Illustrated Key to the Genitalia of Male Mosquitoes of Indiana

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INTRODUCTION

Because of their medical importance, mosquitoes constitute what is probably the most intensively studied family of insects. Many keys for mosquito identification have been developed. These include keys to the mosquito fauna of all of North America, and keys to the mosquitoes of various regions and states within North America. However, most keys are constructed for the identification of adult females and fourth instar larvae. Less common are keys for male mosquitoes and mosquito eggs.

Males of some species may be successfully identified by means of female keys, provided good specimens are used. This approach has its limitations, since many field-collected males are rubbed or otherwise damaged. Being more protected from the adversities of the environment, male genitalia are less vulnerable to damage than are the scales and bristles employed in keys to female mosquitoes, and are the most reliable characters to use in identification of male mosquitoes. Use of male genitalia is an invaluable tool in identification when mixed female and male specimens are obtained in rubbed condition, such as in sweep net collections.

When specimens are in good condition, morphological differences between some species may still be more distinct in the genitalia than in female or larval characters. For example, females of *Aedes atlanticus* and *Aedes tormentor* are distinguished with difficulty. Adults of these species can be separated most readily on the basis of male genitalia. Male genitalia are also useful in separating Indiana representatives of the *Aedes stimulans* group - *A. stimulans, A. fitchii, A. excrucians,* and *A. flavescens* - since the female characters are sometimes indistinct.

On the other hand, situations occur in which male characters are not sufficient to separate species. As males, *Aedes nigromaculis* and *Aedes sollicitans* are inseparable, though both females and larvae are distinctive. *Orthopodomyia alba* and *O. signifera* are separable only as larvae. Thus, keys to male, female and larval mosquitoes are often complementary.

Males are generally considered innocuous in disease transmission. Their presence, however, is indicative of the pending emergence or co-existence of female mosquitoes. Generally speaking, males have a shorter adult longevity. Males do not take blood; rather, they feed on natural carbohydrates. Males are not attracted to the usual baits and lures used in collecting female mosquitoes. Males can be collected with a sweep net or mechanical aspirator from vegetation or other resting sites. They may also be collected at natural feeding sites, such as blooming plants or trees which exude sap.

Of approximately 160 species of mosquitoes known to inhabit North America, 51 occur in Indiana. An additional eight species, though not yet reported from this state, are likely or potential inhabitants and are included in the key. These species belong to three subfamilies of Culicidae. The majority of Indiana genera belong to subfamily Culicinae; subfamily Anophelinae includes the genus *Anopheles*. Subfamily Toxorhynchitinae is represented by one subspecies, *Toxorhynchites rutilus septentrionalis*.

The male genitalia, specifically the structures associated with the eighth, ninth, and tenth abdominal segments, vary considerably between genera. Figure 1 indicates the major sexual structures of diagnostic value in *Aedes*, though these structures may take a somewhat different form in other genera, particularly in *Culex* and *Anopheles*. Characters referred to in the key couplets are indicated by arrows or labels in the associated illustrations to facilitate understanding.

Although there is no universally accepted terminology pertaining to the morphology of the male genitalia of mosquitoes, terminology used in this paper is essentially that of Carpenter and La Casse (1955), and appears to be widely accepted by other workers. A standard terminology of genitalia has been recently proposed by Knight and Laffoon (1971).

Since the male genitalia rotate 180° on the longitudinal axis soon after emergence, the structures which appear ventral are dorsal in origin, and those which appear dorsal are actually ventral. When "dorsal" and "ventral" are applied to genital structures, they refer to the original positions before rotation.

<u>Preparation of male genitalia for study</u>

1. Remove the apical third of the male abdomen with forceps or an insect pin. This operation should be done over a white surface, especially when using dried specimens that are likely to shatter.

2. Transfer the genitalia to a few drops of 70% ethyl alcohol in a spot plate or depression slide. This will prevent the genitalia from floating during the subsequent stages of preparation.

3. Transfer the genitalia to a small porcelain crucible containing 10% KOH and slowly heat over a bunsen burner to nearly the boiling point. Boiling may damage or throw the specimen out of the crucible. The process should require 3-5 minutes, though more time may be necessary if inspection indicates that the structures still retain tissues.

4. Transfer the genitalia to a few drops of distilled water in a spot plate for 2-5 minutes.

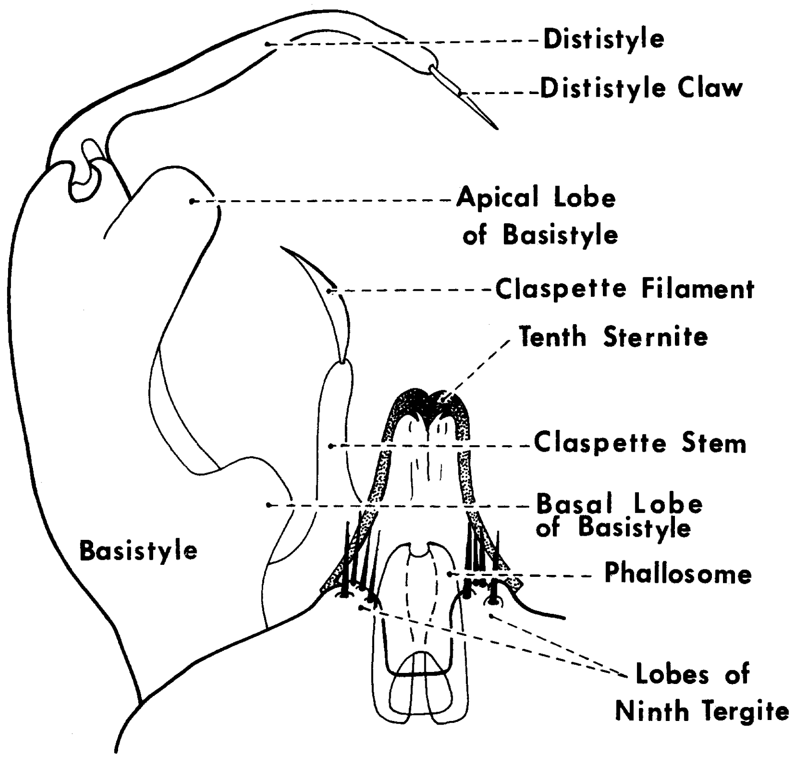

Fig. 1

5. If a temporary mount is desired, transfer the washed specimen to 2-3 drops of glycerin on a microscope slide. With two minuten pins (mounted on applicator sticks) remove all non-essential abdominal segments, including the eighth segment, while working under a disecting microscope. Orient the genitalia dorsal side up (phallosome above the plane of the basistyle) and extend the dististyles. For some *Aedes* and *Culex* it may be desirable to partially dissect the genitalia for proper observation of certain structures. However, the general configuration of the intact genitalia is valuable in identification and should be retained whenever possible. Two or three pieces of broken coverslip should be placed around the specimen before applying a coverslip. This is an excellent method for making routine identifications. Identification can often be facilitated by applying light pressure to the cover slip and manipulating the wet-mount preparation into the desired position.

6. If a permanent mount is desired, transfer the washed genitalia to a spot of 95% ethyl alcohol and allow to dehydrate at least two minutes.

7. Transfer the specimen to a spot of xylene or cellosolve for 2-5 minutes, and then mount in Canada balsam, using bits of broken coverslip as spacers. Orient the genitalia as described in Step 5.

8. For identification of genitalia, a compound microscope with magnifications of about 100X and 450X is required.

Techniques used in preparation of genitalia for study are also described in Barr (1958) and Carpenter (1955).

With reference to the genus *Anopheles*, Barr (1958) states that separation of species is most definite in the adult female. If difficulties are encountered in identifying male terminalia, consult the key to adult female *Anopheles* in Siverly (1972) for supportive information. This approach may be especially helpful in separating *An. earlei* from *An. crucians* and *An. punctipennis*.

Specimens with genitalia intermediate in structure between *C. p. pipiens* and *C. p. quinquefasciatus* are known to occur, and may represent hybrid forms. Knight and Wonio (1969) provide a key to the male *Culex* of Iowa based on non-genital characters which may be helpful when used in conjunction with the key to the genitalia.

Other regional publications which contain keys to male genitalia include those by Gerhardt (1966), Gjullin et al (1961), Gjullin and Eddy (1972), Harmston and Lawson (1967), and Ross and Horsfall (1965).

Terminology of scientific names follows that set forth in the catalog by Stone et al (1959).

ACKNOWLEDGMENTS

We are indebted to Dr. A. Ralph Barr, University of California at Los Angeles, Dr. Lewis T. Nielsen, The University of Utah, Salt Lake City, and Dr. Harry D. Pratt, Atlanta, Georgia, for their critical reviews of the manuscript and for their helpful suggestions. We very much appreciate the loan of specimens from the Center for Disease Control, Atlanta.

Illustrations were drawn by Mr. John Joyner, an undergraduate art major at Indiana University. Mr. Joyner's talents were available during summers and university recess periods here at Ball State University.

Within the next few years we hope to incorporate this key with the Mosquitoes of Indiana, published in 1972 by the Indiana State Board of Health. In the meantime, suggestions are welcomed regarding improvements in either of these publications.

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KEYS

To Genera, Monotypic Genera, and Species of *Orthopodomyia*

1. Phallosome tubular, at least four times as long as wide; basistyle with stout spines at base (Fig. 2). . . . . *Anopheles*

   Phallosome not tubular, less than four times as long as wide; basistyle without stout spines at base (Fig. 3). 2

Fig. 2

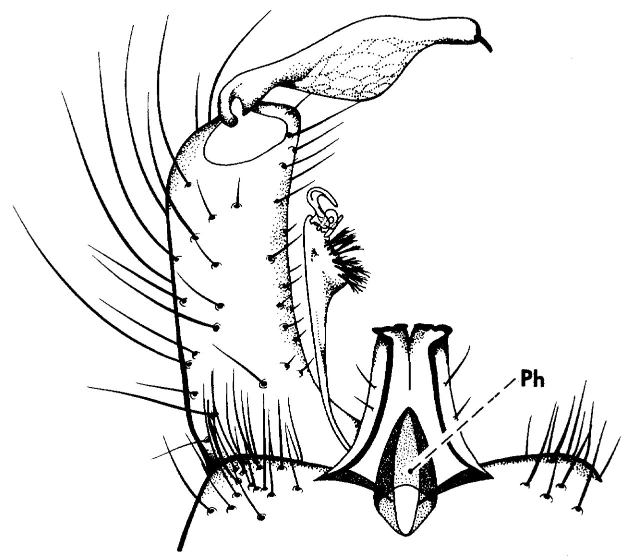

Fig. 3

2. Diststyle multilobed and swollen; basistyle with two or three long setae lateral to the phallosome (Fig. 4). . . . . *Wyeomyia smithii*

   Diststyle either unbranched or with one or two simple lobes (Fig. 5); basistyle without long setae lateral to the phallosome 3

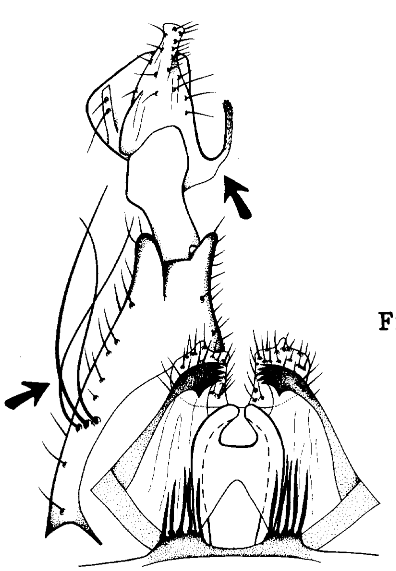

Fig. 4

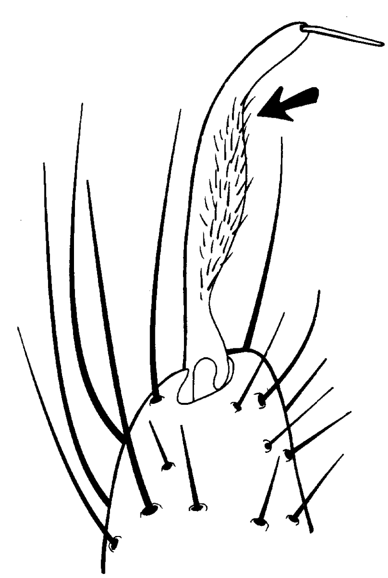

Fig. 5

3. Mesal face of basistyle with a stout, truncate rod (Fig. 6). . . . . *Coquillettidia perturbans*

   Mesal face of basistyle without a stout, truncate rod, though one or more slender setae may be present (Fig. 7) 4

