

DESCRIPTIONS OF TWO NEW SPECIES OF WYEOMYIA AND
THE MALE OF SABETHES TARSOPUS DYAR AND KNAB(DIPTERA, CULICIDAE)^{1,2}By PEDRO GALINDO³, STANLEY J. CARPENTER⁴, AND HAROLD TRAPIDO³

In the course of a study of the forest mosquitoes of Panama, an endemic area of sylvan yellow fever, a number of undescribed species have been found. In the present paper, which is the fourth in a series reporting the results of this work, we describe two new species of *Wyeomyia* and the hitherto unknown male of *Sabethes tarsopus* Dyar and Knab.

Of the two species of *Wyeomyia*, one belongs to the subgenus *Davismyia* Lane and Cerqueira. The finding of a member of this peculiar group of sabethines in Panama is interesting, as only two species have been previously known, *petrocchiae* Shannon and Del Ponte from Argentina, Brazil and Paraguay, and *schnusei* Martini, described without a type locality. The second species described in this paper belongs to the subgenus *Wyeomyia* and appears close to *hemisagnosta* Dyar and Knab.

***Wyeomyia (Davismyia) arborea*, new species**

MALE. Proboscis slightly shorter than fore femur, somewhat swollen toward tip, dark except for a line of yellowish scales on the underside of the apical fourth and a small light spot underneath the base. Palpi very short, barely longer than clypeus, dark. Antenna more than half the length of the proboscis, not plumose. Occiput clothed with dark greenish scales except for a triangular silvery spot on the vertex which is joined to a broad silvery patch below by an indistinct line of light scales behind the eyes.

Anterior pronotal lobes separated, clothed dorsally with scales that give a violet reflection under daylight illumination, and with a patch of grayish silvery scales underneath. Mesonotum covered with flat round scales with greenish metallic reflection, not as pronounced as in *Sabethoides*, and with a distinct patch of light bluish scales, with strong metallic reflection, above the roots of the wings. Pleura and coxae clothed with silvery scales. Pleural chaetotaxy as follows: two propleurals, no posterior pronotals, two spiraculars, four or five lower sternopleurals located below the level of the upper margin of the meron, a patch of prealars and of upper mesepimerals. Scutellum concolorous with mesonotum. Postnotum bare except for the usual tuft of hairs present in all sabethines. Legs dark except for the median pair which have the fifth tarsal segment white on one side. Wings with

¹Studies on The Forest Mosquitoes of Panama. IV.²Publication costs paid by Gorgas Memorial Institute.³Gorgas Memorial Laboratory, Apartado 1252, Panama, R. de P.⁴Colonel, M. S. C., U.S. Army Caribbean, Fort Clayton, C. Z.

broad scales predominating on second, third, and fourth veins, those on the other veins being mostly narrow. Squamae bare. Abdomen dark greenish blue above, white below, the colors separated on the sides by a shaggy undulating line, with the dark indenting the white on the posterior end of each segment.

MALE TERMINALIA. Basistyle about two and a half times as long as its greatest width, the posterior angle produced into a short pointed horn; dorsal⁵ surface clothed with short hairs and narrow ribbed scales; a basal tuft of some eleven or twelve hairs inserted in a semilunar tubercle on the ventral surface. Median plate quadrangular, sparsely clothed with short hairs. Dististyle with long stem, broadening toward tip, about $\frac{3}{4}$ the length of the basistyle. Tip of the dististyle divided into two main arms, the outer arm heavily sclerotized and broad at the base, curving sharply at a right angle toward the tip, and the apical half quite narrow and beak-like, giving the arm the appearance of a sea-gull's head; inner arm sessile, flat, fan-shaped, and clothed with two rows of short, fine hairs on its posterior border; ventro-posterior angle of the arm dark, heavily sclerotized, U-shaped. There are three appendages attached to this arm as follows: a strap-like one inserted near the tip and pointing anteriorly; a second long, tubular, U-shaped one inserted near the base of the arm and slightly expanded at tip; and a third appendage inserted at the antero-dorsal angle of the arm and pointing directly anteriorly in line with the stem of the dististyle. This third appendage is thinly membranous and leaf-like, with fine striations, and is occasionally hidden from view by the stem of the dististyle. Mesosome slightly less than twice as long as it is broad, lateral borders sinuate, ending in a heavily sclerotized upturned tip; basal opening rather narrow. Tenth sternites mostly membranous with sclerotized upper border and tip which has three or four closely appressed subequal teeth. Lobes of the ninth tergite with five hairs on each side, inserted in well defined tubercles, and decreasing in size from the center outwardly; interlobar space concave and quite narrow.

