of vein R_{4+5} usually dark-scaled (Fig. 454) .... *alba* (Plate 41)

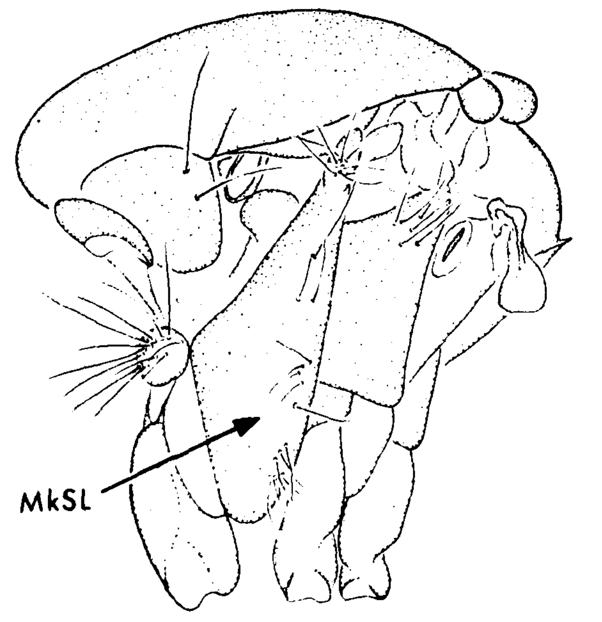


Fig. 451 — *Lateral view of thorax - Or. signifera*

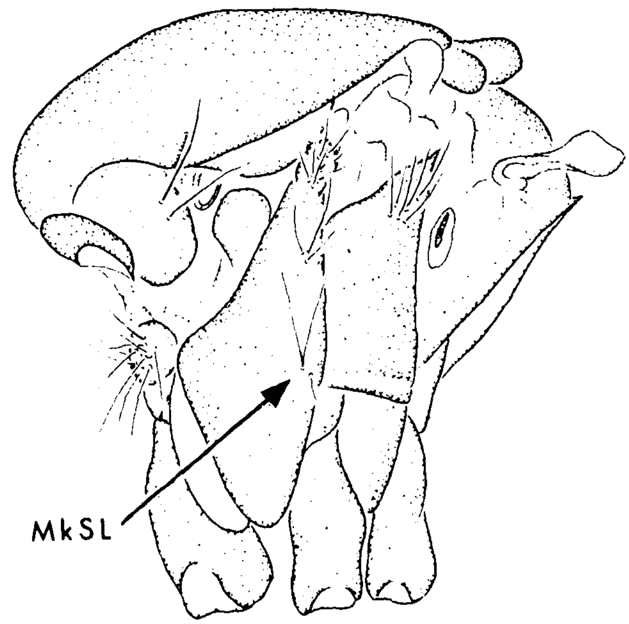


Fig. 453 — *Lateral view of thorax - Or. alba*

Fig. 452 — *Dorsal view of wing - Or. signifera*

Fig. 454 — *Dorsal view of wing - Or. alba*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *PSOROPHORA*

1. Wing scales dark and pale on all veins (Fig. 455); hindfemur with more or less distinct, narrow, subapical band of pale scales (Fig. 456)(subgenus *Grabhamia*) 2

   Wing scales all dark or with only few pale scales on veins C and Sc (Fig. 457); hindfemur without subapical, pale band (Fig. 458) 5

Fig. 455 — *Dorsal view of wing - Ps. columbiae*

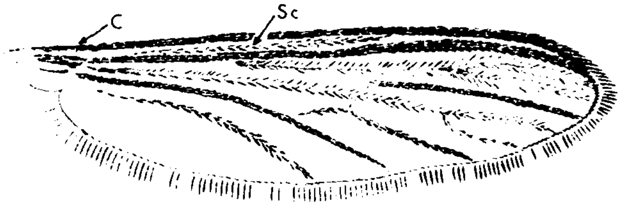


Fig. 457 — *Dorsal view of wing - Ps. ciliata*

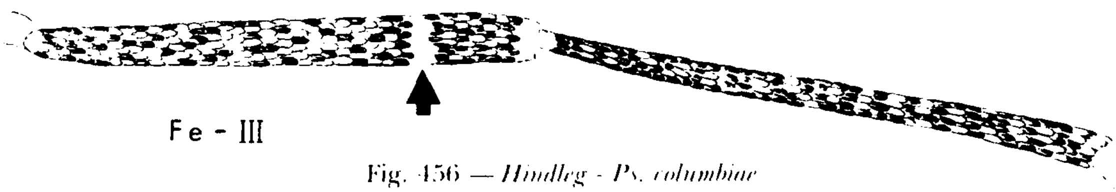


Fig. 456 — *Hindleg - Ps. columbiae*

Fig. 458 — *Hindleg - Ps. cyanescens*

2(1). Hindtarsomere 1 dark-scaled, except for narrow, basal, pale ring (Fig. 459) .... *pygmaea* (Plate 39)

   Hindtarsomere 1 largely pale-scaled, or with pale ring at middle (Fig. 460) 3

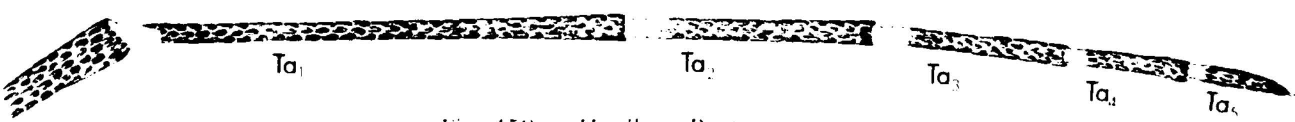


Fig. 459 — *Hindleg - Ps. pygmaea*

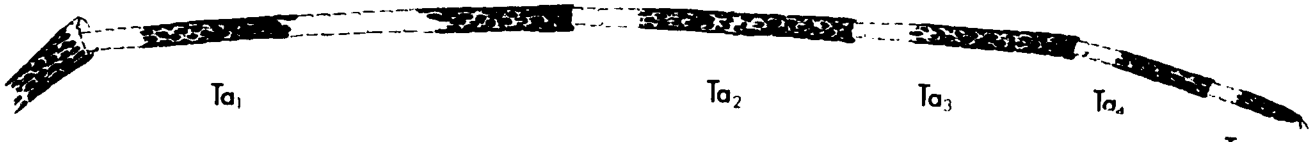


Fig. 460 — *Hindleg - Ps. columbiae*

3(2). Hindtarsomere 1 with pale-scaled rings at base and middle (Fig. 461); dark and pale wing scales in no definite pattern (Fig. 462) .... *columbiae confinnis* (Plate 40)

Hindtarsomere 1 largely pale-scaled (Fig. 463); wing with definite areas of pale and dark scales (Fig. 464) 4

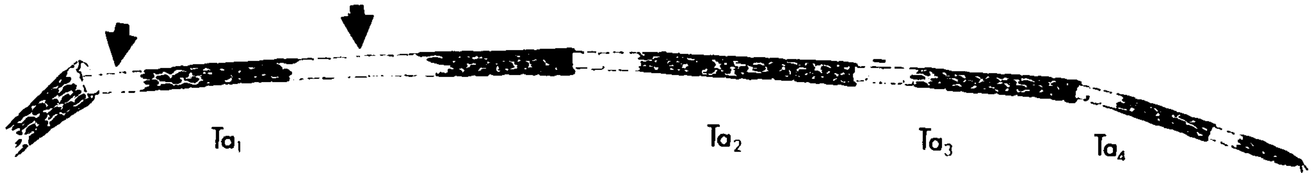


Fig. 461 — *Hindleg - Ps. columbiae*

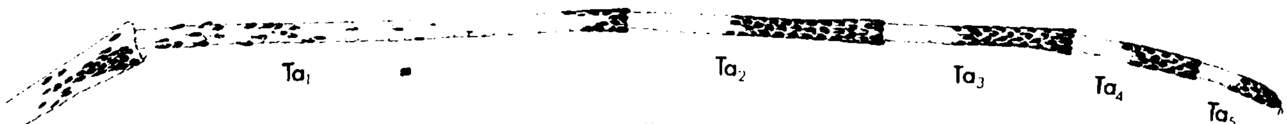


Fig. 463 — *Hindleg - Ps. discolor*

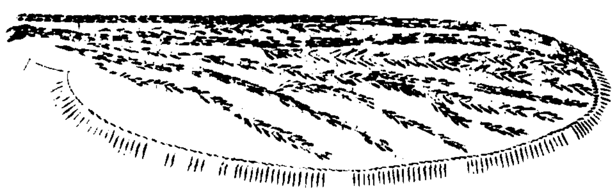


Fig. 462 — *Dorsal view of wing - Ps. columbiae*

Fig. 464 — *Dorsal view of wing - Ps. discolor*

4(3). Wing fringe with alternating spots of dark and pale scales, vein A pale-scaled apically (Fig. 465) .... *signipennis* (Plate 44)

Wing fringe uniformly dark-scaled, vein A with dark scales apically (Fig. 466) .... *discolor* (Plate 45)

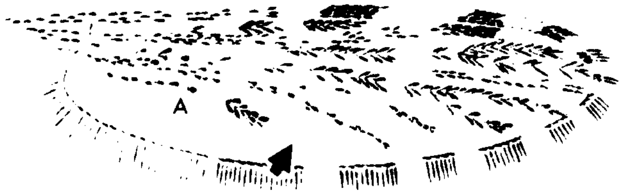


Fig. 465 — *Dorsal view of wing - Ps. signipennis*

Fig. 466 — *Dorsal view of wing - Ps. discolor*

5(1). Apices of hindfemur and tibia with long, erect scales, shaggy in appearance; hindtarsomere 5 not entirely pale-scaled (Fig. 467)(subgenus *Psorophora*) 6

Apices of hindfemur and tibia usually without erect scales, if somewhat shaggy, then hindtarsomere 5 entirely pale-scaled (Fig. 468, 469)(subgenus *Janthinosoma*) 7

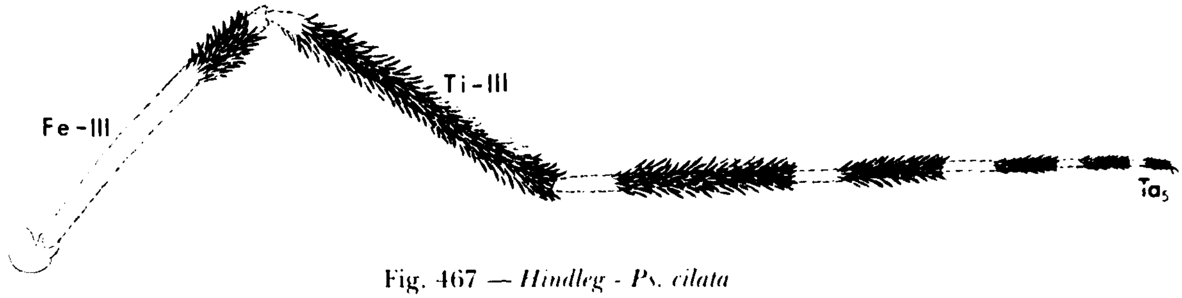


Fig. 467 — *Hindleg - Ps. ciliata*

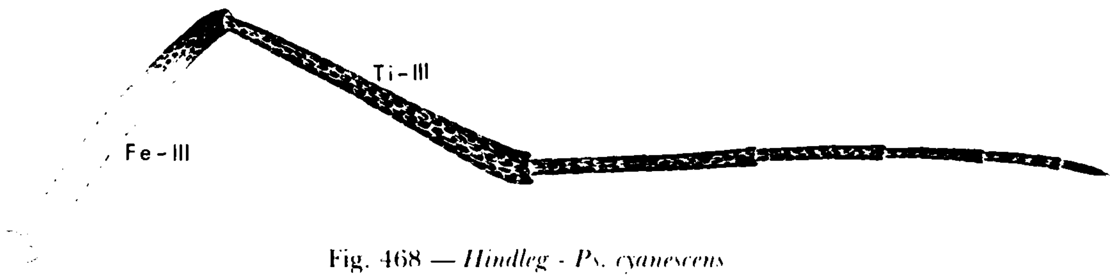


Fig. 468 — *Hindleg - Ps. cyanescens*

Fig. 469 — *Hindleg - Ps. ferox*

6(5). Scutum with narrow, median, longitudinal stripe of golden scales (Fig. 470); proboscis yellow-scaled in distal 0.5, except labella (Fig. 471) .... *ciliata*
(Plate 43)

Scutum with median, longitudinal stripe of dark brown scales (Fig. 472); proboscis dark-scaled (Fig. 473) .... *howardii*
(Plate 48)

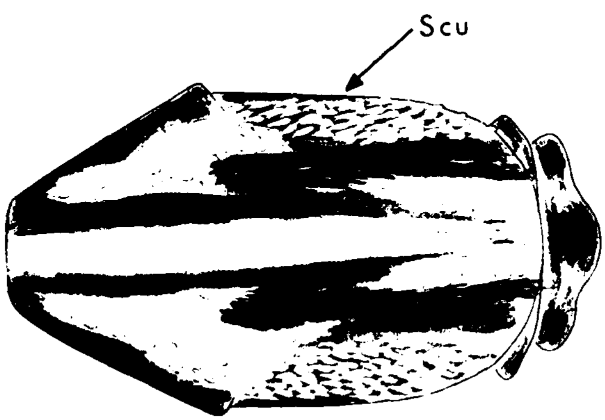


Fig. 470 — *Dorsal view of thorax - Ps. ciliata*

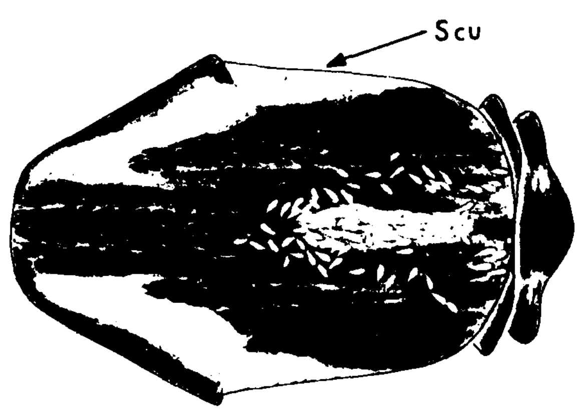


Fig. 472 — *Dorsal view of thorax - Ps. howardii*

Fig. 471 — *Lateral view of head and proboscis - Ps. ciliata*

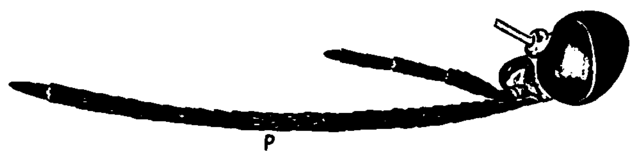


Fig. 473 — *Lateral view of head and proboscis - Ps. howardii*

7(5). Hindtarsomeres dark-scaled (Fig. 474); abdominal terga with dorsal patches of golden scales (Fig. 475) .... *cyanescens* (Plate 43)

Hindtarsomeres with at least some pale scaling (Fig. 476); abdominal terga with pale to yellow scales, if present, restricted to apicolateral corners (Fig. 477) 8

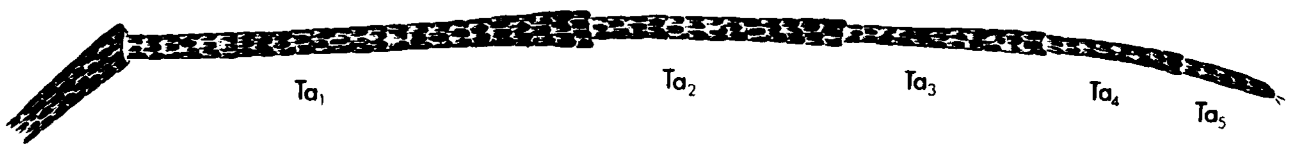


Fig. 474 — *Hindleg - Ps. cyanescens*

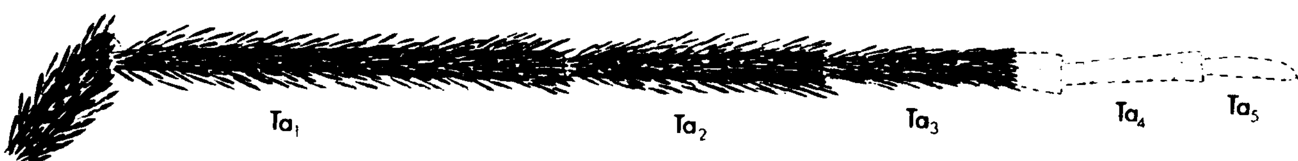


Fig. 476 — *Hindleg - Ps. ferox*

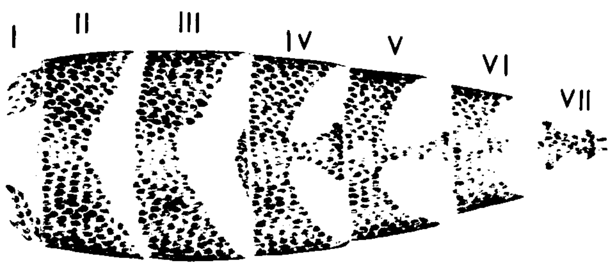


Fig. 475 — *Dorsal view of abdomen - Ps. cyanescens*

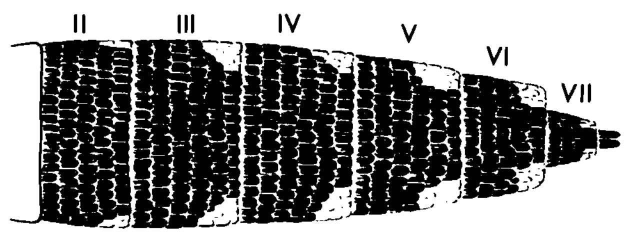


Fig. 477 — *Dorsal view of abdomen - Ps. ferox*

8(7). Only hindtarsomere 4 pale-scaled on at least one side, other tarsomeres dark-scaled (Fig. 478) 9

Hindleg with tarsomeres 4, 5 and often part of 3 entirely pale-scaled, or only tarsomere 5 pale (Fig. 479) 11

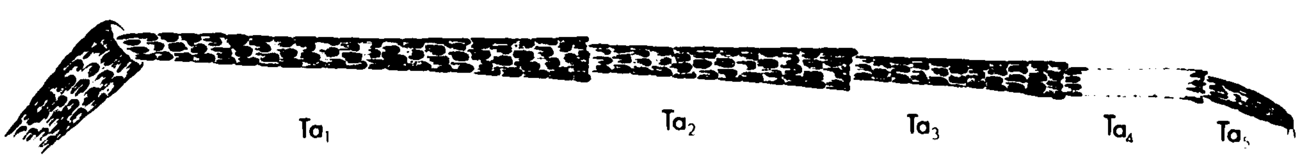


Fig. 478 — *Hindleg - Ps. mathesoni*

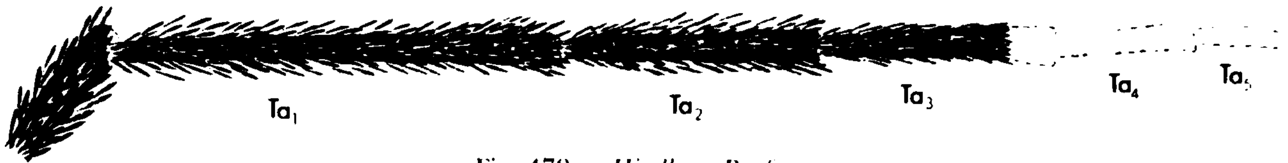


Fig. 479 — *Hindleg - Ps. ferox*

9(8). Scutum entirely covered with yellowish-white scales (Fig. 480) .... *johnstonii* (Plate 33)

Scutum with broad, longitudinal, median stripe of dark scales, yellowish-white scales laterally (Fig. 481) 10

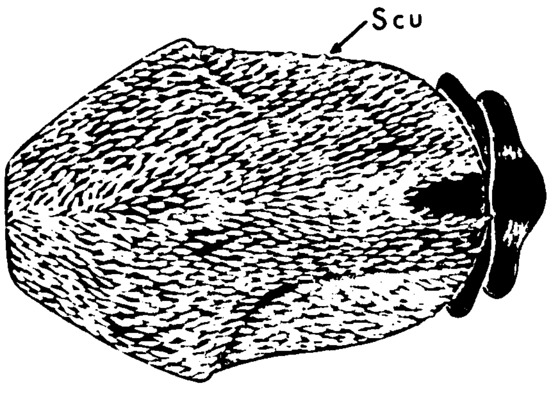


Fig. 480 — *Dorsal view of thorax - Ps. johnstonii*

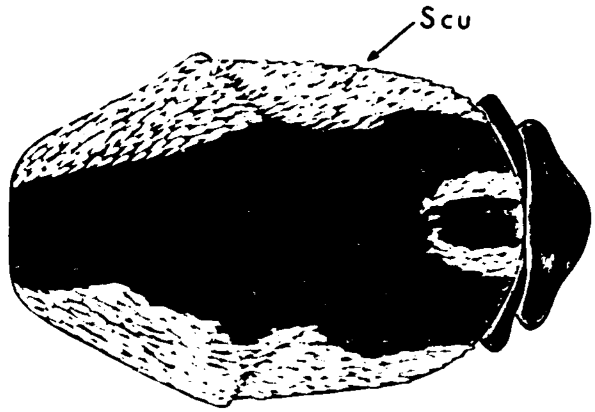


Fig. 481 — *Dorsal view of thorax - Ps. mathesoni*

10(9). Subspiracular area with few or no scales (Fig. 482) .... *mathesoni* (Plate 46)

Subspiracular area with many scales (Fig. 483) .... *varipes*

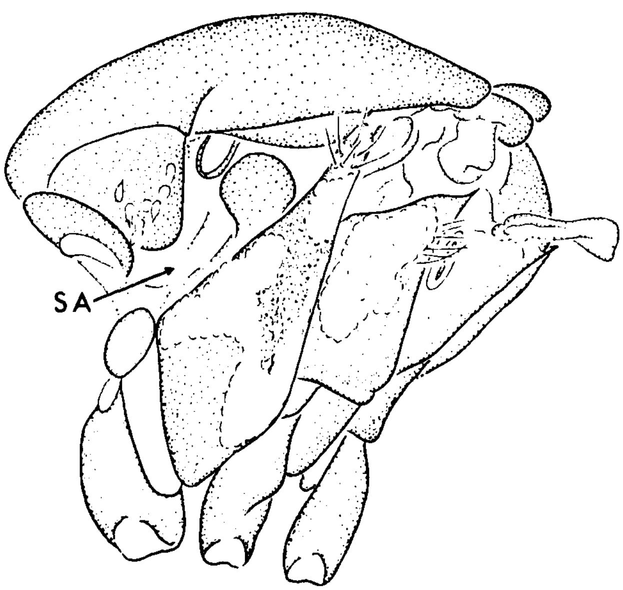


Fig. 482 — *Lateral view of thorax - Ps. mathesoni*

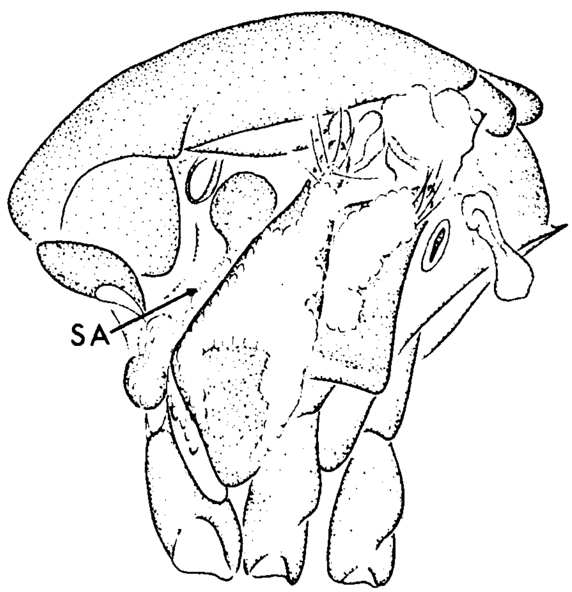


Fig. 483 — *Lateral view of thorax - Ps. varipes*

11(8). *Hindtarsomere 5 pale-scaled, others dark-scaled (Fig. 484)* .... *mexicana*
(Plate 39)

Hindleg with tarsomeres 4,5 and often part of 3 pale-scaled (Fig. 485) 12

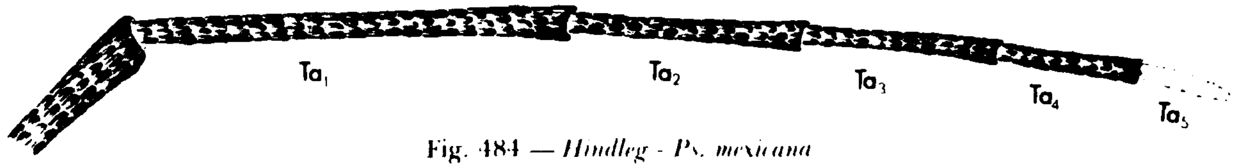


Fig. 484 — *Hindleg - Ps. mexicana*

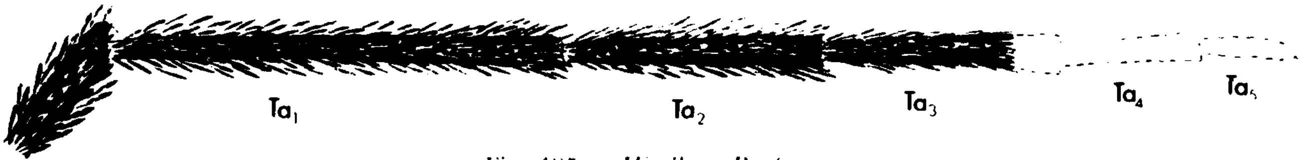


Fig. 485 — *Hindleg - Ps. ferox*

12(11). Scutum with dark brown and golden yellow scales mixed in no definite pattern (Fig. 486); abdominal tergum I with purplish scales medially (Fig. 487) .... *ferox*
(Plate 44)

Scutum with broad, median, longitudinal stripe of dark scales, pale scales laterally (Fig. 488); tergum I with pale scales medially (Fig. 489) 13

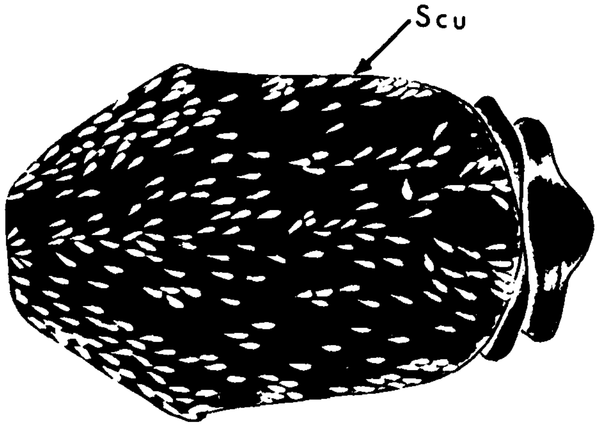


Fig. 486 — *Dorsal view of thorax - Ps. ferox*

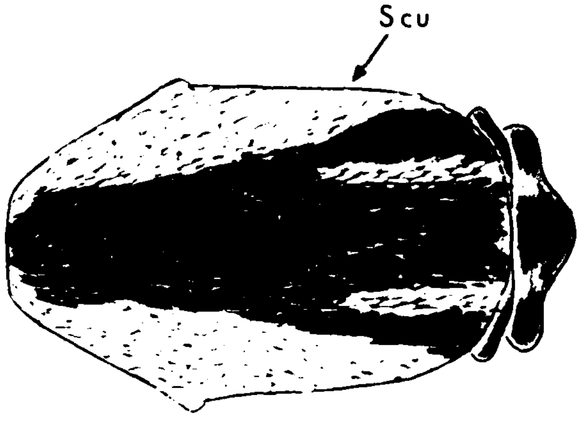


Fig. 488 — *Dorsal view of thorax - Ps. horrida*

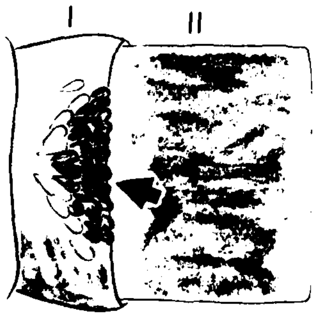


Fig. 487 — *Dorsal view of abdominal segments I-II - Ps. ferox*

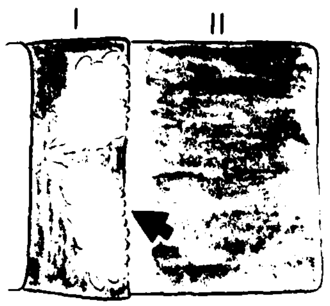


Fig. 489 — *Dorsal view of abdominal segments I-II - Ps. horrida*

13(12). Femora with pale-scaled, apical rings (Fig. 490); palpus less than 0.25 length of proboscis, apical segment subequal to segments 1-3 (Fig. 491) .... *horrida* (Plate 47)

Femora without apical pale rings (Fig. 492); palpus more than 0.25 length of proboscis, apical segment 1.5 length of 1-3 (Fig. 493) .... *longipalpus* (Plate 49)

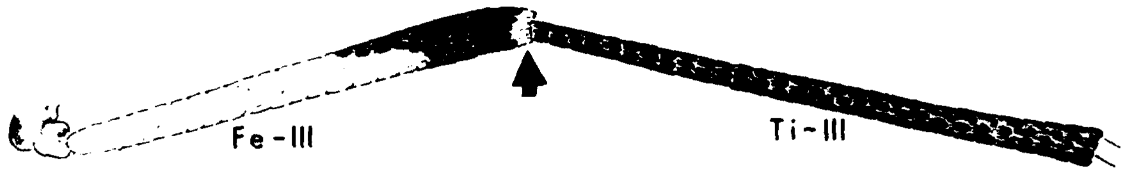


Fig. 490 — *Hindleg - Ps. horrida*

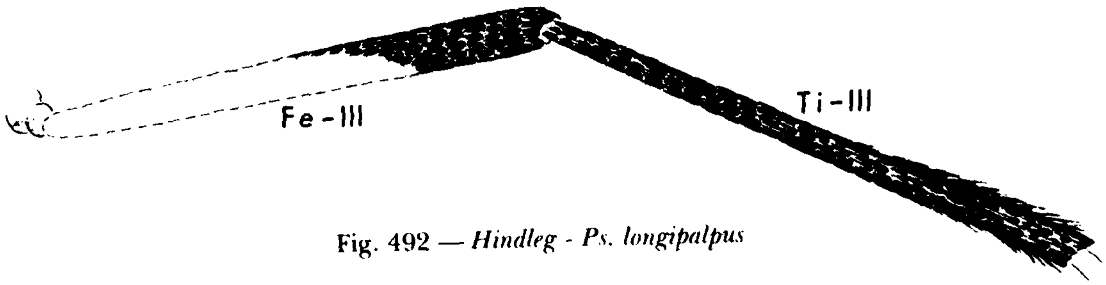


Fig. 492 — *Hindleg - Ps. longipalpus*

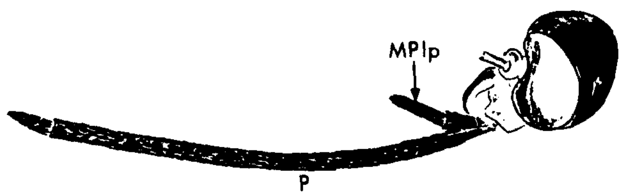


Fig. 491 — *Lateral view of head - Ps. horrida*

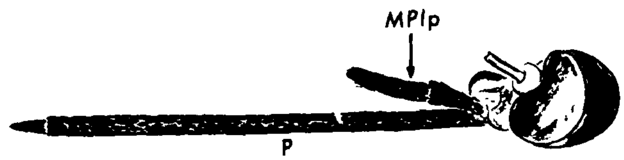


Fig. 493 — *Lateral view of head - Ps. longipalpus*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *URANOTAENIA*

1. Hindtarsomeres 4,5 and part of 3 pale-scaled (Fig. 494) .... *lowii* (Plate 49)

   Hindtarsomeres all dark-scaled (Fig. 495) 2

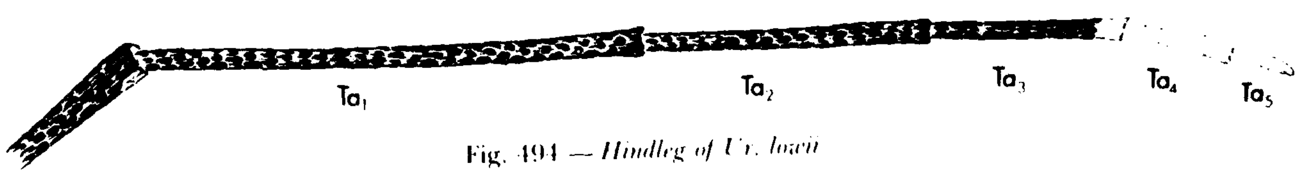


Fig. 494 — *Hindleg of Ur. lowii*

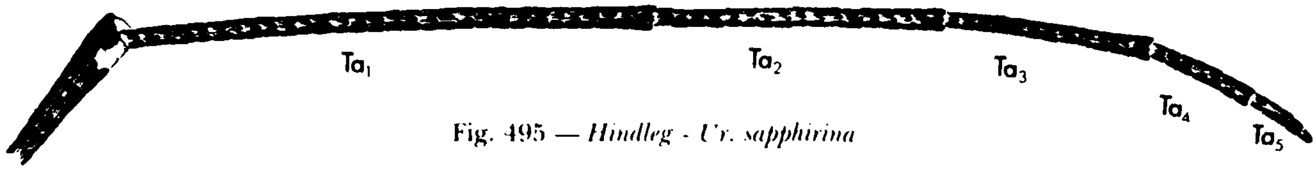


Fig. 495 — *Hindleg - Ur. sapphirina*

2(1). Narrow, median, longitudinal stripe of scutum and midlobe of scutellum with iridescent blue scales (Fig. 496) .... *sapphirina* (Plate 49)

Scutum and scutellum without median, longitudinal stripe of iridescent blue scales (Fig. 497) 3

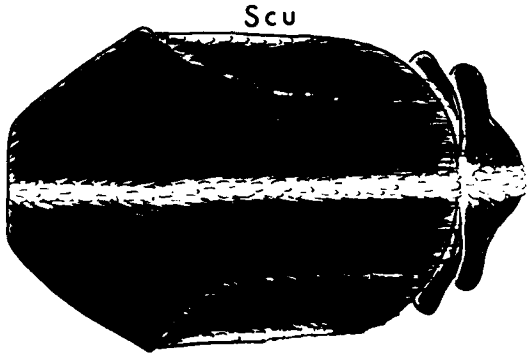


Fig. 496 — *Dorsal view of thorax - Ur. sapphirina*

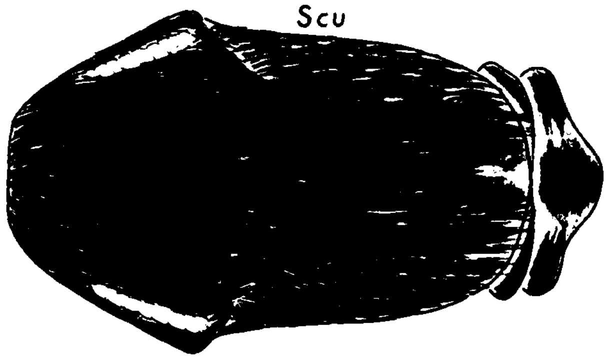


Fig. 497 — *Dorsal view of thorax - Ur. a. anhydor*

3(2). Scutum with lateral line of iridescent blue scales incomplete, broken above mesothoracic spiracle (Fig. 498) .... *a. anhydor* (Plate 42)

Scutum with continuous lateral line of iridescent blue scales from anterior promontory to wing base (Fig. 499) .... *a. syntheta* (Plate 42)

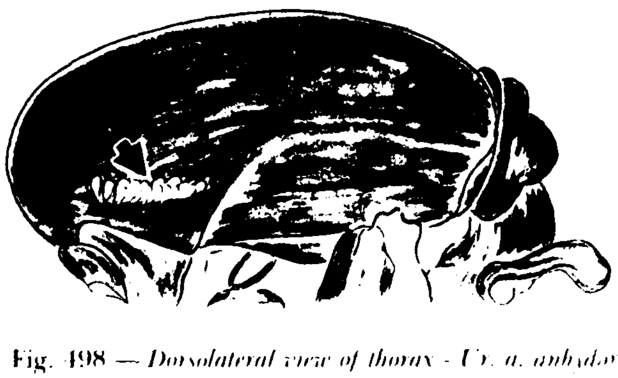


Fig. 498 — *Dorsolateral view of thorax - Ur. a. anhydor*

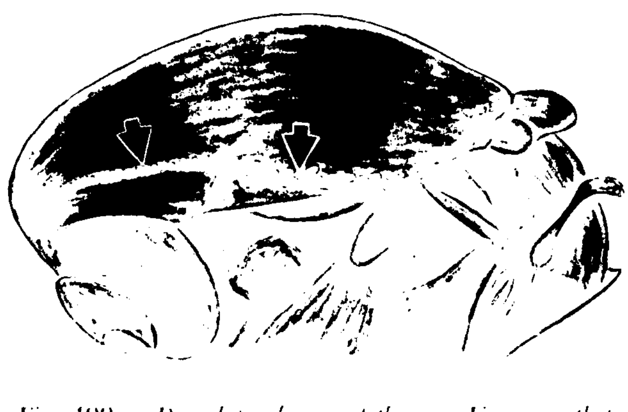


Fig. 499 — *Dorsolateral view of thorax - Ur. a. syntheta*

KEY TO ADULT FEMALE MOSQUITOES OF THE GENUS *WYEOMYIA*

1. Antepronotum with silvery-white scales (Fig. 500); hindtarsomeres with basal patches of pale scales posteriorly (Fig. 501) .... *vanduzeei* (Plate 46)

   Antepronotum with mostly bluish to purplish scales (Fig. 502); hindtarsomeres with or without basal patches of pale scales (Fig. 503) 2

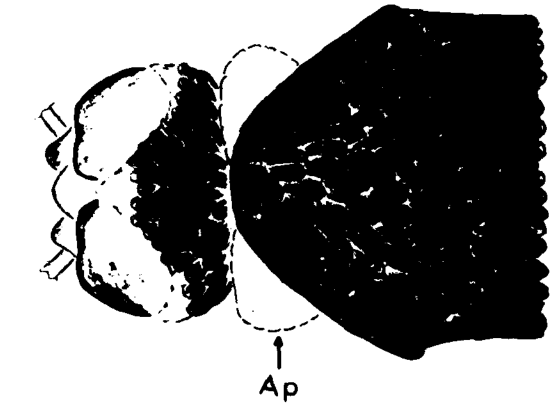


Fig. 500 — *Dorsal view of thorax - Wy. vanduzeei*

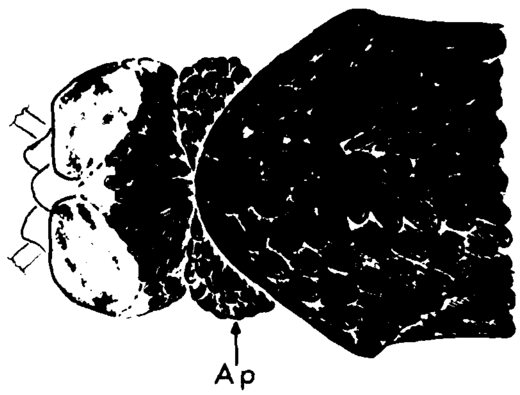


Fig. 502 — *Dorsal view of thorax - Wy. smithii*

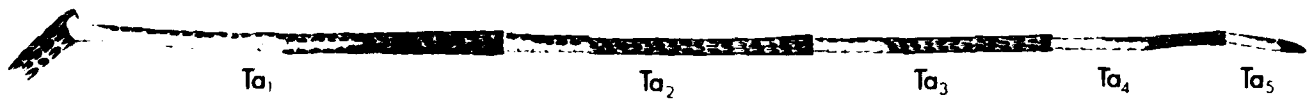


Fig. 501 — *Ventral view of hindleg - Wy. vanduzeei*

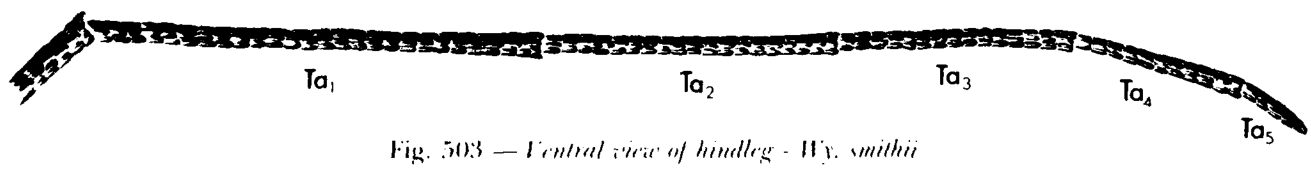


Fig. 503 — *Ventral view of hindleg - Wy. smithii*

2(1). Occiput with pale scales along ocular line (Fig. 504); postpronotum with broad, pale scales (Fig. 505) .... *mitchellii* (Plate 45)

   Occiput with dark scales along ocular line (Fig. 506); postpronotum with overlapping, dark scales (Fig. 507) 3

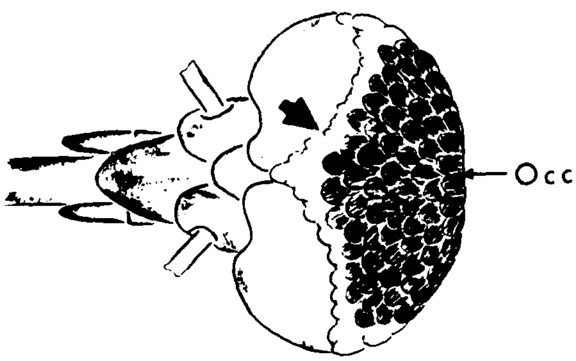


Fig. 504 — *Dorsal view of head - Wy. mitchellii*

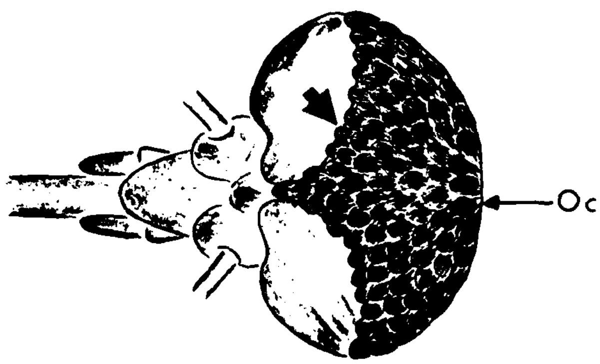


Fig. 506 — *Dorsal view of head - Wy. smithii*

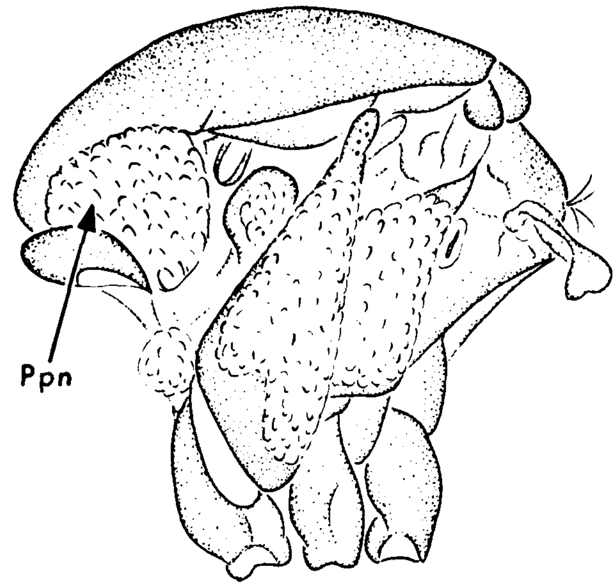


Fig. 505 — *Lateral view of thorax - Wy. mitchellii*

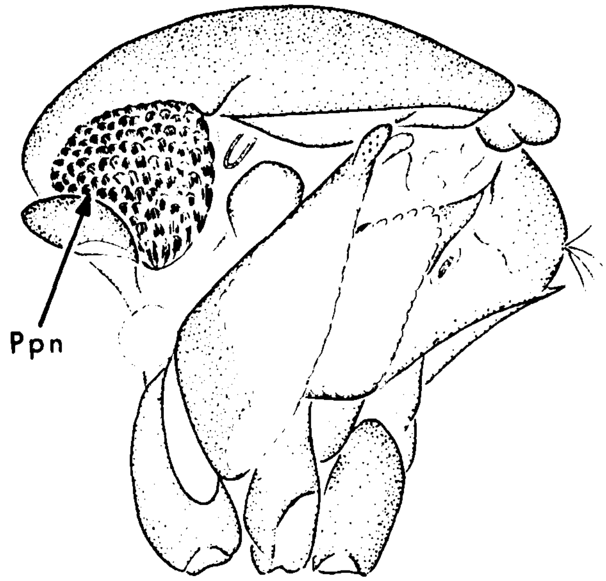


Fig. 507 — *Lateral view of thorax - Wy. smithii*

3(2). Scutellum with patch of silvery scales on midlobe (Fig. 508) .... *haynei* (Plate 34)

Midlobe of scutellum with patch of dark scales (Fig. 509) .... *smithii* (Plate 39)

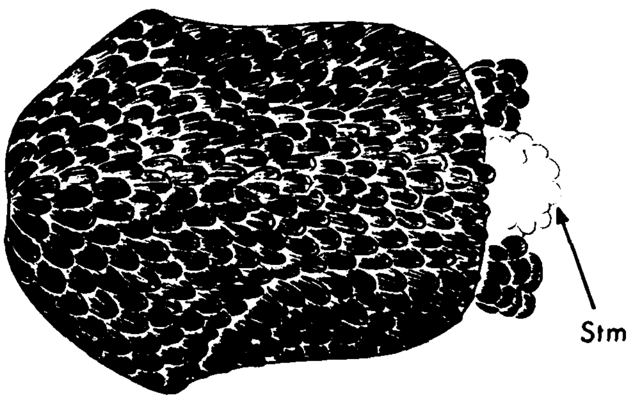


Fig. 508 — *Dorsal view of thorax - Wy. haynei*

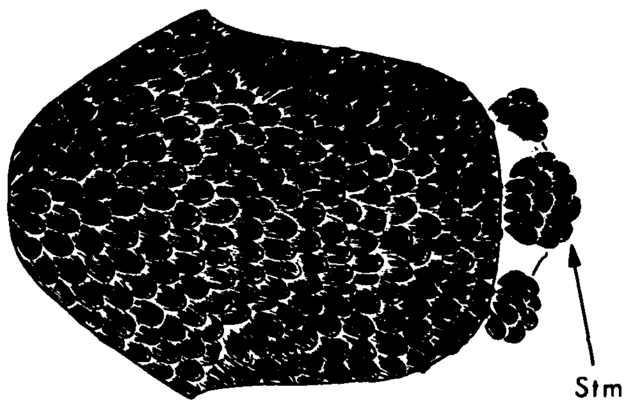


Fig. 509 — *Dorsal view of thorax - Wy. smithii*

MORPHOLOGY OF FOURTH STAGE MOSQUITO LARVA[1,2]

The fourth stage mosquito larval body, contrary to the adult, is largely composed of soft, membranous tissue, but with some parts consisting of hardened, sclerotized plates. This allows for the characteristic swimming movements and doubling of the body when cleaning the lateral palatal brushes. The body is divided into the head, thorax and abdomen. The head capsule is completely sclerotized, while the thorax and abdomen are largely membranous. The larval body is adorned with some 190 pairs of setae (Plates 5, 6), a study of the arrangement of which is called chaetotaxy. These, along with various kinds of spicules are known collectively as the vestiture, i.e., protrusions from the cuticle of the integument, the covering of the body (Harbach and Knight 1978C), and are thus defined as cuticular projections. The organization and nomenclature of these structures is very important to know in larval identification. A complete treatment of the vestiture in general and the chaetotaxy in particular may be found in articles by Knight and Laffoon (1971B), and Harbach and Knight (1978A, 1978C). However, only those structures used in the present keys will be defined herein.

VESTITURE - The two main components of the larval vestiture are spicules and setae (synonyms: hairs, hair tufts, bristles). In larvae whose thorax and/or abdomen are sparsely or densely covered with a pubescence, the spicules are called aculeae, and the cuticle is aculeate (Fig. 672). Without this pile the surface would be smooth or glabrous. Where parts of a structure bear thornlike spicules, varying from tiny to very coarse, they are termed aciculae, and the condition is known as aciculate (Fig. 903). The lateral aspect of abdominal segment VIII, and also the siphon, in many kinds of mosquito larvae, bear specialized projections (Plates 6, 8). On abdominal segment VIII the structures are known as **comb scales** (CS) and they usually bear along their free posterior border a fringe of subequal spinules, or a median, large spine and lateral, smaller spinules. The **pecten** (Pt) is a comb-like row of spines, borne on a **pecten plate** (PP) in anophelines and posterolaterally on the **siphon** (S) in most culicine species. Each unit may bear one to many lateral denticles on one, or less frequently, both margins (Fig. 856). In subgenus *Psorophora*, the **pecten spines** (PS) are extended apically into long filaments (Fig. 931).

Setae may be distinguished from spicules by the presence of a basal alveolus from which the seta arises, (see Plate 7A - L). The **alveolus** is a membranous socket located in the integument, allowing the seta movement. Setae may be found attached to the sclerotized structures, such as the head, siphon and saddle, or directly to the membranous integument of the larval body. At times, the membrane may bear a special sclerite, to which one or more setae are attached, called a **setal support plate.** Setae can be simple, unbranched or variously branched. **Unbranched setae** (A) are usually cylindrical and attenuated apically. They can also be very thick and spinelike, in which case they are called **spiniform setae** (B). **Branched setae** are composed of a main stem and ramifying members (F). In some, the branches arise directly from the base and therefore have no stem or an extremely short one. Those which have only a few branches arising beyond the basal third of the main stem are termed **forked** (E), while those with a very stout stem and many branches are called **fanlike setae** (L). Setae with numerous, regularly arranged branches arising on either side of the stem are **plumose** (G). When setae have various stems with branches that are divided and subdivided so that they resemble the branches on a tree, they are known as **dendritic** (H). Specialized seta, characteristic of the genus *Anopheles*, have flattened moveable branches usually radiating horizontally from a short, stout stem and are named **palmate** (I, J). The branches are known as leaflets which can have smooth or serrate margins. The flat surface of the leaflet is the blade and it may have a terminal **filament.** They may be fully developed (I) or partially formed (J). The lateral palatal brushes (mouth brushes) are composed of unique specialized spicules, termed **comb-tipped filaments** (K), bearing a row of rigid processes apically on one side, like the teeth of a comb. Special mention needs to be made of seta 4 of abdominal segment X, a group of setal tufts, known as the **ventral brush,** see Figs. 670, 671. In most mosquito larvae, it is composed of a row of fanlike setae, some or all of which are usually attached to a heavily sclerotized network of bars called the **grid** (G); see Plate 8A. It is composed of a number of **transverse grid bars** (TGB) connected to **lateral grid bars** (LGB). In some cases, the setae are joined to a setal support plate.

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[1] The use of "stage" instead of "instar" follows Jones (1978).

[2] For references cited herein, see Selected Bibliography of Mosquito Morphology at the end of section on Morphology of Adult Female.

known as a boss. Those setal tufts attached to the grid or boss are called **cratal setae** and those which are attached to the segment anterior to the cratal setae and grid are the **precratal setae.**

Single, or the components of branched, setae may be smooth, or spiculate. Their parts may be beset with, thin needlelike processes, which may vary in thickness. This condition is known as **aciculate** (C), whereas if the processes are small and spinelike, it is **spinulate** (D). If the setal parts have no processes, they are called **smooth.**

The following abbreviations will be used in a discussion of the morphology of the larval body regions (Plates 5, 6), and also in the larval keys.

A = antenna	III = abdominal segment III
C = head	IV = abdominal segment IV
P = prothorax	V = abdominal segment V
M = mesothorax	VI = abdominal segment VI
T = metathorax	VII = abdominal segment VII
I = abdominal segment I	VIII = Abdominal segment VIII
II = abdominal segment II	X = abdominal segment X
	S = siphon

HEAD

The head is composed of a sclerotized capsule, bearing the mouthparts and antennae anteriorly and the occipital foramen, the opening of the cranium to which the cervix is attached, posteriorly. The shape of the head is distinctive in some mosquito larvae. Most have an ovate head, wider than long, with the greatest width at the level of the eyes. In the genus *Deinocerites*, the head is rather triangular, with the greatest width anteriorly at the level of the bases of the antennae. In the genus *Uranotaenia*, larval heads are thin, longer than wide, while in the predatory larvae of the genera *Toxorhynchites* and *Psorophora* heads are quadrate-shaped.

For a few species the integument of the **dorsal apotome** (frontoclypeus), the large sclerite forming the dorsal aspect of the head, contains patterns of pigment which may be diagnostic. To evaluate this character correctly, the larval head must be examined under low magnification.

The mouthparts will not be discussed here. For their descriptions and understanding, consult Gardner et al. (1973), Harbach (1977, 1978), Harbach and Knight (1977A, 1977B, 1977C), Knight (1971B), Knight and Harbach (1977), Pao and Knight (1970A, 1970B), Pucat (1965), and Shalaby (1956, 1957A, 1957B). Dorsolateral to the mouthparts, of which the mandibles and maxillae are most obvious externally, is a lobe which bears a large brush formed of specialized spicules. The lobe is composed of the **lateral tormal process** and the **lateral palatal plate** and the brush, the **lateral palatal brush** (=mouth brush). Usually the brush is made up of many comb-tipped filaments; but in the predatory larvae, they consist of a few, stout, prehensile spicules, see Fig. 520.

Setae of Head - On the head are found 16 pairs of setae, of which setae 2-C to 9-C are used in identification. The letter "C" is used to indicate that it is a seta located on the head. Formerly some of those setae were called by descriptive names, such as inner, outer and posterior clypeal hairs in anopheline larvae for setae 2-C, 3-C and 4-C and upper and lower head hairs in culicine larvae for 5-C and 6-C. In the keys that follow only numbers and letters or Roman numerals will be used in naming the larval setae.

The position of the setae in relation to one another is often used in identification. In anophelines, the two 2-C setae may be so close together that they have not the diameter of one of their alveoli separating them (Fig. 789); or they may be widely separated, closer to 3-C than to each other (Fig. 815). Two culicine species, *Ae. cinereus* and *Ae. hemiteleus* (Fig. 548), are distinguished in having setae 5-C, 6-C and 7-C in a straight line; while others of that genus have 6-C anteriorly out-of-line.

In several species, e.g. *Ae. abserratus* (Fig. 575), the setae of the head are very coarse, the diameters are about equal, extending almost to the apex; while in most larvae the setae are attenuated, gradually tapering apically. Usually 4-C is a weak, small seta, but in some species of the subgenus *Protomacleaya*, e.g. *Ae. triseriatus* (Fig. 692), it is a well developed, many branched seta.

In many instances, the size of the seta or the relative size of one in comparison to another, the number of branches, the manner of branching, the presence or absence of aciculae are all used as diagnostic characters. In some cases, the individual branches may be unequal, some shorter than others, e.g., *Ps. longipalpus* (Fig. 965). The setae 5-C and 6-C of larvae in the subgenus *Uranotaenia* are unique. They are very stout spiniform setae with spinulate surfaces.

Antennae - The antenna is a cylindrical, sensory appendage attached anterolaterally to the head. It bears six setae, 1-A to 6-A. In the genera *Coquillettidia* and *Mansonia*, the antenna is modified. It has an additional segment distal to the point of attachment of setae 2-A and 3-A, called here the **flagellum,** after Wharton (1962), see Figs. 514, 516. Another unique variation of the antenna is its sinuate, inflated shape in *Ps. discolor* (Fig. 932). In most species of the genus *Culex* (Fig. 833), the antenna is markedly constricted in the distal 0.33, beyond the attachment of seta 1-A. The antennal length is significant; in most species it is shorter than the head, but in some it is as long as or much longer than the head (Fig. 938). In the subgenus *Psorophora* the antenna is very small, hardly reaching the anterior margin of the head (Fig. 930). The surface of the antenna is usually beset with spinules, but may vary from none, as in *Ae. triseriatus* (Fig. 666), to a few small spinules, as in *Ae. muelleri* (Fig. 679), to many coarse spinules, as in *Ae. fitchii* (Fig. 667). Some of the 6 setae offer assistance in identification. The attachment of seta 1-A is diagnostic for some larvae. It may be near the middle of the antenna but may also occur in the basal 0.33 or distal 0.33 depending on the species. The number and size of the branches of 1-A also are used. In several cases, the size of setae 2-A and 3-A, as between species, or as compared with the size of 4-A is helpful, see *Cq. perturbans*, Figs. 514, 516.

THORAX

The thorax is an ovate unit of the body, somewhat wider than the head in well nourished, fourth stage larvae. As in the adult, it consists of the 3 segments, the pro-, meso- and metathorax. They are distinguished by the 3 distinct sets of setae, 0-P to 14-P on the prothorax, 1-M to 14-M on the mesothorax and 1-T to 13-T on the metathorax. The integument of the thorax is sometimes aculeate. This is most easily detected by checking under the compound microscope the edges of the thorax on a vertical surface where debris, often found covering the body of mature larvae, does not seem to accumulate. The non-aculeate surface is called smooth or glabrous and is the more usual condition.

Of the 42 pairs of setae available on the thorax, only 10 are used in the larval keys. Setae 1-P, 3-P and 7-P have diagnostic size and or number of branches useful in separating species of several genera. In culicines setae 1-, 2-, 3-P are in a line, very close to one another; so it is hard to distinguish them. Likewise, often they are borne on a setal support plate; see Figs. 742, 803, 968. Seta 1-M is particularly useful in separating a number of *Aedes* larvae. In most it is a short seta, but in several it is long and stout. It is compared in the keys to the length of the antenna or to 2-M or 3-M. In the other thoracic setae, their number of branches or size are used.

ABDOMEN

The larval abdomen consists of 10 segments, each designated by the appropriate Roman numeral. The first 7 segments are very similar, segment I bearing 13 setae and II through VII, 15. Segments VIII-X are functionally specialized and morphologically different from the others. Segment IX does not exist as a distinct morphological unit, but is incorporated into VIII and X and will not be used in the keys.

In anophelines, abdominal segments I-VII possess a **tergal plate** anteriorly and may also have 1 or more **accessory tergal plates,** as in Figs. 818, 820. They do not ordinarily occur in culicine larvae, but some species of *Orthopodomyia* have well developed tergal plates on VII and VIII. *Uranotaenia* and some *Psorophora* larvae have lateral sclerites on VIII known as **comb plates,** to which the comb scales are attached; and the *Toxorhynchites* larvae have numerous small **setal support plates** on their thoracic and abdominal segments, a larger one laterally on VIII (Fig. 521).

Segments I- VII - Although there are 97 pairs of setae on abdominal segments I-VII, only 24 are used as key characters. Seta 1 is developed as a palmate type in some or all of abdominal segments I-VII of anophelines. The fully developed palmate setae usually have 10 or more large leaflets; and when one is in its normal position, it is spread to at least 180 degrees. The number of segments with fully formed palmate setae varies with the species. Segments I-III and VII sometimes have palmate setae not fully developed, which is expressed as 0.5 or 0.7 as large (Figs. 806, 807). Seta 6 (=lateral abdominal hair of authors) is used in a number of instances. It is usually a very prominent seta on each abdominal segment, especially on I-II. It is plumose on those 2 segments in anophelines and aciculate, commonly double or triple, in culicines. In 2 species of *Anopheles*, *barberi* and *judithae*, 6-I-VI are plumose. When seta 6 is more than single on segments III-VI, it is usually diagnostic for the species on which it occurs, e.g., *Ae. taeniorhynchus*, Fig. 598; *Cx. peus*, Fig. 845. Its size may also be characteristic, as in *Ps. horrida* (Fig. 958). Seta 0 is usually a tiny, single seta in anophelines, but in *An. crucians* (Fig. 800) it is well developed, with 4 or more branches. The other setae found on I-VII, employed in the keys are 2, 3, 7, and 13. Their size and number of branches are traits of certain species. In *Ae. monticola*, setae 1 and 13-IV-V are similar in size and number of branches; while in *Ae. varipalpus*, they are not. These 2 setae are located dorsoventrally opposite each other on the segment.

Segment VIII - Mosquito larvae are metapneustic, that is, the only functional external orifices of the respiratory system the **spiracular openings** (SOp), are located posteriorly on abdominal segment VIII; (see Plate 8). These openings are surrounded by the **spiracular apparatus** (SAp). In anophelines this structure is sessile; while in culicines it is borne on the end of a sclerotized tube, the **siphon.** There are only 5 setae on the segment, 1-VIII to 5-VIII. Laterally, in all larvae, except those of the genus *Toxorhynchites*, there occur the **comb scales** (CS). They may be arranged in a single row, double row, or in an irregular patch. There may be as few as 4, as in *Ae. papago*, Fig. 670, or as many as 70, as in *Ae. pionips*, Fig. 741. The total number, within ranges, is diagnostic and used throughout the keys. Among those larvae of the subgenus *Melanoconion*, *Cx. abdominator* has a short comb scale without a narrow elongation in the middle, while the others have a rather slipper-shaped scale, elongated and narrow in the middle; as in *Cx. iolambdis*, Fig. 883. The character of the median spine and the comparison of its size to that of the subapical spinules are extensively utilized. The size of the median spine ranges from only slightly larger than the subapical spinules, as in *Ae. melanimon*, Fig. 769, to very long, with tiny subapical and lateral spinules, as in *Ae. riparius*, Fig. 657. Extreme development of the median spine occurs in some larvae. In the subgenera *Protomacleaya* and *Ochlerotatus*, *varipalpus* group, the whole posterior projection of the comb scale is a rather blunt spine, fringed all along the edges with tiny spinules, Fig. 669. In *Ae. nevadensis*, larvae sometimes have 3 large, median spines (Gjullin et al., 1968, p. 135, Fig. 2C). In 4 species of *Aedes*, the subapical spinules are almost as stout as the median spine, e.g., *Ae. thibaulti*, Fig. 750; *Ae. aegypti*, Fig. 676.

Spiracular Apparatus - The spiracular apparatus (SAp) is a 5-lobed valve which closes the spiracular openings during submersion of the larva and protects them. The 5 lobes are: the **anterior spiracular lobe** (ASL), the two **anterolateral spiracular lobes** (ALSL) and two **posterolateral spiracular lobes** (PSL). They are moveable, flaplike projections and bear a total of 11 pairs of setae, 3-S to 13-S. Seta 6-S is unusually long in one species of *Psorophora* (Fig. 939). The posterolateral spiracular lobes are prolonged into taillike processes in one anopheline, see *An. pseudopunctipennis*, Fig. 794. In North America, the genera *Coquillettidia* and *Mansonia* have the spiracular apparatus highly modified for piercing the roots of certain aquatic plants, in which the larvae find a source of air. It is in the form of an attenuated tube, bearing hooklike teeth at the apex, the **inner and outer spiracular teeth** (IST, OST) and a row of teeth on the anterior surface, known as the **saw** (SAW) (Plate 8B). Such modified apparatuses possess 4 visible pairs of setae, 1-, 2-, 6-, and 8-S, according to Belkin (1962, Vol. 2, Figs. 198-204).

Siphon - The **siphon** (S) in culicines is one of the most useful structures in identification. Its size and shape vary considerably. The length/width dimensions are expressed by the **siphon index.** Harbach and Knight (1978A) have defined it as the ratio of the length of the siphon to the median width, but since so many descriptions of North American mosquito larvae have used the index as the ratio of the length to the basal width, it is being followed here. Actually, in most instances it makes very little difference; but for larvae of subgenera *Janthinosoma* and *Grabhamia*, where the siphon is swollen medially, measurements would be dissimilar. In the species treated here the index varies from 1.4 (*Ae. togoi*, Fig. 748) to 10.0 (*Cx. opisthopus*, Fig. 876). At the base of the siphon is attached a small, lateral sclerite, the **siphon acus** (SA). In some species it is absent (*Ae. papago*, Fig. 670), while in others it is detached from the siphon "floating" in the basal membrane (*Ae. hendersoni*, Fig. 699).

Pecten - Five North American genera, *Coquillettidia*, *Mansonia*, *Orthopodomyia*, *Toxorhynchites* and *Wyeomyia* have no pecten spines on the siphon; see Fig. 518. The **pecten spines** (PS) in the larvae of those genera bearing them are so variable as to offer good characters that are used extensively in the keys. A common variant is to have 1-4 of the distalmost spines more widely spaced than the others. In the keys they are termed "detached apically," e.g., *Ae. excrucians*, Fig. 606. The **pecten** (Pt) may be very short, with few spines, as in *Ae. deserticola*, Fig. 684, and *Ps. columbiae*, Fig. 933, or extend almost to the apex of the siphon, as in *Ae. cataphylla*, Fig. 608. The number of spines and the proportion of the siphon to which it extends from the base are used in the keys. In some species several apical spines are quite large; and their length is compared to the apical diameter of the siphon, as in *Ae. fitchii*, Fig. 704, or to the length of seta 2-S, as in *Ae. campestris*, Fig. 760. The pecten spine usually has 1-4 lateral denticles on its ventral edge, or less frequently on the dorsal edge, too; but their number varies from none in *Cx. latisquama*, Fig. 854, to about 20 in *Cx. anips*, Fig. 886.

The siphon may be adorned with other types of spicules. It may bear a large patch of aciculae apically, as in *Cx. bahamensis*, Fig. 824, or a set of spines near the apex, as in *Cx. coronator*, Fig. 834.

Siphonal Setae - The siphon ordinarily has 2 pairs of setae, 1-S and 2-S; however, when there are several setae present, the basalmost one is named 1a-S, then in sequence 1b-, 1c-, 1d-S, etc., proceeding distally (Belkin, 1950). Seta 2-S is small, preapical, and located anteriorly. It is called by Carpenter and LaCasse (1955) the dorsal preapical spine. Its length, curvature and presence or absence of a secondary branch are all useful characters; see Figs. 858, 859, 886, and 887. The position of 1-S with respect to the pecten is beneficial in separating groups of species in *Aedes*. Normally 1-S is attached distal to the apicalmost pecten spine. At times it is attached basal to the distalmost pecten spine, and it is described as being "attached within the pecten"; see *Ae. tormentor*, Fig. 566. The number of setae and their positions on the siphon are diagnostic in many species. Several species of *Aedes*, e.g., *provocans*, Fig. 539, have at least 1a-S to 1c-S. A trait of *Culex* larvae is the presence of 3 or more pairs of setae on the siphon. The total number is often characteristic, and in many instances the penultimate seta is dorsally out-of-line with the others (Fig. 826). They are also frequently in a straight line and in the subgenus *Melanoconion* have an additional one or more subdorsal, small setae, Fig. 856. The genus *Culiseta* has as its principal recognizing feature a pair of basal, ventrolateral setae, 1-S see Plate 8A. Furthermore, species of the subgenus *Culiseta* have a row of short setae just distal to the pecten, Fig. 891. In some larvae, the siphonal setae are irregularly placed, e.g., *Cx. restuans* Fig. 830, *Wy. smithii*, Fig. 978. The length of seta 1-S is compared to many other structural dimensions, e.g., basal or apical diameter (Fig. 646), total length (Fig. 937), and distance from its alveolus to the apex of the siphon (Fig. 926). Likewise, its location at or distal to the middle of the siphon is peculiar to some larvae; see *Ae. melanimon*, Fig. 607. Of course, the numbers of branches of 1-S vary and are employed in the keys.

Segment X - This highly modified abdominal segment commonly called the anal segment, is the most posterior. It possesses a large sclerite, the **saddle** (Sa) which partially or entirely encircles the segment, usually 2 pairs of anal papillae, the homeostatic, almost transparent, cylindrical organs attached terminally to the segment, and 4 pairs of setae, 1-X to 4-X.

Saddle - In most larvae there is a single saddle sclerite, but those of the genus *Deinocerites* bear small ones dorsally and ventrally. Of the remaining culicine genera, larvae of *Haemagogus*, *Wyeomyia*, some *Aedes* and species *bahamensis* of the genus *Culex* possess saddles which do not completely encircle segment X. It is often necessary to determine the extent to which the saddle encircles the segment. Some are small and do not extend even 0.5 the distance to the midventral line, e.g., *Ae. atropalpus*, Fig. 613, in which case seta 1-X is attached ventrally to the saddle. On the other hand, some species have very long, though incomplete, saddles, almost reaching to the midventral line, e.g., *Ae. punctodes*, Fig. 708. At times it is extremely difficult to determine the exact size of the saddle sclerite of larvae which have been mounted in Canada balsam for some years, because of clearing by the mountant. Very fine focusing by a compound microscope with 200-400X magnification will help to locate its ventral edge. Some saddles are deeply incised along the ventral margin, as in *Ae. euedes*, Fig. 647; and in a number of larvae of the genera *Aedes*, *Haemagogus*, and *Culiseta*, the saddles have prominent aciculae along the posterior border, which vary in size with the species; see Figs. 776, 779, 903.

Anal papillae - Of those species treated here, 2 have larvae with only one pair of **anal papillae** (APP), i.e., *Cx. bahamensis*, Fig. 825, and *Wy. smithii*, Fig. 980. *Ae. dupreei* larvae are unique for having very long anal papillae, about 8.0 the length of the saddle and darkly pigmented (Fig. 578). At the other extreme, those species with larvae which breed in brackish water have very small anal papillae; see *Ae. taeniorhynchus*, Fig. 599. It is customary to express the length of the anal papillae as a ratio with the length of the saddle. It is known as the **anal papilla-saddle index** and is computed by dividing the length of the papilla by the length of the saddle, i.e., its anteroposterior me surement along the middorsal line.

Setae - Setae of segment X provide differentiating characters. The length of seta 1-X, the saddle seta, is frequently used in the *Aedes* key, e.g., Fig. 754, 755. It is commonly compared with the saddle length. Setae 2-X and 3-X are known collectively as the dorsal brush; 2 is ordinarily multibranched and 3 long and single. *Ae. abserratus* larvae are unusual in that both these setae are long and single, Fig. 574. Seta 4 is composed of a variable number of paired and unpaired setae. The most posterior seta is designated as 4a; then proceeding anteriorly, they are 4b-, 4c-, 4d-X, etc. This group of setae acts as a rudder during swimming. It is particularly well developed in the larvae of the genus *Psorophora*, in which the numerous precratal fanlike setae usually extend anteriorly more than 0.5 the length of the segment (Fig. 528). Contrarily, it is poorly developed in those tree hole-inhabiting larvae belonging to subgenera *Abraedes*, *Kompia*, *Protomacleaya* and the *varipalpus* group of *Ochlerotatus*, as well as in those larvae of the genera *Coquillettidia* and *Mansonia*, which attach themselves to roots of plants. They have no more than 3 to 7 pairs of setae in the brush; see Figs. 700, 701, 922. In some of these larvae a boss is present for attachment of the setae instead of a grid; see Fig. 670. The number of branches in the 2 caudalmost setae (*Ae. sierrensis*, Fig. 680), or the 2 anteriormost setae (*Ae. brelandi*, Fig. 701) is diagnostic. The position of the ventral brush is important in distinguishing those *Aedes* larvae possessing a completely circular saddle. In them the setae are confined to that part of the segment posterior to the saddle. The total number of fanlike setae is distinctive for a number of species, e.g., *Ae. zoosophus*, Fig. 694, and *Cs. minnesotae*, Fig. 897. In *Wyeomyia* larvae no regular, rudderlike ventral brush is present. Seta 4 is nothing more than a pair of long or short setae ventrolateroposteriorly on the segment; see Figs. 972, 974.

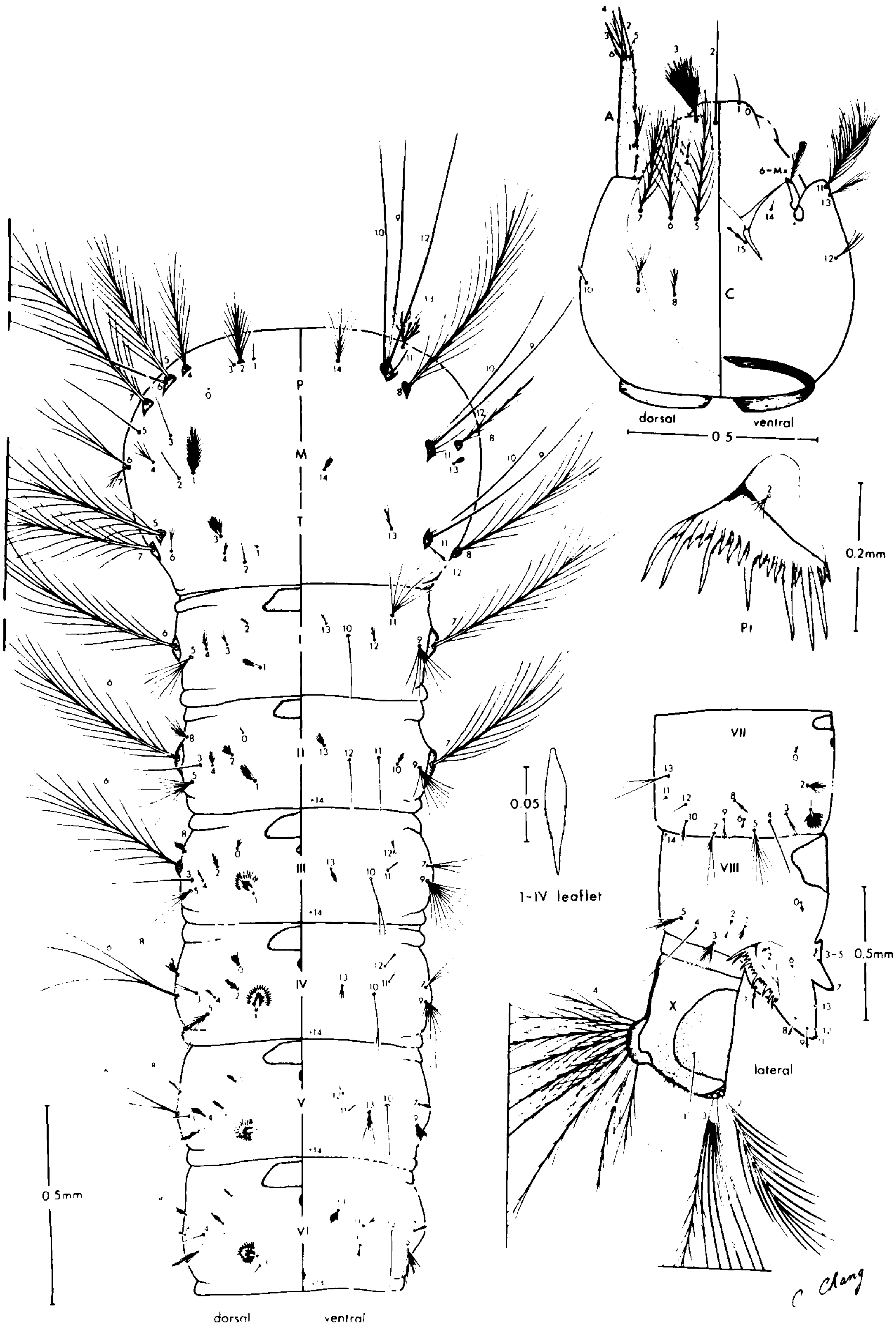


Plate 5. Fourth stage anopheline larva; dorsal left, ventral right.

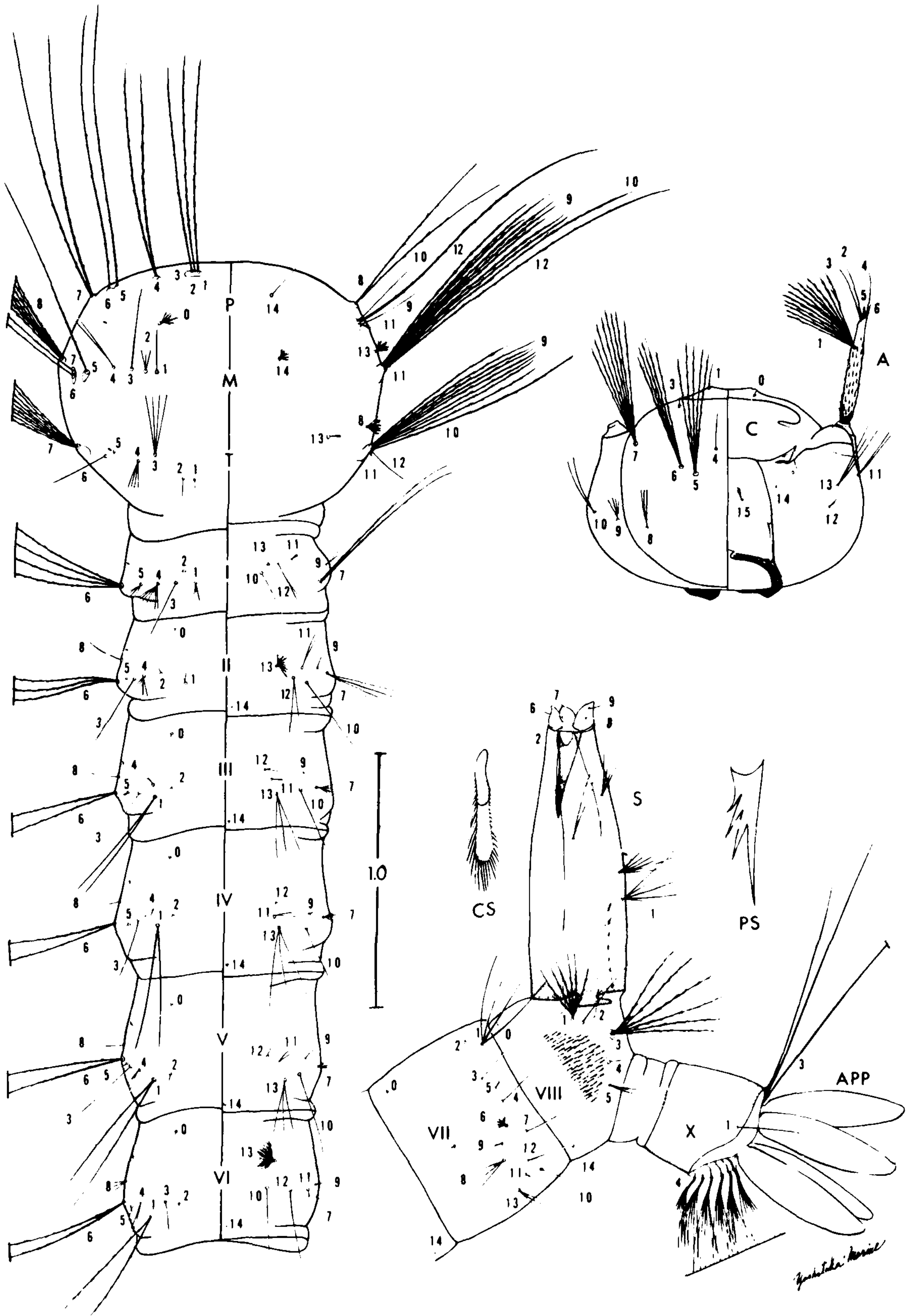


Plate 6. Fourth stage culicine larva; dorsal left, ventral right.

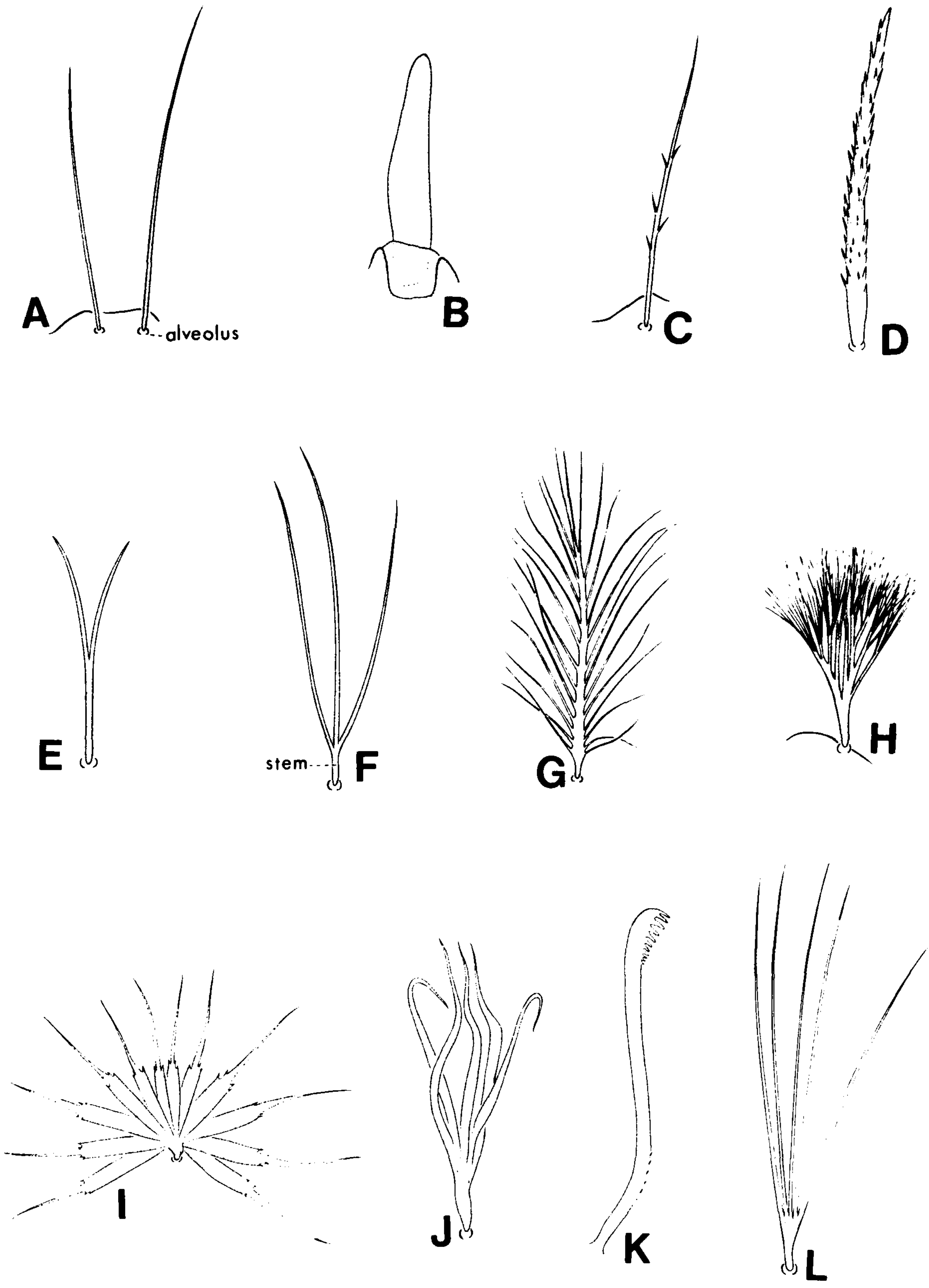


Plate 7. Examples of kinds of setae found in mosquito larvae. A. Unbranched smooth setae; B. Spiniform seta; C. Unbranched aciculate seta; D. Spinulate spiniform seta; E. Forked seta; F. Branched seta; G. Plumose seta; H. Dendritic seta; I. Palmate seta, fully developed; J. Palmate seta, 0.5 developed; K. Comb-tipped filament; L. Fanlike seta of ventral brush.

ABBREVIATIONS IN PLATE 8

APP - anal papilla
ASL - anterior spiracular lobe
ASLP - anterior spiracular lobe plate
C - comb
CS - comb scales
G - grid
IST - inner spiracular teeth
LGB - lateral grid bar
LSL - anterolateral spiracular lobe
LSLP - anterolateral spiracular lobe plate
MdP - median plate
OST - outer spiracular teeth
PP - pecten plate
PS - pecten spines
PSL - posterolateral spiracular lobe
PSLP - posterolateral spiracular lobe plate
PSP - posterior spiracular plate
Pt - pecten
S - siphon
Sa - saddle
SA - siphon acus
SaA - saddle acus
SAd- spiracular apodeme
SAp- spiracular apparatus
SAW - saw
SOp - spiracular opening
TGB - transverse grid bar
VII - abdominal segment VII
VIII - abdominal segment VIII
X - abdominal segment X (anal segment)
2-S - seta 2 of siphon

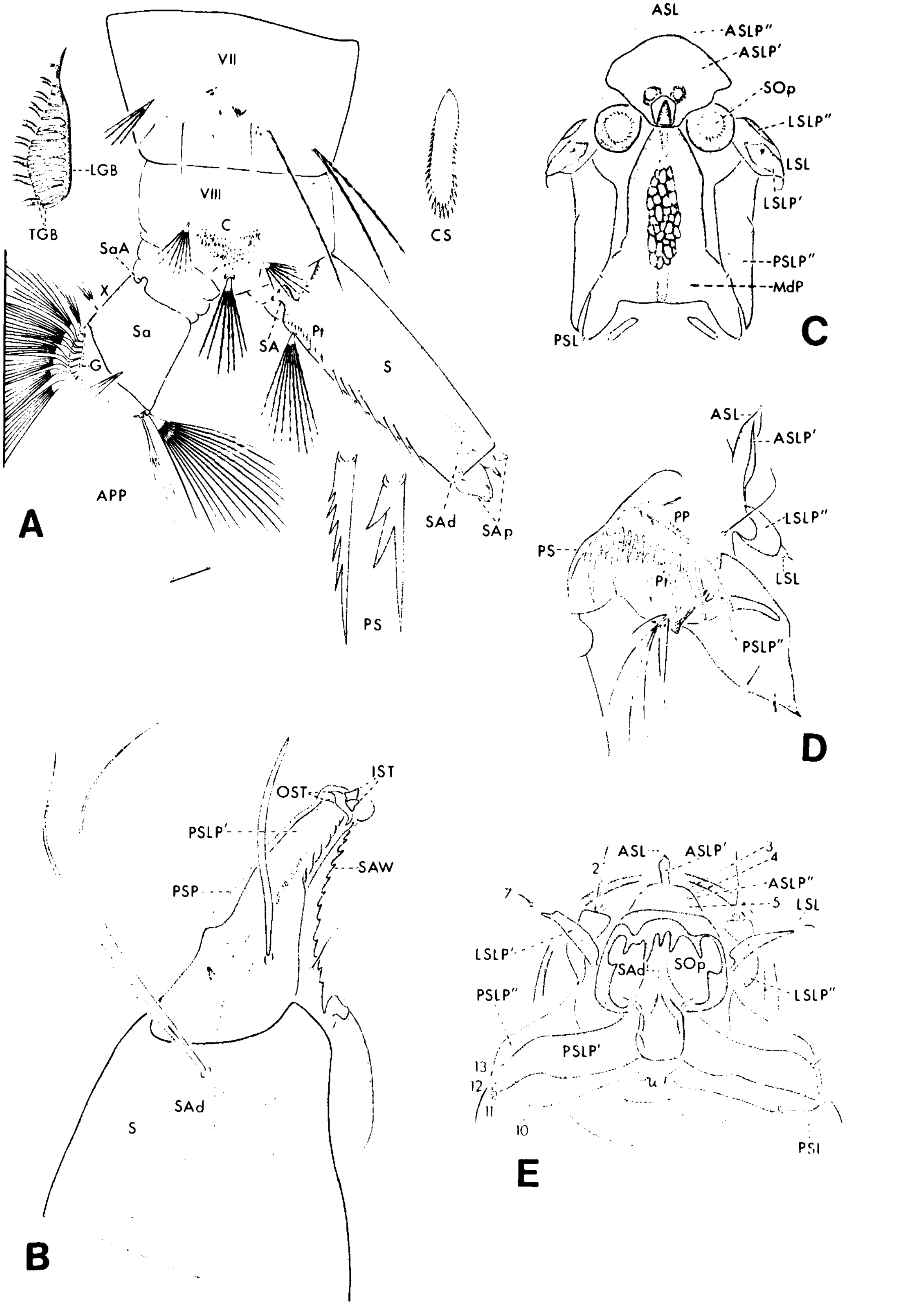


Plate 8. Morphology of terminal abdominal segments of mosquito larvae. A. segments VII-X of *Culiseta*; B. Siphon and spiracular apparatus of *Mansonia*; C,D. Spiracular apparatus of *Anopheles*; C. dorsal view, D. lateral view; E. Dorsal view of spiracular apparatus of *Culex*.