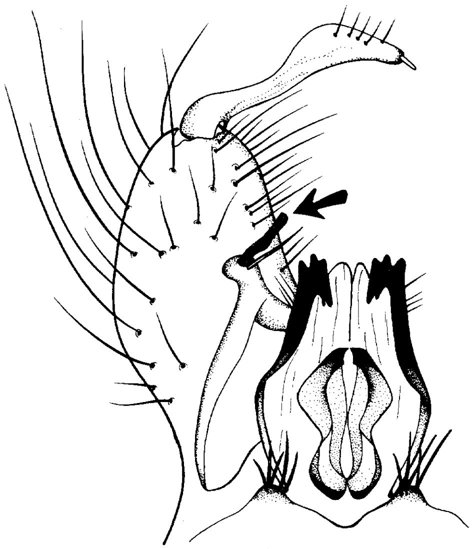

Fig. 6

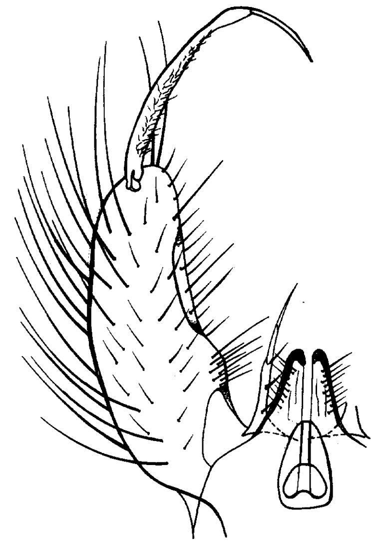

Fig. 7

4. Apical claw of dististyle double (Fig. 8). . . . . *Culiseta*

   Apical claw of dististyle single (Fig. 9). 5

Fig. 8

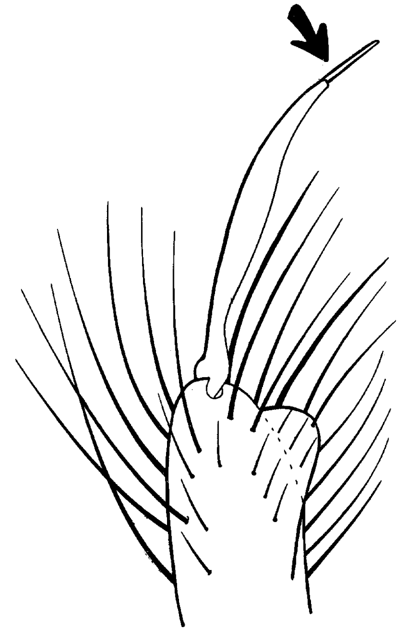

Fig. 9

5. Apical claw of dististyle cone-shaped and fringed at apex (Fig. 10) . . . . *Orthopodomyia alba, Orthopodomyia signifera*

Apical claw of dististyle either parallel-sided (Fig. 11); tapered to apex (Fig. 12); or blunt (Fig. 13); apical claw never fringed apically . 6

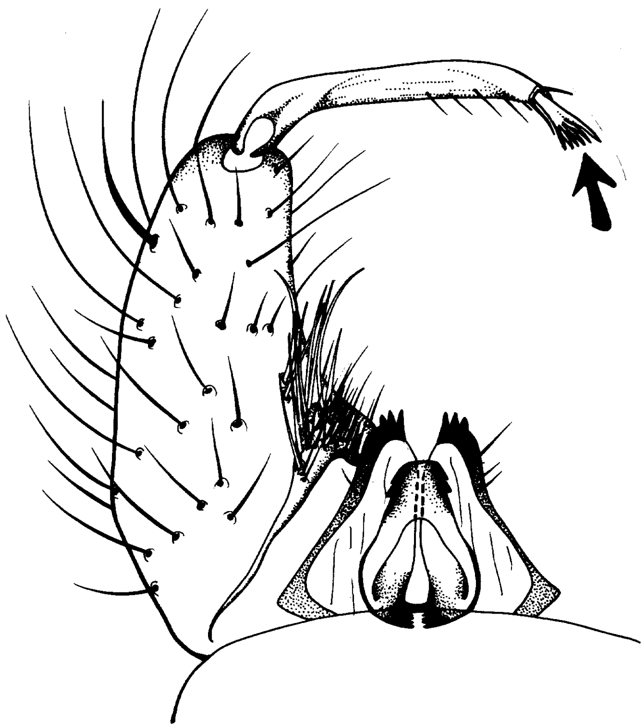

Fig. 10

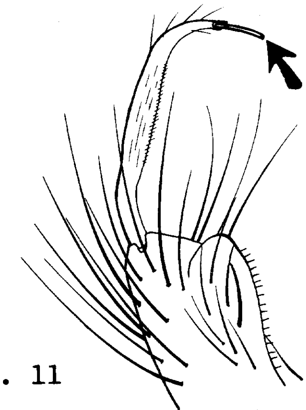

Fig. 11

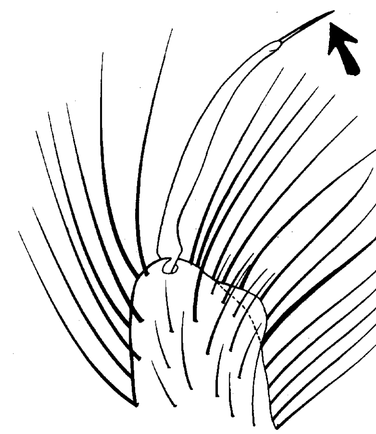

Fig. 12

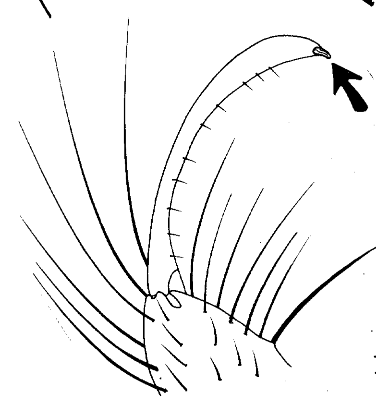

Fig. 13

6. Ninth tergite large, bilobed and plate-like, almost as long as basistyle and without setae (Fig. 14); tenth sternite absent . . . . *Uranotaenia sapphirina*

Ninth tergite much shorter than basistyle and usually with setae; tenth sternite present (Fig. 15). 7

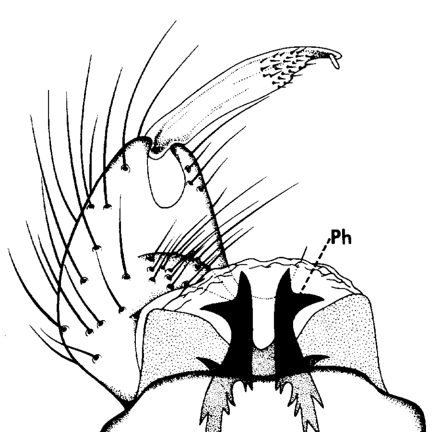

Fig. 14

Fig. 15

7. Phallosome divided into two lateral, apically convergent plates connected by a narrow sclerotized bridge near their bases (Fig. 16) . . . . *Toxorhynchites rutilus septentrionalis*

Phallosome not divided into two lateral, apically convergent plates connected by a narrow sclerotized bridge near their bases (Fig. 17) . 8

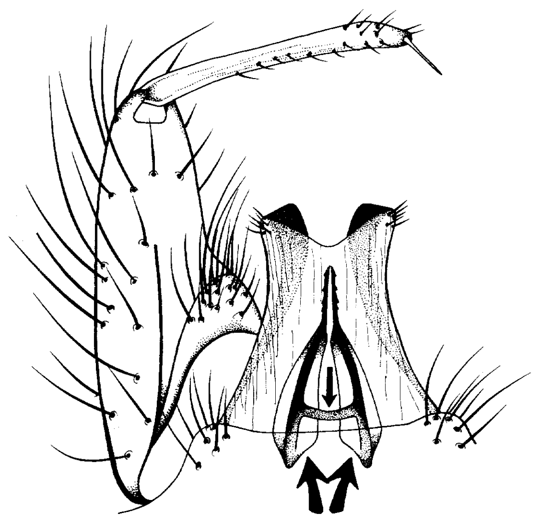

Fig. 16

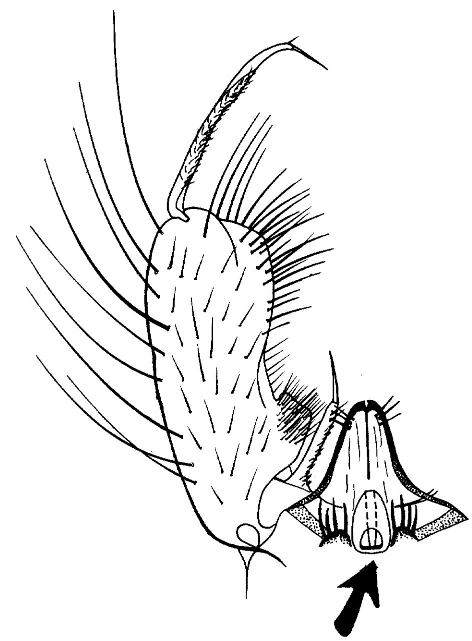

Fig. 17

8. Basistyle with subapical mesal lobe bearing spines, filaments, or both; tenth sternite crowned with numerous stout spines or a comb of teeth (Fig. 18). . . . . *Culex*

Basistyle without subapical mesal lobe bearing spines or filaments; tenth sternite without stout spines or a comb of teeth (Fig. 19). 9

Fig. 18

Fig. 19

9. Basal lobe present and distinct (Fig. 20) *Aedes*, subgenus *Ochlerotatus*

Basal lobe absent (Fig. 21) (Fig. 22), or indicated by a darkly pigmented area covered by a dense clump of setae (Fig. 23) 10

Fig. 20

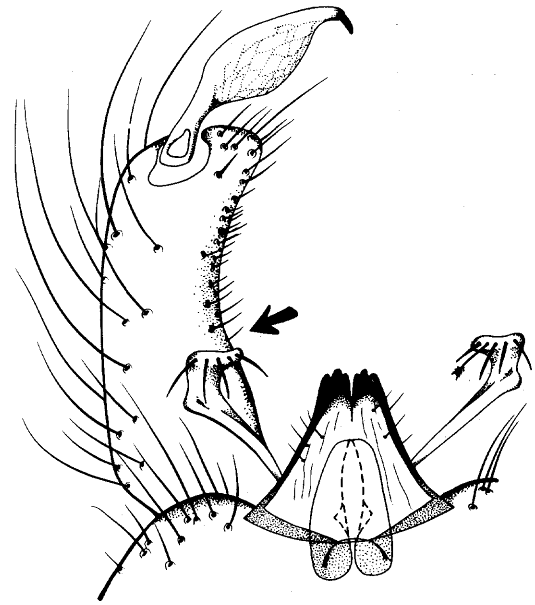

Fig. 21

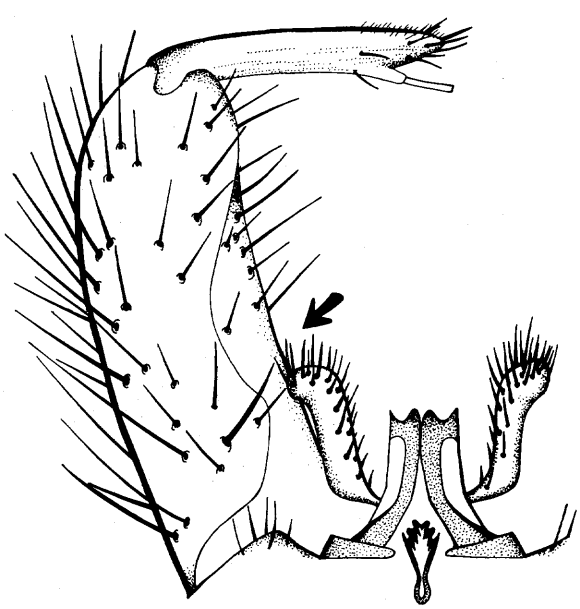

Fig. 22

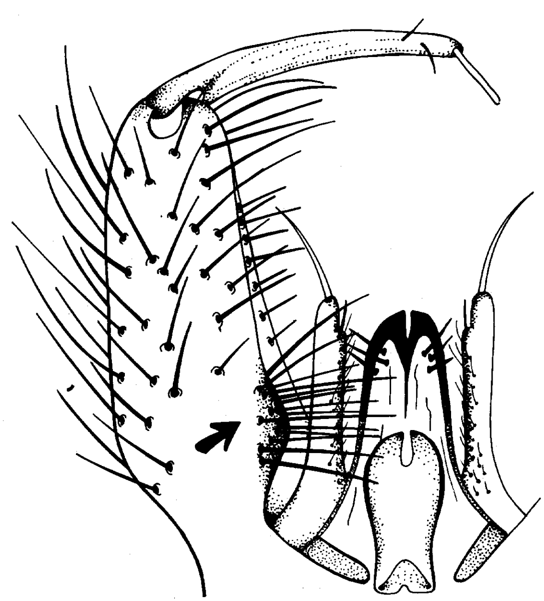

Fig. 23

10. Diststyle swollen, with apical claw (Fig. 24); if narrow, with a small, dorsal, angular projection (Fig. 25). . . . . *Psorophora*