FEMALE. Similar to male. Proboscis dark above and below.

LARVA. Head rounded; antennae cylindrical, very short, glabrous; head hairs single, very short and fine. Integument of body glabrous. Lateral abdominal hairs double or triple on segment I, single or double on others. Subdorsal abdominal hairs in weak non-stellate tufts. Lateral comb of the eighth segment in a single row of some twenty spine-like scales. Air-tube three and one-half times as long as basal width, tapering sharply from the base to the tip. There are four rows (two ventral and two dorsal) of very long single hairs which extend from the base to the outer third of the air tube, and a very short and fine two-haired dorsal tuft near its tip. There is no fringe or pseudopecten. Anal segment with the dorsal plate almost ringing the segment, light colored.

⁵The terms dorsal and ventral are used in this paper to designate definitive positions, not in the true morphological sense.

Dorsal anal hair double (1 + 1); lateral hair single, as long as dorsal; ventral tuft with two hairs, as long but slightly weaker than dorsal. Anal gills short, barely as long as the segment.

PUPA. Trumpets tubular, but slightly tapering from tip to base; meatus four times as long as the diameter of the pinna, entirely reticulate with no visible tracheoid portion. Median group of hairs of the cephalothorax with a long double and a long single hair, others represented by very small and weak two or three-haired tufts. All dorsal abdominal hairs weak and insignificant except for the following: hair 2 on segment I (terminology of Knight and Chamberlain, 1948) large and dendritic; hair 5 on segments IV, V and VI quite outstanding and longer than the segment; hair 8 on segments VII and VIII a large multiple and conspicuous tuft. Paddles triangular, slightly longer than the length of the eighth abdominal segment, weakly sclerotized; midrib broad, fading toward the tip of the paddle which is weakly fringed with short fine spicules.

TYPE MATERIAL. *Holotype* pinned male (terminalia, associated larval and pupal skins mounted on two separate slides), reared from eggs laid by a female taken while biting man in the upper canopy of the forest, 45 feet above the ground, at Bijao on the slopes of Chiriqui Volcano, 3,000 feet above sea-level, Chiriqui Province, Republic of Panama, on August 15th, 1950. *Allotype* female (with associated larval and pupal skins) reared from one larva taken from the water in a bamboo internode placed as a larval trap in the upper canopy of the forest at the type locality, July 11th, 1950. *Paratypes*: two males, same data as the holotype; one male with associated pupal case, same data as the allotype; three females taken while biting man at the type locality on June 20th, 1950; one male and one female taken with a net from the branches of a tree 30 feet above the ground on the forested slopes of Cerro Tute, near Santa Fe, Veraguas Province, at 2,200 feet above sea-level on July 11th, 1950.

Holotype, allotype and one paratype to be deposited in U.S.N.M., two paratypes in the collection of Dr. John Lane at the University of São Paulo, Brazil, and the remainder of the type material in the senior author's collection.

TAXONOMIC DISCUSSION. The present species falls in the subgenus *Davismyia*, created by Lane and Cerqueira (1942) to include two species, *petrocchiae* Shannon and Del Ponte and *schnusei* Martini, which are distinguished from all other species of the genus by the strong metallic reflection of the mesonotal scales. The pleural chaetotaxy of the group and the wing scaling are, in general, quite similar to those species of the series *Cleobonnea*, subgenus *Dendromyia*, to which *Davismyia* appears closely related.

Females of *arborea* can be separated readily from other species of *Davismyia* by the less pronounced metallic reflection of the mesonotal scales as well as by the leg markings. *W. schnusei* having all the tarsi marked with white, *W. petrocchiai* having the mid-tarsi marked with white on one side.

The male of the new species can be readily separated from all other known males of the genus by the presence of a fan-shaped, 11-haired tuft inserted in a semilunar tubercle on the base of the basistyle.