KEY TO GENERA OF FOURTH STAGE MOSQUITO LARVAE OF NORTH AMERICA, NORTH OF MEXICO

1. Respiratory siphon absent; abdominal terga with seta 1 palmate, at least on IV-VI (Fig. 510) .... *Anopheles*

   Respiratory siphon present; seta 1 on abdominal terga never palmate (Fig. 511) 2

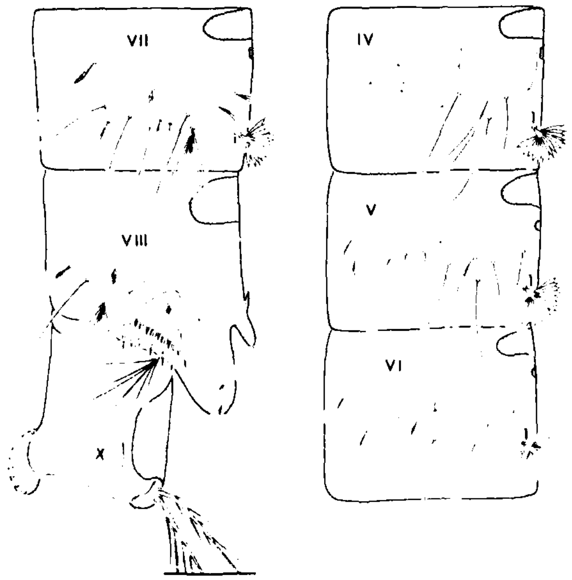


Fig. 510 — *Lateral view of abdominal segments IV-X - An. quadrimaculatus*

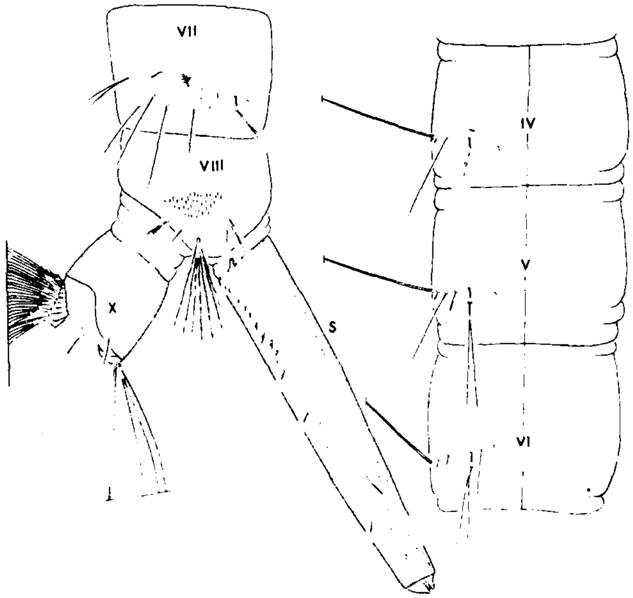


Fig. 511 — *Dorsal and lateral view of abdominal segments IV-X - Cx. pipiens*

2(1). Posterolateral spiracular lobe of siphon elongated, sclerotized and attenuated, with dorsal saw, adapted for piercing plant tissue (Fig. 512) 3

   Posterolateral spiracular lobe not specially adapted, part of spiracular apparatus of siphon (Fig. 513) 4

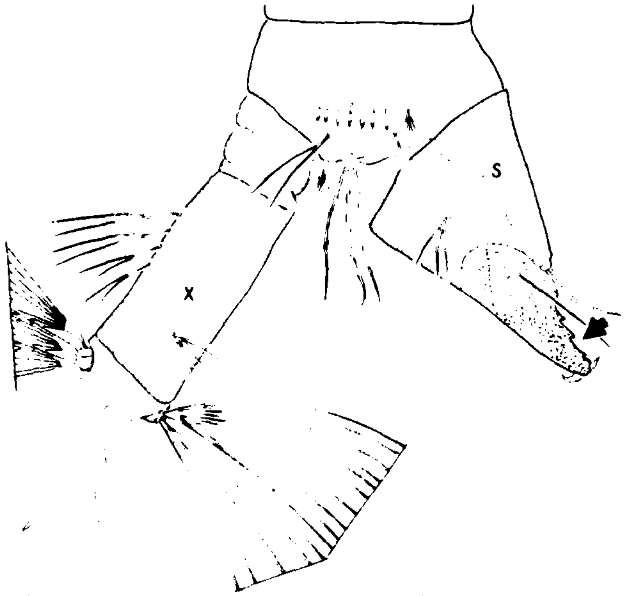


Fig. 512 — *Lateral view of abdominal segments VIII-X - Ma. dyari*

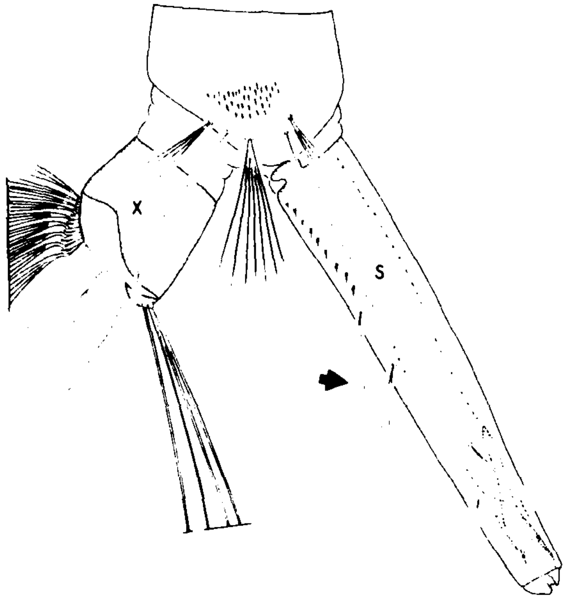


Fig. 513 — *Lateral view of abdominal segments VIII-X - Cx. pipiens*

3(2). Setae 2, 3-A about length of antennal flagellum, or longer (Fig. 514); saddle bearing 3, 4 robust, precratal setae (Fig. 515) .... *Mansonia*

Setae 2, 3-A much shorter than antennal flagellum (Fig. 516); saddle without precratal setae, or if present, no more than 2 thin setae (Fig. 517) .... *Coquillettidia perturbans* (Plate 32)

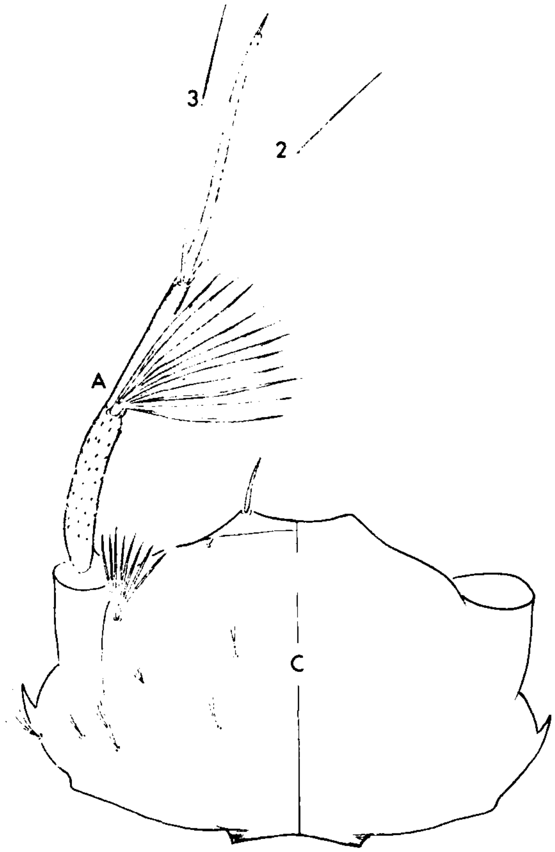


Fig. 514 — *Dorsal view of head and antenna - Ma. dyari*

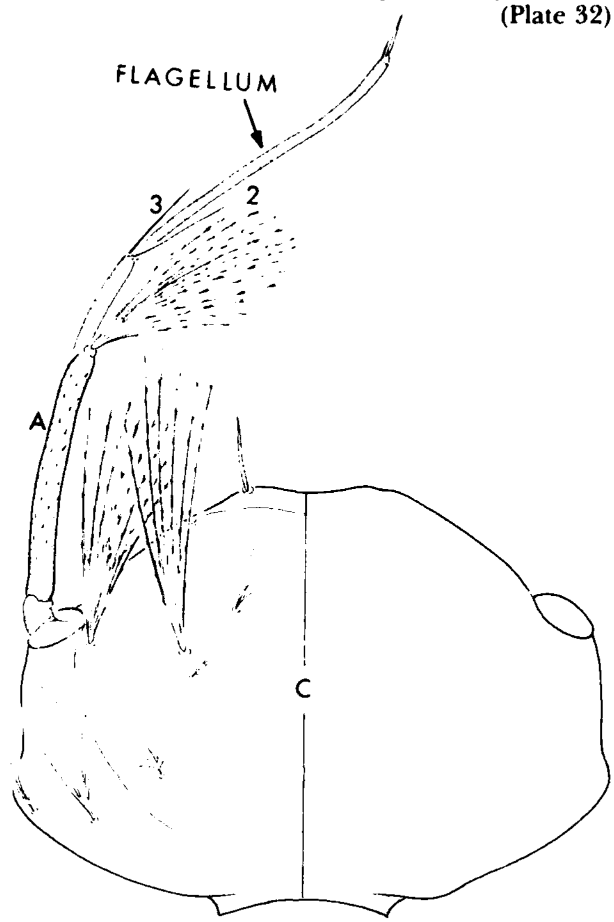


Fig. 516 — *Dorsal view of head and antenna - Cq. perturbans*

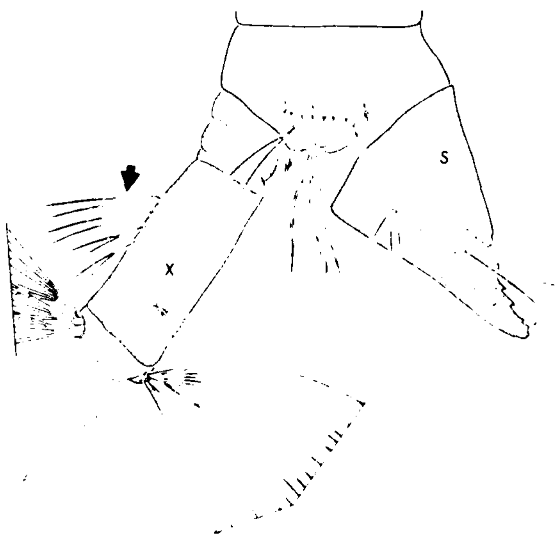


Fig. 515 — *Lateral view of abdominal segments VIII-X - Ma. dyari*

Fig. 517 — *Lateral view of abdominal segments VIII-X - Cq. perturbans*

4(2). Siphon without pecten spines (Fig. 518) 5

Siphon with pecten spines (Fig. 519) 7

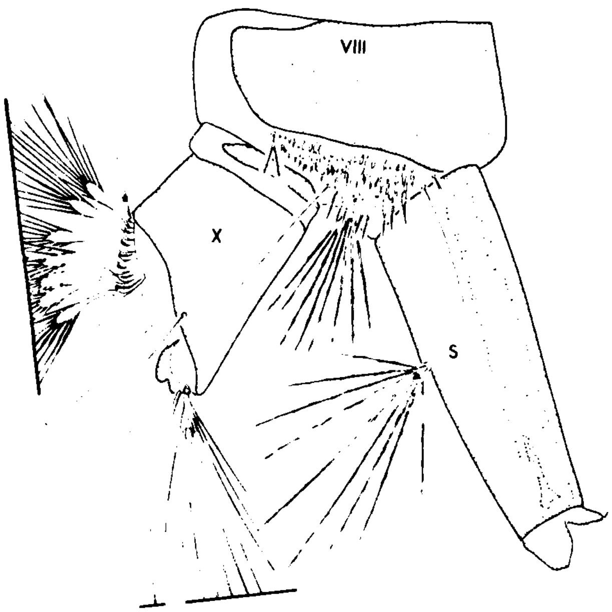


Fig. 518 —*Lateral view of abdominal segments VIII-X - Or. signifera*

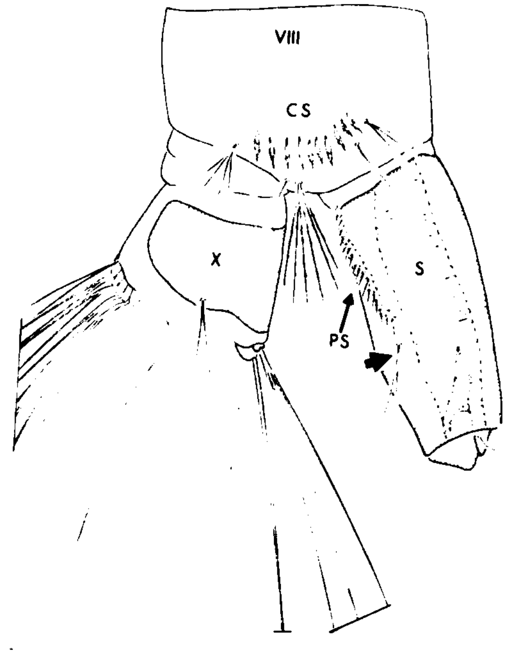


Fig. 519 —*Lateral view of abdominal segments VIII-X - Ae. aegypti*

5(4). Lateral palatal brush composed of few, stout, curved rods (Fig. 520); comb scales absent (Fig. 521) .... *Toxorhynchites r. rutilus*
Toxorhynchites r. septentrionalis
(Plates 48, 39)

Lateral palatal brush composed of numerous, thin, usually comb-tipped filaments (Fig. 522); with comb scales (Fig. 523) 6

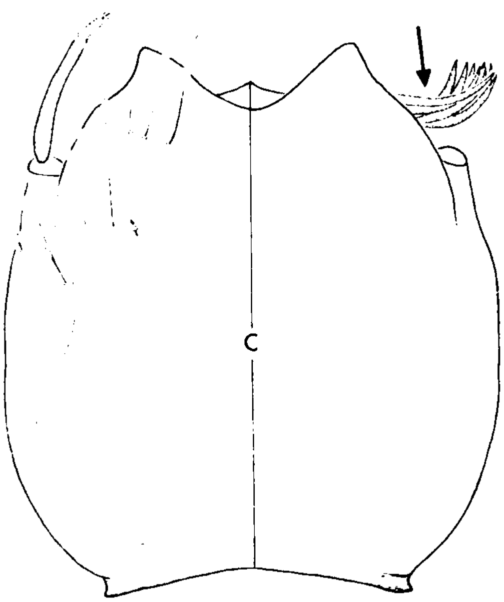


Fig. 520 — *Dorsal view of head - Tx. r. septentrionalis*

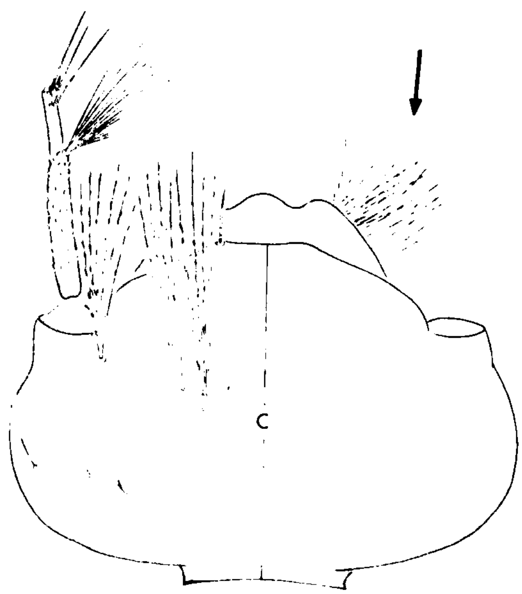


Fig. 522 — *Dorsal view of head - Cx. pipiens*

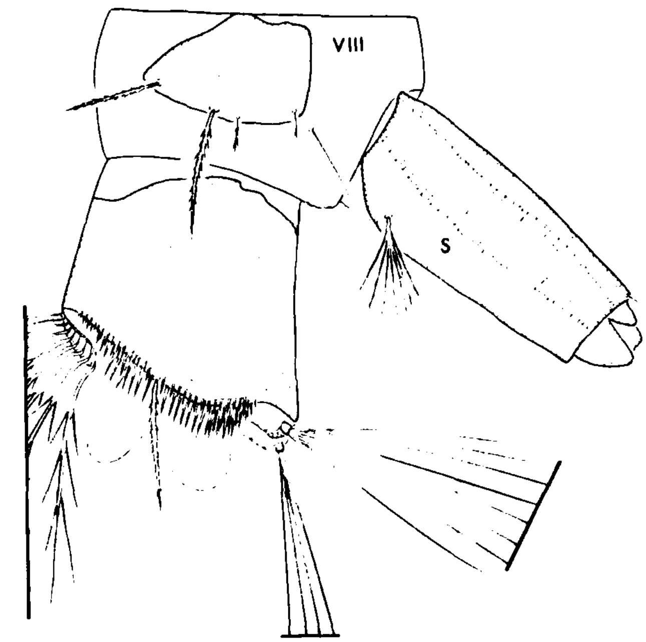


Fig. 521 —*Lateral view of abdominal segments VIII-X - Tx. r. rutilus*

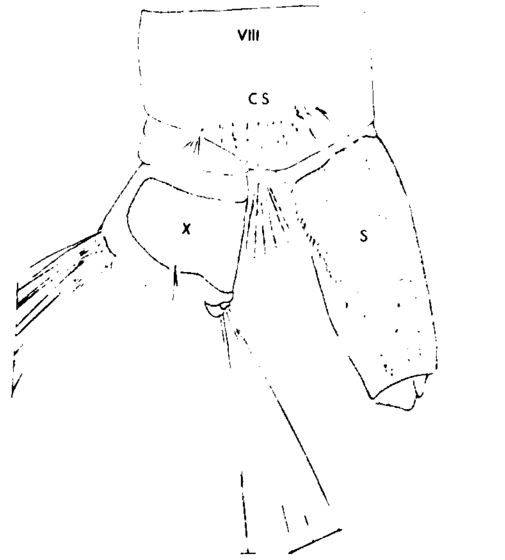


Fig. 523 —*Lateral view of abdominal segments VIII-X - Ae. aegypti*

6(5). Segment X without median, ventral brush, setae 4-X a pair of ventroposterolateral setae; comb scales in single row (Fig. 524) . . . . *Wyeomyia*

Segment X with seta 4-X a well developed, median, ventral brush; comb scales in 2 rows (Fig. 525) . . . . *Orthopodomyia*

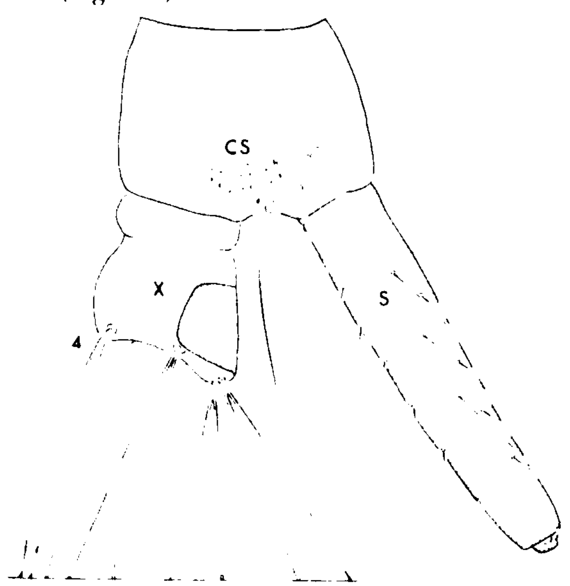


Fig. 524 — *Lateral view of abdominal segments VIII-X - Wy. smithii*

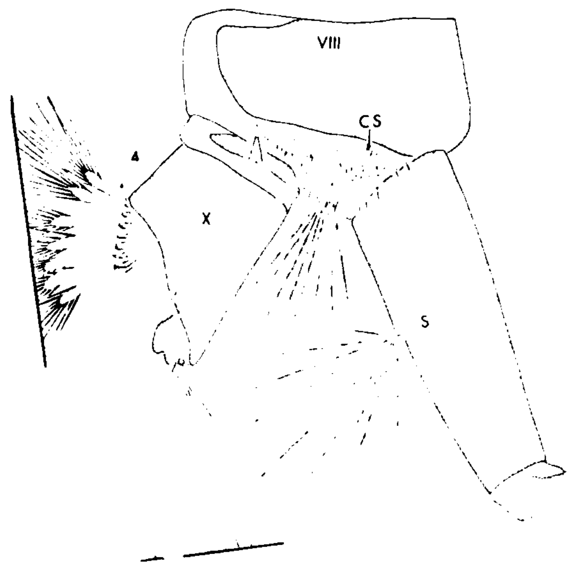


Fig. 525 —*Lateral view of abdominal segments VIII-X - Or. signifera*

7(4). Segment VIII with large, lateral comb plate bearing comb scales (Fig. 526); head longer than wide (Fig. 527) . . . . *Uranotaenia*

Segment VIII usually without comb plate, if present, small (Fig. 528); head wider than long (Fig. 529) 8

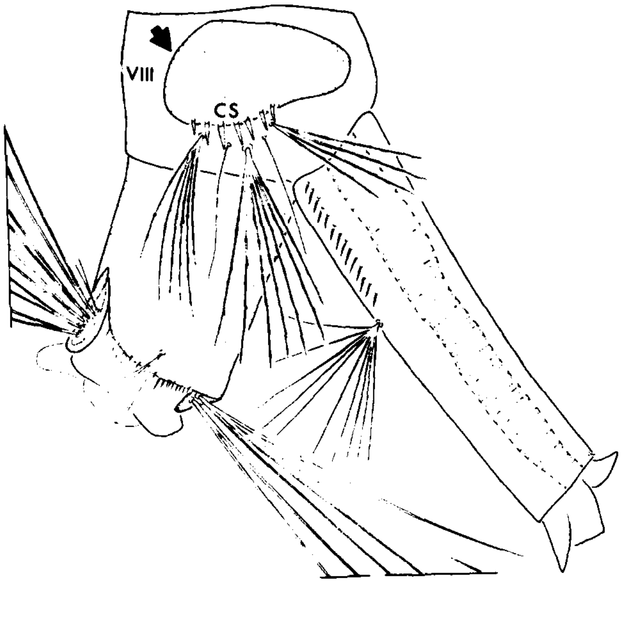


Fig. 526 — *Lateral view of abdominal segments VIII-X - Ur. sapphirina*

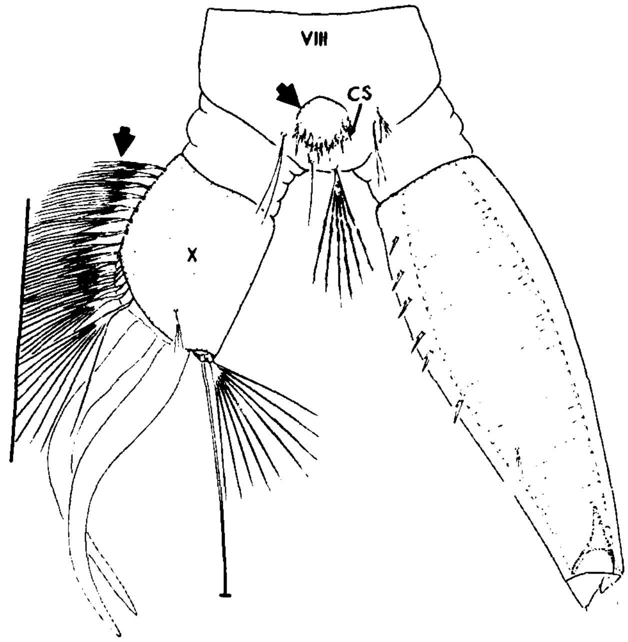


Fig. 528 — *Lateral view of abdominal segments VIII-X - Ps. columbiae*

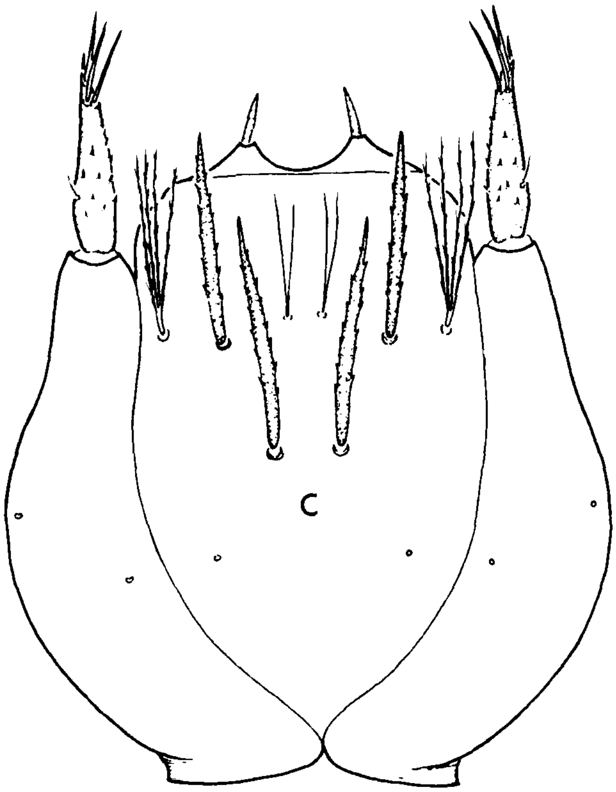


Fig. 527 — *Dorsal view of head - Ur. sapphirina*

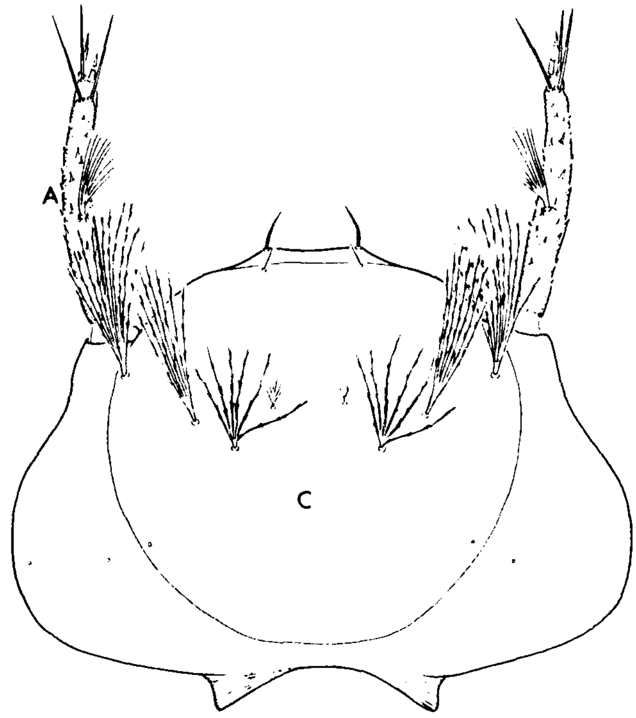


Fig. 529 — *Dorsal view of head - Ps. columbiae*

8(7). Head capsule widest near level of antennal attachment (Fig. 530); segment X with dorsal and ventral, sclerotized plates (Fig. 531) .... *Deinocerites*

Head capsule widest in caudal 0.5 (Fig. 532); segment X with single, sclerotized plate (Fig. 533) 9

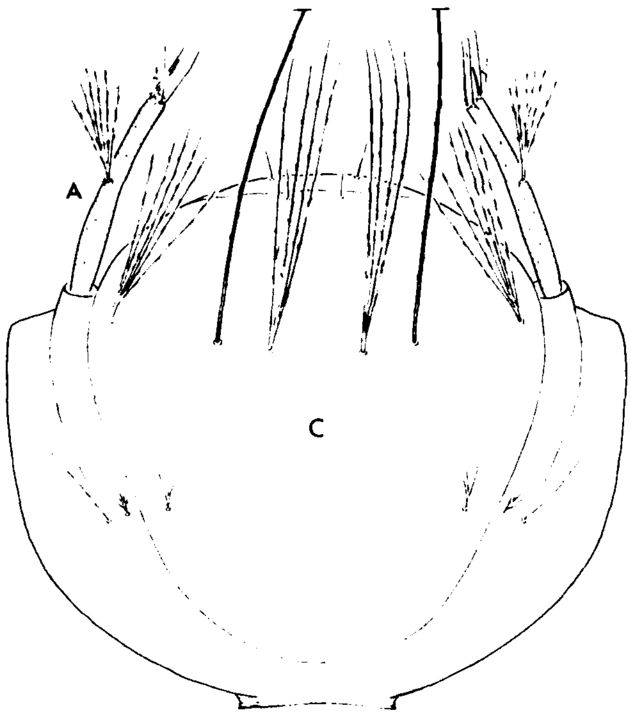


Fig. 530 — *Dorsal view of head - De. pseudes*

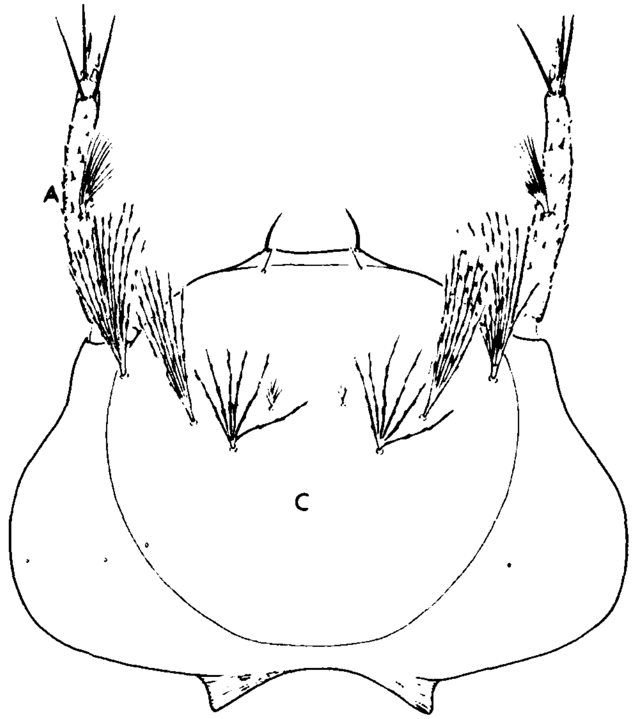


Fig. 532 — *Dorsal view of head - Ps. columbiae*

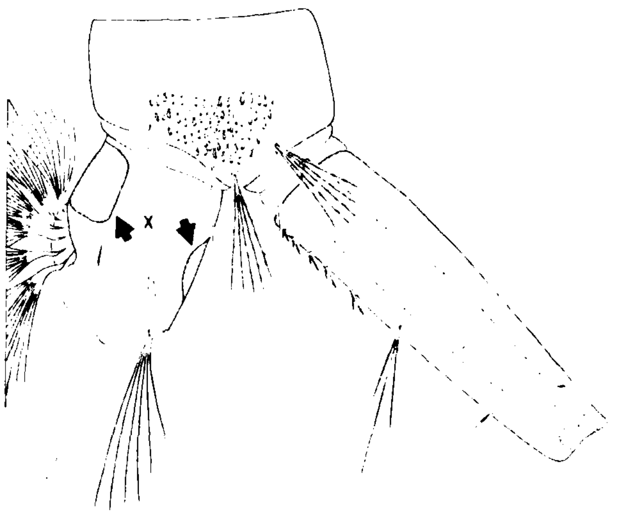


Fig. 531 — *Lateral view of abdominal segments VIII-X - De. pseudes*

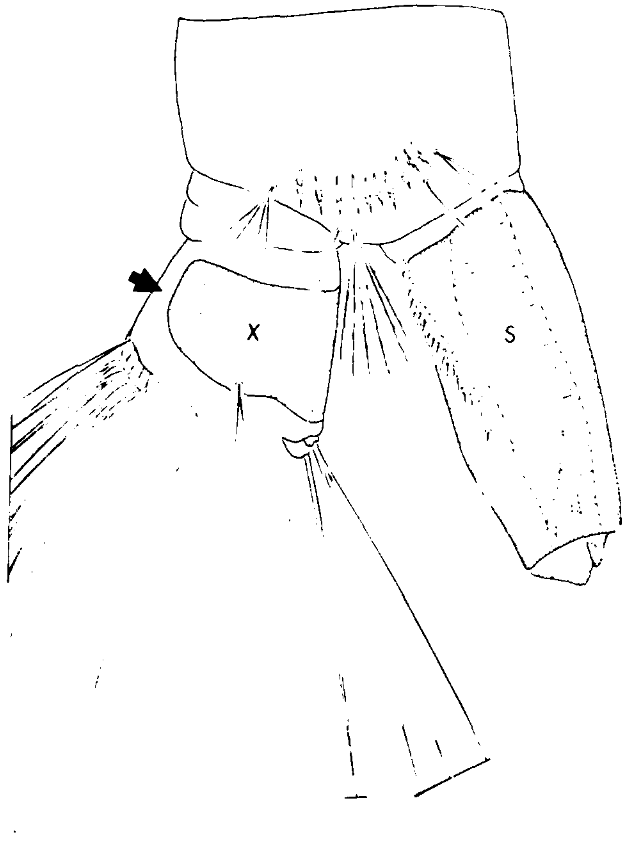


Fig. 533 — *Lateral view of abdominal segments VIII-X - Ae. aegypti*

9(8). Siphon with at least a basal pair of ventral setae (Fig. 534) .... *Culiseta*

Siphon with setae elsewhere, not ventrally near base (Fig. 535) 10

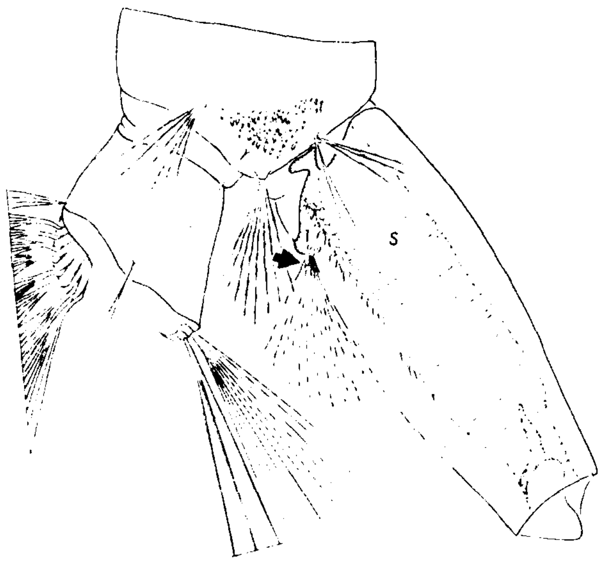


Fig. 534 —*Lateral view of abdominal segments VIII-X - Cs. inornata*

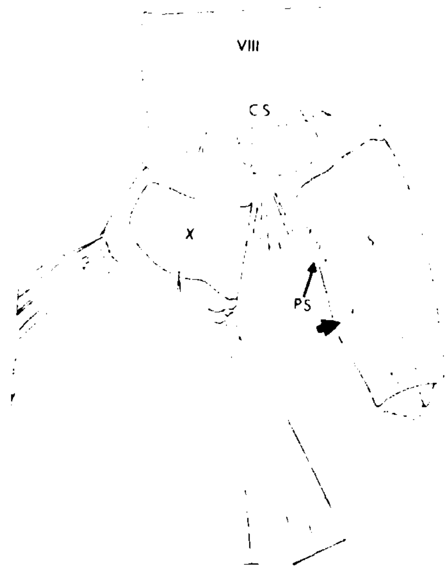


Fig. 535 —*Lateral view of abdominal segments VIII-X - Ae. aegypti*

10(9). Siphon with 3 or more pairs of setae, other than setae 2-S (Fig. 536) 11

Siphon with only 1 pair of setae, other than setae 2-S (Fig. 537) 12

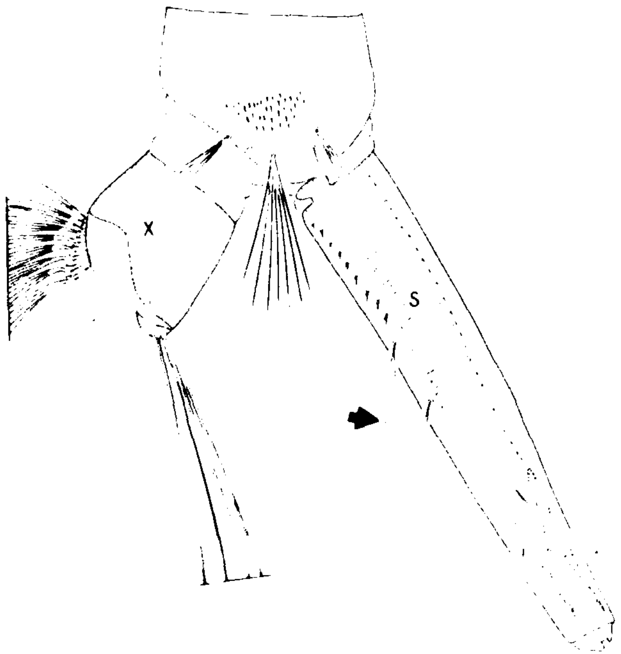


Fig. 536 —*Lateral view of abdominal segments VIII-X - Cx. pipiens*

Fig. 537 —*Lateral view of abdominal segments VIII-X - Ae. aegypti*

11(10). Saddle completely encircling segment X (Fig. 538) .... *Culex*

Saddle not completely encircling segment X (Fig. 539) .... (in part) *Aedes*

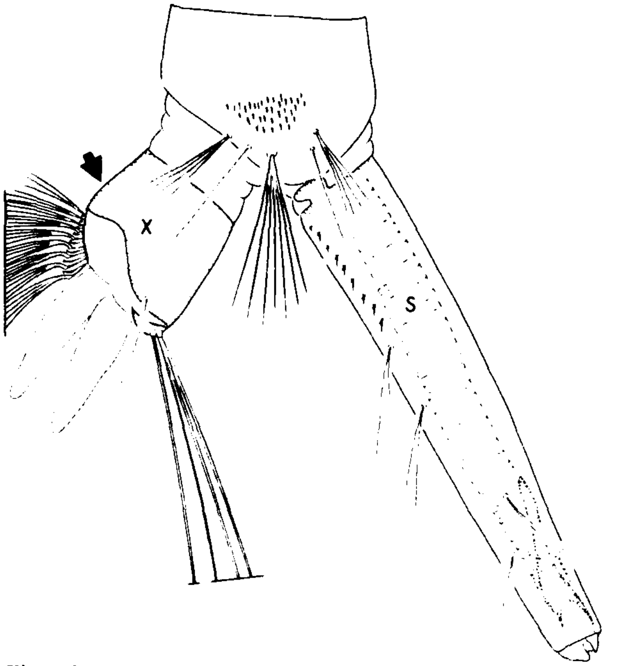


Fig. 538—*Lateral view of abdominal segments VIII-X - Cx. pipiens*

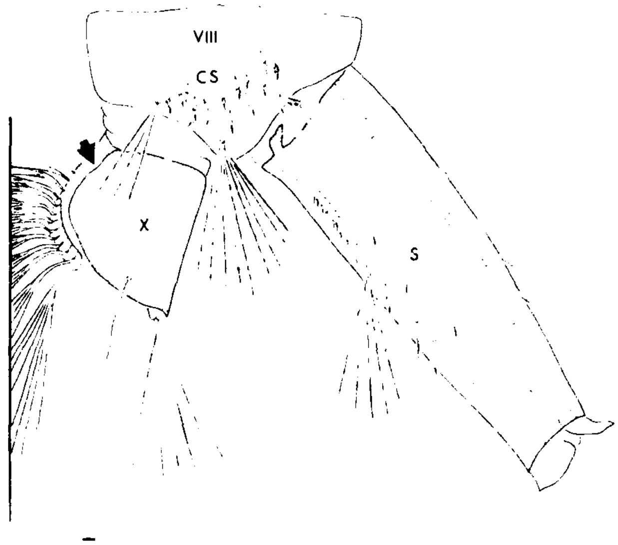


Fig. 539—*Lateral view of abdominal segments VIII-X - Ae. provocans*

12(10). Saddle completely encircling segment X, pierced along midventral line by row of precratal, setal tufts (Fig. 540) .... *Psorophora*

Saddle usually not encircling segment X, but if so, then setal tufts of ventral brush confined posterior to it (Fig. 541) 13

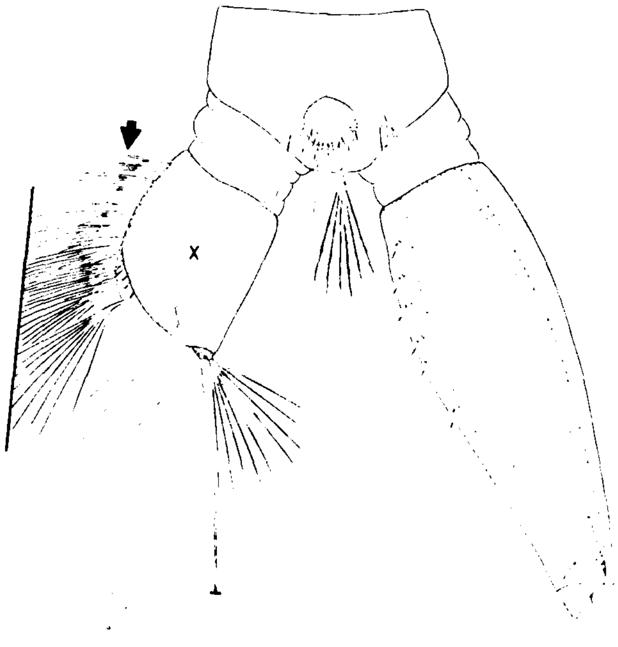


Fig. 540—*Lateral view of abdominal segments VIII-X - Ps. columbiae*

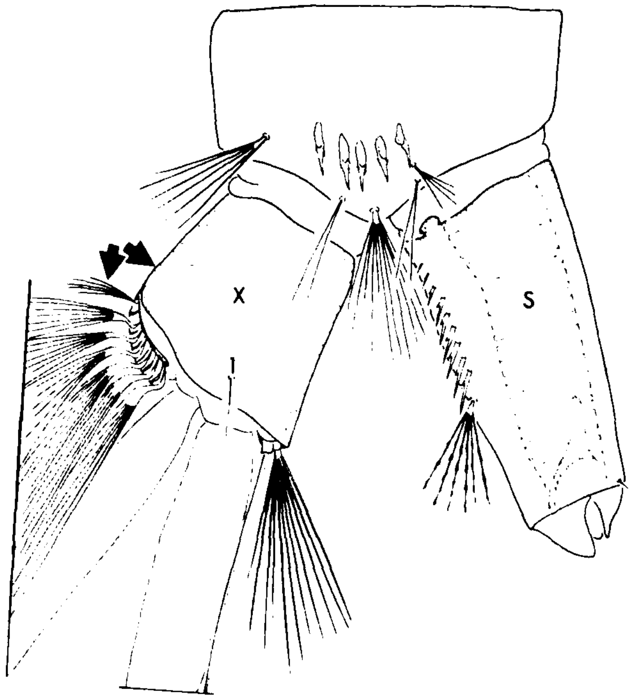


Fig. 541—*Lateral view of abdominal segments VIII-X - Ae. atlanticus*

13(12). **Saddle completely encircling segment X (Fig. 542) .... (in part) *Aedes***

Saddle not completely encircling segment X (Fig. 543) 14

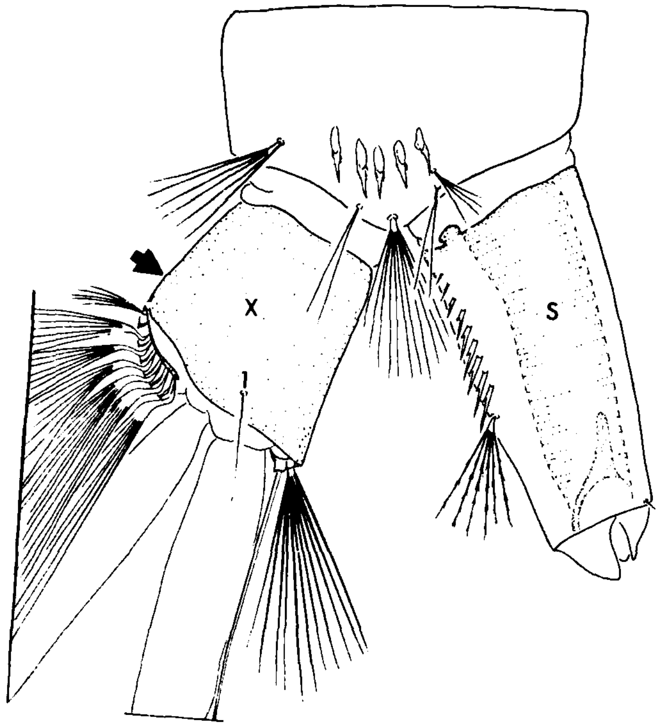


Fig. 542 — *Lateral view of abdominal segments VIII-X - Ae. atlanticus*

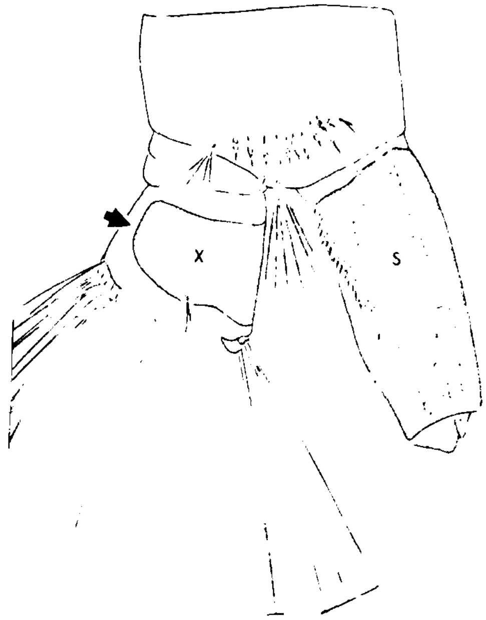


Fig. 543 — *Lateral view of abdominal segments VIII-X - Ae. aegypti*

14(13). Saddle bearing prominent aciculae on posterior border; seta 3 well developed, longer than tergum on VII, single (Fig. 544) .... *Haemagogus equinus* (Plate 40)

Saddle with at most small aciculae; seta 3 weak, shorter than tergum on VII, rarely longer, single or multibranched (Fig. 545) .... (in part) *Aedes*

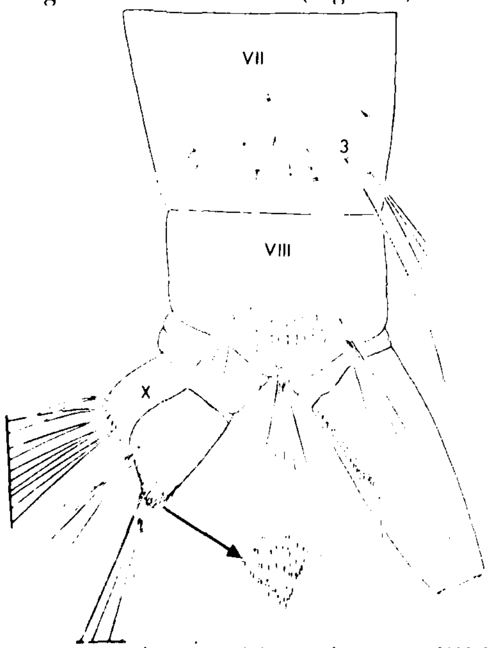


Fig. 544 — *Lateral view of abdominal segments VII-X - Hg. equinus*

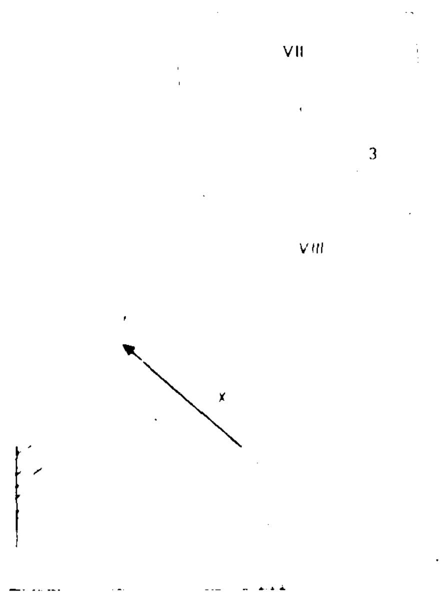


Fig. 545 — *Lateral view of abdominal segments VII-X - Ae. aegypti*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *AEDES*

1. Siphon with more than 1 pair of setae, excluding seta 2-S (Fig. 546) 2

   Siphon with but 1 pair of setae, excluding seta 2-S (Fig. 547) 4

Fig. 546 — *Lateral view of siphon - Ae. provocans*

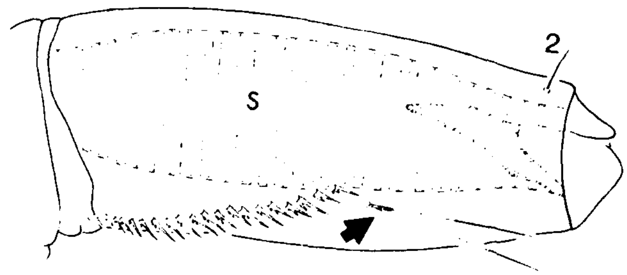


Fig. 547 — *Lateral view of siphon - Ae. aegypti*

2(1.) Bases of setae 5-7-C nearly in straight line (Fig. 548) .... *cinereus hemiteleus* (Plate 21)

   Base of seta 6-C distinctly anterior to setae 5- and 7-C (Fig. 549) 3

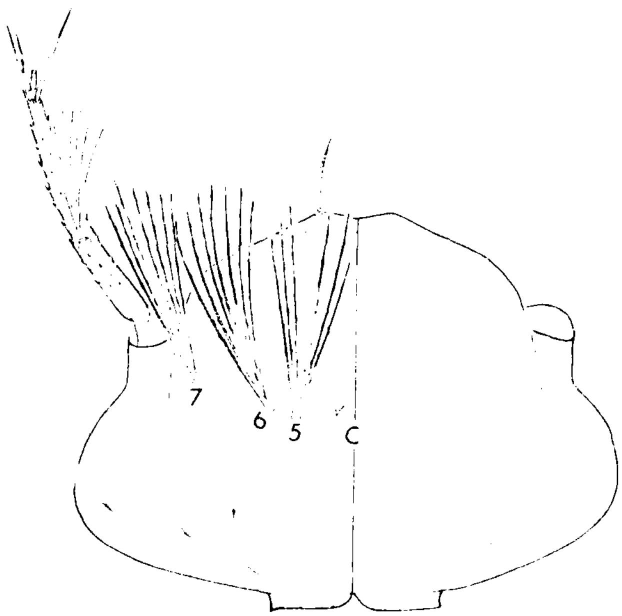


Fig. 548 — *Dorsal view of head - Ae. hemiteleus*

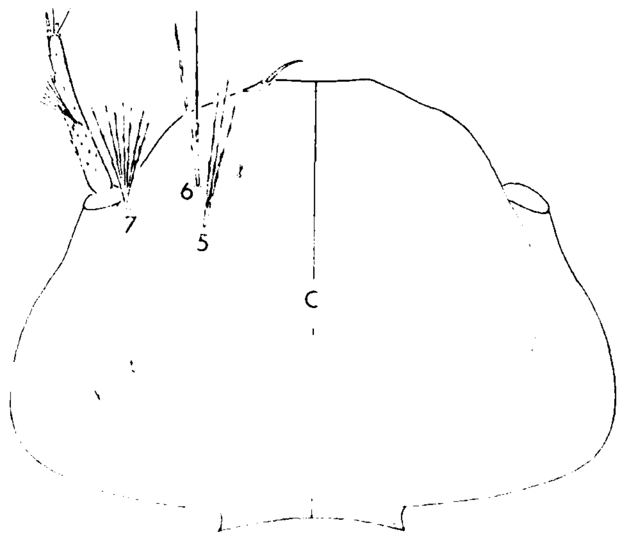


Fig. 549 — *Dorsal view of head - Ae. provocans*

3(2). Siphon with 4-5 pairs of subdorsal setae; segment VIII with 14-16 comb scales (Fig. 550) ...... *provocans* (Plate 26)

   Siphon with 1 pair of subdorsal setae; segment VIII with 4-6 comb scales (Fig. 551) ...... *bicristatus* (Plate 15)

Fig. 550 — *Lateral view of abdominal segments VIII-X-Ae. provocans*

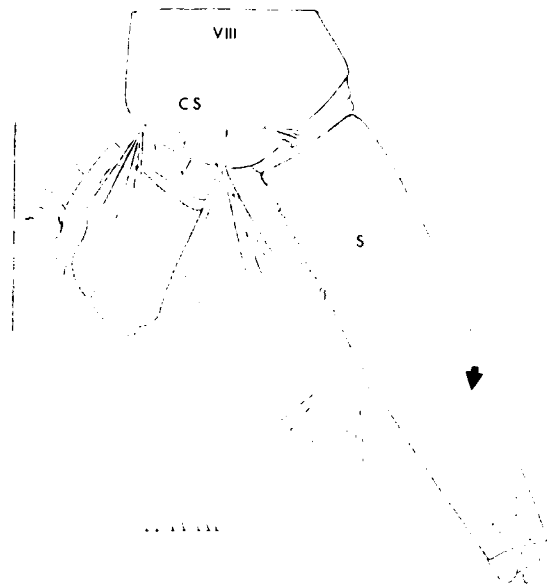


Fig. 551 — *Lateral view of abdominal segments VIII-X - Ae. bicristatus*

4(1). Saddle completely encircling segment X (Fig. 552) 5

Saddle not completely encircling segment X (Fig. 553) 23

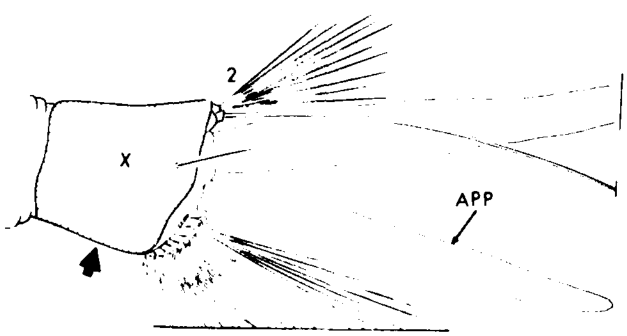


Fig. 552 — *Lateral view of abdominal segment X - Ae. atlanticus*

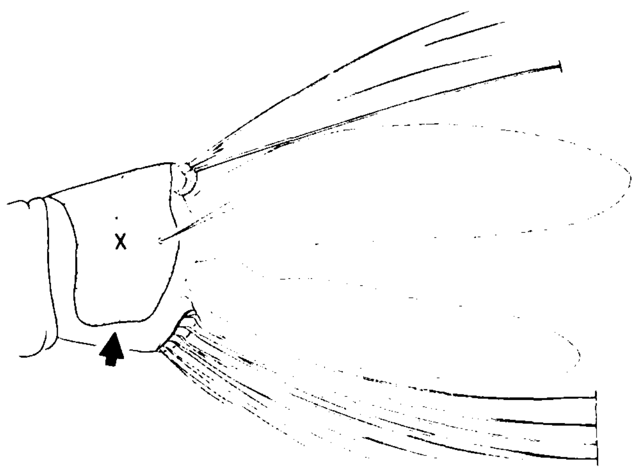


Fig. 553 — *Lateral view of abdominal segment X - Ae. aegypti*

5(4). Pecten on siphon with 1 or more distal spines detached apically (Fig. 554) 6

Pecten with spines more or less evenly spaced (Fig. 555) 9

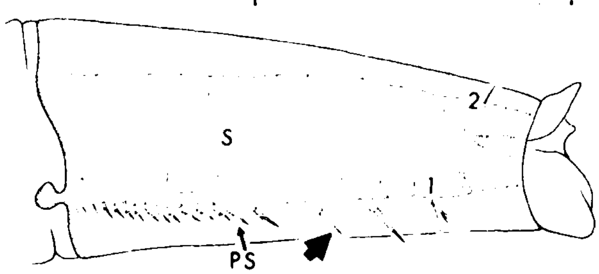


Fig. 554 — *Lateral view of siphon - Ae. nigromaculis*

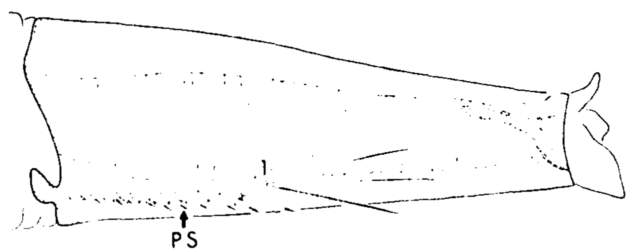


Fig. 555 — *Lateral view of siphon - Ae. abserratus*

6(5). **Comb scales with median spine at least 4.0 length of minute, basal spinules (Fig. 556); seta 1-S attached distal to pecten, or sometimes within pecten (Fig. 557) 7**

Comb scales with median spine no more than 2.0 length of subapical spinules, or fringed with subequal spinules (Fig. 558); seta 1-S within pecten (Fig. 559) 8

Fig. 556 — *Comb scale - Ae. nigromaculis*

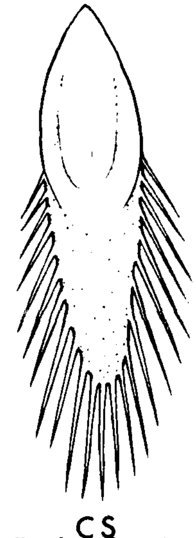


Fig. 558 — *Comb scale - Ae. f. pallens*

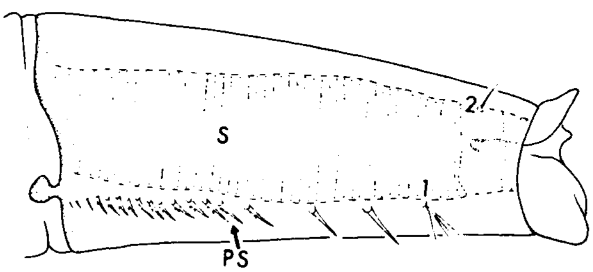


Fig. 557 — *Lateral view of siphon - Ae. nigromaculis*

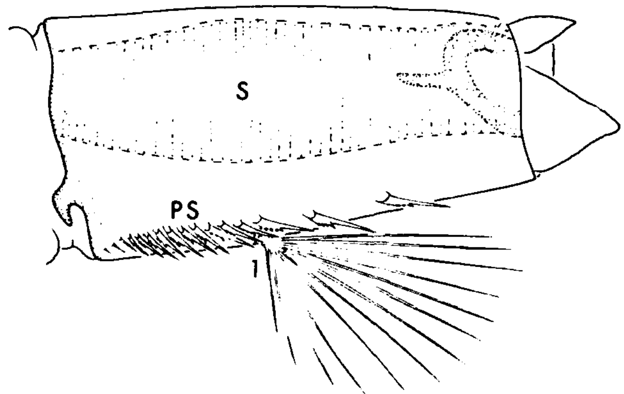


Fig. 559 — *Lateral view of siphon - Ae. f. pallens*

7(6). Seta 1-S with branches less than 0.5 length of basal diameter of siphon; seta 2-S nearly equal to length of apical pecten spine (Fig. 560) .... *nigromaculis* (Plate 25)

Seta 1-S with branches at least equal to basal diameter of siphon; seta 2-S less than 0.5 length of apical pecten spine (Fig. 561) .... *nigripes* (Plate 25)

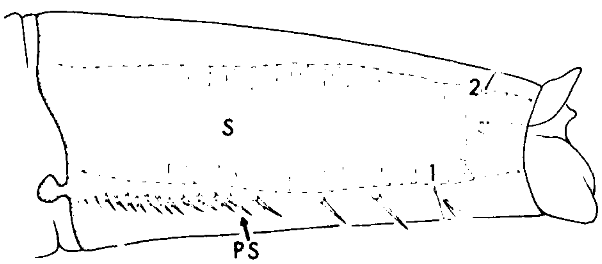


Fig. 560 — *Lateral view of siphon - Ae. nigromaculis*

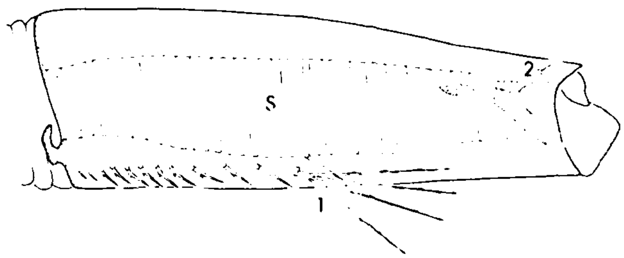


Fig. 561 — *Lateral view of siphon - Ae. nigripes*

8(6). Comb scale fringed with subequal spinules (Fig. 562); seta 6-C usually double or triple (Fig. 563) .... *fulvus pallens* (Plate 18)

Comb scale with median spine markedly longer than subapical spinules (Fig. 564); seta 6-C simple (Fig. 565) .... *thelcter* (Plate 23)

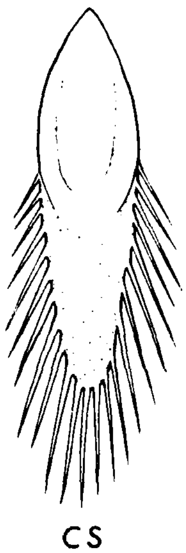


Fig. 562 — *Comb scale - Ae. f. pallens*

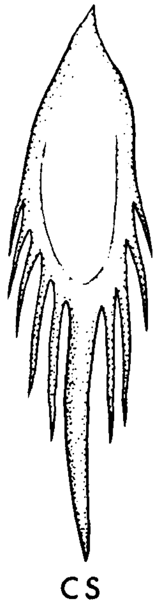


Fig. 564 — *Comb scale - Ae. thelcter*

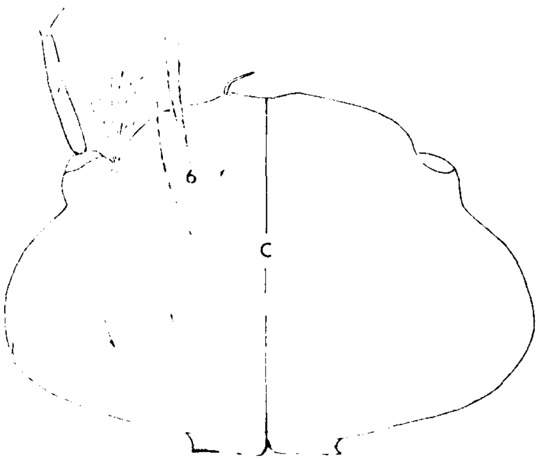


Fig. 563 — *Dorsal view of head - Ae. f. pallens*

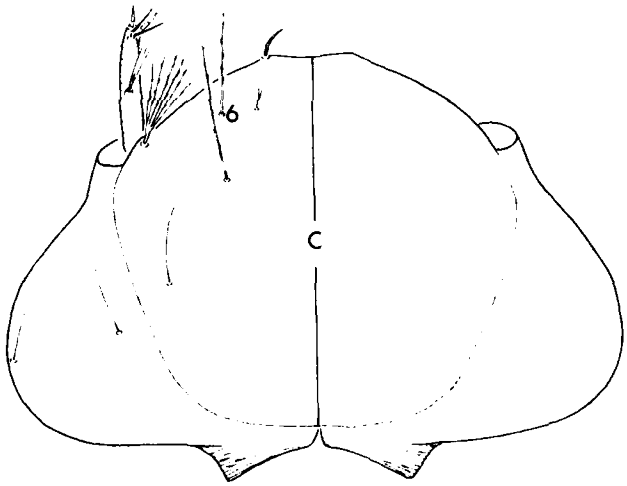


Fig. 565 — *Dorsal view of head - Ae. thelcter*

9(5). Seta 1-S attached within pecten (Fig. 566) 10

Seta 1-S attached distal to pecten (Fig. 567) 11

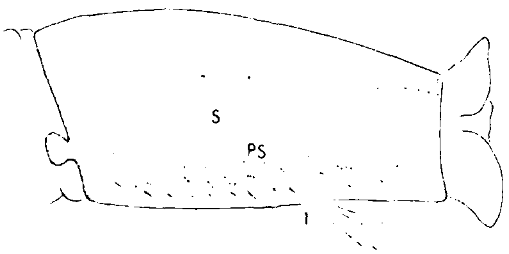


Fig. 566 — *Lateral view of siphon - Ae. tormentor*

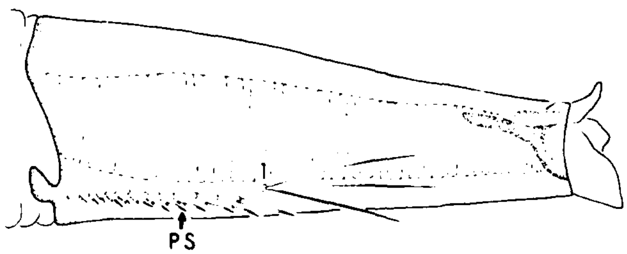


Fig. 567 — *Lateral view of siphon - Ae. abserratus*

10(9). Comb scales 30-40, evenly fringed with subequal spinules (Fig. 568) .... *bimaculatus* (Plate 16)

Comb scales 9-12, with large median spine and minute basal spinules (Fig. 569) .... *tormentor* (Plate 24)

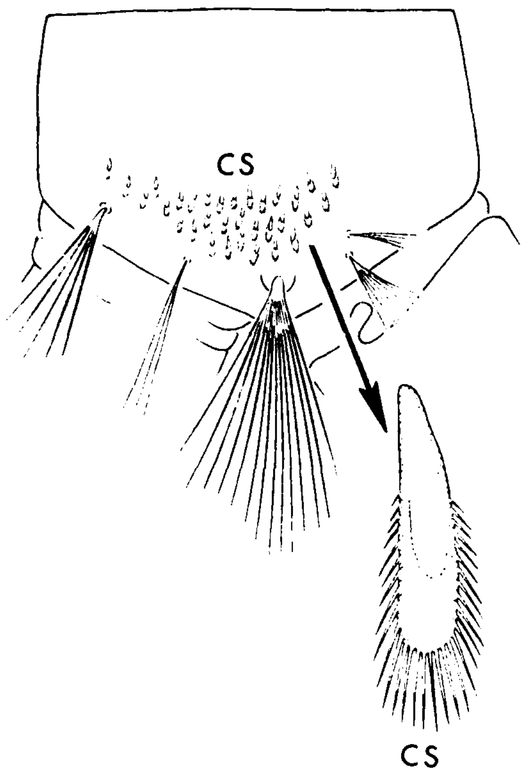


Fig. 568 — *Lateral view of abdominal segment VIII - Ae. bimaculatus*

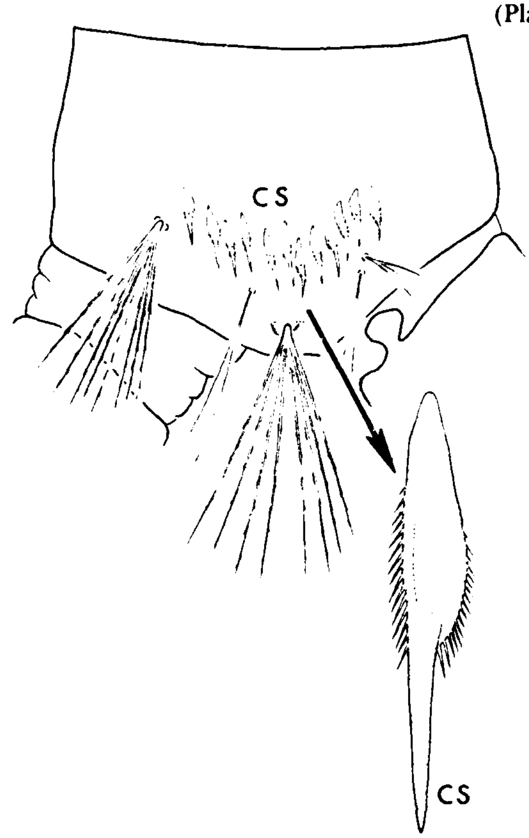


Fig. 569 — *Lateral view of abdominal segment VIII - Ae. tormentor*

11(9). Comb scale with apical spine at least 4.0 length of subapical spinules (Fig. 570); thoracic integument smooth (Fig. 571) 12

Comb scale with apical spine not more than 3.0 length of subapical spinules, or fringed by subequal spinules (Fig. 572); thoracic integument usually aculeate (Fig. 573) 18

Fig. 570 — *Comb scale - Ae. atlanticus*

Fig. 572 — *Comb scale - Ae. taeniorhynchus*

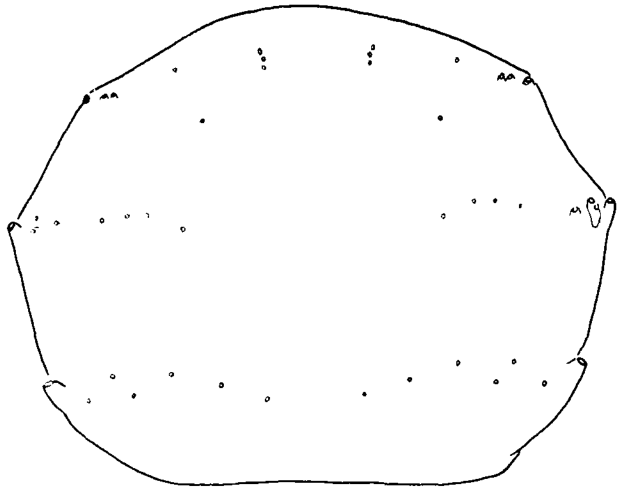


Fig. 571 — *Dorsal view of thorax - Ae. sollicitans*

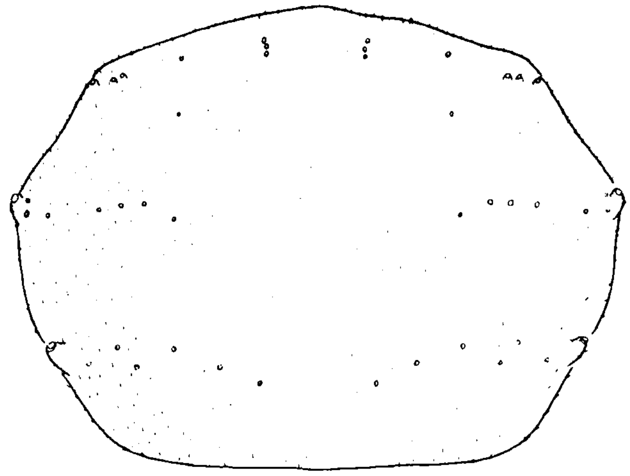


Fig. 573 — *Dorsal view of thorax - Ae. taeniorhynchus*

12(11). Setae 2, 3-X both single (Fig. 574); most setae on head and body coarse, about equal in diameter throughout (Fig. 575) .... *abserratus* (Plate 10)

Seta 2-X multibranched, 3-X single (Fig. 576); head and body setae finely attenuated apically (Fig. 577) 13

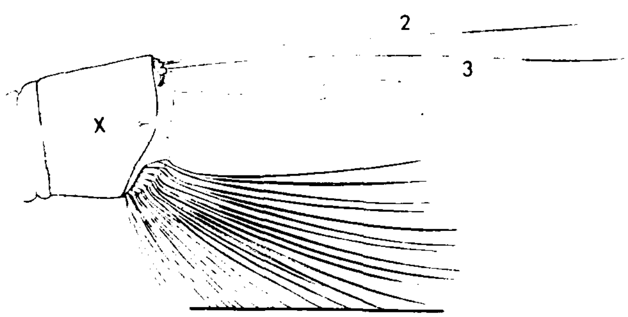


Fig. 574 — *Lateral view of abdominal segment X - Ae. abserratus*

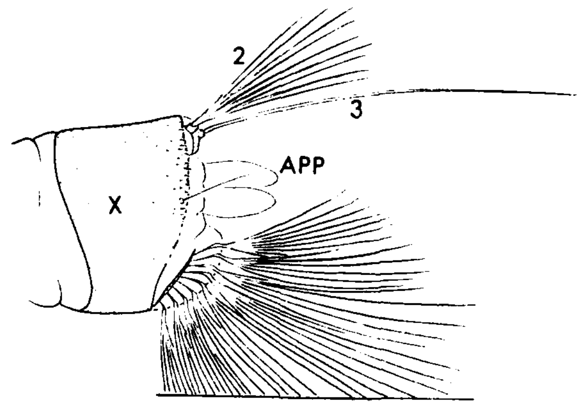


Fig. 576 — *Lateral view of abdominal segment X - Ae. taeniorhynchus*

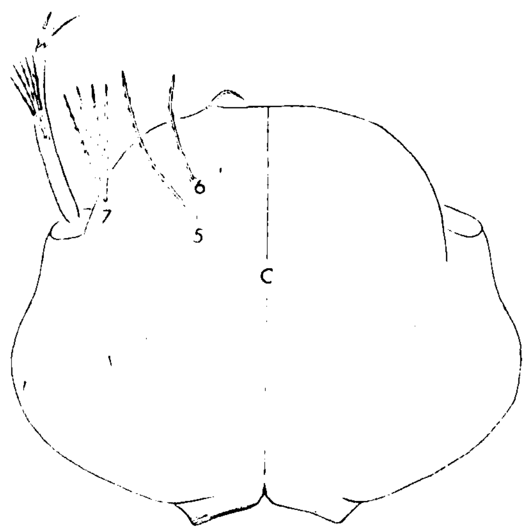


Fig. 575 — *Dorsal view of head - Ae. abserratus*

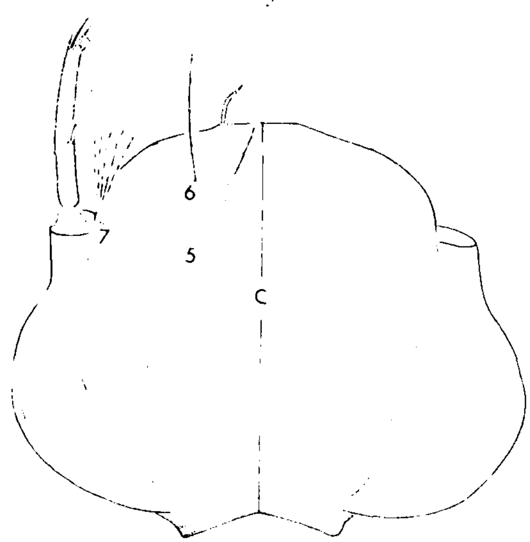


Fig. 577 — *Dorsal view of head - Ae. taeniorhynchus*

13(12). Anal papilla-saddle index at least 8.0, papilla with darkly pigmented tracheae; seta 2-X with 2,3 branches (Fig. 578) .... *dupreei* (Plate 17)

Anal papilla-saddle index at most 5.0, usually much less, papilla lacking dark tracheae; seta 2-X with 4 or more branches (Fig. 579) 14

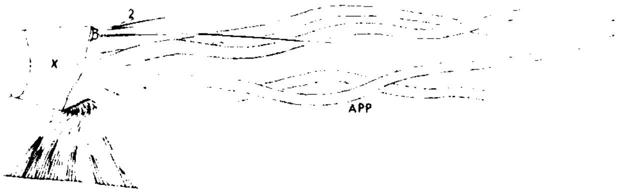


Fig. 578 — *Lateral view of abdominal segment X - Ae. dupreei*

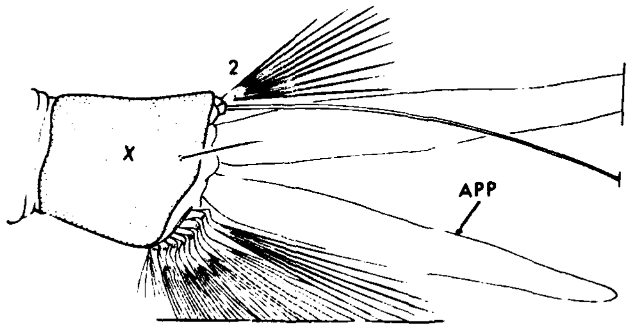


Fig. 579 — *Lateral view of abdominal segment X - Ae. atlanticus*

14(13). Comb scales 4-9, large (Fig. 580) 15

Comb scales usually 10-30, small (Fig. 581) 16

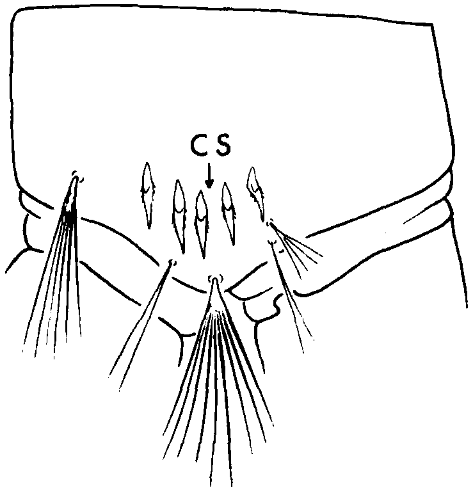


Fig. 580 — *Lateral view of abdominal segment VIII - Ae. atlanticus*

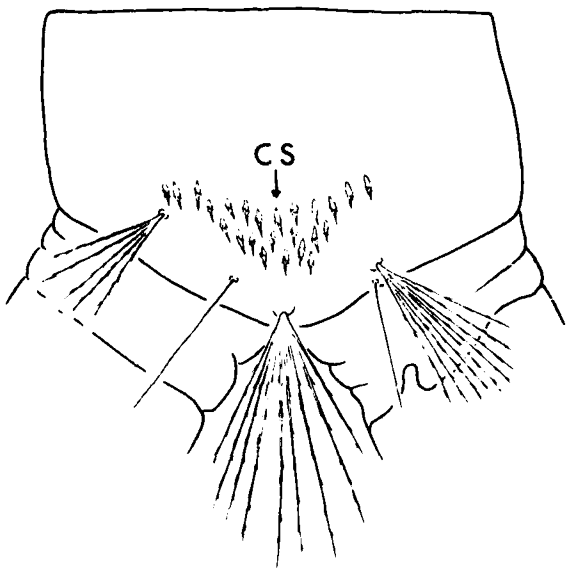


Fig. 581 — *Lateral view of abdominal segment VIII - Ae. sollicitans*

15(14). Siphon index about 2.0; seta 1-X shorter than saddle (Fig. 582) .... *atlanticus* (Plate 12)

Siphon index about 3.0; seta 1-X equal to length of saddle or longer (Fig. 583) .... *hexodontus* (Plate 20)

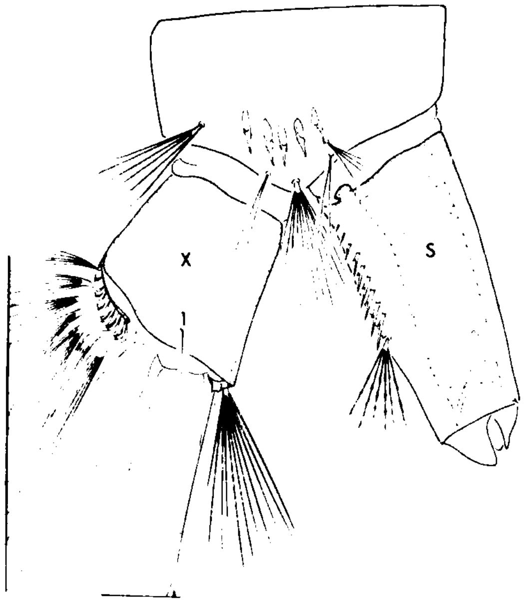


Fig. 582 —*Lateral view of abdominal segments VIII-X - Ae. atlanticus*

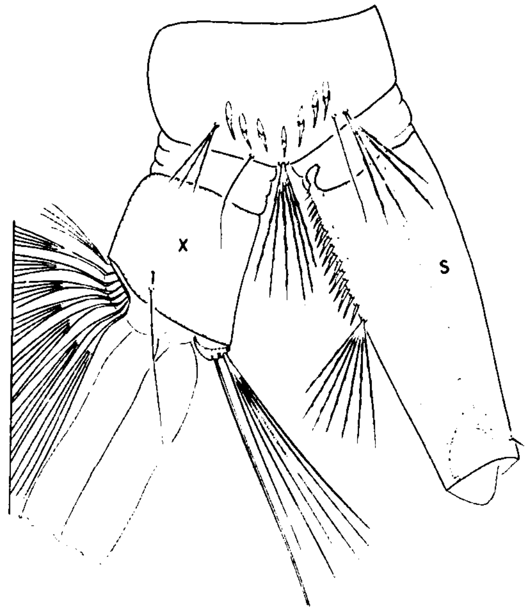


Fig. 583 —*Lateral view of abdominal segments VIII-X - Ae. hexodontus*

16(14). Seta 2-S much shorter than apical pecten spine; seta 1-X subequal to saddle (Fig. 584) .... *punctor* (Plate 13)

Seta 2-S equal to length of apical pecten spine; seta 1-X shorter than saddle (Fig. 585) 17

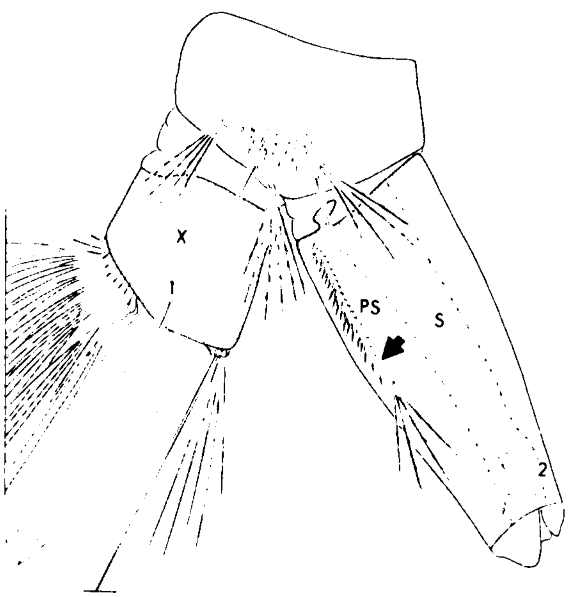


Fig. 584 —*Lateral view of abdominal segments VIII-X - Ae. punctor*

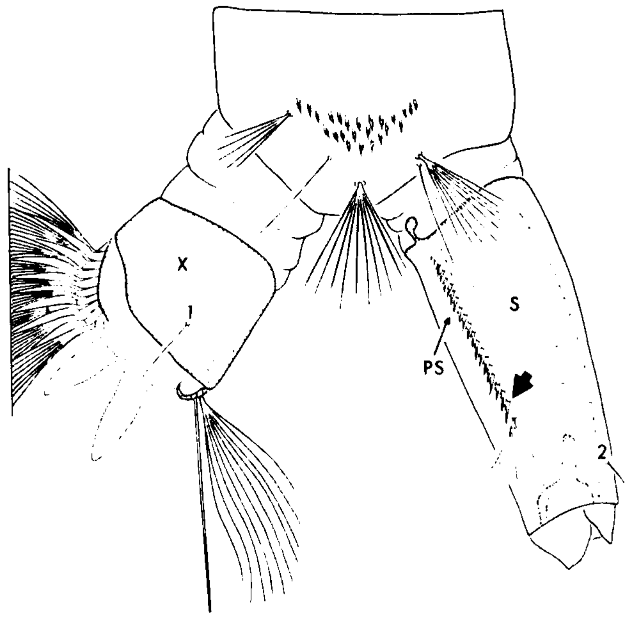


Fig. 585 —*Lateral view of abdominal segments VIII-X - Ae. sollicitans*

17(16). Siphon index 3.0-3.5; pecten not reaching middle of siphon (Fig. 586); setae 5 , 6-C coarse, about equal in diameter to near apex (Fig. 587) .... *mitchellae* (Plate 15)

Siphon index 2.0-2.5; pecten reaching to middle of siphon or more distally (Fig. 588); setae 5 , 6-C attenuated apically (Fig. 589) .... *sollicitans* (Plate 20)

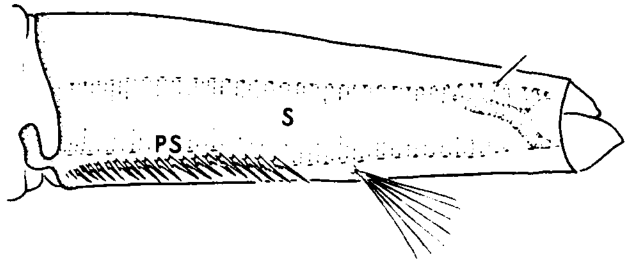


Fig. 586 — *Lateral view of siphon - Ae. mitchellae*

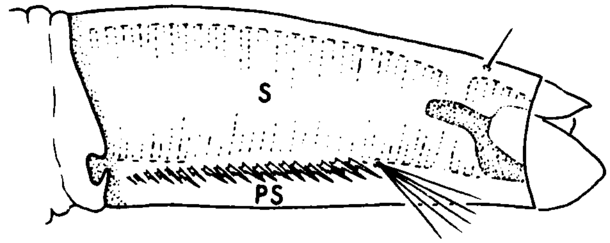


Fig. 588 — *Lateral view of siphon - Ae. sollicitans*

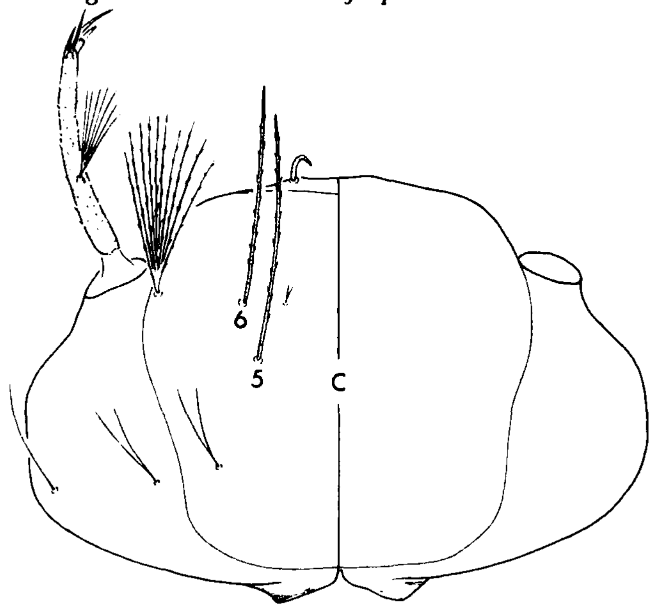


Fig. 587 — *Dorsal view of head - Ae. mitchellae*

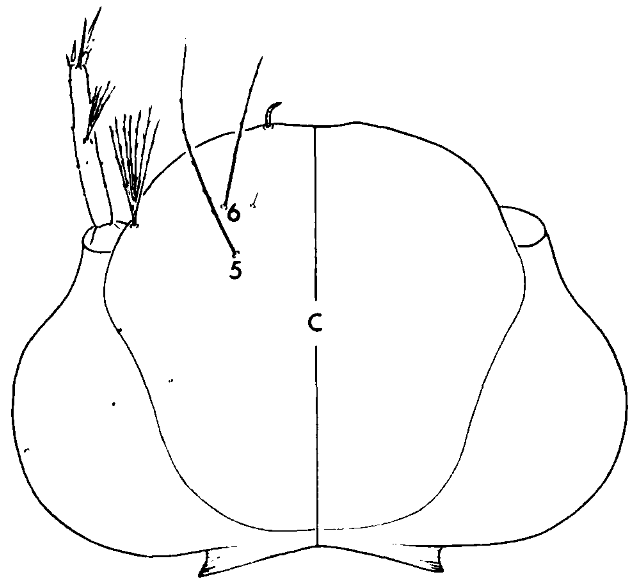


Fig. 589 — *Dorsal view of head - Ae. sollicitans*

18(11). Comb scale with apical spine about 2.0-3.0 length of subapical spinules (Fig. 590) 19

Comb scale with apical spine subequal to subapical spinules, or only slightly stouter and longer (Fig. 591) 20

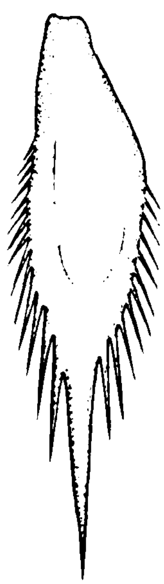


Fig. 590 — *Comb scale - Ae. infirmatus*

Fig. 591 — *Comb scale - Ae. taeniorhynchus*

19(18). Median spine of comb scale 6.0 broader at base, or more, and 2.0-3.0 longer than subapical spinules (Fig. 592) .... *infirmatus* (Plate 11)

Median spine of comb scale no more than 2.0 broader at base and less than 2.0 longer than subapical spinules (Fig. 593) .... *trivittatus* (Plate 27)

Fig. 592 — *Comb scale - Ae. infirmatus*

Fig. 593 — *Comb scale - Ae. trivittatus*

20(18). Siphon index about 3.5 (Fig. 594); thoracic integument glabrous (Fig. 595) .... *rempeli* (Plate 9)

Siphon index no more than 3.0 (Fig. 596); thoracic integument aculeate (Fig. 597) 21

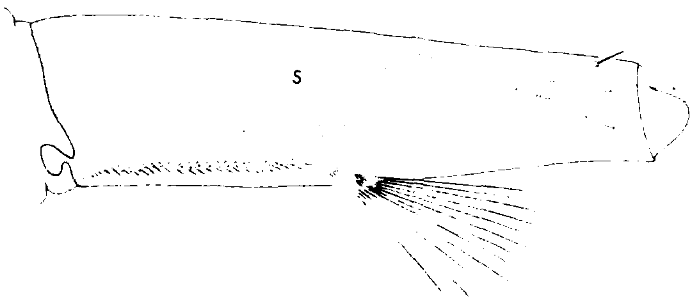


Fig. 594 — *Lateral view of siphon - Ae. rempeli*

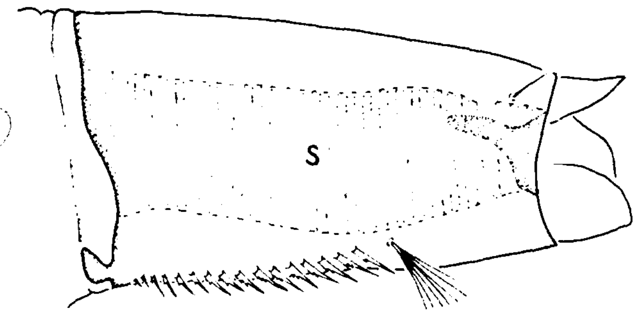


Fig. 596 — *Lateral view of siphon - Ae. taeniorhynchus*

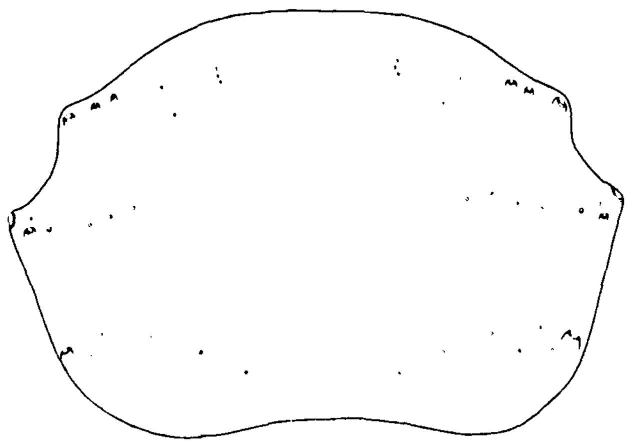


Fig. 595 — *Dorsal view of thorax - Ae. rempeli*

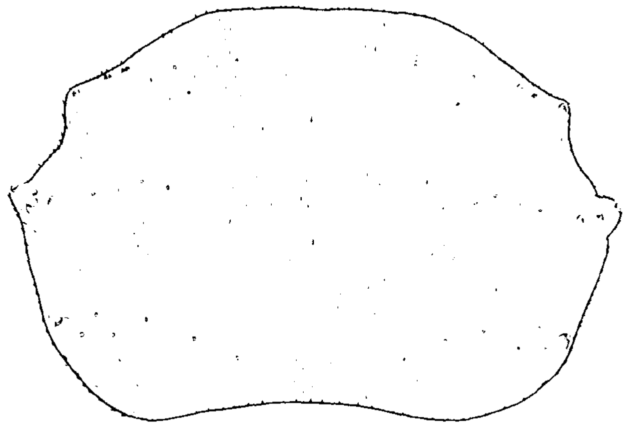


Fig. 597 — *Dorsal view of thorax - Ae. scapularis*

21(20). Seta 6-III-V with 2-5 branches (Fig. 598); anal papilla-saddle index 0.5 or less (Fig. 599) .. *taeniorhynchus* (Plate 9)

Seta 6-III-V single (Fig. 600); anal papilla-saddle index 1.0 or more (Fig. 601) 22

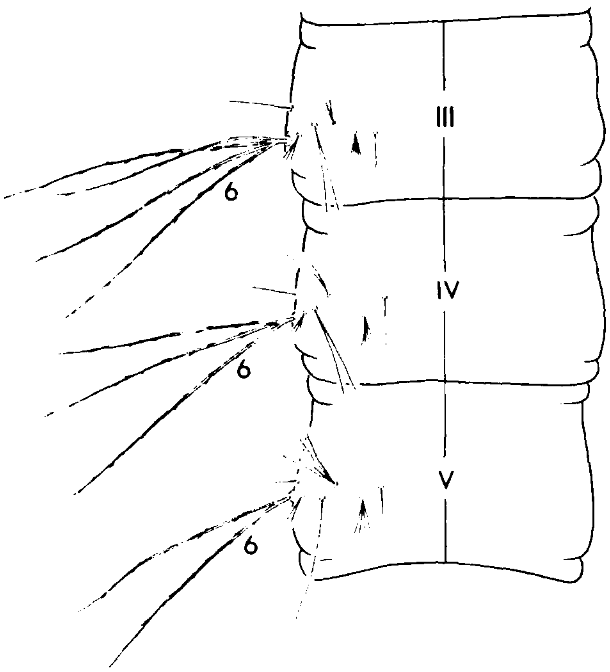


Fig. 598 — *Dorsal view of abdominal segments III-V - Ae. taeniorhynchus*

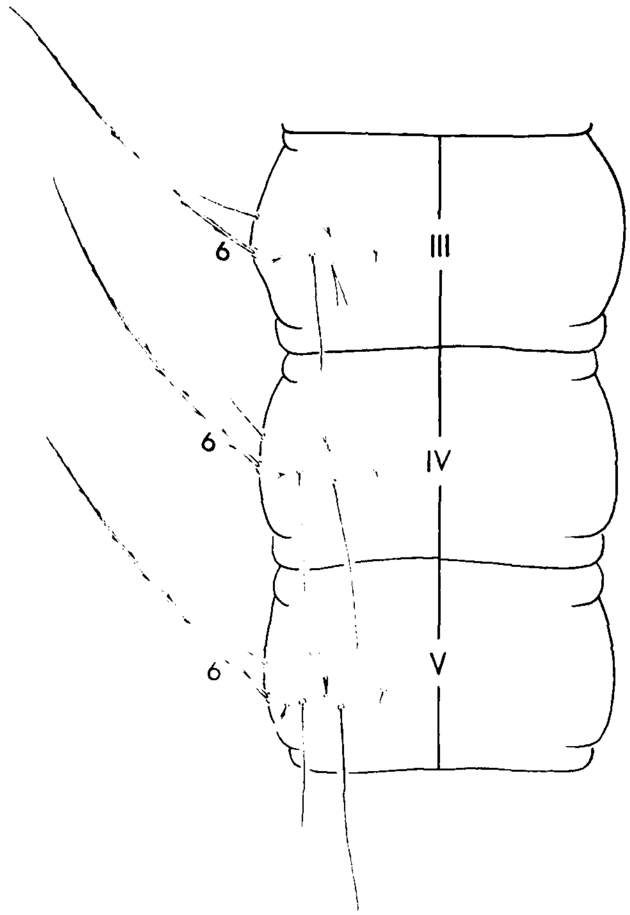


Fig. 600 — *Dorsal view of abdominal segments III-V - Ae. scapularis*

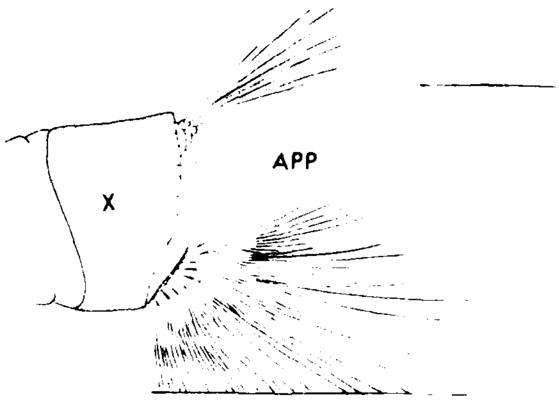


Fig. 599 — *Lateral view of abdominal segment X - Ae. taeniorhynchus*

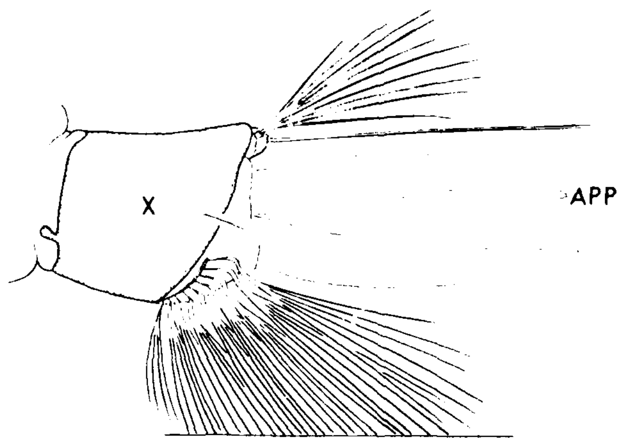


Fig. 601 — *Lateral view of abdominal segment X - Ae. scapularis*

22(21). Seta 13-III long, single (Fig. 602); thoracic integument densely aculeate (Fig. 603) .... *scapularis* (Plate 12)

Seta 13-III short, multibranched (Fig. 604); thoracic integument sparsely aculeate (Fig. 605) .... *tortilis* (Plate 14)

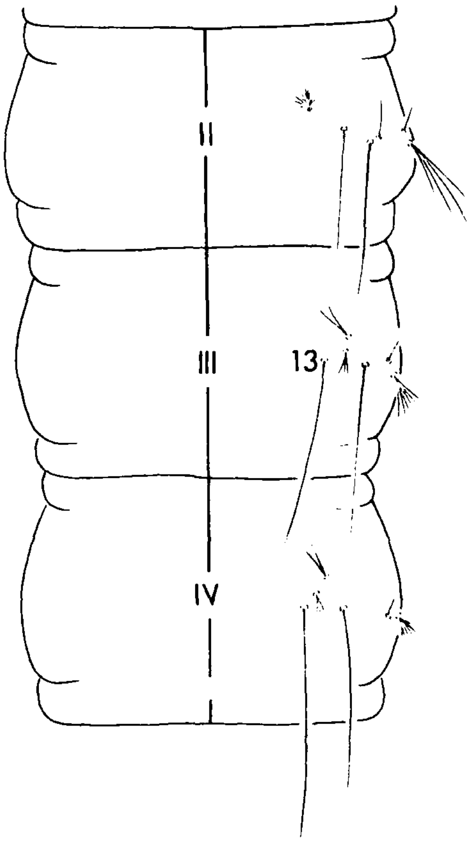


Fig. 602 — *Ventral view of abdominal sterna II-IV - Ae. scapularis*

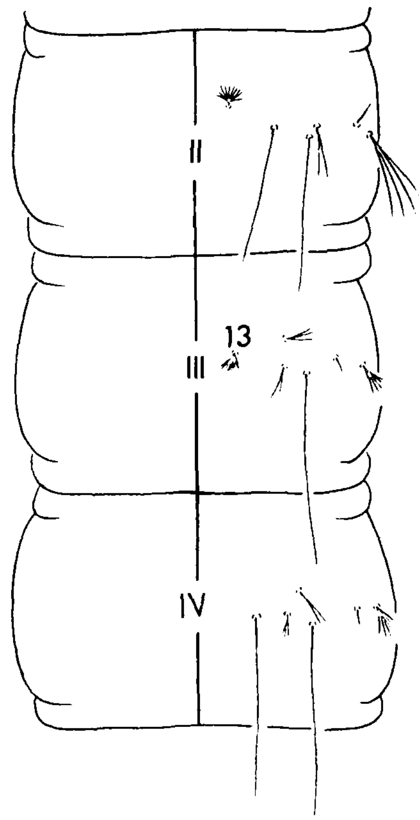


Fig. 604 — *Ventral view of abdominal sterna II-IV - Ae. tortilis*

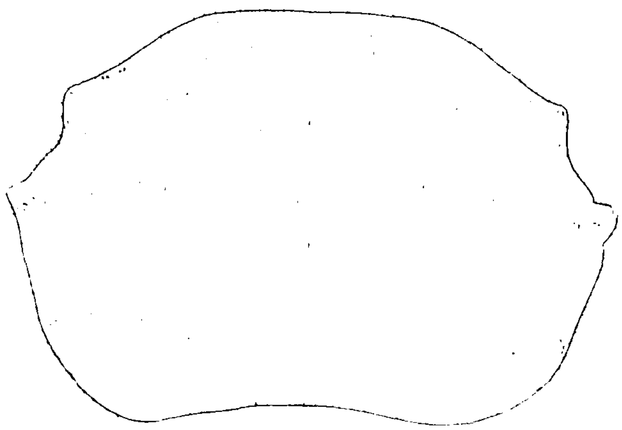


Fig. 603 — *Dorsal view of thorax - Ae. scapularis*

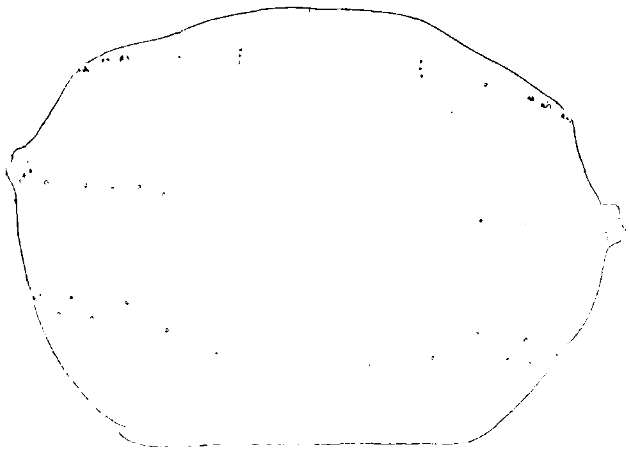


Fig. 605 — *Dorsal view of thorax - Ae. tortilis*

23(4). Pecten of siphon with 1 or more spines detached distally (Fig. 606) 24

Pecten with spines more or less evenly spaced (Fig. 607) 42

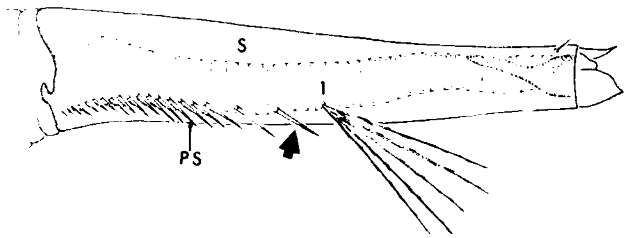


Fig. 606 — *Lateral view of siphon - Ae. excrucians*

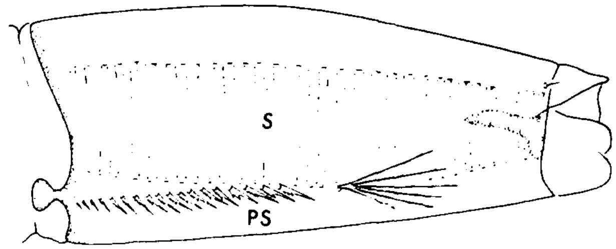


Fig. 607 — *Lateral view of siphon - Ae. melanimon*

24(23). Seta 1-S attached within pecten (Fig. 608) 25

Seta 1-S attached distal to pecten (Fig. 609) 27

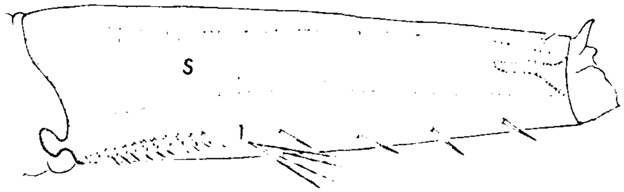


Fig. 608 — *Lateral view of siphon - Ae. cataphylla*

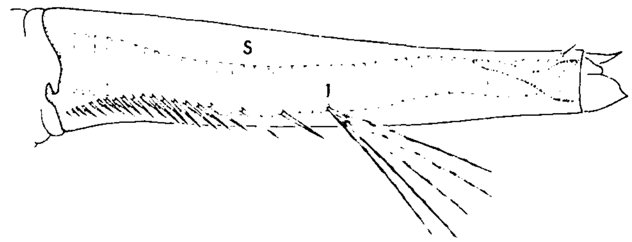


Fig. 609 — *Lateral view of siphon - Ae. excrucians*

25(24). Comb scale with large apical spine and short, lateral spinules (Fig. 610); seta 1-X attached to saddle (Fig. 611) .... *cataphylla* (Plate 10)

Comb scale fringed with subequal spinules (Fig. 612); seta 1-X attached ventral to saddle (Fig. 613) 26

Fig. 610 — *Comb scale - Ae. cataphylla*

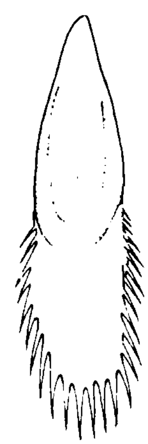


Fig. 612 — *Comb scale - Ae. atropalpus*

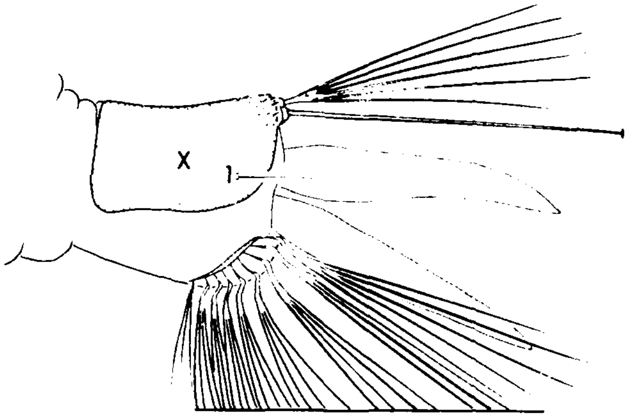


Fig. 611 — *Lateral view of abdominal segment X - Ae. cataphylla*

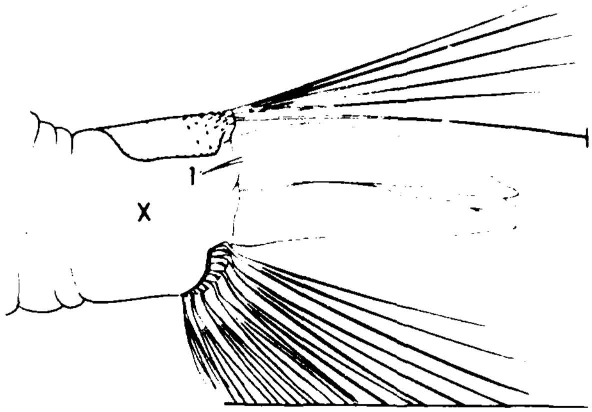


Fig. 613 — *Lateral view of abdominal segment X - Ae. atropalpus*

26(25). Seta 1-M long, reaching near to level of seta 1-P (Fig. 614); with 34 or more comb scales (Fig. 615) . . . . *atropalpus* (Plate 13)

Seta 1-M short, only reaching near to level of seta 0-P (Fig. 616); with fewer than 34 comb scales (Fig. 617) . . . . *epactus* (Plate 13)