Diststyle either tapered (Fig. 26) or with subapical claw (Fig. 27); without a small, dorsal, angular projection (Fig. 28) . . . . *Aedes*

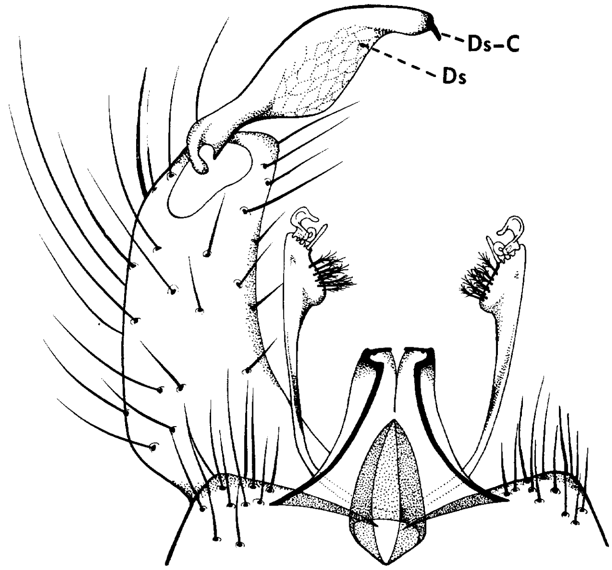

Fig. 24

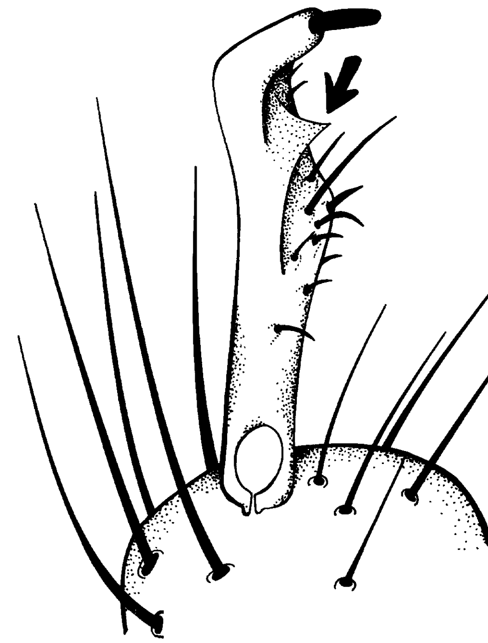

Fig. 25

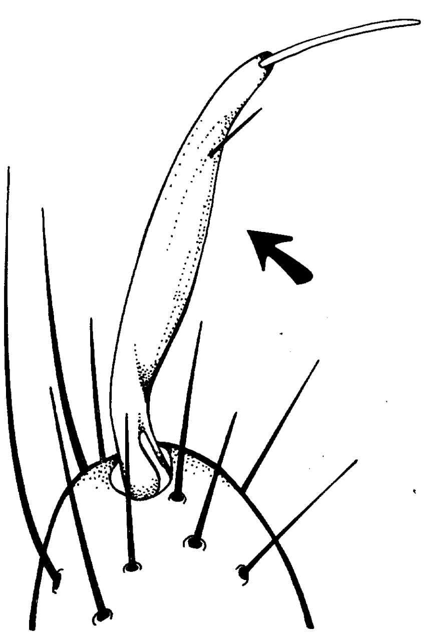

Fig. 26

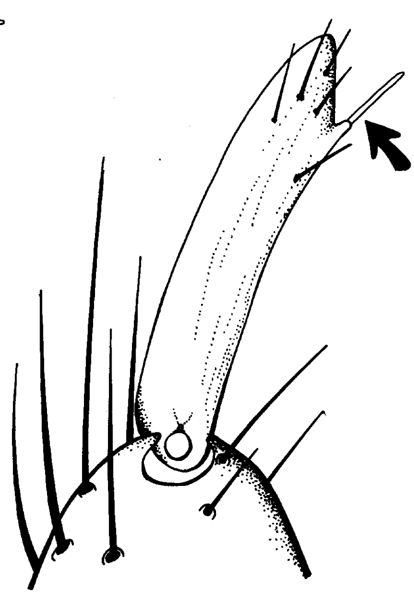

Fig. 27

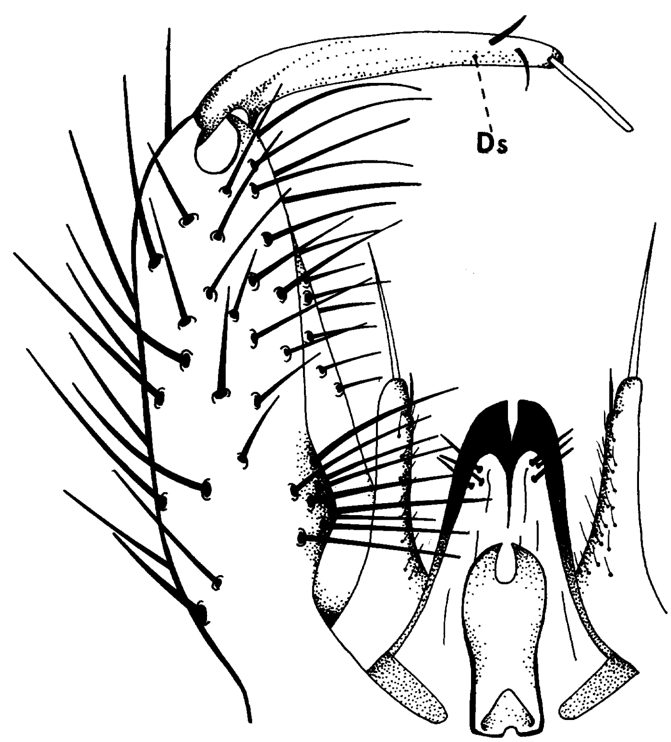

Fig. 28

Genus *Aedes*

1. Dististyle forked both at base and at apex, inserted well before the apex of the basistyle; claspette stem divided into two unequal branches (Fig. 29). . . . . *cinereus*

   Dististyle not forked, inserted at or near apex of basistyle; claspette when present, not as above (Fig. 30). 2

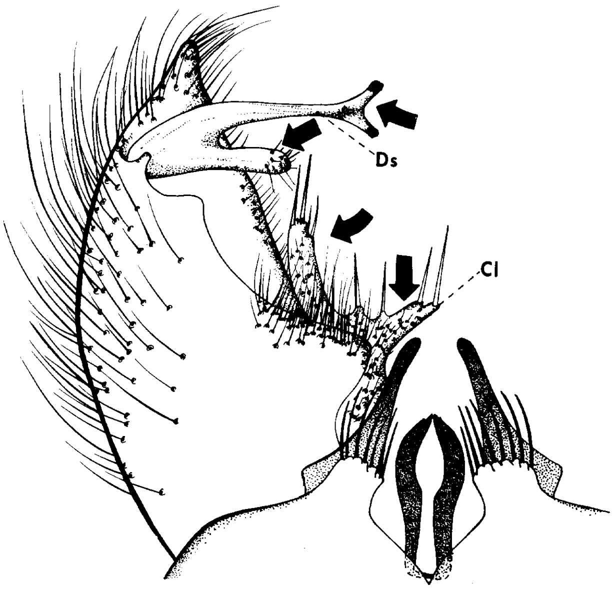

Fig. 29

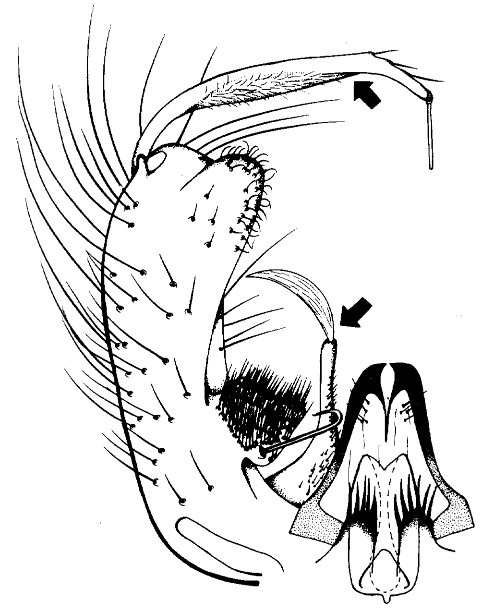

Fig. 30

2. Claspettes absent; basistyle less than twice as long as wide (Fig. 31) . . . . *aegypti*

   Claspettes present; basistyle at least twice as long as wide (Fig. 32) 3

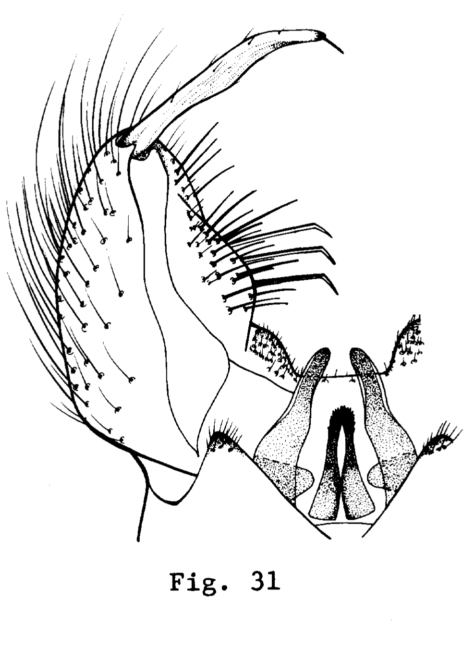

Fig. 31

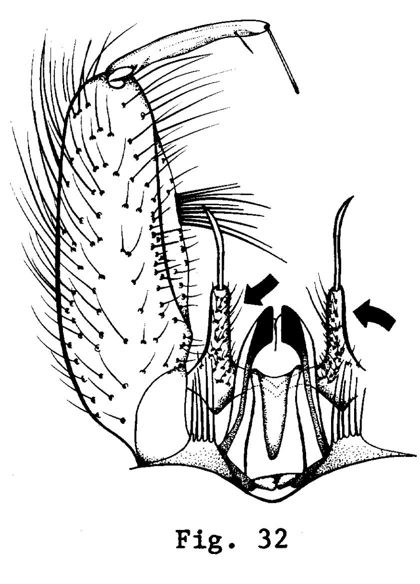

Fig. 32

3. Dististyle with a subapical claw; claspette stem with a dense crown of setae; claspette filament absent (Fig. 33). . . . . *vexans*

Dististyle with apical claw; claspette filament present (Fig. 34). . 4

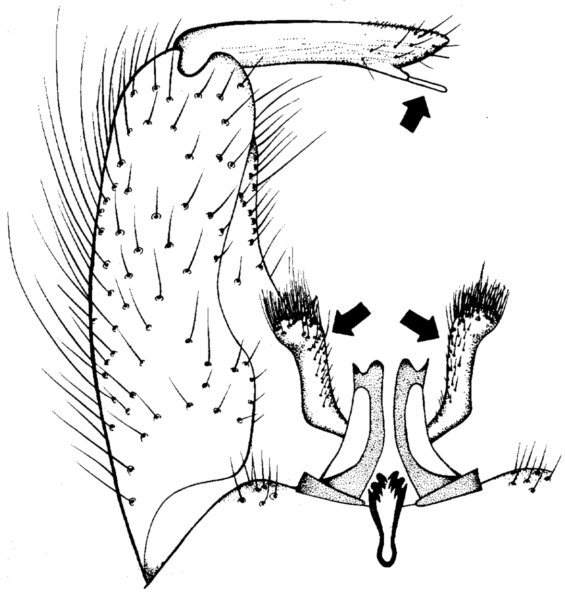

Fig. 33

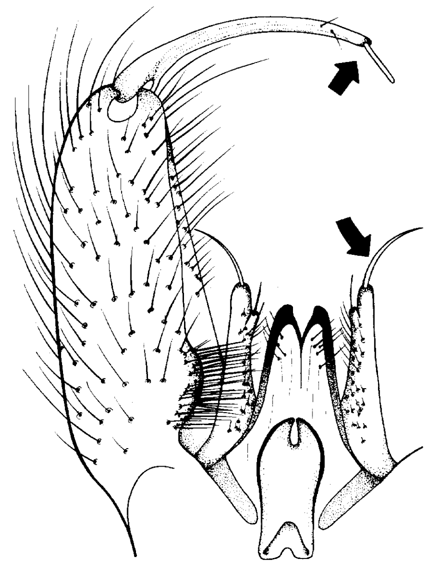

Fig. 34

4. Basal lobe of basistyle present and usually distinct (Fig. 35); somewhat reduced in a few species rare in Indiana (subgenus *Ochlerotatus*) . . 5