We wish to express our appreciation to Dr. John Lane who examined two males of this species sent him by us, and who concurred in our belief that it was undescribed.

Wyeomyia (Wyeomyia) nigritubus, new species

MALE. Proboscis short and stout, shorter than fore femur, slightly swollen at tip, dark. Palpi small, barely longer than the clypeus. Antennae not plumose, about two-thirds the length of the proboscis. Occiput clothed with flat scales which give a dull greenish reflection, and with an indistinct line of whitish scales bordering the eyes and joining a broad patch of silvery scales below. Anterior pronotal lobes clothed with dull brownish scales above and a small patch of silvery ones below. Mesonotum covered with dull brown scales. Pleura silvery scaled. Pleural chaetotaxy as follows: no posterior pronotal, one spiracular, no post spiraculars, lower sternopleurals below upper margin of meron, a patch of upper sternopleurals and of upper mesepimerals. Scutellum clothed with scales concolorous with those of mesonotum. Postnotum bare except for the usual tuft of hairs present in all subethines. Legs dark, mid-tarsi white on the outside of the third and fourth segments, hind tarsi with white on one side of the fourth and fifth segments, except for the very tip of the fourth which is dark. Wing scales dark, the outstanding ones of the base of the fourth vein narrow and ligulate, those of the branches of the second, third and fourth veins broad and mostly truncate. Squamae bare. Abdomen dark above, pale yellowish below, the colors separated in a straight line.

MALE TERMINALIA. Basistyle about three and one-half times longer than its greatest width, clothed with short hairs and some ribbed scales dorsally, and with three long setae inserted in closely appressed tubercles on the ventral side near the base. Median plate quadrangular, with a long stout process projecting anteriorly, and bearing seven or eight short hairs on the surface and two stout setae on the dorso-posterior angle. Dististyle with a long and slender stem and a capitate tip which is divided into two plates. Dorsal plate small with rounded tip and about twelve hairs arising from tuberculate bases. This dorsal plate also bears a long arm from its base which points anteriorly along the stem of the dististyle for about half its length, then bends sharply back to end near its origin. Ventral plate larger, roughly quadrate, bearing numerous short hairs on its ventral border, and five or six

modified rod-like setae on the anterio-ventral angle. Mesosome elongate, bulging at the middle and with rounded tip; two small wing-like processes located ventrally near the tip. Tenth sternite membranous with sclerotized upper border and two subequal teeth at the tip. Lobes of the ninth tergite each with six strong pointed hairs, progressively longer from the median line laterad; interlobar space small and straight or very slightly concave.

FEMALE. Similar to male.

LARVA. Head rounded; antennae small, cylindrical and glabrous; head hairs single, slight. Integument of body glabrous. Lateral abdominal hairs multiple and long on segments I and II, in threes or fours on segments III, IV and V, and double on others. Subdorsal abdominal hairs in long, strong tufts of four or five branches. Lateral comb of the eighth segment of ten to fourteen spine-like scales in a straggling line appearing double in some specimens. Air tube four times as long as basal diameter, heavily sclerotized and dark, bearing ventrally a long and strong two-haired tuft on basal third, and a small single hair near the tip; dorsally there is a row of four small hairs, the two basal ones being double and the two apical ones single. Anal segment wider than long with the saddle also heavily sclerotized, and not ringing the plate. Dorsal anal tuft 11 or 12-haired ($8 + 3$) or ($8 + 4$); lateral tuft long and strong, three or four haired; ventral tuft short, 8 to 10-haired.

PUPA. Trumpet tubular, narrowing slightly medianly; meatus about three or four times longer than diameter of pinna; tracheoid area absent. Dorsal abdominal hairs mostly single and weak, except the following: hair 2 on segment I the usual conspicuous palmate tuft, on segment II strong and single at the base but frayed into three or four branches at the tip; hair 5 single but long and strong, particularly on segments IV, V and VI where it is longer than the length of the segment immediately posterior; hair 7 single and very long on segment II, longer than length of segment III; hair 8 a multiple tuft on segments VII and VIII. Paddles short and acutely triangular, diverging slightly outward toward tip, longer than the length of the eighth segment, with lightly spiculate apices and pronounced midribs.