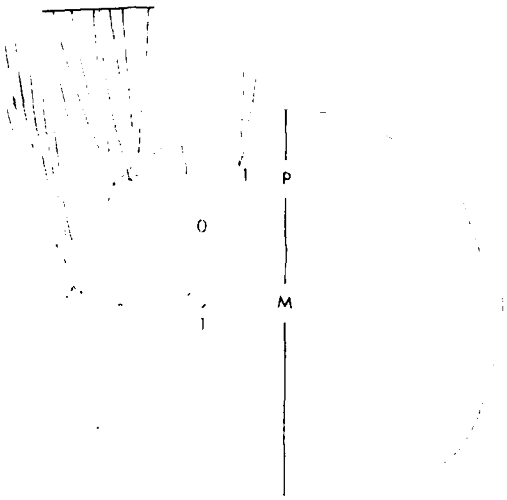


Fig. 614 — *Dorsal view of thorax - Ae. atropalpus*

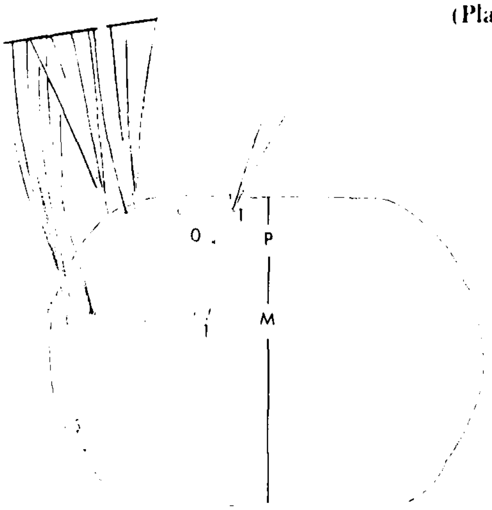


Fig. 616 — *Dorsal view of thorax - Ae. epactus*

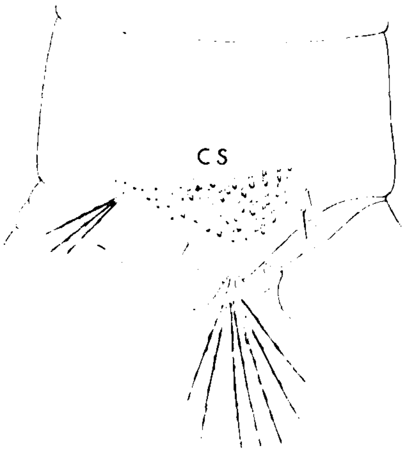


Fig. 615 — *Lateral view of abdominal segment VIII - Ae. atropalpus*

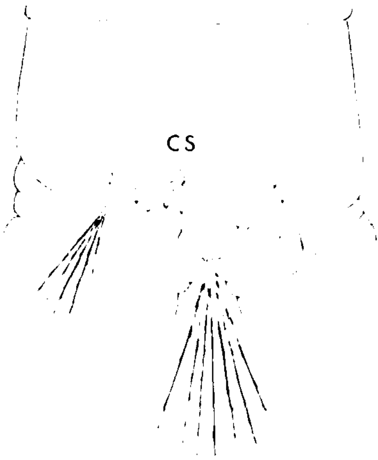


Fig. 617 — *Lateral view of abdominal segment VIII - Ae. epactus*

27(24). Antenna equal to length of head capsule, or longer (Fig. 618) 28

Antenna shorter than head capsule (Fig. 619) 29

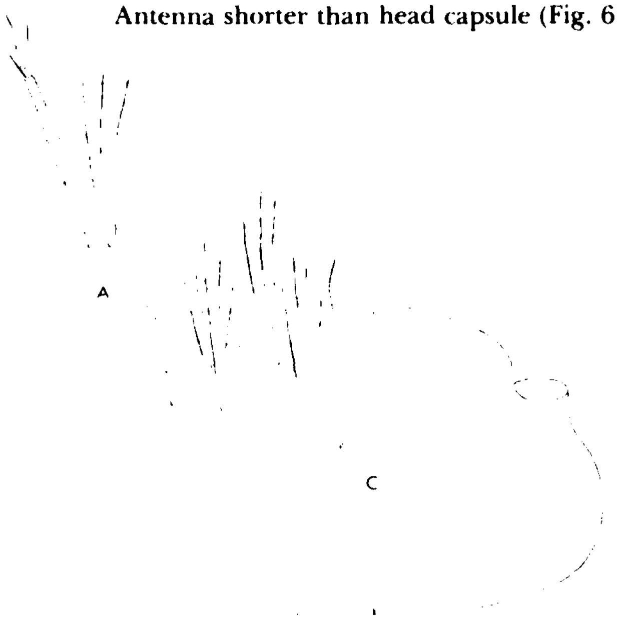


Fig. 618 — *Dorsal view of head and antennae - Ae. diantaeus*

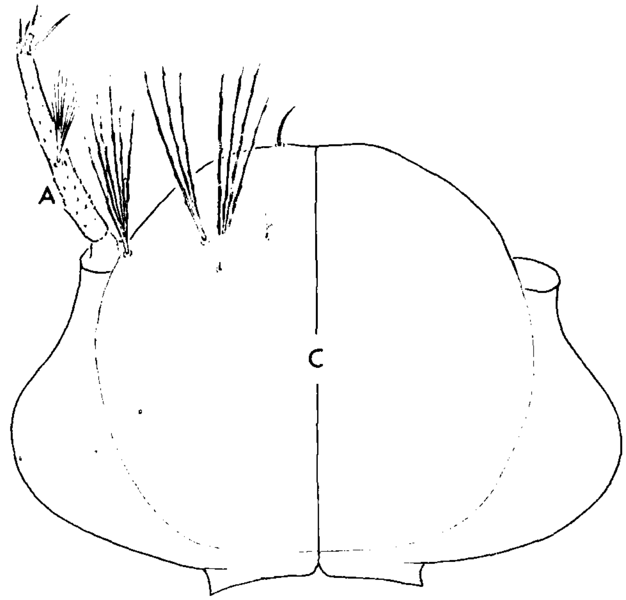


Fig. 619 — *Dorsal view of head and antennae - Ae. vexans*

28(27). Seta 1-A attached near middle of antenna (Fig. 620); with 15 or fewer comb scales in irregular row (Fig. 621) .... *dian*
(Plate 23)

Seta 1-A attached to distal 0.4 of antenna (Fig. 622); with 20 or more comb scales in patch (Fig. 623) .... *aurifer*
(Plate 14)

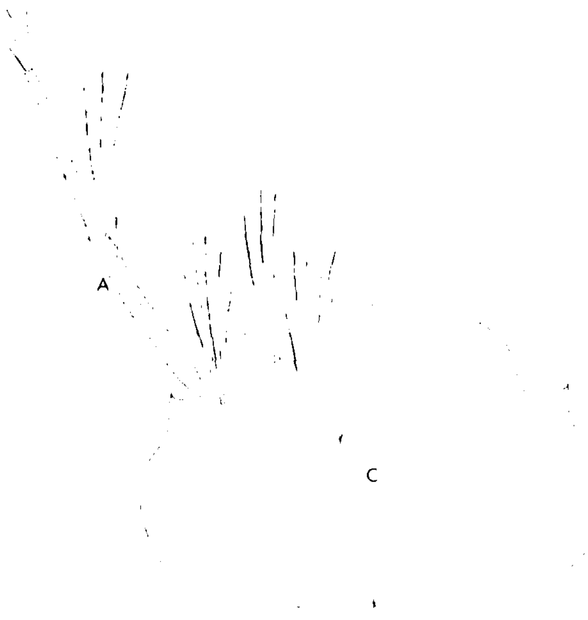


Fig. 620 — *Dorsal view of head and antennae - Ae. diantaeus*

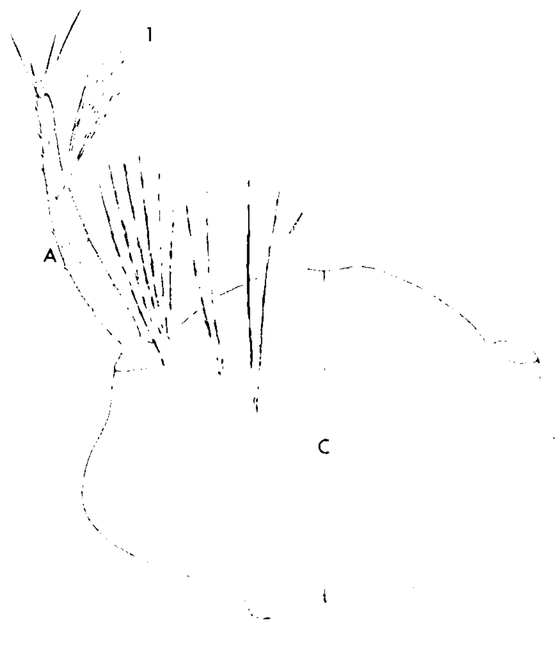


Fig. 622 — *Dorsal view of head and antennae - Ae. aurifer*

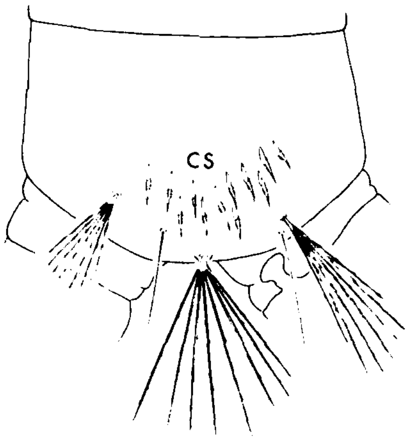


Fig. 621 — *Lateral view of abdominal segment VIII - Ae. diantaeus*

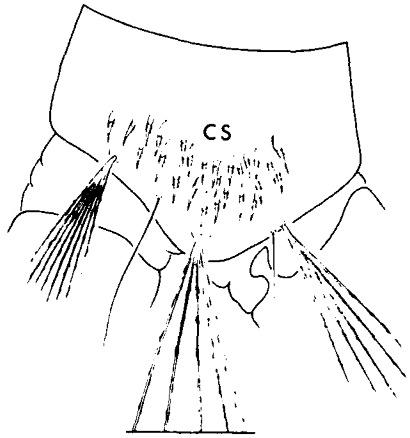


Fig. 623 — *Lateral view of abdominal segment VIII - Ae. aurifer*

29(27). Thorax and abdomen with integument aculeate (Fig. 624) 30

Thorax and abdomen with integument glabrous (Fig. 625) 31

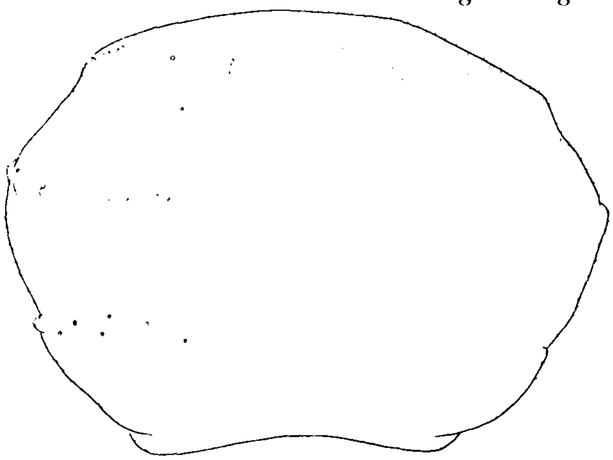


Fig. 624 — *Dorsal view of thorax - Ae. s. spencerii*

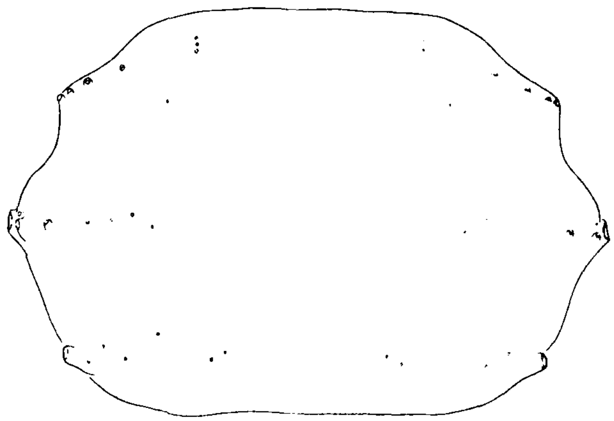


Fig. 625 — *Dorsal view of thorax - Ae. campestris*

30(29). Comb scales 13 or fewer (Fig. 626); median spine of comb scale broad at base (Fig. 627) . . . . . . *s. spencerii* (Plate 21)

Comb scales 14 or more (Fig. 628); median spine of comb scale narrow at base (Fig. 629) . . . . *s. idahoensis* (Plate 21)

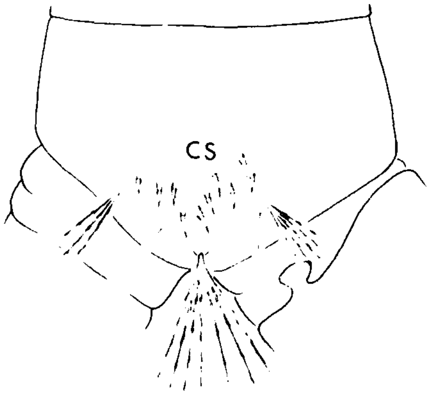


Fig. 626 — *Lateral view of abdominal segment VIII - Ae. s. spencerii*

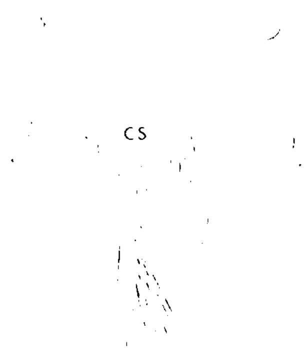


Fig. 628 — *Lateral view of abdominal segment VIII - Ae. s. idahoensis*

Fig. 627 — *Comb scale - Ae. s. spencerii*

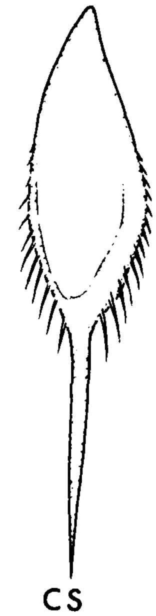


Fig. 629 — *Comb scale - Ae. s. idahoensis*

31(29). Comb scales in patch of 18 or more (Fig. 630) 32

Comb scales in single or irregular double row, usually 17 or fewer (Fig. 631) 35

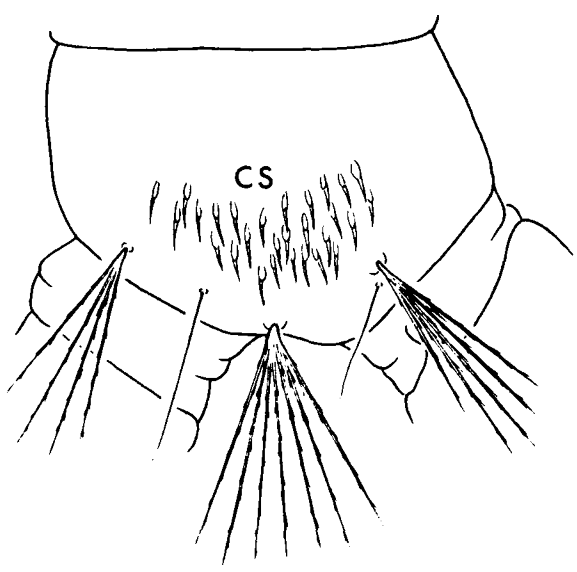


Fig. 630 — *Lateral view of abdominal segment VIII - Ae. excrucians*

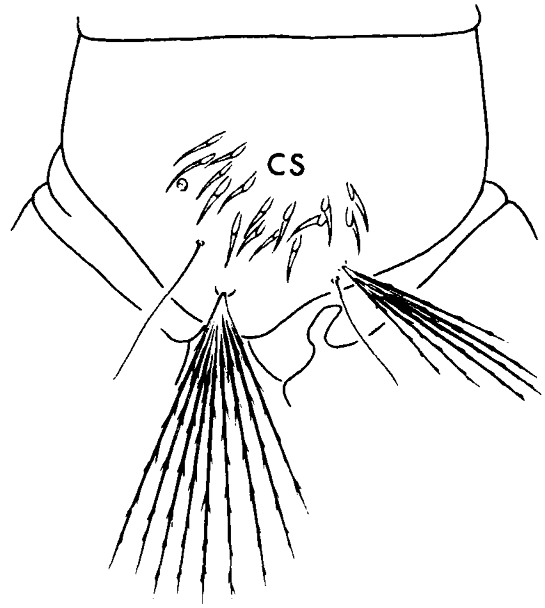


Fig. 631 — *Lateral view of abdominal segment VIII - Ae. intrudens*

32(31). Siphon slender, index about 5.0 (Fig. 632); seta 6 usually single on III-VI (Fig. 633) ...... *excrucians* (Plate 15)

Siphon stouter, index not more than 4.0 (Fig. 634); seta 6 double on III-VI (Fig. 635) 33

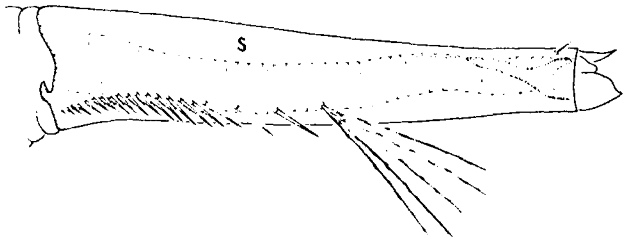


Fig. 632 — *Lateral view of siphon - Ae. excrucians*

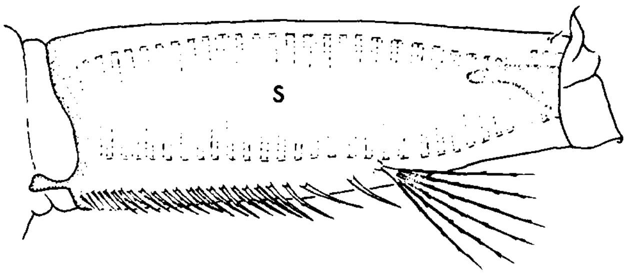


Fig. 634 — *Lateral view of siphon - Ae. campestris*

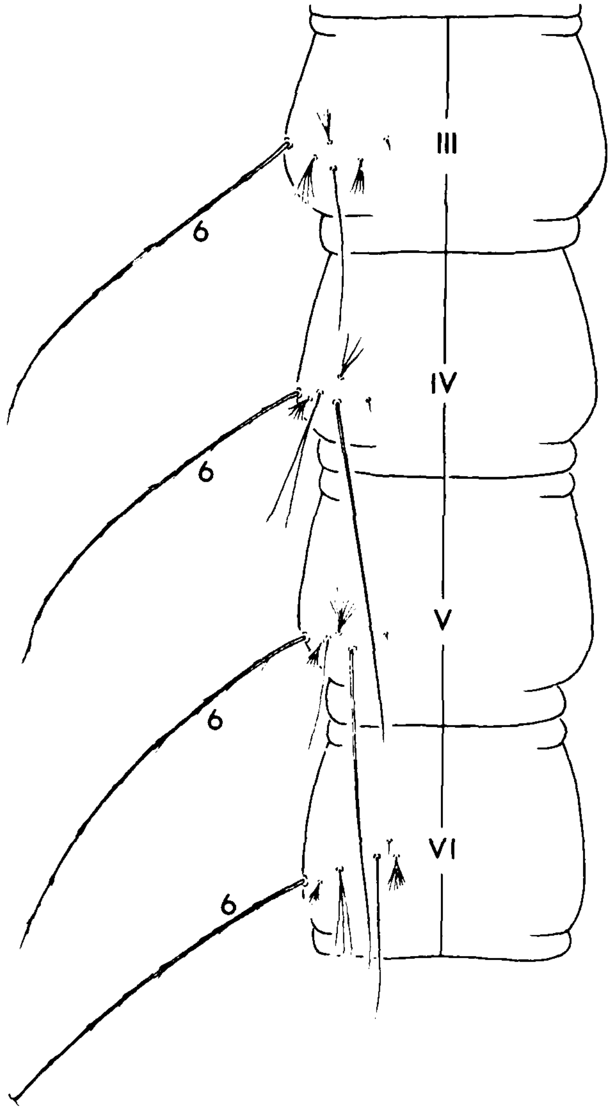


Fig. 633 — *Dorsal view of abdominal segments III-VI - Ae. excrucians*

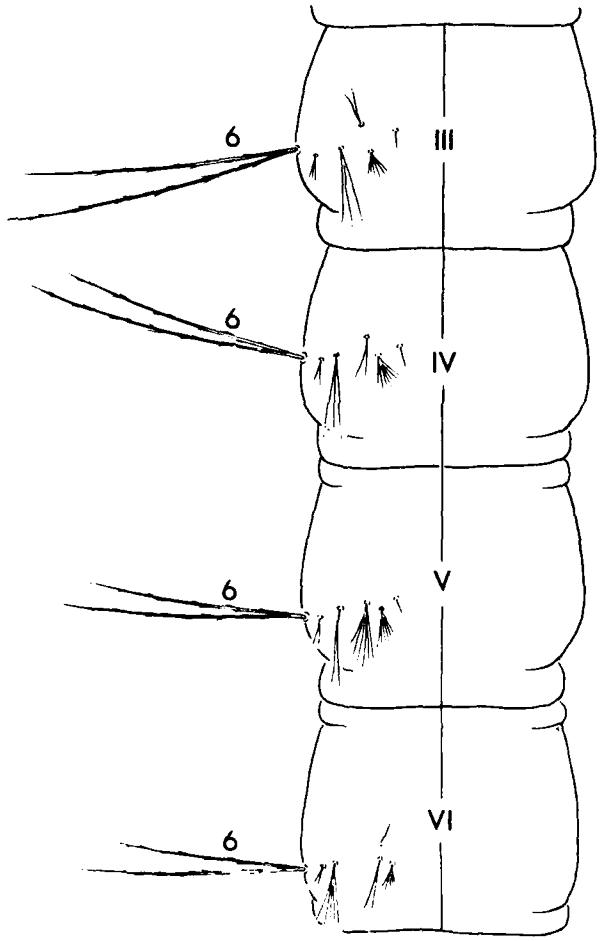


Fig. 635 — *Dorsal view of abdominal segments III-VI - Ae. campestris*

33(32) Pecten reaching distal to middle of siphon (Fig. 636); seta 1-M longer than antenna (Fig. 637) . . . . (in part) *campestris* (Plate 12)

Pecten not reaching middle of siphon (Fig. 638); seta 1-M shorter than antenna (Fig. 639) 34

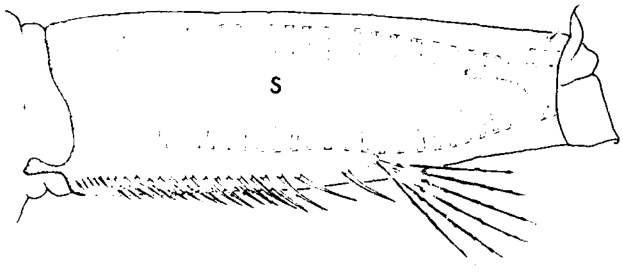


Fig. 636 — *Lateral view of siphon - Ae. campestris*

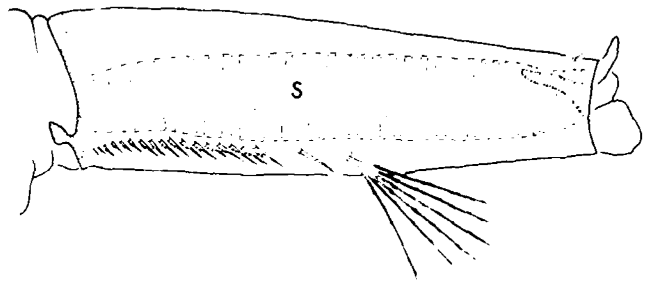


Fig. 638 — *Lateral view of siphon - Ae. flavescens*

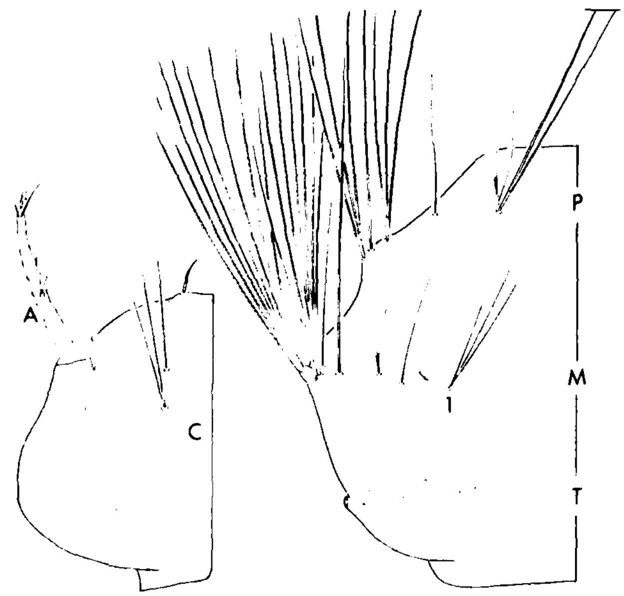


Fig. 637 — *Dorsal view of thorax and head - Ae. campestris*

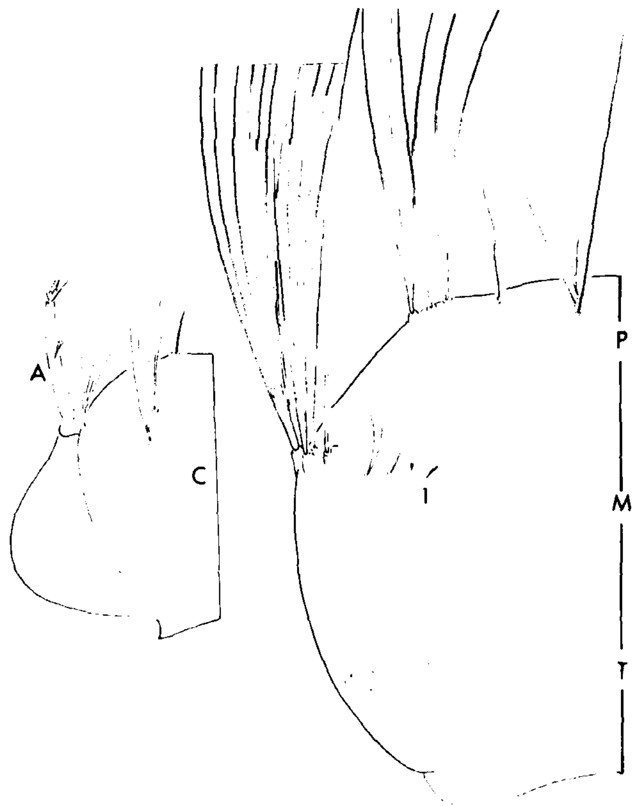


Fig. 639 — *Dorsal view of thorax and head - Ae. flavescens*

34(33). Siphon index 3.5-4.0 (Fig. 640); body integument glabrous (Fig. 641) . . . . (in part) *flavescens* (Plate 12)

Siphon index 4.5-5.0 (Fig. 642); body integument aculeate (Fig. 643) . . . . *aloponotum* (Plate 11)

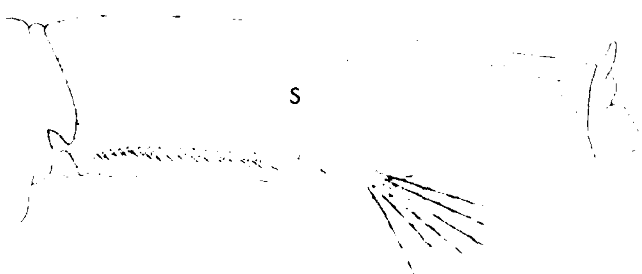


Fig. 640 — *Lateral view of siphon - Ae. flavescens*

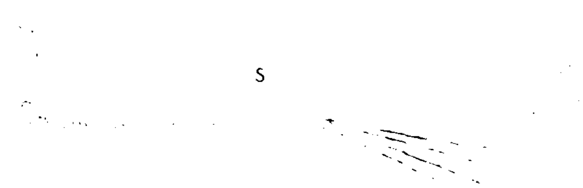


Fig. 642 — *Lateral view of siphon - Ae. aloponotum*

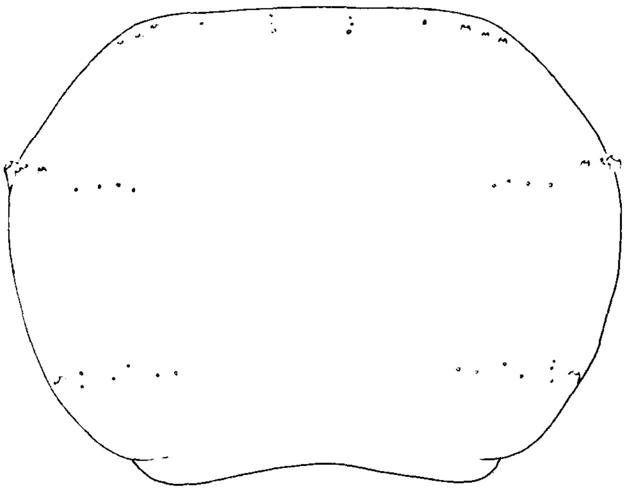


Fig. 641 — *Dorsal view of thorax - Ae. flavescens*

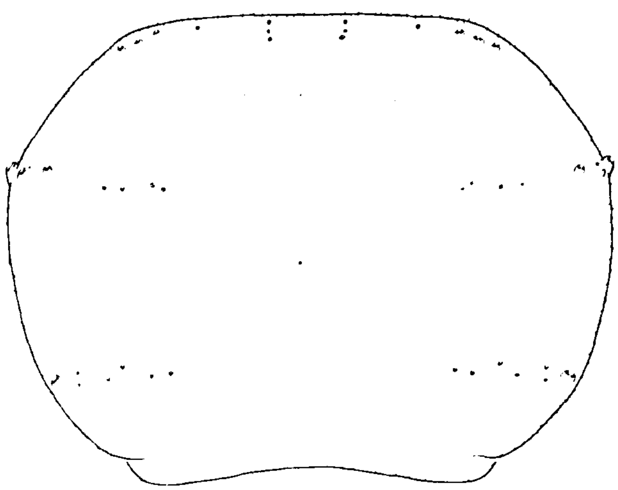


Fig. 643 — *Dorsal view of thorax - Ae. aloponotum*

35(31). Seta 5-C with 3 or more branches (Fig. 644) 36

Seta 5-C single or double, rarely triple on both sides (Fig. 645) 38

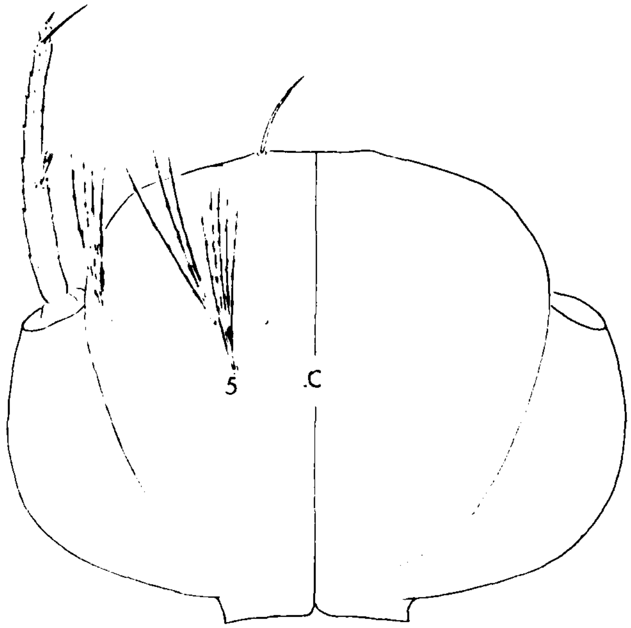


Fig. 644 — *Dorsal view of head - Ae. intrudens*

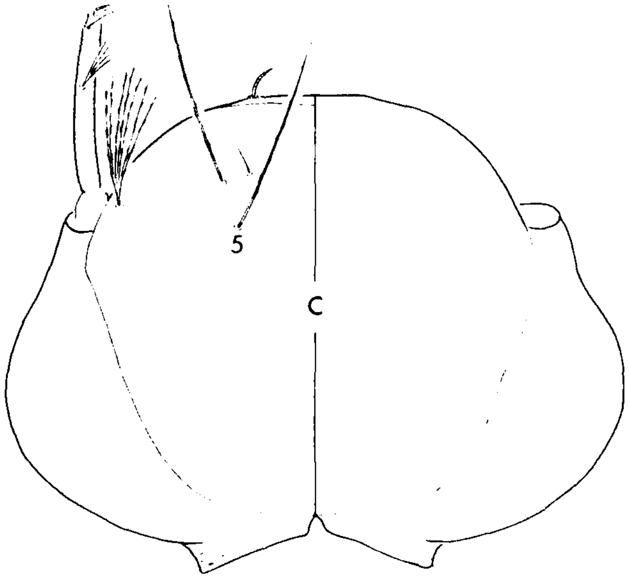


Fig. 645 — *Dorsal view of head - Ae. niphadopsis*

36(35). Branches of seta 1-S rarely more than 0.5 length of basal diameter of siphon; saddle not incised on ventral margin (Fig. 646) .... *vexans* (Plate 26)

Branches of seta 1-S about equal to length of basal diameter of siphon; saddle deeply incised on ventral margin (Fig. 647) 37

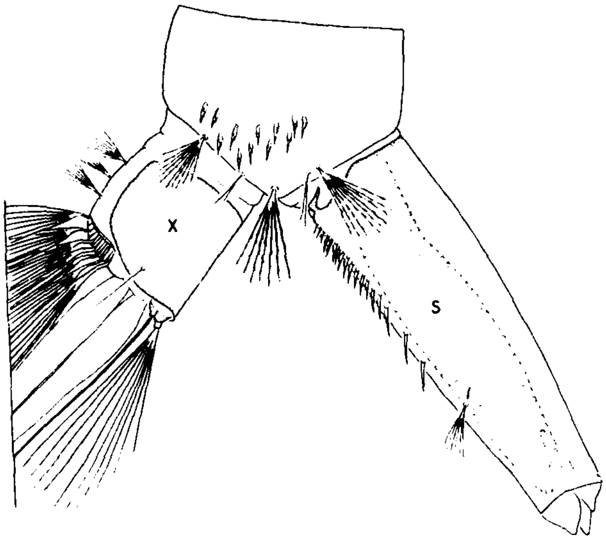


Fig. 646 — *Lateral view of abdominal segments VIII-X - Ae. vexans*

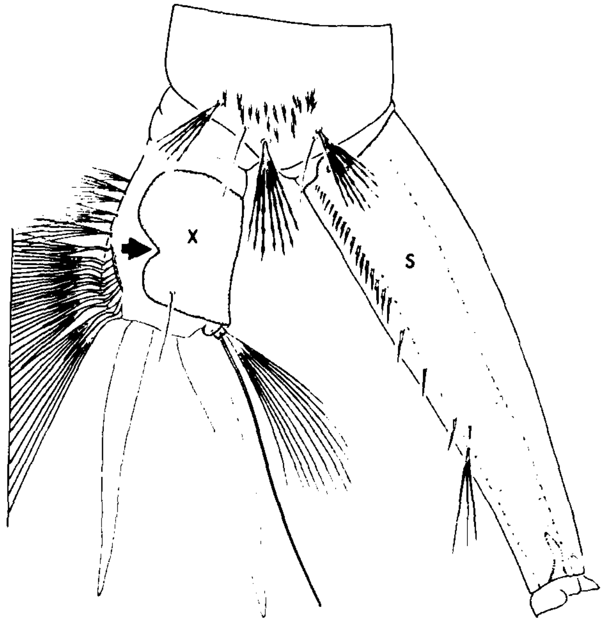


Fig. 647 — *Lateral view of abdominal segments VIII-X - Ae. euedes*

37(36). Seta 6 usually single on III-VI (Fig. 648); seta 1-S with 4 or more branches (Fig. 649) ...... *intrudens* (Plate 9)

Seta 6 usually double on III-VI (Fig. 650); seta 1-S double or triple (Fig. 651) .... (in part) *euedes* (Plate 15)

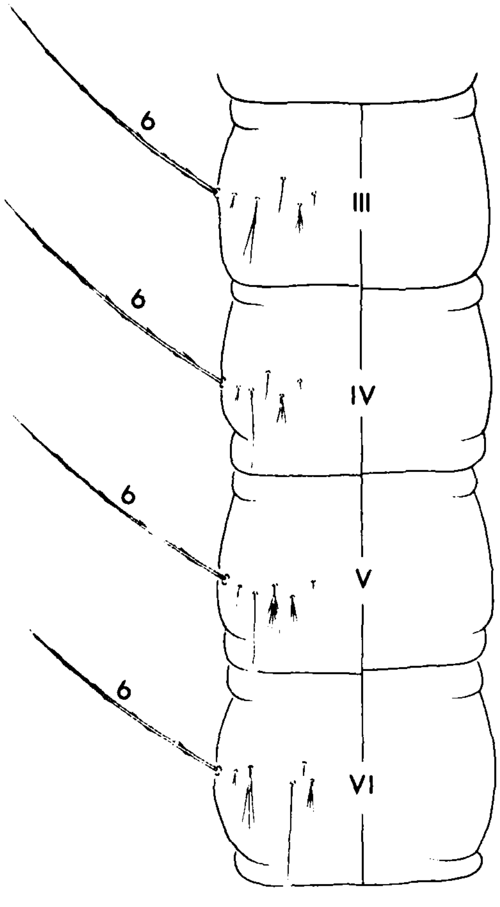


Fig. 648 — *Dorsal view of abdominal segments III-VI - Ae. intrudens*

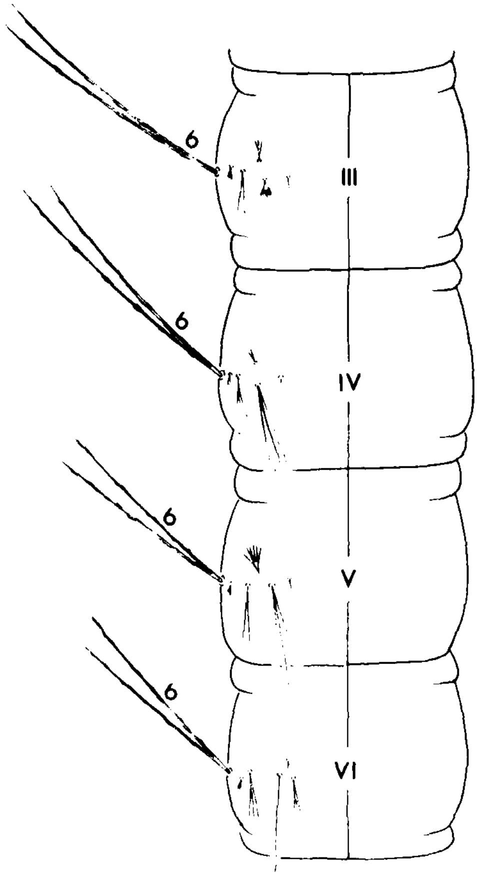


Fig. 650 — *Dorsal view of abdominal segments III-VI - Ae. euedes*

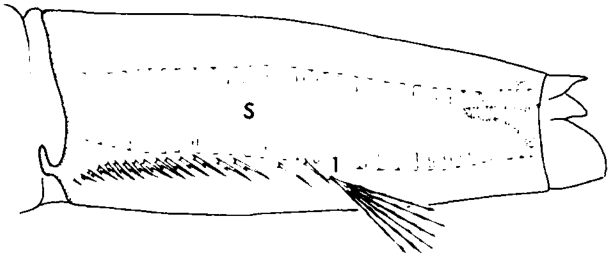


Fig. 649 — *Lateral view of siphon - Ae. intrudens*

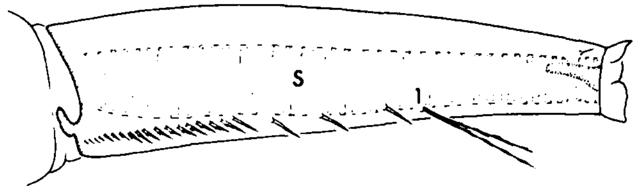


Fig. 651 — *Lateral view of siphon - Ae. euedes*

38(35) Antenna at least 0.6 length of head capsule; setae 5-7-C coarse, of about equal diameter throughout (Fig. 652) . . . . *decticus* (Plate 17)

Antenna not more than 0.5 length of head capsule; setae 5-7-C gradually tapering apically (Fig. 653) 39

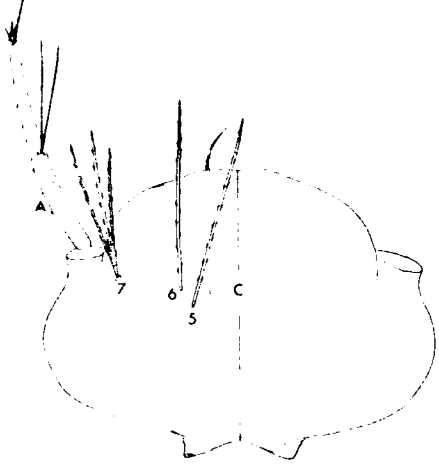


Fig. 652 — *Dorsal view of head - Ae. decticus*

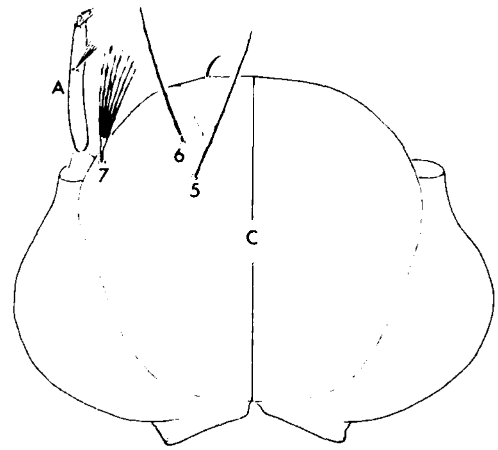


Fig. 653 — *Dorsal view of head - Ae. niphadopsis*

39(38). Median spine of comb scale 2.0 length of subapical spinules (Fig. 654); seta 1-M equal to 3-M, or longer (Fig. 655); pecten confined to basal 0.3 of siphon (Fig. 656) . . . . *niphadopsis* (Plate 13)

Median spine of comb scale 4.0 length of subapical spinules, or more (Fig. 657); seta 1-M shorter than 3-M (Fig. 658); pecten on basal 0.5 of siphon, or more (Fig. 659) 40

Fig. 654 — *Comb scale - Ae. niphadopsis*

Fig. 657 — *Comb scale - Ae. riparius*

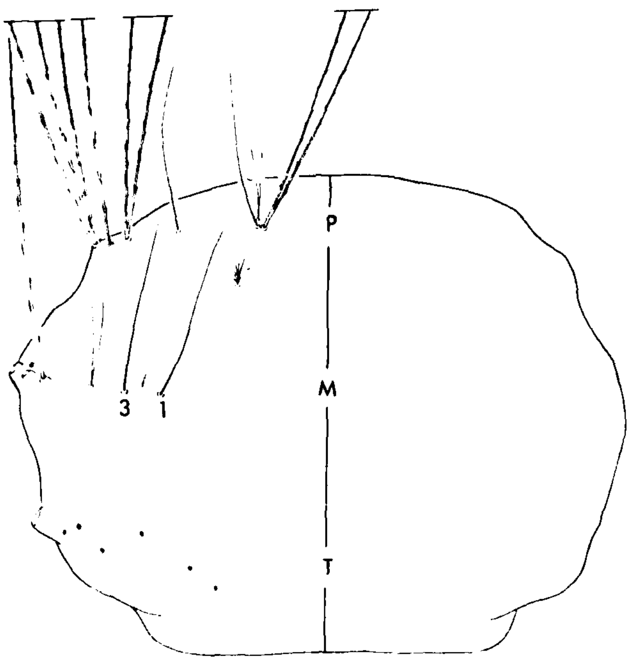


Fig. 655 — *Dorsal view of thorax - Ae. niphadopsis*

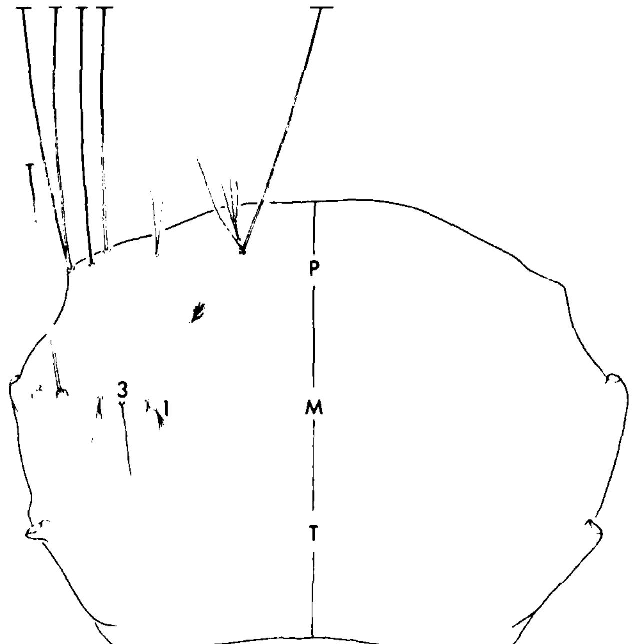


Fig. 658 — *Dorsal view of thorax - Ae. riparius*

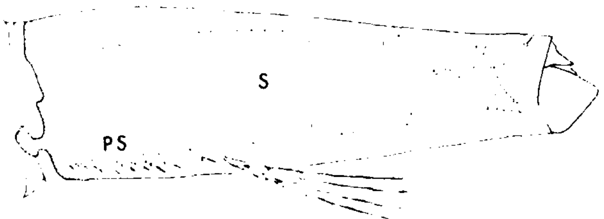


Fig. 656 — *Lateral view of siphon - Ae. niphadopsis*

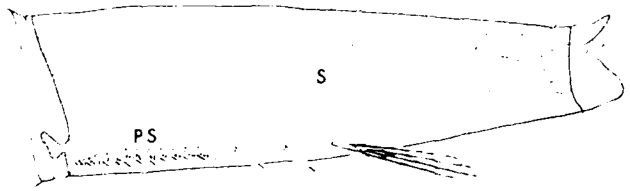


Fig. 659 — *Lateral view of siphon - Ae. riparius*

40(39). Comb with 12 or more scales; pecten on siphon with 18 or more spines (Fig. 660) .... (in part) *euedes* (Plate 15)

Comb with 11 or fewer scales; pecten with 17 or fewer spines (Fig. 661) 41

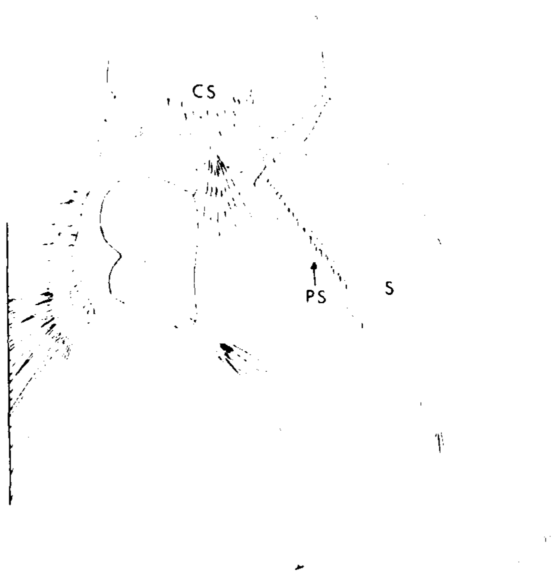


Fig. 660 — *Lateral view of abdominal segment VIII - Ae. euedes*

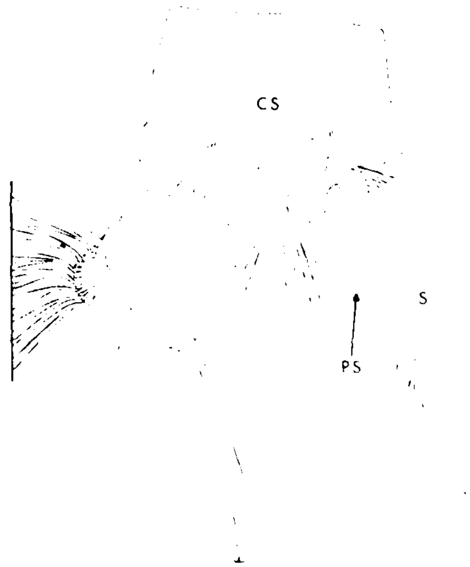


Fig. 661 — *Lateral view of abdominal segment VIII - Ae. ventrovittis*

41(40). Setae 5,6-C double (Fig. 662); saddle incised along ventral margin (Fig. 663) .... *riparius* (Plate 19)

Setae 5,6-C single (Fig. 664); saddle not incised on ventral margin (Fig. 665) .... *ventrovittis* (Plate 19)

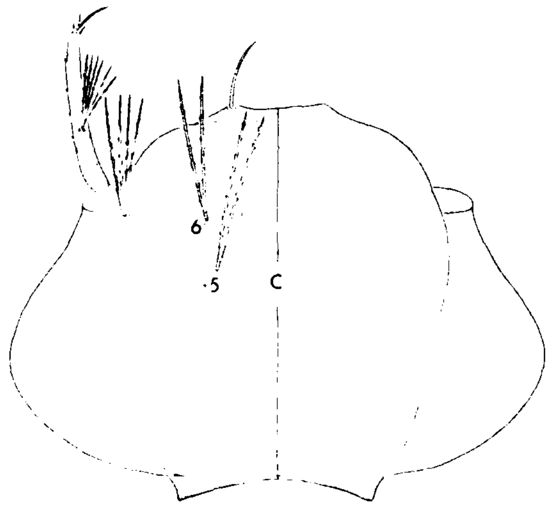


Fig. 662 — *Dorsal view of head - Ae. riparius*

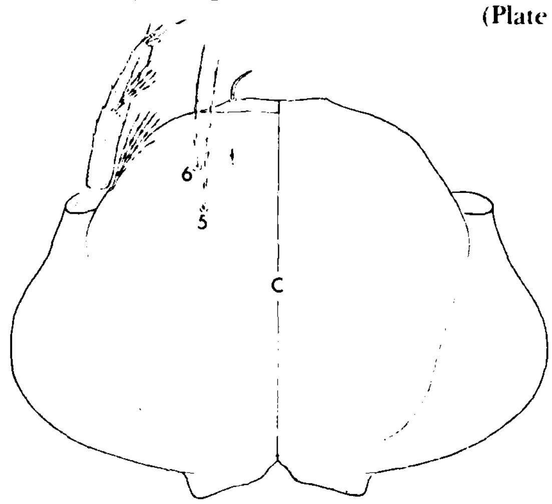


Fig. 664 — *Dorsal view of head - Ae. ventrovittis*

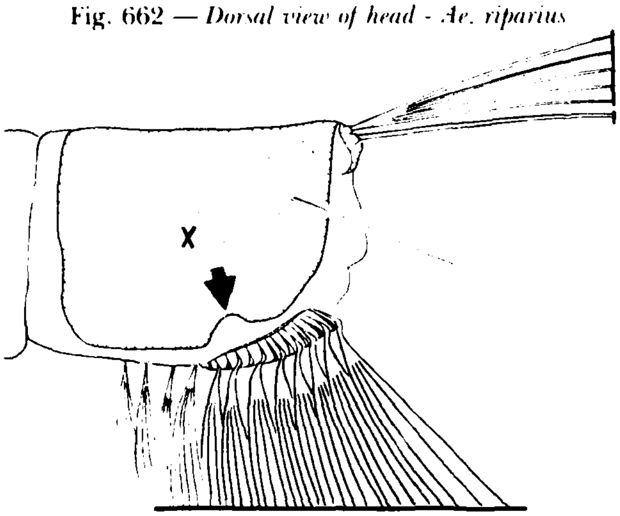


Fig. 663 — *Lateral view of abdominal segment X - Ae. riparius*

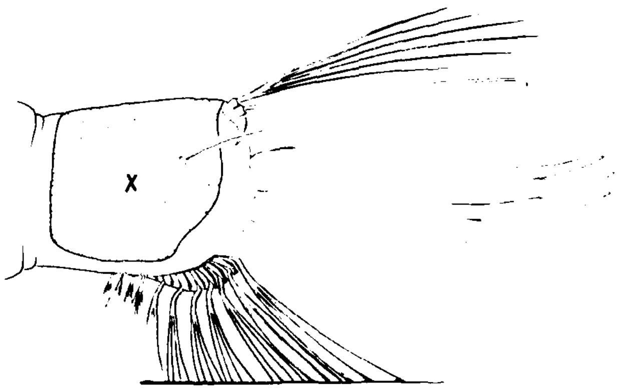


Fig. 665 — *Lateral view of abdominal segment X - Ae. ventrovittis*

42(23). Seta 1-A single or double, antenna usually smooth or with tiny spinules (Fig. 666) 43

Seta 1-A with more than 3 branches, antenna with prominent, coarse spinules (Fig. 667) 55

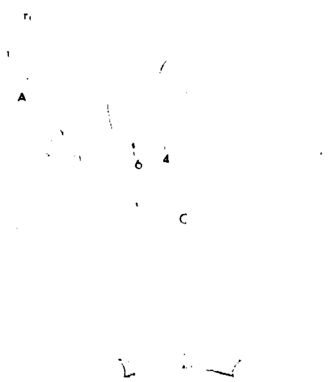


Fig. 666 — *Dorsal view of antenna - Ae. triseriatus*

Fig. 667 — *Dorsal view of antenna - Ae. fitchii*

43(42). Comb with pointed, unfringed, median spine (Fig. 668) 44

Comb scale rather blunt apically, evenly fringed with short spinules (Fig. 669) 47

Fig. 668 — *Comb scale - Ae. purpureipes*

Fig. 669 — *Comb scale - Ae. triseriatus*

44(43). Boss of ventral brush weakly sclerotized; siphon without acus (Fig. 670) .... *papago* (Plate 24)

Boss of ventral brush strongly sclerotized or brush arising from grid; siphon with acus (Fig. 671) 45

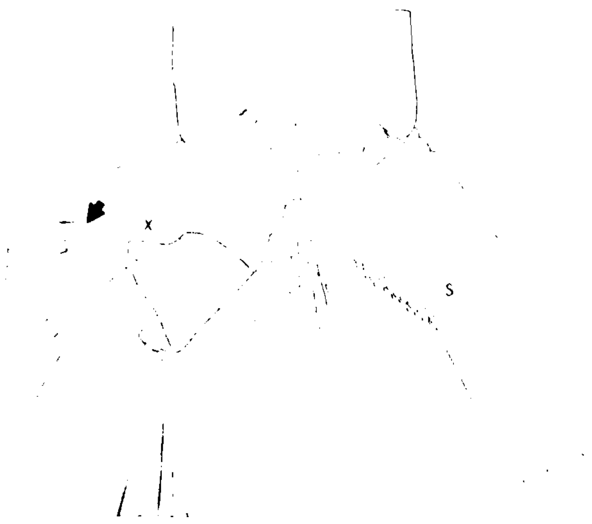


Fig. 670 — *Lateral view of abdominal segments VIII-X - Ae. papago*

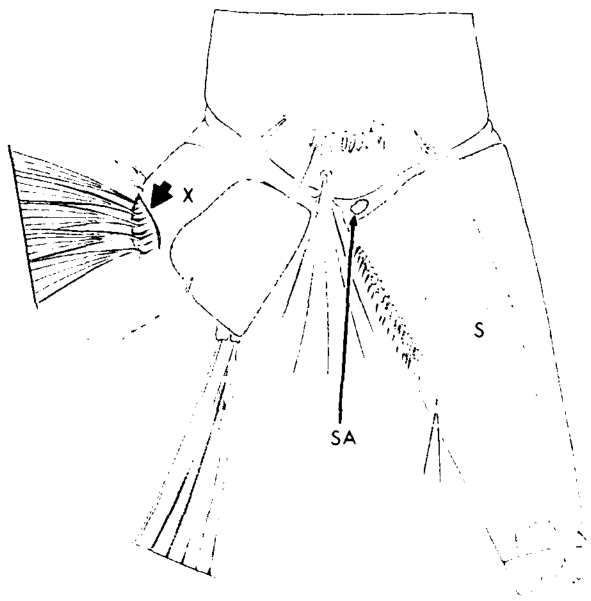


Fig. 671 — *Lateral view of abdominal segments VIII-X - Ae. triseriatus*

45(44). Integument of thorax and abdomen aculeate (Fig. 672); with 3-7 comb scales (Fig. 673) .... *purpureipes* (Plate 21)

Integument of thorax and abdomen glabrous (Fig. 674); with 8-12 comb scales (Fig. 675) 46

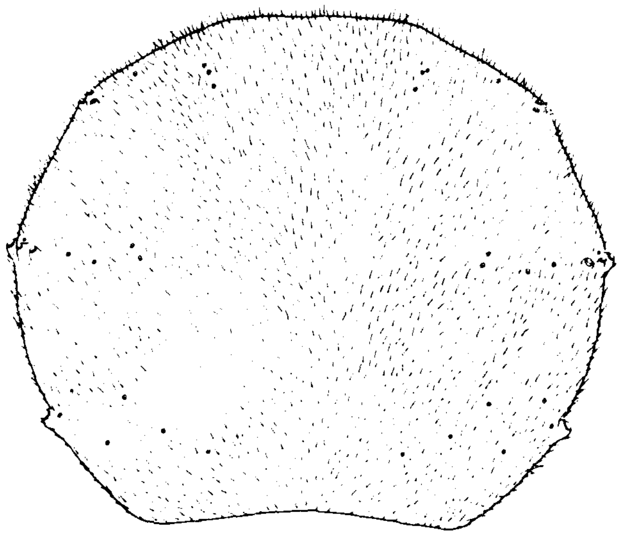


Fig. 672 — *Dorsal view of thorax - Ae. purpureipes*

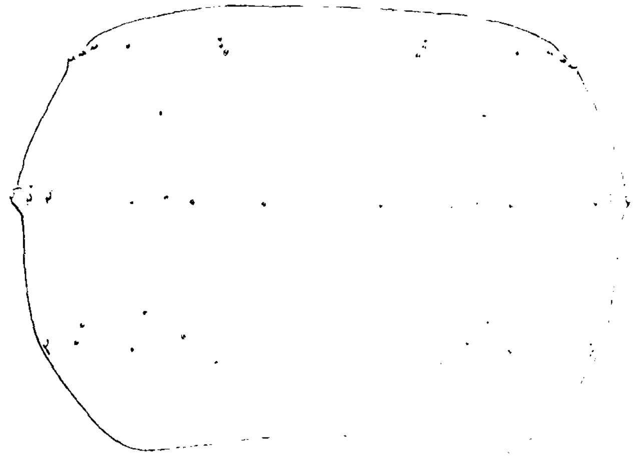


Fig. 674 — *Dorsal view of thorax - Ae. aegypti*

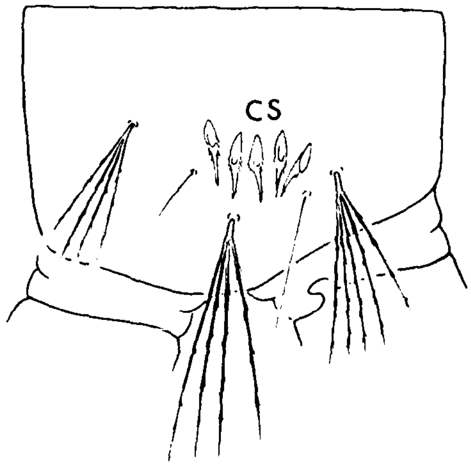


Fig. 673 — *Lateral view of abdominal segment VIII - Ae. purpureipes*

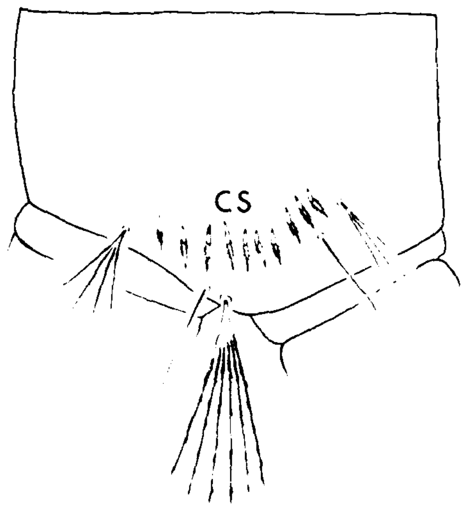


Fig. 675 — *Lateral view of abdominal segment VIII - Ae. aegypti*

46(45). Comb scale with stout, subapical spines (Fig. 676); seta 7-C single (Fig. 677) .... *aegypti* (Plate 10)

Comb scale with weak, subapical spinules (Fig. 678); seta 7-C with 3 or more branches (Fig. 679) .... *muelleri* (Plate 19)

Fig. 676 — *Comb scale - Ae. aegypti*

Fig. 678 — *Comb scale - Ae. muelleri*

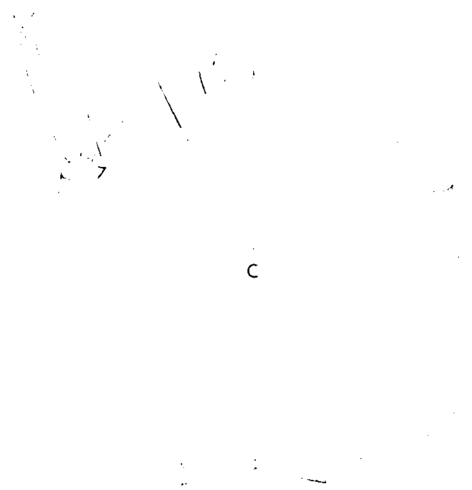


Fig. 677 — *Dorsal view of head - Ae. aegypti*

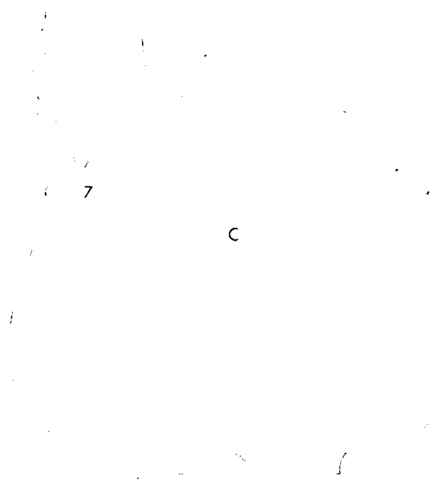


Fig. 679 — *Dorsal view of head - Ae. muelleri*

47(43). Ventral brush with the 2 caudalmost setae single or double, usually with total of 6 pairs of fanlike setae (Fig. 680) 48

Ventral brush with at least one of the 2 caudalmost setae 3-branched or more, usually with a total of either 5 or 7 fanlike setae (Fig. 681) 51

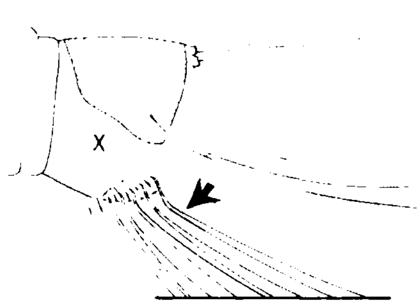


Fig. 680 — *Lateral view of abdominal segment X - Ae. sierrensis*

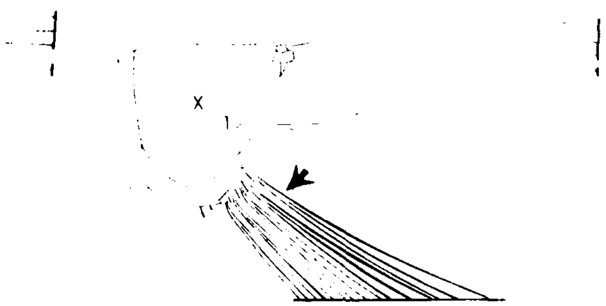


Fig. 681 — *Lateral view of abdominal segment X - Ae. zoosophus*

48(47). Siphon with index 2.7-3.0, not inflated at middle, diameter at apex more than 0.5 width of diameter at widest point; comb scales usually more than 15 (Fig. 682) . . . . *sierrensis* (Plate 22)

Siphon with index 2.5 or less, inflated at middle and sharply reduced at apex, less than 0.5 width of diameter at widest point; comb scales usually fewer than 15 (Fig. 683) 49

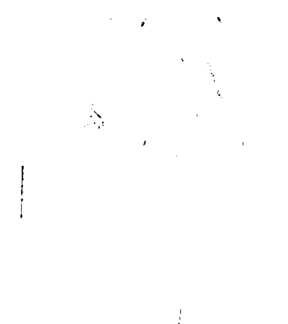


Fig. 682 — *Lateral view of abdominal segments VIII-X - Ae. sierrensis*

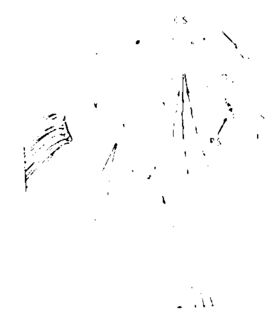


Fig. 683 — *Lateral view of abdominal segments VIII-X - Ae. monticola*

49(48). Seta 1-X usually single, rarely double; pecten with 7-11 spines, restricted to basal 0.2 of siphon (Fig. 684) .... *deserticola* (Plate 22)

Seta 1-X double, rarely single; pecten with 10-15 spines, on basal 0.25 of siphon (Fig. 685) 50

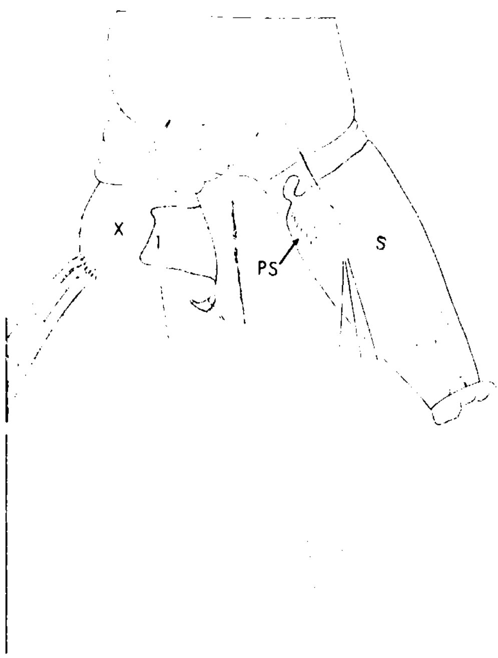


Fig. 684 —*Lateral view of abdominal segments VIII-X - Ae. deserticola*

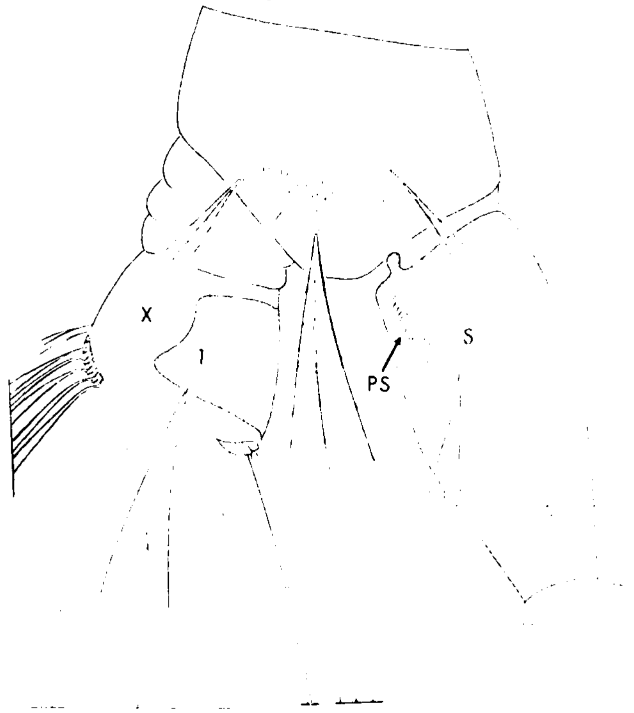
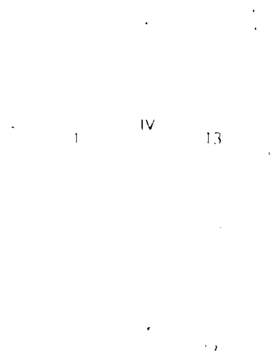


Fig. 685 —*Lateral view of abdominal segments VIII-X - Ae. monticola*

50(49). Setae 1, 13-IV,V similar in size and number of branches (Fig. 686); seta 7-P mostly triple (Fig. 687) .... *monticola* (Plate 22)

Seta 1-IV,V with more branches and usually weaker than seta 13-IV,V (Fig. 688); seta 7-P usually double (Fig. 689) .... *varipalpus* (Plate 22)



...nal segments

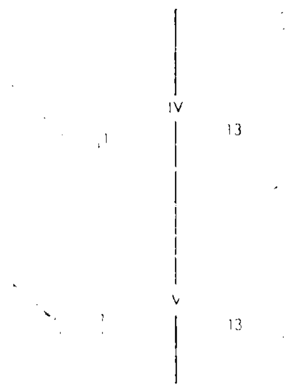


Fig. 688 — *Dorsal/ventral view of abdominal segments IV-V - Ae. varipalpus*

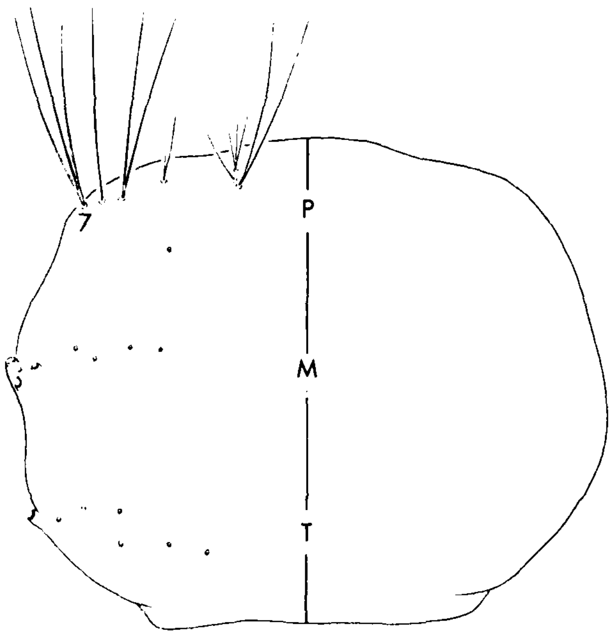


Fig. 687 — *Dorsal view of thorax - Ae. monticola*

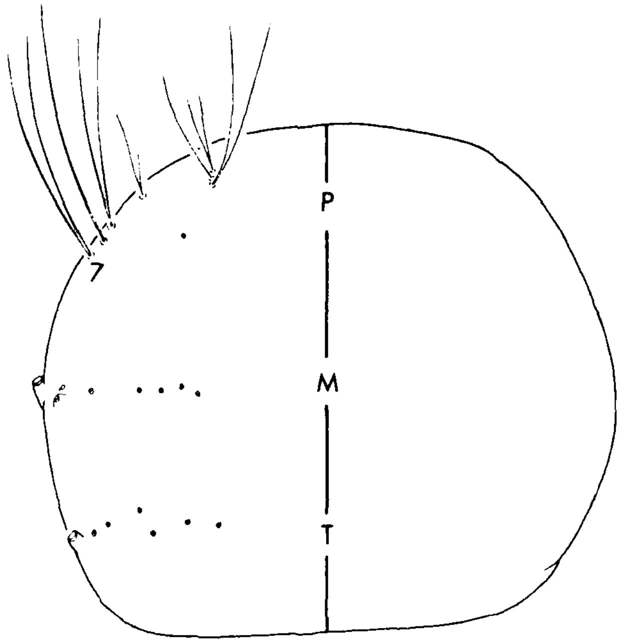


Fig. 689 — *Dorsal view of thorax - Ae. varipalpus*

51(47). Seta 4-C weak, usually with 7 or fewer branches, nearer to seta 6-C than to middorsal line (Fig. 690); comb with 20 or more scales (Fig. 691) .... *burgeri* (Plate 17)

Seta 4-C strong, with 8 or more branches, nearer to middorsal line than to seta 6-C (Fig. 692); comb with 15 or fewer scales (Fig. 693) 52

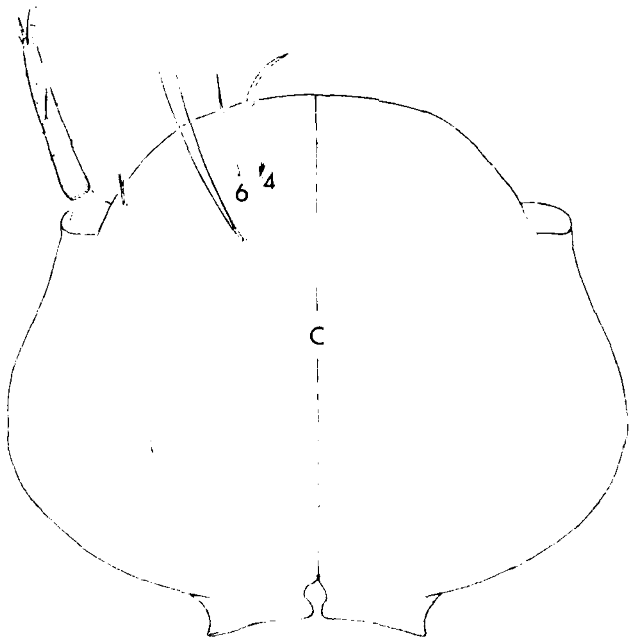


Fig. 690 — *Dorsal view of head - Ae. burgeri*

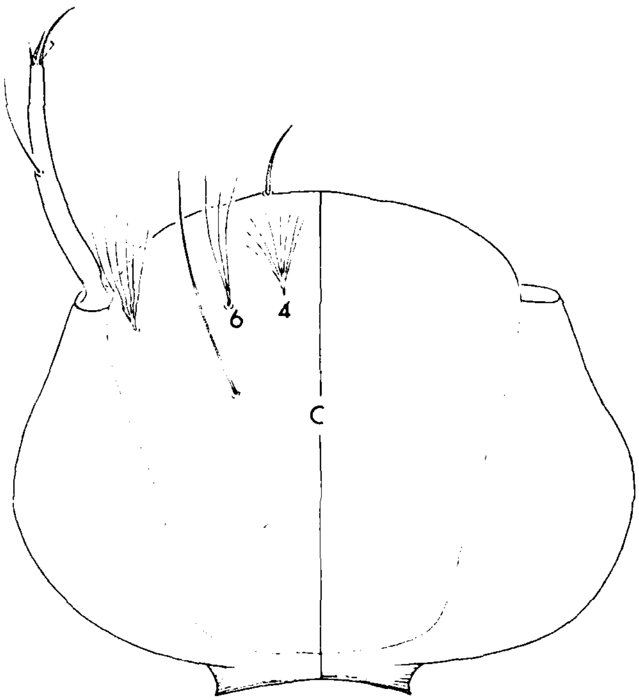


Fig. 692 — *Dorsal view of head - Ae. triseriatus*

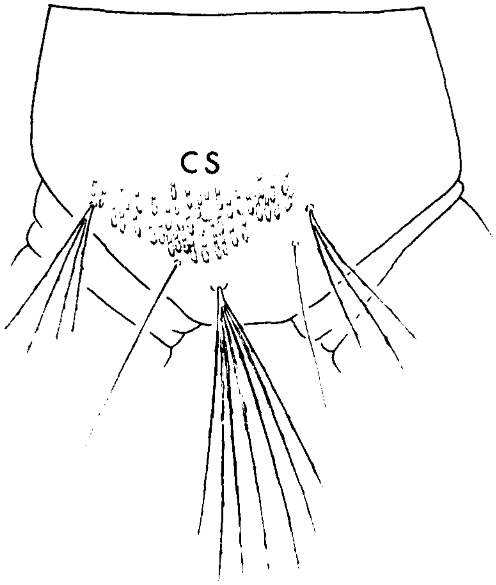


Fig. 691 — *Lateral view of abdominal segment VIII - Ae. burgeri*

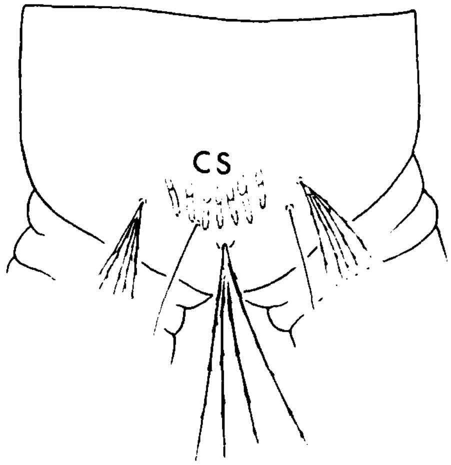


Fig. 693 — *Lateral view of abdominal segment VIII - Ae. triseriatus*

52(51). Saddle extending more than 0.6 distance to midventral line, seta 1-X attached considerably dorsad of ventral border of saddle; ventral brush with 7 pairs of fanlike setae (Fig. 694) .... *zoosophus* (Plate 24)

Saddle not extending more than 0.6 distance to midventral line, seta 1-X attached near to ventral border of saddle; ventral brush with 5,6 pairs of fanlike setae (Fig. 695) 53

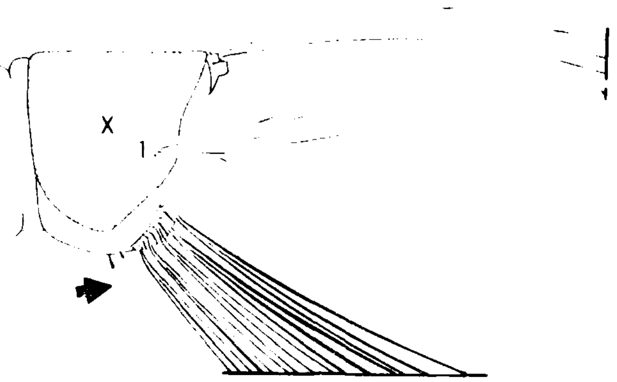


Fig. 694 — *Lateral view of abdominal segment X - Ae. zoosophus*

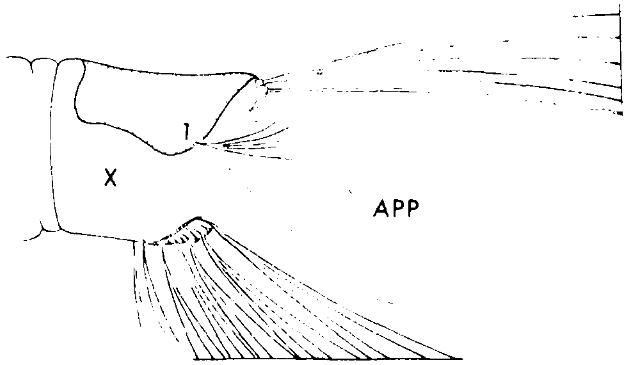


Fig. 695 — *Lateral view of abdominal segment X - Ae. triseriatus*

53(52). Ventral brush on segment X with 6 pairs of fanlike setae (Fig. 696); acus usually attached to siphon, but if detached, situated close to its base (Fig. 697); anal papillae not bulbous, dorsal pair longer than ventral pair (Fig. 696) .... *triseriatus* (Plate 16)

Ventral brush with 5 pairs of fanlike setae (Fig. 698); acus detached and removed from base of siphon (Fig. 699); both pairs of anal papillae about same length, bulbous (Fig. 698) 54

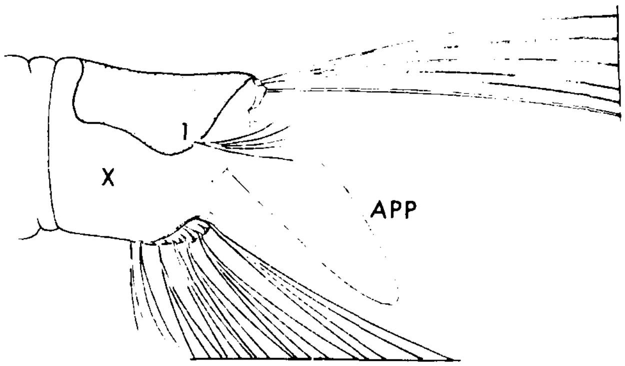


Fig. 696 — *Lateral view of abdominal segment X – Ae. triseriatus*

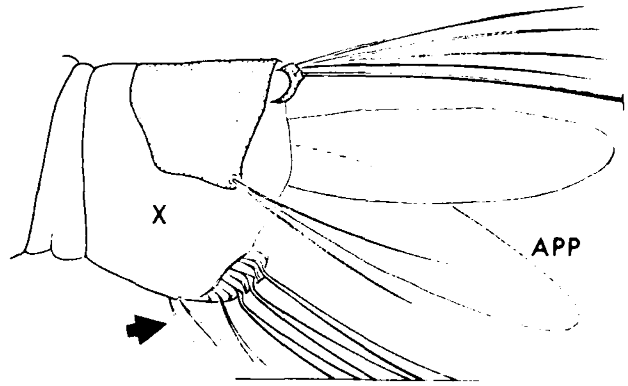


Fig. 698 — *Lateral view of abdominal segment X - Ae. hendersoni*

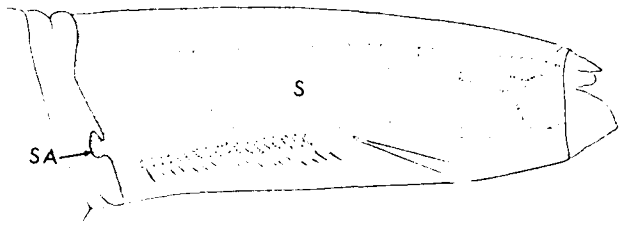


Fig. 697 — *Lateral view of siphon - Ae. triseriatus*

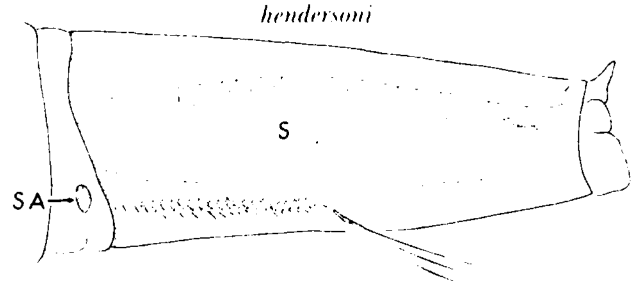


Fig. 699 — *Lateral view of siphon - Ae. hendersoni*

54(53). Ventral brush of segment X with 2 anteriormost setae double (Fig. 700) .... *hendersoni* (Plate 16)

Ventral brush with 2 anteriormost setae 3- or 4- branched (Fig. 701) .... *brelandi* (Plate 10)

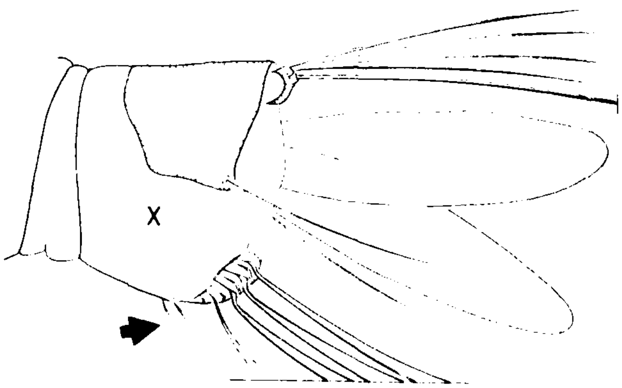


Fig. 700 — *Lateral view of abdominal segment X – Ae. hendersoni*

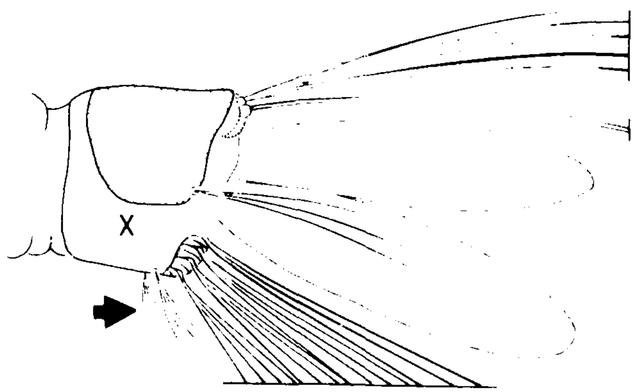


Fig. 701 — *Lateral view of abdominal segment X - Ae. brelandi*

55(42). Individual comb scale with median spine 1.5 length of subapical spinules, or more (Fig. 702) 56

Individual comb scale fringed with subequal spinules or with median spine less than 1.5 length of subapical spinules (Fig. 703) 66

Fig. 702 — *Comb scale - Ae. impiger*

Fig. 703 — *Comb scale - Ae. cantator*

56(55). Siphon index 4.0-5.0; apical pecten spine nearly equal to apical diameter of siphon (Fig. 704) . . . . *fitchii* (Plate 16)

Siphon index usually less than 4.0; apical pecten spine not more than 0.5 apical diameter of siphon (Fig. 705) 57

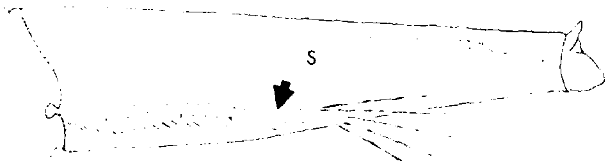


Fig. 704 — *Lateral view of siphon - Ae. fitchii*

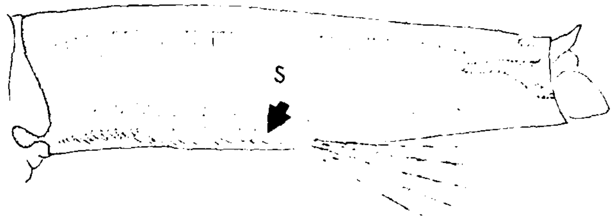


Fig. 705 — *Lateral view of siphon - Ae. c. canadensis*

57(58). Comb with 8-16 scales (Fig. 706) 58

Comb with 18 or more scales (Fig. 707) 59

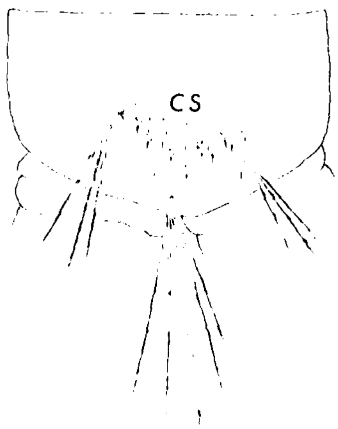


Fig. 706 — *Lateral view of abdominal segment VIII - Ae. impiger*

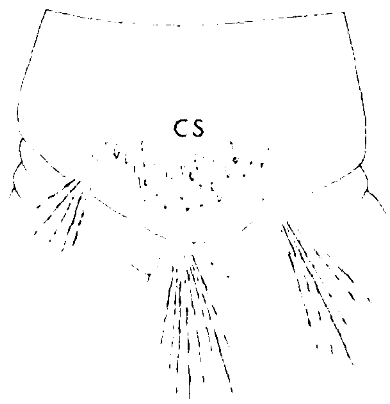


Fig. 707 — *Lateral view of abdominal segment VIII - Ae. stimulans*

58(57). Saddle extending near to midventral line; anal papilla-saddle index less than 1.5 (Fig. 708) .... *punctodes* (Plate 25)

Saddle extending only about 0.5 to midventral line; anal papilla-saddle index 2.0 or more (Fig. 709) .... *impiger* (Plate 22)

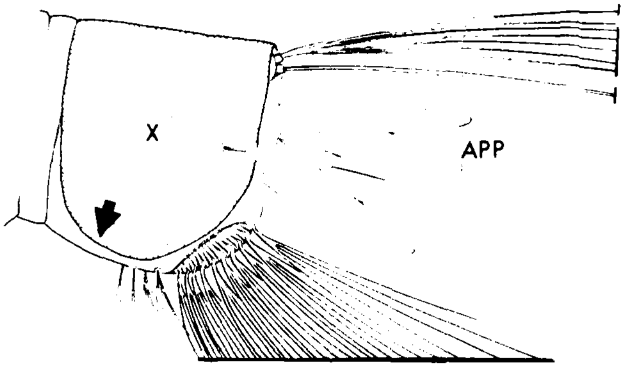


Fig. 708 — *Lateral view of abdominal segment X - Ae. punctodes*

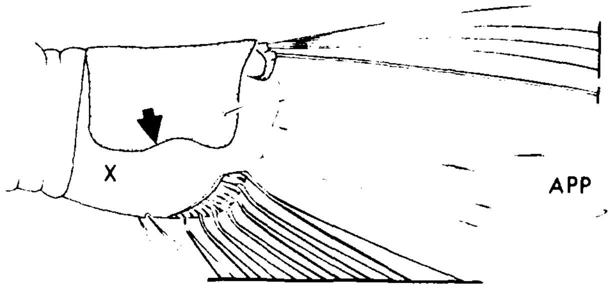


Fig. 709 — *Lateral view of abdominal segment X - Ae. impiger*

59(57). Seta 1-X shorter than saddle (Fig. 710) 60

Seta 1-X longer than saddle (Fig. 711) 65

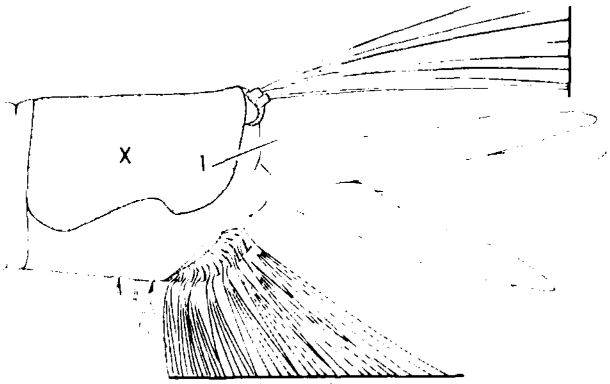


Fig. 710 — *Lateral view of abdominal segment X - Ae. stimulans*

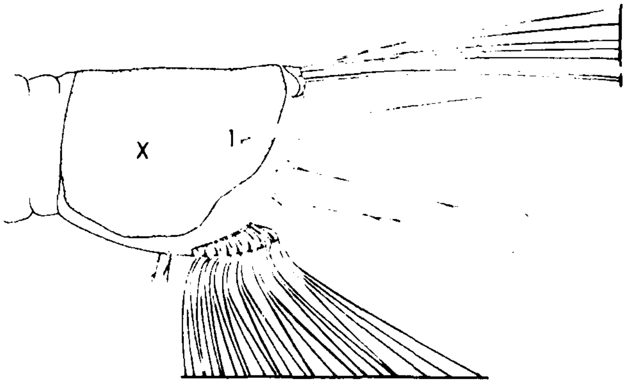


Fig. 711 — *Lateral view of abdominal segment X - Ae. aboriginis*

60(59). Setae 5,6-C single, rarely double (Fig. 712) 61

Seta 5-C with 2-4 branches, seta 6-C usually double (Fig. 713) 63

Fig. 712 — *Dorsal view of head - Ae. melanimon*

Fig. 713 — *Dorsal view of head - Ae. sticticus*

61(60). Seta 1 attached distad to middle of siphon (Fig. 714); seta 1-M about equal to seta 2-M in length (Fig. 715) .... (in part) *melanimon* (Plate 23)

Seta 1 attached about at middle of siphon (Fig. 716); seta 1-M longer than seta 2-M (Fig. 717) 62

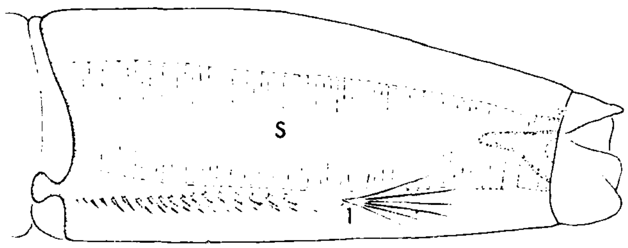


Fig. 714 — *Lateral view of siphon - Ae. melanimon*

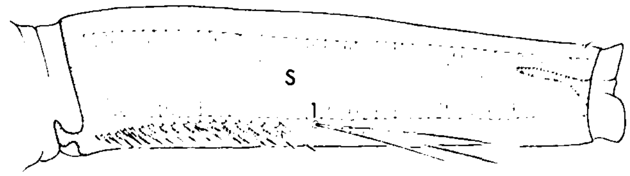


Fig. 716 — *Lateral view of siphon - Ae. stimulans*

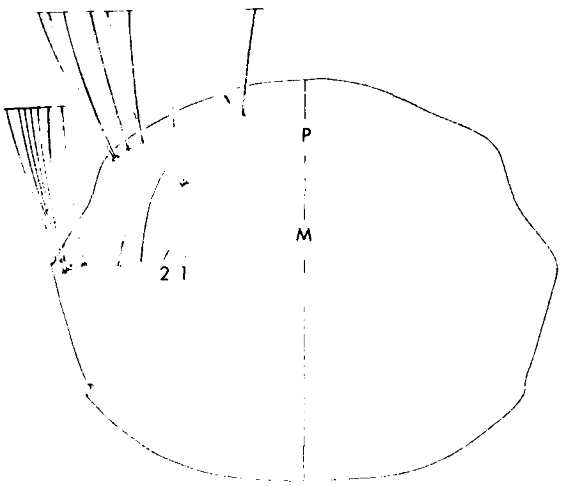


Fig. 715 — *Dorsal view of thorax - Ae. melanimon*

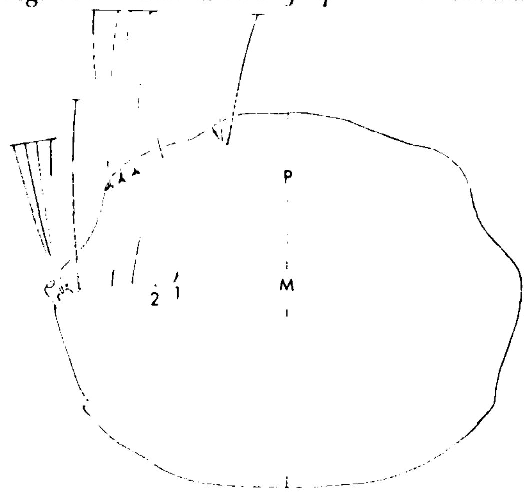


Fig. 717 — *Dorsal view of thorax - Ae. stimulans*

62(61). Comb scale with 1-3 median spines 2.0 length of subapical spinules, or more (Fig. 718); usually with more than 35 comb scales (Fig. 719) .... *nevadensis* (Plate 10)

Comb scale with median spine about 1.5 length of subapical spinules (Fig. 720); usually fewer than 35 comb scales (Fig. 721) .... *stimulans* (Plate 11)

Fig. 718 — *Comb scale - Ae. nevadensis*

Fig. 720 — *Comb scale - Ae. stimulans*

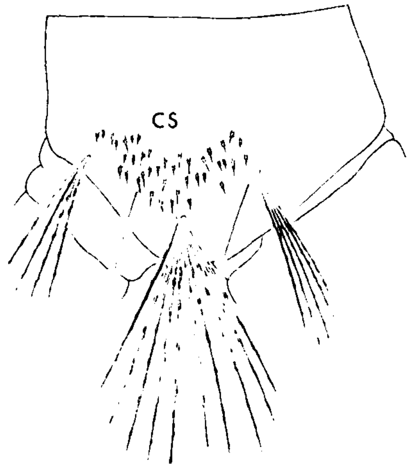


Fig. 719 — *Lateral view of abdominal segment VIII - Ae. nevadensis*

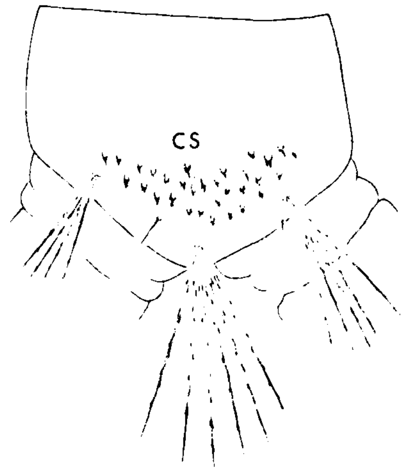


Fig. 721 — *Lateral segment of abdominal segment VIII - Ae. stimulans*

63(60). Seta 1-M longer than seta 3-M and seta 5-C (Figs. 722, 723) .... *mercurator* (Plate 11)

Seta 1-M shorter than seta 3-M and seta 5-C (Fig. 724, 725) 64

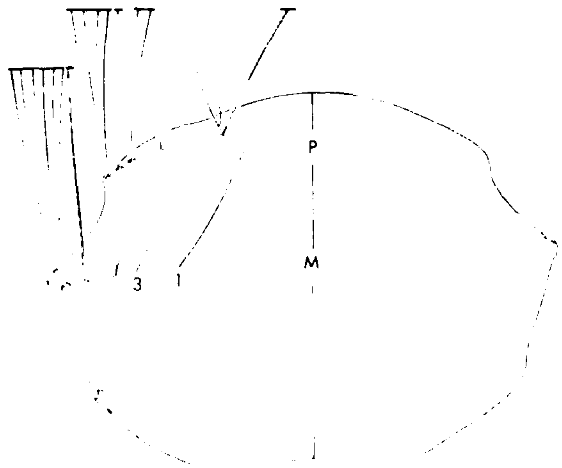


Fig. 722 — *Dorsal view of thorax - Ae. mercurator*

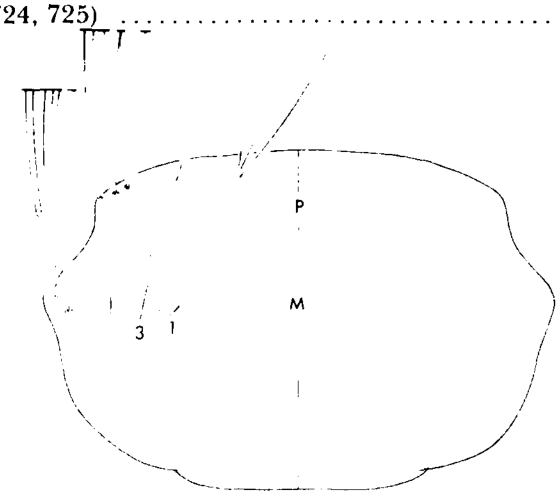


Fig. 724 — *Dorsal view of thorax - Ae. sticticus*

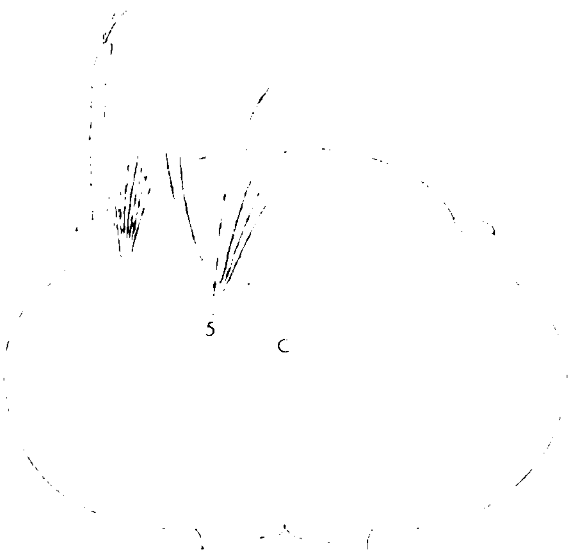


Fig. 723 — *Dorsal view of head - Ae. mercurator*

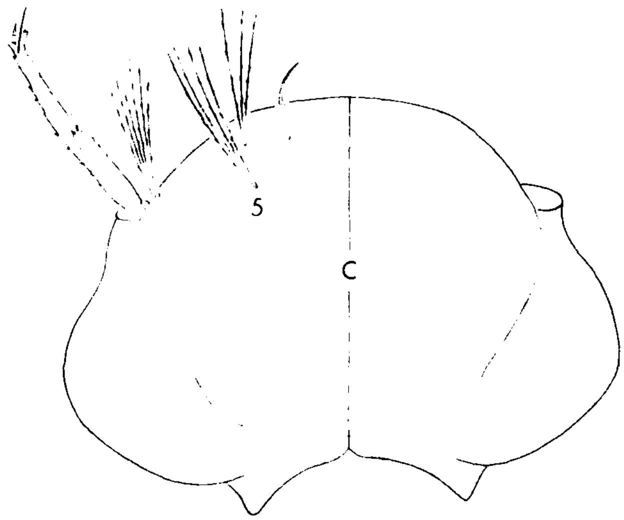


Fig. 725 — *Dorsal view of head - Ae. sticticus*

64(63). Siphon index 3.2-4.0 (Fig. 726); comb scale with stout, subapical spinules (Fig. 727) (in part) *flavescens* (Plate 12)