Basal lobe of basistyle absent (Fig. 36) or indicated by a dense clump of setae (Fig. 37) 21

Fig. 35

Fig. 36

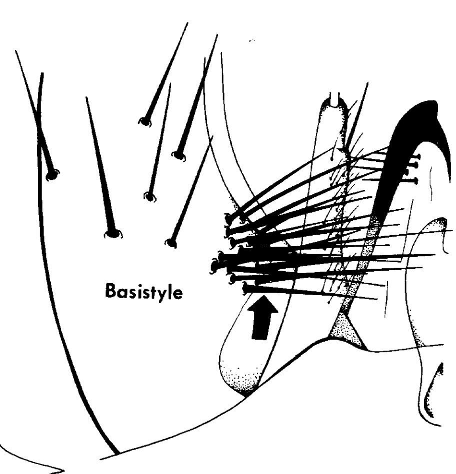

Fig. 37

5. Apical lobe of basistyle present (Fig. 38) 6

   Apical lobe of basistyle absent (Fig. 39) 20

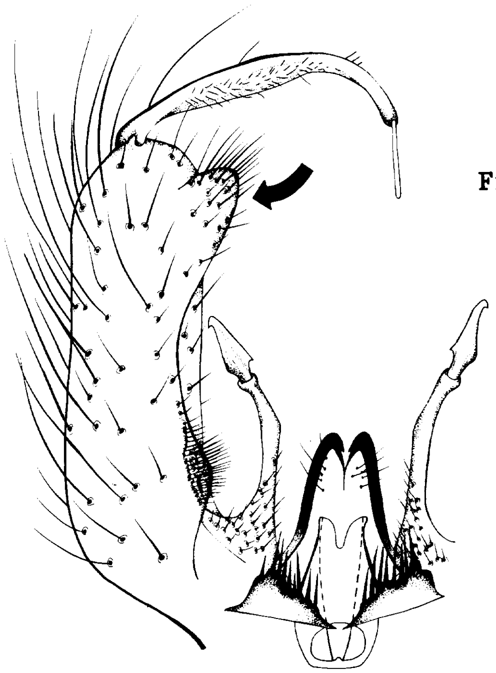

Fig. 38

Fig. 39

6. Claspette filament cylindrical and evenly tapered to apex, never flattened and bladelike (Fig. 40). 7

   Claspette filament not cylindrical or evenly tapered to apex, usually flattened and bladelike (Fig. 41). 8

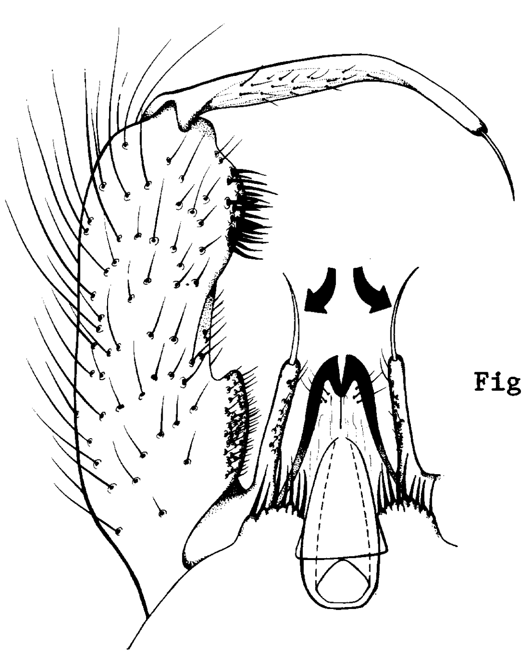

Fig. 40

Fig. 41

7. Apical lobe of basistyle broad, with many flattened setae (Fig. 42). . . . . *canadensis canadensis*

Apical lobe of basistyle slender, with a few fine, non-flattened setae . (Fig. 43) . . . . *dupreei*

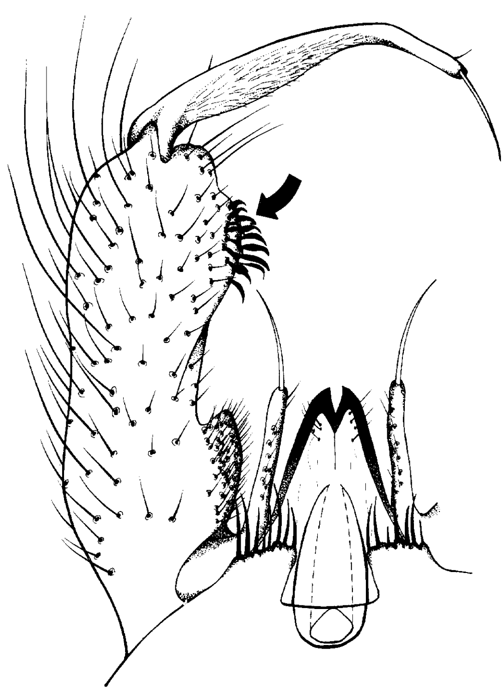

Fig. 42

Fig. 43

8. Claspette filament contorted and leaflike, arising from a short lateral branch of claspette stem (Fig. 44). . . . . *thibaulti*

Claspette filament not contorted and leaflike, and inserted at apex of claspette stem (Fig. 45) 9

Fig. 44

Fig. 45

9. Basal lobe of basistyle with a distinctly enlarged spine (Fig. 46) . . 10

Basal lobe of basistyle without a distinctly enlarged spine (Fig. 47) . . . . *excrucians*

Fig. 46

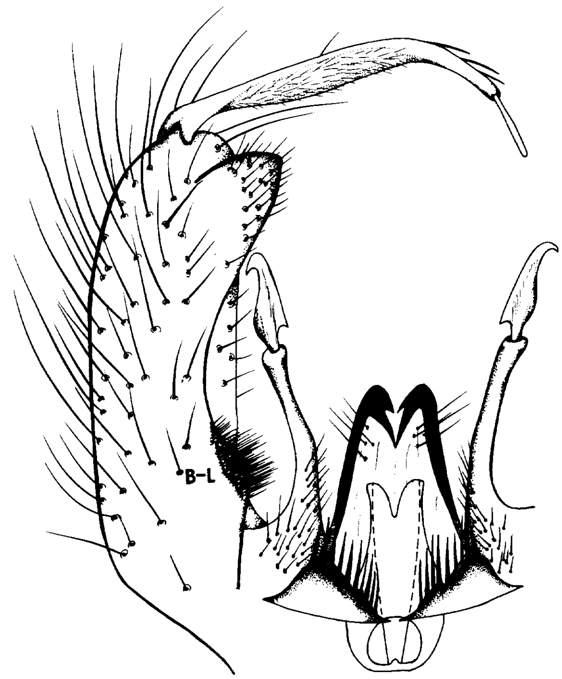

Fig. 47

10. Basistyle with a large, prominent tuft of setae at its apex; basal lobe with an enlarged spine on its posterior margin (Fig. 48) . . . . *aurifer*

Basistyle without a large, prominent tuft of setae at its apex; basal lobe with an enlarged spine on its dorsal side (Fig. 49) 11

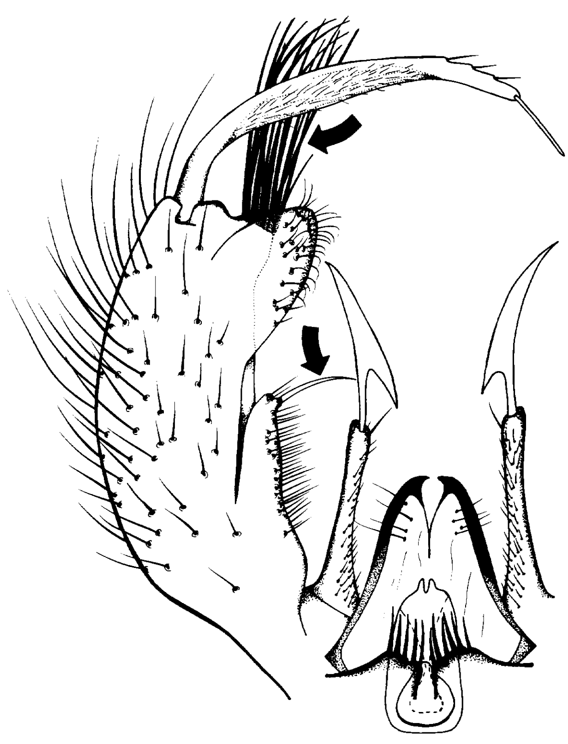

Fig. 48

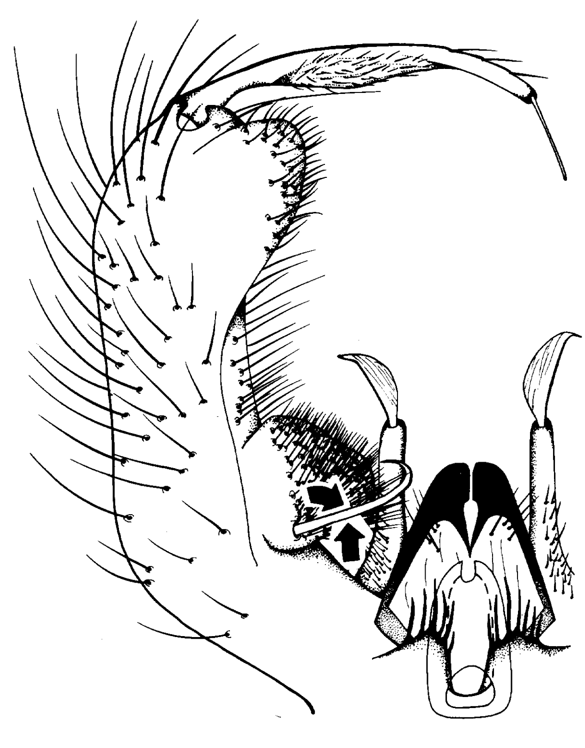

Fig. 49

11. Basal lobe of basistyle with both a long and a short enlarged dorsal spine (Fig. 50) . . . . *dorsalis*

Basal lobe of basistyle with only a long enlarged dorsal spine (Fig. 51) 12

Fig. 50

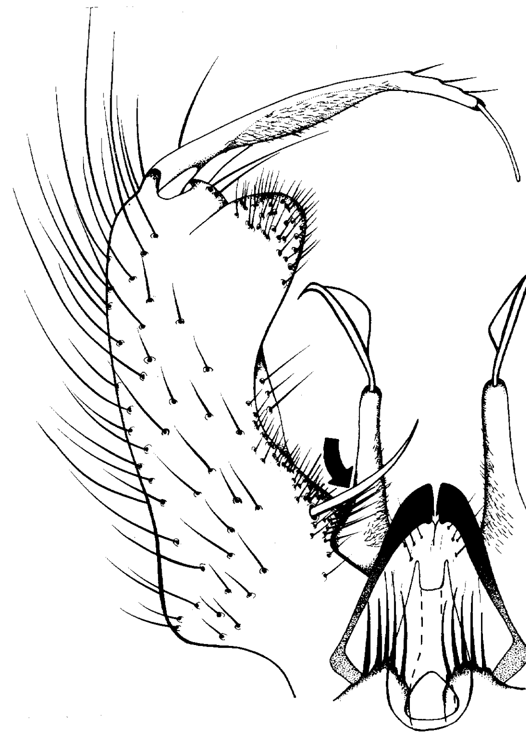

Fig. 51

12. Claspette stem expanded medially and much broader than claspette filament; enlarged dorsal spine of basal lobe arising from a short stalklike projection (Fig. 52) . . . . *atlanticus*

Claspette stem not expanded medially and not broader than claspette filament; enlarged dorsal spine of basal lobe not arising from a short, stalklike projection (Fig. 53). 13