Siphon index 2.5-3.0 (Fig. 728); comb scale with subapical spinules weak (Fig. 729) .... *sticticus* (Plate 25)

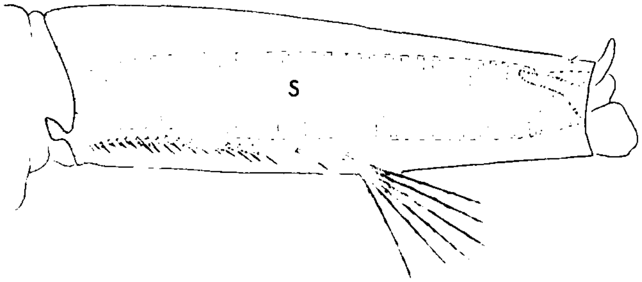


Fig. 726 — *Lateral view of siphon - Ae. flavescens*

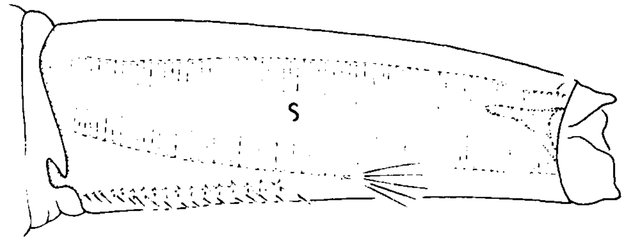


Fig. 728 — *Lateral view of siphon - Ae. sticticus*

Fig. 727 — *Comb scale - Ae. flavescens*

Fig. 729 — *Comb scale - Ae. sticticus*

65(59). Posterior border of saddle aciculate (Fig. 730); seta 1-M with 3-6 branches (Fig. 731) ..... *schizopinax* (Plate 26)

Posterior border of saddle without aciculae (Fig. 732); seta 1-M single (Fig. 733) .... *aboriginis* (Plate 9)

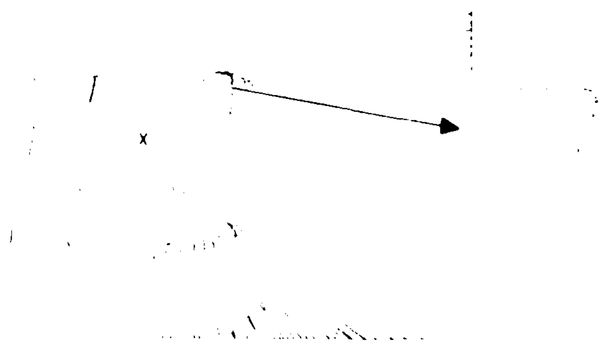


Fig. 730 — *Lateral view of abdominal segment X - Ae. schizopinax*

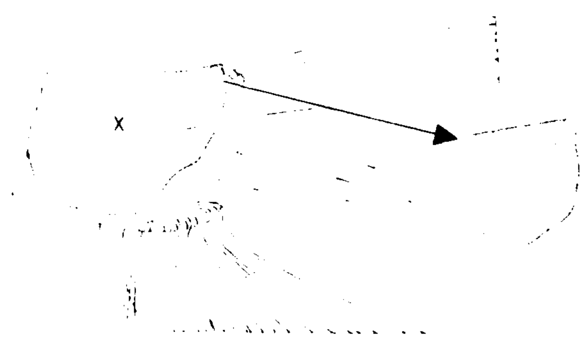


Fig. 732 — *Lateral view of abdominal segment X - Ae. aboriginis*

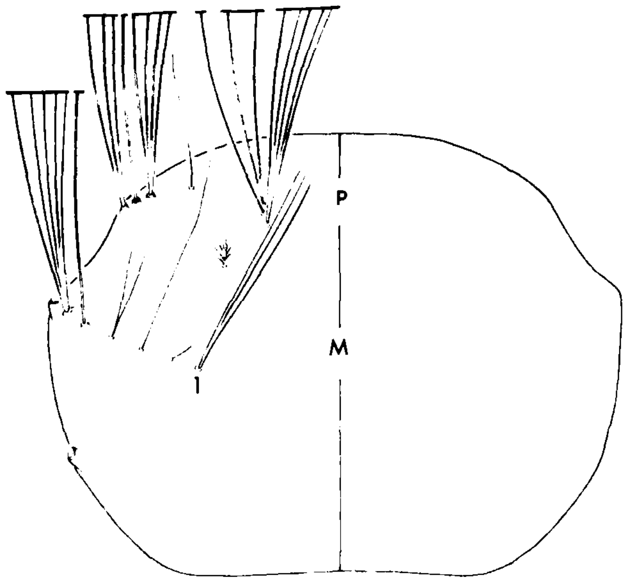


Fig. 731 — *Dorsal view of thorax - Ae. schizopinax*

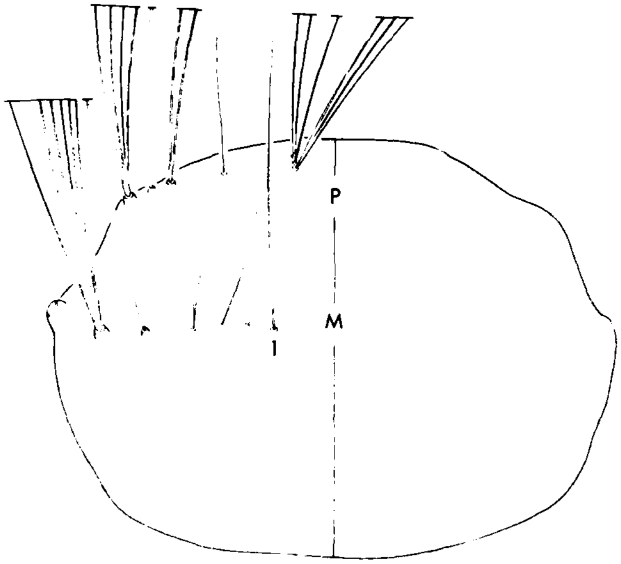


Fig. 733 — *Dorsal view of thorax - Ae. aboriginis*

66(55). Seta 5-C with 4 or more branches, seta 6-C with 3 or more branches (Fig. 734) 67

Seta 5-C with 1-3 branches, rarely 4-branched; seta 6-C single or double, rarely triple (Fig. 735) 72

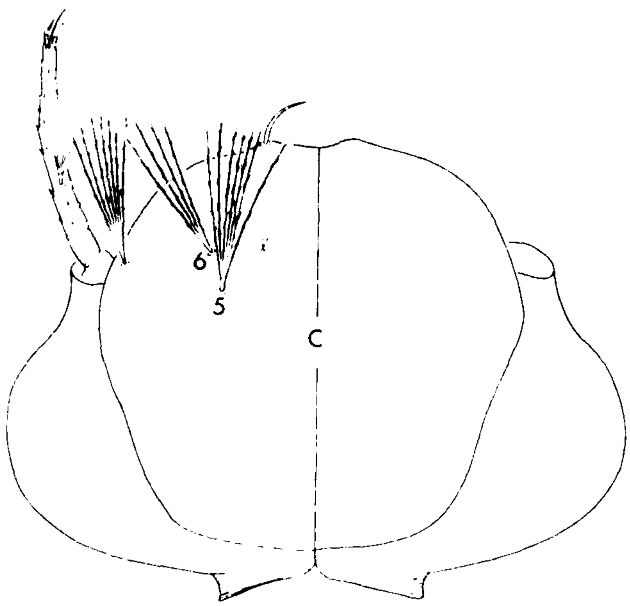


Fig. 734 — *Dorsal view of head - Ae. pullatus*

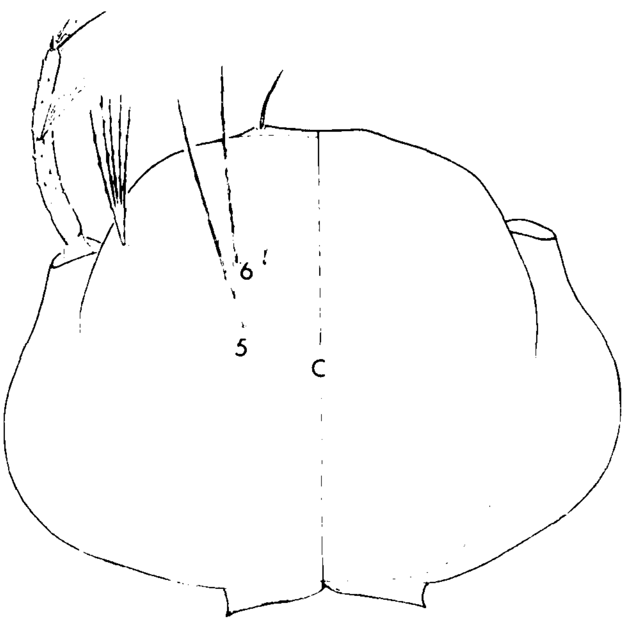


Fig. 735 — *Dorsal view of head - Ae. dorsalis*

67(66). Seta 1-M about length of antenna, or longer (Figs. 736, 737) 68

Seta 1-M much shorter than antenna (Figs. 738, 739) 70

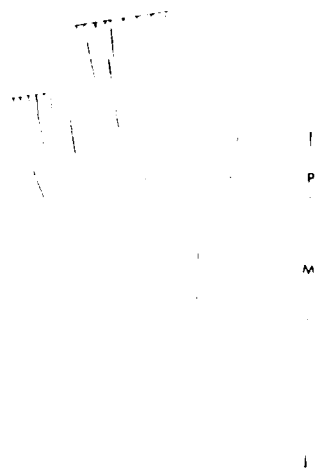


Fig. 736 — *Dorsal view of thorax - Ae. pullatus*

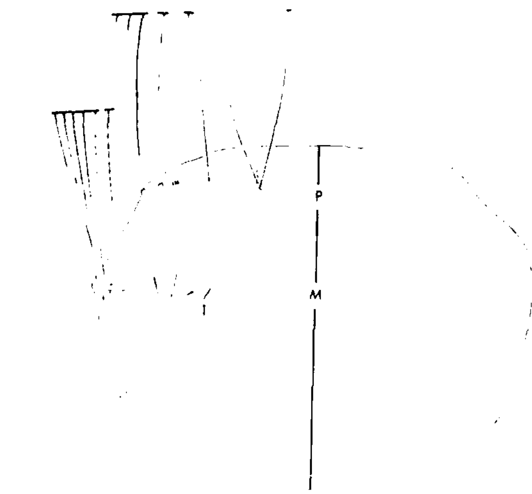


Fig. 738 — *Dorsal view of thorax - Ae. c. canadensis*

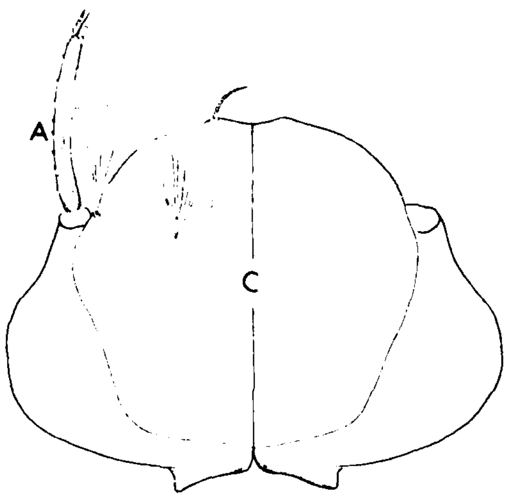


Fig. 737 — *Dorsal view of head - Ae. pullatus*

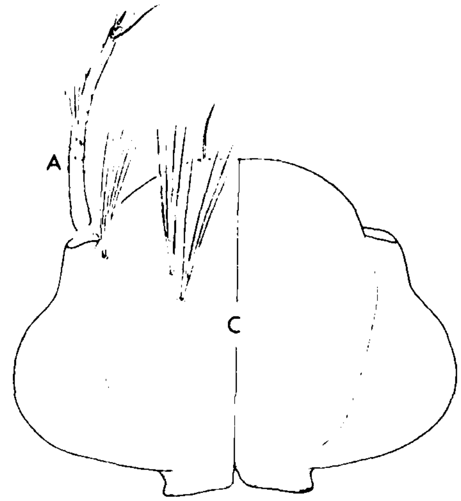


Fig. 739 — *Dorsal view of head - Ae. c. canadensis*

68(67). Seta 3-P single (Fig. 740); with 70 or more comb scales (Fig. 741) .... *pionips* (Plate 18)

Seta 3-P double or triple (Fig. 742); with 60 or fewer comb scales (Fig. 743) 69

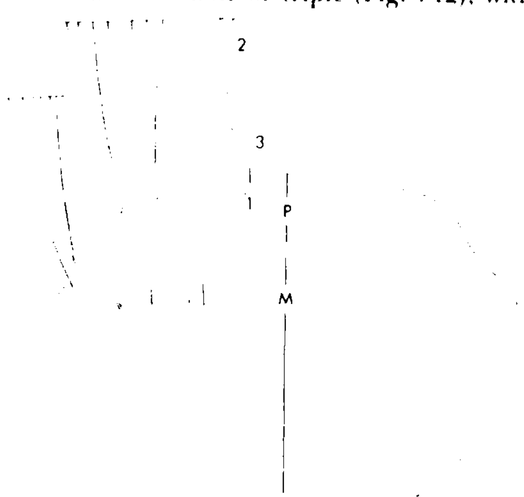


Fig. 740 — *Dorsal view of thorax - Ae. pionips*

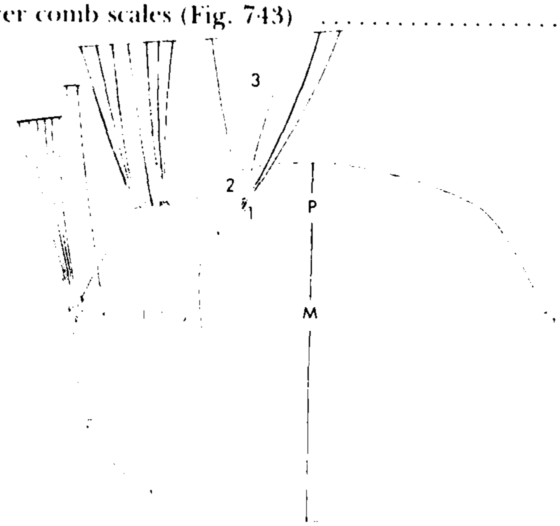


Fig. 742 — *Dorsal view of thorax - Ae. pullatus*

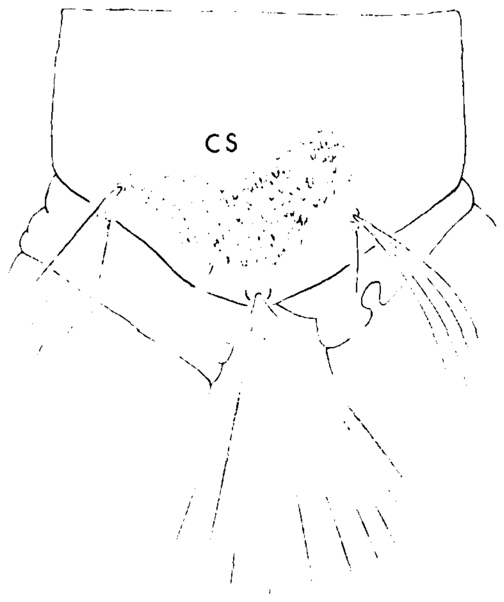


Fig. 741 — *Lateral view of abdominal segment VIII - Ae. pionips*

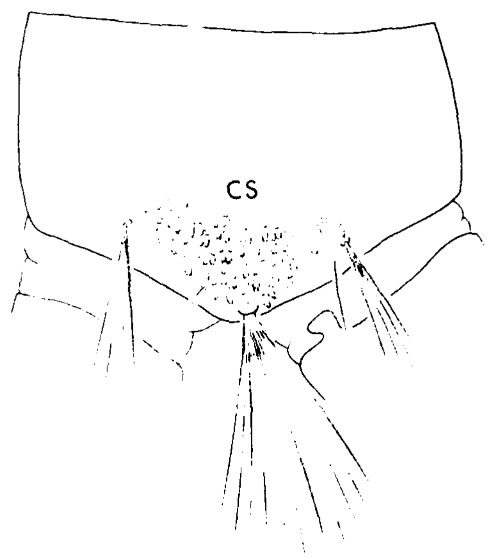


Fig. 743 — *Lateral view of abdominal segment VIII - Ae. pullatus*

69(68). Seta 5-M branched (Fig. 744); seta 1-X about 0.5 length of saddle (Fig. 745) .... *pullatus* (Plate 27)

Seta 5-M single (Fig. 746); seta 1-X about equal to length of saddle (Fig. 747) ... . *cantator* (Plate 19)

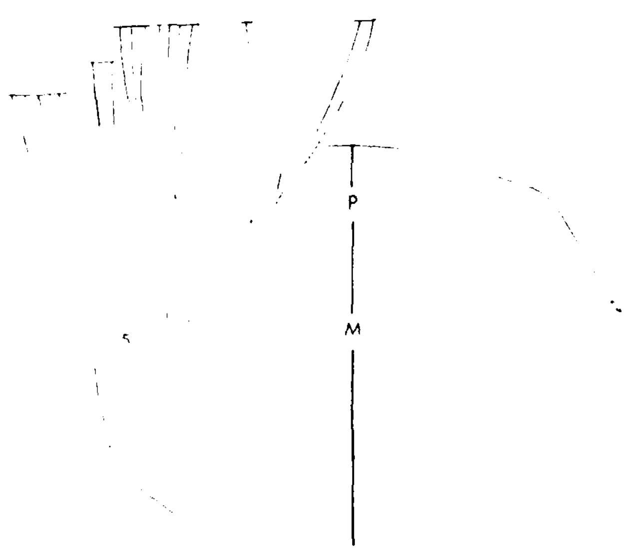


Fig. 744 — *Dorsal view of thorax - Ae. pullatus*

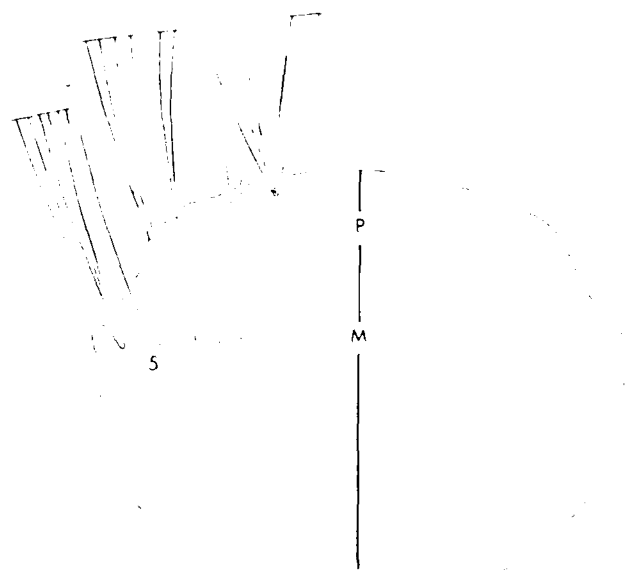


Fig. 745 — *Dorsal view of thorax - Ae. cantator*

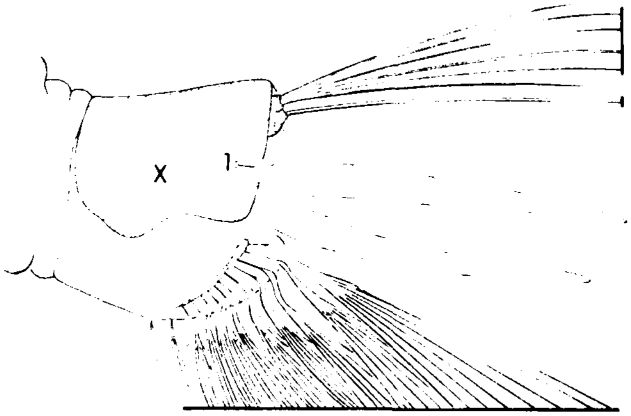


Fig. 745 — *Lateral view of abdominal segment X - Ae. pullatus*

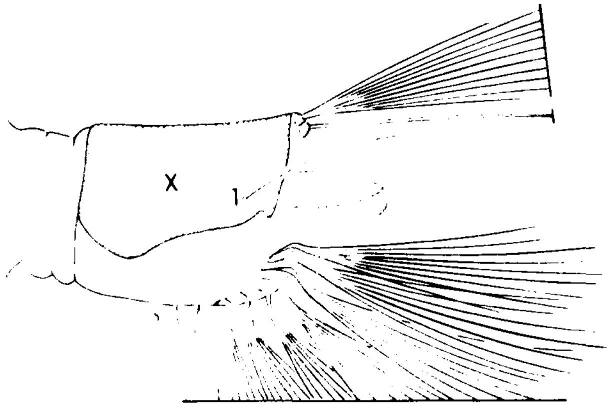


Fig. 747 — *Lateral view of abdominal segment X - Ae. cantator*

70(67). Seta 1-X not attached to saddle; siphon index less than 2.5 (Fig. 748) . . . . *togoi*
(Plate 19)

Seta 1-X attached to saddle; siphon index 3.0 or more (Fig. 749) 71

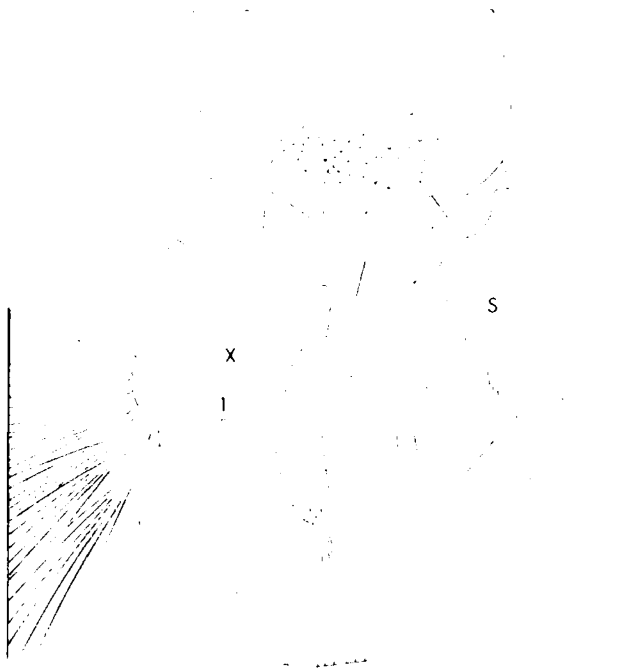


Fig. 748 — *Lateral view of abdominal segments VIII-X - Ae. togoi*

Fig. 749 — *Lateral view of abdominal segments VIII-X - Ae. c. canadensis*

71(70). Comb scale with apical and subapical spines much stouter than lateral spinules (Fig. 750); seta 6-I,II with 3,4 branches (Fig. 751) . . . . *thibaulti*
(Plate 23)

Comb scale fringed with subequal spinules (Fig. 752); seta 6-I,II double (Fig. 753) . . . . . . *c. canadensis*
c. mathesoni
(Plates 14, 18)

Fig. 750 — *Comb scale - Ae. thibaulti*

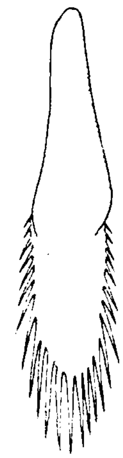


Fig. 752 — *Comb scale - Ae. c. canadensis*

Fig. 751 — *Dorsal view of abdominal segments I-II - Ae. thibaulti*

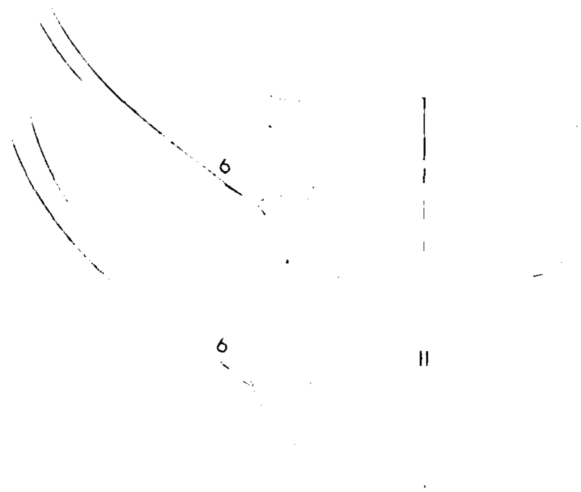


Fig. 753 — *Dorsal view of abdominal segments - I-II - Ae. c. canadensis*

72(66). Seta 1-X equal to length of saddle, or longer (Fig. 754) .... *squamiger* (Plate 27)

Seta 1-X shorter than saddle (Fig. 755) 73

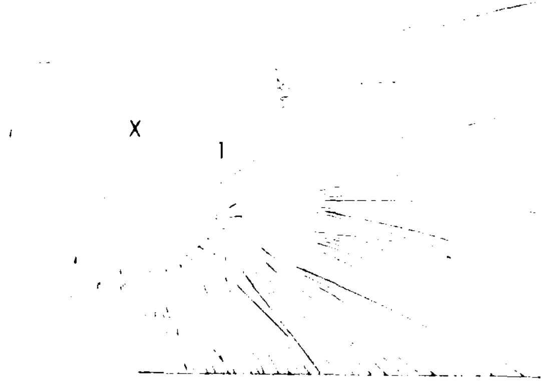


Fig. 754 — *Lateral view of abdominal segment X - Ae. squamiger*

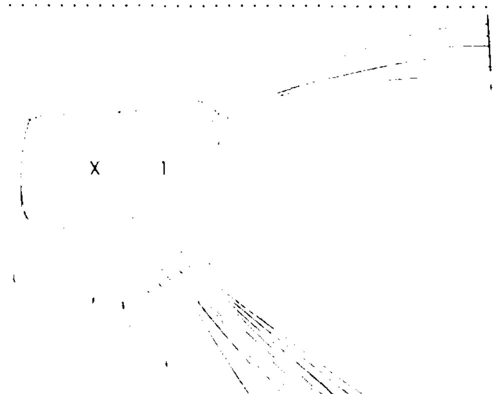


Fig. 755 — *Lateral view of abdominal segment X - Ae. communis*

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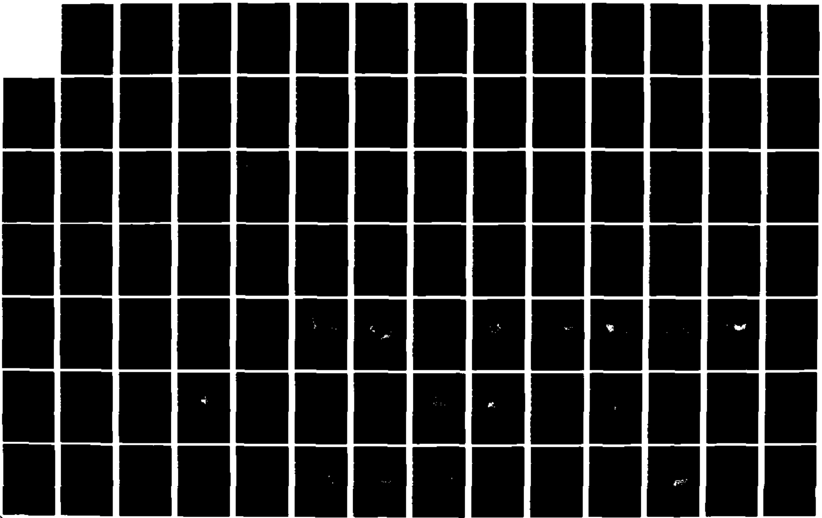

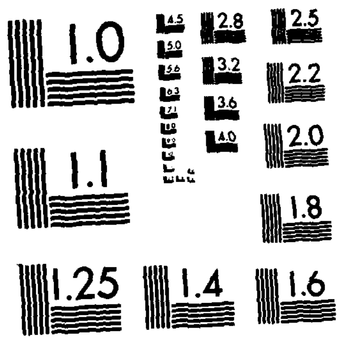

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73(72). Seta 1-M about equal to length of antenna, or longer (Figs. 756, 757) 74

Seta 1-M shorter than antenna (Figs. 758, 759) 76

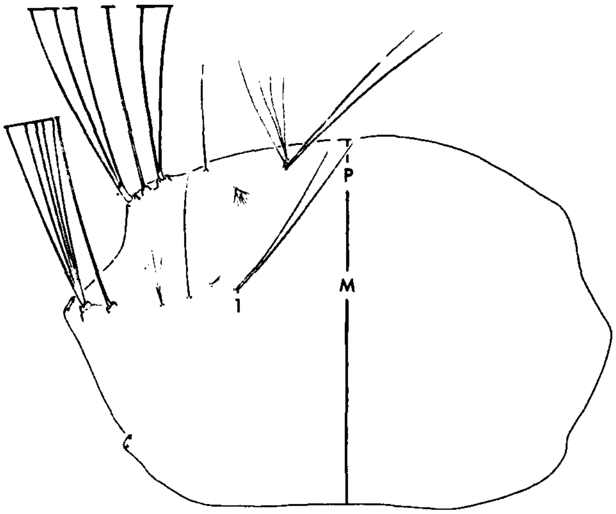


Fig. 756 — *Dorsal view of thorax - Ae. dorsalis*

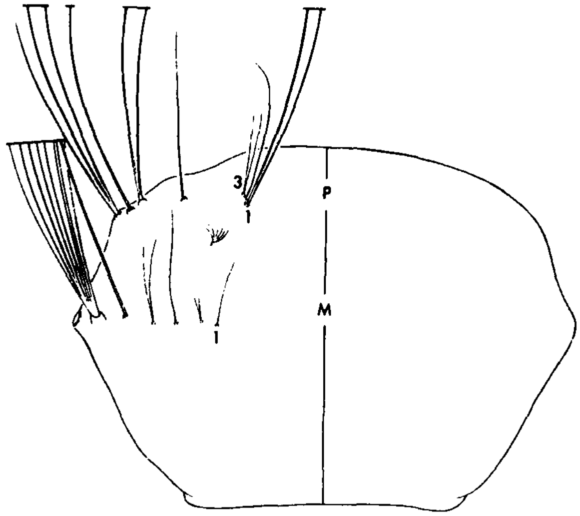


Fig. 758 — *Dorsal view of thorax - Ae. increpitus*

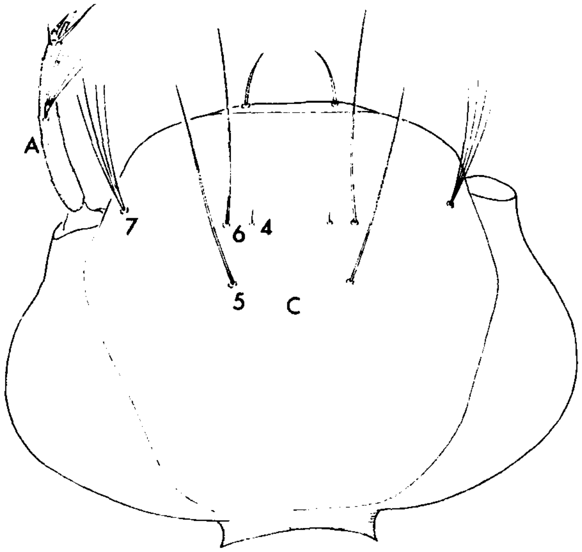


Fig. 757 — *Dorsal view of head - Ae. dorsalis*

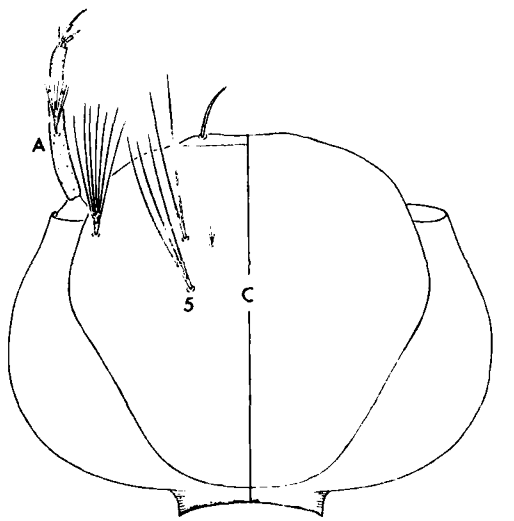


Fig. 759 — *Dorsal view of head – Ae. increpitus*

74(73). Pecten extending to distal 0.5 of siphon, the 1,2 apicalmost spines stouter than preceding two and about 2.0 length of seta 2-S (Fig. 760) .... (in part) *campestris* (Plate 12)

Pecten in basal 0.5 of siphon, the 2 apicalmost spines not much stouter than preceding two and about equal to seta 2-S (Fig. 761) 75

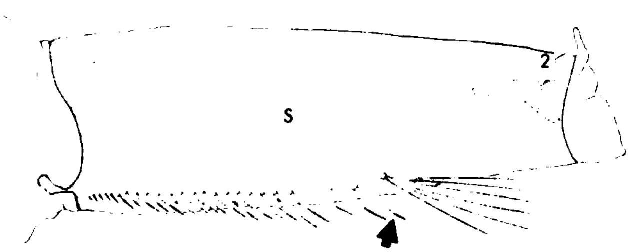


Fig. 760 – *Lateral view of siphon - Ae. campestris*

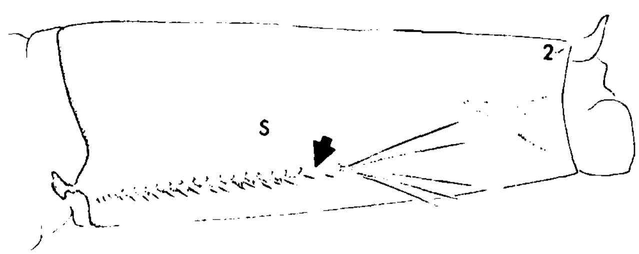


Fig. 761 — *Lateral view of siphon - Ae. dorsalis*

75(74). Seta 1-X about 0.5 length of saddle (Fig. 762); the 4 setae 5,6-C usually single or the total single and branches of branched setae rarely more than 7 (Fig. 763) .... *dorsalis* (Plate 18)

Seta 1-X almost equal to length of saddle (Fig. 764); the 4 setae 5,6-C usually branched, the total single and branches of branched setae usually 10, not fewer than 8 (Fig. 765) .... *grossbecki* (Plate 22)

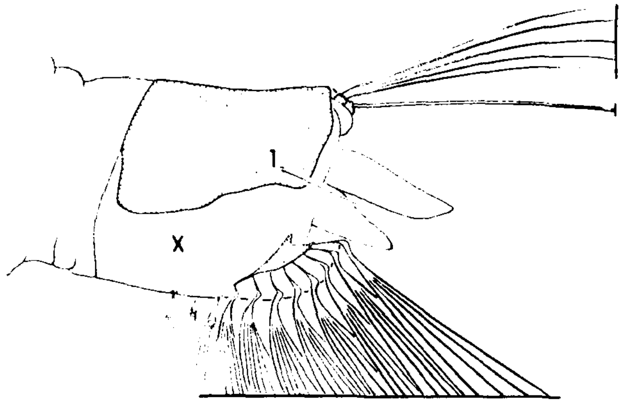


Fig. 762 — *Lateral view of abdominal segment X - Ae. dorsalis*

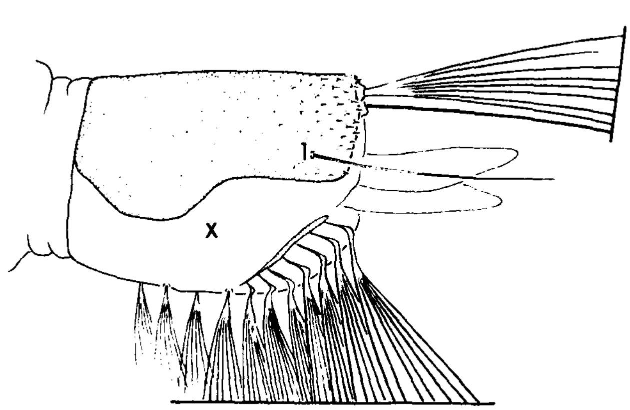


Fig. 764 — *Lateral view of abdominal segment X - Ae. grossbecki*

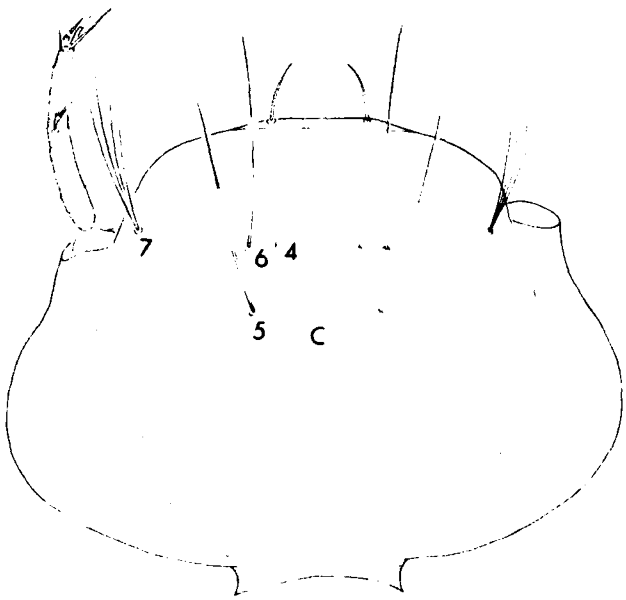


Fig. 763 — *Dorsal view of head - Ae. dorsalis*

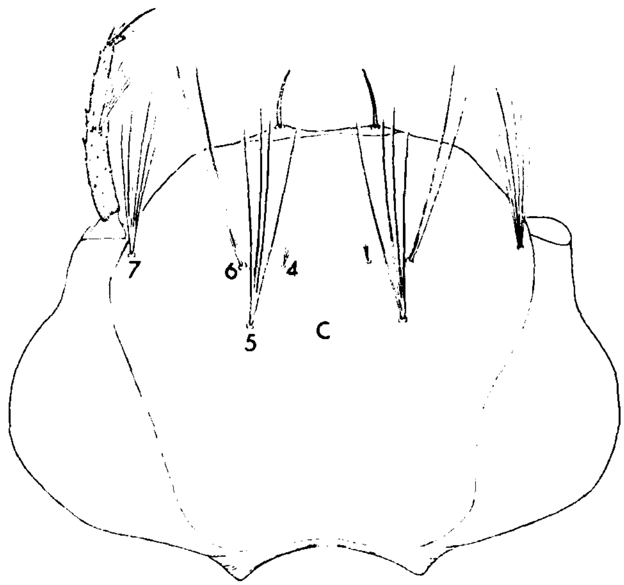


Fig. 765 — *Dorsal view of head - Ae. grossbecki*

76(73). Comb scales 36 or more, with median spine no stouter than subapical spinules (Figs. 766, 767) .... *communis** *churchillensis* (Plates 17, 20)

Comb scales fewer than 35, with median spine stouter than subapical spinules on at least some scales (Figs. 768, 769) 77

*For provisional separation of *communis* and *churchillensis*, see Ellis and Brust (167).

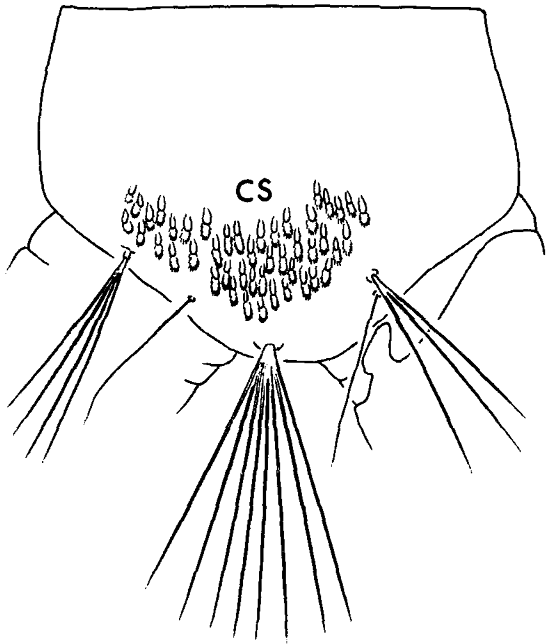


Fig. 766 — *Lateral view of abdominal segment VIII - Ae. communis*

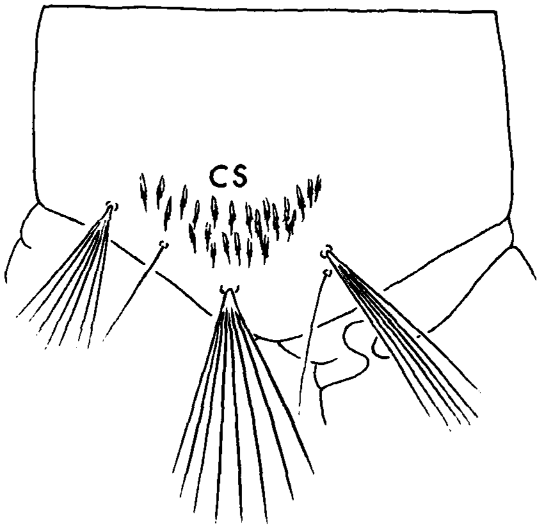


Fig. 768 — *Lateral view of abdominal segment VIII - Ae. melanimon*

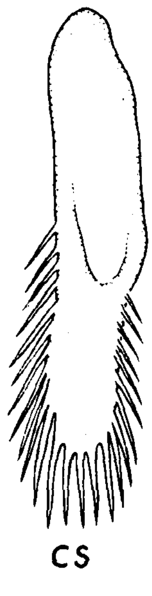


Fig. 767 — *Comb scale - Ae. communis*

Fig. 769 — *Comb scale - Ae. melanimon*

77(76). Pecten extending distal to middle of siphon (Fig. 770); seta 1-IV,V short, multibranched (Fig. 771) . . . . (in part) *melanimon* (Plate 23)

Pecten confined to basal 0.5 of siphon (Fig. 772); seta 1-IV,V long, single to triple (Fig. 773) 78

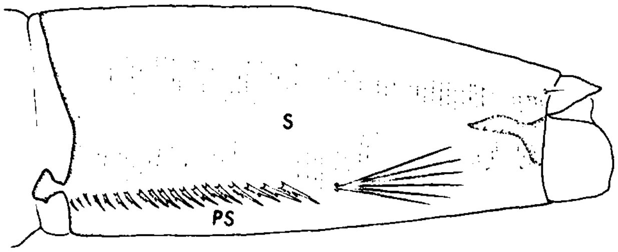


Fig. 770 — *Lateral view of siphon - Ae. melanimon*

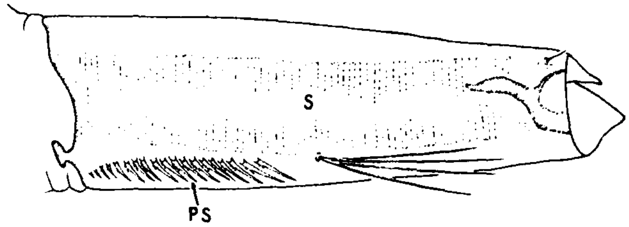


Fig. 772 — *Lateral view of siphon - Ae. increpitus*

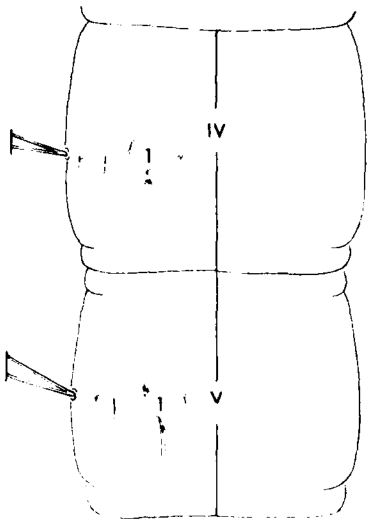


Fig. 771 — *Dorsal view of abdominal segments IV-V - Ae. melanimon*

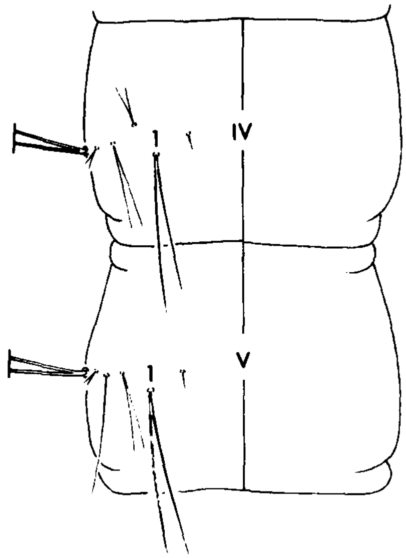


Fig. 773 — *Dorsal view of abdominal segments IV-V - Ae. increpitus*

78(77). Setae 1,3-P usually single (Fig. 774); seta 5-C single (Fig. 775); saddle finely aciculate along posterior border (Fig. 776) .... *implicatus* (Plate 24)

Setae 1, 3-P usually double (Fig. 777); seta 5-C double or triple (Fig. 778); saddle coarsely aciculate along posterior border (Fig. 779) .... *increpitus* (Plate 14)

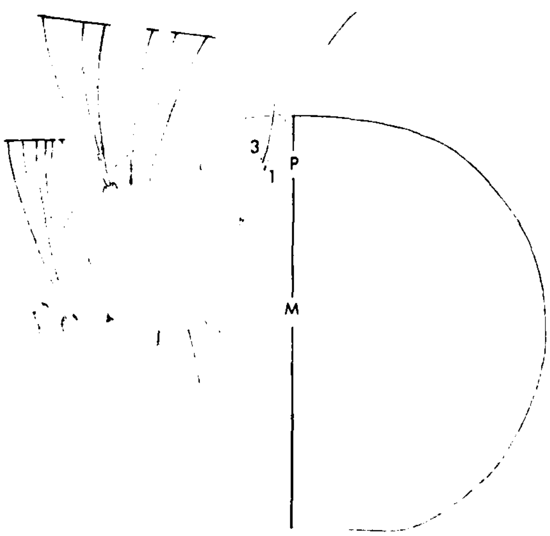


Fig. 774 — *Dorsal view of thorax - Ae. implicatus*

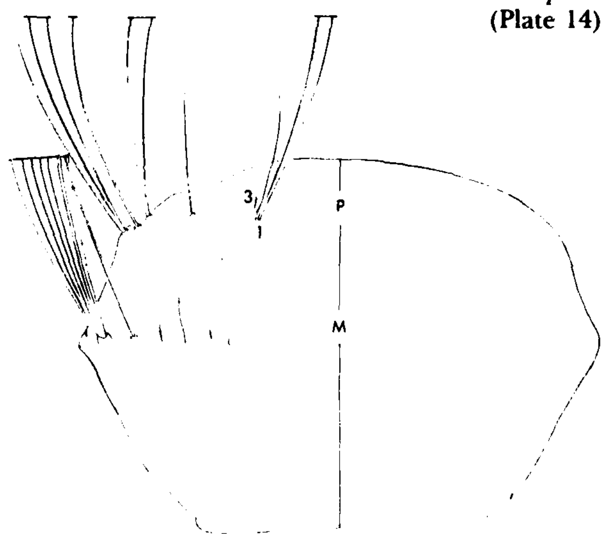


Fig. 777 — *Dorsal view of thorax - Ae. increpitus*

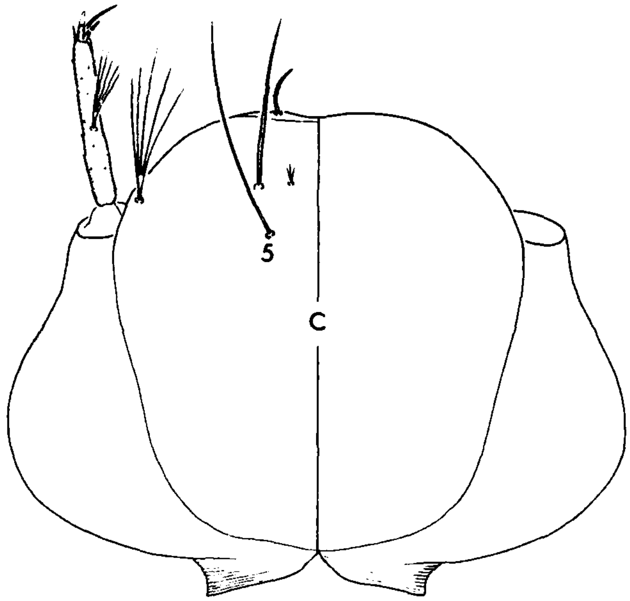


Fig. 775 — *Dorsal view of head - Ae. implicatus*

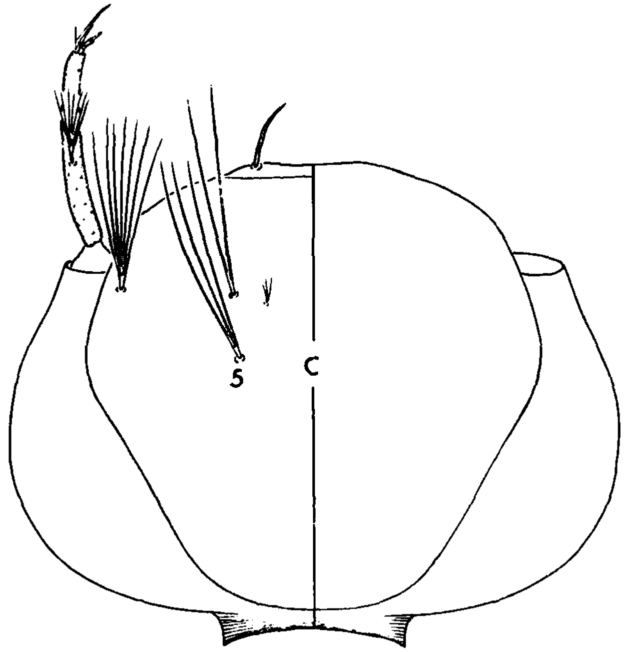


Fig. 778 — *Dorsal view of head - Ae. increpitus*

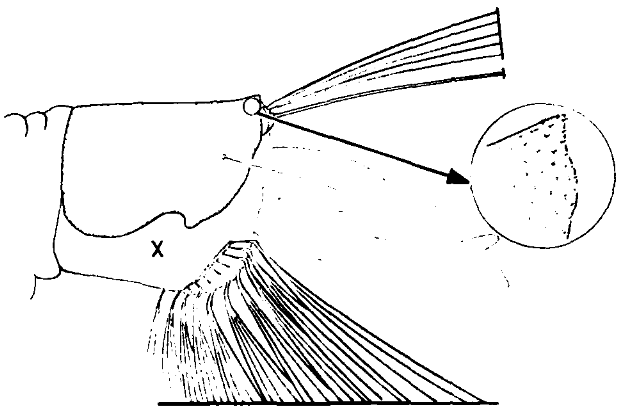


Fig. 776 — *Lateral view of abdominal segment X - Ae. implicatus*

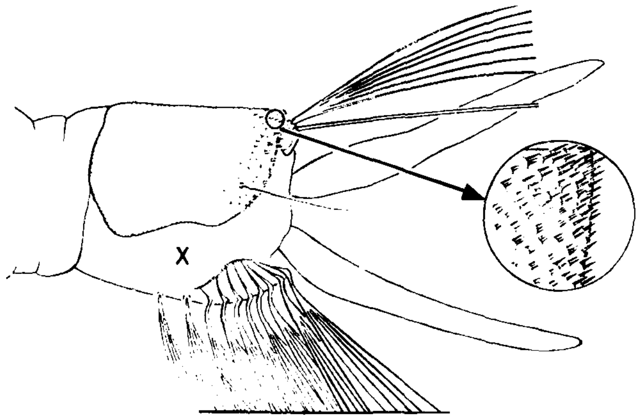


Fig. 779 — *Lateral view of abdominal segment X - Ae. increpitus*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *ANOPHELES*

1. Setae 5-7-C small, single or double (Fig. 780); seta 6 plumose on I-VI (Fig. 781) 2

   Setae 5-7-C large, multibranched, plumose (Fig. 782); seta 6 nonplumose on IV-VI (Fig. 783) 3

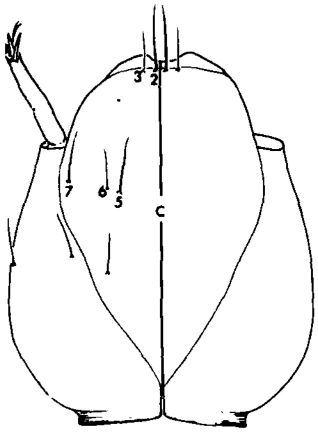


Fig. 780 — *Dorsal view of head - An. judithae*

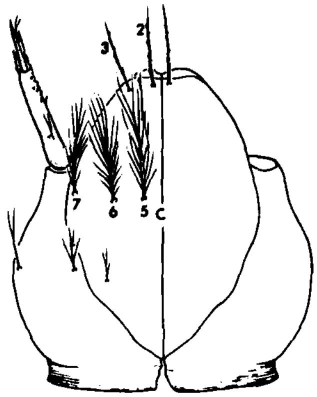


Fig. 782 — *Dorsal view of head - An. albimanus*

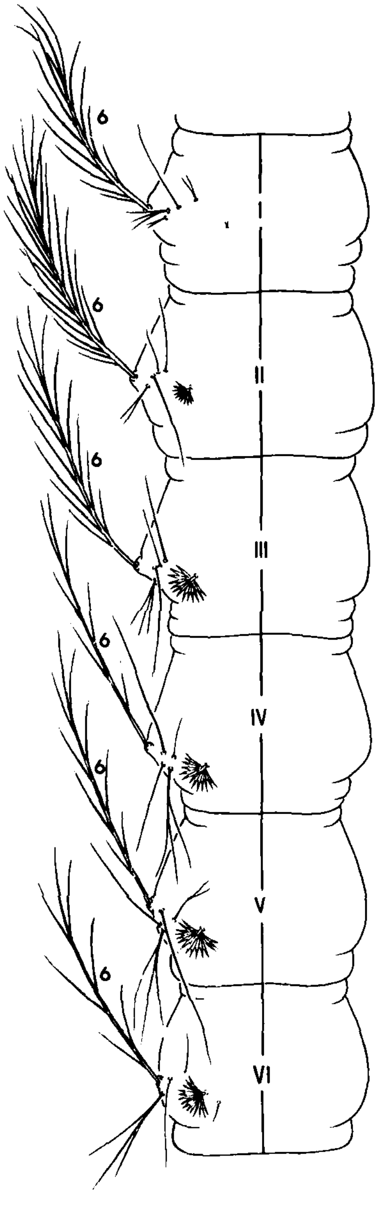


Fig. 781 — *Dorsal view of abdominal segments I-VI - An. judithae*

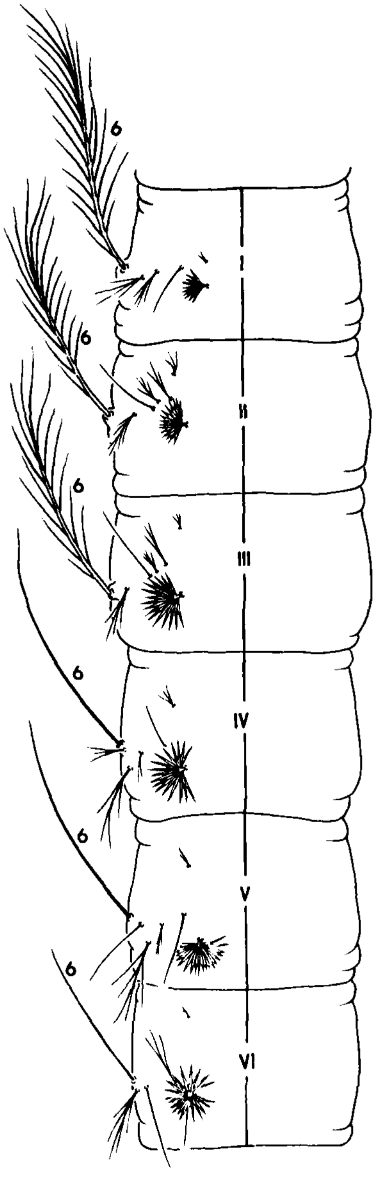


Fig. 783 — *Dorsal view of abdominal segments I-VI - An. albimanus*

2(1). Setae 2-C (inner clypeals) widely separated, closer to setae 3-C (outer clypeals) than to each other (Fig. 784); seta 13-II-V and VII usually 3-branched (Fig. 785) .... *barberi* (Plate 30)

Setae 2-C close together, closer to each other than to setae 3-C (Fig. 786); seta 13-II-V and VII usually single (Fig. 787) .... *judithae* (Plate 30)

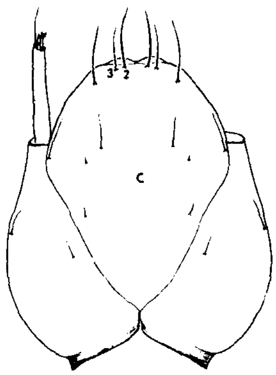


Fig. 784 — *Dorsal view of head - An. barberi*

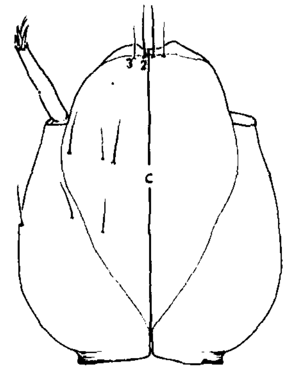


Fig. 786 — *Dorsal view of head - An. judithae*

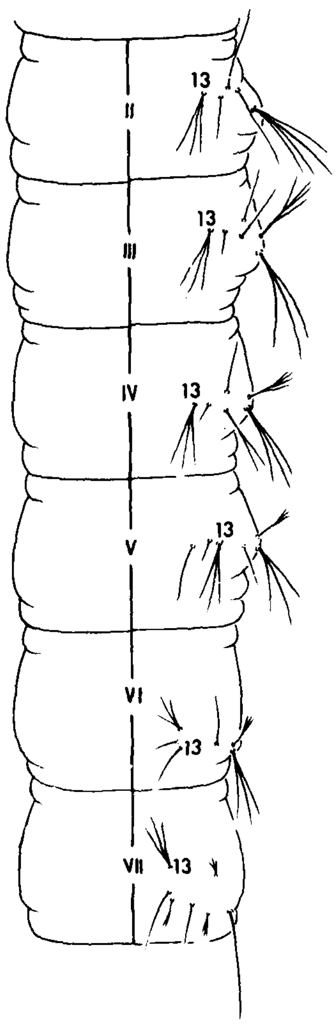


Fig. 785 — *Ventral view of abdominal segments II-VII - An. barberi*

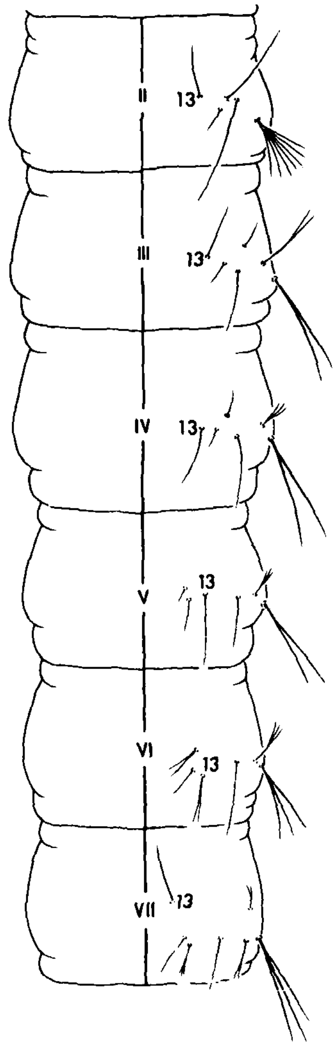


Fig. 787 — *Ventral view of abdominal segments II-VII - An. judithae*

3(1). **Seta 3-C unbranched (Fig. 788)** **4**

Seta 3-C with 5 or more branches (Fig. 789) **6**

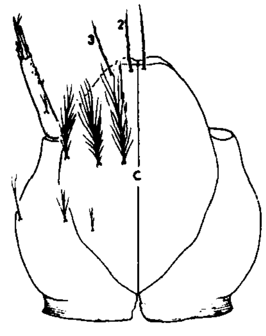


Fig. 788 — *Dorsal view of head - An. albimanus*

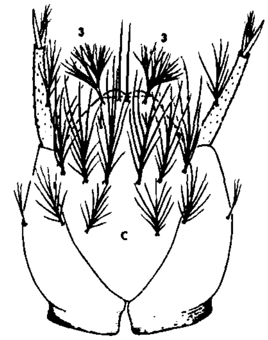


Fig. 789 — *Dorsal view of head - An. quadrimaculatus*

4(3). Seta 1-I-VII palmate, leaflets with margins smooth (Fig. 790); setae 2,3-C aciculate (Fig. 791) .... *albimanus*
(Plate 30)

Seta 1 palmate on III-VII, leaflets with serrate margins (Fig. 792); setae 2,3-C smooth (Fig. 793) 5

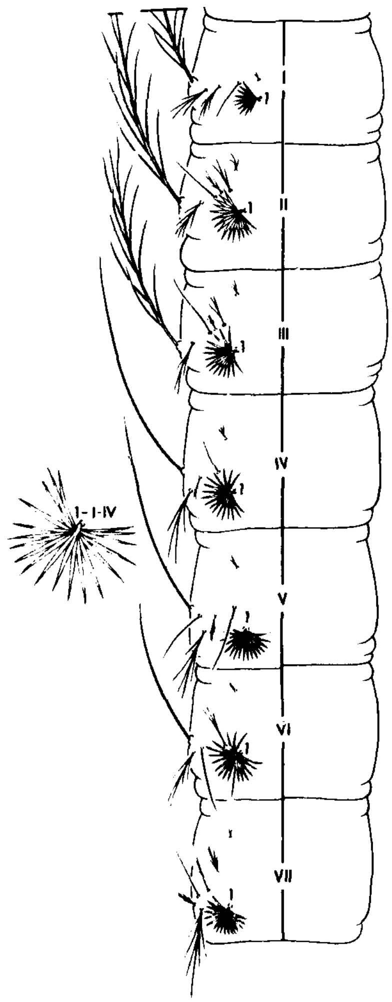


Fig. 790 — *Dorsal view of abdominal segments I-VII - An. albimanus*

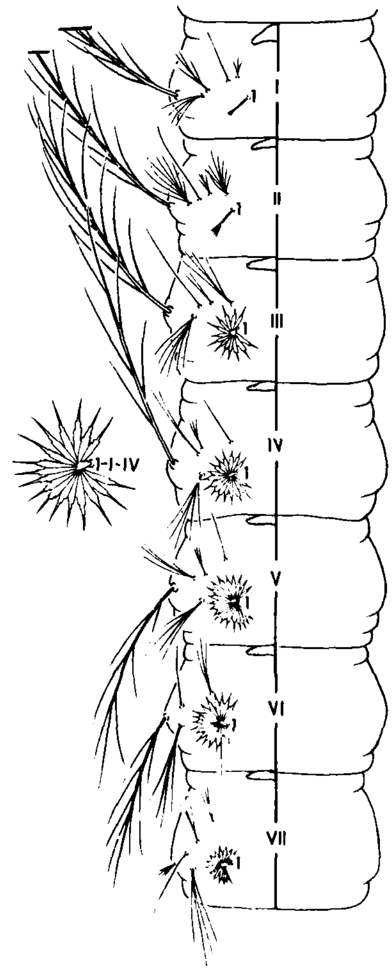


Fig. 792 — *Dorsal view of abdominal segments I-VII - An. pseudopunctipennis*

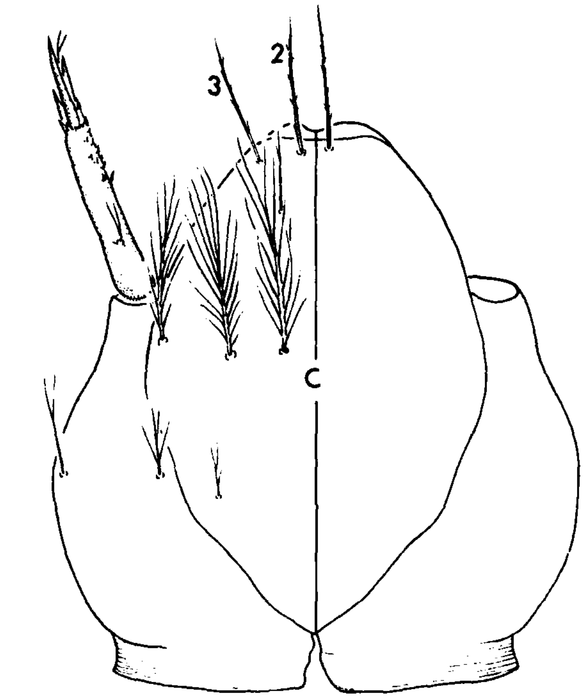


Fig. 791 — *Dorsal view of head - An. albimanus*

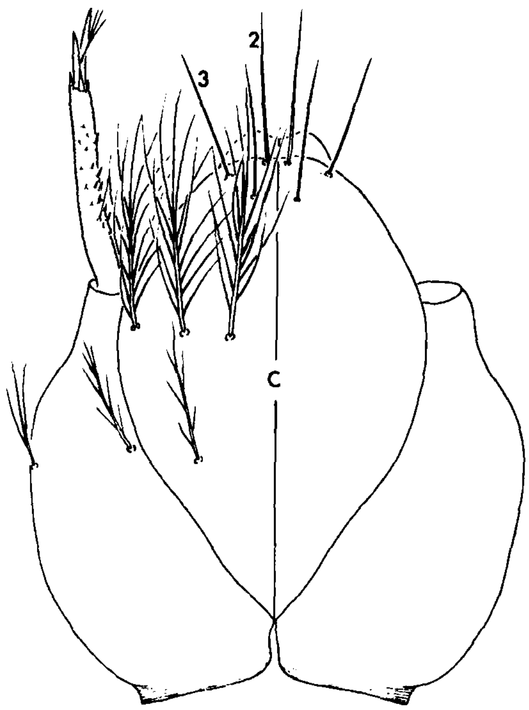


Fig. 793 — *Dorsal view of head - An. pseudopunctipennis*

5(4). Spiracular apparatus with caudal margin of posterolateral spiracular lobe produced into elongated, dark process (Fig. 794); seta 2-IV single (Fig. 795) .... *pseudopunctipennis* (Plate 28)

Spiracular apparatus without elongated process on caudal margin of posterolateral spiracular lobe (Fig. 796); seta 2-IV usually double or triple (Fig. 797) .... *franciscanus* (Plate 28)

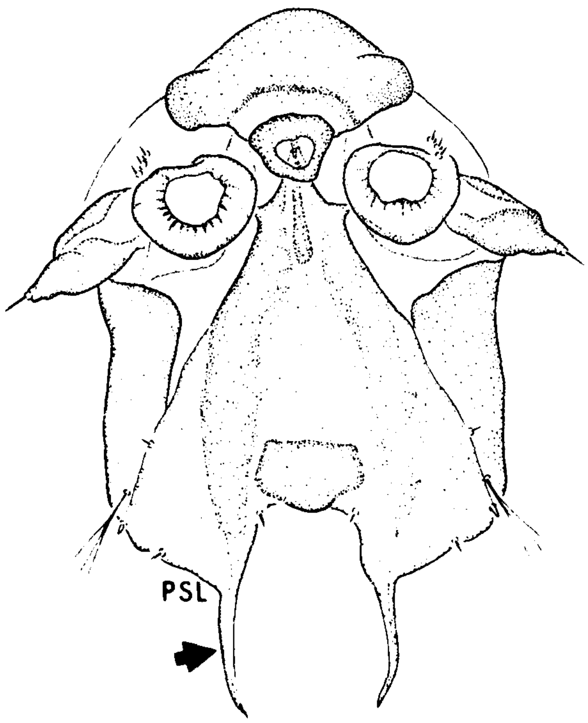


Fig. 794 — *Spiracular apparatus - An. pseudopunctipennis*

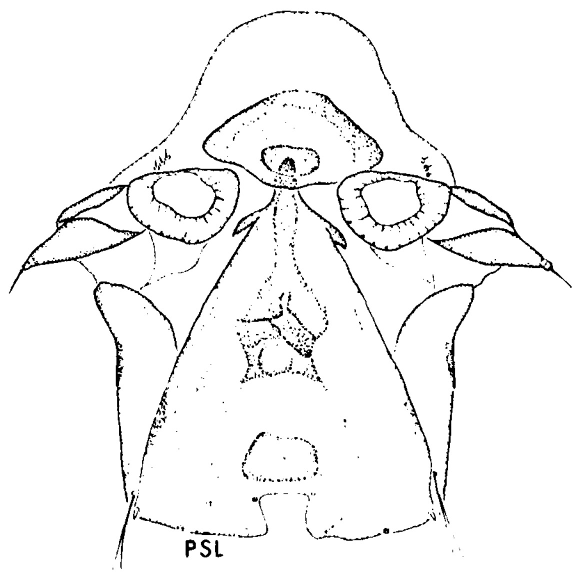


Fig. 796 — *Spiracular apparatus - An. franciscanus*

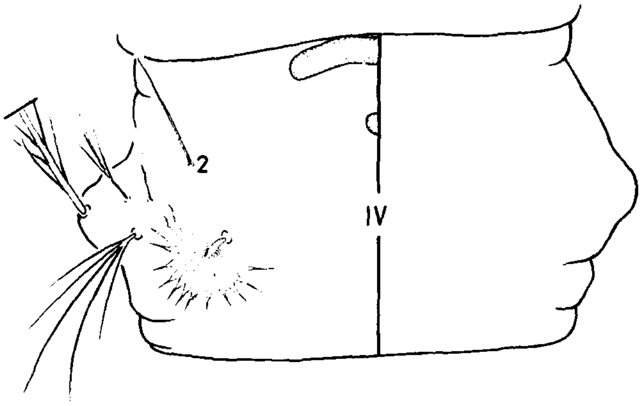


Fig. 795 — *Dorsal view of abdominal segment IV - An. pseudopunctipennis*

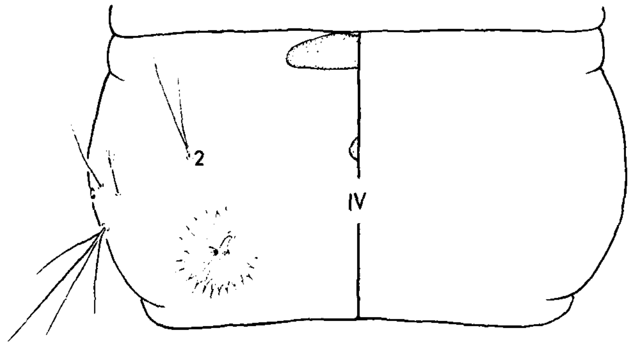


Fig. 797 — *Dorsal view of abdominal segment IV - An. franciscanus*

6(3). Seta 3-C with fewer than 11 branches (Fig. 798) .... *atropos* (Plate 28)

Seta 3-C dentritic, densely branched (Fig. 799) 7

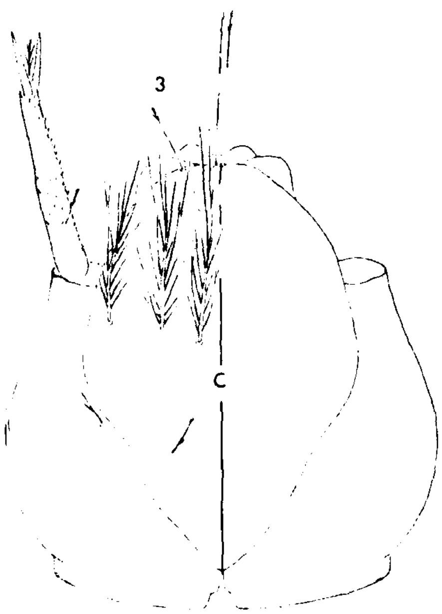


Fig. 798 — *Dorsal view of head - An. atropos*

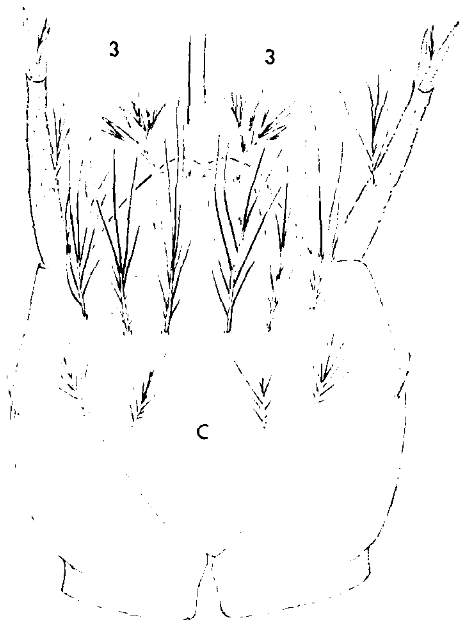


Fig. 799 — *Dorsal view of head - An. quadrimaculatus*

7(6). Seta 0 well developed on IV,V, with 4 or more branches, about equal in size to 2-IV,V (Fig. 800) .... *crucians* (Plate 31)

Seta 0 minute on IV,V, single to triple, much smaller than 2-IV,V (Fig. 801) 8

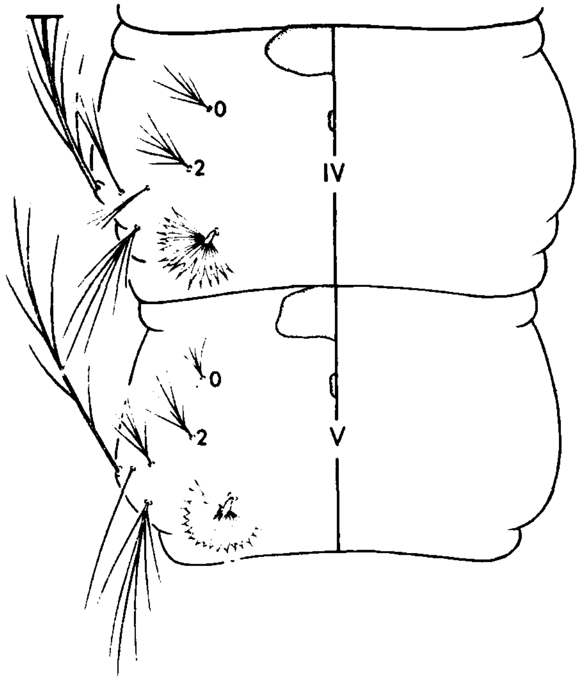


Fig. 800 — *Dorsal view of abdominal segments IV-V - An. crucians*

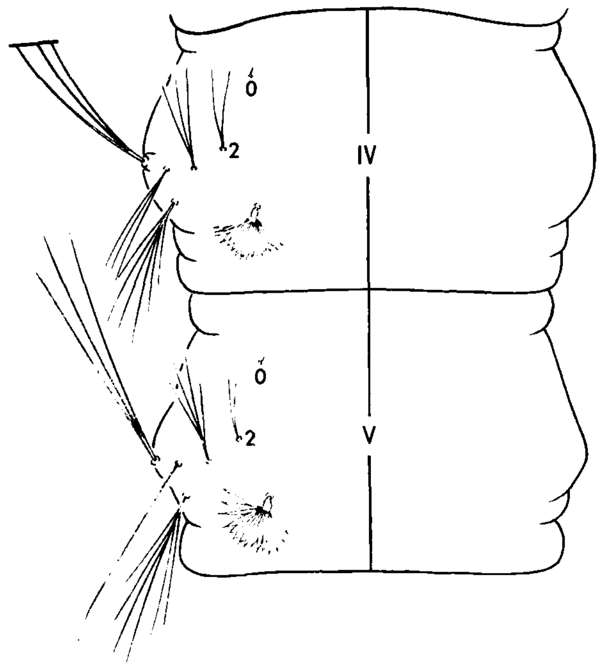


Fig. 801 — *Dorsal view of abdominal segments IV-V - An. punctipennis*

8(7) Seta 2-C simple, sparsely aciculate toward apex (Fig. 802); seta 1-P with 3-5 strong branches from near base (Fig. 803) .... *walkeri* (Plate 28)

Seta 2-C simple or forked in outer 0.5, without aciculae (Fig. 804); seta 1-P weak, single or branches in outer 0.5 only (Fig. 805) 9

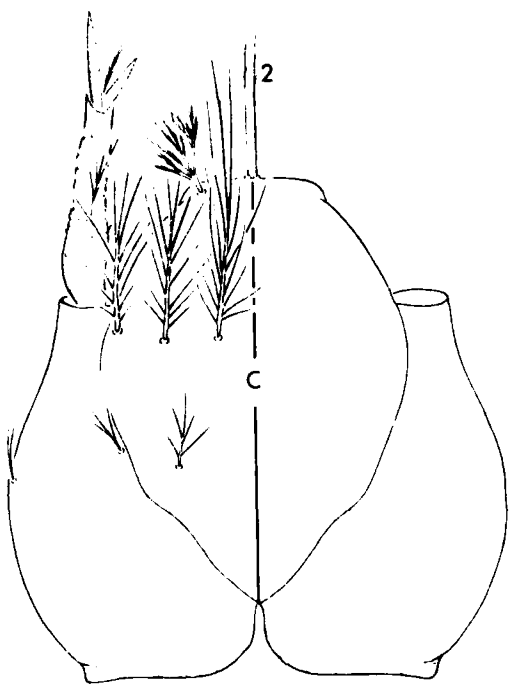


Fig. 802 — *Dorsal view of head - An. walkeri*

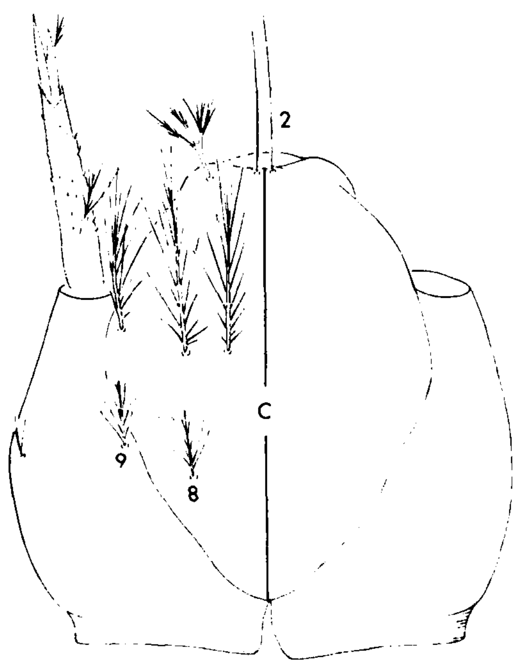


Fig. 804 — *Dorsal view of head - An. quadrimaculatus*

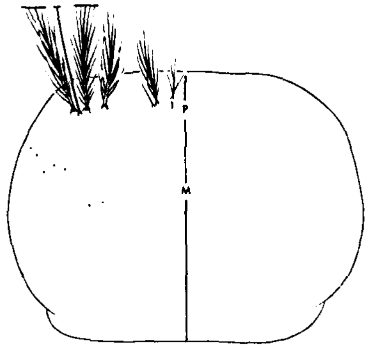


Fig. 803 — *Dorsal view of thorax - An. walkeri*

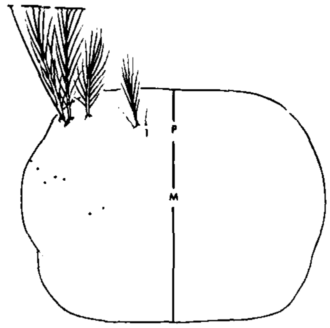


Fig. 805 — *Dorsal view of thorax - An. quadrimaculatus*

9(8). Seta 1-IV-VI fully palmate, 1-III and VII not more than 0.7 as large, leaflets usually with marginal serrations fine (Fig. 806) 10

Seta 1-III-VII fully palmate, apical 0.5 of leaflets with coarse marginal serrations (Fig. 807) 11

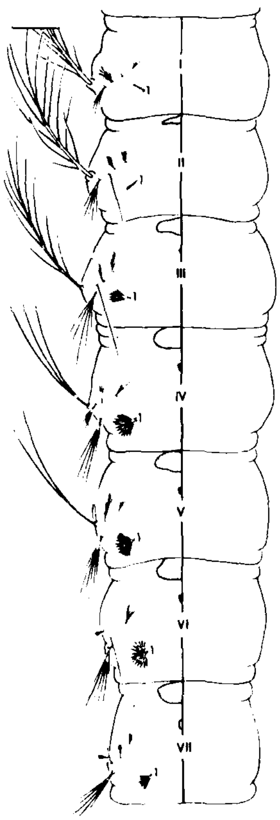


Fig. 806 — *Dorsal view of abdominal segments I-VII - An. bradleyi*

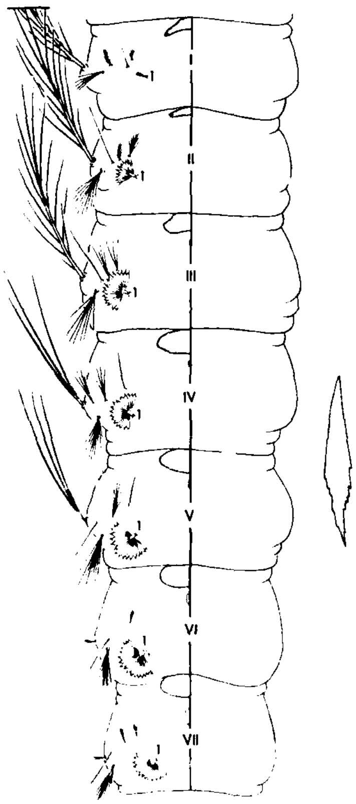


Fig. 807 — *Dorsal view of abdominal segments I-VII - An. quadrimaculatus*

10(9). Seta 1-III better developed palmate seta than 1-I (Fig. 808); seta 5-II usually with fewer than 9 branches (Fig. 809) .... *bradleyi*
(Plate 29)

Seta 1-III not much better developed palmate seta than 1-I (Fig. 810); seta 5-II with 9 or more branches (Fig. 811) .... *georgianus*
(Plate 30)

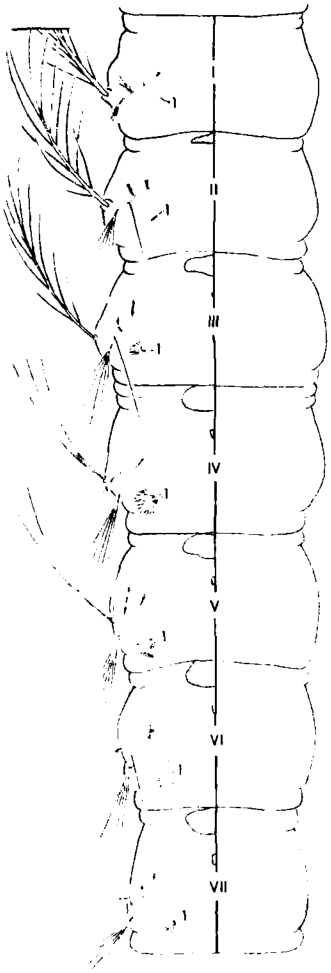


Fig. 808 — *Dorsal view of abdominal segments I-VII - An. bradleyi*

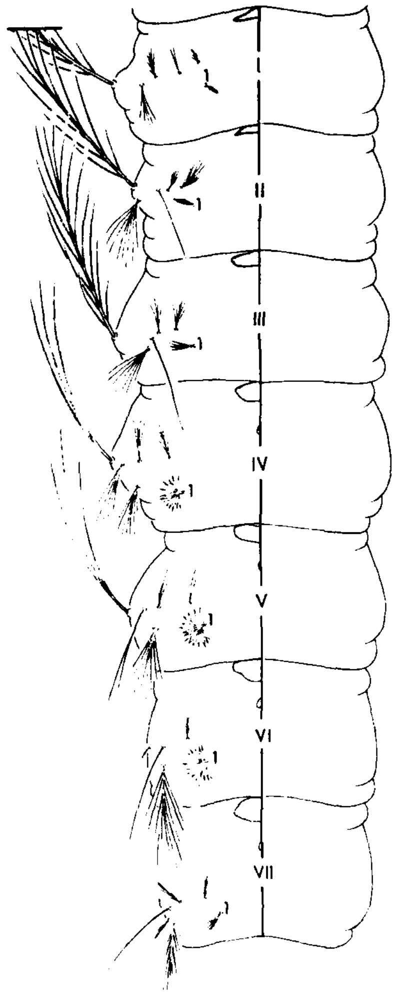


Fig. 810 — *Dorsal view of abdominal segments I-VII - An. georgianus*

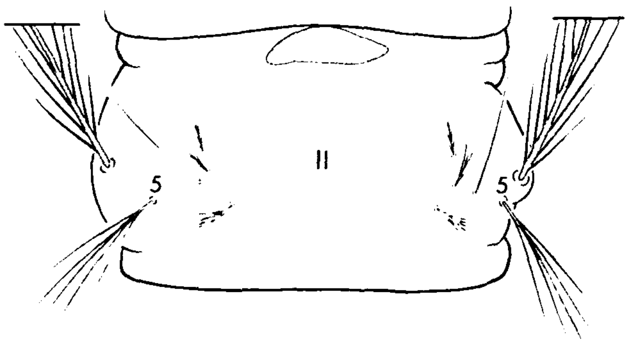


Fig. 809 — *Dorsal view of abdominal segment II - An. bradleyi*

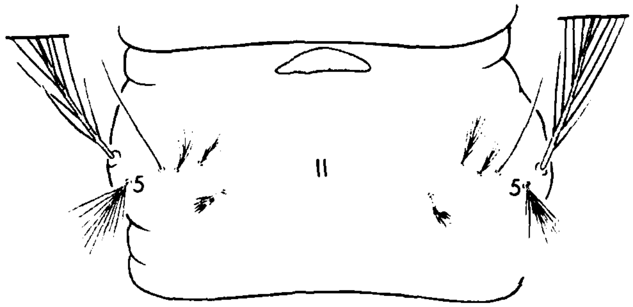


Fig. 811 — *Dorsal view of abdominal segment II - An. georgianus*

11(9). Seta 2-C usually with 2-5 branches in outer 0.5 (Fig. 812) .... *earlei* (Plate 28)

Seta 2-C simple (Fig. 813) 12

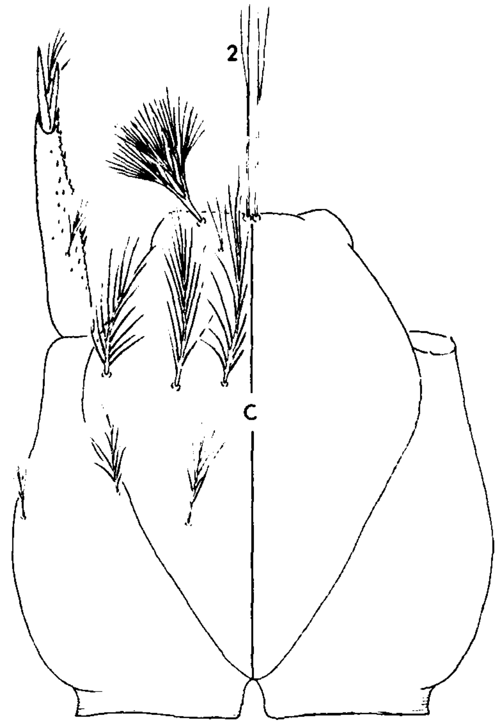


Fig. 812 — *Dorsal view of head An. earlei*

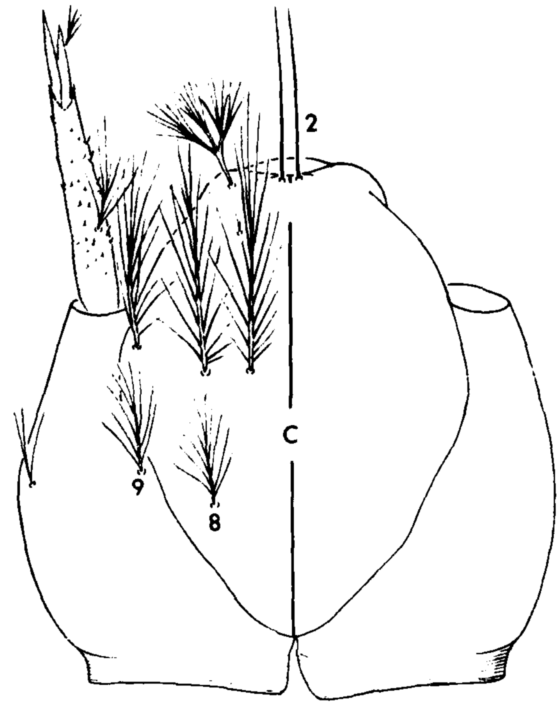


Fig. 813 — *Dorsal view of head - An. quadrimaculatus*

12(11). Alveoli of setae 2-C separated by more than diameter of one alveolus; setae 8 , 9-C large, usually with 8-10 branches (Fig. 814) .... *quadrimaculatus* (Plate 31)

Alveoli of setae 2-C closer together than diameter of one alveolus; setae 8 , 9-C smaller, usually with 5-7 branches (Fig. 815) 13

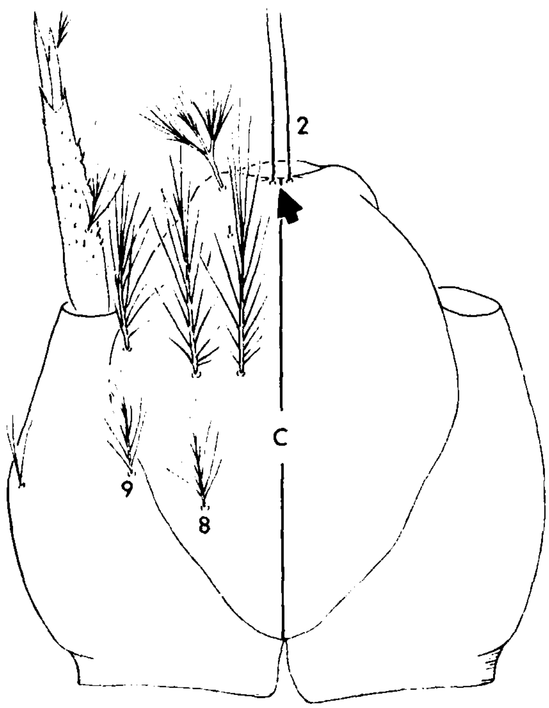


Fig. 814 — *Dorsal view of head - An. quadrimaculatus*

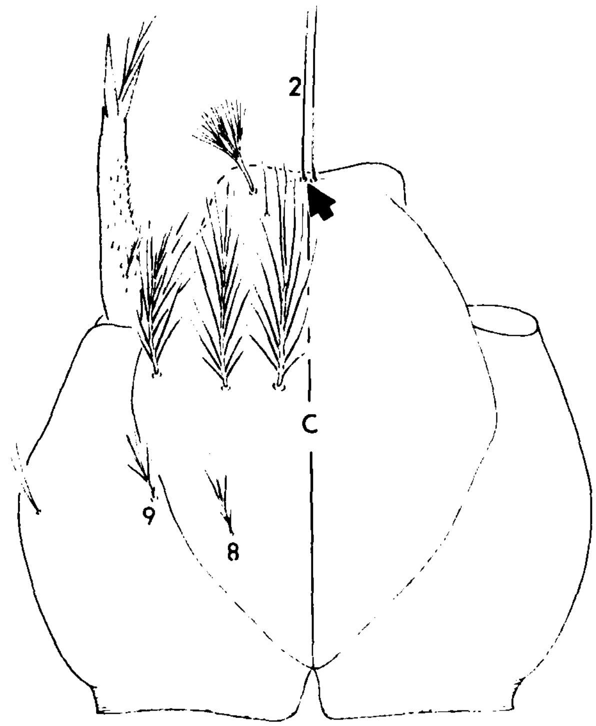


Fig. 815 — *Dorsal view of head - An. punctipennis*

13(12). Setae 2-IV,V usually single (Fig. 816) .... *occidentalis*
(in part) ***perplexens***
(Plates 30, 29)

Setae 2-IV,V usually double or triple (Fig. 817) 14

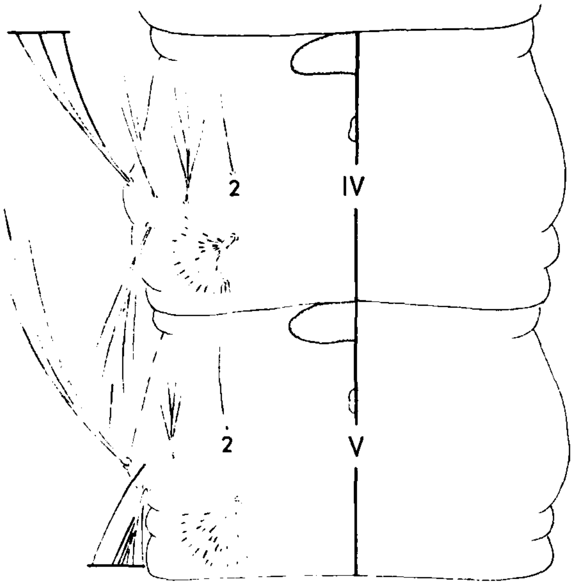


Fig. 816 — *Dorsal view of abdominal segments IV-V - An. occidentalis*

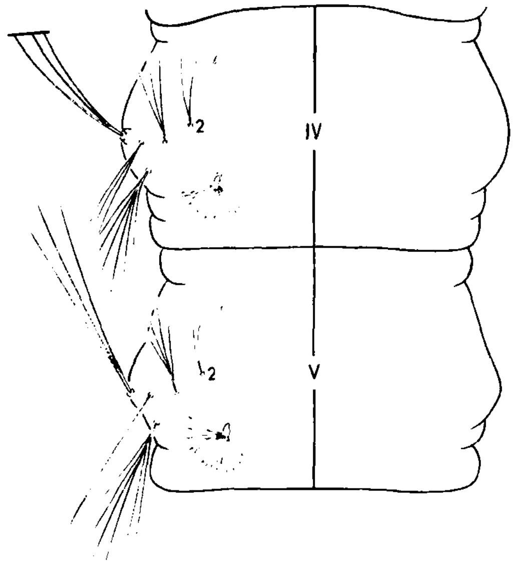


Fig. 817 — *Dorsal view of abdominal segments IV-V- An. punctipennis*

14(13). Segments IV-VI with 3 small, accessory, tergal plates (Fig. 818); seta 1-A attached at or distal to basal 0.33 of antenna; dorsal apotome with integument spotted (Fig. 819) .... *freeborni*
(Plate 31)

Only 1 accessory, tergal plate on IV-VI (Fig. 820); seta 1-A attached within basal 0.33 of antenna; dorsal apotome with integument irregularly banded (Fig. 821) .... *punctipennis*
(in part) *perplexens*
(Plate 29)

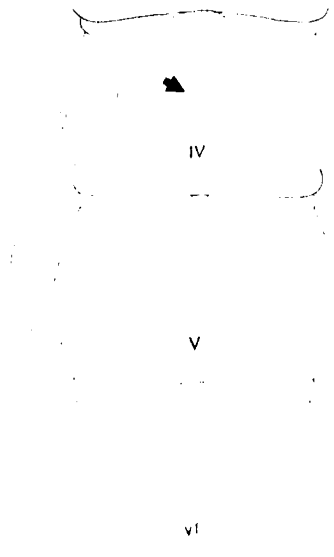


Fig. 818 — *Dorsal view of abdominal segments IV-VI - An. freeborni*

Fig. 820 — *Dorsal view of abdominal segments IV-VI - An. punctipennis*

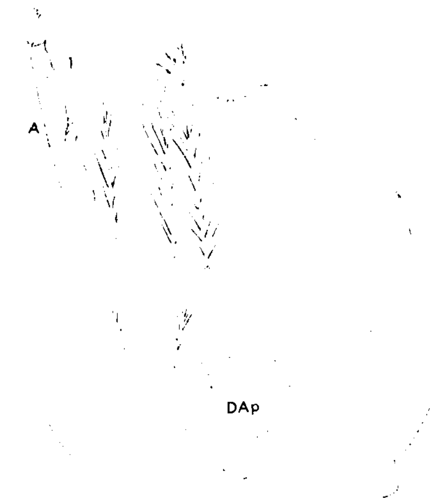


Fig. 819 — *Dorsal view of head - An. freeborni*

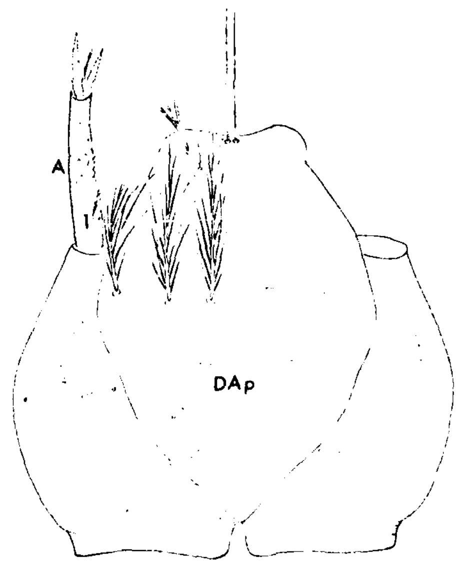


Fig. 821 — *Dorsal view of head - An. punctipennis*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *CULEX*