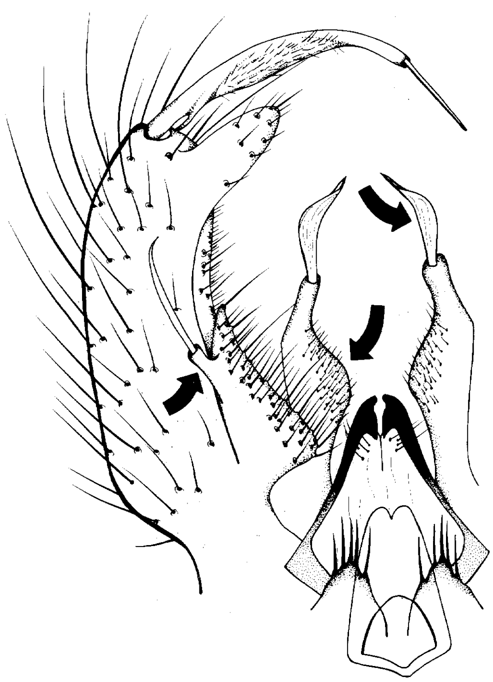

Fig. 52

Fig. 53

13. Claspette filament with several small accessory teeth (Fig. 54). . . . 14

Claspette filament without several small accessory teeth (Fig. 55) . . 15

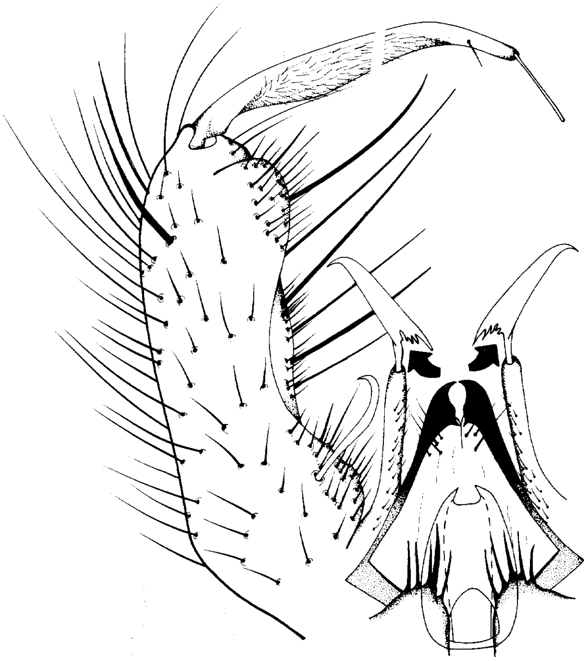

Fig. 54

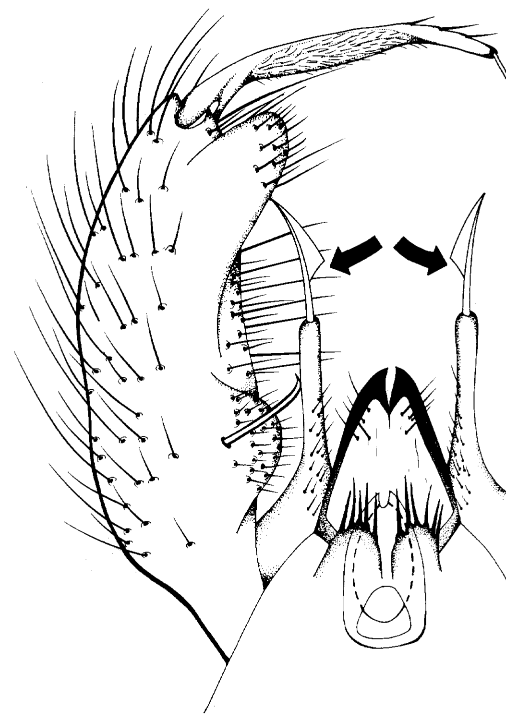

Fig. 55

14. Enlarged dorsal spine of basal lobe with a thickened region near base; inner face of basistyle densely clothed with long setae (Fig. 56) . . *infirmatus*

Enlarged dorsal spine of basal lobe without a thickened region near base; inner face of basistyle sparsely clothed with long setae (Fig. 57) . . . . *trivittatus*

Fig. 56

Fig. 57

15. Posterior margin of basal lobe detached from basistyle; claspette stem with many short, fine setae and 1-3 longer setae on the apical half (Fig. 58) . . . . *S. spencerii, sticticus*

Posterior margin of basal lobe attached to basistyle; claspette stem with many short, fine setae, but without 1-3 longer setae on the apical half (Fig. 59). 16

Fig. 58

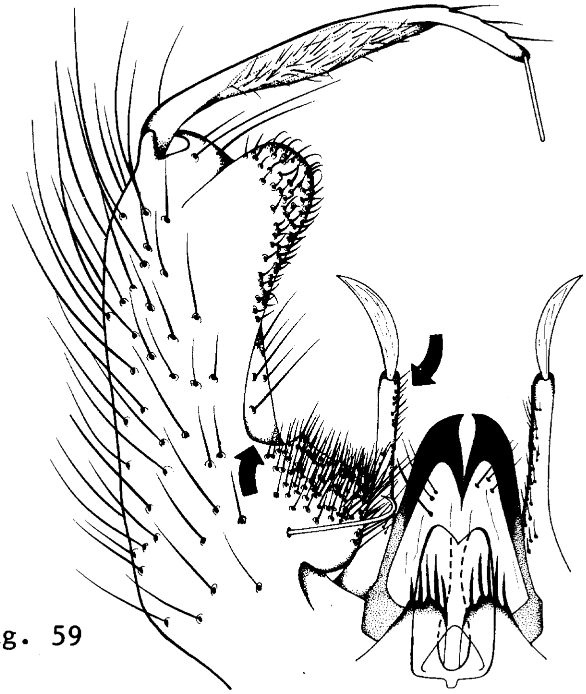

Fig. 59

16. Concave side of claspette filament with a distinct basal lobe (Fig. 60) . . . .*fitchii*

Concave side of claspette filament without a distinct basal lobe (Fig. 61). 17

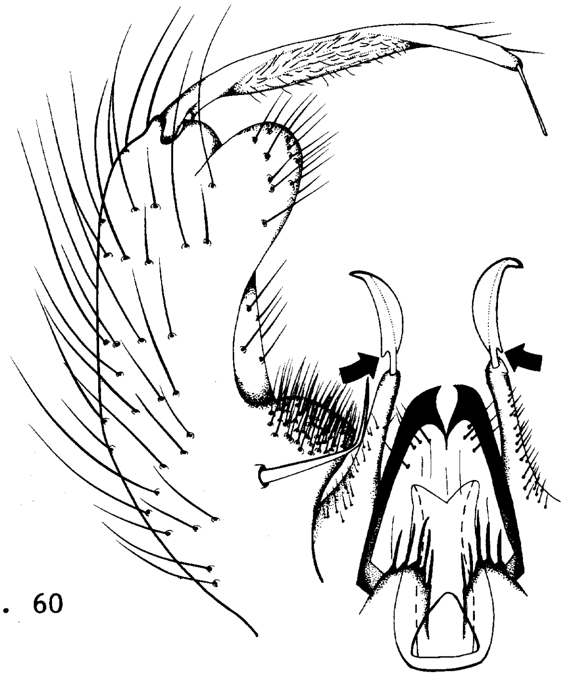

Fig. 60

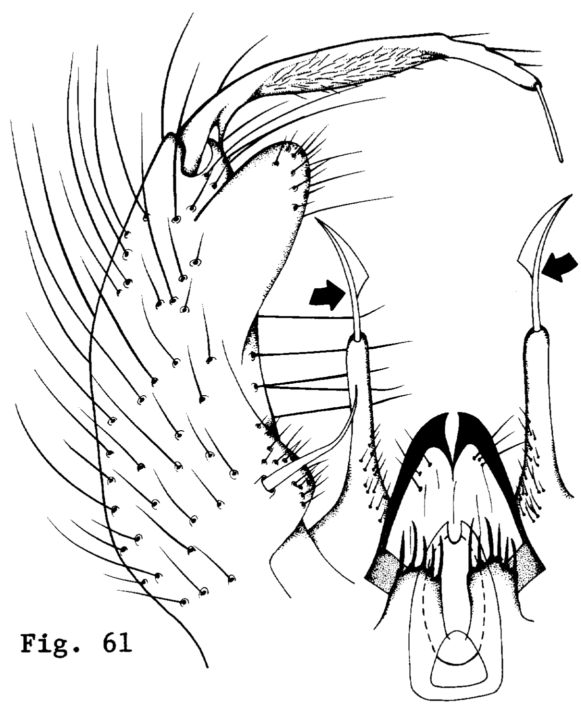

Fig. 61

17. Basal lobe of basistyle only slightly projecting, the posterior margin gradually arising from the basistyle (Fig. 62). 18

    Basal lobe of basistyle strongly projecting, the posterior margin abruptly arising from the basistyle (Fig. 63). 19

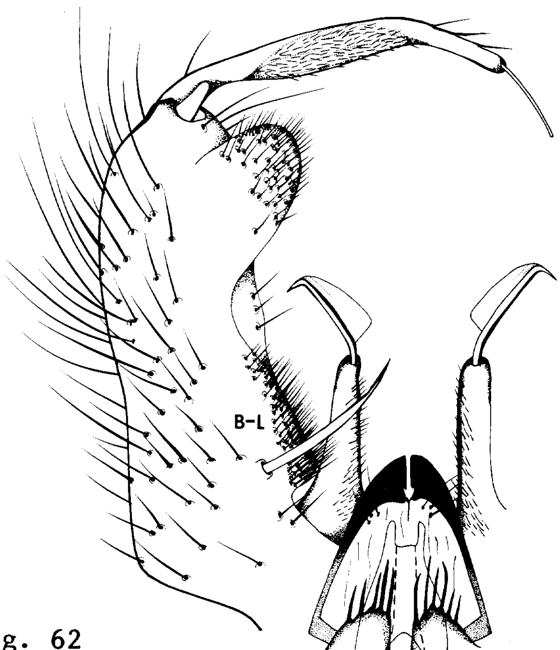

Fig. 62

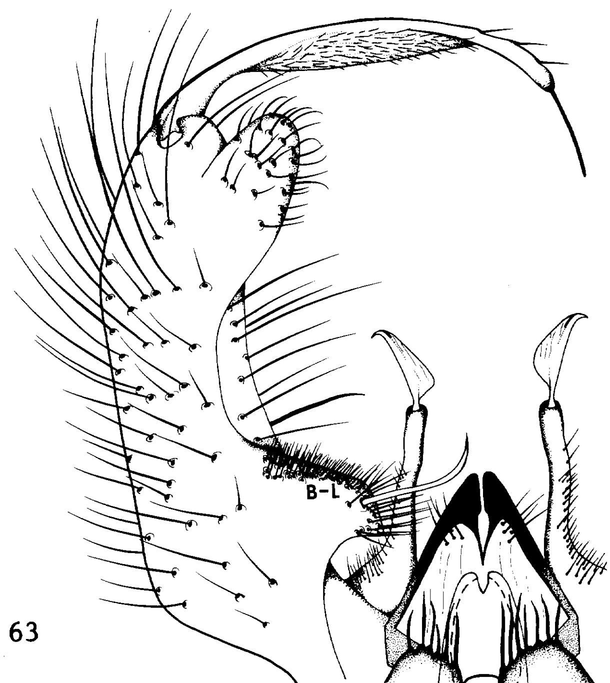

Fig. 63

18. Basal lobe extending to about the middle of basistyle; claspette stem short, about 3-4 times as long as its basal diameter (Fig. 64) *flavescens*

    Basal lobe extending to about the basal third of basistyle; claspette stem long, more than 4 times as long as its basal diameter (Fig. 65) *stimulans*

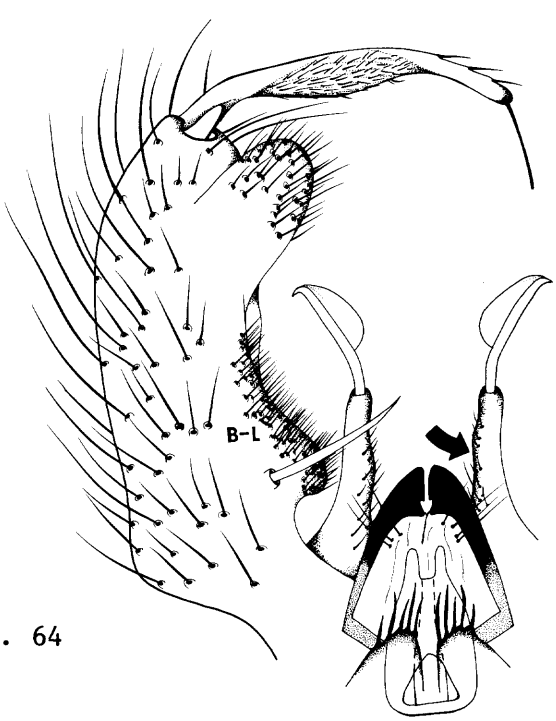

Fig. 64

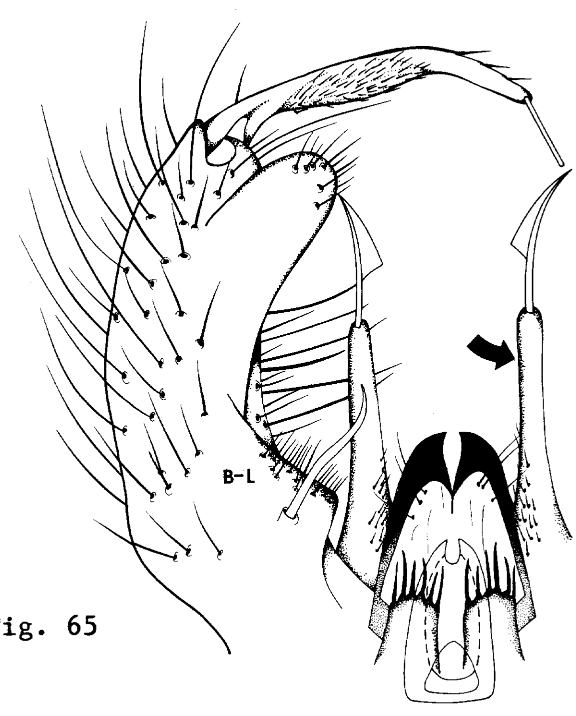

Fig. 65

19. Basal lobe of basistyle conical, symmetrical; strong spine arising from the medial surface of the basal lobe (Fig. 66) . . . . . *grossbecki*

Basal lobe of basistyle asymmetrical; strong spine arising from a dorsobasal protuberance of the basal lobe (Fig. 67) . *abserratus, punctor*

Fig. 66

Fig. 67

20. Basal lobe conspicuously elevated (Fig. 68) . . . . *mitchellae*

Basal lobe only slightly elevated (Fig. 69) *nigromaculis, sollicitans*

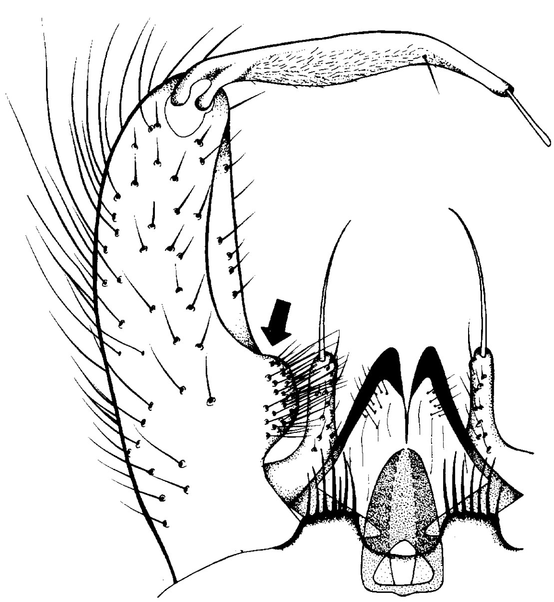

Fig. 68

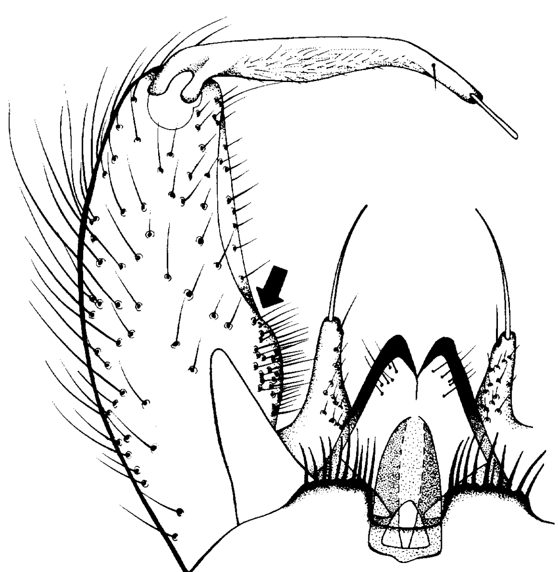

Fig. 69

21. Basistyle with a dense brush of setae on its inner face; apical claw of dististyle about half as long as dististyle (Fig. 70). . . . . *hendersoni*, *triseriatus*

Basistyle without a dense brush of setae on its inner face; apical claw of dististyle less than half as long as dististyle (Fig. 71) . . . . *atropalpus*

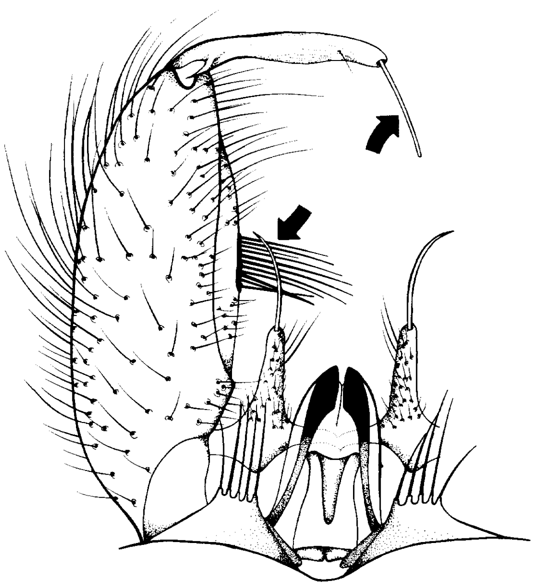

Fig. 70

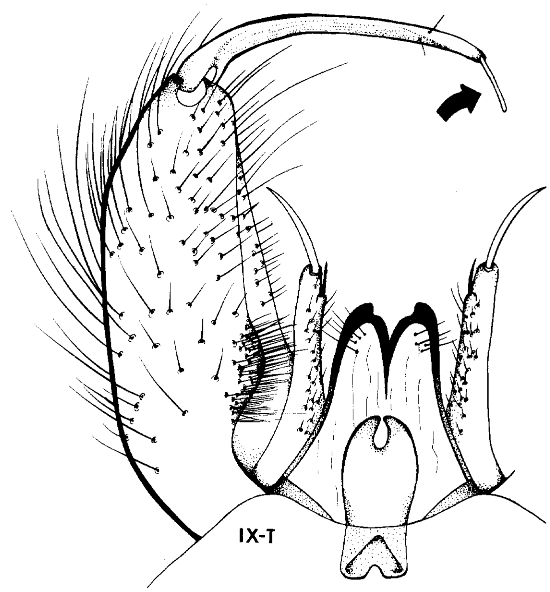

Fig. 71

Genus *Anopheles*

1. Claspette with one or more bluntly rounded spines, in addition to several pointed spines (Fig. 72) 2

   Claspette with pointed spines only (Fig. 73) 4

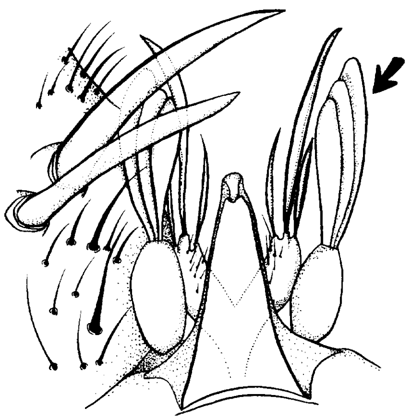

Fig. 72

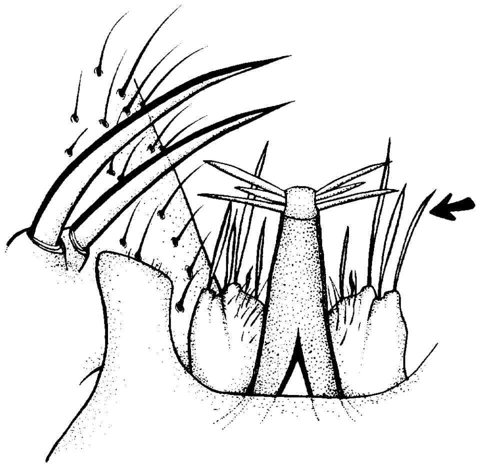

Fig. 73

2. Phallosome without leaflets at apex (Fig. 74) . . . . *barberi*

   Phallosome with leaflets at apex (Fig. 75) 3

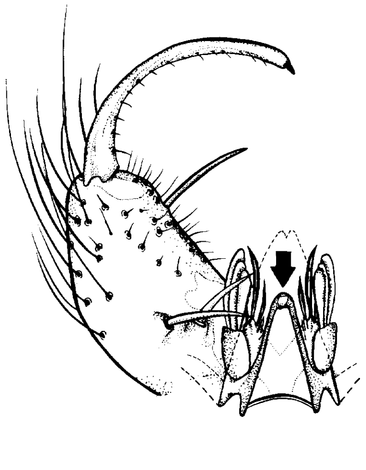

Fig. 74

Fig. 75

3. Lobes of ninth tergite expanded apically, and narrowest medially (Fig. 76). . . . . *quadrimaculatus*

Lobes of ninth tergite not expanded apically, and not narrowest medially (Fig. 77) . . . . *walkeri*

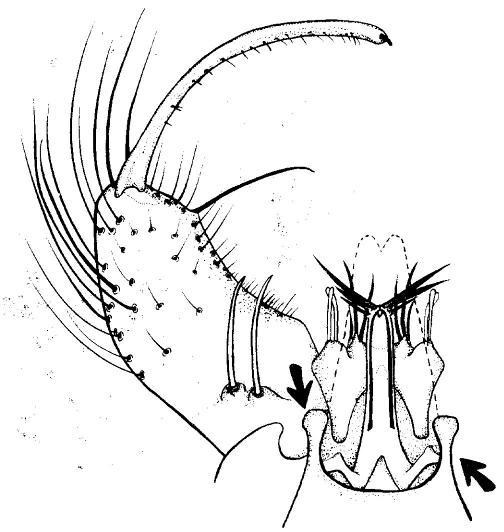

Fig. 76

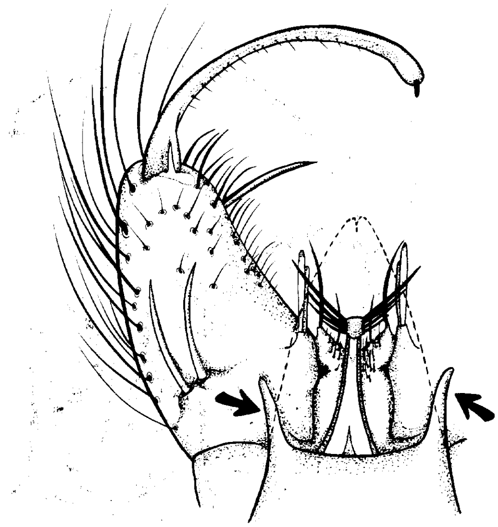

Fig. 77

4. Lobes of ninth tergite broad, their apexes somewhat expanded (Fig. 78) . . . . *earlei*

Lobes of ninth tergite slender, their apexes not expanded (Fig. 79) . . 5

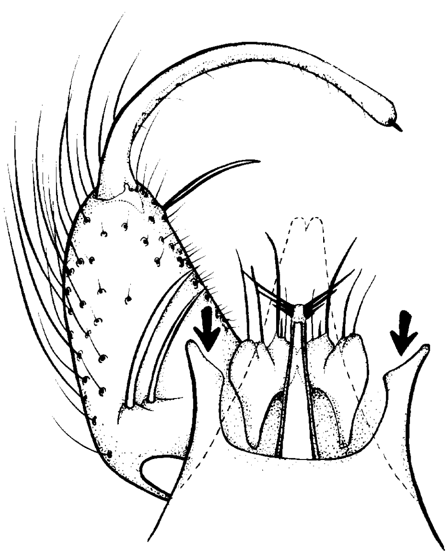

Fig. 78

Fig. 79

5. **Claspette conical, and without distinct dorsal and ventral lobes (Fig. 80)**
. . . . *crucians*

Claspette not conical, and with distinct dorsal and ventral lobes (Fig. 81)
. . . . *punctipennis*