1. Seta 6-C with 3 or more branches (Fig. 822)(subgenus *Culex*) 2

   Seta 6-C single or double (Fig. 823) 14

Fig. 822 — *Dorsal view of head - Cx. pipiens*

Fig. 823 — *Dorsal view of head - Cx. territans*

2(1). Siphon aciculate, with larger aciculae apically (Fig. 824); segment X with 2 anal papillae (Fig. 825) .... *bahamensis* (Plate 25)

   Siphon not aciculate (Fig. 826); segment X with 4 anal papillae (Fig. 827) 3

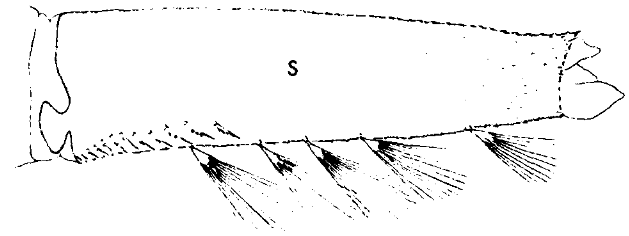


Fig. 824 — *Lateral view of siphon - Cx. bahamensis*

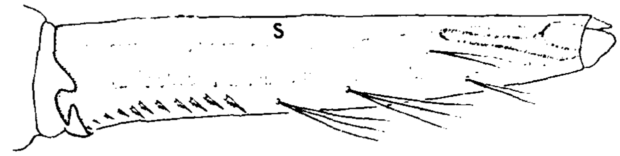


Fig. 826 — *Lateral view of siphon - Cx. pipiens*

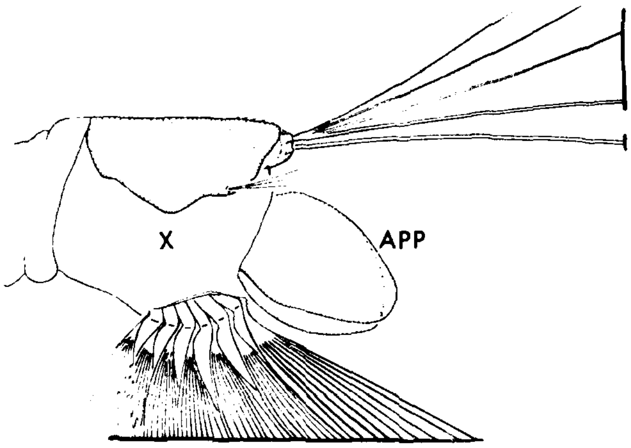


Fig. 825 — *Lateral view of abdominal segment X - Cx. bahamensis*

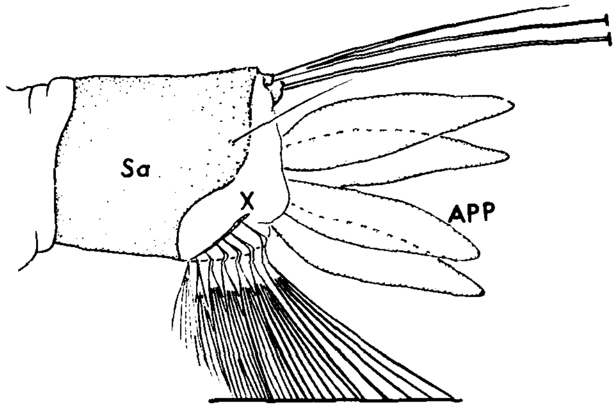


Fig. 827 — *Lateral view of abdominal segment X - Cx. pipiens*

3(2). Pecten reaching distal 0.75 of siphon, apical 4,5 spines large (Fig. 828) .... *interrogator* (Plate 32)

Pecten confined to basal 0.33 of siphon, spines not unusually large (Fig. 829); 4

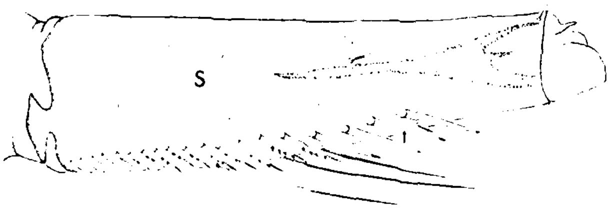


Fig. 828 — *Lateral view of siphon - Cx. interrogator*

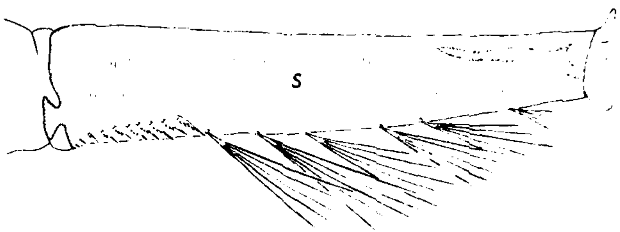


Fig. 829 — *Lateral view of siphon - Cx. tarsalis*

4(3). Siphon setae long, irregularly placed, mostly single (Fig. 830) 5

Siphon setae placed lineally, sometimes with 1,2 pairs dorsally out of line, mostly branched (Fig. 831) 6

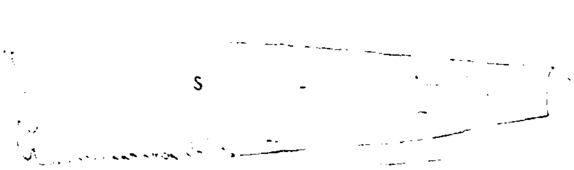


Fig. 830 — *Lateral view of siphon - Cx. restuans*

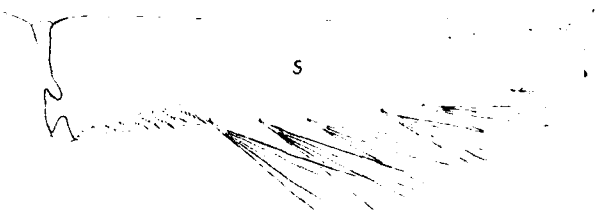


Fig. 831 — *Lateral view of siphon - Cx. tarsalis*

5(4). Antenna not markedly constricted distally, seta 1-A attached near middle (Fig. 832) .... *restuans* (Plate 38)

Seta 1-A attached at constriction in outer 0.33 of antenna, distal part more slender (Fig. 833) .... *thriambus* (Plate 39)

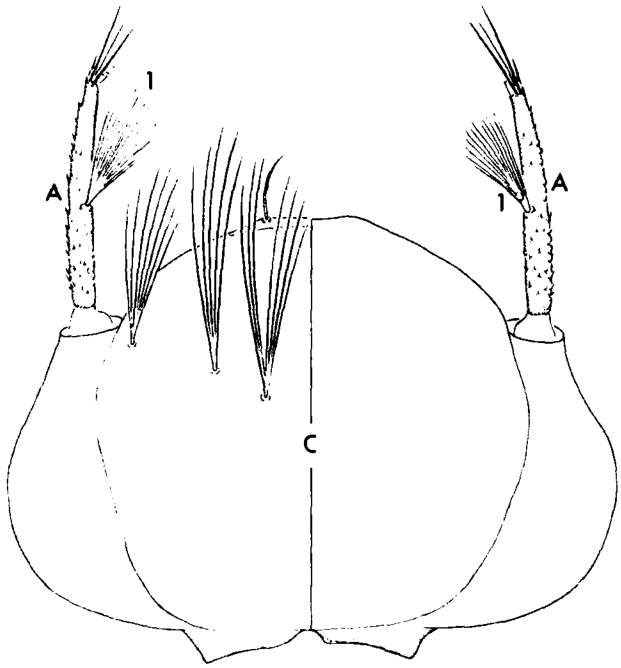


Fig. 832 — *Dorsal view of antenna - Cx. restuans*

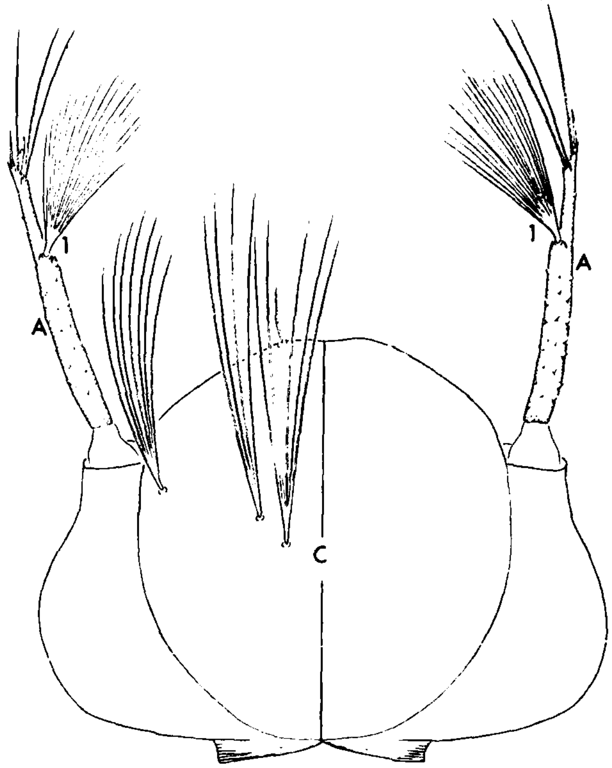


Fig. 833 — *Dorsal view of antenna - Cx. thriambus*

6(4). Siphon with several spines near apex (Fig. 834) .... *coronator* (Plate 35)

Siphon without spines near apex (Fig. 835) 7

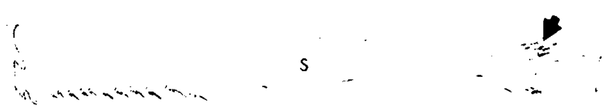


Fig. 834 — *Lateral view of siphon - Cx. coronator*

Fig. 835 — *Lateral view of siphon - Cx. tarsalis*

7(6). Siphon with setae in straight line, usually with 5-9 pairs (Fig. 836) 8

Siphon with 3-5 pairs of setae not all in straight line, 1,2 pairs dorsally out of line (Fig. 837) 9

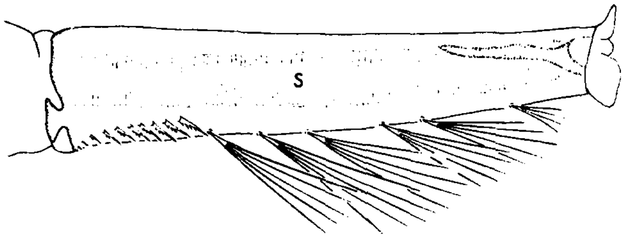


Fig. 836 — *Lateral view of siphon - Cx. tarsalis*

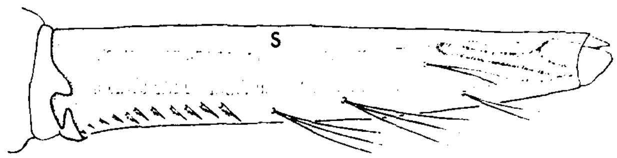


Fig. 837 — *Lateral view of siphon - Cx. pipiens*

8(7). Siphon index 4.5-5.5, usually with 5 pairs of setae (Fig. 838) .... *tarsalis* (Plate 34)

Siphon index 8.0 or more, with 6-9 pairs of setae (Fig. 839) .... *chidesteri* (Plate 34)

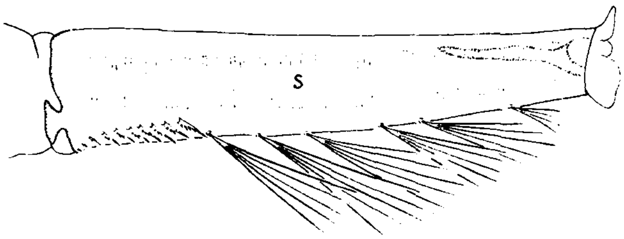


Fig. 838 — *Lateral view of siphon - Cx. tarsalis*

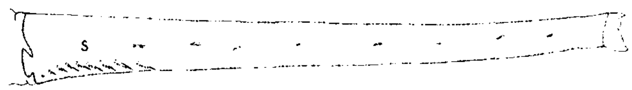


Fig. 839 — *Lateral view of siphon - Cx. chidesteri*

9(7). Siphon with 3 pairs of setae (Fig. 840) .... *declarator* (Plate 36)

Siphon with 4,5 pairs of setae (Fig. 841) 10

Fig. 840 — *Lateral view of siphon - Cx. declarator*

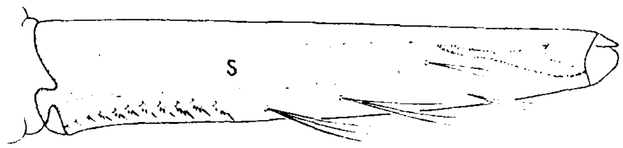


Fig. 841 — *Lateral view of siphon - Cx. pipiens*

10(9). Siphon index 4.0-5.0 (Fig. 842) 11

Siphon index 6.0-8.0 (Fig. 843) 12

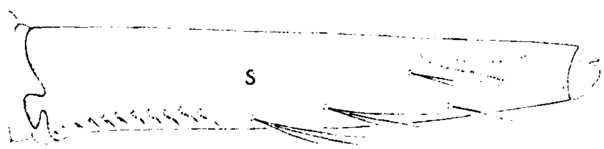


Fig. 842 — *Lateral view of siphon - Cx. pipiens*

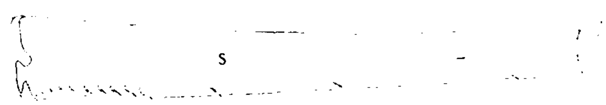


Fig. 843 — *Lateral view of siphon - Cx. salinarius*

11(10). Aciculae on dorsoposterior aspect of saddle much larger than those at dorsal middle (Fig. 844); seta 6-III,IV usually triple (Fig. 845) .... *peus* (Plate 37)

Aciculae on dorsoposterior aspect of saddle not much larger than those at dorsal middle (Fig. 846); seta 6-III,IV usually single or double (Fig. 847) .... *pipiens quinquefasciatus* (Plate 36)

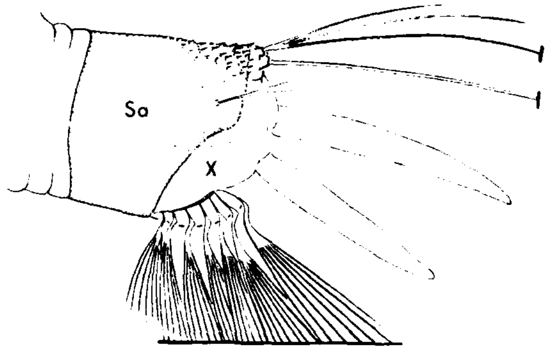


Fig. 844 — *Lateral view of abdominal segment X - Cx. peus*

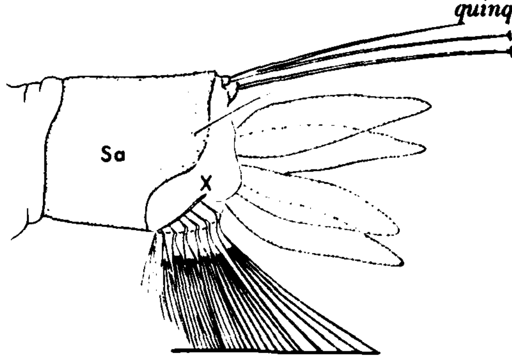


Fig. 846 — *Lateral view of abdominal segment X - Cx. pipiens*

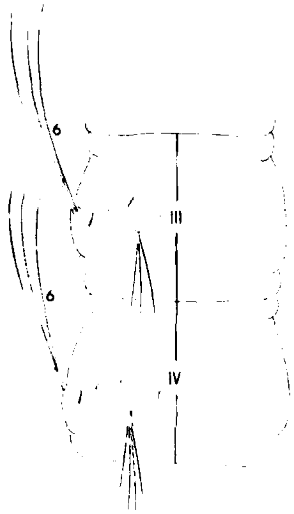


Fig. 845 — *Dorsal view of abdominal segments III-IV - Cx. peus*

Fig. 847 — *Dorsal view of abdominal segment III-IV - Cx. pipiens*

12(10). Thoracic integument with fine aculeae; seta 1-M subequal to 2-M (Fig. 848); seta 1-X single (Fig. 849) .... *nigripalpus* (Plate 37)

Thoracic integument glabrous; seta 1-M much longer than 2-M (Fig. 850); seta 1-X usually double (Fig. 851) 13

Fig. 848 — *Dorsal view of thorax - Cx. nigripalpus*

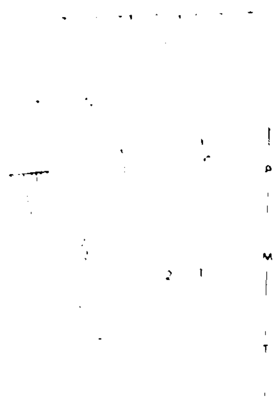


Fig. 850 — *Dorsal view of thorax - Cx. salinarius*

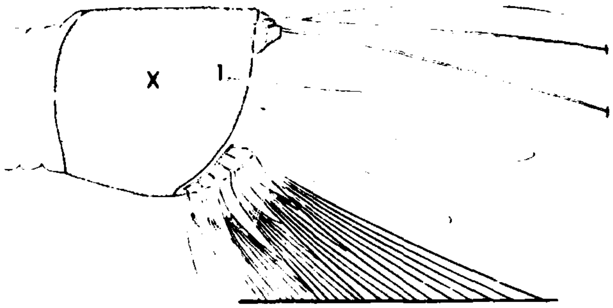


Fig. 849 — *Lateral view of abdominal segment X - Cx. nigripalpus*

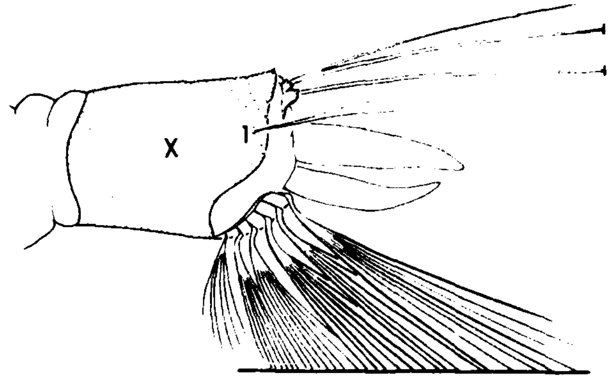


Fig. 851 — *Lateral view of abdominal segment X - Cx. salinarius*

13(12). Siphon usually with 5 pairs of setae, most often 2 pairs dorsally out of line (Fig. 852) . . . *erythrothorax* (Plate 34)

Siphon usually with 4 pairs of setae, only 1 pair dorsally out of line (Fig. 853) . . . . *salinarius* (Plate 35)

Fig. 852 — *Lateral view of siphon - Cx. erythrothorax*

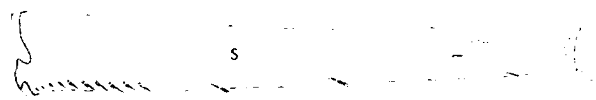


Fig. 853 — *Lateral view of siphon - Cx. salinarius*

14(1). Pecten spines without lateral denticles (Fig. 854); seta 4-A much shorter than 2, 3-A (Fig. 855)(subgenus *Tinolestes*) . . . . *latisquama* (Plate 24)

Pecten spines with lateral denticles (Fig. 856); seta 4-A about as long as 2,3-A (Fig. 857) 15

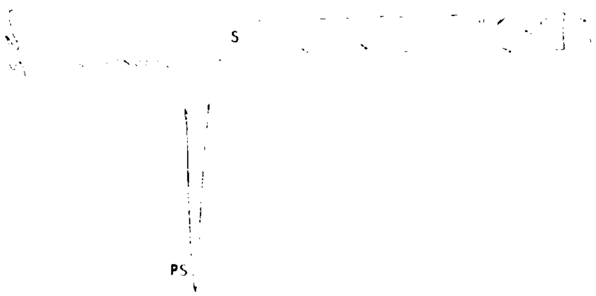


Fig. 854 — *Lateral view of siphon - Cx. latisquama*

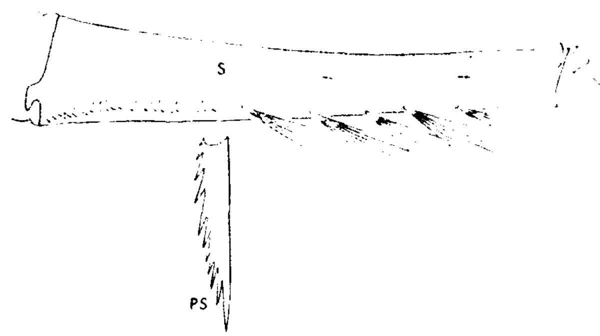


Fig. 856 — *Lateral view of siphon - Cx. peccator*

Fig. 855 — *Dorsal view of head - Cx. latisquama*

Fig. 857 — *Dorsal view of head - Cx. peccator*

15(14). Pecten spines with 1-4 lateral denticles; seta 2-S straight; siphon without subdorsal setae (Fig. 858)(subgenus *Neoculex*) 16

Pecten spines with 10 or more denticles; seta 2-S strongly curved; siphon with 1 or more pairs of subdorsal setae (Fig. 859)(subgenus *Melanoconion*) 20

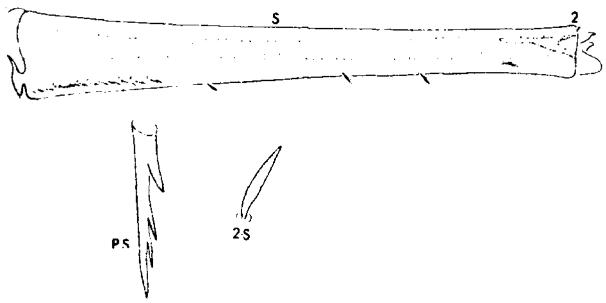


Fig. 858 — *Lateral view of siphon - Cx. territans*

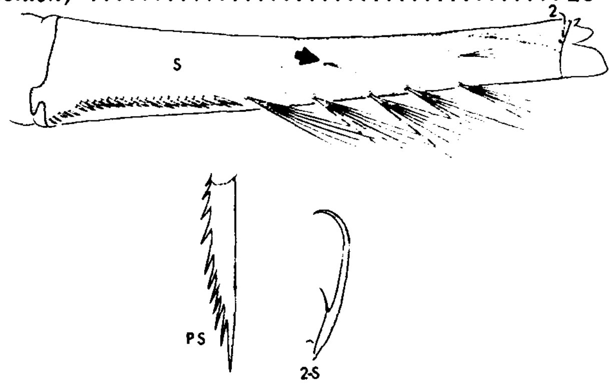


Fig. 859 — *Lateral view of siphon - Cx. peccator*

16(15). Setae 5 , 6-C about equal in length, double (Fig. 860); seta 1a-S about 1.5 longer than distance from its alveolus to base of siphon (Fig. 861) .... *arizonensis* (Plate 32)

Seta 6-C longer than 5-C, usually not both double (Fig. 862); seta 1a-S not more than 1.2 longer than distance from its alveolus to base of siphon (Fig. 863) 17

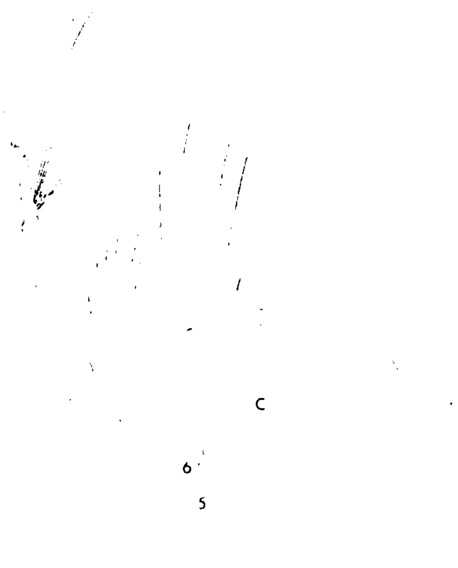


Fig. 860 — *Dorsal view of head - Cx. arizonensis*

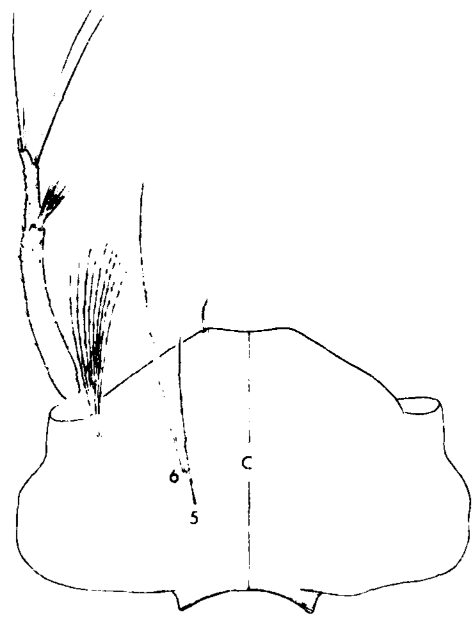


Fig. 862 — *Dorsal view of head - Cx. territans*

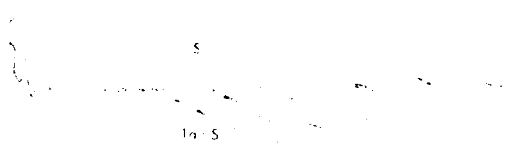


Fig. 861 — *Lateral view of siphon - Cx. arizonensis*

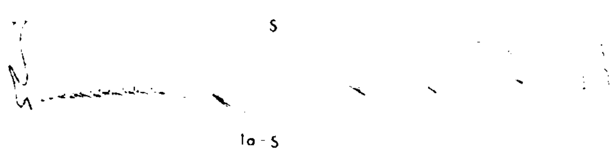


Fig. 863 — *Lateral view of siphon - Cx. territans*

17(16). Siphon 6.0-8.0 longer than basalmost seta, index 7.0-9.0 (Fig. 864) .... *apicalis* (Plate 33)

Siphon less than 6.0 longer than basalmost seta, index usually less than 7.0 (Fig. 865) 18

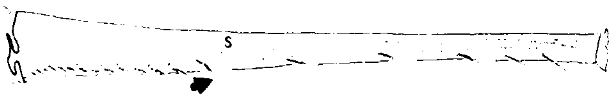


Fig. 864 — *Lateral view of siphon - Cx. apicalis*

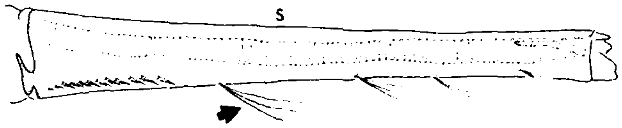


Fig. 865 — *Lateral view of siphon - Cx. territans*

18(17). Seta 5-C with 3 branches, seta 6-C double (Fig. 866) .... *reevesi* (Plate 33)

Seta 5-C single or double, seta 6-C usually single (Fig. 867) 19

Fig. 866 — *Dorsal view of head - Cx. reevesi*

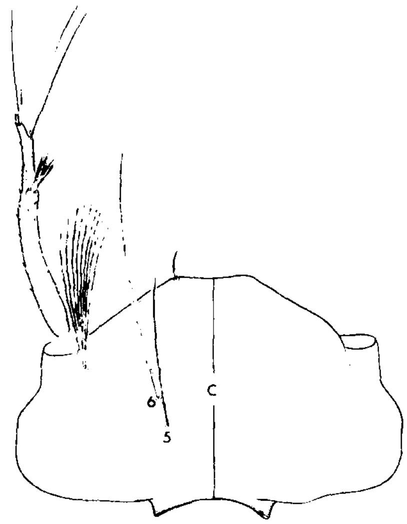


Fig. 867 — *Dorsal view of head - Cx. territans*

19(18). Seta 5-C single, occasionally double or triple (Fig. 868); abdominal segments III-V evenly pigmented (Fig. 869) .... *territans* (Plate 33)

Seta 5-C double, rarely triple (Fig. 870); abdominal segments III and V more darkly pigmented than IV (Fig. 871) .... *boharti* (Plate 35)

Fig. 868 — *Dorsal view of head - Cx. territans*

Fig. 870 — *Dorsal view of head - Cx. boharti*

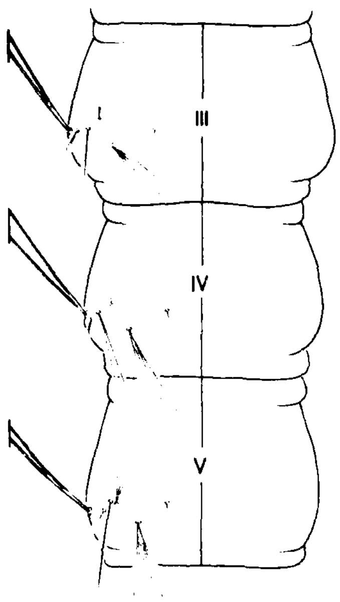


Fig. 869 — *Dorsal view of abdominal segments III-V - Cx. territans*

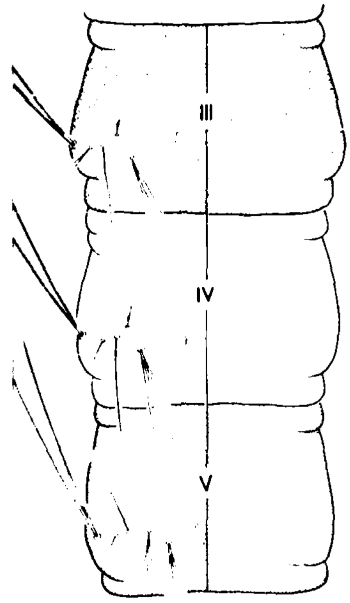


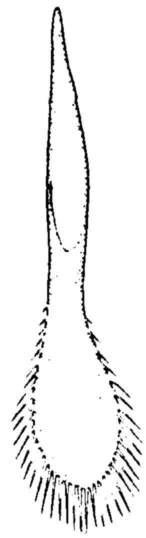
Fig. 871 — *Dorsal view of abdominal segments III-V - Cx. boharti*

20(15). At least some comb scales with large, median spine (Fig. 872) 21

All comb scales evenly fringed with subequal spinules (Fig. 873) 22

CS

Fig. 872 — *Comb scale - Cx. pilosus*



CS

Fig. 873 — *Comb scale - Cx. atratus*

21(20). Siphon distinctly curved, index 4.5 or less, distalmost seta very near apex (Fig. 874) .... *pilosus* (Plate 32)

Siphon only slightly curved, if at all, index 6.0 or more, distalmost seta not near apex (Fig. 875) .... *erraticus* (Plate 37)

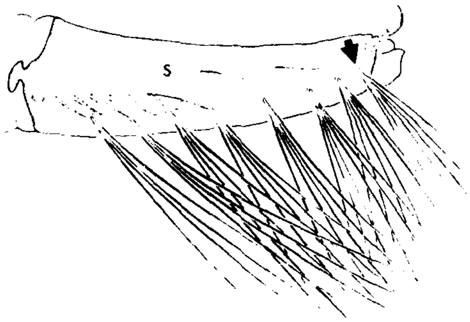


Fig. 874 — *Lateral view of siphon - Cx. pilosus*

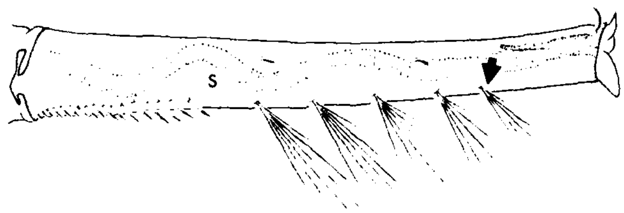


Fig. 875 — *Lateral view of siphon - Cx. erraticus*

22(20). Siphon index more than 7.0 (Fig. 876) 23

Siphon index 7.0 or less (Fig. 877) 24

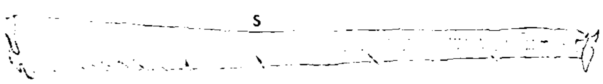


Fig. 876 — *Lateral view of siphon - Cx. opisthopus*

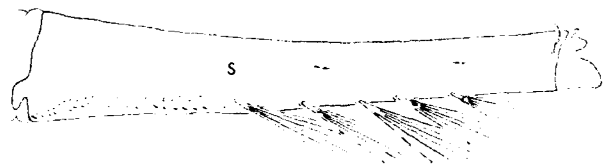


Fig. 877 — *Lateral view of siphon - Cx. peccator*

23(22). Seta 7-I double (Fig. 878); saddle not aciculate dorsoposteriorly (Fig. 879) .... *opisthopus* (Plate 36)

Seta 7-I single (Fig. 880); saddle with large aciculae dorsoposteriorly (Fig. 881) .... *atratus* (Plate 34)

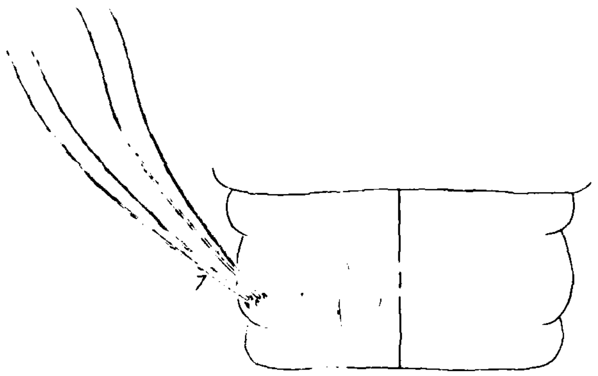


Fig. 878 — *Ventral view of abdominal segment I - Cx. opisthopus*

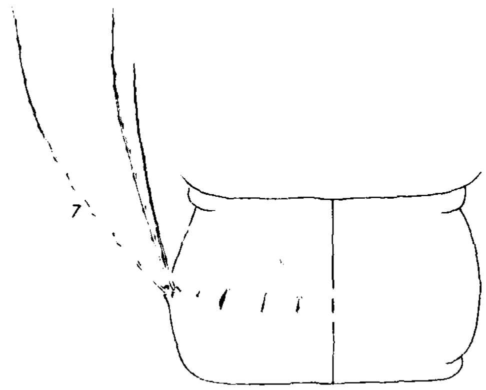


Fig. 880 — *Ventral view of abdominal segment I - Cx. atratus*

Fig. 879 — *Lateral view of saddle - Cx. opisthopus*

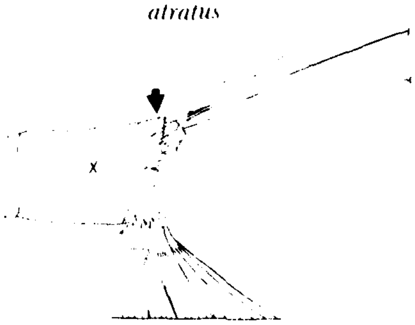


Fig. 881 — *Lateral view of saddle - Cx. atratus*

24(22). Comb scale short, the fringed apical portion about length of basal portion, no elongation in middle (Fig. 882) . . . . *abominator*
(Plate 32)

Comb scale long, with a narrow elongation in middle between base and apical fringed portion (Fig. 883) 25

Fig. 882 — *Comb scale - Cx. abominator*

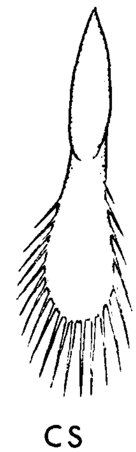


Fig. 883 — *Comb scale - Cx. iolambdis*

25(24). Seta 5-C thin, much thinner and 0.5 or less length of seta 6-C, without aciculae (Fig. 884) 26

Seta 5-C stout, about 0.75 length of 6-C, lightly aciculate (Fig. 885) 27

Fig. 884 — *Dorsal view of head - Cx. peccator*

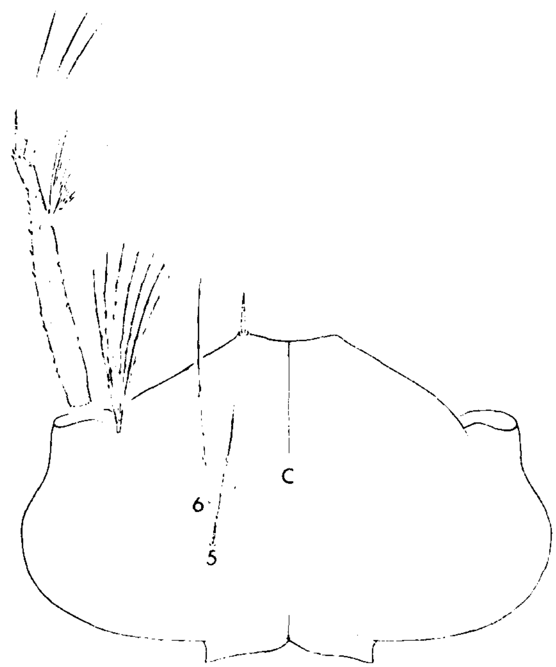


Fig. 885 — *Dorsal view of head - Cx. iolambdis*

26(25). Seta 2-S without secondary tooth; pecten spine with 15 or more fine, lateral denticles (Fig. 886) . . . . *anips*
(Plate 32)

Seta 2-S with secondary tooth; pecten spine with fewer than 12 coarser, lateral denticles (Fig. 887) . . . . *peccator*
(Plate 38)

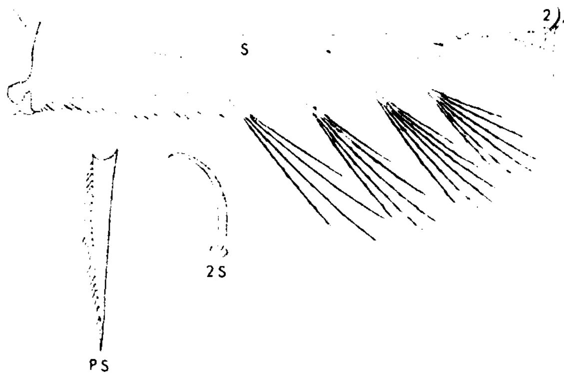


Fig. 886 — *Lateral view of siphon - Cx. anips*

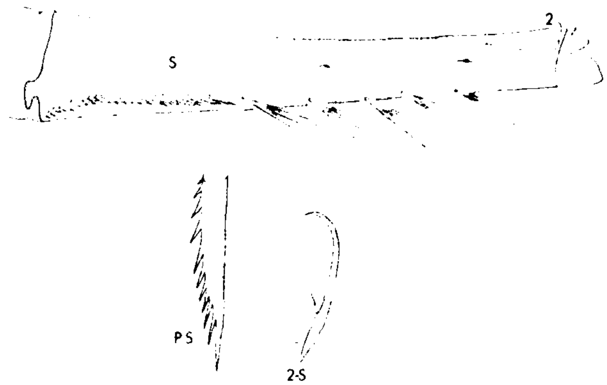


Fig. 887 - *Lateral view of siphon - Cx. peccator*

27(25). Seta 5-C usually double; length of setae 1-C mostly no longer than 0.6 the distance between their bases (Fig. 888) . . . . *iolambdis* (Plate 35)

Seta 5-C usually triple; length of setae 1-C mostly at least 0.7 the distance between their bases (Fig. 889) . . . . *mulrennani* (Plate 38)

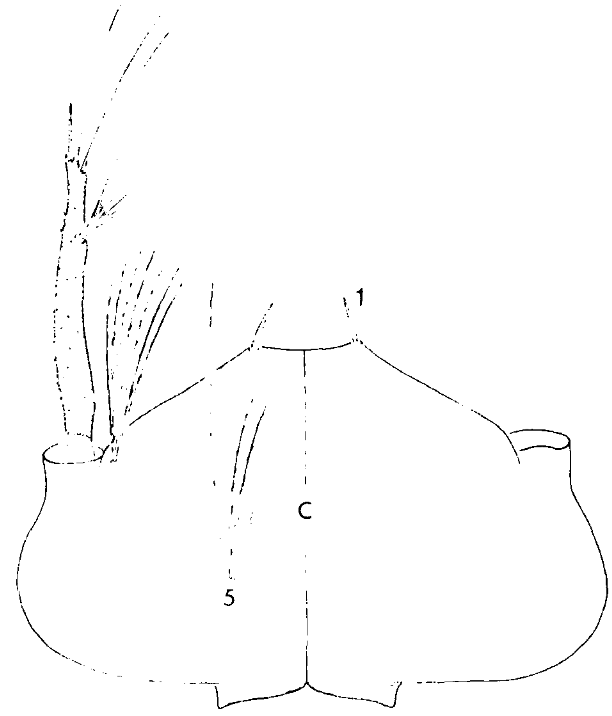


Fig. 888 — *Dorsal view of head - Cx. iolambdis*

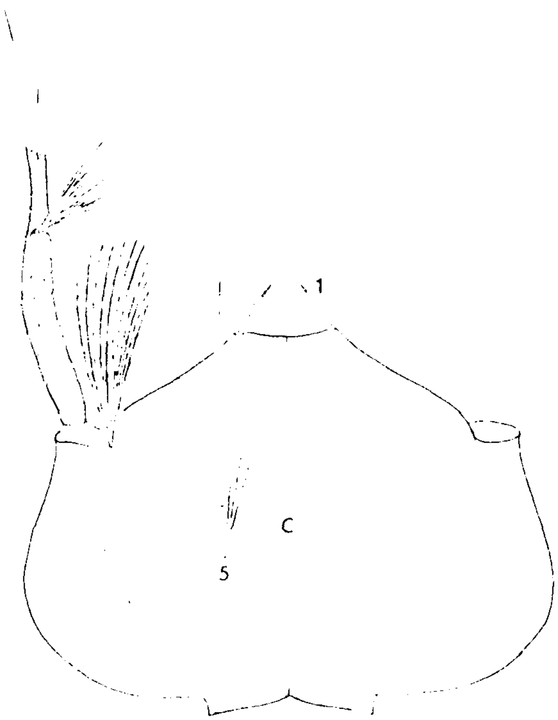


Fig. 889 — *Dorsal view of head - Cx. mulrennani*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *CULISETA*

1. Siphon with row of 8-14 setae along midventral aspect (Fig. 890)(subgenus *Climacura*) . . . . . . *melanura* (Plate 42)

Siphon with setae otherwise distributed, no midventral row (Fig. 891) 2

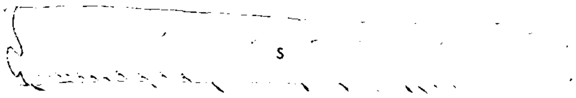


Fig. 890 — *Lateral view of siphon - Cs. melanura*

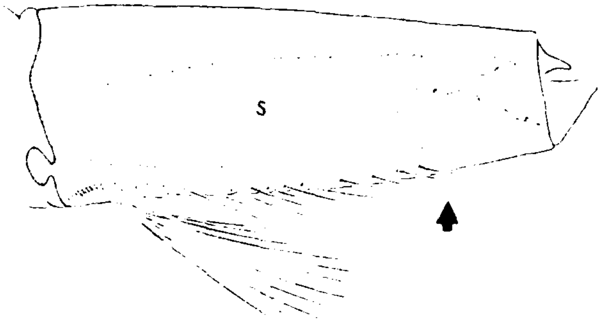


Fig. 891 — *Lateral view of siphon - Cs. inornata*

2(1). Antenna longer than head, seta 1-A attached to distal 0.33 (Fig. 892); siphon without row of single setae distal to pecten (Fig. 893)(subgenus *Culicella*) 3

Antenna shorter than head, seta 1-A attached near to middle (Fig. 894); siphon with row of single setae distal to pecten (Fig. 895)(subgenus *Culiseta*) 4

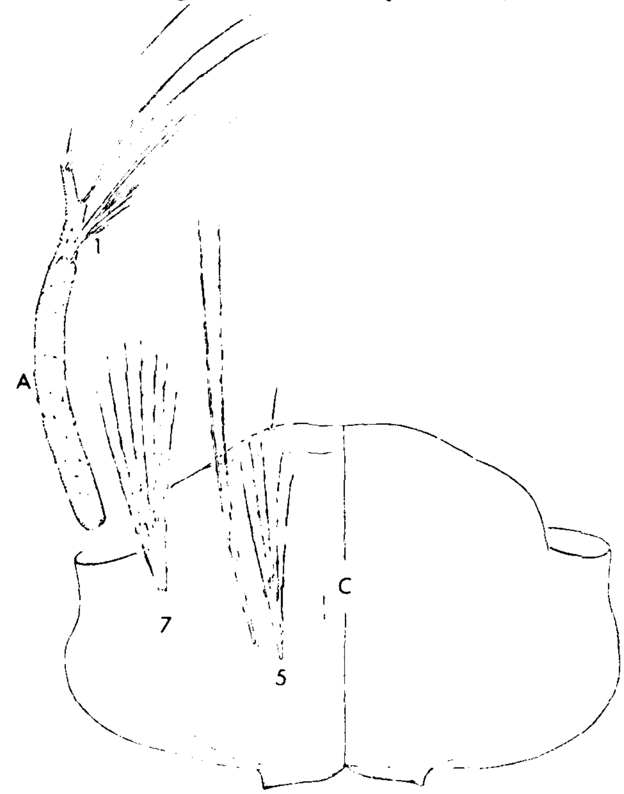


Fig. 892 — *Dorsal view of head - Cs. morsitans*

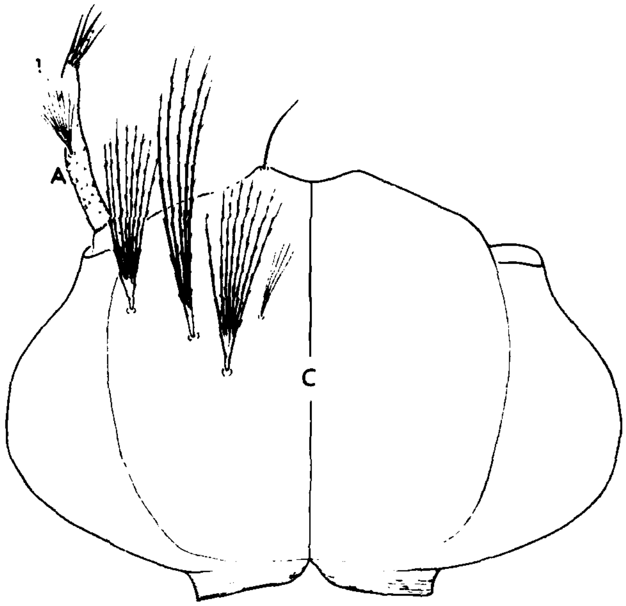


Fig. 894 — *Dorsal view of head - Cs. inornata*

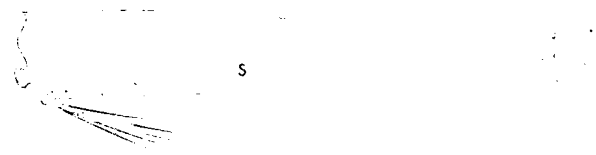


Fig. 893 — *Lateral view of siphon - Cs. morsitans*

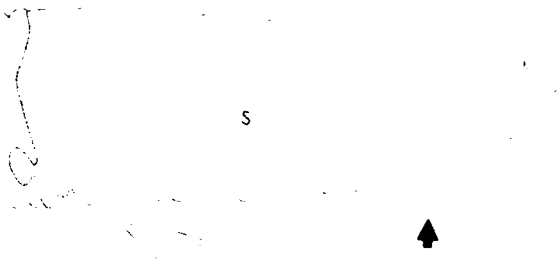


Fig. 895 — *Lateral view of siphon - Cs. inornata*

3(2). Seta 5-C usually with 7 or more branches (Fig. 896); ventral brush of segment X with 16-18 fanlike setae (Fig. 897); seta 7-C mostly with 9 or more branches (Fig. 896) .... ***minnesotae*** **(Plate 45)**

Seta 5-C usually with 5 or fewer branches (Fig. 898); ventral brush with 19-22 fanlike setae (Fig. 899); seta 7-C mostly with 8 or fewer branches (Fig. 898) .... ***morsitans*** **(Plate 48)**

Fig. 896 — *Dorsal view of head - Cs. minnesotae*

Fig. 898 — *Dorsal view of head - Cs. morsitans*

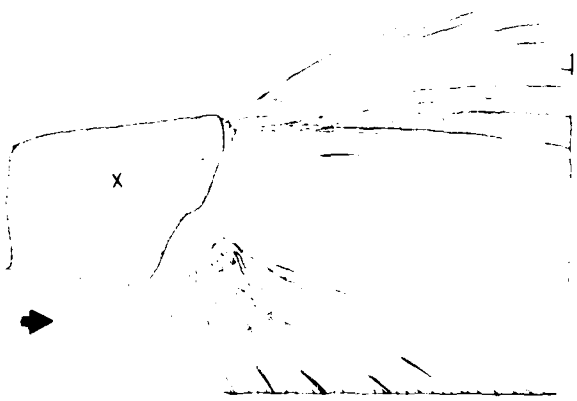


Fig. 897 — *Lateral view of abdominal segment X - Cs. minnesotae*

Fig. 899 — *Lateral view of abdominal segment X - Cs. morsitans*

4(2). Setae 5, 6-C similar in size and number of branches (Fig. 900) .... *impatiens* (Plate 47)

Seta 6-C with fewer branches and usually somewhat longer than seta 5-C (Fig. 901) 5

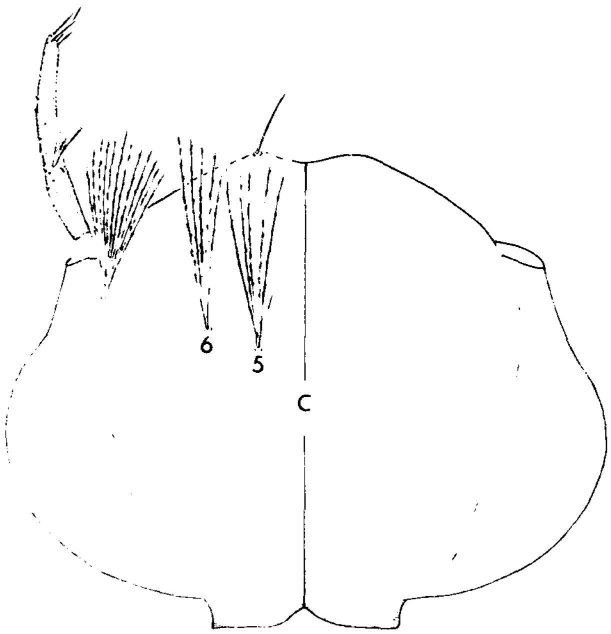


Fig. 900 — *Dorsal view of head - Cs. impatiens*

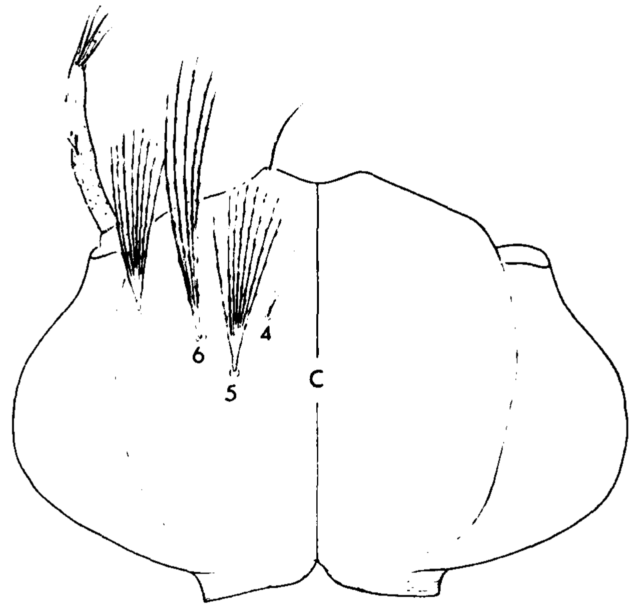


Fig. 901 — *Dorsal view of head - Cs. inornata*

5(4). Seta 4-C nearly equal in size to setae 5, 6-C (Fig. 902); saddle with coarse aciculae dorsoposteriorly (Fig. 903) .... *particeps* (Plate 41)

Seta 4-C much shorter and with branches thinner than setae 5 , 6-C (Fig. 904); saddle not aciculate dorsoposteriorly (Fig. 905) 6

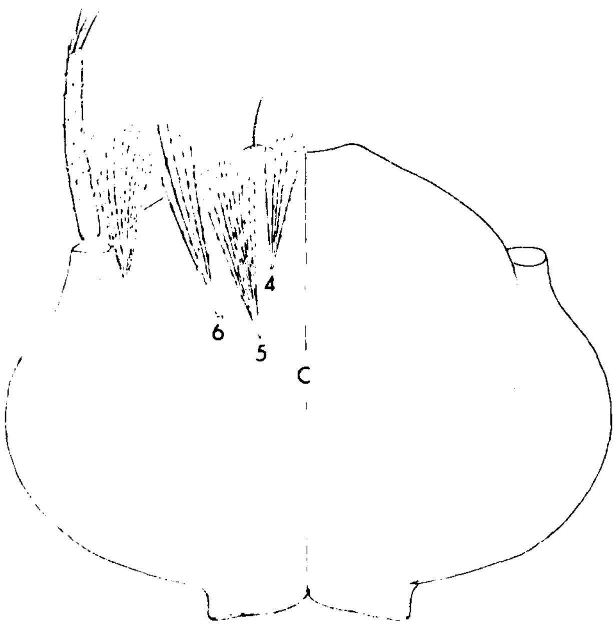


Fig. 902 — *Dorsal view of head - Cs. particeps*

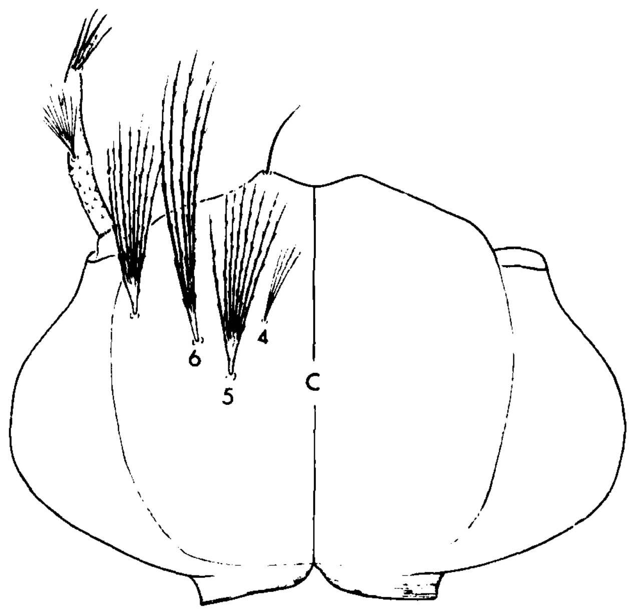


Fig. 904 — *Dorsal view of head - Cs. inornata*

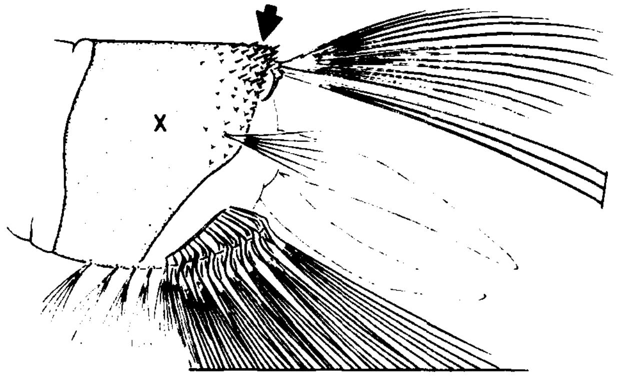


Fig. 903 — *Lateral view of abdominal segment X - Cs. particeps*

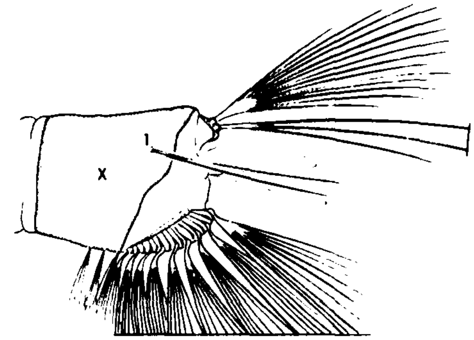


Fig. 905 — *Lateral view of abdominal segment X - Cs. inornata*

6(5). Seta 1-X with rather strong branches equal to length of saddle or longer (Fig. 906) .... *inornata* (Plate 44)

Seta 1-X with fine branches, shorter than saddle (Fig. 907) 7

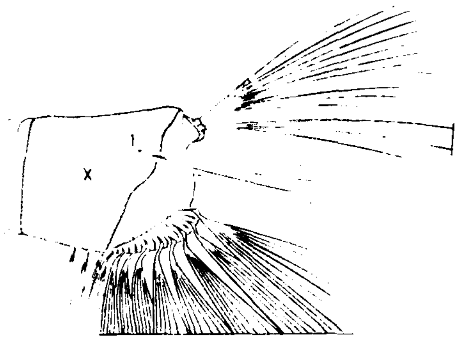


Fig. 906 — *Lateral view of abdominal segment X - Cs. inornata*

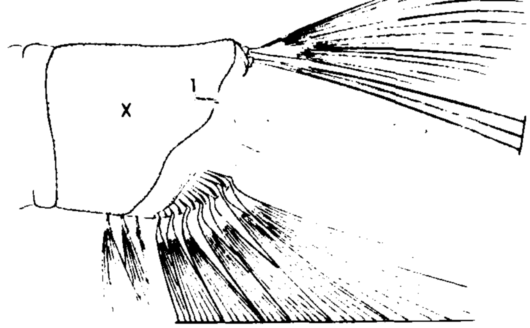


Fig. 907 — *Lateral view of abdominal segment X - Cs. incidens*

7(6). Antenna robust, no more than 8.0 length of basal diameter, with many, coarse spinules on distal 0.5 (Fig. 908); setae 1,2-M both short, multibranched (Fig. 909) .... *alaskaensis* (Plate 40)

Antenna slender, 9.0 or more length of basal diameter, with fewer, fine spinules on distal 0.5 (Fig. 910); seta 1-M single, much longer than multibranched 2-M (Fig. 911) .... *incidens* (Plate 43)

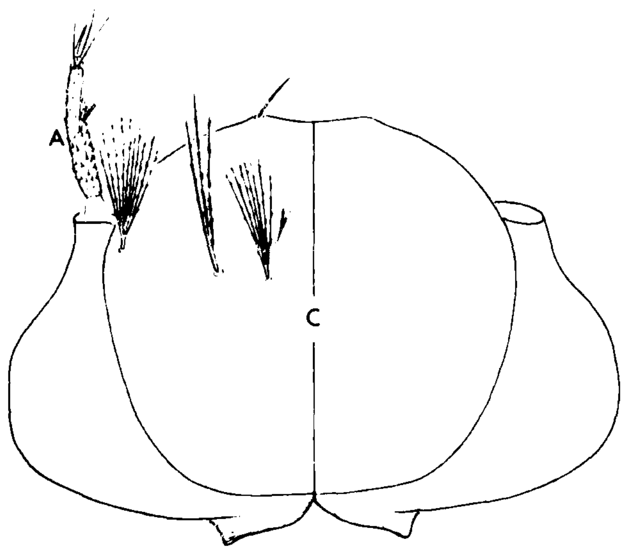


Fig. 908 — *Dorsal view of head - Cs. alaskaensis*

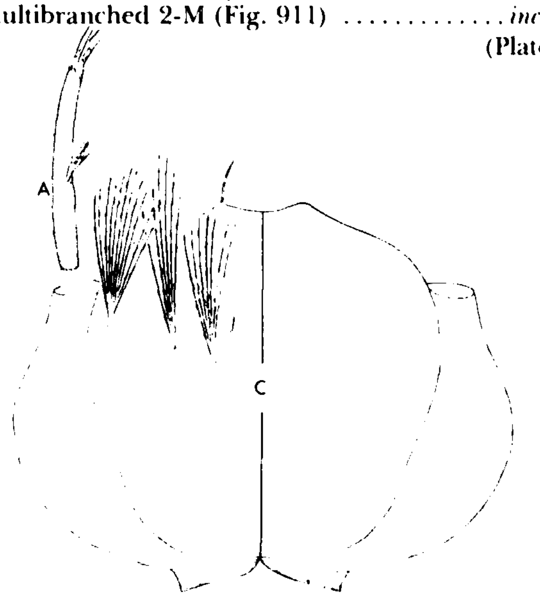


Fig. 910 — *Dorsal view of head - Cs. incidens*

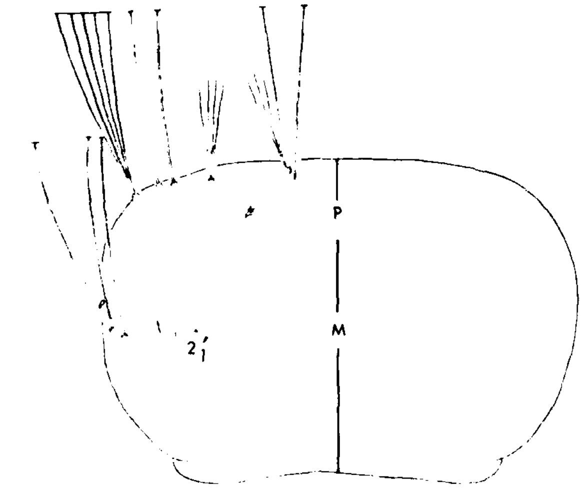


Fig. 909 — *Dorsal view of thorax - Cs. alaskaensis*

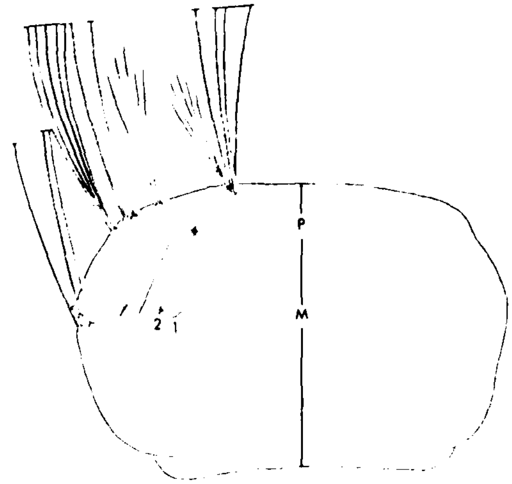


Fig. 911 — *Dorsal view of thorax - Cs. incidens*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *DEINOCERITES*

1. Seta 6-II single (Fig. 912); seta 1-S with 4-6 branches (Fig. 913) .... *mathesoni* (Plate 42)

   Seta 6-II double (Fig. 914); seta 1-S double or triple (Fig. 915) 2

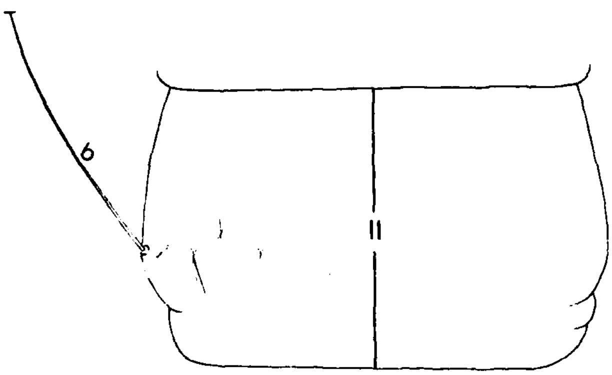


Fig. 912 — *Dorsal view of abdominal segment II - De. mathesoni*

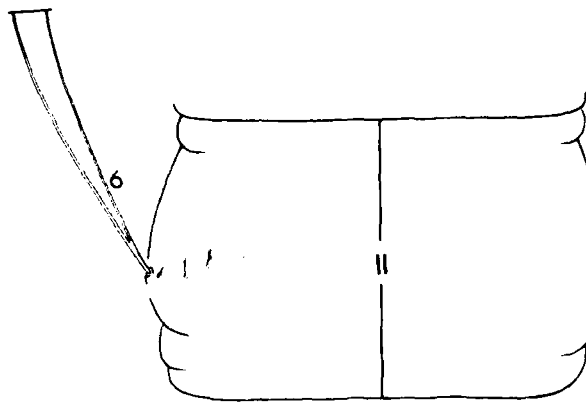


Fig. 914 — *Dorsal view of abdominal segment II - De. pseudes*

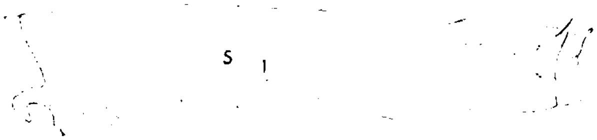


Fig. 913 — *Lateral view of siphon - De. mathesoni*

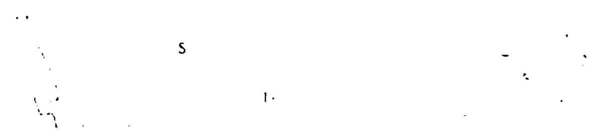


Fig. 915 — *Lateral view of siphon - De. pseudes*

2(1). Seta 6-C double or triple (Fig. 916) .... (in part) *pseudes* (Plate 45)

Seta 6-C simple (Fig. 917) 3

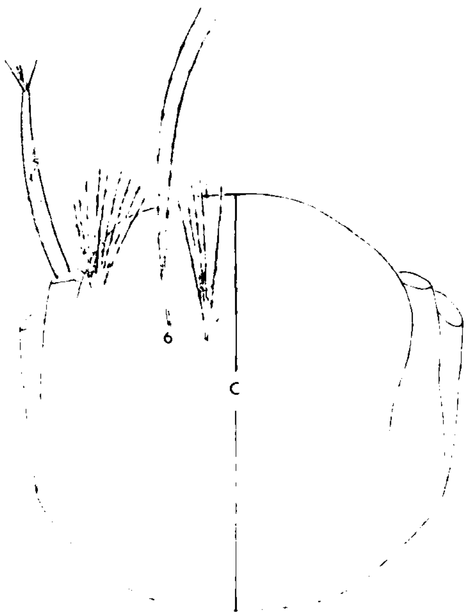


Fig. 916 — *Dorsal view of head - De. pseudes*

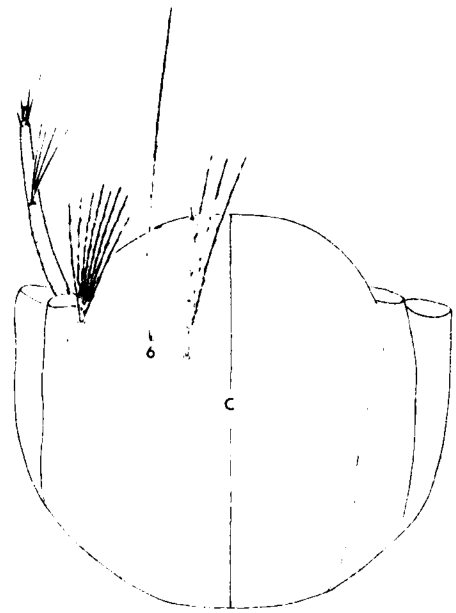


Fig. 917 — *Dorsal view of head - De. cancer*

3(2). Seta 1-VIII usually with 5-7 branches; seta 1-VII long, frequently reaching base of siphon (Fig. 918) .... (in part) *pseudes* (Plate 45)

Seta 1-VIII usually with 3,4 branches; seta 1-VII shorter, not reaching base of siphon (Fig. 919) .... *cancer* (Plate 27)

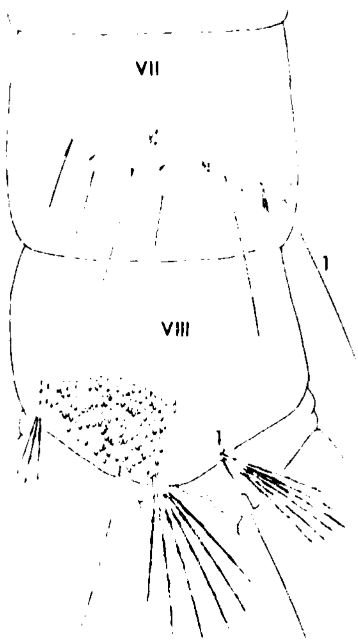


Fig. 918 — *Lateral view of abdominal segments VII-VIII - De. pseudes*

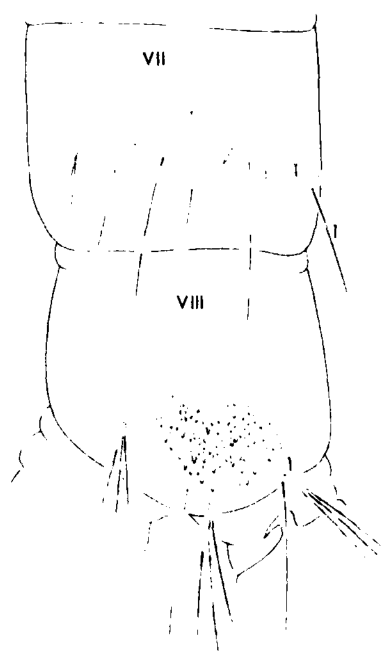


Fig. 919 — *Lateral view of abdominal segments VII-VIII - De. cancer*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *MANSONIA*

Ventral brush of segment X with 4 pairs of setal tufts attached to grid (Fig. 920); comb scale slender, with single spine (Fig. 921) .... *titillans* (Plate 47)

Ventral brush with 3 pairs of setal tufts attached to grid (Fig. 922); comb scale broader, with several stout, subequal spinules (Fig. 923) .... *dyari* (Plate 46)

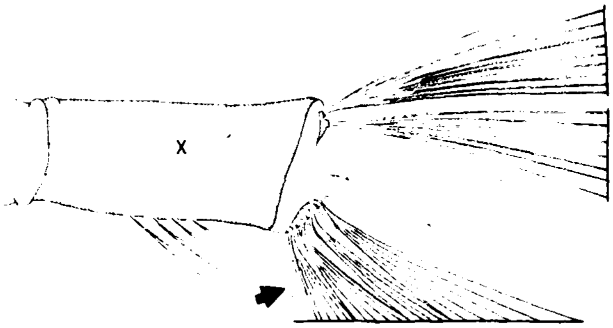


Fig. 920 — *Lateral view of abdominal segment X - Ma. titillans*

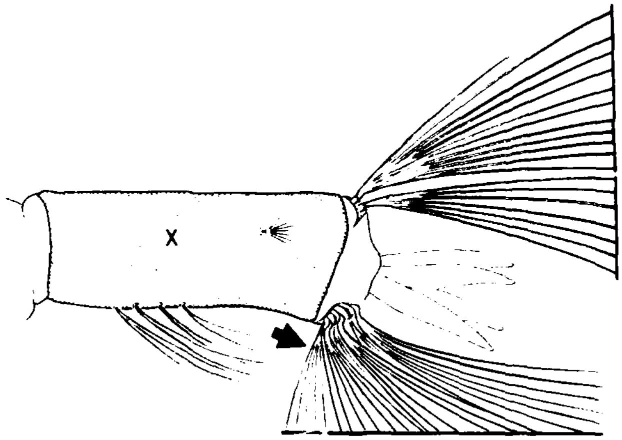


Fig. 922 — *Lateral view of abdominal segment X - Ma. dyari*

Fig. 921 — *Comb scale - Ma. titillans*

Fig. 923 — *Comb scale - Ma. dyari*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *ORTHOPODOMYIA*

1. Seta 1-S usually with 3,4 branches, subequal in length to diameter of siphon at level of attachment; without tergal plate on VIII (Fig. 924) .... *alba* (Plate 41)

   Seta 1-S usually with 6 or more branches, much longer than diameter of siphon at level of attachment; with large tergal plate on VIII (Fig. 925) 2

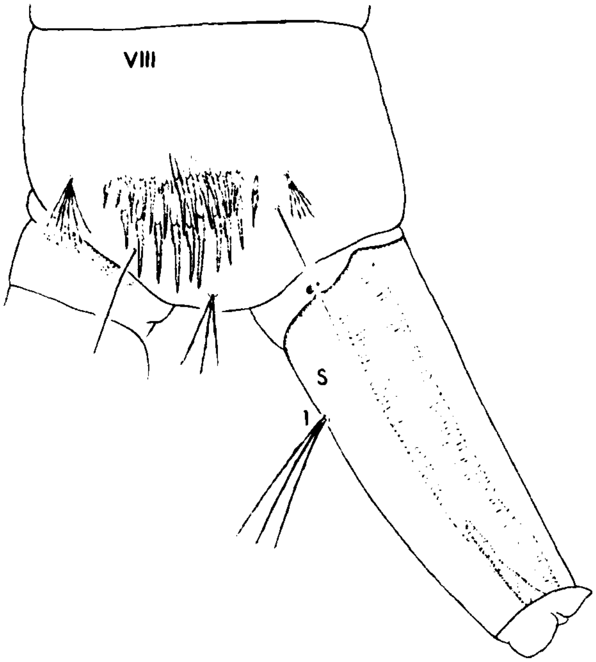


Fig. 924 — *Lateral view of siphon and abdominal segment VIII - Or. alba*

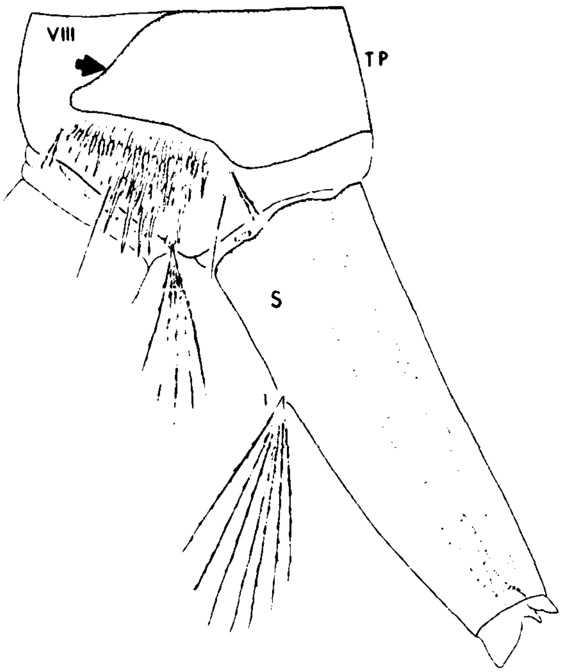


Fig. 925 — *Lateral view of siphon and abdominal segment VIII - Or. signifera*

2(1). Seta 1-S with branches longer than distance from it alveolus to apex of siphon (Fig. 926); dorsal pair of anal papillae much longer than saddle (Fig. 927) .... *kummi* (Plate 47)

Seta 1-S with branches no longer than distance from its alveolus to apex of siphon (Fig. 928); dorsal pair of anal papillae no longer than saddle (Fig. 929) .... *signifera* (Plate 41)

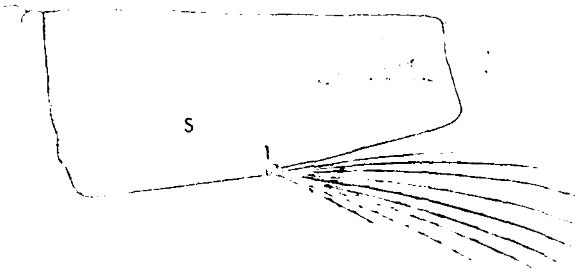


Fig. 926 — *Lateral view of siphon - Or. kummi*

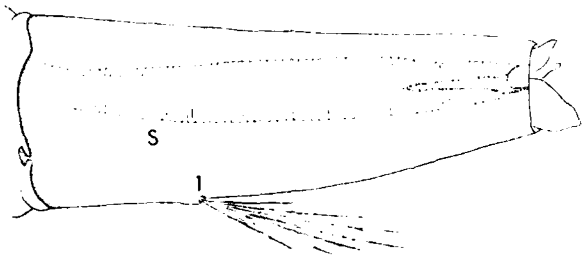


Fig. 928 — *Lateral view of siphon - Or. signifera*

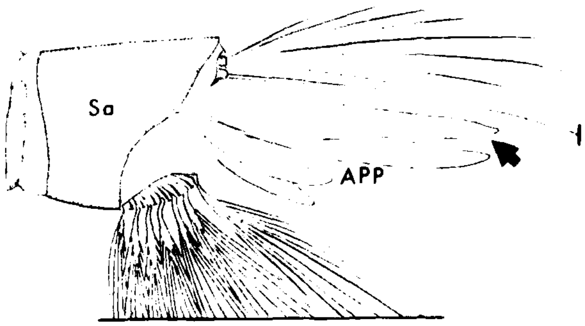


Fig. 927 — *Lateral view of abdominal segment X - Or. kummi*

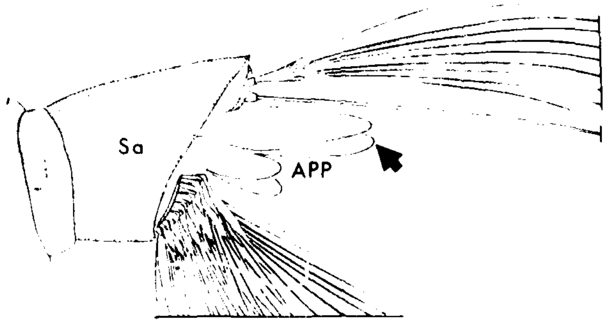


Fig. 929 — *Lateral view of abdominal segment X - Or. signifera*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *PSOROPHORA**

1. Head capsule truncate anteriorly (Fig. 930); pecten with 12 or more filamentous spines (Fig. 931); antenna small, hardly reaching beyond anterior border of head (Fig. 930) (subgenus *Psorophora*) 2

   Head capsule rounded anteriorly (Fig. 932); pecten with fewer than 10 pecten spines, not produced into filaments (Fig. 933); antenna reaching well beyond anterior border of head (Fig. 932) 3

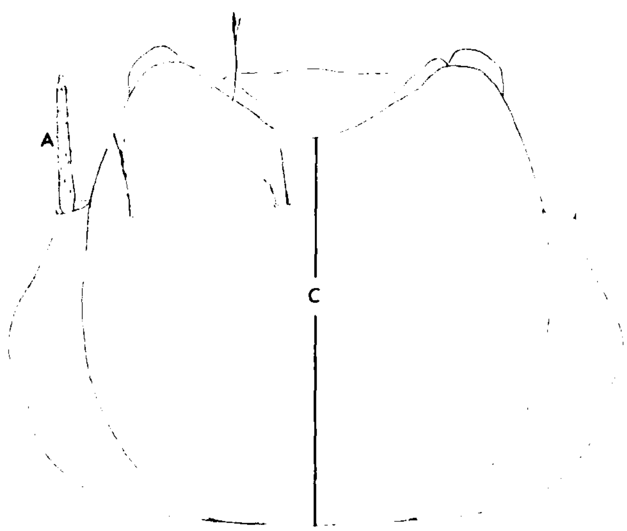


Fig. 930 — *Dorsal view of head - Ps. ciliata*

Fig. 932 — *Dorsal view of head - Ps. discolor*

Fig. 931 — *Lateral view of siphon - Ps. howardii*

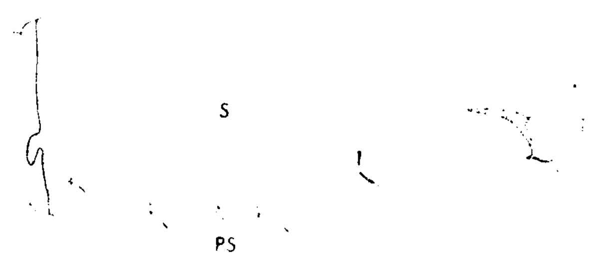


Fig. 933 — *Lateral view of siphon - Ps. columbiae*

2(1). Seta 1-X with 3,4 branches from near base (Fig. 934) . . . . *ciliata* (Plate 43)

   Seta 1-X single or branched some distance distal to base (Fig. 935) . . . . *howardii* (Plate 48)

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*The larva of *Ps. mexicana* is unknown.

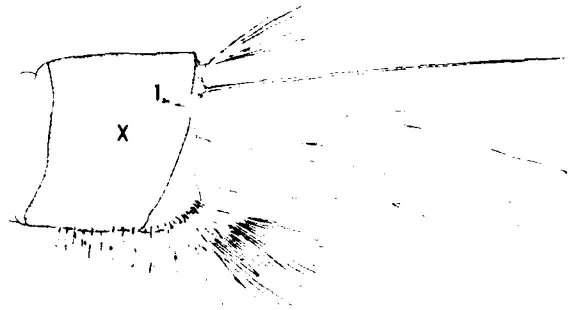

Fig. 934 — *Lateral view of abdominal segment X - Ps. ciliata*

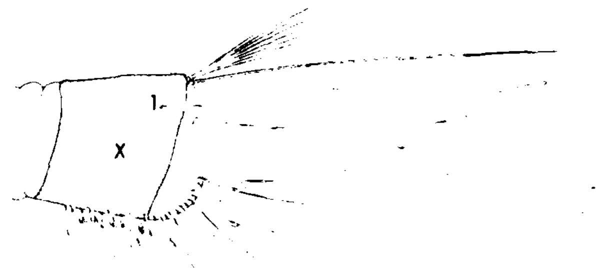

Fig. 935 — *Lateral view of abdominal segment X - Ps. howardii*

3(1). Antenna shorter than head (Fig. 936), if not (*discolor*), then seta 1-S with at least some branches equal to length of siphon (Fig. 937); seta 6-S on anterolateral spiracular lobe shorter than apical diameter of siphon (Fig. 937)(subgenus *Grabhamia*) 4

Antenna about equal to length of head or longer (Fig. 938), if not (*cyanescens*), then seta 6-S subequal to apical diameter of siphon (Fig. 939); seta 1-S much smaller than length of siphon (Fig. 939)(subgenus *Janthinosoma*) 7

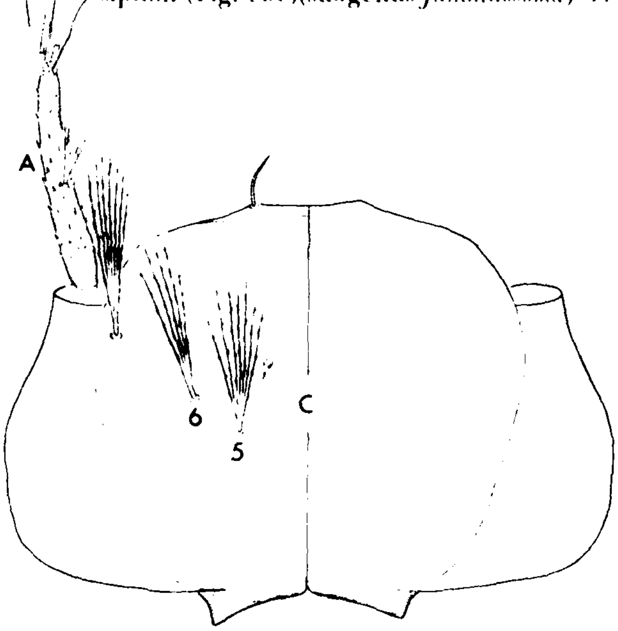

Fig. 936 — *Dorsal view of head - Ps. columbiae*

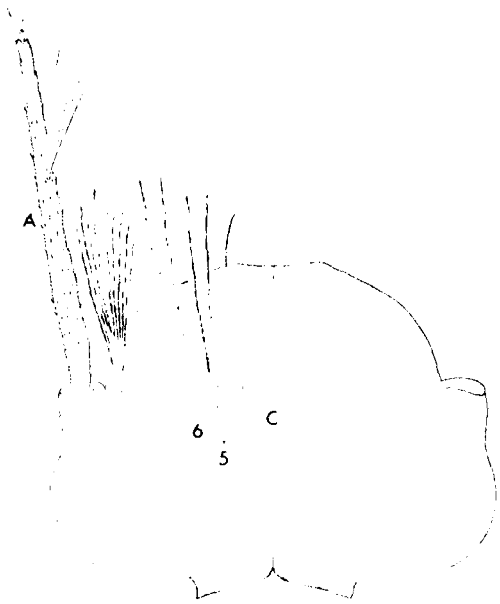

Fig. 938 — *Dorsal view of head - Ps. ferox*

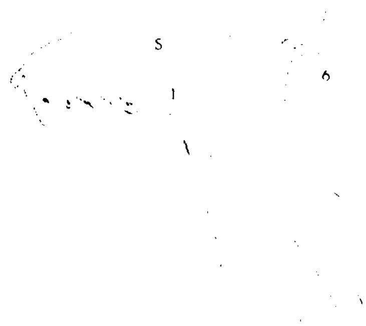

Fig. 937 — *Lateral view of siphon - Ps. discolor*

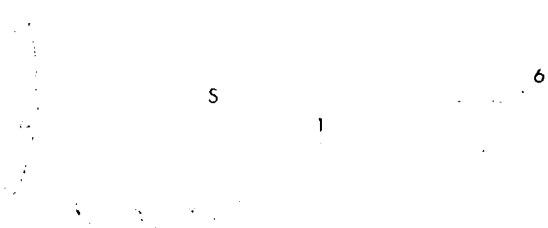

Fig. 939 — *Lateral view of siphon - Ps. cyanescens*

4(3). Antenna longer than head, sinuate, somewhat inflated in distal 0.5 (Fig. 940); seta 1-S very large, with some branches at least equal to length of siphon (Fig. 941) .... *discolor* (Plate 45)

Antenna shorter than head, slightly curved, not inflated (Fig. 942); seta 1-S much shorter than length of siphon (Fig. 943) 5

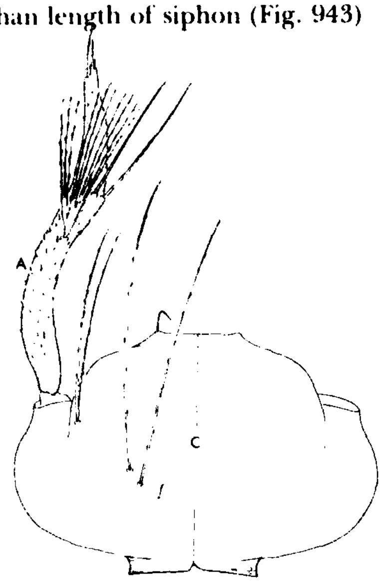

Fig. 940 — *Dorsal view of head - Ps. discolor*

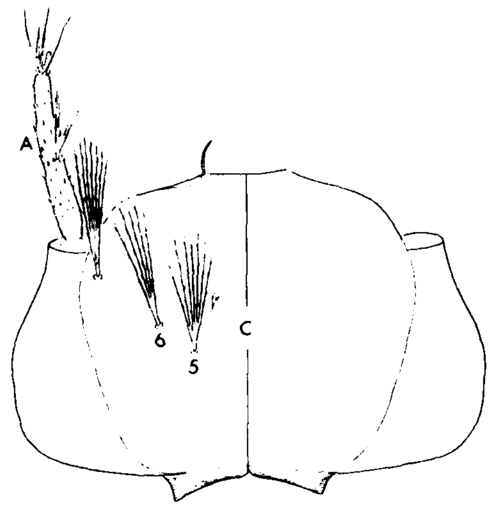

Fig. 942 — *Dorsal view of head - Ps. columbiae*

Fig. 941 — *Lateral view of siphon - Ps. discolor*

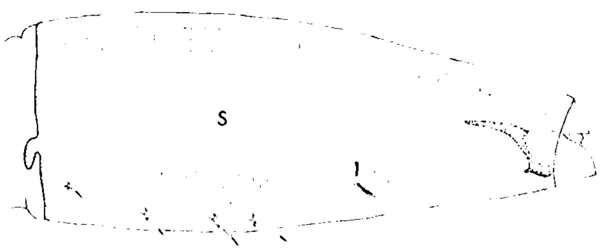

Fig. 943 — *Lateral view of siphon - Ps. columbiae*

5(4). Setae 5 , 6-C shorter than antenna, with 4 or more branches (Fig. 944) .... *columbiae confinnis* (Plate 40)

Setae 5 , 6-C about equal to length of antenna, or longer, single to triple (Fig. 945) 6

Fig. 944 — *Dorsal view of head - Ps. columbiae*

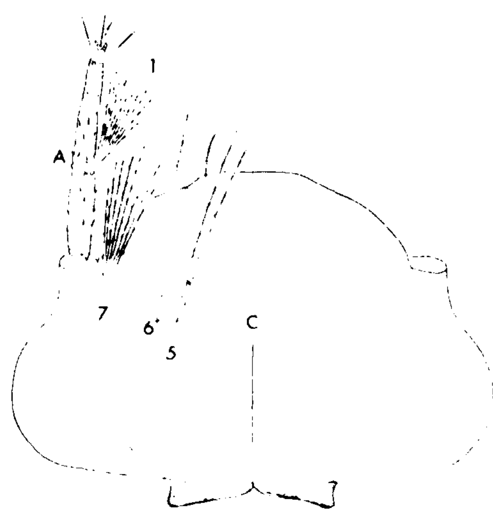

Fig. 945 — *Dorsal view of head - Ps. signipennis*

6(5). Antenna with strong spinules; setae 1-A and 7-C strongly aciculate, 1-A with 8 or more branches, 7-C with at least 6 branches (Fig. 946) .... *signipennis* (Plate 44)

Antenna with weak spinules; setae 1-A and 7-C weakly aciculate, with fewer than 6 branches (Fig. 947) .... *pygmaea* (Plate 39)

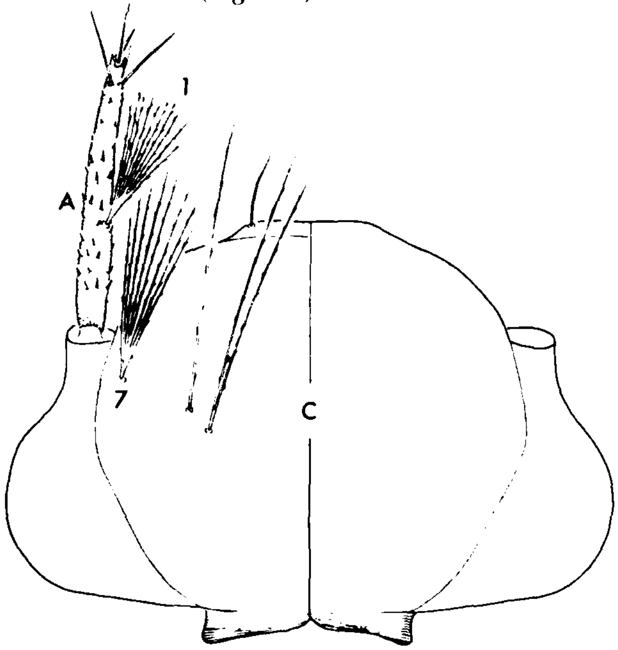

Fig. 946 — *Dorsal view of head - Ps. signipennis*

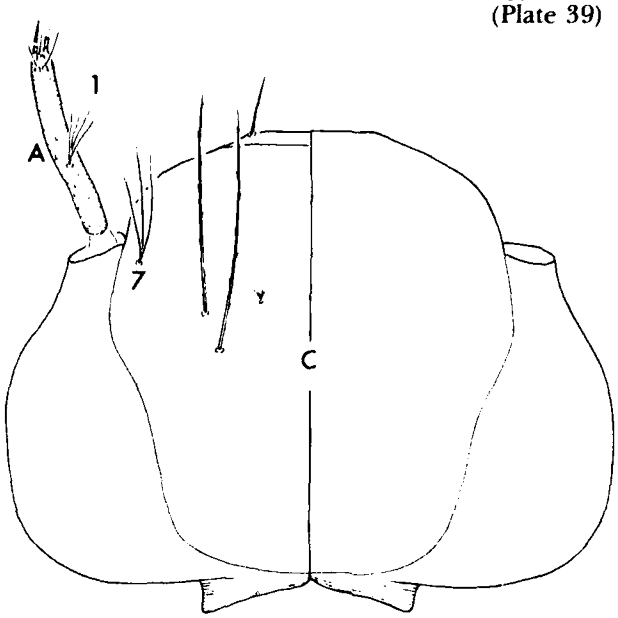

Fig. 947 — *Dorsal view of head - Ps. pygmaea*

7(3). Antenna shorter than head (Fig. 948); seta 6-S on anterolateral spiracular lobe subequal to apical diameter of siphon (Fig. 949) .... *cyanescens* (Plate 43)

Antenna about equal to length of head, or longer (Fig. 950); seta 6-S much less than apical diameter of siphon (Fig. 951) 8

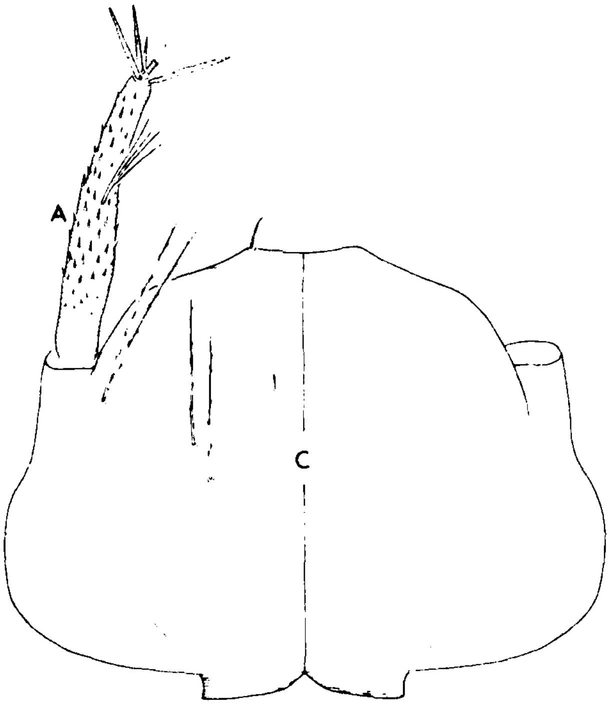

Fig. 948 — *Dorsal view of head - Ps. cyanescens*

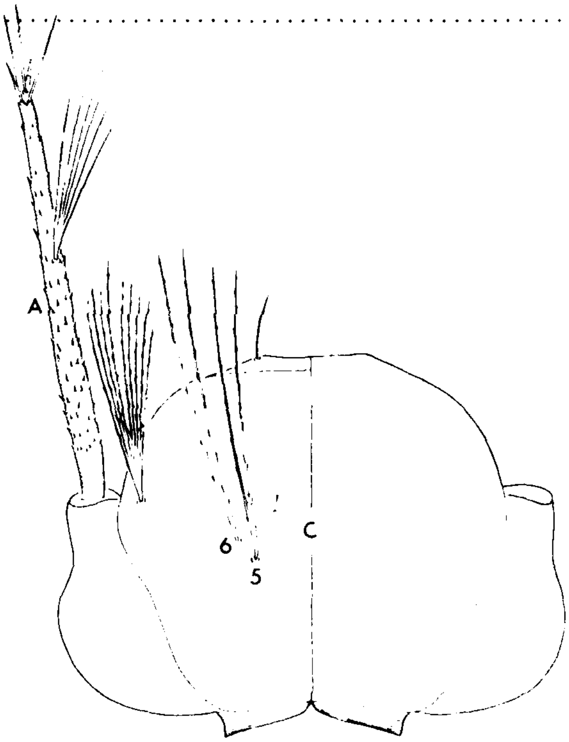

Fig. 950 — *Dorsal view of head - Ps. ferox*

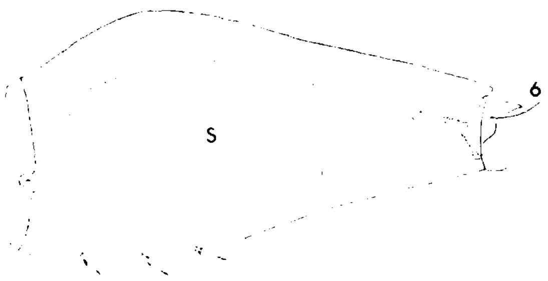

Fig. 949 — *Lateral view of siphon - Ps. cyanescens*

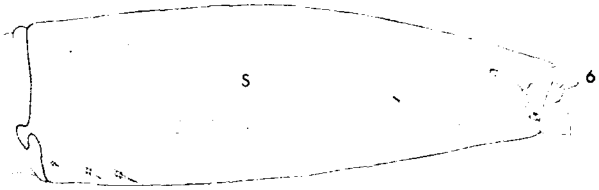

Fig. 951 — *Lateral view of siphon - Ps. ferox*

8(7). Siphon index 2.5-3.0, without subapical, narrowed part (Fig. 952); with 4-6 precratal fanlike setae (Fig. 953) .... *johnstonii* (Plate 33)

Siphon index 3.5 or more, with distinct subapical, narrowed part (Fig. 954); with 7 or more precratal fanlike setae (Fig. 955) 9

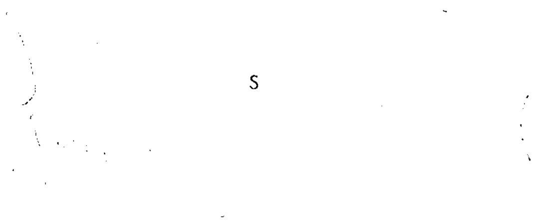

Fig. 952 — *Lateral view of siphon - Ps. johnstonii*

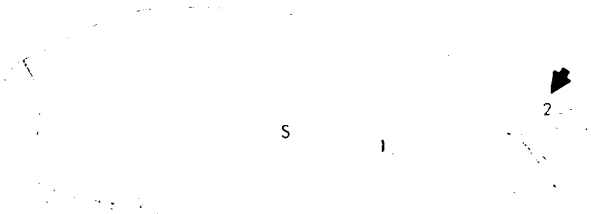

Fig. 954 — *Lateral view of siphon - Ps. horrida*

Fig. 953 — *Lateral view of abdominal segment X - Ps. johnstonii*

Fig. 955 — *Lateral view of abdominal segment X - Ps. horrida*

9(8). Antenna subequal to median length of head (Fig. 956) 10

Antenna distinctly longer than median length of head (Fig. 957) 11

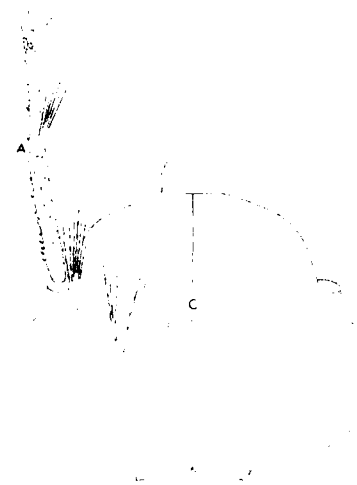

Fig. 956 — *Dorsal view of head - Ps. horrida*

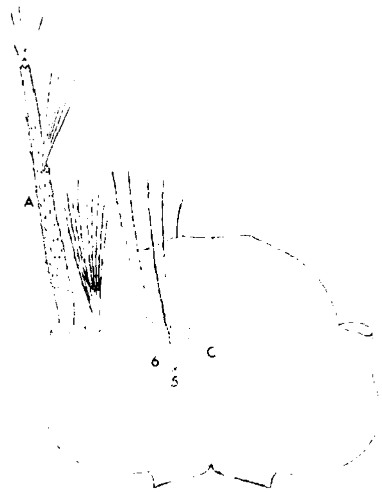

Fig. 957 — *Dorsal view of head - Ps. ferox*

10(9). Seta 6-IV-VI medium-sized, not as long as succeeding segment, double or triple (Fig. 958); seta 1-S subequal to seta 2-S (Fig. 959) .... *horrida* (Plate 47)