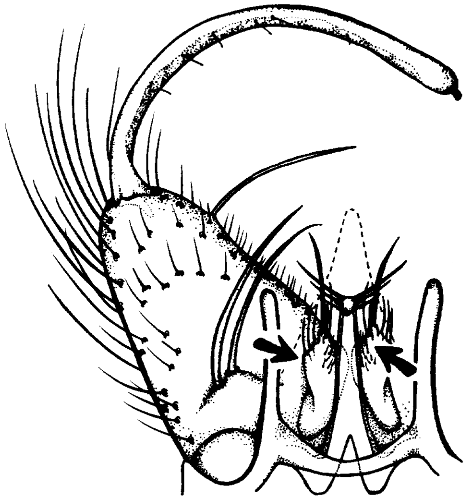

Fig. 80

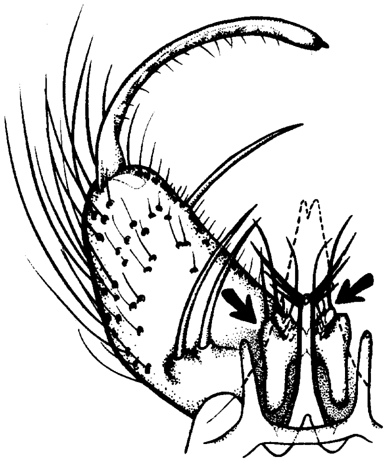

Fig. 81

Genus *Culex*

1. Subapical lobe of basistyle subdivided into 2-3 distinct stalks (Subgenus *Melanoconion*) (Fig. 82). 2

   Subapical lobe of basistyle undivided (Fig. 83). 3

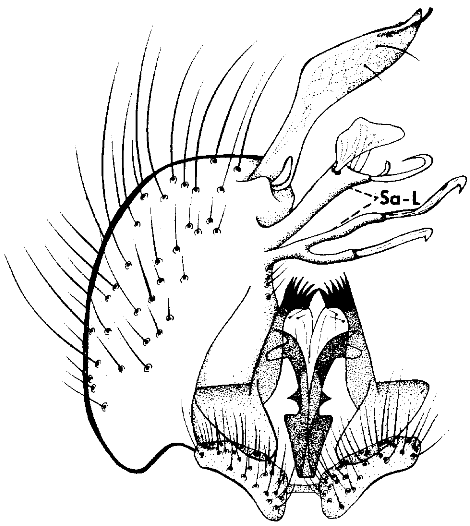

Fig. 82

Fig. 83

2. Diststyle tapered and curved apically, bearing short setae on outer margin toward apex; phallosomal plates with a laterally directed triangular projection near middle (Fig. 84). . . . . *erraticus*

   Diststyle constricted on basal third, squarely expanded on distal half with a hairy crest; phallosomal plates without a laterally directed triangular projection near middle (Fig. 85) . . . . *peccator*

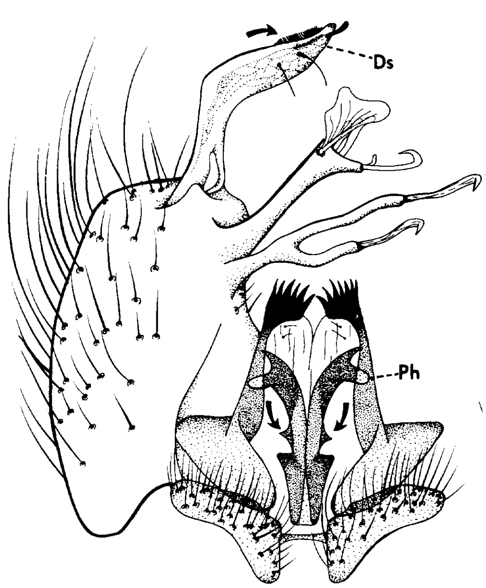

Fig. 84

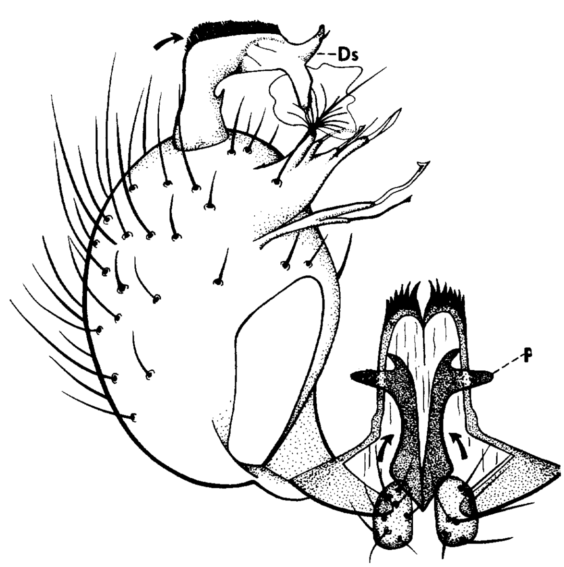

Fig. 85

3. Tenth sternite crowned with a single row of blunt teeth; phallosomal plates connected by a narrow, sclerotized, subapical bridge (Subgenus *Neoculex*) (Fig. 86). . . . . *territans*

Tenth sternite crowned with a dense tuft of bristles; phallosomal plates not connected by a narrow, sclerotized subapical bridge (Fig. 87) . . . 4

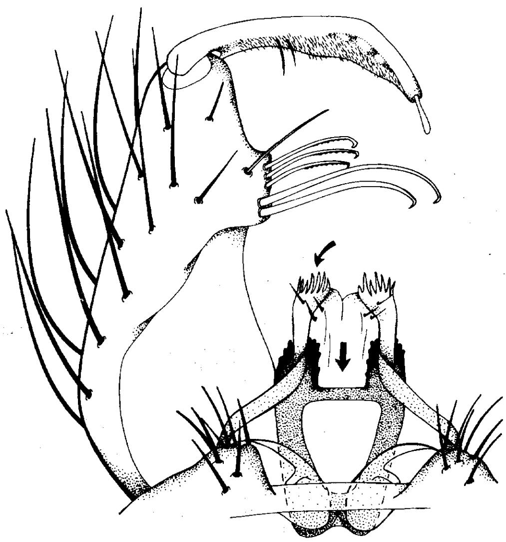

Fig. 86

Fig. 87

4. Basal arm of tenth sternite much shorter than tenth sternite, and not curved (Fig. 88) 5

Basal arm of tenth sternite about as long as tenth sternite, and curved (Fig. 89). 6

Fig. 88

Fig. 89

5. Dorsal arms of phallosome divergent, V-shaped in appearance (Fig. 90) . . . . *pipiens pipiens*

Dorsal arms of phallosome convergent or parallel, U-shaped in appearance (Fig. 91) . . . . *pipiens quinquefasciatus*

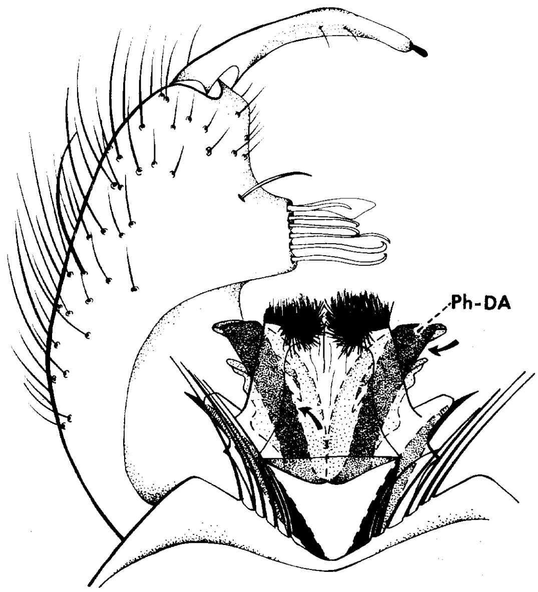

Fig. 90

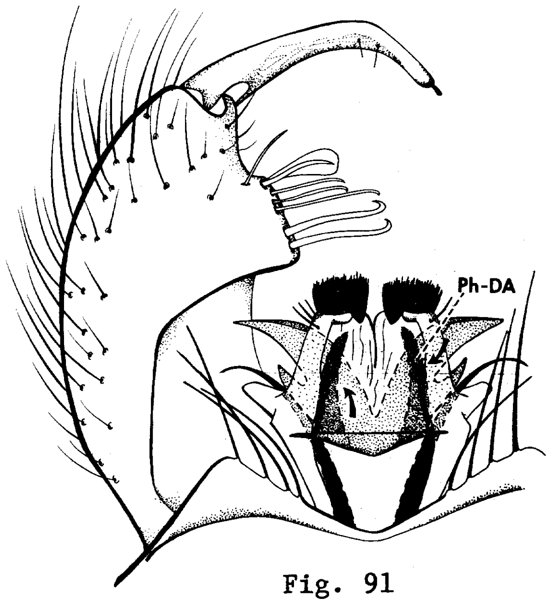

Fig. 91

6. Each phallosomal plate with only one stout tooth (Fig. 92). . *restuans*

Each phallosomal plate with three or more stout teeth (Fig. 93) 7

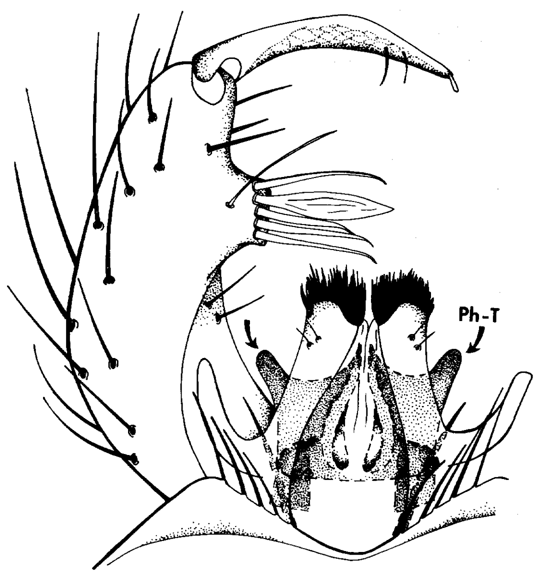

Fig. 92

Fig. 93

7. Crown of tenth sternite with all spines sharply pointed; subapical lobe of basistyle with a broad, leaflike filament (Fig. 94) . *salinarius*

Crown of tenth sternite with outer spines blunt; subapical lobe of basistyle with a narrow, leaflike filament (Fig. 95) . . . . . . *tarsalis*

Fig. 94

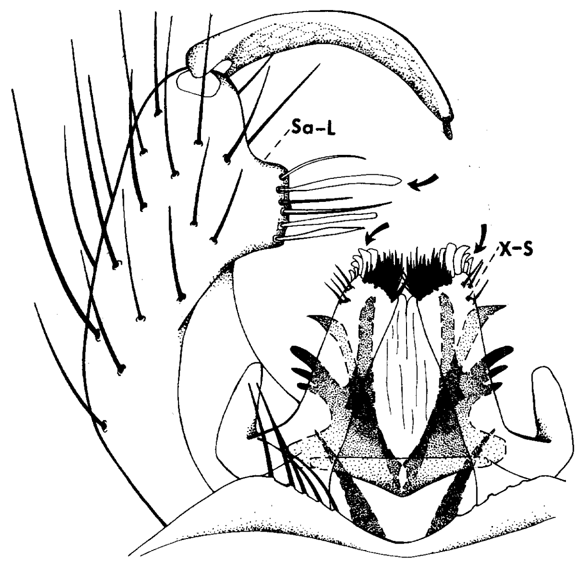

Fig. 95

Genus *Culiseta*

1. Lobes of ninth tergite heavily sclerotized, with many short, stout spines; phallosome heavily sclerotized and tapered to a narrow apex (Fig. 96) . . . . *inornata*

   Lobes of ninth tergite lightly sclerotized, with several long, slender setae; phallosome lightly sclerotized and not tapered to a narrow apex (Fig. 97) 2

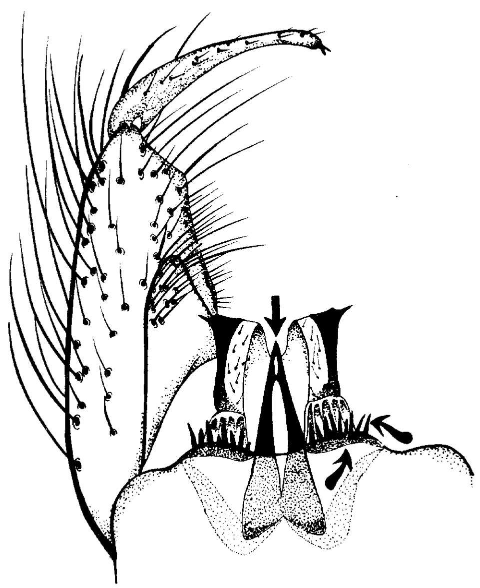

Fig. 96

Fig. 97

2. Phallosome quadrate, with angular lateral margins near the apex; apex of phallosome folded in appearance (Fig. 98) . . . *silvestris minnesotae*

   Phallosome not quadrate, with rounded lateral margins near the apex; apex of phallosome not folded in appearance (Fig. 99) 3