Seta 6-IV-VI stout, much longer than succeeding segment (Fig. 960); seta 1-S much longer than seta 2-S (Fig. 961) .... *mathesoni* (Plate 46)

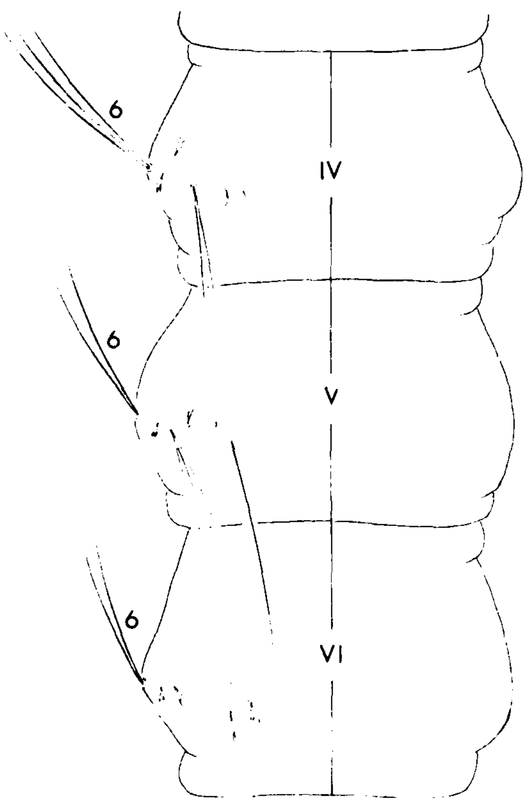

Fig. 958 — *Dorsal view of abdomen Ps. horrida*

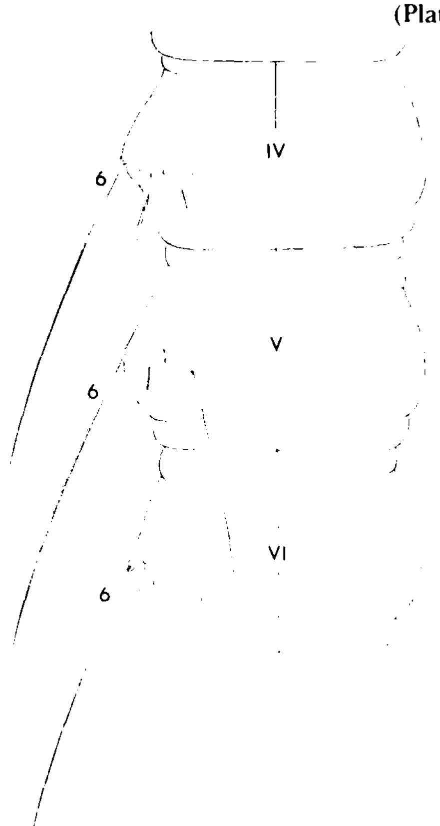

Fig. 960 — *Dorsal view of abdomen - Ps. mathesoni*

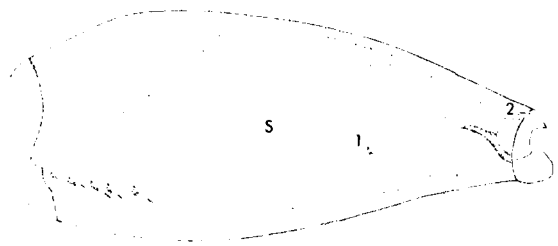

Fig. 959 — *Lateral view of siphon - Ps. horrida*

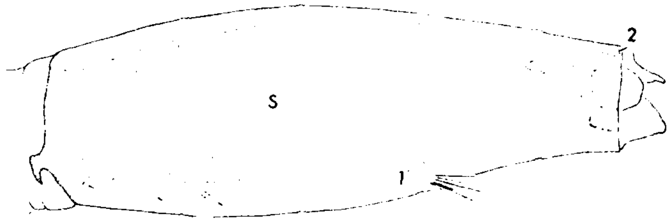

Fig. 961 — *Lateral view of siphon - Ps. mathesoni*

11(9). Seta 6-IV-VI single or double (Fig. 962); individual branches of setae 5, 6-C nearly equal in length (Fig. 963) .... *ferox*
(Plate 44)

Seta 6-IV-VI with 3 or more branches (Fig. 964); individual branches of setae 5, 6-C not equal, at least one shorter and weaker (Fig. 965) .... *longipalpus*
(Plate 49)

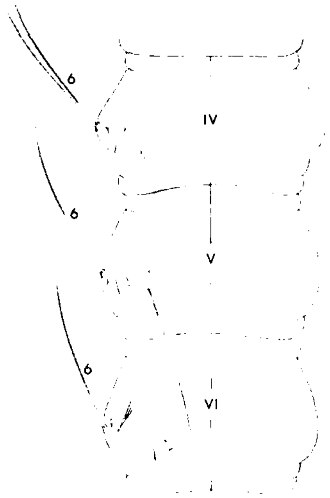

Fig. 962 — *Dorsal view of abdominal segments IV-VI - Ps. ferox*

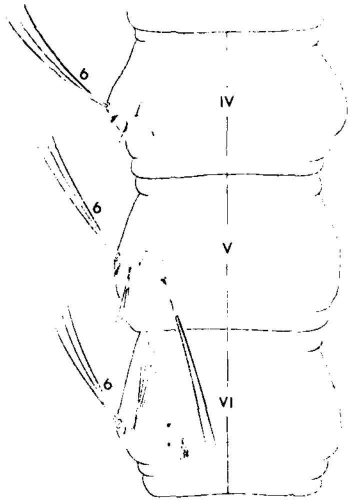

Fig. 964 — *Dorsal view of abdominal segments IV-VI - Ps. longipalpus*

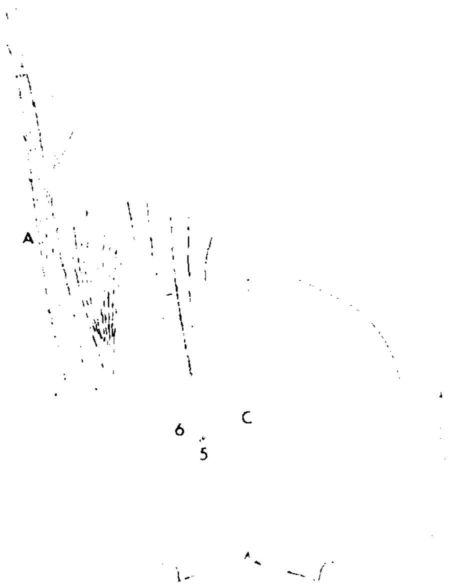

Fig. 963 — *Dorsal view of head - Ps. ferox*

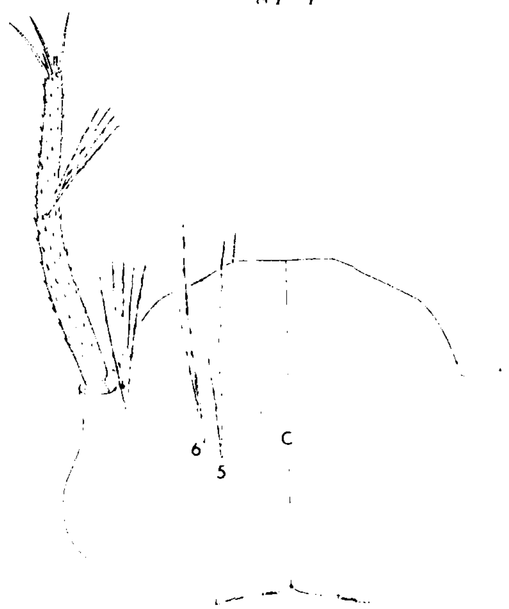

Fig. 965 — *Dorsal view of head - Ps. longipelpus*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *URANOTAENIA*

1. Seta 5-C double or triple, seta 6-C single, coarse but not spiniform (Fig. 966)(subgenus *Pseudoficalbia*) .... *a. anhydor*
a. syntheta
(Plate 42)

   Setae 5, 6-C single, stout, spiniform, spinulate (Fig. 967) (subgenus *Uranotaenia*) 2

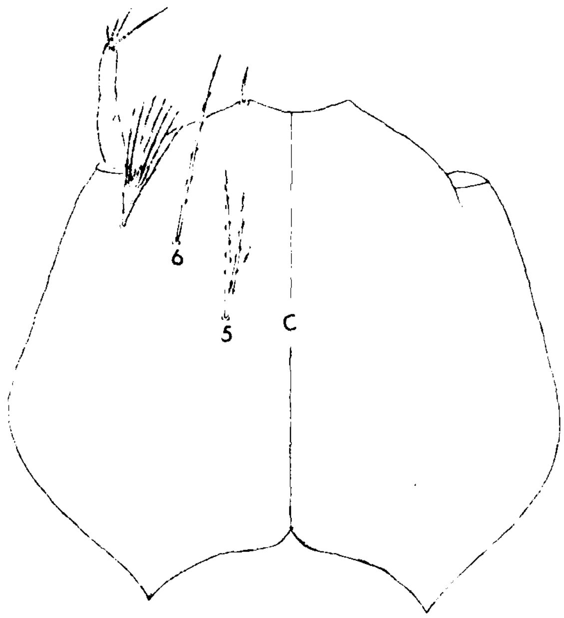

Fig. 966 — *Dorsal view of head - Ur. a. syntheta*

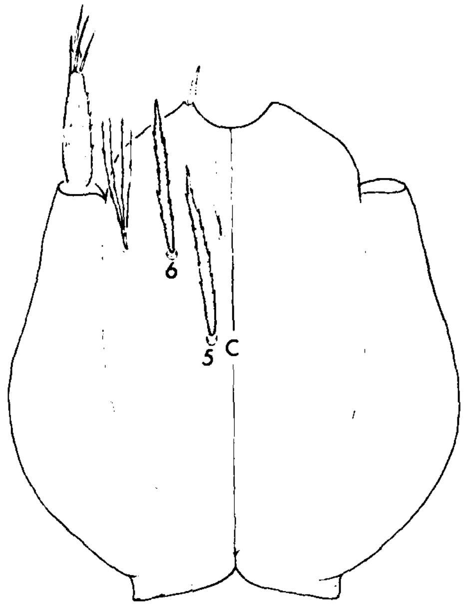

Fig. 967 — *Dorsal view of head - Ur. sapphirina*

2(1). Seta 3-P more than 0.5 length of seta 1-P, with 4-8 branches (Fig. 968); seta 6-I,II double (Fig. 969) .... *lowii*
(Plate 49)

   Seta 3-P much less than 0.5 length of seta 1-P, with 8-10 branches (Fig. 970); seta 6-I,II triple (Fig. 971) .... *sapphirina*
(Plate 49)

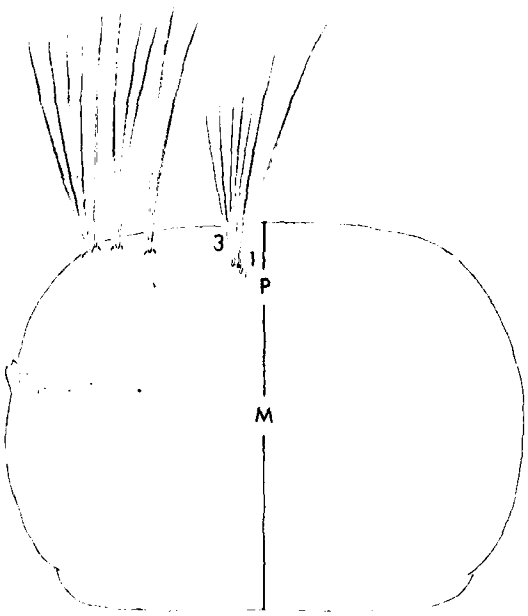

Fig. 968 — *Dorsal view of thorax - Ur. lowii*

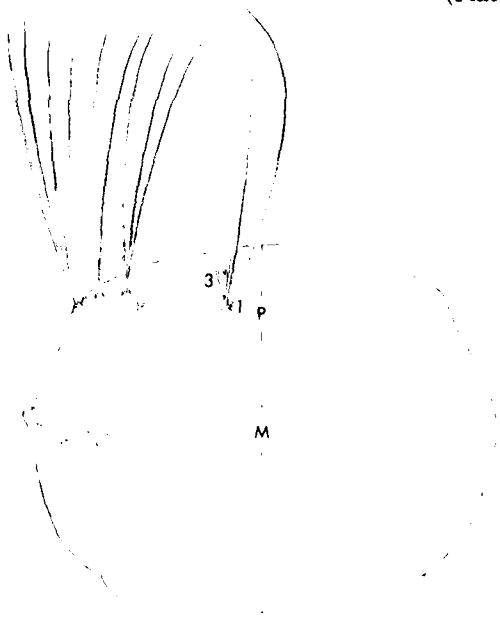

Fig. 970 — *Dorsal view of thorax - Ur. sapphirina*

Fig. 969 — *Dorsal view of abdominal segments I-II - Ur. lowii*

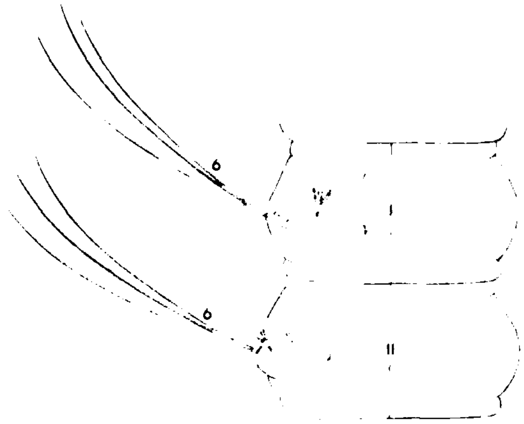

Fig. 971 — *Dorsal view of abdominal segments I-II - Ur. sapphirina*

KEY TO FOURTH STAGE LARVAE OF THE GENUS *WYEOMYIA*

1. Setae 1-3-X single, seta 4-X with 7 or more branches (Fig. 972); seta 5-C with 3,4 branches (Fig. 973) . . . . *mitchellii* (Plate 45)

   Setae 1-3-X not all single, seta 4-X with no more than 6 branches (Fig. 974); seta 5-C simple (Fig. 975) 2

Fig. 972 — *Lateral view of abdominal segment X - Wy. mitchellii*

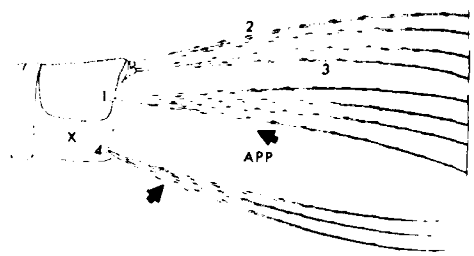

Fig. 974 — *Lateral view of abdominal segment X - Wy. smithii*

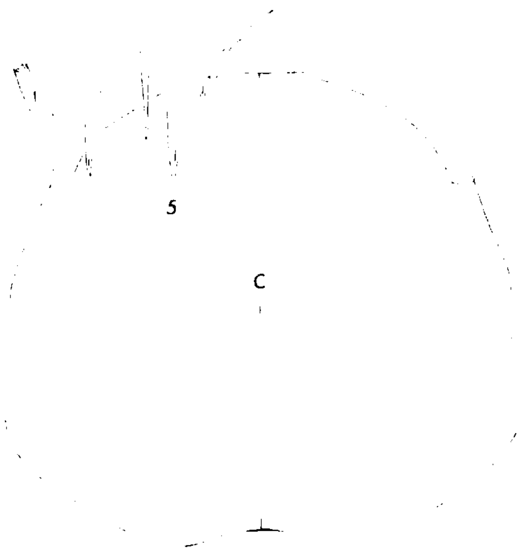

Fig. 973 — *Dorsal view of head - Wy. mitchellii*

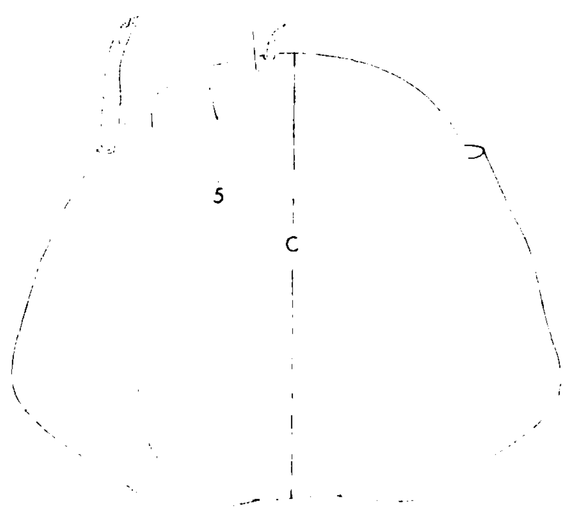

Fig. 975 — *Dorsal view of head - Wy. smithii*

2(1). Siphon index about 6.0 (Fig. 976); seta 4-X with 1,2 long and 3,4 short branches (Fig. 977); several setae on siphon double or triple (Fig. 976) . . . . *vanduzeei* (Plate 46)

Siphon index about 4.0-5.0 (Fig. 978); seta 4-X with 2,3 long, subequal branches (Fig. 979); setae on siphon all single (Fig. 978) 3

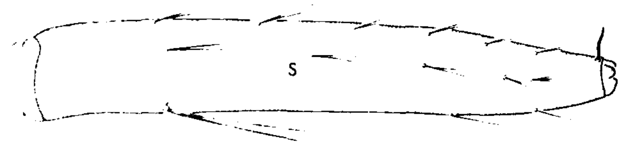

Fig. 976 — *Lateral view of siphon - Wy. vanduzeei*

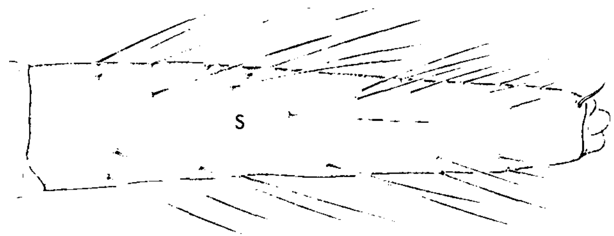

Fig. 978 — *Lateral view of siphon - Wy. smithii*

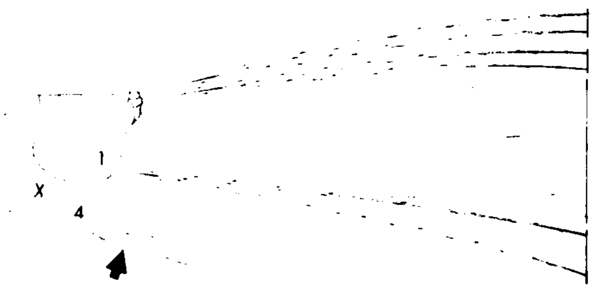

Fig. 977 — *Lateral view of abdominal segment X - Wy. vanduzeei*

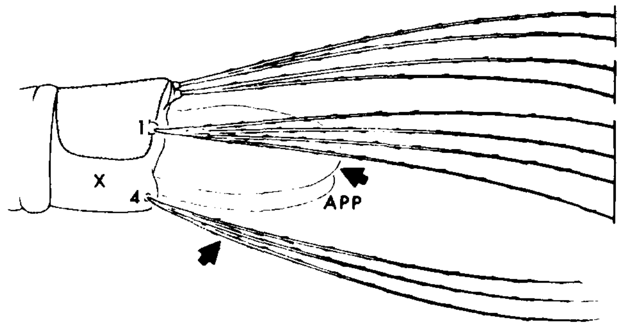

Fig. 979 — *Lateral view of abdominal segment X - Wy. smithii*

3(2). Abdominal segment X with 2 anal papillae (Fig. 980); seta 14-M stouter than seta 14-P (Fig. 981) . . . . *smithii* (Plate 39)

Segment X with 4 anal papillae (Fig. 982); seta 14-P stouter than seta 14-M (Fig. 983) . . . . *haynei* (Plate 34)

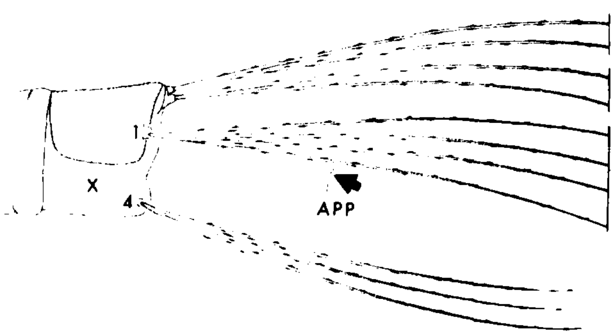

Fig. 980 — *Lateral view of abdominal segment X - Wy. smithii*

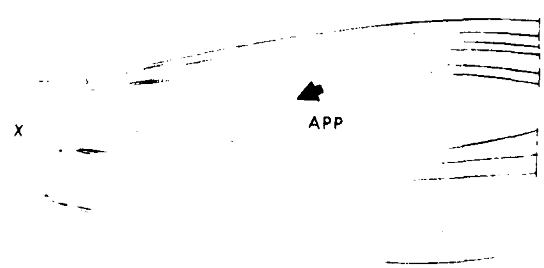

Fig. 982 — *Lateral view of abdominal segment X - Wy. haynei*

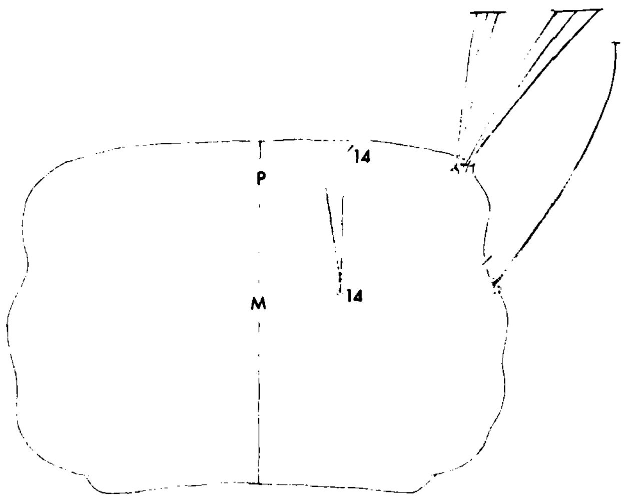

Fig. 981 — *Ventral view of thorax - Wy. smithii*

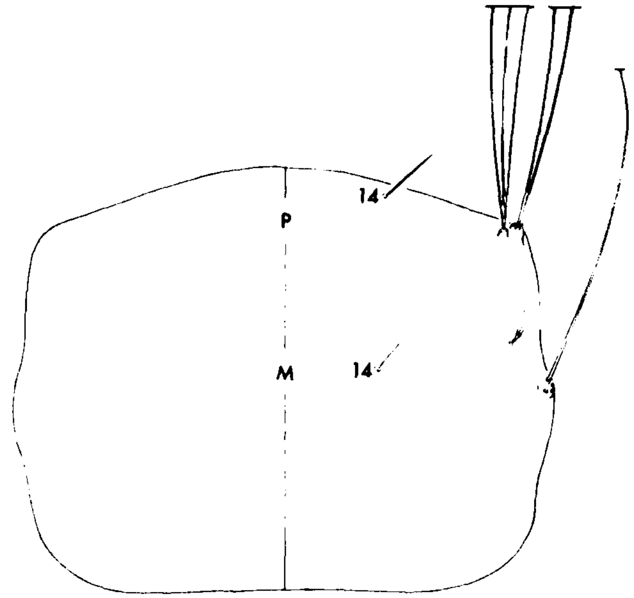

Fig. 983 — *Ventral view of thorax Wy. haynei*

GEOGRAPHICAL DISTRIBUTION OF THE CULICIDAE OF NORTH AMERICA, NORTH OF MEXICO

Closely associated with the identification of any taxon is its geographical distribution. The process of identification will be greatly influenced and assisted by knowing the limits of dispersion of the fauna with which you are working. Obviously, if you determine that a specimen is a particular species and, by checking its distribution, discover that you collected it outside of its known range, you will check it again. In this publication, identification and distribution have been linked, so that the user can check one against the other.

Tables 2-4 list the species and subspecies and the states/provinces from which they have been reported. Table 2 registers 101 species and subspecies from the 24 eastern states of the USA and the District of Columbia; Table 3, 142 species and subspecies from the 24 western states; and Table 4, 79 species and subspecies from Canada and Alaska. Of the 167 taxa, 75 occur in the conterminous 48 states and in Canada/Alaska (the latter two are lumped because they share a similar mosquito fauna); moreover, 87 taxa are found in the 48 states, but not in Canada/Alaska, and 5 are restricted to the latter area. Comparing Canada with Alaska, each has three species not found in the other area, i.e., Canada: *Ae. churchillensis*, *Ae. rempeli* and *Ae togoi;* Alaska: *Ae. punctodes*, *Ae. ventrovittis* and *Cs. particeps*. *Ae. churchillensis* is a sibling species of *Ae. communis* (167). *Ae. rempeli* has also been reported from the Union of Soviet Socialist Republics (154) so has wider distribution than the Canadian records would indicate. Therefore both of these could occur in Alaska. All three Alaskan taxa are potential members of the Canadian fauna (505). As far as *Ae. togoi* is concerned it belongs to the fauna of the Oriental biogeographical region and is apparently a recent introduction into British Columbia.

Of the 162 taxa distributed in the 48 states, 82 are disseminated in both the eastern and western blocks of states as listed in Tables 2, 3. Only 19 are restricted to the eastern states, while three times that many (61) are confined to the West. In all, 14, or 74%, of those found only in the East, are limited to peninsular Florida with a few extending into southern Georgia. The western states, on the other hand, with their plains, high mountains and deserts offer a wide variety of weather conditions and habitats which has resulted in the development of a diverse mosquito fauna, unique to the West. In fact, three western states, Texas, Arizona and California, have three species each not occurring in any other political unit of the region.

There follows in this section maps which depict the distribution in North America, north of Mexico, of all 167 taxa now known in the culicid fauna, except *Ps. varipes*, for which at present specific distribution is indefinite (see ref. 33). They have been drawn as accurately as possible within the limits of available information on occurrence in the states and provinces of the region, also referred to as political units. Because of the paucity of information about some, the distributional limits of the taxa necessarily had to be estimated. Many are depicted as having discontinuous distribution based on available records and whether it is real or imagined remains to be determined by further study. No attempt has been made to delineate within political units exactly in which parts such widespread species, as *Ae. vexans*, have been found.

In studying the biogeographical distributional patterns exhibited by the mosquito fauna in North America, north of Mexico, two paths of dispersal are very evident. Southern taxa, such as *Ae. thibaulti* and *Ps. ferox* (Plates 23, 44), have apparently spread northward using the lowlands of the valley of the Mississippi River and its tributaries and the coastal plain of the Atlantic Ocean. On the other hand, northern species, such as *Ae. communis* and *Ae. hexodontus* (Plates 17, 20), have dispersed southward along the high ranges of the western Rocky Mountains. It appears that the eastern Appalachian range lacks either sufficient altitude or possibly favorable breeding sites at the higher elevations to support the northern fauna. However, the Appalachian area has not been studied in depth and its mosquito fauna is not well documented.

Another noteworthy dispersal pattern is the avoidance of the southwestern states by such species as *Ae. sticticus*, *Ae. hendersoni* and *Cx. restuans;* see Plates 25, 16, 38. They have been able to colonize large areas of North America but not the southwest. Apparently, they simply cannot tolerate the dry climate and types of habitats found there. On the other hand, widespread species, such as *Ae. dorsalis*, *Ae. vexans* and *Cx. tarsalis* (see Plates 18, 26, 34) are well adapted and have successfully thrived in the dry areas of the southwestern USA.

One species, *Ae. aegypti*, presents a peculiar distributional problem. Christophers (531) stated that temperature limits its dispersal, and in North America it is restricted to that part south of a January isotherm of 1.8°C (35°F) and a July isotherm of 23.9°C (75°F). That agrees quite well with our limits indicated on Plate 10 as the extreme range. Rozeboom (532) spoke of three zones in relation to its limit of distribution: the zone of continuous breeding, the zone of egg survival in overwintering diapause, and the temporary summer zone with incursions during the warm months and complete winter dieoff. On Plate 10, then, the usual range marks the limits of continuous breeding, while the extreme range would include the latter two categories. In preparing the map we also considered the records of Morland and Tinker (318) and Tinker and Hayes (467) whose distribution of *aegypti* was based on actual surveys.

The study of Wood et al. (505) and our own review of the specimens in the U.S. National Museum have lead to the conclusion that *An. occidentalis* Dyar and Knab does not occur in Canada nor Alaska, as depicted by references 106, 135, 190, 448. Gjullin et al. (192) had previously stated that Alaskan records for *An. occidentalis* referred to *An. earlei*. Although we list it for Washington State, there is some doubt that it really is found there (see 505).

An analysis of the known distribution of the North American mosquitoes in other parts of the world reveals that only 48, or 28.7%, are indigenous, not found outside of the region. The number and proportion in each biogeographical region, area or specific country are given below.

REGION	NO. OF SPECIES	PERCENT OF TOTAL	REGION	NO. OF SPECIES	PERCENT OF TOTAL
Indigenous	48	28.7			
Palearctic	27[1]	16.2	Caribbean & Mexico	5	3.0
Neotropical	36	21.5			
Oriental	1	0.6	Caribbean only	6	3.5
Cosmotropical	2	1.2			
			Mexico only	40	23.9
Worldwide	1	0.6	Cuba only	1	0.6

[1] Includes *Cx. pipiens* which also occurs in the Southern Neotropical and Southern Ethiopian regions and two species, *Ae. dorsalis* and *Ae. sticticus* which likewise are distributed in Mexico.

For the general distribution of each taxon outside our region, if applicable, see the Systematic Index section, page 2. The sources for this dispersal information have been principally Knight and Stone (519) and Knight (518).

In all, 83 species found in North America, north of Mexico, also are distributed in Mexico. Of the total, 33 taxa occur elsewhere in the Neotropical biogeographical region, 2 are cosmotropical, 5 share the Caribbean islands with Mexico, 3 are Holarctic or worldwide and extend into Mexico, and 40 are known only from Mexico outside the target area. The central highlands of Mexico and Baja California are considered part of the Nearctic biogeographical region, while the lowlands are included in the Neotropical zone. Of the 40 taxa, 18 species have Nearctic distribution in Mexico; and the other 22 are dispersed in the Neotropical lowlands although some also may occur in the highlands. In reality then 58, or 34.7% of taxa occurring in North America, north of Mexico, are also part of the Neotropical fauna. The works of Vargas (533) and Vargas and Martínez-Palacios (534) have been helpful in understanding the distribution of the Mexican culicid fauna. Vargas (*loc. cit.*) also reported that *Ae. punctor*, *Ae. impiger*, *Ae. spencerii*, and *Cs. impatiens* have been collected in Mexico; but their known distributions are so far removed from Mexico that the records need further confirmation; see Plates 13, 21, 22, 47.

For 31 of the taxa, distributional maps have been previously published and have been used as the basis for those shown here. Their sources have been acknowledged in the captions. The other 136 delimitations shown on the maps are originals, except that the northern extremes of 72 of the 75 Canadian taxa were delimited with the help of maps and information given by Wood et al. (505). The captions of each of the succeeding plates have been organized in the following manner: 1. States of the United States of America, using the official United States Post Office Department two letter abbreviations, tabulated in alphabetical order according to the spelling of the state. 2. Provinces of Canada, using the general accepted abbreviations; 3. In most instances, a reference to taxonomy listed as "Tax.", is followed by the numbers of the references in the bibliography which contain information on some aspect of the taxonomy of that species. The numbers in parentheses within the lists of states and provinces indicate the bibliographic reference which first cited the occurrence of that species in that political unit.

It must be understood that the starting point for this publication was the monograph of Carpenter and La Casse (106), and that the references, which they cited verifying the occurrence of a species in a given political unit are not repeated here, but the user is referred to their treatise. Additionally, where applicable, there is a notation with substantiating reference if a species was previously reported to have been found in a political unit and subsequently determined that it did not actually occur there. The meaning of the abbreviations for the states and provinces will be found listed on the inside cover of the publication. Listed under the name of each species included in the identification keys is a plate number. This refers to the map on which appears the geographical distribution of that species.

In preparing a presentation of geographical distribution a nagging question to face is the problem of doubtful records. All mosquito specialists who have been responsible for mosquito records in particular political units have an obligation to preserve in an acceptable manner voucher specimens for each species known to occur within its boundaries. Published reports of species found in states/provinces ought to be verified by sample specimens. In the years since 1955 a large number of doubtful records have been settled (see captions on Plates 9-49) and those responsible must be commended. Some still remain in doubt and the following 17 records have not been included either because they are quite far removed from the known range of the species or a specimen may have been collected many years ago and no further evidence exists that the species is indeed a part of the fauna.

SPECIES	POLITICAL UNIT	REFERENCE
Ae. aboriginis	Michigan	229
Ae. canadensis mathesoni	Michigan	481
Ae. canadensis mathesoni	Newfoundland	505
Ae. fulvus pallens	Indiana	392
Ae. increpitus	Manitoba	505
Ae. nigromaculis	Kentucky	106
Ae. pullatus	Michigan	229
Ae. triseriatus	Manitoba	505
Ae. trivittatus	Nova Scotia	505
Cx. apicalis	Illinois	221
Cx. pipiens	Alberta	505
Cx. pipiens	Manitoba	505
Cx. territans	Arizona	382
Cs. incidens	Michigan	229
Cs. incidens	Newfoundland	177
Ma. titillans	Arkansas	225
Ps. mathesoni	Iowa	249

TABLE 2. SYNOPSIS OF THE OCCURRENCE OF MOSQUITO SPECIES IN THE EASTERN UNITED STATES

Mosquito Species	Alabama (55)	Connecticut (42)	Delaware (51)	District of Columbia (36)	Florida (68)	Georgia (58)	Indiana (52)	Kentucky (52)	Maine (36)	Maryland (57)	Massachusetts (45)	Michigan (57)	Mississippi (53)	New Hampshire (44)	New Jersey (57)	New York (58)	North Carolina (53)	Ohio (57)	Pennsylvania (51)	Rhode Island (31)	South Carolina (55)	Tennessee (50)	Vermont (27)	Virginia (51)	West Virginia (24)
Ae. abserratus		★					★		★	★	★	★		★	★	★		★	★	★			★		
Ae. aegypti	★			★	★	★	★	★		★			★			★	★	★			★	★		★	
Ae. atlanticus	★		★	★	★	★	★	★		★			★		★	★	★				★	★		★	
Ae. atropalpus	★	★		★		★		★	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★
Ae. aurifer		★	★				★		★	★	★	★		★	★	★		★	★	★			★		
Ae. campestris												★													
Ae. c. canadensis	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. c. mathesoni	★				★	★						☆						☆			★				
Ae. cantator		★	★					★	★	★	★			★	★	★		★	★	★				★	
Ae. cinereus	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Ae. communis									★		★	★		★	★	★			★						
Ae. decticus									★		★	★		★		★			★						
Ae. diantaeus									★		★	★		★		★			★				★		
Ae. dorsalis		★	★				★			★	★	★			★	★		★	★						
Ae. dupreei	★		★		★	★	★	★				★	★		★		★	★			★	★		★	
Ae. euedes												★													
Ae. excrucians		★	★				★		★	★	★	★		★	★	★		★	★	★			★		
Ae. fitchii		★	★				★		★	★	★	★		★	★	★		★	★	★			★		
Ae. flavescens							★					★		★	★	★		★						★	
Ae. fulvus pallens	★				★	★	☆	★		★			★				★				★	★		★	
Ae. grossbecki		★	★				★	★		★			★		★	★		★	★		★	★	★	★	
Ae. hendersoni	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★		★	★		★	★
Ae. impiger												★		★											
Ae. implicatus									★		★	★		★	★	★		★							
Ae. infirmatus	★		★		★	★	★	★		★			★				★				★	★		★	
Ae. intrudens		★							★		★	★		★	★	★			★	★					
Ae. mitchellae	★		★	★	★	★		★		★		★	★		★	★	★	★	★		★	★		★	
Ae. pionips									★			★													
Ae. provocans		★							★		★	★		★	★	★			★	★			★		
Ae. punctor							★		★		★	★		★	★	★			★				★		
Ae. riparius												★				★		★							
Ae. sollicitans	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★		★	
Ae. s. spencerii												★				★		★							
Ae. sticticus	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★		★	★	★	★	★

★ Confirmed Record ☆ Doubtful Record

TABLE 2 (CONTINUED)

Mosquito Species	Alabama	Connecticut	Delaware	District of Columbia	Florida	Georgia	Indiana	Kentucky	Maine	Maryland	Massachusetts	Michigan	Mississippi	New Hampshire	New Jersey	New York	North Carolina	Ohio	Pennsylvania	Rhode Island	South Carolina	Tennessee	Vermont	Virginia	West Virginia
Ae. stimulans		★	★				★	★	★	★	★	★	★	★	★	★		★	★	★			★	★	
Ae. taeniorhynchus	★	★	★	★	★	★				★	★		★	★	★	★	★		★	★	★			★	
Ae. thelcter					★																				
Ae. thibaulti	★	★	★		★	★	★	★		★			★			★	★	★			★	★		★	
Ae. tormentor	★		★		★	★		★		★			★				★	★			★	★			
Ae. tortilis					★																				
Ae. triseriatus	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. trivittatus	★	★	★	★		★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★		★	★
Ae. vexans	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
An. albimanus					★																				
An. atropos	★				★	★				★			★		★		★				★			★	
An. barberi	★		★	★	★	★	★	★		★		★	★		★	★	★	★	★		★	★		★	★
An. bradleyi	★		★		★	★				★			★		★	★	★				★			★	
An. crucians	★	★	★	★	★	★	★	★		★	★	★	★		★	★	★	★	★	★	★	★		★	
An. earlei		★							★		★	★		★	★	★							★		
An. georgianus	★				★	★							★				★				★				
An. perplexens	★				★	★											★	★	★			★			
An. pseudopunctipennis													★									★			
An. punctipennis	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
An. quadrimaculatus	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
An. walkeri	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Cq. perturbans	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cx. atratus					★																				
Cx. bahamensis					★																				
Cx. erraticus	★		★	★	★	★	★	★		★		★	★		★		★	★	★		★	★		★	★
Cx. iolambdis					★																				
Cx. latisquama					★																				
Cx. mulrennani					★																				
Cx. nigripalpus	★				★	★		★					★				★				★	★			
Cx. opisthopus					★																				
Cx. peccator	★				★	★		★				★	★				★				★	★		★	
Cx. pilosus	★				★	★		★					★				★				★				
Cx. pipiens	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cx. quinquefasciatus	★			★	★	★	★	★		★			★				★	★			★	★		★	★
Cx. restuans	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cx. salinarius	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cx. tarsalis	★				★	★	★	★				★	★		★			★	★		★	★			
Cx. territans	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★

TABLE 2 (CONTINUED)

	Alabama	Connecticut	Delaware	District of Columbia	Florida	Georgia	Indiana	Kentucky	Maine	Maryland	Massachusetts	Michigan	Mississippi	New Hampshire	New Jersey	New York	North Carolina	Ohio	Pennsylvania	Rhode Island	South Carolina	Tennessee	Vermont	Virginia	West Virginia
Cs. impatiens		★							★		★	★		★		★			★				★		
Cs. inornata	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★		★	★		★	★
Cs. melanura	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★		★	
Cs. morsitans		★	★				★	★	★	★	★	★		★	★	★		★	★	★			★		
Cs. minnesotae		★	★				★			★	★	★		★	★	★		★							
De. cancer					★																				
Ma. dyari					★	★																			
Ma. titillans					★																				
Or. alba	★		★	★	★	★	★	★		★		★	★		★	★	★	★	★			★		★	
Or. signifera	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★		★	★
Ps. ciliata	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★		★	★
Ps. columbiae	★		★	★	★	★	★	★		★	★		★		★	★	★	★	★		★	★		★	★
Ps. cyanescens	★		★		★	★	★	★		★			★		★		★	★			★	★		★	
Ps. discolor	★		★	★	★	★	★	★		★			★		★		★	★			★	★		★	
Ps. ferox	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★		★	★		★	★
Ps. horrida	★		★	★	★	★	★	★		★		★	★				★	★	★		★	★		★	
Ps. howardii	★		★	★	★	★	★	★		★			★				★	★			★	★		★	
Ps. johnstonii					★																				
Ps. mathesoni	★		★		★	★	★	★		★			★		★	★	★	★			★	★		★	
Ps. pygmaea					★																				
Ps. signipennis								★														★			
Tx. r. rutilus					★	★															★				
Tx. r. septentrionalis	★	★	★	★	★	★	★	★		★			★		★	★	★	★	★		★	★		★	★
Ur. lowii	★				★	★							★				★				★				
Ur. sapphirina	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Wy. haynei	★				★	★				★							★				★			★	
Wy. mitchellii					★	★																			
Wy. smithii		★	★				★		★	★	★	★		★	★	★		★	★	★					
Wy. vanduzeei					★																				

TABLE 3. SYNOPSIS OF THE OCCURRENCE OF MOSQUITO SPECIES IN THE WESTERN UNITED STATES

Mosquito Species	Arizona (43)	Arkansas (54)	California (47)	Colorado (42)	Idaho (49)	Illinois (58)	Iowa (48)	Kansas (52)	Louisiana (56)	Minnesota (51)	Missouri (54)	Montana (46)	Nebraska (49)	Nevada (35)	New Mexico (55)	North Dakota (32)	Oklahoma (59)	Oregon (47)	South Dakota (40)	Texas (82)	Utah (47)	Washington (43)	Wisconsin (50)	Wyoming (46)
Ae. aboriginis					★													★				★		
Ae. abserratus						★				★													★	
Ae. aegypti		★				★		★	★		★						★			★				
Ae. aloponotum																		★				★		
Ae. atlanticus		★				★		★	★		★						★			★				
Ae. atropalpus										★													★	
Ae. aurifer						★	★			★													★	
Ae. bicristatus			★																					
Ae. bimaculatus																				★				
Ae. brelandi																				★				
Ae. burgeri	★																							
Ae. campestris			★	★	★		★			★		★	★	★	★	★		★	★	★	★	★	★	★
Ae. c. canadensis		★			★	★	★	★	★	★	★	★	★			★	★		★	★		★	★	★
Ae. cataphylla	★		★	★	★							★		★	★			★			★	★		★
Ae. cinereus		★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★		★	★	★	★
Ae. communis			★	★	★					★		★		★	★			★			★	★	★	★
Ae. decticus										★														
Ae. deserticola			★																					
Ae. diantaeus										★		★											★	★
Ae. dorsalis	★		★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. dupreei		★				★	★	★	★		★						★			★				
Ae. epactius	★	★		★				★	★		★				★		★			★	★			
Ae. euedes										★														
Ae. excrucians				★	★	★				★		★			★	★		★			★	★	★	★
Ae. fitchii	★		★	★	★	★	★			★		★	★	★	★	★		★			★	★	★	★
Ae. flavescens			★	★	★	★	★	★		★	★	★	★			★		★	★		★	★	★	★
Ae. fulvus pallens		★				★			★		★						★			★				
Ae. grossbecki		★				★			★		★									★			★	
Ae. hemiteleus			★															★						
Ae. hendersoni		★		★	★	★	★	★	★	★	★	★	★		★		★	★	★	★	★		★	★
Ae. hexodontus			★	★	★							★		★	★			★			★	★		★
Ae. impiger				★	★							★						★			★	★		★
Ae. implicatus	★			★	★		★			★		★	★		★			★			★	★	★	★

• Confirmed Record   Doubtful Record

TABLE 3 (CONTINUED)

Mosquito Species	Arizona	Arkansas	California	Colorado	Idaho	Illinois	Iowa	Kansas	Louisiana	Minnesota	Missouri	Montana	Nebraska	Nevada	New Mexico	North Dakota	Oklahoma	Oregon	South Dakota	Texas	Utah	Washington	Wisconsin	Wyoming
Ae. increpitus	★		★	★	★							★	★	★	★			★	★		★	★		★
Ae. infirmatus		★				★			★		★									★				
Ae. intrudens				★	★					★		★				★		★	★		★	★	★	★
Ae. melanimon			★	★	★							★	★	★	★			★			★	★		★
Ae. mercurator					★							★												★
Ae. mitchellae		★				★		★	★						★		★			★				
Ae. monticola	★														★									
Ae. muelleri	★														★					★				
Ae. nevadensis					★									★				★			★	★		★
Ae. nigromaculis	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★		★
Ae. niphadopsis			★		★									★				★			★			★
Ae. papago	★																							
Ae. pionips				★	★					★		★				★		★				★		★
Ae. provocans					★					★		★										★	★	
Ae. pullatus	★		★	★	★							★		★	★			★			★	★		★
Ae. punctor				★	★	★	★			★		★				★						★	★	★
Ae. purpureipes	★																							
Ae. riparius							★			★	★	★				★							★	
Ae. scapularis																				★				
Ae. schizopinax			★	★	★							★		★	★			★			★			★
Ae. sierrensis			★		★							★		★				★			★	★		
Ae. sollicitans	★	★				★	★	★	★		★		★		★	★	★		★	★				
Ae. s. idahoensis				★	★							★	★	★	★	★		★	★		★	★		★
Ae. s. spencerii						★	★	★		★		★	★			★	★		★				★	★
Ae. squamiger			★																					
Ae. sticticus		★	★	★	★	★	★	★	★	★	★	★	★			★	★	★	★	★	★	★	★	★
Ae. stimulans						★	★	★		★	★		★						★				★	
Ae. taeniorhynchus	★	★	★					★	★								★			★				
Ae. thelcter															★		★			★				
Ae. thibaulti		★				★			★		★									★				
Ae. tormentor		★				★			★		★						★			★				
Ae. triseriatus		★				★	★	★	★	★	★		★				★			★			★	
Ae. trivittatus	★	★		★	★	★	★	★	★	★	★	★	★		★	★	★		★	★	★		★	★
Ae. varipalpus	★																				★			
Ae. ventrovittis	★		★		★													★			★	★		★
Ae. vexans	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. zoosophus		★						★	★								★			★				
An. albimanus																				★				

TABLE 3 (CONTINUED)

Mosquito Species	Arizona	Arkansas	California	Colorado	Idaho	Illinois	Iowa	Kansas	Louisiana	Minnesota	Missouri	Montana	Nebraska	Nevada	New Mexico	North Dakota	Oklahoma	Oregon	South Dakota	Texas	Utah	Washington	Wisconsin	Wyoming
An. atropos									★											★				
An. barberi		★				★	★	★	★	★	★		★				★		★	★			★	
An. bradleyi									★											★				
An. crucians		★				★	★	★	★		★				★		★			★			★	
An. earlei				★	★		★	★		★		★	★	★		★			★		★	★	★	★
An. franciscanus	★		★	★				★					★	★	★		★	★		★	★			★
An. freeborni	★		★	★	★							★		★	★			★		★	★	★		★
An. georgianus									★															
An. judithae	★														★					★				
An. occidentalis			★															★				★		
An. pseudopunctipennis		★						★	★		★				★		★			★				
An. punctipennis		★	★	★	★	★	★	★	★	★	★	★	★		★	★	★	★	★	★		★	★	★
An. quadrimaculatus		★				★	★	★	★	★	★		★			★	★		★	★			★	
An. walkeri		★				★	★	★	★	★	★		★			★			★	★			★	
Cq. perturbans		★	★	★	★	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★	★	★	★
Cx. abominator																				★				
Cx. anips			★																					
Cx. apicalis	★		★			☆								★	★		★	★		★	★			
Cx. arizonensis	★																							
Cx. boharti			★		★									★				★				★		
Cx. chidesteri																				★				
Cx. coronator	★														★					★				
Cx. declarator																				★				
Cx. erraticus		★				★	★	★	★	★	★		★		★		★		★	★			★	
Cx. erythrothorax	★		★	★	★									★	★					★	★			
Cx. interrogator																				★				
Cx. nigripalpus	★								★								★			★				
Cx. peccator		★				★		★	★		★						★			★				
Cx. peus	★		★											★	★		★	★		★		★		
Cx. pilosus									★											★				
Cx. pipiens		★	★	★	★	★	★	★		★	★	★	★			★	★	★	★		★	★	★	★
Cx. quinquefasciatus	★	★	★			★	★	★	★		★		★	★	★		★			★	★			
Cx. reevesi			★																					
Cx. restuans	★	★	★	★	★	★	★	★	★	★	★	★	★		★	★	★	★	★	★	★		★	★
Cx. salinarius		★		★	★	★	★	★	★	★	★		★		★	★	★		★	★			★	★
Cx. tarsalis	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cx. territans	★	★	★	★	★	★	★	★	★	★	★	★	★	★			★	★	★	★	★	★	★	★
Cx. thriambus	★		★											★	★		★			★	★			

TABLE 3 (CONTINUED)

Mosquito Species	Arizona	Arkansas	California	Colorado	Idaho	Illinois	Iowa	Kansas	Louisiana	Minnesota	Missouri	Montana	Nebraska	Nevada	New Mexico	North Dakota	Oklahoma	Oregon	South Dakota	Texas	Utah	Washington	Wisconsin	Wyoming
Cs. alaskaensis				★	★							★		★										★
Cs. impatiens			★	★	★		★				★	★	★	★	★			★	★		★	★	★	★
Cs. incidens	★		★	★	★							★	★	★	★	★	★	★	★	★	★	★		★
Cs. inornata	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cs. melanura		★				★	★	★	★	★	★		★				★			★			★	
Cs. minnesotae					★	★	★			★		★						★			★	★	★	
Cs. morsitans					★	★	★			★		★				★			★		★		★	
Cs. particeps	★		★															★				★		
De. mathesoni																				★				
De. pseudes																				★				
Hg. equinus																				★				
Ma. titillans																				★				
Or. alba		★				★	★	★	★		★		★		★		★			★				
Or. kummi	★														★									
Or. signifera	★	★	★			★	★	★	★	★	★		★		★		★	★	★	★	★		★	
Ps. ciliata		★				★	★	★	★	★	★		★		★		★		★	★			★	
Ps. columbiae		★	★	★		★	★	★	★	★	★		★	★			★		★	★				
Ps. confinnis complex	★		☆												★									
Ps. cyanescens		★				★		★	★		★		★		★		★			★				
Ps. discolor	★	★				★	★	★	★		★		★		★		★			★				
Ps. ferox		★				★	★	★	★	★	★		★				★		★	★			★	
Ps. horrida		★				★	★	★	★	★	★		★				★		★	★			★	
Ps. howardii	★	★				★		★	★		★		★				★			★				
Ps. longipalpus		★						★	★		★		★				★		★	★				
Ps. mathesoni		★				★			★		★						★			★			★	
Ps. mexicana																				★				
Ps. signipennis	★	★	★	★			★	★			★	★	★	★	★	★	★		★	★	★			★
Tx. r. septentrionalis		★				★		★	★		★						★			★				
Tx. sp.	★																							
Ur. a. anhydor	★		★											★										
Ur. a. syntheta		★													★		★			★				
Ur. lowii		★							★								★			★				
Ur. sapphirina		★				★	★	★	★	★	★		★		★	★	★		★	★			★	
Wy. smithii						★				★													★	

TABLE 4. SYNOPSIS OF THE OCCURRENCE OF MOSQUITO SPECIES IN CANADA AND ALASKA

Mosquito Species	Alaska (32)	Alberta (41)	British Columbia (46)	Labrador (26)	Manitoba (43)	New Brunswick (28)	Newfoundland (15)	Northwest Territories (28)	Nova Scotia (25)	Ontario (57)	Prince Edward Island (18)	Quebec (52)	Saskatchewan (40)	Yukon (26)
Ae. aboriginis	★		★											
Ae. abserratus				★	★	★	★		★	★	★	★		
Ae. aloponotum			★											
Ae. atropalpus				★						★		★		
Ae. aurifer						★				★		★		
Ae. campestris		★	★		★					★		★	★	★
Ae. c. canadensis	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. c. mathesoni							☆							
Ae. cantator				★		★	★		★		★	★		
Ae. cataphylla	★	★	★										★	★
Ae. churchillensis		★			★									
Ae. cinereus	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. communis	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. decticus	★	★		★	★			★		★		★		
Ae. diantaeus	★	★	★	★	★			★	★	★		★	★	★
Ae. dorsalis		★	★		★	★				★		★	★	
Ae. euedes	★	★	★		★			★	★	★		★	★	
Ae. excrucians	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. fitchii	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. flavescens	★	★	★	★	★			★		★		★	★	★
Ae. grossbecki										★				
Ae. hendersoni			★		★					★		★	★	
Ae. hexodontus	★	★	★	★	★			★		★		★		★
Ae. impiger	★	★	★	★	★			★		★		★	★	★
Ae. implicatus	★	★	★	★	★			★		★	★	★	★	★
Ae. increpitus		★	★		☆								★	
Ae. intrudens	★	★	★	★	★	★	★		★	★	★	★	★	
Ae. melanimon		★	★										★	
Ae. mercurator	★	★	★		★			★		★		★	★	★
Ae. nigripes	★		★	★	★		★	★				★		★
Ae. nigromaculis		★			★								★	
Ae. pionips	★	★	★	★	★			★		★		★	★	★
Ae. provocans		★	★		★	★		★	★	★	★	★	★	
Ae. pullatus	★	★	★	★			★	★				★		★
Ae. punctodes	★													

★ Confirmed Record   ☆ Doubtful Record

TABLE 4 (CONTINUED)

Mosquito Species	Alaska	Alberta	British Columbia	Labrador	Manitoba	New Brunswick	Newfoundland	Northwest Territories	Nova Scotia	Ontario	Prince Edward Island	Quebec	Saskatchewan	Yukon
Ae. punctor	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Ae. rempeli								★		★		★		
Ae. riparius	★	★	★		★	★		★	★	★		★	★	★
Ae. schizopinax		★												
Ae. sierrensis			★											
Ae. sollicitans						★			★	★	★			
Ae. s. idahoensis			★											
Ae. s. spencerii		★	★		★					★			★	
Ae. sticticus		★	★	★	★	★				★		★	★	
Ae. stimulans					★	★	★		★	★	★	★		
Ae. thibaulti										★				
Ae. togoi			★											
Ae. triseriatus					☆	★				★		★		
Ae. trivittatus					★				☆	★		★		
Ae. ventrovittis	★													
Ae. vexans	★	★	★		★	★			★	★	★	★	★	★
An. barberi										★		★		
An. earlei	★	★	★	★	★	★		★	★	★	★	★	★	★
An. freeborni			★											
An. punctipennis			★		★	★			★	★		★		
An. quadrimaculatus										★		★		
An. walkeri					★	★			★	★		★	★	
Cq. perturbans		★	★		★	★			★	★	★	★	★	
Cx. pipiens		☆	★		☆	★			★	★		★		
Cx. restuans		★			★	★			★	★		★	★	
Cx. tarsalis		★	★		★			★		★			★	
Cx. territans	★	★	★	★	★	★		★	★	★		★	★	★
Cs. alaskaensis	★	★	★	★	★			★				★	★	★
Cs. impatiens	★	★	★	★	★	★	★	★		★		★	★	★
Cs. incidens	★	★	★				☆	★					★	★
Cs. inornata		★	★		★			★		★		★	★	★
Cs. melanura										★		★		
Cs. minnesotae	★	★	★		★					★		★	★	
Cs. morsitans	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Cs. particeps	★													
Or. alba										★		★		
Or. signifera										★				
Ps. ciliata										★		★		
Ps. columbiae										★				

TABLE 4 (CONTINUED)

	Alaska	Alberta	British Columbia	Labrador	Manitoba	New Brunswick	Newfoundland	Northwest Territories	Nova Scotia	Ontario	Prince Edward Island	Quebec	Saskatchewan	Yukon
Ps. ferox										★				
Ps. signipennis													★	
Tx. r. septentrionalis										★				
Ur. sapphirina										★		★		
Wy. smithii				★	★	★	★		★	★	★	★	★	

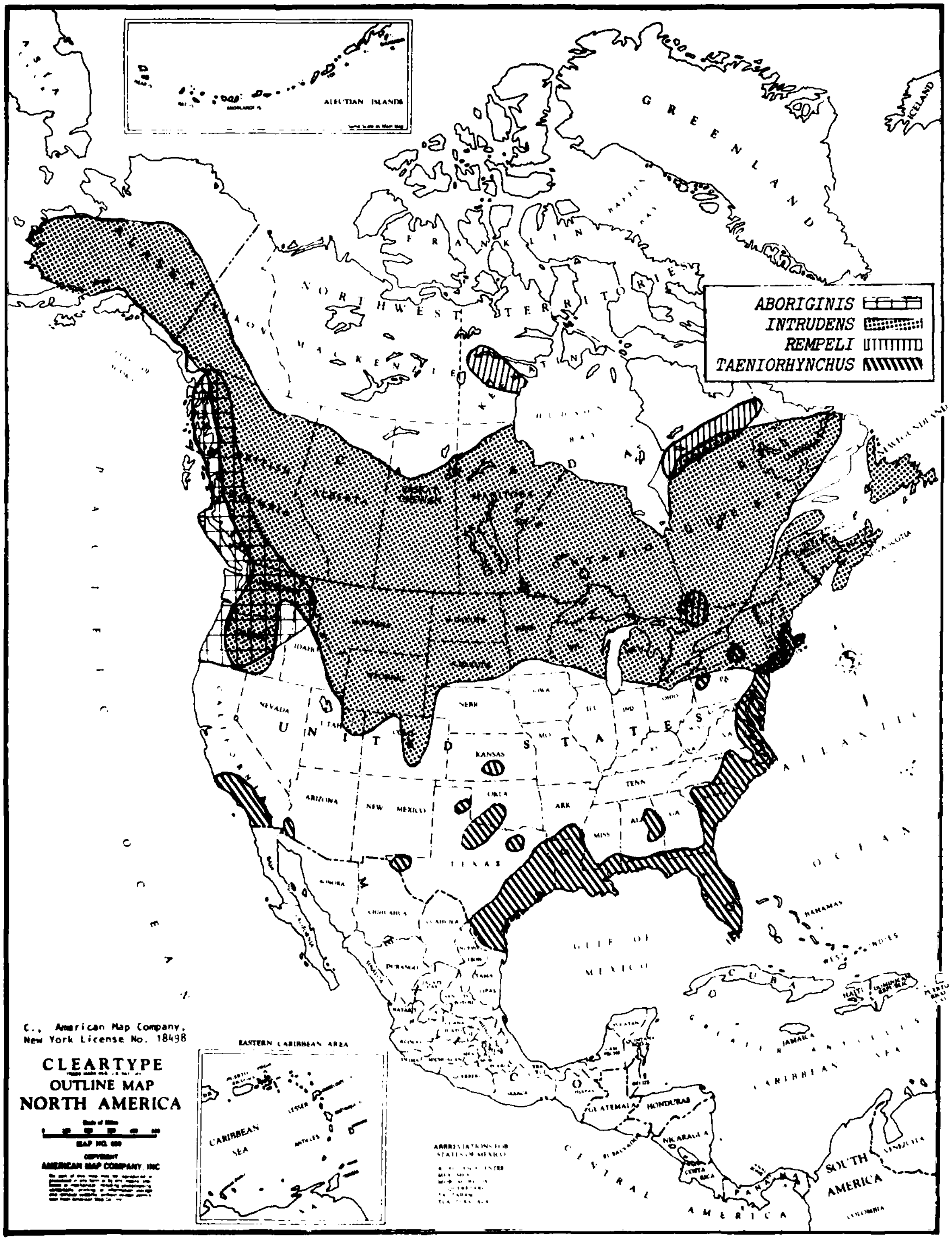

Plate 9. Distribution of *Aedes aboriginis* - USA: AK, ID, OR, WA (106); CANADA: BC (106), Not in SASK (380); Tax. 279, 505. *Aedes intrudens* - USA: AK, CO, CT, ID, ME, MA, MI, MN, MT, NH, NY, ND, OR, PA, RI, SD, UT, WA, WI, WY (106), NJ (133); CANADA: ALTA, BC, LAB, MAN, NB, NS, PEI (106), NFLD (360), ONT (27), PQ (155), SASK (380); Tax. 279, 505. *Aedes rempeli* - CANADA: NWT, PQ (106), ONT (505); Tax. 154, 279, 434, 505. *Aedes taeniorhynchus* - USA: AL, AR, CA, CT, DE, DC, FL, GA, LA, MD, MA, MS, NJ, NY, NC, PA, RI, SC, TX, VA (106), AZ (385), KS (344), NH (74), OK (215, 225), Not in NM (502); Map modified after Knight (248); Tax. 34, 279.

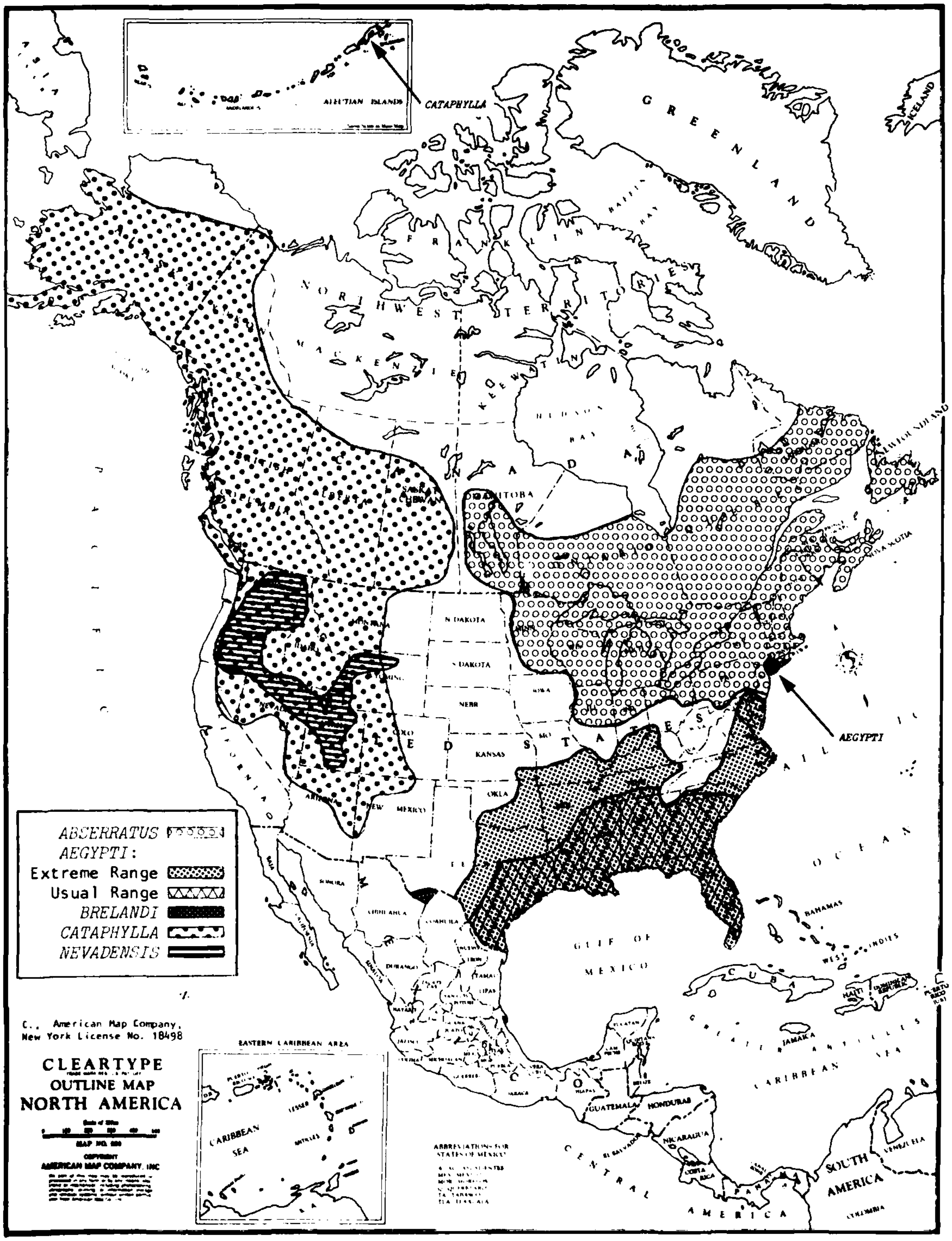

Plate 10. Distribution of *Aedes abserratus* - USA: CT, IL, ME, MA, MI, MN, NH, NJ, NY, OH, PA, RI, VT, WI (106), IN (415), MD (50);CANADA : LAB, NS, ONT, PEI (106), MAN (70), NB (529), NFLD (478), PQ (288); Tax. 279, 478, 505. *Aedes aegypti* - USA: AL, AR, DC, FL, GA, IL, IN, KS, KY, LA, MS, MO, NC, OK, SC, TN, TX, VA (106), MD (467), NY (40), OH (Berry & Parsons, in litt. 1978); Map modified after Morland & Tinker (318); Tax. 34, 279. *Aedes brelandi* - USA: TX (514); Tax. 514. *Aedes cataphylla* - USA: CA, CO, ID, MT, OR, UT, WA, WY (106), AK (192), AZ, NV (382), NM (340); CANADA : ALTA, BC, SASK, YUK (106); Tax. 279, 501, 505. *Aedes nevadensis* - USA: ID, OR, WA (191), NV, UT, WY (117); Map modified after Ellis & Brust (167); Tax. 117, 167, 191, 501.

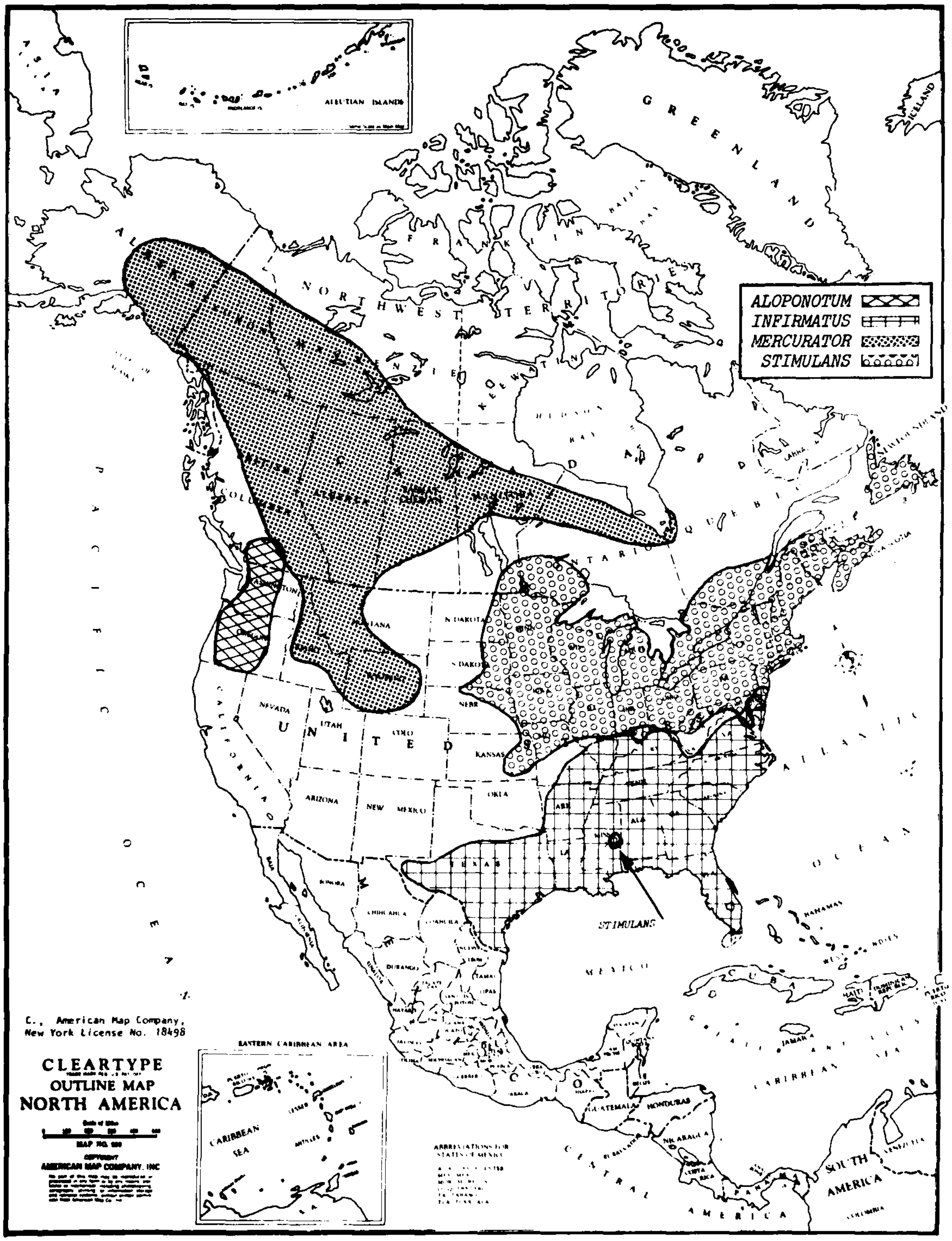

Plate 11. Distribution of *Aedes aloponotum* - USA: OR, WA (106); CANADA: BC (191); Tax. 191, 279, 505. *Aedes infirmatus* - USA: AL, AR, FL, GA, KY, LA, MS, MO, NC, SC, TN, TX (106), DE (252), IL (220), IN (217), MD (123), VA (7). Not in AZ (7); Map modified after Arnell (7); Tax. 7, 279. *Aedes mercurator* - USA: ID, MT, WY (106 as *Ae. stimulans*), AK (504); CANADA: ALTA, MAN, NWT, ONT, SASK, YUK (504), BC, PQ (505); Tax. 504, 505. *Aedes stimulans* USA: CT, DE, IL, IA, KS, ME, MA, MI, MN, MS, MO, NE, NH, NJ, NY, OH, PA, RI, SD, VT, WI (106), IN (414), KY (128), MD, VA (46). Not in CO (212) nor UT (338); CANADA: MAN, NB, NS, ONT, PEI, PQ (106), NFLD (360). Not in ALTA, BC, NWT, SASK, YUK (504); Tax. 279, 302, 504, 505.

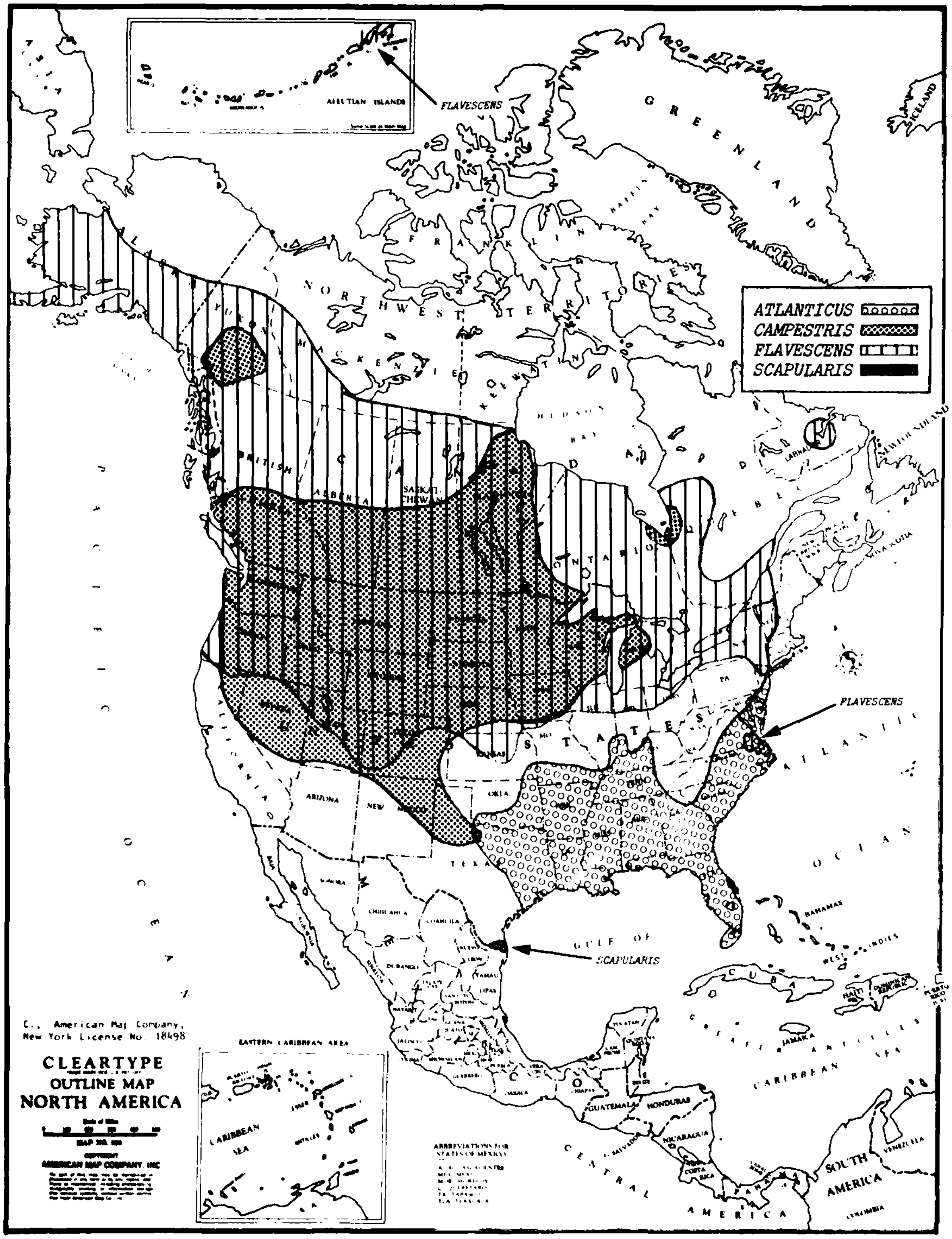

Plate 12. Distribution of *Aedes atlanticus* - USA: AL, AR, DE, DC, FL, GA, KS, LA, MD, MS, MO, NJ, NY, NC, OK, SC, TX, VA (106), IL (393), IN (422), KY (127), TN (61); Tax. 279. *Aedes campestris* - USA: CO, ID, IA, MI, MN, MT, NE, ND, OR, SD, TX, UT, WA, WI, WY (106), CA (203), NV (115), NM (460); CANADA : ALTA, BC, MAN, ONT, PQ, SASK, YUK (106); Tax. 279, 478, 505. *Aedes flavescens* - USA: AK, CA, CO, ID, IL, IA, KS, MI, MN, MO, MT, NE, NY, ND, OR, SD, UT, WA, WI, WY (106), IN (414), NH (Burger, in litt. 1977), NJ (132), OH (Berry & Parsons, in litt. 1978), VA (Skeeter 23: 2, 1978); CANADA: ALTA, BC, LAB, MAN, NWT, ONT, SASK, YUK (106), PQ (155); Tax. 279, 478, 505. *Aedes scapularis* - USA: TX (106). Not in FL (7) nor LA (95); Tax. 7, 279.

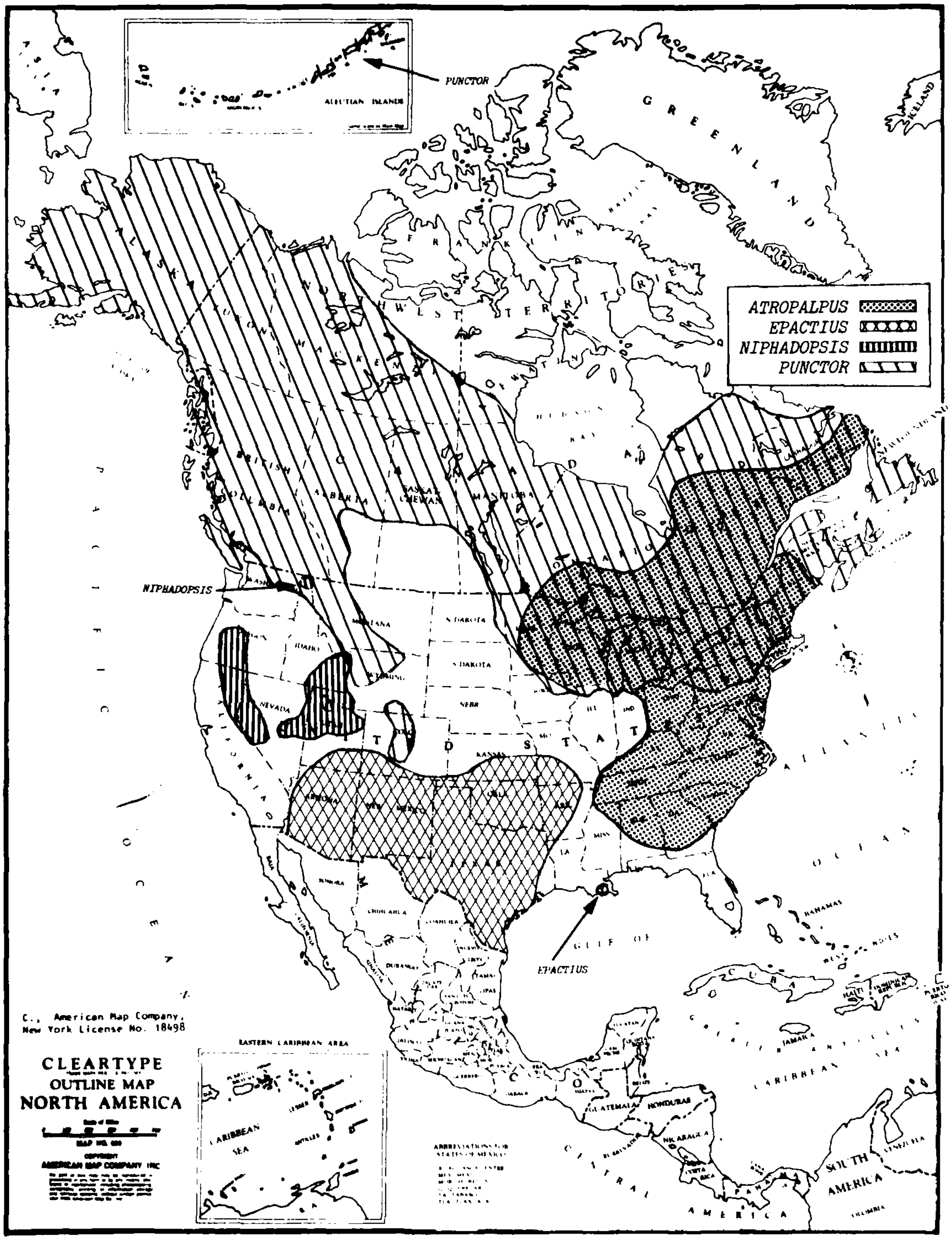

Plate 13. Distribution of *Aedes atropalpus* - USA: CT, DC, GA, ME, MD, MA, MN, NH, NJ, NY, NC, PA, RI, SC, TN, VT, VA, WV, WI (106), AL, KY (514), MI (23), OH (Berry & Parsons, in litt. 1978); CANADA: LAB, ONT, PQ (106); Map modified after Zavortink (514); Tax. 279, 347, 348, 505, 514. *Aedes epactius* USA: AZ, AR, CO, KS, MO, NM, OK, TX, UT (514), LA (141); Map modified after Zavortink (514); Tax. 347, 348, 514. *Aedes niphadopsis* - USA: ID, NV, OR, UT (106), CA (97), WY (114); CANADA: Not in ALTA (Pucat, in litt. 1979); Tax. 279, 378. *Aedes punctor* USA: AK, CO, IL, ME, MA, MI, MN, MT, NH, NJ, NY, ND, VT, WI, WY (106), ID (190), IN (416), IA (361), PA (69), WA (325), Not in MD (46) nor UT (338); CANADA: ALTA, BC, LAB, MAN, NB, NWT, NS, ONT, PEI, PQ, SASK, YUK (106), NFLD (177); Tax. 279, 505.

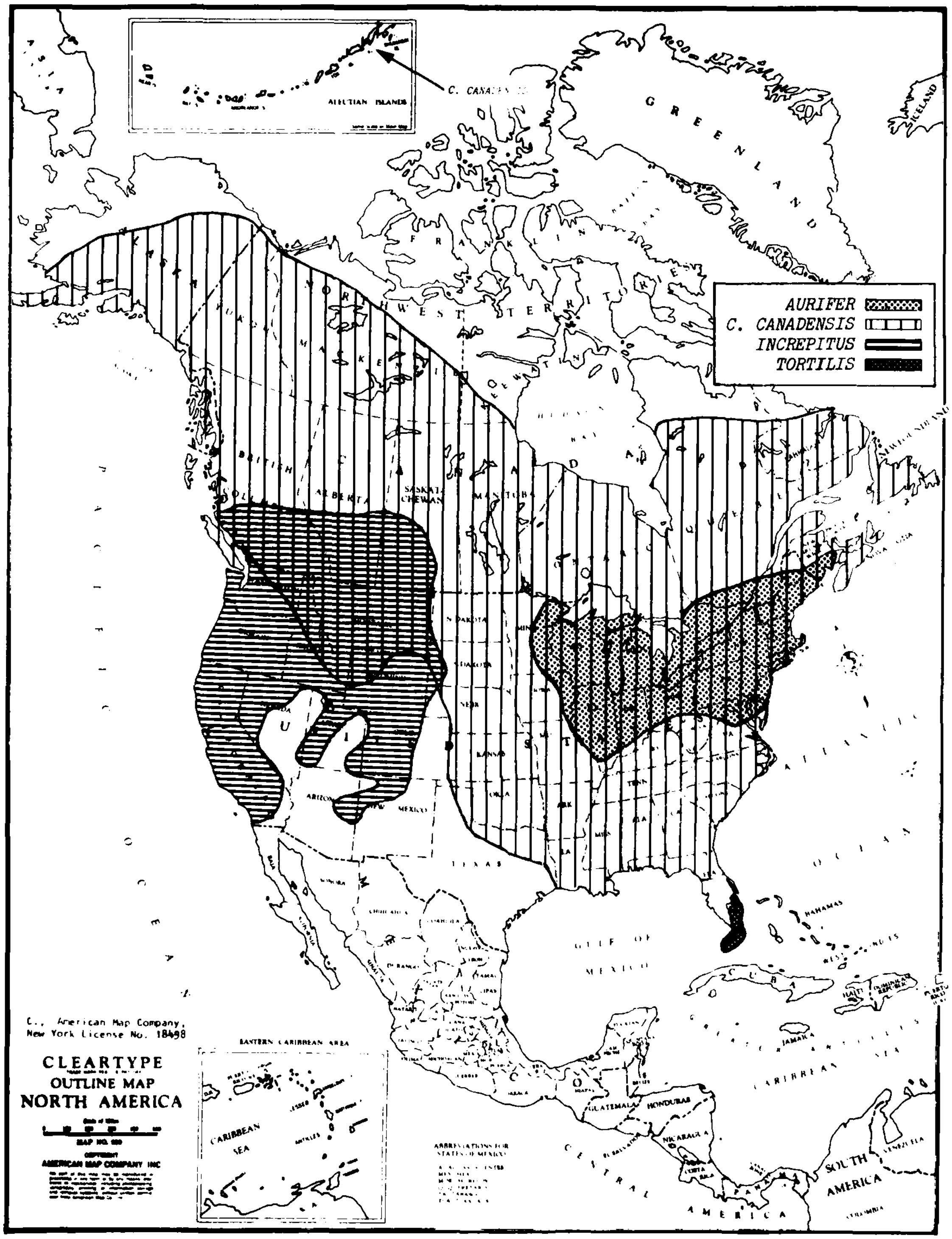

Plate 14. Distribution of *Aedes aurifer* - USA: CT, DE, IL, IA, ME, MD, MA, MI, MN, NH, NJ, NY, OH, RI, VT, WI (106), IN (407), PA (492); CANADA: ONT, PQ (106), NB (314); Tax. 279, 505. *Aedes c. canadensis* - USA: AL, AR, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WA, WI, WY (106), AK (130), WV (3), Not in NM (502); CANADA: ALTA, BC, LAB, MAN, NB, NFLD, NWT, NS, ONT, PEI, PQ, SASK, YUK (106); Tax. 28, 279, 505. *Aedes increpitus* - USA: CA, CO, ID, MT, NV, NM, OR, UT, WA, WY (106), AZ (503), NE (376), SD (187); CANADA: BC, SASK (106), ALTA (370); Tax. 279, 501, 505. *Aedes tortilis* - USA: FL (106); Map after Arnell (7); Tax. 7, 28, 34.

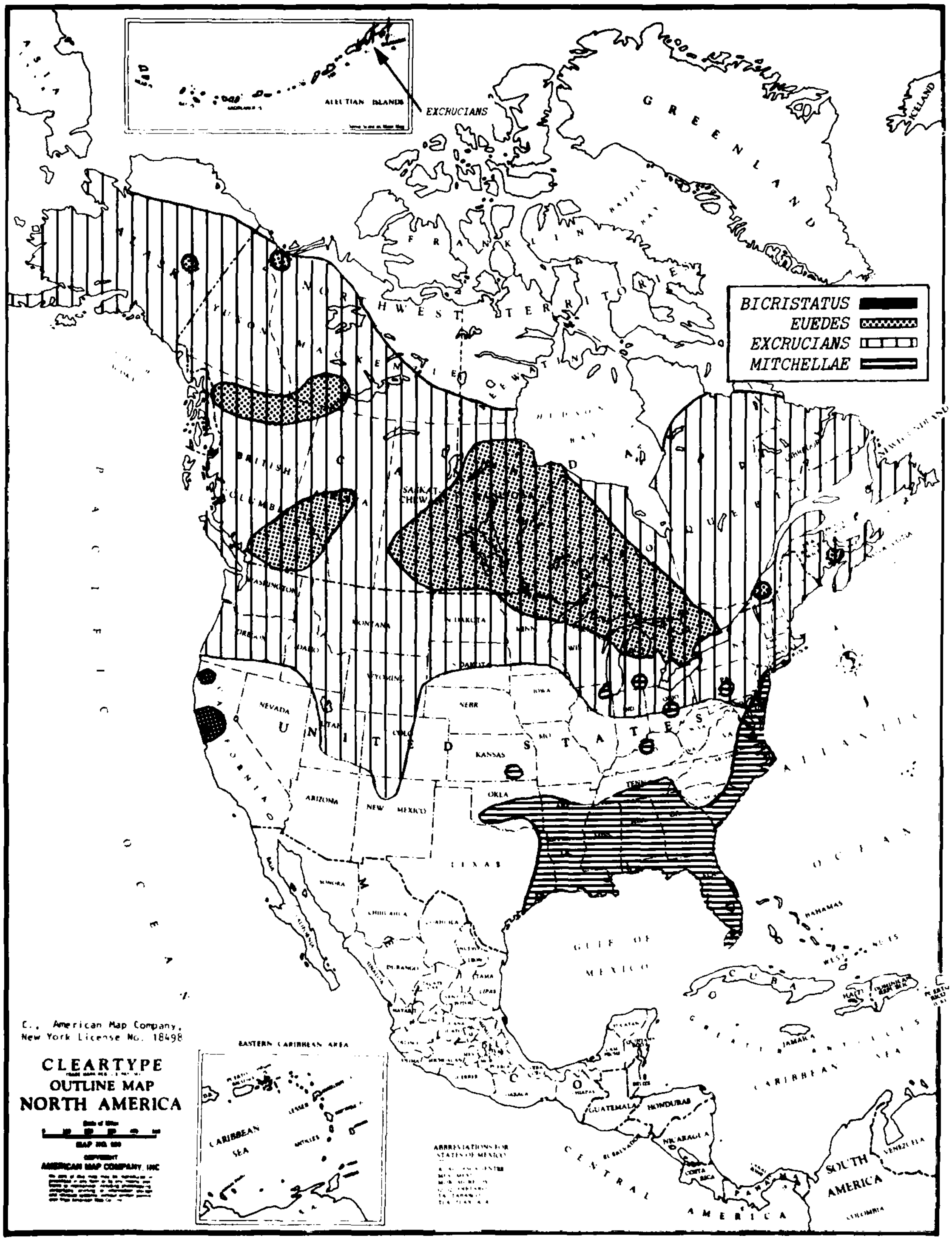

Plate 15. Distribution of *Aedes bicristatus* - USA: CA (106, 107); Tax. 279. *Aedes euedes* - USA: AK (333), MI (23), MN (395); CANADA: ALTA (169), MAN (70), NS (529), ONT (444), PQ (155), BC, NWT, SASK (505); Tax. 138, 279, 395, 504, 505, 516. *Aedes excrucians* - USA: AK, CO, CT, ID, IL, ME, MA, MI, MN, MT, NH, NJ, NY, ND, OH, OR, PA, RI, UT, VT, WA, WI, WY (106), DE (252), IN (414), MD (50), NM (340); CANADA: ALTA, BC, MAN, NFLD, NWT, NS, ONT, PEI, PQ, SASK, YUK (106), LAB (219), NB (314); Tax. 136, 205, 279, 302, 501, 505. *Aedes mitchellae* - USA: AL, AR, DE, DC, FL, GA, IL, LA, MD, MS, NJ, NM (no specific locality), NY, NC, OK, SC, TN, TX, VA (106), KS (344), KY (127), MI (Newson, in litt. 1977), OH (352), PA (443); Tax. 279.

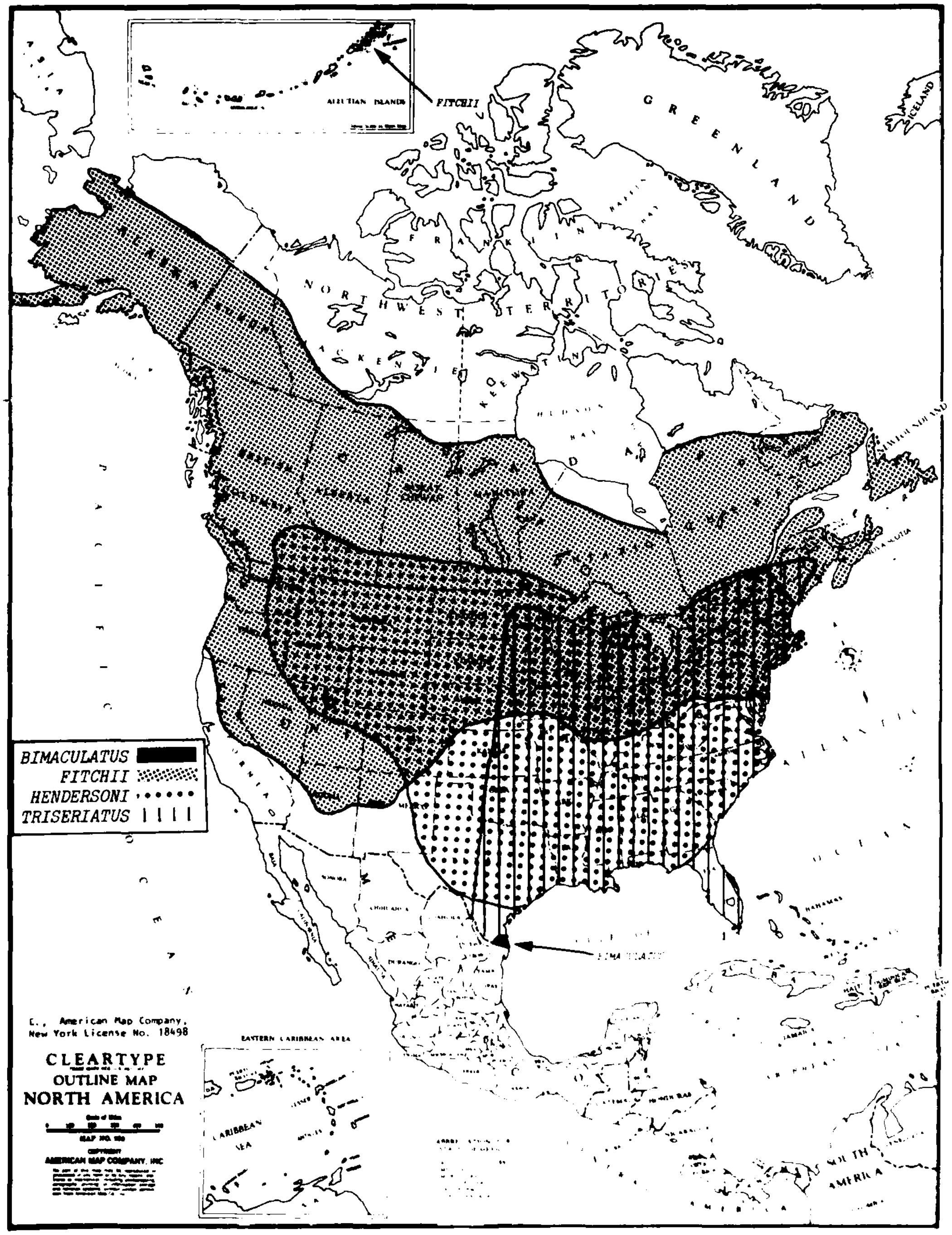

Plate 16. Distribution of *Aedes bimaculatus* - USA: TX (106). *Aedes fitchii* - USA: AK, CA, CO, CT, ID, IL, IA, ME, MA, MI, MN, MT, NE, NH, NJ, NY, ND, OH, OR, RI, UT, VT, WA, WI, WY (106), AZ, NV (382), DE (251), IN (414), MD (46), NM (499), PA (396); CANADA: ALTA, BC, LAB, MAN, NFLD, NWT, ONT, PEI, PQ, SASK, YUK (106), NB (214), NS (529); Tax. 279, 501, 505. *Aedes hendersoni* - USA: AL, AR, CT, DE, DC, GA, IA, KY, ME, MD, MA, MN, MS, NH, NJ, NY, NC, OR, PA, SC, TN, UT, VA, WV (514), CO, TX (65), ID, WY (337), IL (222), IN, MI, OH (472), KS, NE (212), LA (116), MO (427), MT, NM, SD (332), OK (353), WI (268); CANADA: BC (514), MAN (470), ONT, PQ, SASK (505); Map after Zavortink (514); Tax. 65, 201, 211, 279, 505, 514. *Aedes triseriatus* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, NE, NH, NJ, NY, NC, OH, OK, PA, RI, SC, TN, TX, VT, VA, WI (106), WV (3); CANADA: ONT, PQ (106), NB (529); Map modified after Zavortink (514); Tax. 65, 201, 211, 279, 505, 514.

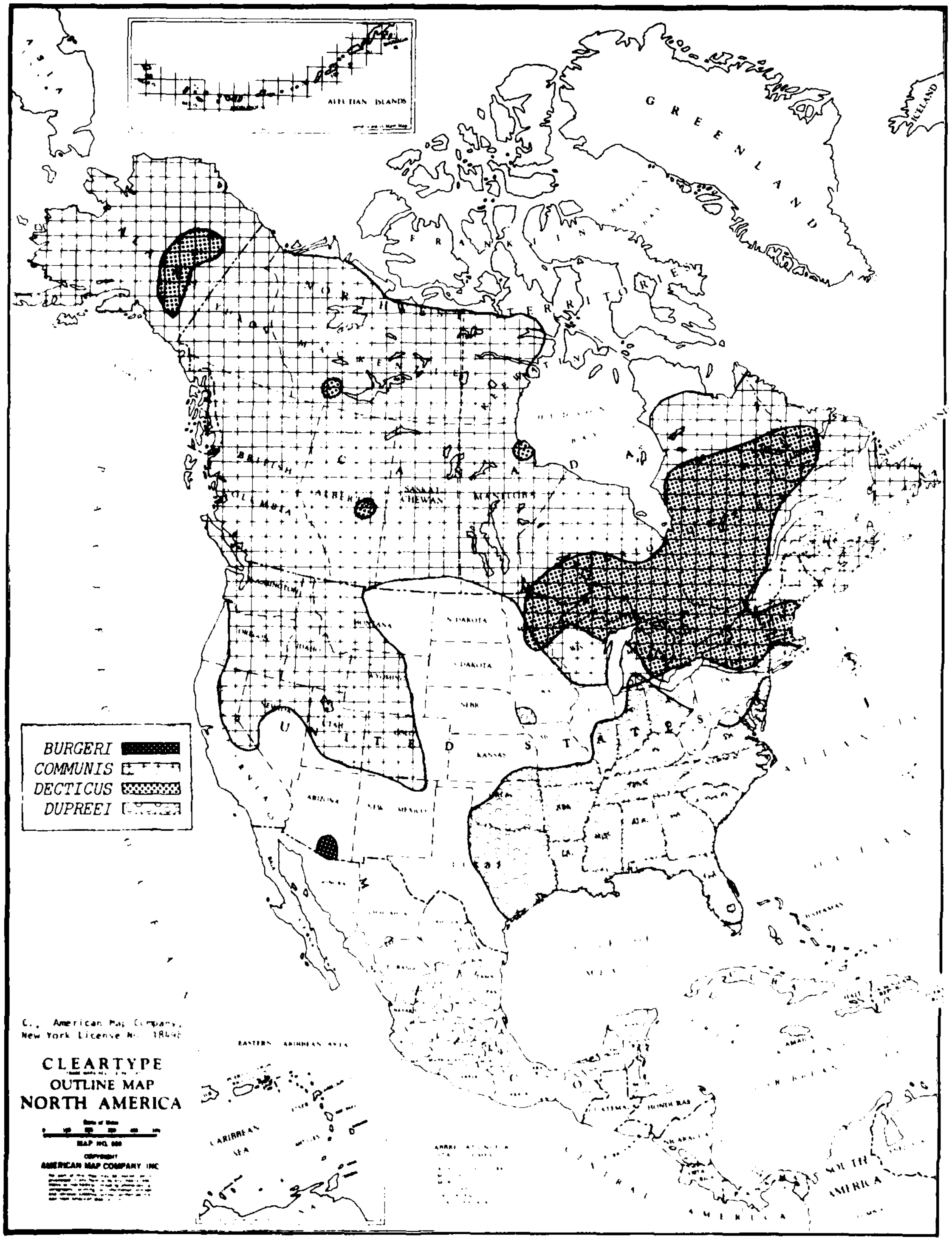

Plate 17. Distribution of *Aedes burgeri* - USA: AZ (514); Map after Zavortink (514); Tax. 73, 514. *Aedes communis* - USA: AK, CA, CO, ME, MA, MI, MN, MT, NH, NJ, NY, OR, PA, UT, WA, WI, WY (106), ID (321), NV (109), NM (340); CANADA: ALTA, BC, LAB, MAN, NB, NWT, NS, ONT, PEI, PQ, SASK, YUK (106), NFLD (167); Map modified after Ellis & Brust (167); Tax. 167, 279, 501, 505. *Aedes decticus* - USA: AK, MA, MI, NH, NY (106), ME (399), MN (19), PA (193); CANADA: LAB, ONT (106), ALTA, MAN (156), PQ (288), NWT (505); Map modified after Bourassa et al. (55); Tax. 279, 505. *Aedes dupreei* - USA: AL, AR, FL, GA, IL, IA, KS, KY, LA, MS, MO, NJ, NC, OK, SC, TN, TX, VA (106), DE (250), IN (416), MI (Newson, in litt. 1978), OH (352), Not in MD (46); Tax. 279

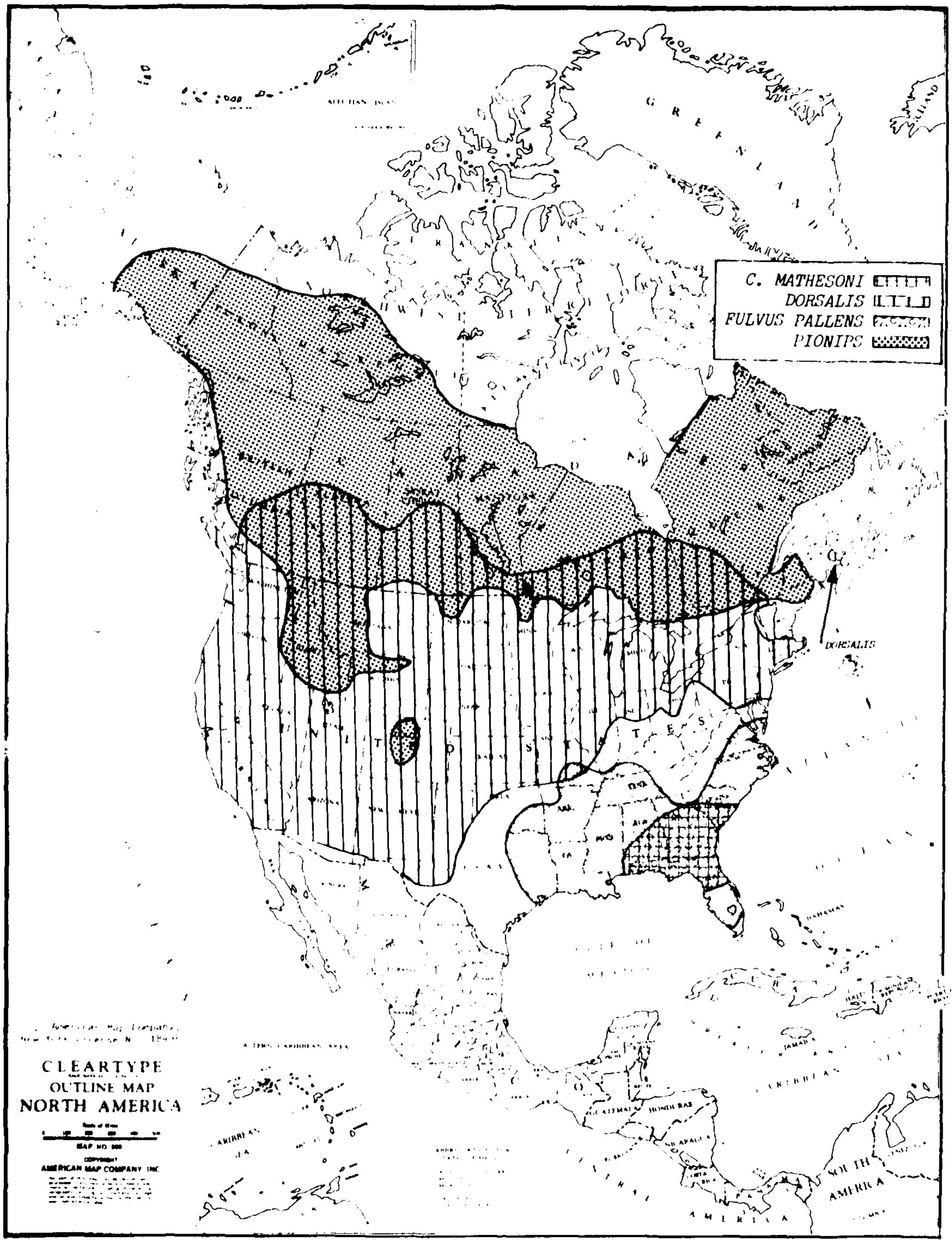

Plate 18. Distribution of *Aedes c. mathesoni* - USA: AL, FL, GA, SC (106). Not in OH (Parsons in litt. 1978); CANADA: NFLD (360, doubtful 505). *Aedes dorsalis* - USA: CA, CO, CT, DE, ID, IL, IA, KS, MA, MN, MO, MT, NE, NV, NM, NY, ND, OH, OK, OR, PA, SD, TX, UT, WA, WI, WY (106), AZ (382), IN (116), MD (292), MI (23), NJ (72); CANADA: ALTA, BC, MAN, ONT, PQ, SASK (106), NB (311); Tax. 13, 53, 205, 279, 505. *Aedes fulvus pallens* - USA: AL, AR, FL, GA, IL, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA (106), MO (291); Tax. 279. *Aedes pionips* - USA: AK, CO, ID, MT, ND, WY (106), ME (301), MI (23), MN (16), OR, WA (190); CANADA: ALTA, BC, LAB, MAN, NWT, ONT, PQ, SASK, YUK (106); Tax. 136, 205, 279, 505.

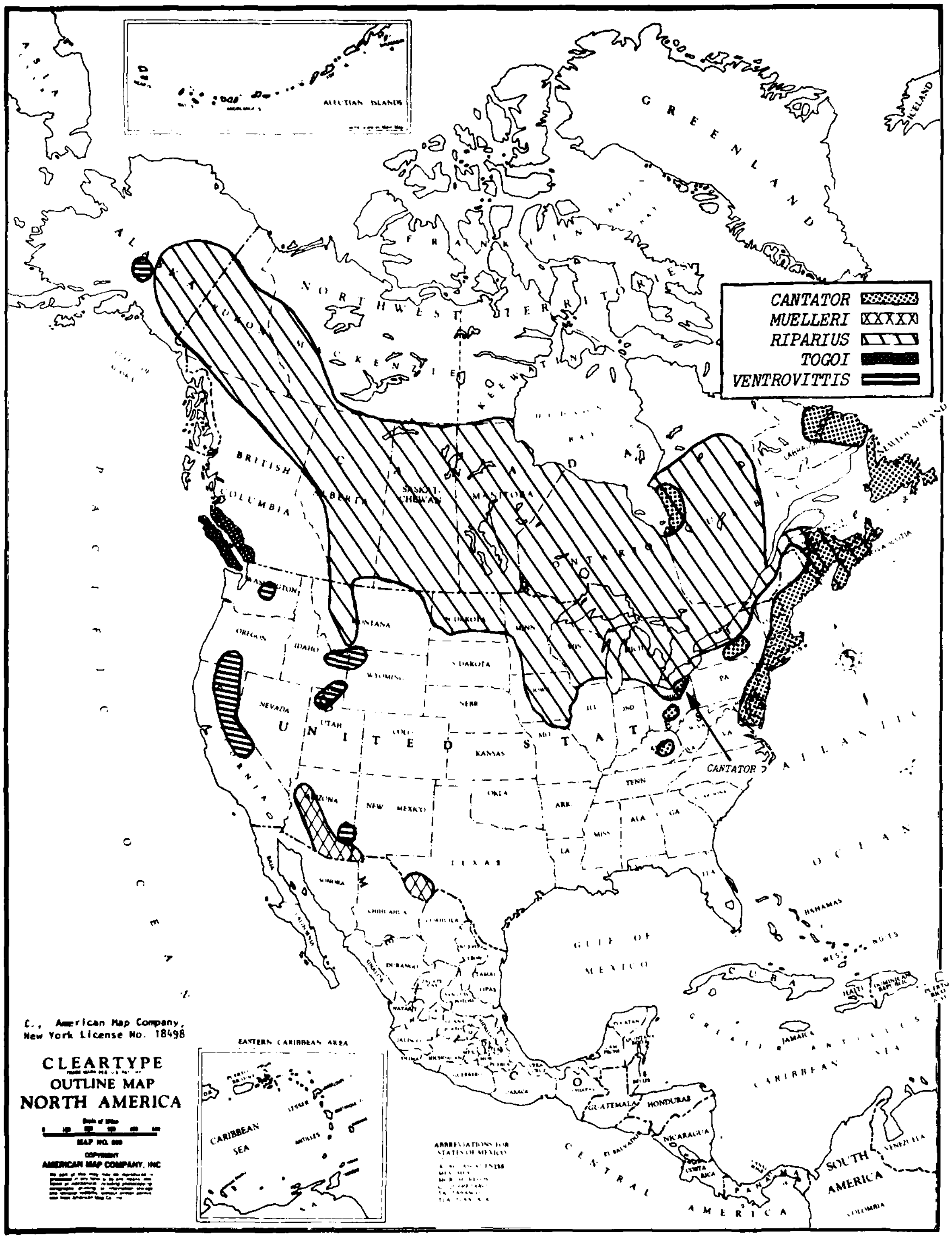

Plate 19. Distribution of *Aedes cantator* - USA: CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VA (106), KY (Knapp, in litt. 1978), OH (352); CANADA: NB, NS, PEI (106), LAB, PQ (291), NFLD (478); Tax. 279, 505. *Aedes muelleri* - USA: AZ (106), NM (336), TX (64); Map modified after Zavortink (514); Tax. 305, 514. *Aedes riparius* - USA: AK, IA, MI, MN, MT, NY, ND, WI (106), MO (427), OH (352), Not in CO (212) nor WY (350); CANADA: ALTA, BC, MAN, NWT, ONT, SASK, YUK (106), NB (529), NS (505), PQ (155); Tax. 136, 205, 279, 505. *Aedes togoi* - CANADA : BC (437); Tax. 505. *Aedes ventrovittis* - USA: CA, ID, WA (106), AK (48), AZ (304), OR (190), UT (330), WY (331); Tax. 279, 331.

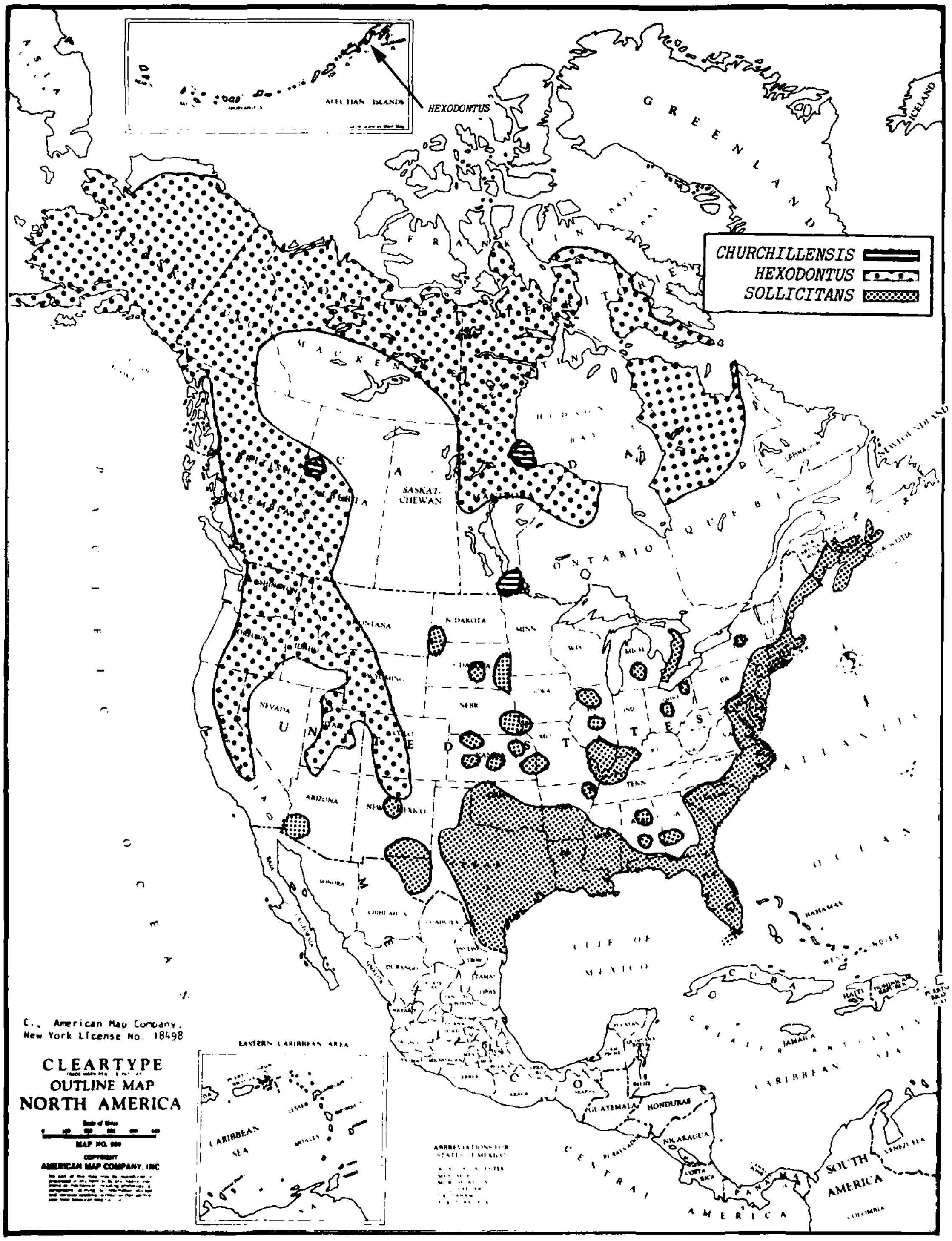

Plate 20. Distribution of *Aedes churchillensis* - CANADA: ALTA, MAN (167); Tax. 167, 505. *Aedes hexodontus* - USA: AK, CA, CO, ID, MT, OR, WA (106), NV (109), NM (340), UT (379), WY (350); CANADA: BC, MAN, NWT, PQ, YUK (106), ALTA (370), LAB, ONT (505); Tax. 279, 478, 501, 504, 505. *Aedes sollicitans* - USA: AL, AZ, AR, CT, DE, DC, FL, GA, IL, IN, KS, KY, LA, ME, MD, MA, MS, MO, NE, NH, NJ, NM, NY, NC, ND, OH, OK, PA, RI, SC, TX, VA (106), IA (248), MI (Newson, in litt. 1977), SD (187), TN (438); CANADA: NB, NS, PEI (106); ONT (223); Map modified after Knight (248); Tax. 28, 34, 279, 505.

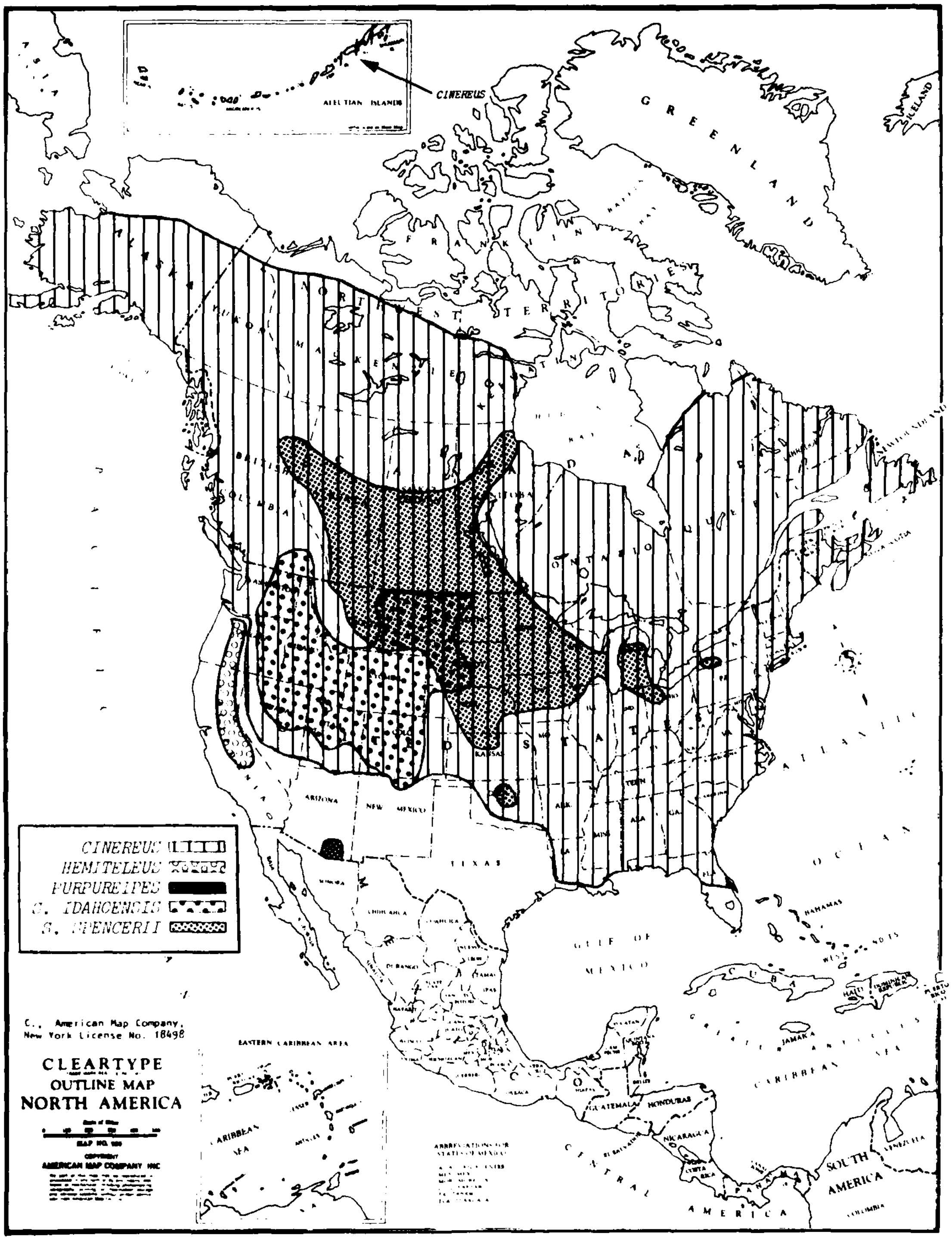

Plate 21. Distribution of *Aedes cinereus* - USA: AL, AK, AR, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, WA, WI, WY (106), KY (127), LA (116), NV (382), NM (503), VA (193); CANADA: ALTA, BC, LAB, MAN, NWT, NS, ONT, PEI, PQ, SASK, YUK (106); NB (314), NFLD (505); Tax. 54, 279, 356, 501, 505. *Aedes hemiteleus* - USA: CA, OR (54); Tax. 54, 356. *Aedes purpureipes* - USA: AZ (106); Tax. 279, 306, 514. *Aedes s. idahoensis* - USA: CO, ID, MT, NE, NV, ND, OR, UT, WA, WY (106), NM (212), SD (187); CANADA: BC (106); Tax. 338, 366. *Aedes s. spencerii* - USA: IL, IA, KS, MI, MN, MT, NE, NY, ND, SD, WI, WY (106), OH (95), OK (353); CANADA: ALTA, BC, MAN, SASK (106), ONT (505); Tax. 28, 279, 338, 366, 505.

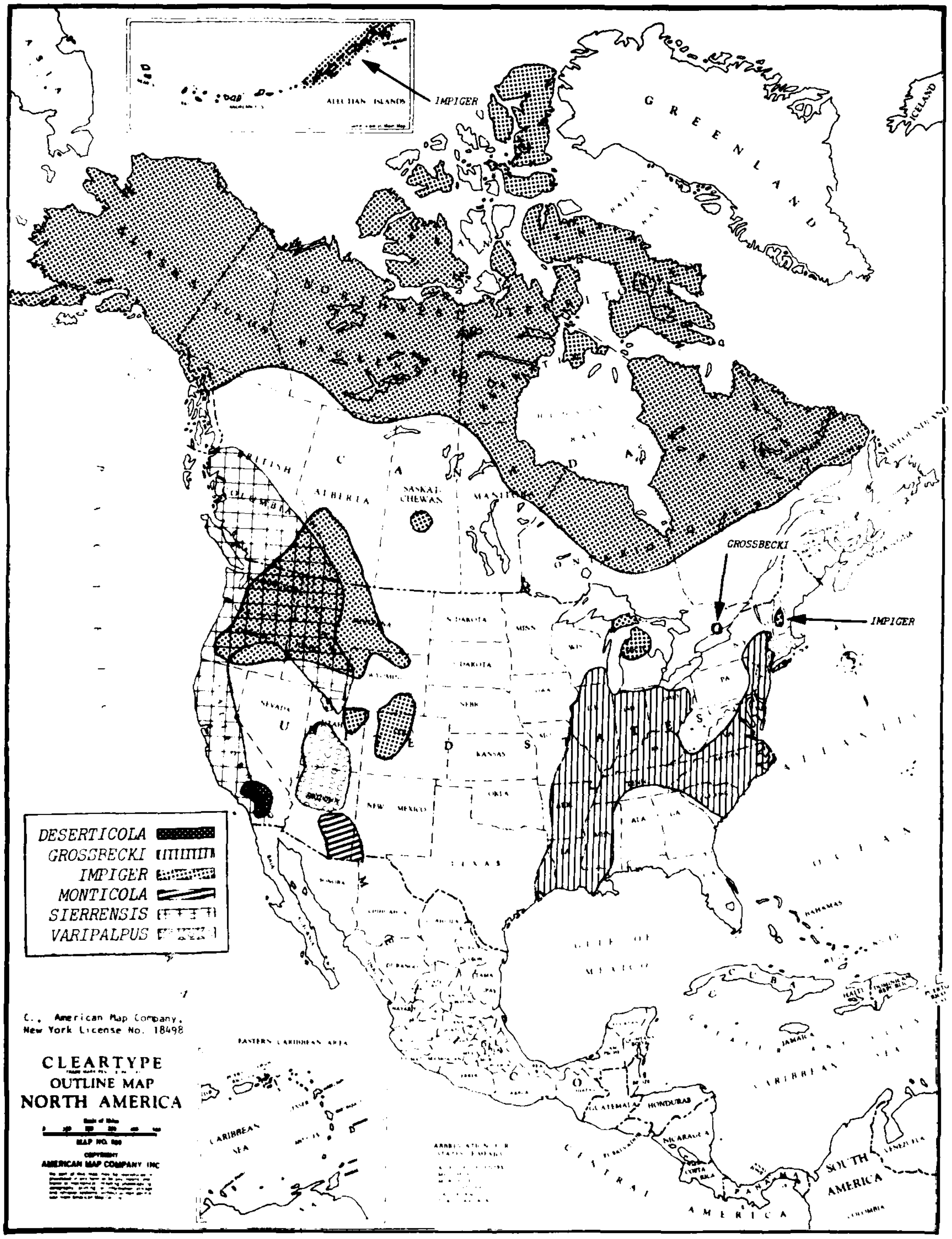

Plate 22. Distribution of *Aedes deserticola* - USA: CA (510); Map after Arnell & Nielsen (9); Tax. 9, 510. *Aedes grossbecki* - USA: AR, DE, IL, KY, LA, MD, MS, MO, NJ, NY, OH, SC, TN, VT, VA (106), CT (483), IN (407), PA (493), TX (Harris Co. M.C.D., in litt. 1978), WI (466); CANADA: ONT (223); Tax. 279, 505. *Aedes impiger* - USA: AK, CO, ID, MT, OR, UT, WA, WY (106), MI (229), NH (235); CANADA: ALTA, MAN, NWT, ONT, PQ, SASK, YUK (106), BC (177), LAB (505); Tax. 28, 139, 279, 478, 505. *Aedes monticola* - USA: AZ (38), NM (336); Map after Arnell & Nielsen (9); Tax. 9, 38, 279. *Aedes sierrensis* - USA: CA (267), ID (80) MT (337), NV (112), OR (213), UT (332), WA (325); CANADA: BC (135); Map after Arnell & Nielsen (9); Tax. 9, 36, 38, 134, 279, 505. *Aedes varipalpus* - USA: AZ (38), UT (332); Map after Arnell & Nielsen (9); Tax. 9, 36, 38, 279.

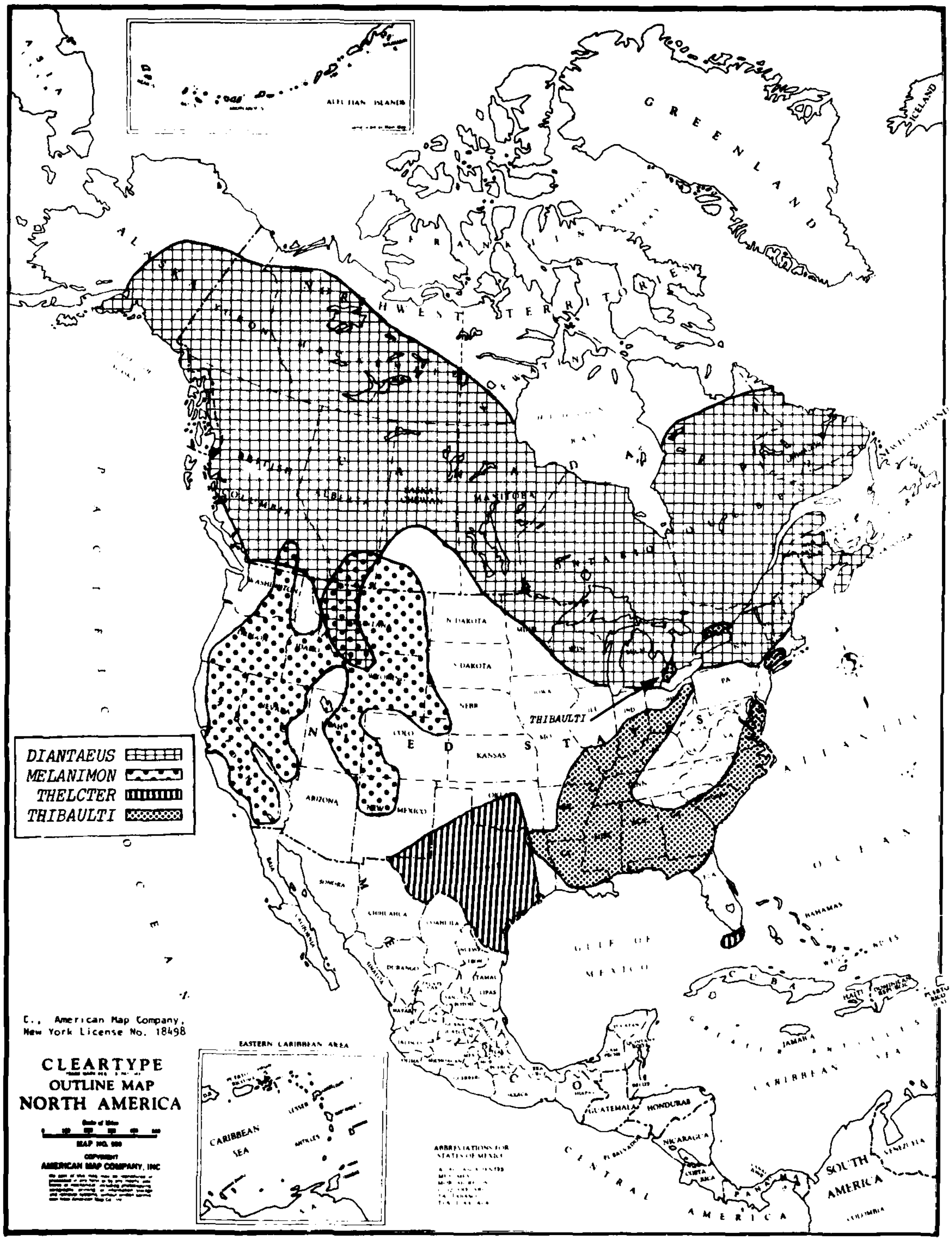

Plate 23. Distribution of *Aedes diantaeus* - USA: AK, ME, MA, MI, MN, MT, NH, NY, VT, WY (106), PA (493), WI (420); CANADA: BC, LAB, NWT, NS, ONT, PQ, YUK (106), ALTA (370), SASK (380), MAN (505); Tax. 205, 279, 505. *Aedes melanimon* - USA: CA, CO, MT, NV (106), ID, NE, NM, UT, WA, WY (381), OR (190); CANADA: ALTA (76), BC (Belton, in litt. 1978), SASK (226); Tax. 13, 53, 279, 381, 505. *Aedes thelcter* - USA: FL, OK, TX (106), NM (316); Map after Arnell (7); Tax. 7, 279. *Aedes thibaulti* - USA: AL, AR, FL, GA, IL, KY, LA, MS, MO, NC, OH, SC, TN, TX (106), CT, NY (485), DE (46), IN (408), MD (239), VA (46); CANADA: ONT (44); Tax. 279, 505.

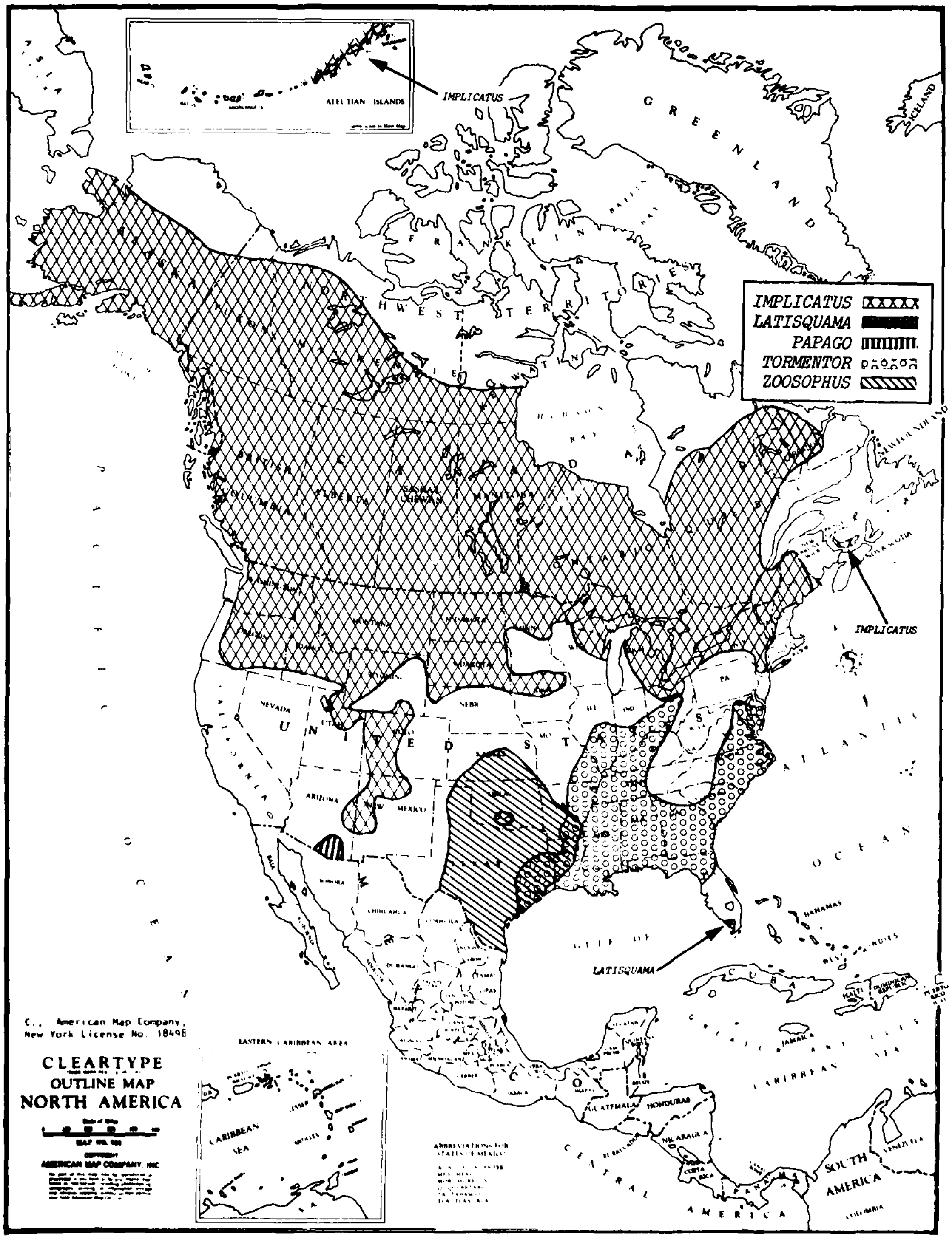

Plate 24. Distribution of *Aedes implicatus* - USA: AK, CO, ID, IA, MA, MI, MN, MT, NE, NH, NY, UT, WA, WY (106), AZ, NM (340), ME (301), NJ (72), OH (352), OR (190), WI (420); CANADA: ALTA, BC, MAN, NWT, ONT, PQ, SASK, YUK (106), LAB (505), PEI (529); Tax. 279, 478, 501, 505. *Aedes papago* - USA: AZ (513), Map after Zavortink (514); Tax. 513, 514. *Aedes tormentor* - USA: AL, AR, FL, GA, LA, MS, MO, NC, OH, OK, SC, TX (106), DE (Lake, in litt. 1972), IL (393), KY (397), MD (50), TN (61); Tax. 279, 388. *Aedes zoosophus* - USA: KS, OK, TX (106), AR (225), LA (236), Not in NM (502); Map after Zavortink (514); Tax. 514. *Culex latisquama* - USA: FL (454); Tax. 175.

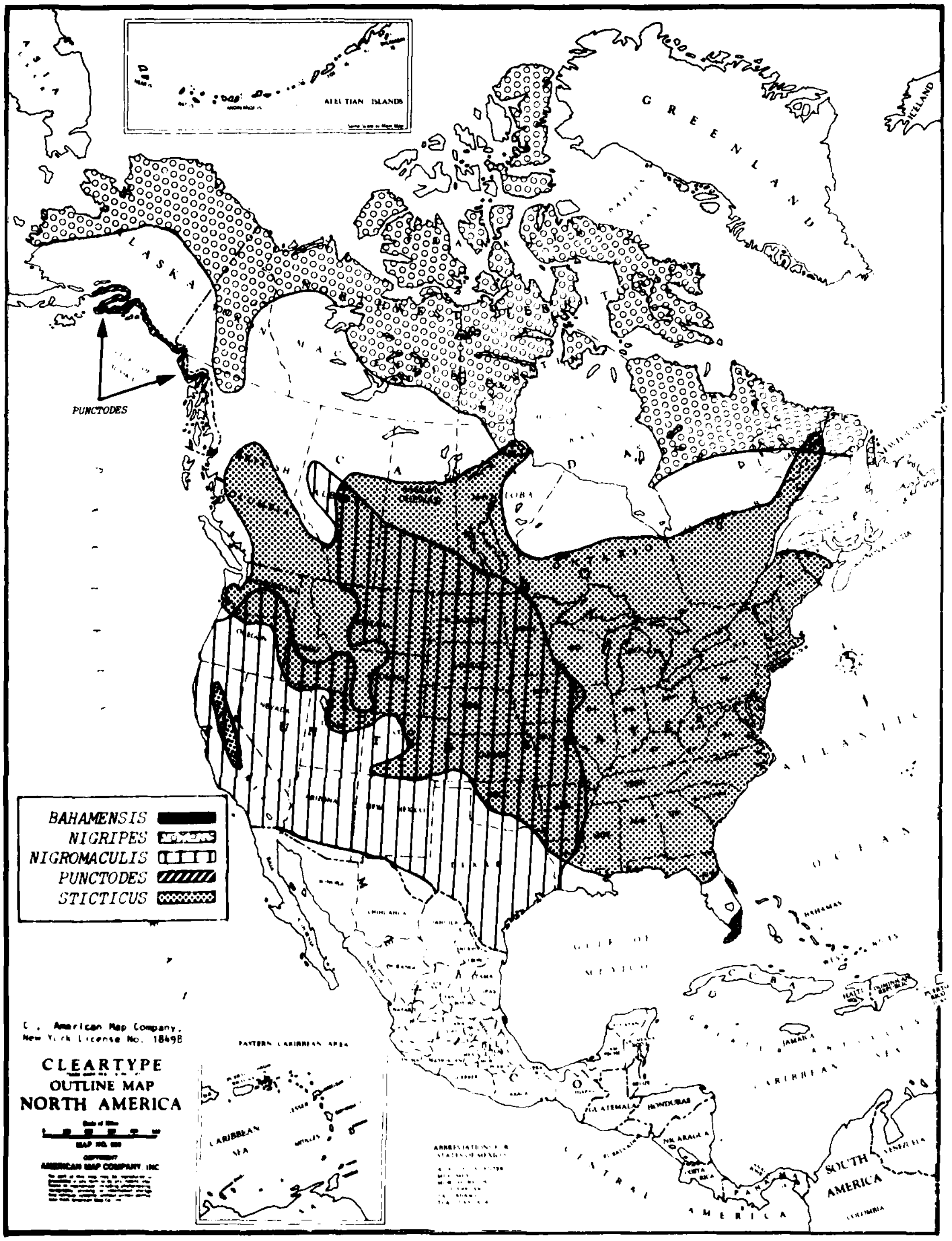

Plate 25. Distribution of *Aedes nigripes* - USA: AK (106, 463), CANADA: MAN, NWT, PQ, YUK (106), BC, LAB, NFLD (505); Tax. 139, 205, 279, 505. *Aedes nigromaculis* - USA: CA, CO, ID, IL, IA, KS, MN, MO, MT, NE, NM, ND, OK, OR, SD, TX, UT, WA, WY (106), AZ (382) AR, LA (225), NV (115); CANADA: ALTA, MAN, SASK (106); Tax. 279, 505. *Aedes punctodes* - USA: AK (106); Tax. 136, 279. *Aedes sticticus* - USA: AL, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, VA, WA, WY (106), WV (3), WI (519); CANADA: ALTA, BC, MAN, NB, ONT, PQ, SASK (106), LAB (505); Tax. 205, 279, 505, 515. *Culex bahamensis* - USA: FL (106); Tax. 34, 57.

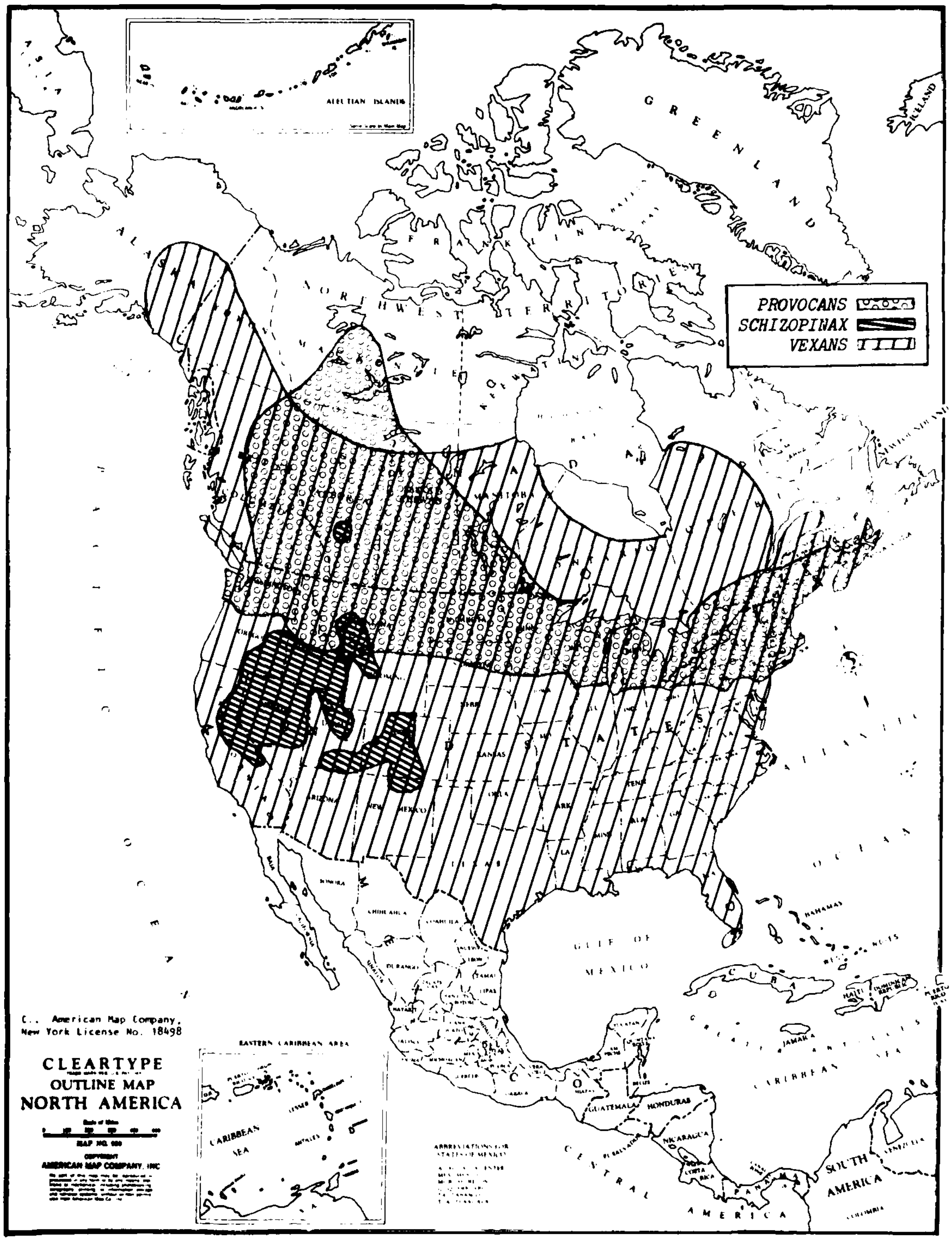

Plate 26. Distribution of *Aedes provocans* - USA: CT, ID, ME, MA, MI, MN, MT, NH, NY, RI, VT, WA, WI, (106, as *Ae. trichurus*), NJ (133), PA (398); CANADA: ALTA, BC, MAN, NB, NS, ONT, PEI, PQ, SASK (106, as *Ae. trichurus*), NWT (505); Tax. 279, 504, 505. *Aedes schizopinax* - USA: MT, WY (106), CA (382), CO, ID, OR (329), NV (109), NM (340), UT (379); CANADA: ALTA (169); Tax. 279, 501, 505. *Aedes vexans* - USA: AL, AZ, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY (106), AK (441), NV (382); CANADA: ALTA, BC, MAN, NB, NS, ONT, PEI, PQ, SASK, YUK (106); Tax. 279, 505.

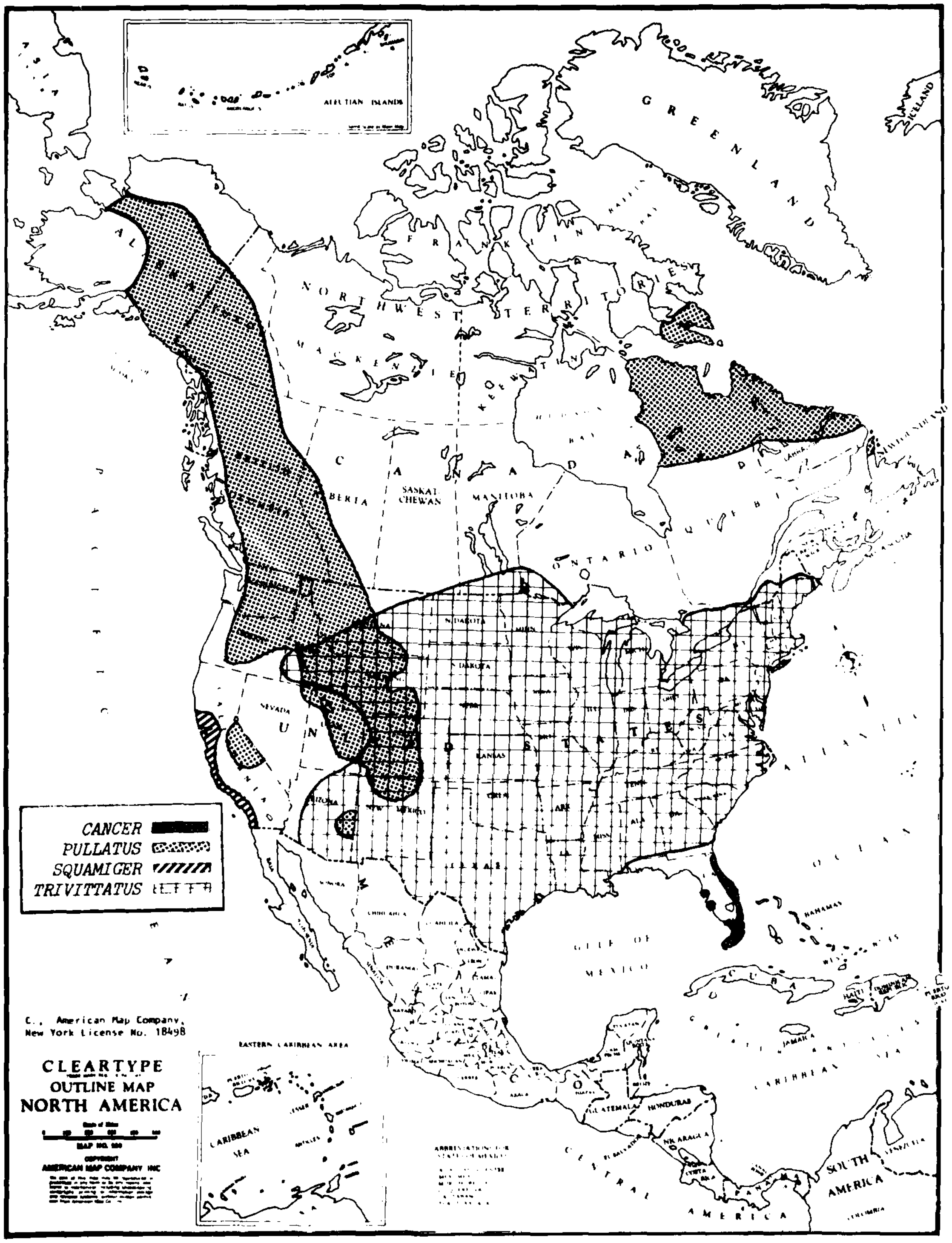

Plate 27. Distribution of *Aedes pullatus* - USA: AK, CA, CO, ID, MT, OR, UT, WA, WY (106), AZ (340), NV (109), NM (316), Not in MT (114); CANADA: ALTA, BC, NWT, PQ, YUK (106), LAB, NFLD (505); Tax. 136, 205, 279, 501, 505. *Aedes squamiger* - USA: CA (106); Tax. 279. *Aedes trivittatus* - USA: AR, CO, CT, DE, DC, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MN, MO, MT, NE, NJ, NM, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VA, WV, WI, WY, (106), AL (61), AZ (382), MI (481), NH (52), UT (330); CANADA: ONT (106), MAN (470), PQ (265); Map after Arnell (7); Tax. 7, 279, 505. *Deinocerites cancer* - USA: FL (106); Tax. 1, 34, 35.

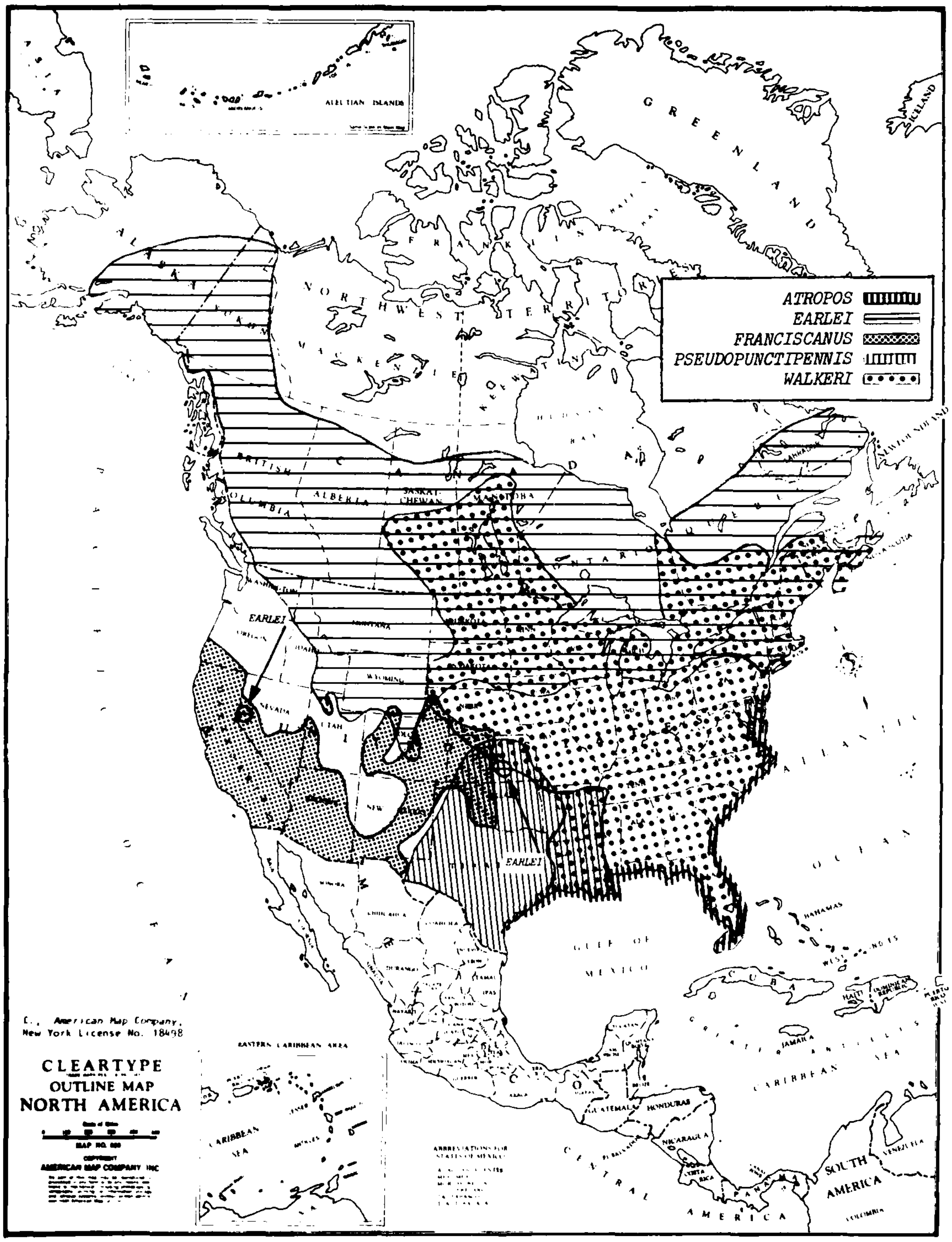

Plate 28. Distribution of *Anopheles atropos* - USA: AL, FL, GA, LA, MD, MS, NJ, NC, SC, TX, VA (106); Tax. 34. *Anopheles earlei* - USA: AK, CO, CT, ID, IA, ME, MA, MI, MN, MT, NE, NH, NY, ND, SD, VT, WI, WY (106), KS (344), NV (109), NJ (131), UT (339), WA (190); CANADA: ALTA, BC, LAB, MAN, NB, NS, ONT, PQ, SASK (106), NWT, PEI, YUK (505); Tax. 488, 505. *Anopheles franciscanus* - USA: AZ, CA, CO, KS, NV, NM, OK, OR, TX, UT, WY (106), NE (375); Tax. 436. *Anopheles pseudopunctipennis* - USA: AR, KS, LA, MS, MO, NM, OK, TN, TX (106), Not in CO (212); Tax. 435. *Anopheles walkeri* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, NE, NH, NJ, NY, NC, ND, OH, PA, RI, SC, SD, TN, TX, VT, VA, WI (106); CANADA: MAN, NB, NS, ONT, PQ (106), SASK (308), Not in BC (441); Tax. 28, 505.

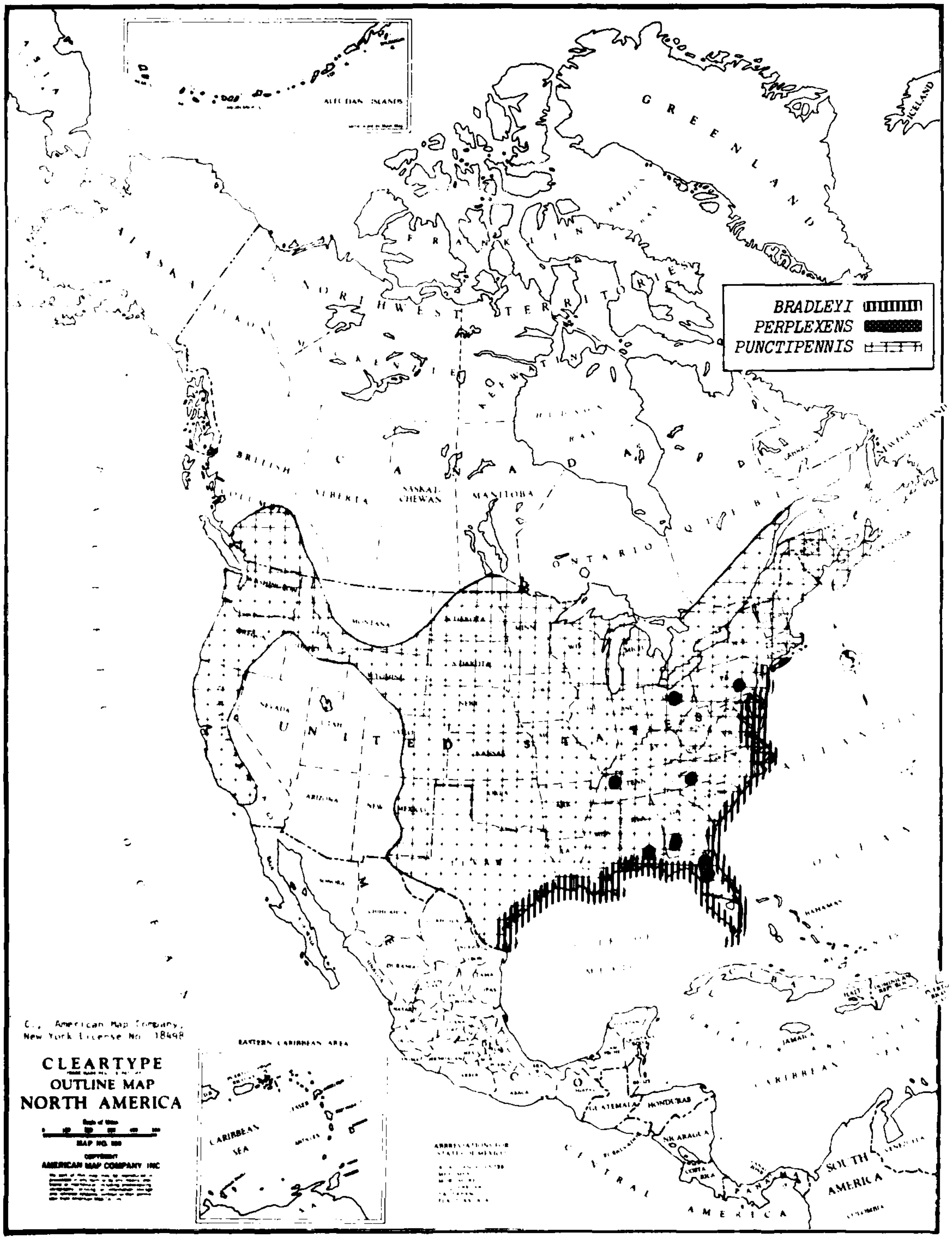

Plate 29. Distribution of *Anopheles bradleyi* - USA: AL, DE, FL, GA, LA, MD, MS, NJ, NY, NC, SC, TX, VA (106); Map after Floore et. al. (174); Tax. 174. *Anopheles perplexens* - USA: AL, FL (245), GA (41), NC, TN (394), OH (352), PA (272); Tax. 41. *Anopheles punctipennis* - USA: AL, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, VT, VA, WA, WV, WI, WY (106); CANADA: BC, MAN, NS, ONT, PQ (106), NB (473); Tax. 39, 41, 505.

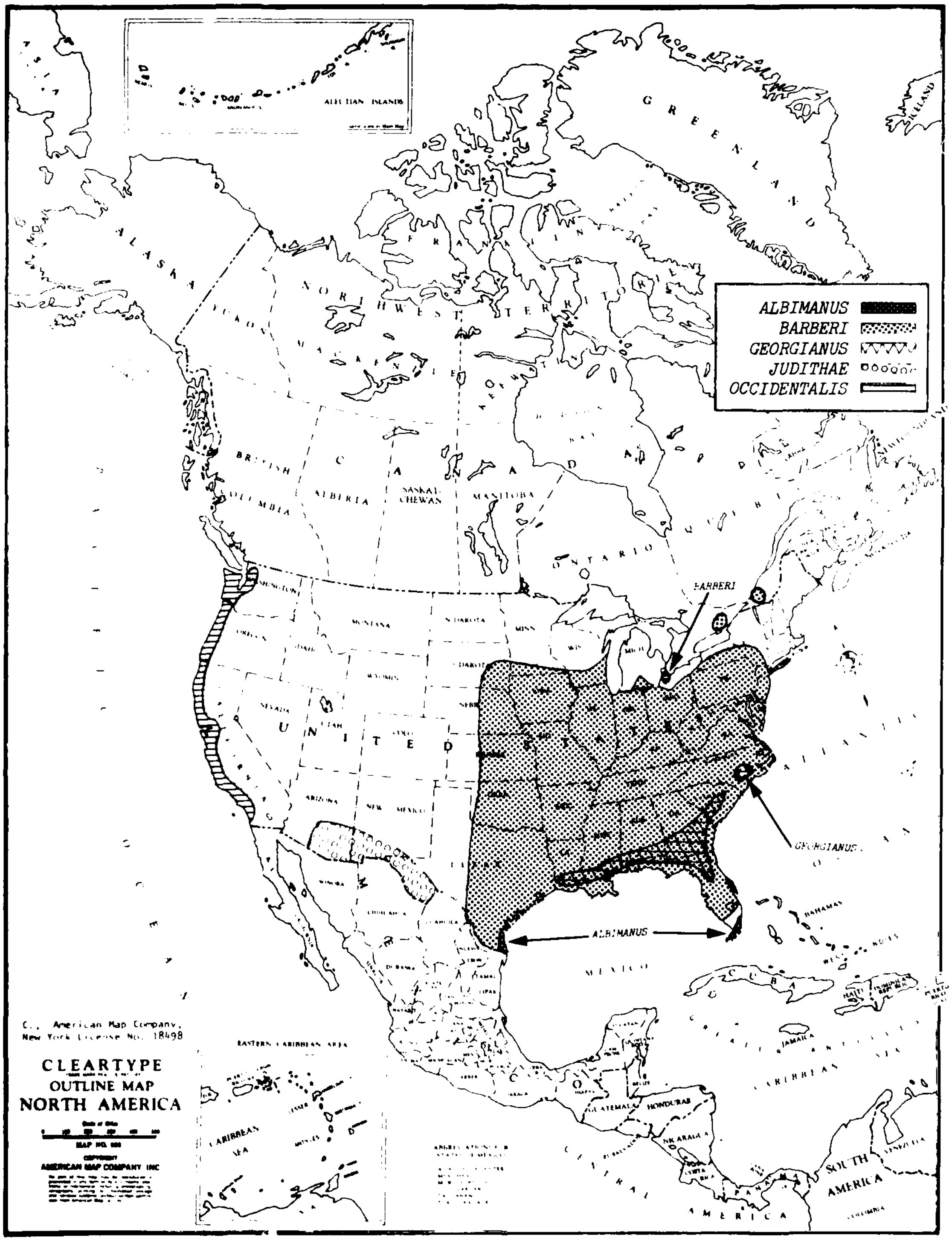

Plate 30. Distribution of *Anopheles albimanus* - USA: FL, TX (106); Tax. 34. *Anopheles barberi* - USA: AL, AR, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MS, MO, NE, NJ, NY, NC, OH, OK, PA, SC, TN, TX, VA (106), MI (Newson, in litt. 1977), MN (369), SD (161), WV (3), WI (363); CANADA: ONT (435), PQ (264); Map modified after Zavortink (511); Tax. 505, 509, 511. *Anopheles georgianus* - USA: AL, FL, GA, LA, MS, NC, SC (106); Map after Floore et. al. (174); Tax. 174. *Anopheles judithae* - USA: AZ, NM (509), TX (511); Map after Zavortink (511); Tax. 509, 511. *Anopheles occidentalis*: USA: CA, OR, WA (106). Not in AK (192); CANADA: Not in BC (505) nor YUK (488); Tax. 488.

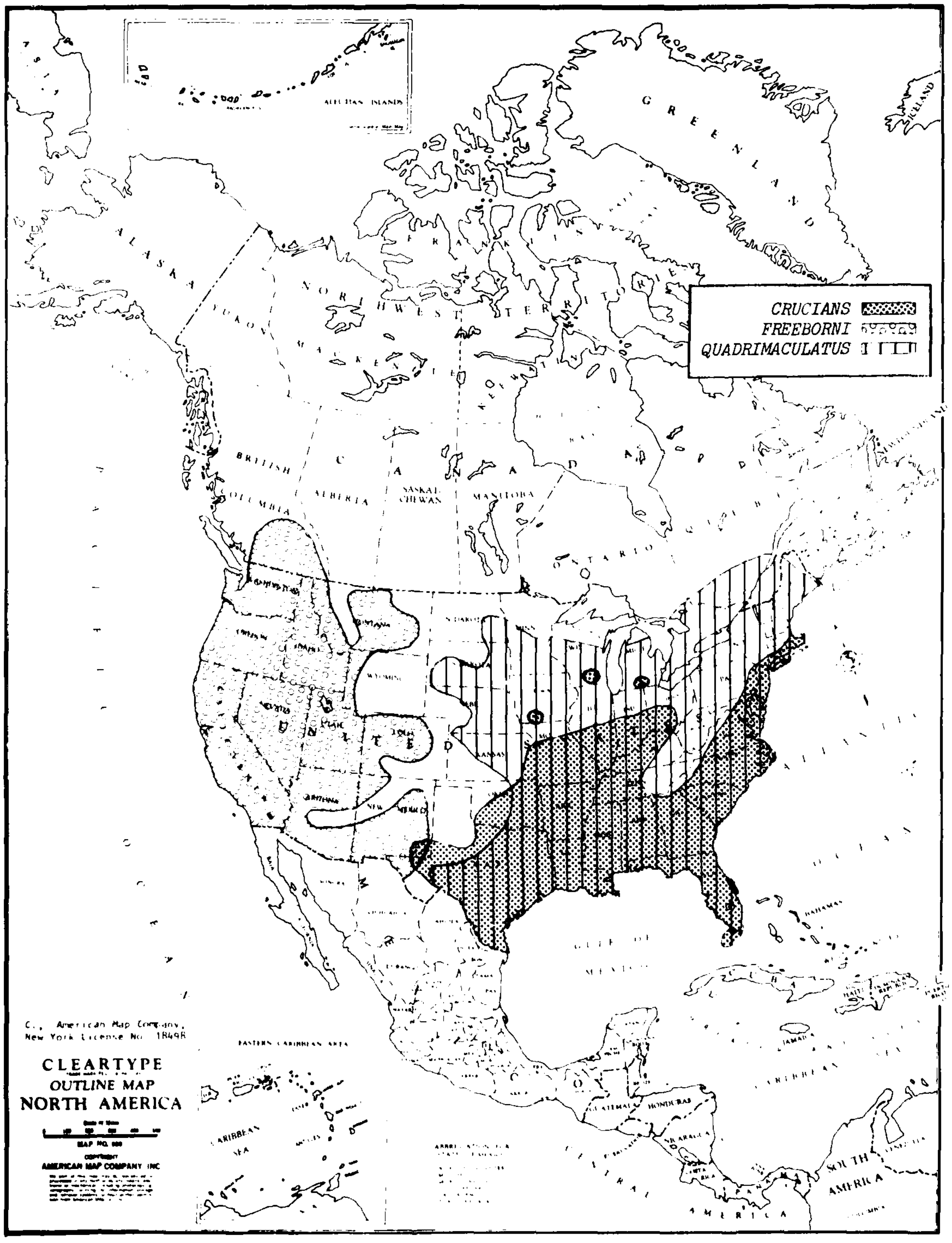

Plate 31. Distribution of *Anopheles crucians* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MA, MS, MO, NJ, NM, NY, NC, OH, OK, PA, RI, SC, TN, TX, VA (106), MI (Newson, in litt. 1977), WI (Dicke, in litt. 1979); Map after Floore et. al. (174); Tax. 34, 174. *Anopheles freeborni* - USA: AZ, CA, CO, ID, MT, NV, NM, OR, TX, UT, WA, WY (106); CANADA: BC (106); Tax. 488, 505. *Anopheles quadrimaculatus* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, NE, NH, NJ, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VT, VA, WI (106), WV (3); CANADA: ONT, PQ (106); Tax. 39, 505.

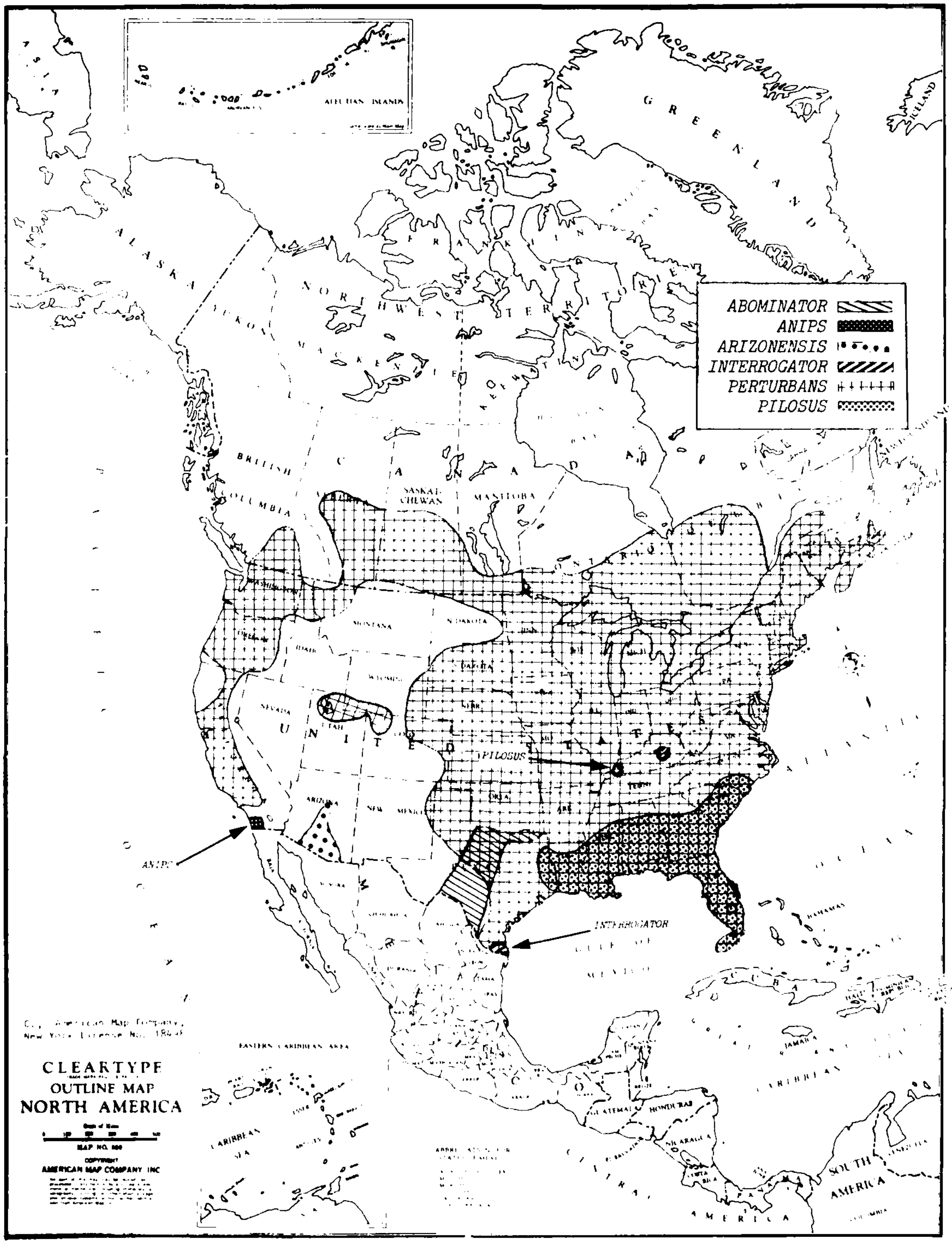

Plate 32. Distribution of *Coquillettidia perturbans* - USA: AL, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WY (106), NM (502), WV (3); CANADA: BC, MAN, NS, ONT, PEI, PQ, SASK (106), ALTA (206), NB (314); Tax. 39, 389, 390, 505. *Culex abominator* - USA: TX (106), Not in LA (95); Map after Fournier & Snyder (176); Tax. 175. *Culex anips* - USA: CA (106); Tax. 54, 175. *Culex arizonensis* - USA: AZ (106); Tax. 262. *Culex interrogator* - USA: TX (106); Tax. 57. *Culex pilosus* - USA: AL, FL, GA, KY, LA, MS, NC, SC (106), TX (498); Tax. 34, 175, 247.

Plate 33. Distribution of *Culex apicalis* - USA: AZ, CA (106), NV (115), NM (172), OK (353), OR (190), TX (62), UT (339); Tax. 261, 262. *Culex reevesi* - USA: CA (106); Tax. 262. *Culex territans* - USA: AK, CA, FL, GA, ID, IA, LA, MD, MA, MI, MN, MS, MO, MT, NY, NC, OH, OK, OR, RI, TX, VT, VA, WA (106), AL, SC (245), AZ (382), AR (225), CO (12), CT (183), DE (144), IL (392), IN (414), KS (522), KY (127), ME (301), NE (164), NV (337), NH (52), NJ (71), PA (496), SD (187), TN (438), UT (339), WV (3), WI (147), WY (350); CANADA: BC (106), ALTA (370), LAB, NWT (177), MAN (310), NB (314), NS (473), ONT (242), PQ (155), SASK (380), YUK (505); Tax. 28, 39, 205, 262, 505. *Psorophora johnstonii* - USA: FL (106); Tax. 34.

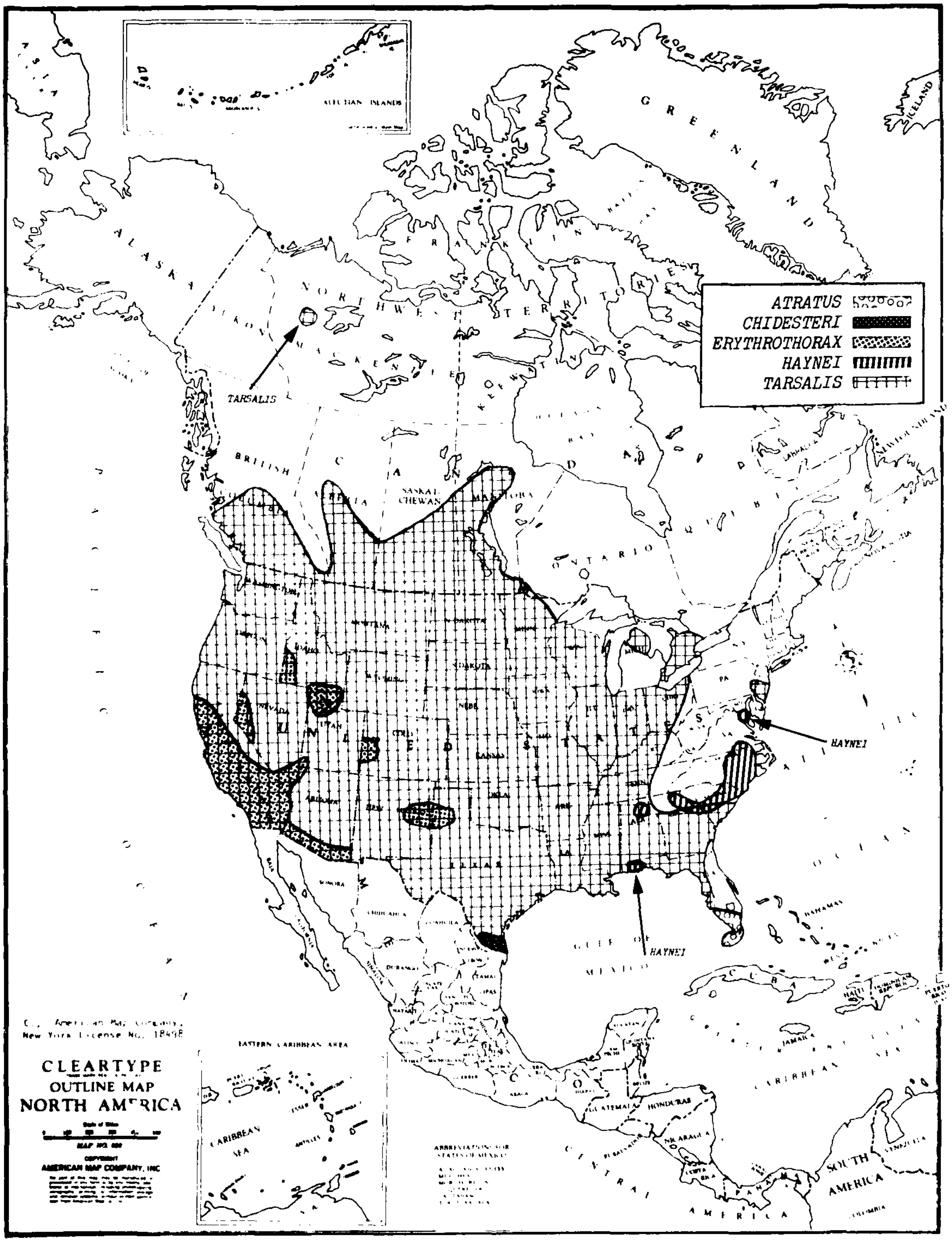

Plate 34. Distribution of *Culex atratus* - USA: FL (106); Tax. 28, 34, 175, 247. *Culex chidesteri* - USA: TX (106); Tax. 34, 57. *Culex erythrothorax* - USA: CA, ID, UT (106), AZ (382), CO (212) NV (115), NM (460), TX (312); Tax. 57. *Culex tarsalis* - USA: AL, AZ, AR, CA, CO, FL, GA, ID, IL, IN, IA, KS, KY, LA, MI, MN, MS, MO, MT, NE, NV, NM, ND, OK, OR, SC, SD, TN, TX, UT, WA, WI, WY (106), NJ (256), OH (352), PA (66); CANADA: ALTA, BC, MAN, NWT, SASK (106), ONT (223); TAX. 54, 57, 505. *Wyeomyia haynei* - USA: AL, NC, SC (106), FL (58), GA (145), MD (51), VA (129); Tax. 145.

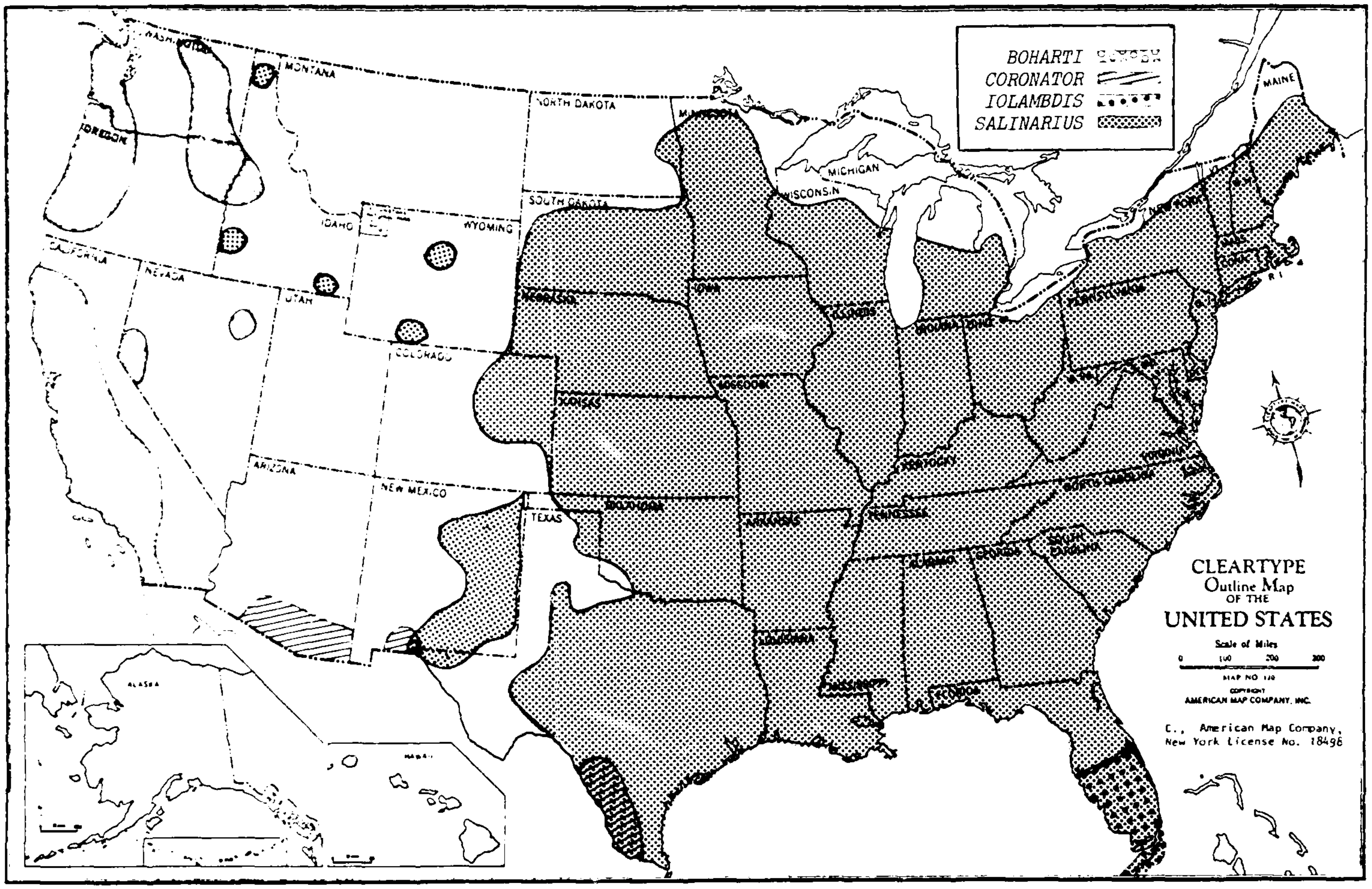

Plate 35. Distribution of *Culex boharti* - USA:CA (106), ID,OR, WA (262), NV (382); Tax. 262. *Culex coronator* - USA: TX (106), AZ (382), NM [illegible]. Not in LA (95); Tax. 57. *Culex iolambdis* - USA: FL (106); Tax. 34, 175, 247. *Culex salinarius* - USA: AL, AR, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MQ, NE, NH, NJ, NM, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VT, VA, WI, WY (106), WV, (3). Not in UT (330); CANADA: Not in NS (505); Tax. 57.

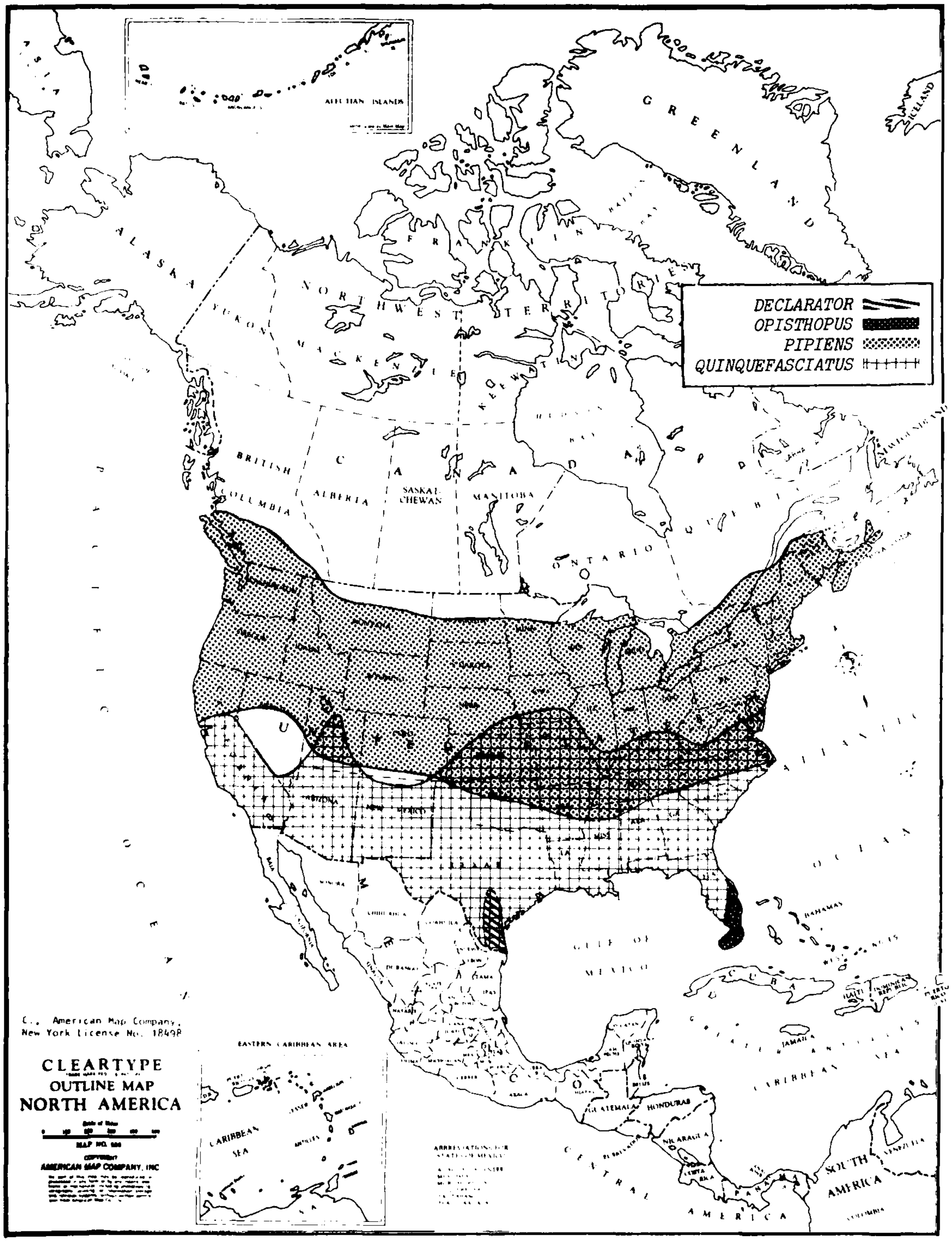

Plate 36. Distribution of *Culex declarator* - USA: TX (106); Tax. 57, 447. *Culex pipiens* - USA: AL, AR, CA, CO, CT, DE, DC, GA, ID, IL, IN, IA, KS, KY, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, VA, WA, WI, WY (106), WV (3), Not in NM (502); CANADA: BC, NB, NS, ONT, PQ (106); Tax. 14, 57, 505, 523. *Culex opisthopus* - USA: FL (106); Tax. 34, 175, 185, 247, 457. *Culex quinquefasciatus* - USA: AL, AZ, AR, CA, DC, FL, GA, IL, IA, KS, KY, LA, MS, MO, NE, NM, NC, OH, OK, SC, TN, TX, UT, VA (106), IN (327), MD (14), NV (118), WV (3); Tax. 14, 31, 34, 405, 523, 524.

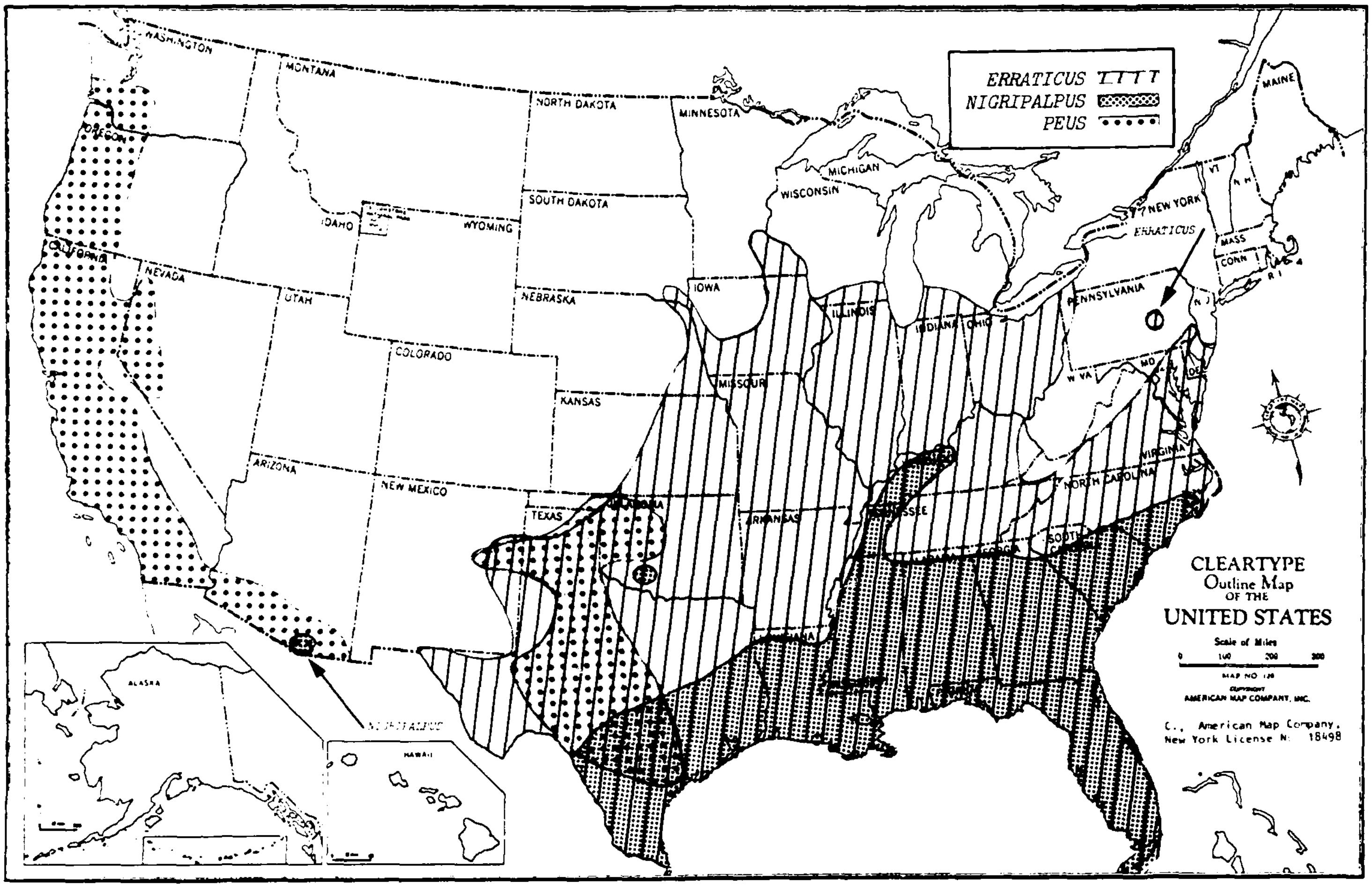

Plate 37. Distribution of *Culex erraticus* - USA: AL, AR, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MI, MS, MO, NE, NC, OH, OK, SC, SD, TN, TX, VA (106), MN (16), NJ (132), NM (502), PA (396), WV (3), WI (Dicke, in litt. 1979); Tax. 34, 175, 247. *Culex nigripalpus* - USA: AL, FL, GA, LA, MS, NC, SC, TN, TX (106), AZ (304), KY (127), OK (225). Not in AR, NM (95); Tax. 34, 57. *Culex peus* - USA: CA, OK, OR, TX, WA (106), AZ, NV (382), NM (460); Tax. 34, 57.

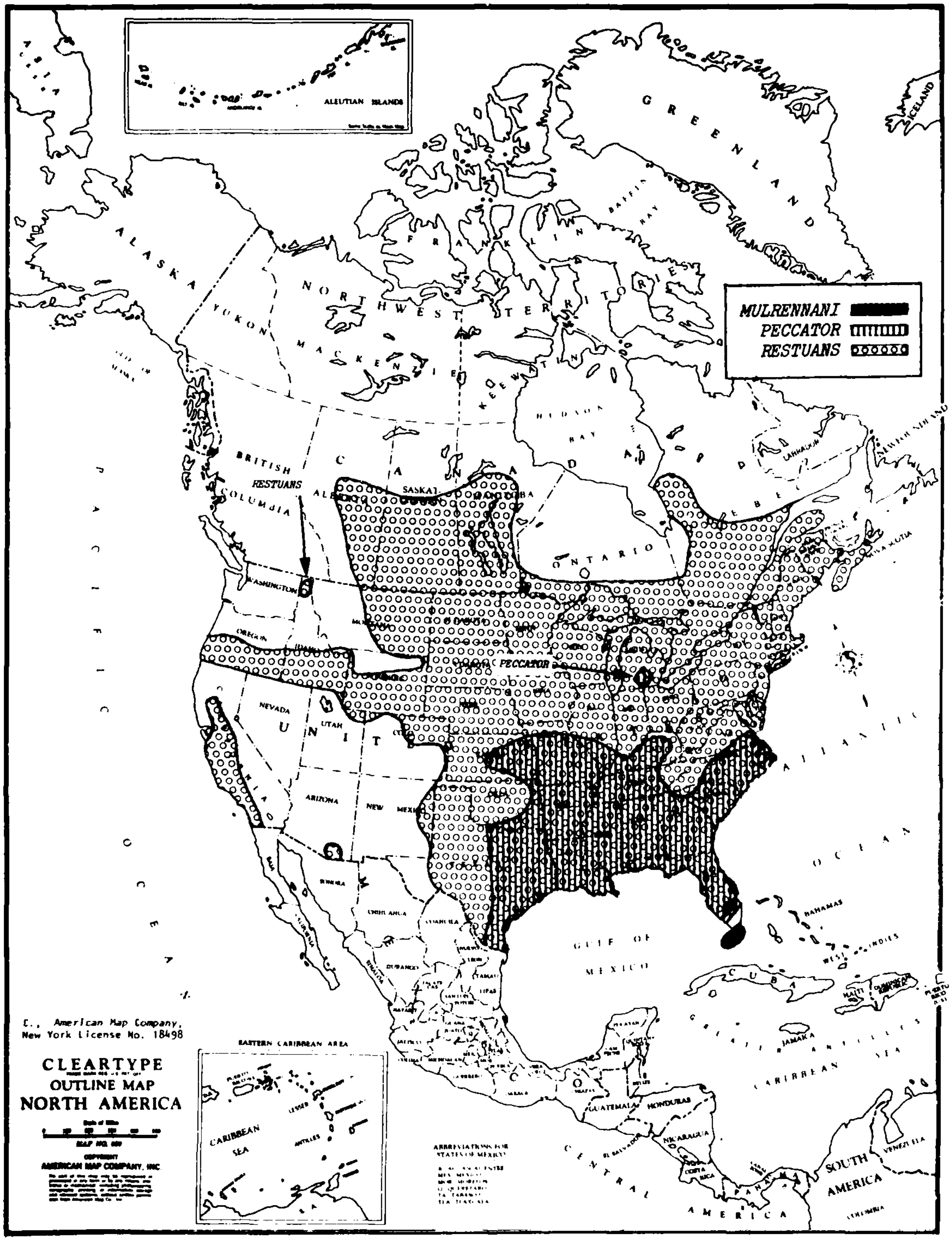

Plate 38. Distribution of *Culex mulrennani* - USA: FL (106); Tax. 175, 247. *Culex peccator* - USA: AL, AR, FL, GA, IL, KS, KY, LA, MI, MS, MO, NC, OK, SC, TN, TX, VA (106). Not in DE (Lake, in litt. 1972); Tax. 175, 247. *Culex restuans* - USA: AL, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NJ, NM, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, UT, VT, VA, WV, WI, WY (106), AZ (382), OR (213); CANADA: MAN, NB, ONT, PQ, SASK (106), ALTA (371), NS (529); Tax. 57, 505.

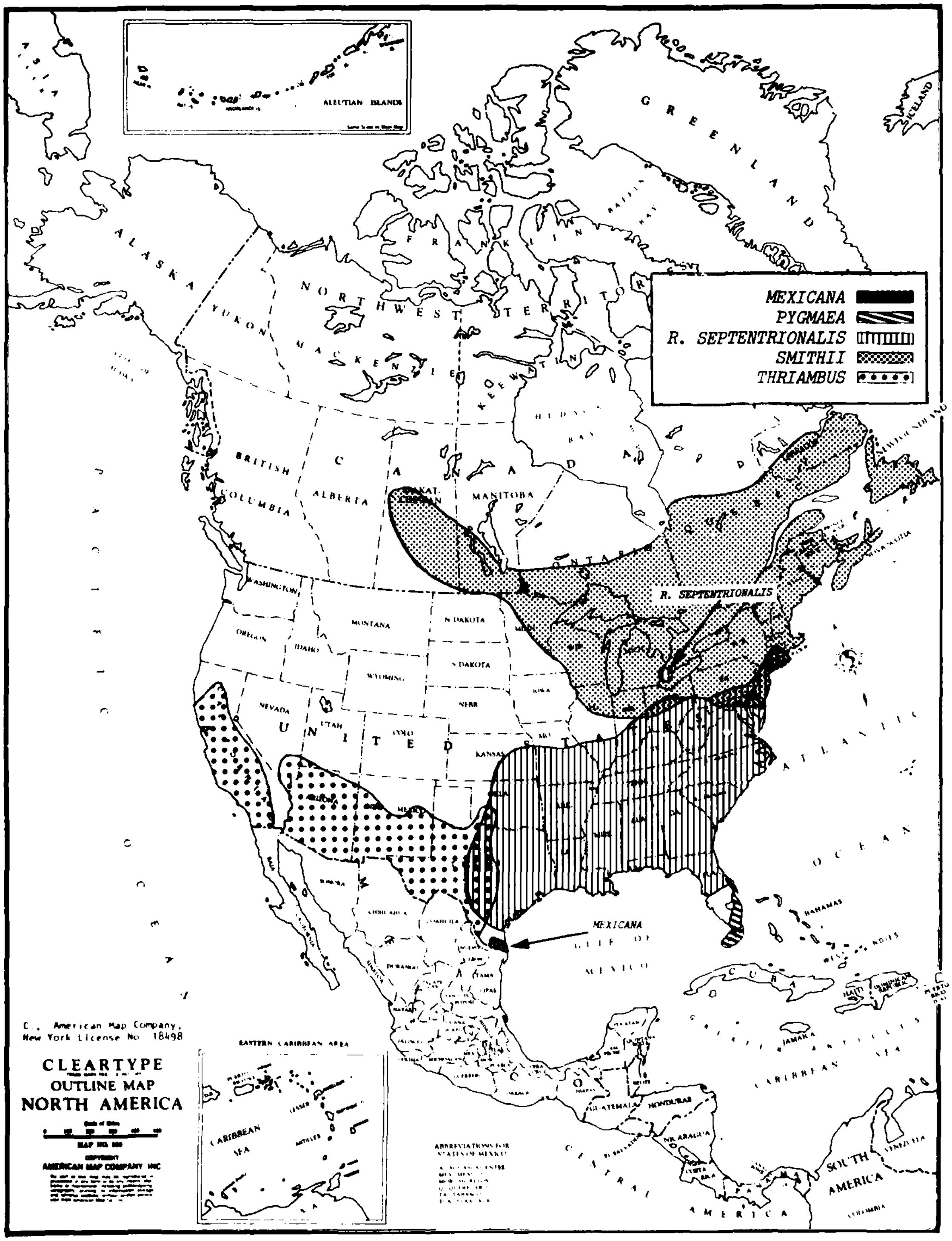

Plate 39. Distribution of *Culex thriambus* - USA: CA, OK, TX (106), AZ (385), NV (382), NM (225), UT (334); Tax. 57. *Psorophora mexicana* - USA: TX (241); Tax. 28. *Psorophora pygmaea* - USA: FL (106), Not in MS (95); Tax. 28, 34. *Toxorhynchites r. septentrionalis* - USA: AL, AR, DE, DC, FL, GA, IL, KS, KY, LA, MD, MS, MO, NJ, NC, OH, OK, PA, SC, TN, TX, VA, WV (106), CT (286), IN (218), NY (246); CANADA: ONT (351); Tax. 151, 476, 505. *Wyeomyia smithii* - USA: CT, DE, IL, ME, MA, MI, MN, NH, NJ, NY, OH, RI, WI (106), IN (411), MD (50), PA (492); CANADA: LAB, MAN, NS, ONT (106), NB (529), NFLD (360), PEI (505), PQ (288), SASK (77); Tax. 145, 505.