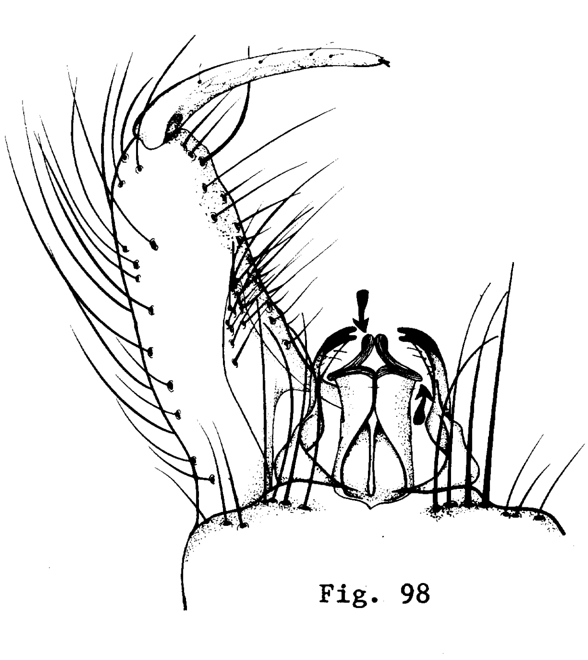

Fig. 98

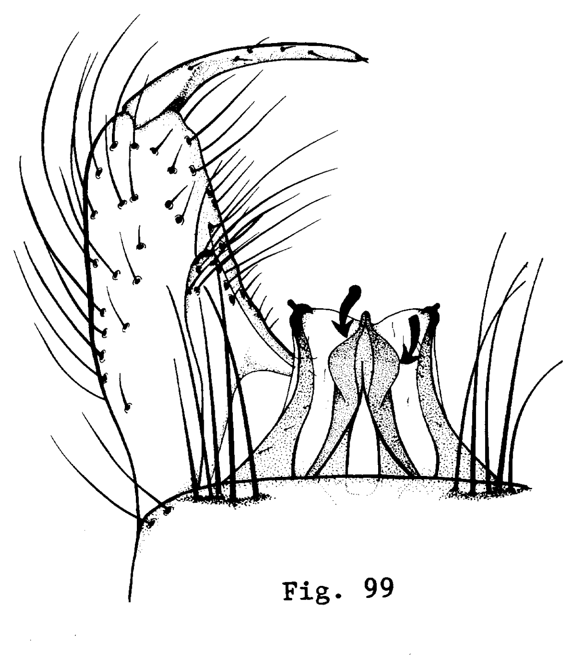

Fig. 99

3. Phallosome eight-shaped, being constricted medially (Fig. 100). . . . . . *morsitans dyari*

Phallosome not eight-shaped, not constricted medially (Fig. 101) *melanura*

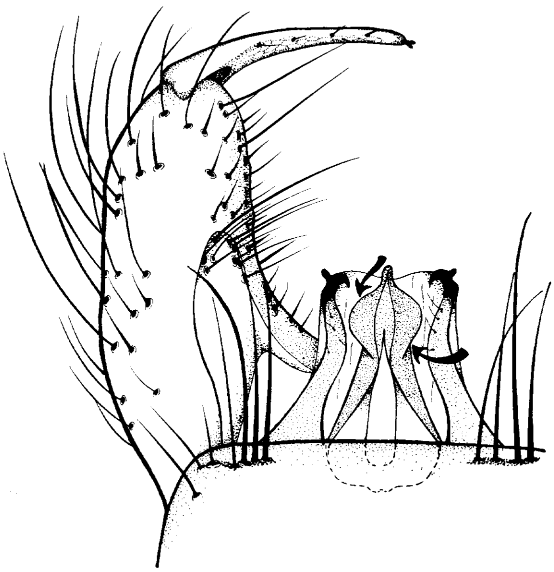

Fig. 100

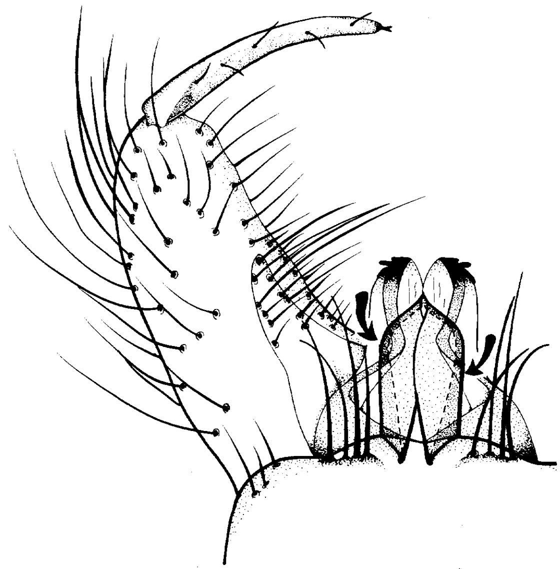

Fig. 101

Genus *Psorophora*

1. Phallosome with two broad, lateral triangular projections and a pair of longitudinal toothed ridges (Subgenus *Psorophora)* (Fig. 102) 2

   Phallosome without broad, lateral triangular projections and without toothed ridges (Fig. 103) 3

Fig. 102

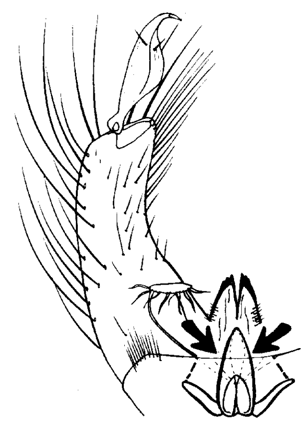

Fig. 103

2. Dististyle narrow, with a small dorsal, angular projection (Fig. 104) . . . . *ciliata*

   Dististyle stout, with a large hatchet-shaped mesal lobe (Fig. 105) *howardii*

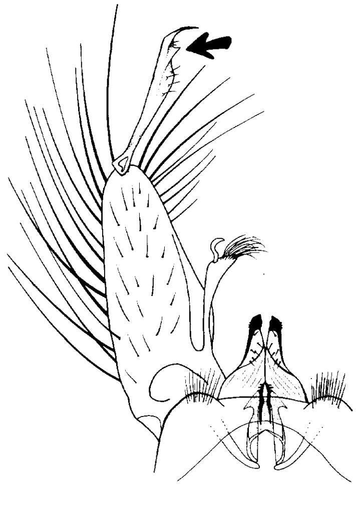

Fig. 104

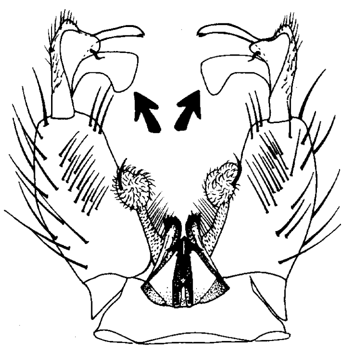

Fig. 105

3. Claspette stem extended along one-half or less of the length of basistyle (Subgenus *Grabhamia*) (Fig. 106) 4

Claspette stem extended beyond the basal half of basistyle (Subgenus *Janthinosoma*) (Fig. 107) 6

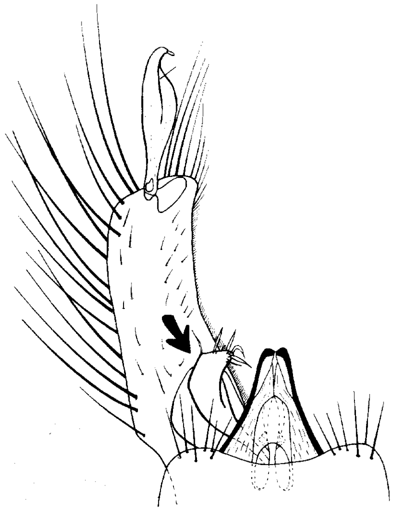

Fig. 106

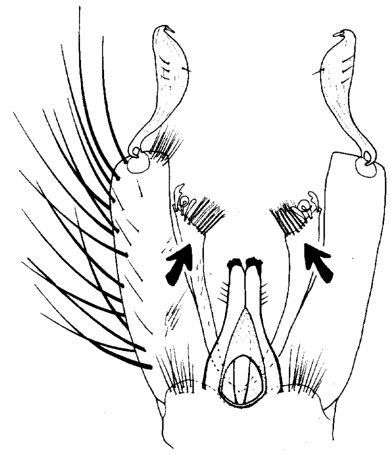

Fig. 107

4. Inner margin of each plate of phallosome with a distinct angular projection (Fig. 108). . . . . *discolor*

Inner margin of each plate of phallosome without an angular projection . . 5

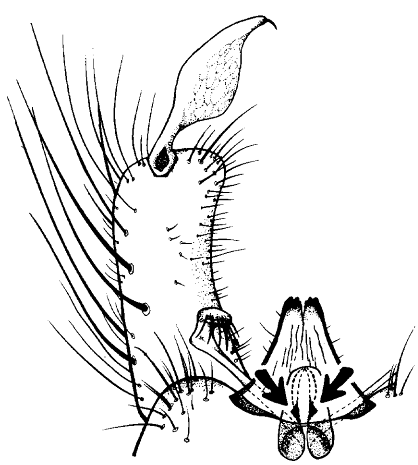

Fig. 108

5. Claspette with six or seven feather-like filaments, and one feathered seta (Fig. 109) . . . . *confinnis*

Claspette without feather-like filaments, and with five or six setae (Fig. 110) . . . . *signipennis*

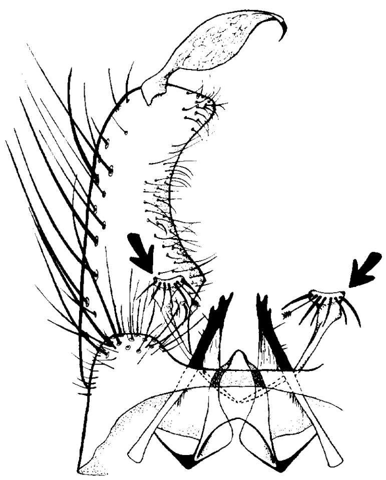

Fig. 109

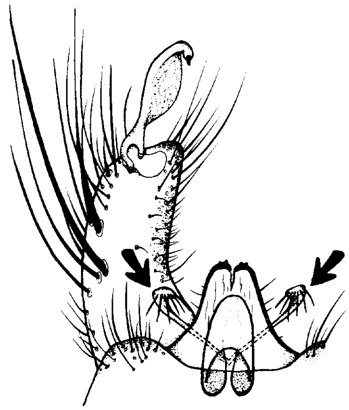

Fig. 110

6. Diststyle truncate at apex; apical claw of diststyle inserted subapically (Fig. 111). . . . . *varipes*

Diststyle not truncate; apical claw of diststyle inserted apically (Fig. 112) 7

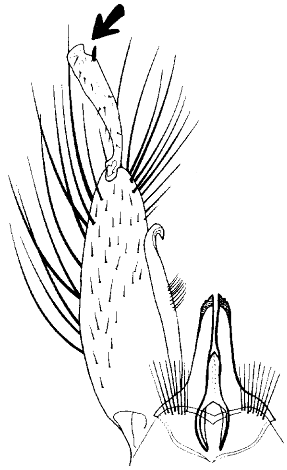

Fig. 111

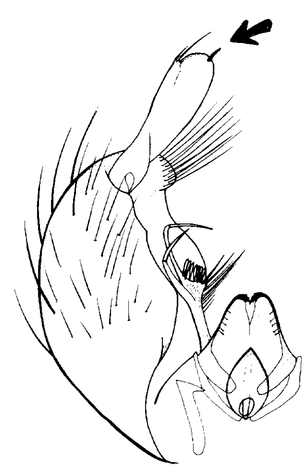

Fig. 112

7. Dististyle expanded and swollen at apex; claspette divided into two unequal branches (Fig. 113) . . . . *longipalpus*

Dististyle narrow at apex, expanded medially; claspette unbranched (Fig. 114). 8

Fig. 113

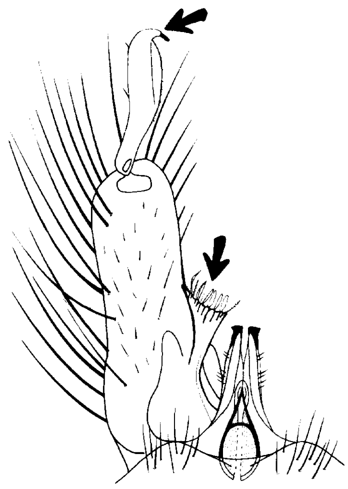

Fig. 114

8. Claspette with about nine flat, pointed filaments and some feathered setae (Fig. 115) . . . . *cyanescens*

Claspette with two contorted, leaf-like filaments, a blunt filament, and many feathered setae (Fig. 116) . . . . *ferox*
horrida

Fig. 115

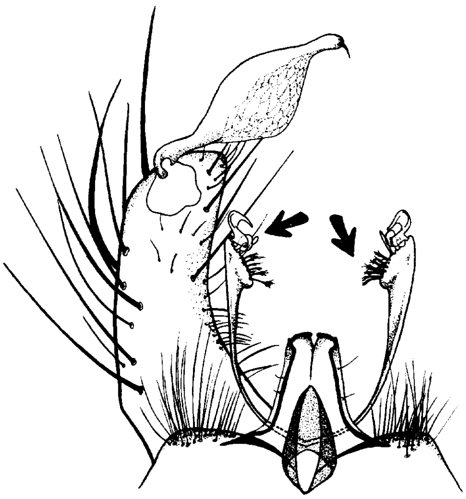

Fig. 116