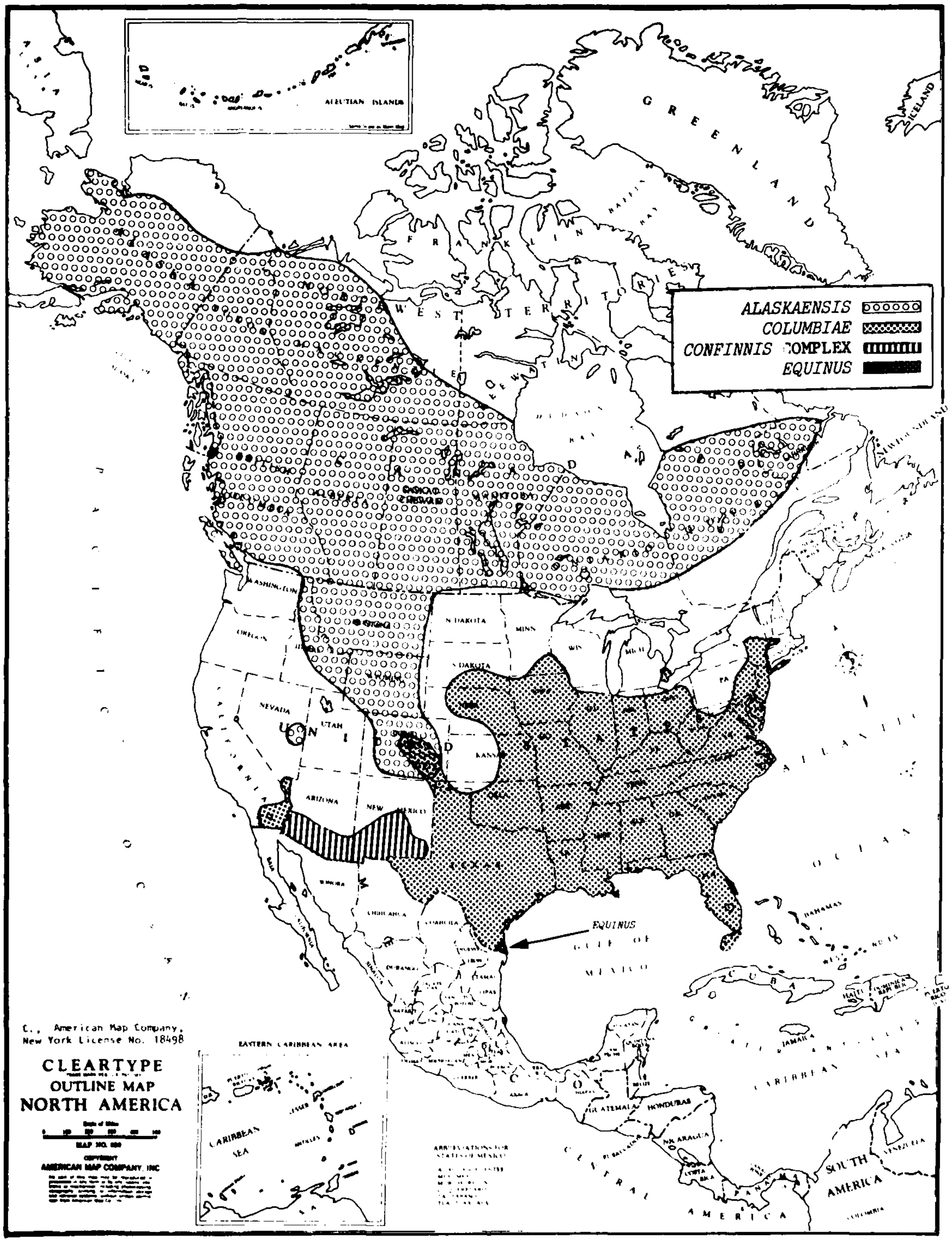

Plate 40. Distribution of *Culiseta alaskaensis* - USA: AK, CO, MT, WY (106), ID (146), NV (535); CANADA: ALTA, BC, LAB, MAN, NWT, PQ, YUK (106), SASK (380); Map modified after Hopla (227); Tax. 295, 505. *Haemagogus equinus* - USA: TX (469); Tax. 6, 28, 34. *Psorophora columbiae* - USA: AL, AR, CO, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MA, MS, MO, NE, NJ, NM, NY, NC, OH, OK, PA, SC, SD, TN, TX, VA, WV (106, as *Ps. confinnis*), CA (54), MN (124), NV (112); CANADA: ONT (505); Tax. 34, 49, 54, 142, 505. *Psorophora confinnis* complex - USA: AZ, NM (106), CA (doubtful, 54); Tax. 34, 49, 54, 142.

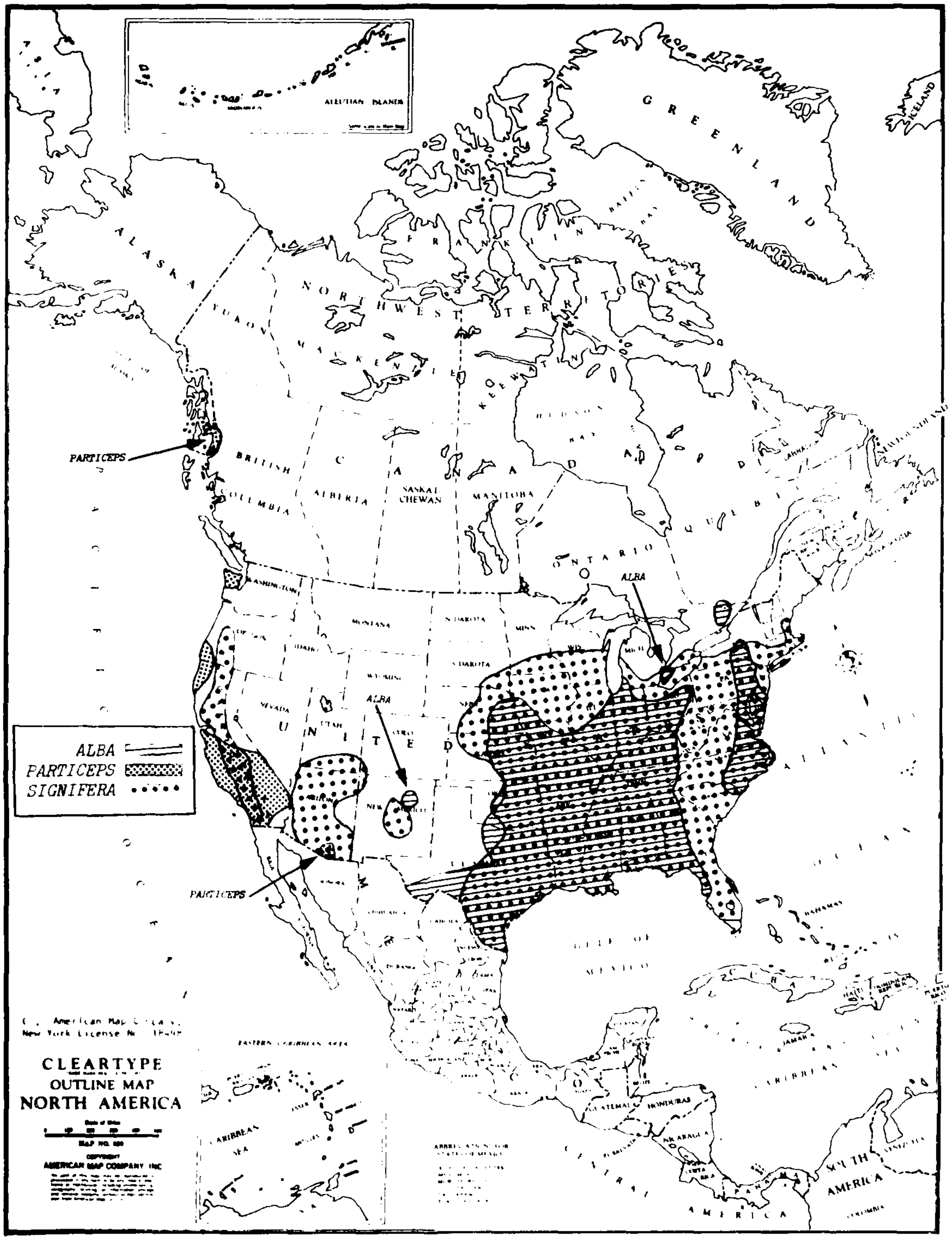

Plate 41. Distribution of *Culiseta particeps* - USA: CA, OR (106), AK (48), AZ (382), WA (325); Tax. 296, 448. *Orthopodomyia alba* - USA: AL, IL, KY, LA, MS, MO, NJ, NY, NC, TX, VA (106), AR, DC, MD, OH (508), DE (251), FL (Haeger in litt. 1967), GA (461), IN (67), IA (280), KS (525), MI (200), NM (315), OK (225), PA (495), NE (278), TN (60); CANADA: ONT (435), PQ (505); Tax. 505, 508. *Orthopodomyia signifera* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MA, MS, MO, NE, NJ, NM, NY, NC, OH, OK, PA, RI, SC, TN, TX, VA (106), AZ (382), CA, OR, UT (508), MI (200), MN (369), NH (Burger, in litt. 1977), SD (161), WV (3), WI (363); CANADA: ONT (435); Tax. 505, 508.

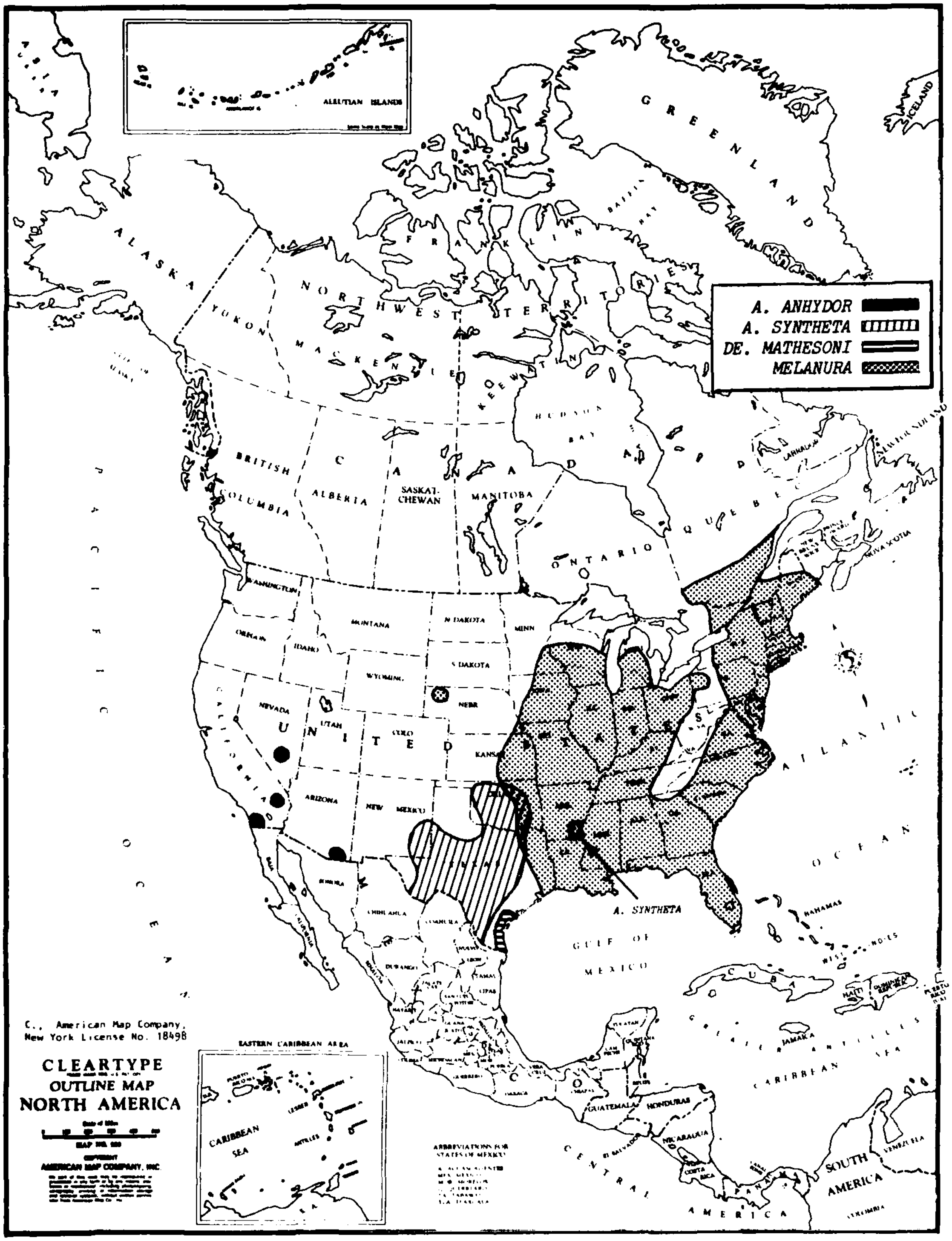

Plate 42. Distribution of *Culiseta melanura* - USA: AL, AR, DE, DC, FL, GA, IA, KY, LA, ME, MD, MA, MI, MN, MS, MO, NE, NH, NJ, NY, NC, OH, OK, PA, RI, SC, TN, TX, VA, WI (106), CT (482), IL (413), IN (406), KS (344), Not in CO (212); CANADA: ONT (108), PQ (168, 189); Tax. 505. *Deinocerites mathesoni* - USA: TX (35); Tax. 1, 35, 359. *Uranotaenia a. anhydor* - USA: CA (106), AZ, NV (37); Tax. 37. *Uranotaenia a. syntheta* - USA: NM, OK, TX (106), AR (59); Tax. 37, 526.

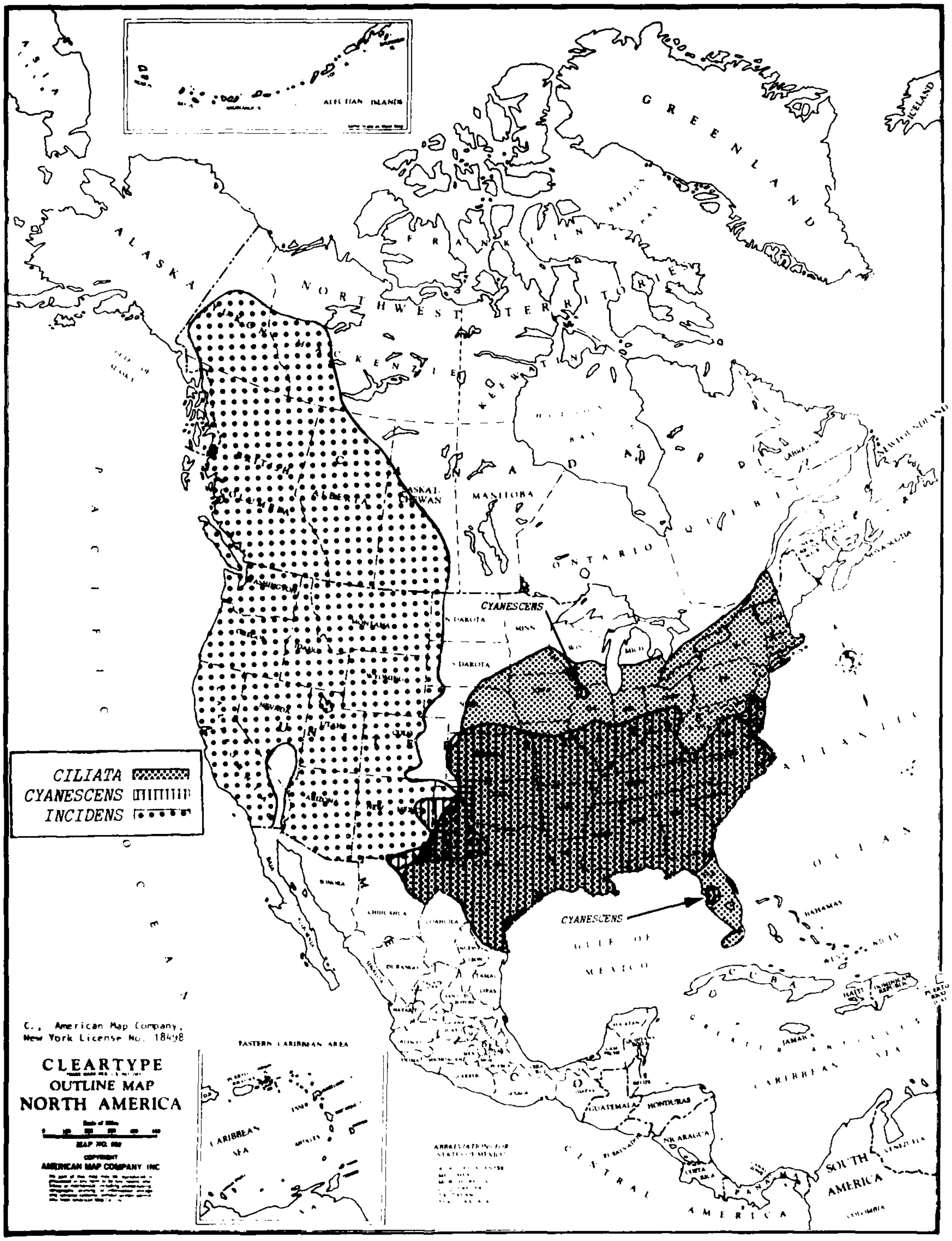

Plate 13. Distribution of *Culiseta incidens* - USA: AK, AZ, CA, CO, ID, MT, NE, NV, NM, ND, OK, OR, TX, UT, WA, WY (106), SD (187); CANADA: ALTA, BC, NWT, YUK (106), SASK (310); Not in NS (177); Tax. 28, 296, 505. *Psorophora ciliata* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MA, MI, MS, MO, NE, NH, NJ, NY, NC, OH, OK, PA, RI, SC, SD, TN, TX, VA, WV, WI (106), MN (16), NM (316); CANADA: ONT, PQ (106); Tax. 28, 34, 39, 505. *Psorophora cyanescens* - USA: AL, AR, FL, GA, IL, IN, KS, KY, LA, MS, MO, NE, NM, NC, OH, OK, SC, TN, TX, VA (106), DE (254), MD (240), NJ (732).

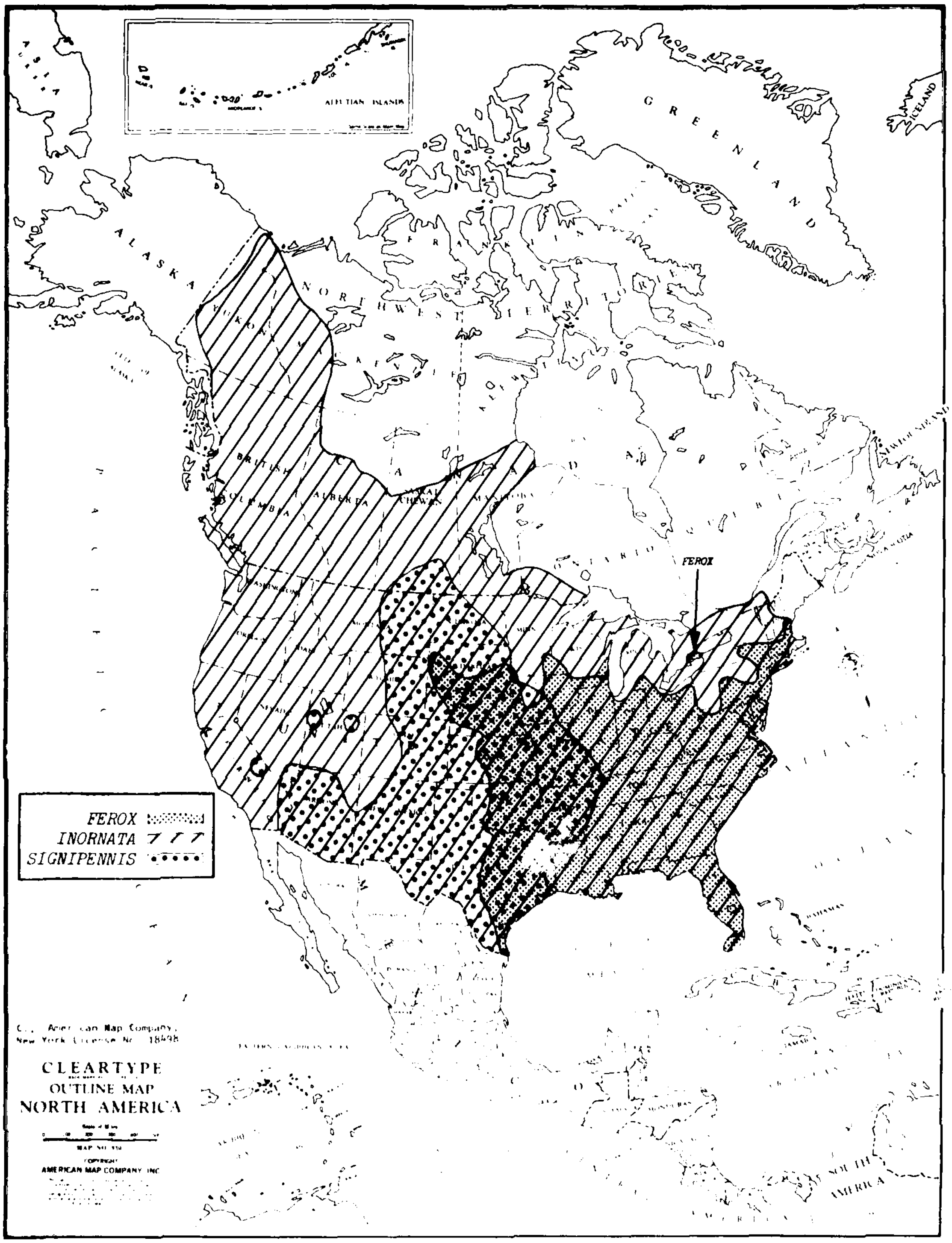

Plate 44. Distribution of *Culiseta inornata* - USA: AL, AZ, AR, CA, CO, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, SC, SD, TN, TX, UT, VA, WA, WI, WY (106), CT (483), WV (3); CANADA: ALTA, BC, MAN, NWT, ONT, SASK, YUK (106), PQ (265); Tax. 296, 505. *Psorophora ferox* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MA, MI, MN, MS, MO, NE, NH, NJ, NY, NC, OH, OK, PA, SC, SD, TN, TX, VA, WI (106), MD (46), WV (3); CANADA: ONT (505); Tax. 28, 34, 505. *Psorophora signipennis* - USA: AZ, AR, CO, IA, KS, KY, MO, MT, NE, NM, ND, OK, SD, TN, TX, WY (106), CA (120), NV (224), UT (382); CANADA: SASK (380); Tax. 505.

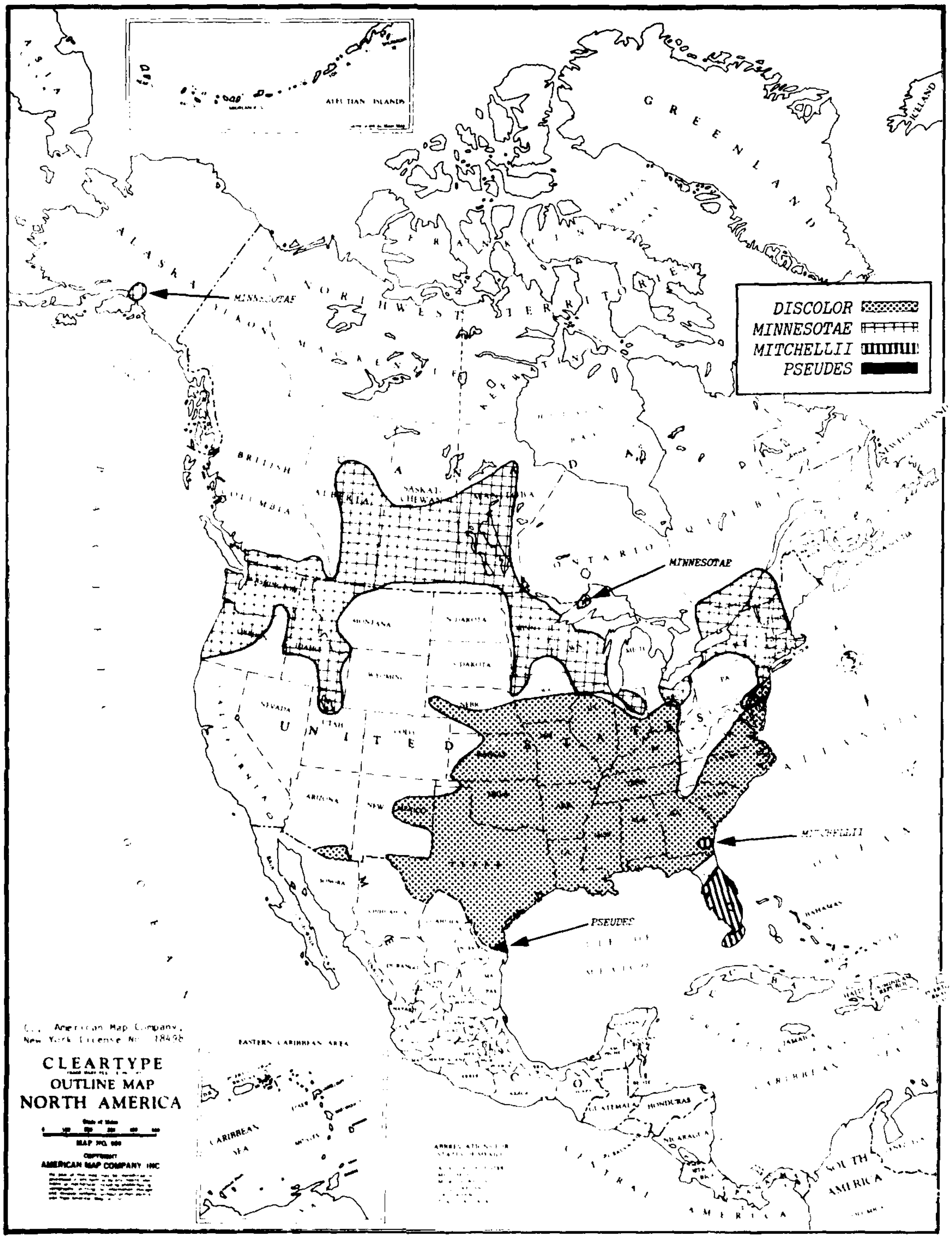

Plate 45. Distribution of *Culiseta minnesotae* - USA: AK (535), CT (293), DE (252), ID, ME (337), IL (393), IN (412), IA (121), MD (50), MA (517), MI (23), MN (15), NH (75), NJ (72), NY (311), OH (352), OR (190), UT (338), WA (325), WI (420); CANADA: ALTA (198), BC (126), MAN (470), ONT (444), PQ (263), SASK (310); Tax. 15, 296, 367, 505. *D... pseudes* - USA: TX (35); Tax. 1, 35, 359. *Psorophora discolor* - USA: AL, AR, DE, DC, ... GA, IL, IA, KS, KY, LA, MD, MS, MO, NE, NJ, NM, NC, OH, OK, SC, TN, TX, ... (106), AZ (382), IN (419). *Wyeomyia mitchellii* - USA: FL (106), GA (326) ...

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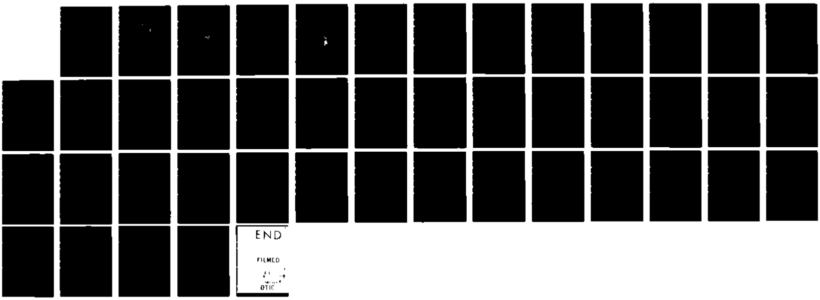

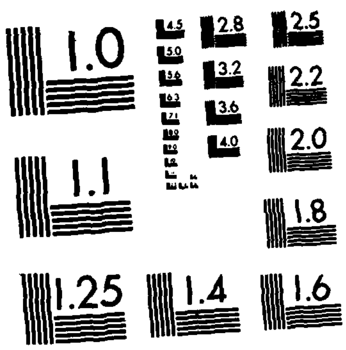

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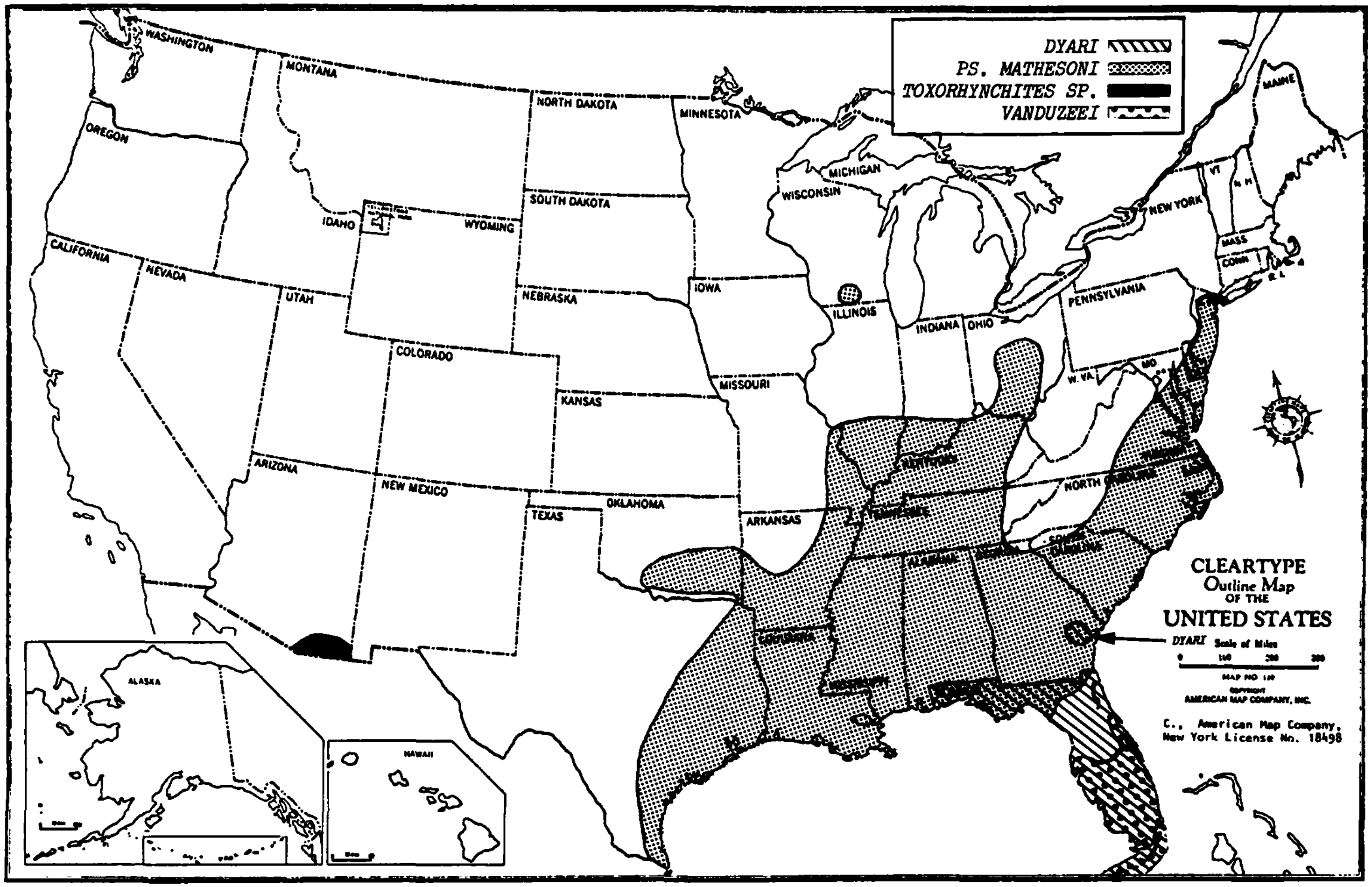

Plate 46. Distribution of *Mansonia dyari* - USA: FL, GA (106); Tax. 34, 389, 390. *Psorophora mathesoni* - USA: AL, AR, FL, GA, IL, IN, KY, LA, MS, MO, NY, NC, OH, OK, SC, TN, TX, VA (106), DE (254), MD (46), NJ (72), WI (466), Listed in all references as *Ps. varipes;* Tax. 33. *Toxorhynchites* sp. USA: AZ (512), *Wyeomyia vanduzeei* - USA: FL (106); Tax. 34.

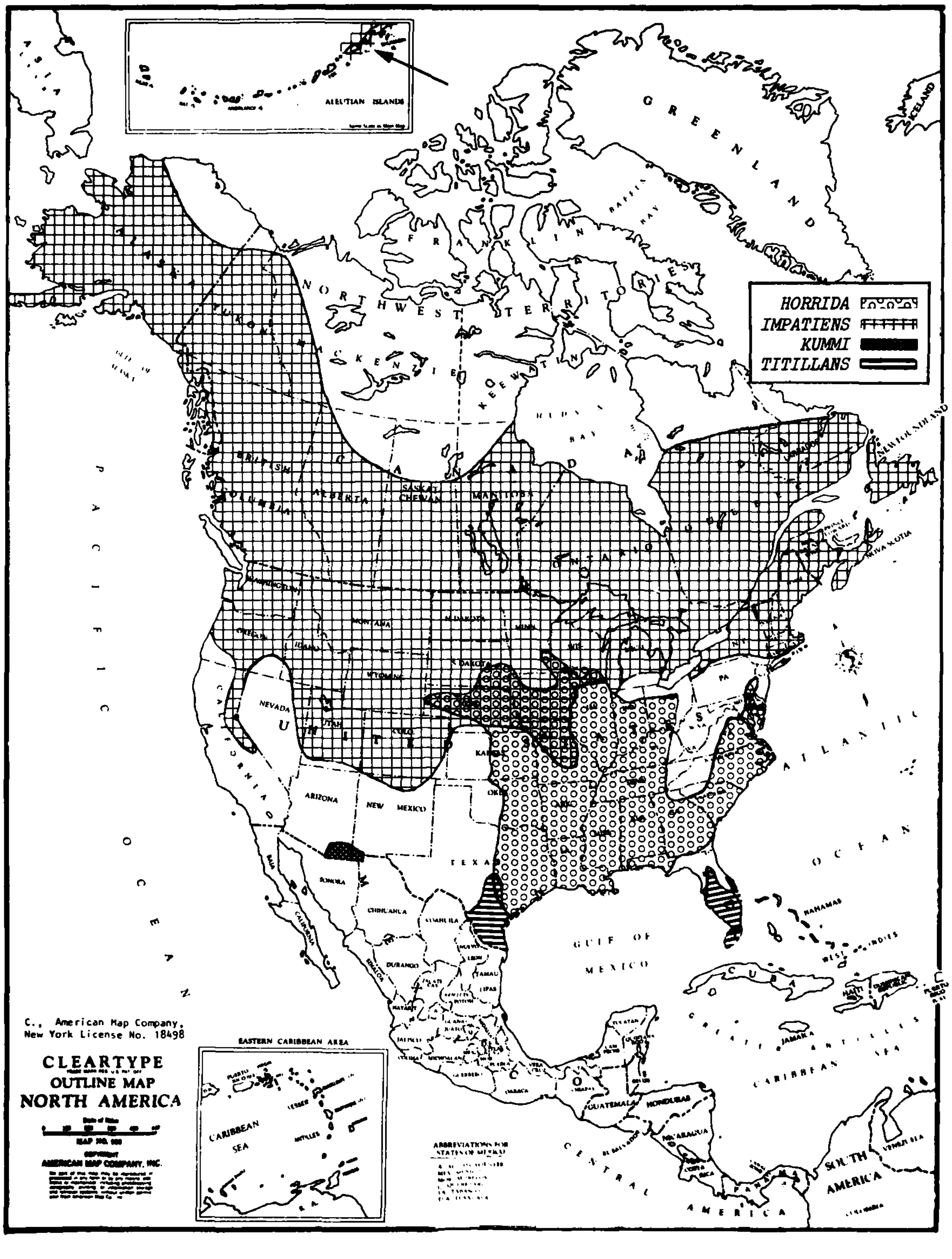

Plate 47. Distribution of *Culiseta impatiens* - USA: AK, CA, CO, ID, IA, ME, MA, MI, MO, MT, NE, NH, NY, OR, UT, VT, WA, WI, WY (106), CT (484), NV (382), NM (503), PA (Wills, in litt. 1979), SD (187); CANADA: ALTA, BC, LAB, MAN, NB, NWT, ONT, PQ, YUK (106), NFLD (360), SASK (380), Not in NS (505); Map modified after Hopla (227); Tax. 296, 505. *Mansonia titillans* - USA: FL, TX (106); Tax. 34, 389, 390. *Orthopodomyia kummi* - USA: AZ (307), NM (336); Tax. 508. *Psorophora horrida* - USA: AL, AR, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MS, MO, NE, NC, OH, OK, PA, SC, TN, TX, VA (106), DF (254), MI (Newson, in litt. 1977, no locality specified), MN (124), SD (187), WI (Dicke, in litt. 1979).

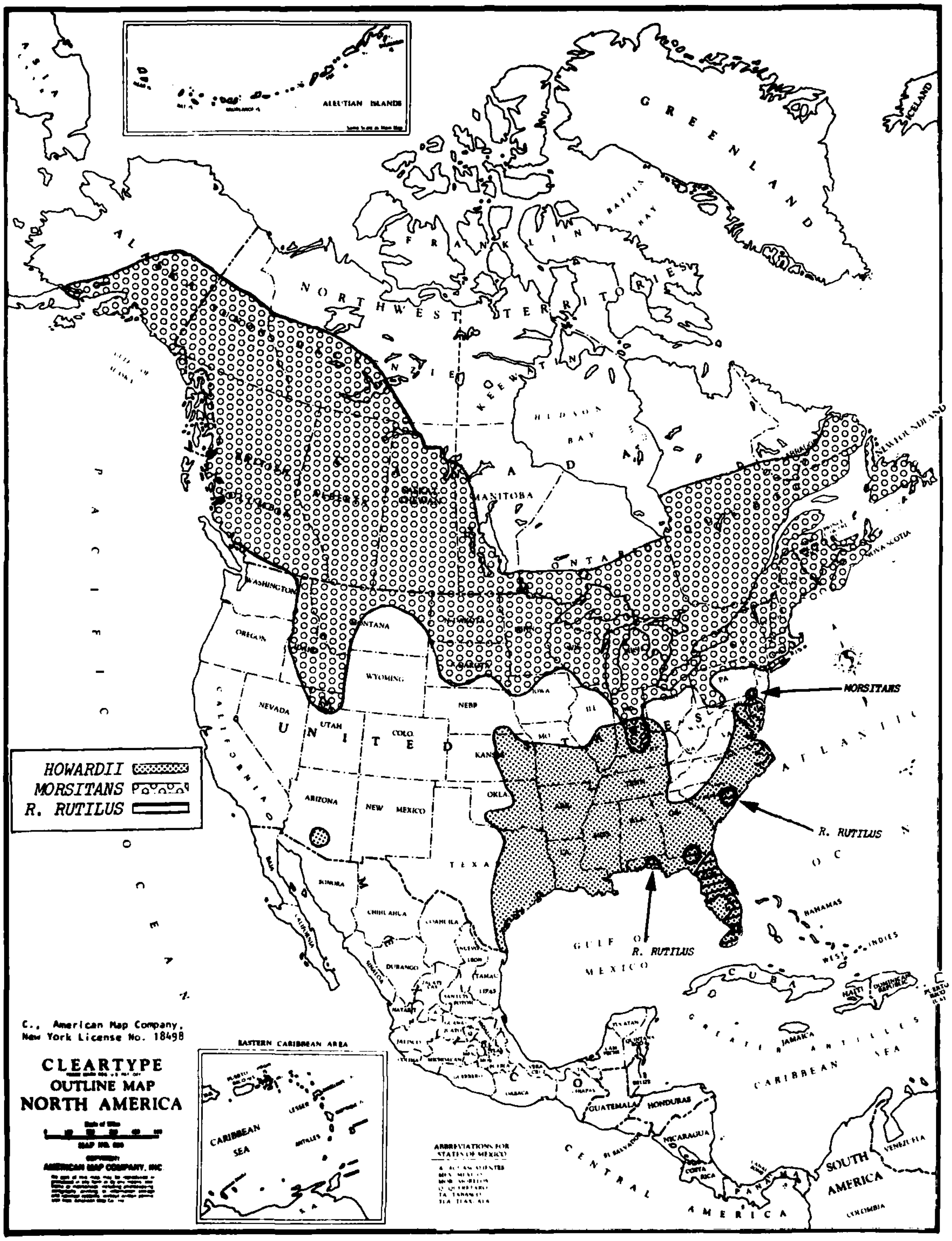

Plate 48. Distribution of *Culiseta morsitans* - USA: AK, CT, DE, ID, IL, IA, KY, ME, MA, MI, MN, NH, NJ, NY, ND, OH, PA, RI, SD, WI (106), IN (415), MD (50), MT (337), UT (330), VT (535), Not in CO (212); CANADA: ALTA, BC, LAB, MAN, NB, NWT, NS, ONT, PEI, PQ, SASK, YUK (106), NFLD (360); Tax. 15, 296, 505. *Psorophora howardii* - USA: AL, AR, DC, FL, GA, IL, IN, KS, KY, LA, MD, MS, MO, NE, NC, OK, SC, TN, TX, VA (106), AZ (382), DE (250), OH (Berry & Parsons, in litt. 1978). *Toxorhynchites r. rutilus* - USA: FL, GA, SC (106); Tax. 476.

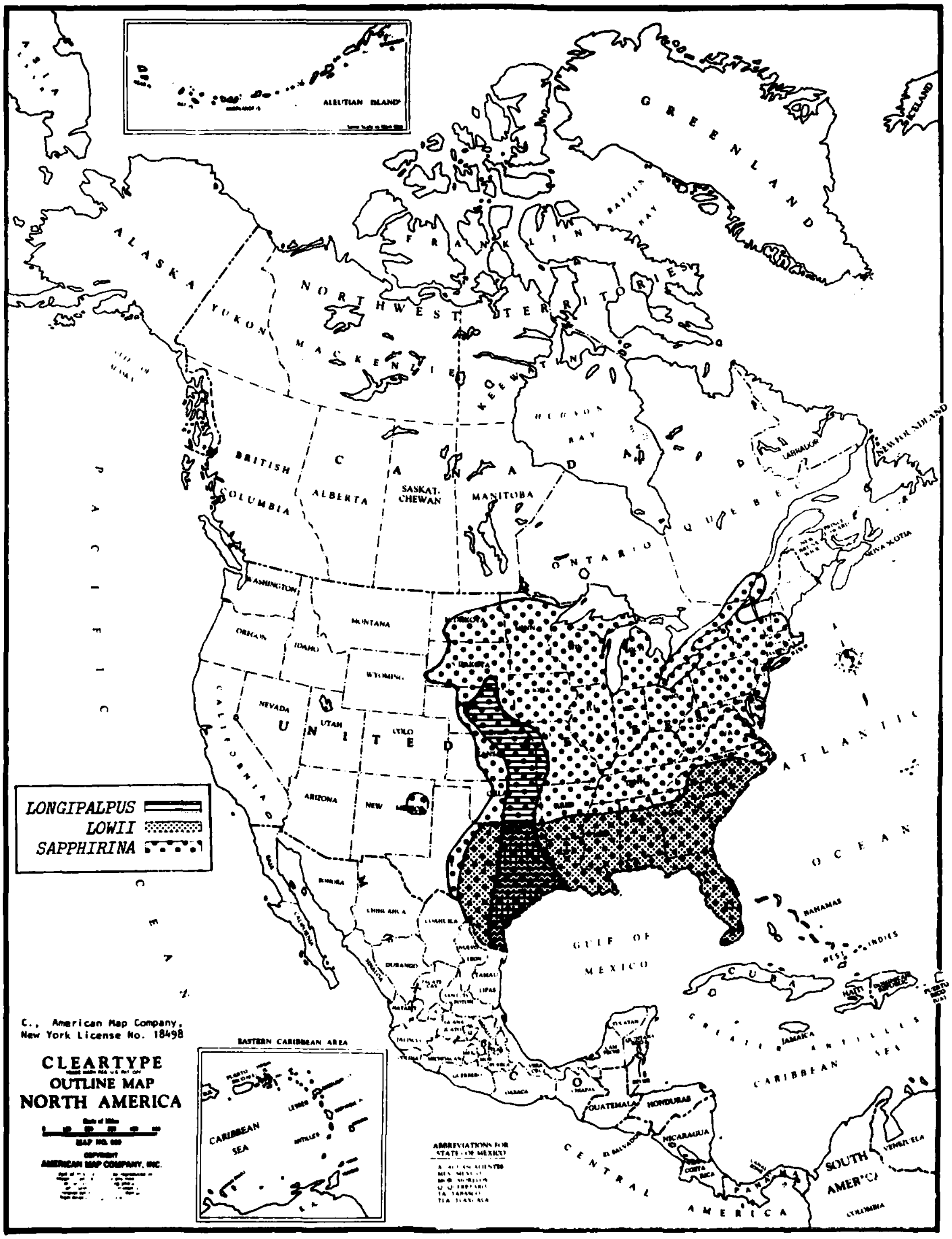

Plate 49. Distribution of *Psorophora longipalpus* - USA: AR, KS, LA, MO, OK, SD, TX (106), NE (376); Map after Roth (527); Tax. 246. *Uranotaenia lowii* - USA: AL, AR, FL, GA, LA, MS, NC, SC, TX (106), OK (353); Tax. 28, 34, 186. *Uranotaenia sapphirina* - USA: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, LA, MD, MA, MI, MN, MS, MO, NE, NH, NJ, NM, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VT, VA, WI (106), WV (3); CANADA: ONT, PQ (106); Tax. 34, 505.

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* Includes mainly period from 1955 to 1978, i.e., since Carpenter & LaCasse (1955), but contains some references and distribution records before 1955 not cited by them.

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APPENDIX: LOCALITY DATA FOR MOSQUITO SPECIMENS USED TO PREPARE ILLUSTRATIONS FOR KEYS

For the benefit of mosquito taxonomists and other scientists interested in the localities from which the specimens were collected the following list is presented. Actually 96% of the specimens are from the USA and Canada, but for some of those species which are Neotropical in distribution and are found only in the extreme southern parts of USA, it was necessary to select specimens from the Caribbean islands, Mexico, Central America, Panama, and Colombia. Specimens were utilized from all states of the continental United States, except Iowa, Indiana, New Hampshire, South Dakota and West Virginia; and all provinces of Canada, except New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island and Quebec. In all, adult females were selected from 38 states of the USA, 7 provinces of Canada and 8 foreign countries while larvae were from 35 states of the USA, 4 provinces of Canada and 9 foreign countries.

Since the mosquito fauna is better known in some states/provinces than in others, it is not surprising that specimens from only 11 states/provinces were used to prepare 50% of the adult illustrations, while larvae from 10 states/provinces accounted for 64.7% of the drawings used in the keys to immatures.

LOCALITY DATA FOR MOSQUITO SPECIMENS USED TO PREPARE ILLUSTRATIONS FOR KEYS

Figure Number	*Species*	*Country*	*State/Province*	*County*	*Locality*
1, 2	*Tx. r. septentrionalis*	USA	Delaware	Kent	Bombay Hook
3, 4	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
5, 6	*An. quadrimaculatus*	USA	North Carolina	Robeson	Maxton
7, 8	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
9, 10	*Wy. smithii*	USA	Massachusetts	Hampden	Westfield
11	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
12	*Ae. vexans*	USA	North Dakota	Grand Forks	Grand Forks
13, 14	*Ur. sapphirina*	USA	Virginia	Fairfax	Falls Church
15	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
16	*Ae. vexans*	USA	North Dakota	Grand Forks	Grand Forks
17	*Ps. ciliata*	USA	Virginia	Accomack	Chincoteague
18	*Cs. inornata*	USA	Oregon	Portland	Portland
19, 20	*Ma. titillans*	Mexico	Tamaulipas		Tampico
21, 22	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
23	*Ps. ciliata*	USA	Virginia	Accomack	Chincoteague
24	*Ps. cyanescens*	USA	Texas	Dallas	Dallas
25	*Ae. vexans*	USA	North Dakota	Grand Forks	Grand Forks
26	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
27, 28	*Cs. inornata*	USA	Oregon	Portland	Portland
29, 30	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
31	*Hg. equinus*	USA	Texas	Cameron	Brownsville
32	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
33, 34	*Or. signifera*	USA	Florida	Indian River	Vero Beach
35, 36	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
37	*Cq. perturbans*	USA	New York	Wayne	Fair Haven
38, 40	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
39	*De. pseudes*	USA	Texas	Cameron	Brownsville

Figure Number	*Species*	*Country*	*State/Province*	*County*	*Locality*
41, 42	*Ae. purpureipes*	USA	Arizona	Santa Cruz	Madera Canyon
43	*Cx. pipiens*	USA	New York	Brooklyn	Ft. Hamilton
44	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
45, 47	*Ae. excrucians*	USA	Montana	Glacier	Glacier Natl. Park
46	*Ae. triseriatus*	USA	Kentucky	Jefferson	Louisville
48	*Ae. c. canadensis*	USA	Minnesota	Roseau	Warroad
49	*Ae. sollicitans*	USA	Florida	Dade	Miami
50	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
51, 52	*Ae. taeniorhynchus*	USA	Florida	Palm Beach	Palm Beach
53, 54	*Ae. sollicitans*	USA	Florida	Dade	Miami
55, 56	*Ae. mitchellae*	USA	Florida		
57, 60	*Ae. sollicitans*	USA	Florida	Dade	Miami
61, 62	*Ae. nigromacalis*	USA	Idaho	Ada	Boise
63, 64	*Ae. papago*	USA	Arizona	Pima	Mendoza Canyon
65	*Ae. taeniorhynchus*	USA	Florida	Palm Beach	Palm Beach
66	*Ae. vexans*	USA	North Dakota	Grand Forks	Grand Forks
67	*Ae. aegypti*	USA	Florida		
68	*Ae. c. canadensis*	USA	Minnesota	Roseau	Warroad
69	*Ae. zoosophus*	USA	Texas	Frio	
70	*Ae. epactius*	USA	Texas	Travis	
71, 73	*Ae. vexans*	Canada	Ontario	Kenora	Dryden
72	*Ae. excrucians*	USA	Montana	Glacier	Glacier Natl. Park
74	*Ae. vexans*	USA	North Dakota	Grand Forks	Grand Forks
75, 76	*Ae. cantator*	USA	New York	Long Island	
77	*Ae. grossbecki*	USA	Louisiana	Rapides	Alexandria
78	*Ae. stimulans*	Canada	Ontario	Carleton	Ottawa
79	*Ae. squamiger*	USA	California	Orange	Huntington
80	*Ae. squamiger*	USA	California	San Diego	San Diego
81, 82	*Ae. grossbecki*	USA	Louisiana	Rapides	Alexandria
83	*Ae. nigromaculis*	USA	North Dakota	Ramsey	Devils Lake
84	*Ae. nigromaculis*	USA	Idaho	Ada	Boise
85, 86	*Ae. increpitus*	USA	Utah	Cache	River Heights
87	*Ae. flavescens*	Canada	Saskatchewan		Oxbow
88, 90	*Ae. increpitus*	USA	Utah	Cache	River Heights
89	*Ae. excrucians*	USA	Montana	Glacier	Glacier Natl. Park
91, 93	*Ae. riparius*	Canada	Alberta		Red Deer
92	*Ae. stimulans*	Canada	Ontario	Carleton	Ottawa
94	*Ae. fitchii*	Canada	Ontario	Algoma	White River
95, 96	*Ae. riparius*	Canada	Alberta		Red Deer
97, 98	*Ae. aloponotum*	USA	Oregon	Marion	Idanha
99-102	*Ae. euedes*	USA	Minnesota	Clearwater	Itasco State Park
103-106	*Ae. fitchii*	Canada	Ontario	Algoma	White River
107, 108	*Ae. increpitus*	USA	Utah	Cache	River Heights
109, 110	*Ae. stimulans*	Canada	Ontario	Carleton	Ottawa
111	*Ae. fitchii*	Canada	Ontario	Algoma	White River
112	*Ae. mercurator*	Canada	Yukon	Klondike	Dawson
113	*Ae. stimulans*	Canada	Ontario	Carleton	Ottawa
114	*Ae. euedes*	USA	Minnesota	Clearwater	Itasca State Park

Figure Number	Species	Country	State/Province	County	Locality
115-117	*Ae. mercurator*	Canada	Yukon	Klondike	Dawson
118-120	*Ae. fitchii*	Canada	Ontario	Algoma	White River
121, 122	*Ae. stimulans*	Canada	Ontario	Carleton	Ottawa
123, 124	*Ae. euedes*	USA	Minnesota	Clearwater	Itasca State Park
125, 126	*Ae. dorsalis*	USA	Oregon	Klamath	Klamath Falls
127, 128	*Ae. atropalpus*	USA	Massachusetts	Essex	
129, 130	*Ae. melanimon*	USA	Montana	Hill	Havre
131-134	*Ae. dorsalis*	USA	Oregon	Klamath	Klamath Falls
135, 136	*Ae. campestris*	USA	Nevada	Elko	Carlin
137	*Ae. togoi*	Taiwan			
138-140	*Ae. c. canadensis*	USA	Minnesota	Roseau	Warroad
141, 142	*Ae. atropalpus*	USA	Massachusetts	Essex	
143, 144	*Ae. c. canadensis*	USA	Minnesota	Roseau	Warroad
145, 146	*Ae. c. mathesoni*	USA	Florida	Clay	Camp Blanding
147-149	*Ae. atropalpus*	USA	Massachusetts	Essex	
150-152	*Ae. sierrensis*	USA	Washington	Mason	Lake Cushman
153-155	*Ae. epactius*	USA	Texas	Travis	
156-158	*Ae. atropalpus*	USA	Massachusetts	Essex	
159	*Ae. monticola*	USA	Arizona	Pima	Sabino Basin
160	*Ae. sierrensis*	USA	Washington	Mason	Lake Cushman
161	*Ae. varipalpus*	USA	Arizona	Coconino	Williams
162,163	*Ae. sierrensis*	USA	California	Los Angeles	Pearblossom
164	*Ae. sierrensis*	USA	Washington	Mason	Lake Cushman
165, 166	*Ae. deserticola*	USA	California	Riverside	Joshua Tree Natl. Monument
167, 169, 170	*Ae. f. pallens*	USA	Louisiana	Rapides	Alexandria
168	*Ae. triseriatus*	USA	Kentucky	Jefferson	Louisville
171, 172	*Ae. bimaculatus*	USA	Texas	Cameron	Brownsville
173	*Ae. purpureipes*	USA	Arizona	Santa Cruz	Madera Canyon
174	*Ae. hendersoni*	USA	Colorado	Weld	Kuner
175	*Ae. atlanticus*	USA	North Carolina	Brunswick	Wilmington
176, 178	*Ae. triseriatus*	USA	Kentucky	Jefferson	Louisville
177	*Ae. pullatus*	USA	Colorado	Grand	Grand Lake
179	*Ae. atlanticus*	USA	North Carolina	Brunswick	Wilmington
180, 181	*Ae. triseriatus*	USA	Kentucky	Jefferson	Louisville
182, 184, 185	*Ae. hendersoni*	USA	Ohio	Portage	Ravenna
183	*Ae. hendersoni*	USA	Colorado	Weld	Kuner
186, 187	*Ae. brelandi*	USA	Texas	Brewster	Big Bend Natl. Park
188	*Ae. trivittatus*	USA	Missouri	Clay	Kansas City
189, 191	*Ae. atlanticus*	USA	North Carolina	Brunswick	Wilmington
190	*Ae. infirmatus*	USA	Florida	Gulf	
192, 193	*Ae. scapularis*	USA	Texas	Hidalgo	Mission
194, 195	*Ae. infirmatus*	USA	Florida	Gulf	
196, 197	*Ae. burgeri*	USA	Arizona	Santa Cruz	Bodie Canyon
198, 199	*Ae. atlanticus*	USA	North Carolina	Brunswick	Wilmington
200, 201	*Ae. muelleri*	USA	Arizona	Santa Cruz	Bodie Canyon

Figure Number	Species	Country	State/Province	County	Locality
202, 203, 205	*Ae. atlanticus*	USA	North Carolina	Brunswick	Wilmington
204	*Ae. dupreei*	USA	Louisiana	East Baton Rouge	Baton Rouge
206	*Ae. niphadopsis*	USA	Utah	Salt Lake	Salt Lake City
207, 209	*Ae. s. idahoensis*	USA	Utah	Uintah	Ouray
208	*Ae. pullatus*	USA	Colorado	Grand	Grand Lake
210	*Ae. niphadopsis*	USA	Utah	Salt Lake	Salt Lake City
211, 212	*Ae. s. spencerii*	USA	North Dakota	Ramsey	Devils Lake
213, 214	*Ae. s. idahoensis*	USA	Utah	Uintah	Ouray
215, 216	*Ae. ventrovittis*	USA	Wyoming	Teton	Yellowstone Natl. Park
217	*Ae. bicristatus*	USA	California	Lake	Lower Lake
218	*Ae. cataphylla*	Canada	British Columbia		Cranbrook
219, 220	*Ae. niphadopsis*	USA	Utah	Salt Lake	Salt Lake City
221, 222	*Ae. cataphylla*	Canada	British Columbia		Cranbrook
223, 224	*Ae. bicristatus*	USA	California	Lake	Lower Lake
225, 226	*Ae. cataphylla*	Canada	British Columbia		Cranbrook
227, 229, 230	*Ae. pullatus*	USA	Colorado	Grand	Grand Lake
228	*Ae. diantaeus*	USA	Michigan	Keweenaw	Copper Harbor
231, 232	*Ae. implicatus*	USA	Idaho	Kootenai	Athol
233, 234	*Ae. intrudens*	USA	Maine	Washington	Crawford
235, 236	*Ae. pullatus*	USA	Colorado	Grand	Grand Lake
237, 238	*Ae. implicatus*	USA	Idaho	Kootenai	Athol
239, 240	*Ae. provocans*	USA	Minnesota	Roseau	Warroad
241	*Ae. diantaeus*	USA	Michigan	Keweenaw	Copper Harbor
242	*Ae. intrudens*	USA	Maine	Washington	Crawford
243, 244	*Ae. aurifer*	USA	Delaware	New Castle	Glasgow
245-247	*Ae. thibaulti*	USA	Alabama	Lauderdale	Wilson Dam
248-250	*Ae. decticus*	USA	Massachusetts	Hampshire	Belchertown
251, 252	*Ae. diantaeus*	USA	Michigan	Keweenaw	Copper Harbor
253	*Ae. sticticus*	USA	Massachusetts	Hampshire	Northampton
254	*Ae. punctor*	USA	Massachusetts	Hampshire	Chesterfield
255	*Ae. thelcter*	USA	Texas	Bexar	San Antonio
256-258	*Ae. intrudens*	USA	Maine	Washington	Crawford
259, 260	*Ae. sticticus*	USA	Massachusetts	Hampshire	Northampton
261, 262	*Ae. cinereus*	USA	Minnesota	Roseau	Warroad
263-265	*Ae. intrudens*	USA	Maine	Washington	Crawford
266	*Ae. tortilis*	Bahamas			
267, 268	*Ae. rempeli*	Canada	Northwest Territories		Baker Lake
269-272	*Ae. sticticus*	USA	Massachusetts	Hampshire	Northampton
273-275	*Ae. communis*	USA	Michigan	Keweenaw	Copper Harbor
276, 277	*Ae. nevadensis*	USA	Nevada	Elko	Lamoille Canyon
278	*Ae. churchillensis*	Canada	Manitoba		Churchill
279, 280	*Ae. ventrovittis*	USA	Wyoming	Teton	Yellowstone Natl. Park
281	*Ae. implicatus*	USA	Idaho	Kootenai	Athol

Figure Number	Species	Country	State/Province	County	Locality
282	*Ae. punctor*	USA	Massachusetts	Hampshire	Chesterfield
283, 284	*Ae. impiger*	USA	Alaska		Nome
285	*Ae. pionips*	Canada	Ontario	Algoma	White River
286	*Ae. implicatus*	USA	Idaho	Kootenai	Athol
287, 288	*Ae. impiger*	USA	Alaska		Nome
289, 290	*Ae. nigripes*	Canada	Manitoba		Churchill
291, 292	*Ae. schizopinax*	USA	California	Nevada	Boca
293, 294	*Ae. punctor*	USA	Massachusetts	Hampshire	Chesterfield
295	*Ae. implicatus*	USA	Idaho	Kootenai	Athol
296	*Ae. hexodontus*	Canada	British Columbia		Prince Rupert
297-299	*Ae. implicatus*	USA	Idaho	Kootenai	Athol
300-302	*Ae. punctor*	USA	Massachusetts	Hampshire	Chesterfield
303, 304	*Ae. pionips*	Canada	Ontario	Algoma	White River
305-308	*Ae. hexodontus*	Canada	British Columbia		Prince Rupert
309, 310	*Ae. punctor*	USA	Massachusetts	Hampshire	Chesterfield
311	*(Map)*				
312	*An. crucians*	USA	Georgia	Baker	Newton
313	*An. quadrimaculatus*	USA	Arkansas	Arkansas	Stuttgart
314	*An. earlei*	USA	Minnesota	Ramsey	St. Paul
315	*An. albimanus*	Panama	Canal Zone		Gatun
316, 318-320	*An. punctipennis*	USA	Connecticut	Fairfield	Redding
317	*An. crucians*	USA	Georgia	Baker	Newton
321	*An. pseudopunctipennis*	USA	Texas	Cameron	Ft. Brown
322	*An. pseudopunctipennis*	USA	Texas	Travis	
323	*An. punctipennis*	USA	Connecticut	Fairfield	Redding
324	*An. perplexens*	USA	Florida		
325	*An. pseudopunctipennis*	USA	Texas	Travis	
326	*An. pseudopunctipennis*	USA	Texas	Cameron	Ft. Brown
327, 328	*An. franciscanus*	USA	New Mexico	Eddy	Artesia
329, 331	*An. earlei*	USA	Minnesota	Ramsey	St. Paul
330	*An. quadrimaculatus*	USA	Arkansas	Arkansas	Stuttgart
332	*An. occidentalis*	USA	California	Alameda	Palo Alto
333, 334	*An. barberi*	USA	Delaware	Kent	Bombay Hook
335	*An. quadrimaculatus*	USA	Arkansas	Arkansas	Stuttgart
336	*An. freeborni*	USA	California	Stanislaus	Modesto
337	*An. barberi*	USA	Delaware	Kent	Bombay Hook
338	*An. judithae*	USA	Arizona	Santa Cruz	Nogales
339	*An. freeborni*	USA	California	Stanislaus	Modesto
340	*An. quadrimaculatus*	USA	Arkansas	Arkansas	Stuttgart
341	*An. walkeri*	USA	Michigan	Livingston	
342	*An. atropos*	USA	Louisiana	Plaquemines	Buras
343	*An. freeborni*	USA	California	Nevada	Auburn
344	*An. quadrimaculatus*	USA	Arkansas	Arkansas	Stuttgart
345-347	*An. walkeri*	USA	Michigan	Livingston	
348-350	*An. atropos*	USA	Louisiana	Plaquemines	Buras
351, 352	*Cx. pipiens*	USA	Oregon	Multnomah	Portland
353, 354	*Cx. erraticus*	USA	Florida	Dade	Miami
355	*Cx. restuans*	USA	Wisconsin	Dane	

Figure Number	Species	Country	State/Province	County	Locality
356	*Cx. territans*	USA	Virginia	Fairfax	Falls Church
357	*Cx. tarsalis*	USA	Texas	Victoria	Victoria
358	*Cx. restuans*	USA	Wisconsin	Dane	
359	*Cx. tarsalis*	USA	California		
360	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
361	*Cx. bahamensis*	USA	Florida	Monroe	Key Largo
362, 363	*Cx. tarsalis*	USA	Texas	Victoria	Victoria
364	*Cx. tarsalis*	USA	California		
365	*Cx. peus*	USA	California	Mariposa	
366	*Cx. peus*	USA	California		
367	*Cx. thriambus*	USA	Texas	Kerr	Kerrville
368, 369	*Cx. coronator*	USA	Texas	Cameron	Weslaco
370	*Cx. declarator*	Costa Rica			Puerto Viejo
371, 372	*Cx. erythrothorax*	USA	California	San Luis Obispo	San Luis Obispo
373–375	*Cx. nigripalpus*	USA	Florida		
376	*Cx. restuans*	USA	Wisconsin	Dane	
377, 378	*Cx. nigripalpus*	USA	Florida		
379-381	*Cx. salinarius*	USA	Maryland	Calvert	Chesapeake Beach
382	*Cx. chidesteri*	USA	Texas	Cameron	Brownsville
383	*Cx. pipiens*	USA	Tennessee	Campbell	Loyston
384	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
385-388	*Cx. restuans*	USA	Wisconsin	Dane	Madison
389, 390	*Cx. interrogator*	Panama	Canal Zone		
391	*Cx. reevesi*	Mexico	Baja California Norte		
392-394	*Cx. territans*	USA	Virginia	Fairfax	Falls Church
395	*Cx. arizonensis*	USA	Arizona	Yavapai	Prescott
396	*Cx. apicalis*	USA	Arizona	Cochise	Portal
397, 398	*Cx. territans*	USA	Virginia	Fairfax	Falls Church
399	*Cx. boharti*	USA	California	San Diego	San Diego
400	*Cx. boharti*	USA	California	Placer	Lake Tahoe
401	*Cx. apicalis*	USA	Arizona	Cochise	Portal
402	*Cx. arizonensis*	USA	Arizona	Yavapai	Prescott
403	*Cx. latisquama*	Colombia			
404	*Cx. pipiens*	USA	New Jersey	Middlesex	Nixon
405	*Cx. erraticus*	USA	Texas	Kinney	Brackettsville
406, 407	*Cx. peccator*	USA	Louisiana	La Salle	Olla
408	*Cx. atratus*	Cuba			Havana
409	*Cx. opisthopus*	USA	Florida	Dade	Miami
410, 412	*Cx. peccator*	USA	Louisiana	La Salle	Olla
411	*Cx. abominator*	USA	Texas	Bexar	
413	*Cx. iolambdis*	USA	Florida	Monroe	Key Largo
414, 415	*Cx. atratus*	Cuba			Havana
416	*Cx. pilosus*	USA	Florida	Broward	Ft. Lauderdale
417	*Cx. pilosus*	USA	Florida		
418	*Cx. mulrennani*	USA	Florida	Monroe	Big Pine Key
419	*Cx. melanura*	USA	Illinois		

Figure Number	Species	Country	State/Province	County	Locality
420, 421	*Cs. morsitans*	USA	Michigan	Livingston	
422	*Cs. impatiens*	USA	Colorado	Grand	Grand Lake
423, 424	*Cs. particeps*	USA	California	Humboldt	Arcata
425	*Cs. morsitans*	USA	Michigan	Livingston	
426	*Cs. impatiens*	USA	Colorado	Grand	Grand Lake
427	*Cs. particeps*	USA	California	Humboldt	Arcata
428	*Cs. alaskaensis*	USA	Alaska		Anchorage
429	*Cs. incidens*	USA	Washington	Whatcom	Bellingham
430	*Cs. impatiens*	USA	Colorado	Grand	Grand Lake
431	*Cs. minnesotae*	USA	Minnesota	St. Louis	Virginia
432	*Cs. morsitans*	USA	Michigan	Livingston	
433, 434	*Cs. inornata*	USA	Missouri	St. Louis	W. St. Louis
435, 436	*Cs. impatiens*	USA	Colorado	Grand	Grand Lake
437	*De. pseudes*	Panama			
438, 439	*De. cancer*	USA	Florida	Indian River	Vero Beach
440	*De. mathesoni*	USA	Texas	Cameron	Brownsville
441	*Ma. titillans*	Cuba			
442	*Ma. titillans*	USA	Florida		
443	*Ma. dyari*	USA	Florida	Indian River	Vero Beach
444	*Ma. dyari*	USA	Florida	Okeechobee	Okeechobee
445	*Or. kummi*	Costa Rica			
446, 447	*Or. kummi*	Panama			El Volcán
448	*Or. alba*	USA	Maryland	Anne Arundel	Patuxent
449	*Or. signifera*	USA	Louisiana	Chicot	Kilbourne
450	*Or. alba*	USA	Texas	Travis	Austin
451	*Or. signifera*	USA	Louisiana	Orleans	Camp Planché
452	*Or. signifera*	USA	Louisiana	Chicot	Kilbourne
453	*Or. alba*	USA	Maryland	Anne Arundel	Patuxent
454	*Or. alba*	USA	Texas	Travis	Austin
455, 456	*Ps. columbiae*	USA	Texas	Cameron	Brownsville
457	*Ps. ciliata*	USA	South Carolina	Beaufort	Parris Island
458	*Ps. cyanescens*	USA	New Jersey	Cumberland	Fairton
459	*Ps. pygmaea*	USA	Florida	Monroe	Key West
460-462	*Ps. columbiae*	USA	Texas	Cameron	Brownsville
463, 464, 466	*Ps. discolor*	USA	Georgia	Fulton	Ft. McPherson
465	*Ps. signipennis*	USA	Texas	Sutton	Sonora
467	*Ps. ciliata*	USA	South Carolina	Beaufort	Parris Island
468	*Ps. cyanescens*	USA	New Jersey	Cumberland	Fairton
469	*Ps. ferox*	USA	North Carolina	Columbia	Lake Waccamaw
470	*Ps. ciliata*	USA	South Carolina	Beaufort	Parris Island
471	*Ps. ciliata*	USA	South Carolina	Berkeley	McCellanville
472, 473	*Ps. howardii*	USA	Delaware	New Castle	Newport
474	*Ps. cyanescens*	USA	New Jersey	Cumberland	Fairton
475	*Ps. cyanescens*	USA	Texas	Dallas	Dallas
476, 477, 479	*Ps. ferox*	USA	North Carolina	Columbus	Lake Waccamaw
478	*Ps. mathesoni*	USA	Delaware	Sussex	Thompsonville
480	*Ps. johnstonii*	USA	Florida	Indian River	Vero Beach

Figure Number	Species	Country	State/Province	County	Locality
481, 482	*Ps. mathesoni*	USA	Delaware	Sussex	Thompsonville
483	*Ps. varipes*	Guatemala	Retalhuleu		Champerico
484	*Ps. mexicana*	USA	Texas	Cameron	Brownsville
485-487	*Ps. ferox*	USA	North Carolina	Columbus	Lake Waccamaw
488-491	*Ps. horrida*	USA	Louisiana	East Baton Rouge	Baton Rouge
492, 493	*Ps. longipalpus*	USA	Texas	Cameron	Brownsville
494	*Ur. lowii*	USA	Florida	Highlands	
495, 496	*Ur. sapphirina*	USA	District of Colombia		Washington
497, 498	*Ur. a. anhydor*	USA	California	Bernardino	Saratoga Springs
499	*Ur. a. syntheta*	USA	Texas	Cameron	
500, 501	*Ur. vanduzeei*	USA	Florida	Indian River	Vero Beach
502, 503	*Wy. smithii*	USA	New Jersey	Union	Rahway
504, 505	*Wy. mitchellii*	USA	Florida	Indian River	Vero Beach
506, 507, 509	*Wy. smithii*	USA	New Jersey	Union	Rahway
508	*Wy. haynei*	USA	South Carolina	Richland	Columbia
510	*An. quadrimaculatus*	USA	North Carolina		Camp Sutton
511, 513	*Cx. pipiens*	USA	Pennsylvania	Allegheny	Turtle Creek
512, 514, 515	*Ma. dyari*	USA	Florida	Palm Beach	W. Palm Beach
516	*Cq. perturbans*	USA	Minnesota	Clearwater	
517	*Cq. perturbans*	USA	Florida	Palm Beach	W. Palm Beach
518	*Or. signifera*	USA	Georgia	Fulton	Atlanta
519	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
520	*Tx. r. septentrionalis*	USA	Georgia	Richmond	Augusta
521	*Tx. r. rutilus*	USA	Florida	Palm Beach	Boca Raton
522	*Cx. pipiens*	USA	Missouri	St. Louis	St. Louis
523	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
524	*Wy. smithii*	USA	Maryland	Worchester	
525	*Or. signifera*	USA	Georgia	Fulton	Atlanta
526	*Ur. sapphirina*	USA	Florida	Palm Beach	Camp Murphy
527	*Ur. sapphirina*	USA	Georgia	Bryan	Ft. Stewart
528, 529	*Ps. columbiae*	USA	Delaware	New Castle	Summit Bridge
530, 531	*De. pseudes*	USA	Texas	Cameron	Brownsville
532	*Ps. columbiae*	USA	Delaware	New Castle	Summit Bridge
533, 535	*Ae. aegypti*	USA	Georgia	Fulton	Atlanta
534	*Cs. inornata*	USA	Louisiana	Rapides	Esler Field
536, 538	*Cx. pipiens*	USA	Pennsylvania	Allegheny	Turtle Creek
537	*Ae. aegypti*	USA	Georgia	Fulton	Atlanta
539	*Ae. provocans*	USA	New York	Tompkins	Ithaca
540	*Ps. columbiae*	USA	Delaware	New Castle	Summit Bridge
541, 542	*Ae. atlanticus*	USA	Georgia	Fulton	Atlanta
543, 545	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
544	*Hg. equinus*	Guatemala			
546	*Ae. provocans*	USA	New York	Tompkins	Ithaca
547	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
548	*Ae. hemiteleus*	USA	California	El Dorado	
549, 550	*Ae. provocans*	USA	New York	Tompkins	Ithaca
551	*Ae. bicristatus*	USA	California	Lake	
552	*Ae. atlanticus*	USA	Georgia	Fulton	Atlanta

Figure Number	Species	Country	State/Province	County	Locality
553	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
554, 556, 557	*Ae. nigromaculis*	USA	California	Tulare	Visalia
555	*Ae. abserratus*	USA	New York	Tompkins	Ringwood
558, 559	*Ae. f. pallens*	USA	Louisiana	Rapides	
560	*Ae. nigromaculis*	USA	California	Tulare	Visalia
561	*Ae. nigripes*	Canada	Manitoba		
562	*Ae. f. pallens*	USA	Louisiana	Rapides	
563	*Ae. f. pallens*	USA	South Carolina	Horry	Myrtle Beach
564, 565	*Ae. thelcter*	USA	Texas	Cameron	Brownsville
566	*Ae. tormentor*	USA	Kentucky	Bullitt	Ft. Knox
567	*Ae. abserratus*	USA	New York	Tompkins	Ringwood
568	*Ae. bimaculatus*	USA	Texas	Cameron	Brownsville
569	*Ae. tormentor*	USA	Kentucky	Bullitt	Ft. Knox
570	*Ae. atlanticus*	USA	Georgia	Fulton	Atlanta
571	*Ae. sollicitans*	USA	Illinois	St. Clair	Dupo
572	*Ae. taeniorhynchus*	USA	Florida	Palm Beach	Camp Murphy
573	*Ae. taeniorhynchus*	USA	Florida	Highlands	Avon Park
574, 575	*Ae. abserratus*	USA	New York	Tompkins	Ringwood
576	*Ae. taeniorhynchus*	USA	Florida	Hillsborough	MacDill Field
577	*Ae. taeniorhynchus*	USA	Florida	Palm Beach	Camp Murphy
578	*Ae. dupreei*	USA	Georgia	Fulton	Atlanta
579, 580	*Ae. atlanticus*	USA	Georgia	Fulton	Atlanta
581	*Ae. sollicitans*	USA	Illinois	St. Clair	Dupo
582	*Ae. atlanticus*	USA	Georgia	Fulton	Atlanta
583	*Ae. hexodontus*	USA	California	Tuolumne	Yosemite Natl. Park
584	*Ae. punctor*	USA	Maine	Penobscot	Orono
585	*Ae. sollicitans*	USA	Illinois	St. Clair	Dupo
586, 587	*Ae. mitchellae*	USA	Mississippi	Harrison	Gulfport
588, 589	*Ae. sollicitans*	USA	Illinois	St. Clair	Dupo
590, 592	*Ae. infirmatus*	USA	Florida	Highlands	Avon Park
591	*Ae. taeniorhynchus*	USA	Florida	Palm Beach	Camp Murphy
593	*Ae. trivittatus*	USA	Illinois	Champaign	Champaign
594, 595	*Ae. rempeli*	Canada	Northwest Territories		Baker Lake
596	*Ae. taeniorhynchus*	USA	Florida	Hillsborough	MacDill Field
597	*Ae. scapularis*	Guatemala			
598	*Ae. taeniorhynchus*	USA	Florida	Hillsborough	Tampa
599	*Ae. taeniorhynchus*	USA	Florida	Hillsborough	MacDill Field
600, 601, 603	*Ae. scapularis*	Guatemala			
602	*Ae. scapularis*	Dominican Republic			
604, 605	*Ae. tortilis*	St. Lucia			
606	*Ae. excrucians*	USA	Massachusetts	Hampden	Springfield
607	*Ae. melanimon*	USA	California	Merced	
608, 610	*Ae. cataphylla*	USA	Oregon	Grant	Dixie Pass
609	*Ae. excrucians*	USA	Massachusetts	Hampden	Springfield
611	*Ae. cataphylla*	USA	California	Mono	

Figure Number	Species	Country	State/Province	County	Locality
612	*Ae. atropalpus*	USA	Maine	Hancock	Mt. Desert Is.
613-615	*Ae. atropalpus*	USA	Maryland	Montgomery	Bethesda
616, 617	*Ae. epactius*	USA	Texas	Comal	New Braunsfel
618, 620	*Ae. diantaeus*	USA	Vermont	Windham	Jacksonville
619	*Ae. vexans*	USA	Louisiana	Rapides	
621	*Ae. diantaeus*	USA	Michigan	Keweenaw	Isle Royale
622	*Ae. aurifer*	USA	Delaware	New Castle	New Castle
623	*Ae. aurifer*	USA	Maryland	Prince Georges	
624, 626, 627	*Ae. s. spencerii*	USA	Minnesota	Ramsey	
625	*Ae. campestris*	USA	Nevada	Churchill	
628	*Ae. s. idahoensis*	USA	Utah	Summit	Oakley
629	*Ae. s. idahoensis*	USA	Colorado	Grand	Grand Lake
630	*Ae. excrucians*	USA	Maryland	Cecil	Elkton
631	*Ae. intrudens*	USA	New York	Tompkins	Ringwood
632	*Ae. excrucians*	USA	Massachusetts	Hampden	Springfield
633	*Ae. excrucians*	USA	New York	Tompkins	MacLean
634-637	*Ae. campestris*	USA	Nevada	Churchill	
638	*Ae. flavescens*				
639	*Ae. flavescens*	W.Germany			Spandau
640	*Ae. flavescens*	USA	Alaska		Anchorage
641	*Ae. flavescens*	W. Germany			Spandau
642, 643	*Ae. aloponotum*	USA	Oregon	Marion	Idanha
644	*Ae. intrudens*	USA	New York	Tompkins	Ringwood
645	*Ae. niphadopsis*	USA	Utah	Tooele	Grantsville
646	*Ae. vexans*	USA	Georgia	Fulton	Atlanta
647	*Ae. euedes*	USA	Minnesota	Clearwater	Itasca State Park
648	*Ae. intrudens*	USA	Alaska		Steese Hwy.
649	*Ae. intrudens*	USA	New York	Tompkins	Ringwood
650, 651	*Ae. euedes*	USA	Minnesota	Clearwater	Itasca State Park
652	*Ae. decticus*	USA	Massachusetts	Hampshire	Belchertown
653-655	*Ae. niphadopsis*	USA	Utah	Tooele	Grantsville
656	*Ae. niphadopsis*	USA	Utah		
657-659	*Ae. riparius*	USA	Minnesota	Ramsey	
660	*Ae. euedes*	USA	Minnesota	Clearwater	Itasca State Park
661	*Ae. ventrovittis*	USA	California	Alpine	
662, 663	*Ae. riparius*	USA	Minnesota	Ramsey	
664, 665	*Ae. ventrovittis*	USA	California	Alpine	
666	*Ae. triseriatus*	USA	Ohio	Portage	Ravenna
667	*Ae. fitchii*	USA	New York	Tompkins	Ringwood
668	*Ae. purpureipes*	USA	Arizona	Santa Cruz	
669	*Ae. triseriatus*	USA	Ohio	Portage	Ravenna
670	*Ae. papago*	USA	Arizona	Pima	Mendoza Canyon
671	*Ae. triseriatus*	USA	Louisiana	Calcasie	Lake Charles
672, 673	*Ae. purpureipes*	USA	Arizona	Santa Cruz	
674-677	*Ae. aegypti*	USA	Georgia	Chatham	Savannah
678, 679	*Ae. muelleri*	USA	Arizona	Santa Cruz	Madera Canyon
680, 682	*Ae. sierrensis*	USA	California	San Diego	

Figure Number	Species	Country	State/Province	County	Locality
681	*Ae. zoosophus*	USA	Texas	Pecos	Sheffield
683, 685-687	*Ae. monticola*	USA	Arizona	Santa Cruz	
684	*Ae. deserticola*	USA	California	Los Angeles	
688	*Ae. varipalpus*	USA	Arizona	Coconino	
689	*Ae. varipalpus*	USA	Utah	Kane	
690, 691	*Ae. burgeri*	USA	Arizona	Santa Cruz	
692, 693, 695-697	*Ae. triseriatus*	USA	Ohio	Portage	Ravenna
694	*Ae. zoosophus*	USA	Texas	Pecos	Sheffield
698-700	*Ae. hendersoni*	USA	Colorado	Boulder	Boulder
701	*Ae. brelandi*	USA	Texas	Brewster	
702	*Ae. impiger*	USA	Alaska		Liberty Falls
703	*Ae. cantator*	USA	Rhode Island	Washington	Westerly
704	*Ae. fitchii*	USA	New York	Tompkins	Ringwood
705	*Ae. c. canadensis*	USA	Massachusetts	Hampshire	Belchertown
706	*Ae. impiger*	USA	Alaska		
707	*Ae. stimulans*	USA	Minnesota	Clearwater	
708	*Ae. punctodes*	USA	Alaska		Anchorage
709	*Ae. impiger*	USA	Alaska		Umiat
710	*Ae. stimulans*	USA	Minnesota	Clearwater	
711	*Ae. aboriginis*	USA	Oregon	Columbia	Vernonia
712	*Ae. melanimon*	USA	California	Kern	Bakersfield
713	*Ae. sticticus*	USA	Georgia	Bibb	Macon
714, 715	*Ae. melanimon*	USA	California	Merced	
716, 717	*Ae. stimulans*	USA	Minnesota	Clearwater	
718, 719	*Ae. nevadensis*	USA	Nevada	Elko	Lamoille Canyon
720, 721	*Ae. stimulans*	USA	Minnesota	Clearwater	
722, 723	*Ae. mercurator*	Canada	Yukon Territory		Dawson
724, 725	*Ae. sticticus*	USA	Georgia	Bibb	Macon
726	*Ae. flavescens*				
727	*Ae. flavescens*	USA	Alaska		Anchorage
728, 729	*Ae. sticticus*	USA	Georgia	Bibb	Macon
730, 731	*Ae. schizopinax*	USA	California	Nevada	
732, 733	*Ae. aboriginis*	USA	Oregon	Columbia	Vernonia
734, 736, 737	*Ae. pullatus*	USA	Colorado	Larimer	Rocky Mt. Natl. Park
735	*Ae. dorsalis*	USA	Kansas	Stafford	
738, 739	*Ae. c. canadensis*	USA	Massachusetts	Hampshire	Belchertown
740, 741	*Ae. pionips*	USA	Michigan	Keweenaw	Isle Royale
742	*Ae. pullatus*	USA	Alaska		Eklutna
743, 744	*Ae. pullatus*	USA	Colorado	Larimer	Rocky Mt. Natl. Park
745	*Ae. pullatus*	USA	Alaska		
746	*Ae. cantator*	USA	Maryland	Ann Arundel	Selby-on-Bay
747	*Ae. cantator*	USA	Rhode Island	Washington	Westerly
748	*Ae. togoi*	Canada	British Columbia		
749	*Ae. c. canadensis*	USA	Georgia	Rabun	
750, 751	*Ae. thibaulti*	USA	Delaware	Sussex	Redden State Forest

Figure Number	Species	Country	State/Province	County	Locality
752, 753	*Ae. c. canadensis*	USA	Georgia	Rabun	
754	*Ae. squaminger*	USA	California	Marin	Richmond
755	*Ae. communis*	USA	Minnesota	Clearwater	
756, 757	*Ae. dorsalis*	USA	Kansas	Stafford	
758, 759	*Ae. increpitus*	USA	California	Mariposa	
760	*Ae. campestris*	USA	Nevada	Churchill	
761-763	*Ae. dorsalis*	USA	Kansas	Stafford	
764, 765	*Ae. grossbecki*	USA	Louisiana	Rapides	Alexandria
766, 767	*Ae. communis*	USA	Alaska		Umiat
768-771	*Ae. melanimon*	USA	California	Merced	
772, 773	*Ae. increpitus*	USA	California	Mono	
774-776	*Ae. implicatus*	USA	Minnesota	Clearwater	
777-779	*Ae. increpitus*	USA	California	Mariposa	
780, 781	*An. judithae*	USA	Arizona	Cochise	Portal
782	*An. albimanus*	USA	Florida	Monroe	
783	*An. albimanus*	USA	Texas	Cameron	Cosmas
784	*An. barberi*	USA	Ohio	Stark	Canton
785	*An. barberi*	USA	Maryland	Montgomery	Cabin John
786	*An. judithae*	USA	Arizona	Cochise	Portal
787	*An. judithae*	USA	Arizona	Santa Cruz	Patagonia
788	*An. albimanus*	USA	Florida	Monroe	
789	*An. quadrimaculatus*	USA	Tennessee	Dyer	Dyersburg
790	*An. albimanus*	USA	Texas	Cameron	Cosmas
791	*An. albimanus*	USA	Florida	Monroe	
792, 793	*An. pseudopunctipennis*	USA	Texas	Bell	Temple
794	*An. pseudopunctipennis*	Dutch West Indies	Curacao		
795	*An. pseudopunctipennis*	USA	Texas	Hidalgo	Edinburg
796, 797	*An. franciscanus*	USA	New Mexico	Eddy	Artesia
798	*An. atropos*	USA	Florida	Monroe	Key Largo
799	*An. quadrimaculatus*	USA	Tennessee	Dyer	Dyersburg
800	*An. crucians*	USA	Louisiana	Calcasie	Lake Charles
801	*An. punctipennis*	USA	Louisiana	Rapides	Esler Field
802	*An. walkeri*	USA	Tennessee	Obion	Walnut Log
803	*An. walkeri*	USA	Tennessee	Dyer	Dyersburg
804, 805	*An. quadrimaculatus*	USA	Tennessee	Dyer	Dyersburg
806, 808	*An. bradleyi*	USA	Mississippi	Harrison	Kessler Field
807	*An. quadrimaculatus*	USA	Louisiana	St. Charles	Narco
809	*An. bradleyi*	USA	Alabama	Mobile	Mobile
810, 811	*An. georgianus*	USA	Georgia	Bibb	Macon
812	*An. earlei*	USA	Minnesota	Beltrami	Bemidji
813, 814	*An. quadrimaculatus*	USA	Tennessee	Dyer	Dyersburg
815, 817	*An. punctipennis*	USA	Louisiana	Rapides	Esler Field
816	*An. occidentalis*	USA	California	San Luis Obispo	Pismo Beach
818	*An. freeborni*	USA	Utah	Salt Lake	Salt Lake City
819	*An. freeborni*	USA	Utah	Weber	Ogden
820	*An. punctipennis*	USA	Louisiana	Rapides	Alexandria
821	*An. punctipennis*	USA	California	Shasta	Tower House

Figure Number	Species	Country	State/Province	County	Locality
822	*Cx. pipiens*	USA	Missouri	St. Louis	St. Louis
823	*Cx. territans*	USA	Georgia	Fulton	Atlanta
824, 825	*Cx. bahamensis*	USA	Florida	Monroe	Matecumbe Key
826	*Cx. pipiens*	USA	Pennsylvania	Allegheny	Turtle Creek
827	*Cx. pipiens*	USA	Missouri	St. Louis	St. Louis
828	*Cx. interrogator*	USA	Texas	Cameron	Harlingen
829, 831	*Cx. tarsalis*	USA	California	Contra Costa	Pittsburg
830	*Cx. restuans*	USA	South Carolina	Richland	Columbia
832	*Cx. restuans*	USA	North Carolina	Robeson	Maxton
833	*Cx. thriambus*	USA	California	Riverside	Coachella Valley
834	*Cx. coronator*	USA	Texas	Cameron	Brownsville
835, 836, 838	*Cx. tarsalis*	USA	California	Contra Costa	Pittsburg
837	*Cx. pipiens*	USA	Pennsylvania	Allegheny	Turtle Creek
839	*Cx. chidesteri*	USA	Texas	Cameron	Brownsville
840	*Cx. declarator*	USA	Texas	Caldwell	Luling
841, 842	*Cx. pipiens*	USA	Pennsylvania	Allegheny	Turtle Creek
843	*Cx. salinarius*	USA	Maryland	Ann Arundel	Selby-on-Bay
844	*Cx. peus*	USA	California	Sacramento	Sacramento
845	*Cx. peus*	USA	California	Marin	
846	*Cx. pipiens*	USA	Missouri	St. Louis	St. Louis
847	*Cx. pipiens*	USA	Nebraska	Otoe	Dunbar
848, 849	*Cx. nigripalpus*	USA	Florida	Palm Beach	Gulf Stream
850	*Cx. salinarius*	USA	Maryland	Ann Arundel	Selby-on-Bay
851, 853	*Cx. salinarius*	USA	Kansas	Douglas	
852	*Cx. erythrothorax*	USA	California	San Luis Obispo	
854, 855	*Cx. latisquama*	Colombia			
856	*Cx. peccator*	USA	Florida		
857	*Cx. peccator*	USA	Georgia	Fulton	Atlanta
858	*Cx. territans*	USA	Georgia	Richmond	Ft. Gordon
859	*Cx. peccator*	USA	Florida		
860, 861	*Cx. arizonensis*	USA	Arizona	Yavapai	Prescott
862	*Cx. territans*	USA	Minnesota	Clearwater	
863, 865	*Cx. territans*	USA	Georgia	Richmond	Ft. Gordon
864	*Cx. apicalis*	USA	Texas	Brewster	Big Bend Natl. Park
866	*Cx. reevesi*	USA	California	San Luis Obispo	
867-869	*Cx. territans*	USA	Minnesota	Clearwater	
870, 871	*Cx. boharti*	USA	California	Benito	
872	*Cx. pilosus*	USA	Louisiana	Orleans	Camp Villere
873	*Cx. atratus*	Puerto Rico			Tortuguero
874	*Cx. pilosus*	USA	Georgia	Fulton	Atlanta
875	*Cx. erraticus*	USA	Georgia	Baker	
876, 878	*Cx. opisthopus*	USA	Florida	Broward	Ft. Lauderdale
877	*Cx. peccator*	USA	Florida		
879	*Cx. opisthopus*	USA	Florida	Dade	
880, 881	*Cx. atratus*	USA	Florida	Monroe	Vaca Key
882	*Cx. abominator*	USA	Texas	Comal	
883	*Cx. iolambdis*	USA	Florida	Martin	Jensen

Figure Number	Species	Country	State/Province	County	Locality
884	*Cx. peccator*	USA	Georgia	Fulton	Atlanta
885	*Cx. iolambdis*	USA	Florida	Palm Beach	Jupiter
886	*Cx. anips*	Mexico	Baja California		Tijuana
887	*Cx. peccator*	USA	Florida		
888	*Cx. iolambdis*	USA	Florida	Palm Beach	Jupiter
889	*Cx. mulrennani*	USA	Florida	Monroe	Big Pine Key
890	*Cs. melanura*	USA	Florida	Okaloosa	Baker
891	*Cs. inornata*	USA	Colorado	Larimer	Estes Park
892, 893	*Cs. morsitans*	USA	Minnesota	Clearwater	
894, 895	*Cs. inornata*	USA	Colorado	Larimer	Estes Park
896, 897	*Cs. minnesotae*	USA	Minnesota	Clearwater	
898, 899	*Cs. morsitans*	USA	Minnesota	Clearwater	
900	*Cs. impatiens*	USA	Alaska		Ketchikan
901	*Cs. inornata*	USA	Minnesota	Clearwater	
902, 903	*Cs. particeps*	USA	California	Kern	Kernville
904	*Cs. inornata*	USA	Colorado	Larimer	Estes Park
905, 906	*Cs. inornata*	USA	Delaware	New Castle	Newark
907	*Cs. incidens*	USA	Idaho	Valley	McCall
908, 909	*Cs. alaskaensis*	USA	Alaska		Glen Allen
910, 911	*Cs. incidens*	USA	California	Madera	
912, 913	*De. mathesoni*	USA	Texas	Cameron	Brownsville
914-916, 918	*De. pseudes*	USA	Texas	Cameron	Brownsville
917	*De. cancer*	USA	Florida	Palm Beach	Boca Raton
919	*De. cancer*	USA	Florida		
920, 921	*Ma. titillans*	Jamaica			
922, 923	*Ma. dyari*	USA	Florida	Palm Beach	West Palm Beach
924	*Or. alba*	USA	Georgia	Fulton	Atlanta
925	*Or. signifera*	USA	Mississippi	Forrest	Camp Shelby
926, 927	*Or. kummi*	USA	Arizona	Santa Cruz	
928, 929	*Or. signifera*	USA	Mississippi	Forrest	Camp Shelby
930	*Ps. ciliata*	USA	Delaware	New Castle	Summit Bridge
931	*Ps. howardii*	USA	Maryland	Prince Georges	College Park
932	*Ps. discolor*	USA	Georgia	Baker	Newton
933	*Ps. columbiae*	USA	Delawar	New Castle	Delaware City
934	*Ps. ciliata*	USA	Texas	Hidalgo	Mission
935	*Ps. howardii*	USA	Delaware	New Castle	Newport
936	*Ps. columbiae*	USA	Delaware	New Castle	Summit Bridge
937	*Ps. discolor*	USA	Georgia	Baker	Newton
938	*Ps. ferox*	USA	Georgia	Worth	
939	*Ps. cyanescens*	USA	Louisiana	Rapides	Alexandria
940, 941	*Ps. discolor*	USA	Georgia	Baker	Newton
942, 944	*Ps. columbiae*	USA	Delaware	New Castle	Summit Bridge
943	*Ps. columbiae*	USA	Delaware	New Castle	Delaware City
945, 946	*Ps. signipennis*	USA	Kansas	Reno	Hutchinson
947	*Ps. pygmaea*	Puerto Rico			Juana Diaz
948, 949	*Ps. cyanescens*	USA	Louisiana	Rapides	Alexandria
950, 951	*Ps. ferox*	USA	Georgia	Worth	

Figure Number	Species	Country	State/Province	County	Locality
952, 953	*Ps. johnstonii*	USA	Florida	Monroe	Long Key
954-956, 958, 959	*Ps. horrida*	USA	Georgia	Hoochee	Ft. Benning
957	*Ps. ferox*	USA	Georgia	Worth	
960	*Ps. mathesoni*	USA	Louisiana		
961	*Ps. mathesoni*	USA	Delaware	Sussex	Thompsonville
962, 963	*Ps. ferox*	USA	Georgia	Worth	
964	*Ps. longipalpus*	USA	Texas	Grayson	Denison
965	*Ps. longipalpus*	USA	Oklahoma	Tulsa	Tulsa
966	*Ur. a. syntheta*	USA	Texas	Bexar	San Antonio
967	*Ur. sapphirina*	USA	Georgia	Bryan	Ft. Stewart
968, 969	*Ur. lowii*	USA	Florida	Palm Beach	Boca Raton
970, 971	*Ur. sapphirina*	USA	Louisiana	Rapides	Alexandria
972, 973	*Wy. mitchellii*	USA	Florida	Palm Beach	Boca Raton
974	*Wy. smithii*	USA	Maryland	Prince Georges	Suitland
975	*Wy. smithii*	USA	Minnesota	Clearwater	
976	*Wy. vanduzeei*	USA	Florida	Palm Beach	Boca Raton
977	*Wy. vanduzeei*	USA	Florida	Dade	Miami
978	*Wy. smithii*	USA	Minnesota	Clearwater	
979, 980	*Wy. smithii*	USA	Maryland	Prince Georges	Suitland
981	*Wy. smithii*	USA	Minnesota	Clearwater	
982, 983	*Wy. haynei*	USA	Georgia	Rabun	

INDEX TO SPECIES

This is an alphabetical listing of the species included in the keys and on the map plates. The generic placement of each species follows the specific name. Abbreviations of genera follow Reinert (1975). Page numbers for species in the keys are in roman type. Those to the left of the slant line (/) refer to the adult, while those to the right pertain to the larva. In a similar manner, the italicized numbers to the left and right of the second slant line pertain to figure numbers for adults and larvae respectively in the keys. Italicized numbers in parentheses ( ) refer to the map plates.

Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico

Supplement 1 to Mosquito Systematics

This volume contains keys for the identification of the adult females and fourth stage larvae of all 167 mosquito species and subspecies known to occur in North America, north of Mexico. Chapters on adult and larval morphology discuss the anatomical structures mentioned in the keys, accompanied by a series of full page plates. Separate generic keys for adult females and larvae are followed by keys to the species of each genus. All characters used in the keys are illustrated by 983 original drawings inserted between key couplets. In addition, in a separate chapter, the geographical distribution of each taxon is shown in a series of maps. Each is accompanied by a listing of the states (U.S.A.) and provinces (Canada) from which each taxon has been reported along with the relevant literature citations. Three tables of distribution provide a synopsis of the occurrence of mosquito species in the eastern United States, the western United States and Canada/Alaska. A bibliography of mosquito taxonomy and geographical distribution cites more than 500 references from 1955 to 1979.

It is anticipated that this text will be of value not only to mosquito control personnel, medical and aquatic entomologists, but also to introductory and advanced students of mosquitoes, due to full utilization of the standardization of morphological terms recommended by R. E. Harbach and K. L. Knight (1980) and the completely illustrated identification keys.

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