TYPE MATERIAL. *Holotype*: pinned male with terminalia and associated larval and pupal skins mounted on two slides. *Allotype*: female with associated larval and pupal skins mounted on slide. *Paratypes*: three females, five larval and three pupal skins. Type material reared from larvae taken from a bamboo internode placed as a larval trap five feet above the forest floor at La Victoria (Cerro Azul) Panama Province, Republic of Panama, at 2,100 feet above sea-level on April 27th, 1950.

Holotype, allotype and one paratype to be deposited in the U.S.N.M. One paratype in the collection of Dr. John Lane,

University of São Paulo, Brazil, and the remainder in the collection of the senior author.

TAXONOMIC DISCUSSION. The presence of narrow ligulate scales on the base of the fourth vein and of broad truncate ones on the branches of veins 2, 3 and 4, places *nigritubus* close to *hemisagnosta* D. & K., the male of which is as yet undescribed. Females of the new species may be separated from those of *hemisagnosta* by the presence of white on the outside of the mid-tarsi, the latter species having the mid-tarsi entirely dark. The larvae of *nigritubus* may be separated from those of *hemisagnosta* by the following characters. *Lateral abdominal hairs*: in *nigritubus* they are multiple on segments I and II, triple or quadruple on segments III, IV and V and double on the others, while in *hemisagnosta* they are quadruple on segments I and II, double on segments III, IV and V, and single on the other segments. *Subdorsal abdominal hairs*: these hairs are quadruple or quintuple in *nigritubus* and double or triple in *hemisagnosta*. *Dorsal anal hairs*: these hairs have eleven or twelve branches in *nigritubus*, but only five branches in *hemisagnosta*. *Lateral anal hairs*: these are triple or quadruple in *nigritubus* and double in *hemisagnosta*.

It is possible that *Wyeomyia nigritubus* is conspecific with *W. hemisagnosta* D. & K., but we describe it here as a new species in view of the differences found in the tarsal markings of the females, and more particularly in the chaetotaxy of the larvae. The finding of typical males of *hemisagnosta* will definitely settle the status of the species herein described.

Sabethes (Sabethes) tarsopus, Dyar and Knab

MALE. Coloration and morphology as in the female, but somewhat smaller. Palpi short; antennae not plumose.

MALE TERMINALIA. Basistyle rather short and stout, about two and one-half times as long as it is wide, densely covered with strong, short hairs and narrow ribbed scales on the dorsal surface. There are three setae from closely appressed tuberculate bases at about the middle of the ventral border. Median plate quadrate, densely clothed with short hairs and bearing two modified long setae from the posterior dorsal corner, and a long and broad process from the posterior border, which is difficult to see unless the plates are dissected out. Dististyle with stem and capitate tip; stem short, thick and sinuate, slightly less than half as long as the basistyle. Tip complicated, divided into four main processes. The innermost process is sausage-shaped and densely covered with short hairs; this is followed laterally by a large quadrate plate bearing on its apical border a row of setae, the ones on distal half being long and notched at the tip and the ones on the proximal half being short, thick and single. The third process is divided into three

arms, the dorsal one broad at the base, narrowing abruptly on the apical half to form a long, smooth beak-like process; the middle one broad and rounded at the tip, densely covered with hairs on the dorsal border; the ventral arm broadly finger shaped and smooth. The fourth process points back along the stem of the dististyle and is divided into a lower club-shaped, heavily sclerotized border bearing a long tuft of hairs at its tip, and a membranous, acutely pointed dorsal border with very fine hairs at the point. Mesosome tubular, short, with sinuate border and small basal opening. Tenth sternites mostly membranous with sclerotized upper border and tip, which bears three strong, subequal teeth and three small subapical setae. Lobes of the ninth tergite with three long, stout, pointed setae on each side; interlobar space large and convex.

This description is based on 32 specimens taken on the wing at different times of the year in the upper canopy of the forest between 40 and 75 feet above the ground at the following localities in the Republic of Panama: La Victoria (Cerro Azul), Panama Province; Buena Vista, Colon Province; Tucue, Cocle Province; Cerro Tute (Santa Fe), Veraguas Province.

REFERENCES

- Dyar, Harrison G., 1928. The mosquitoes of the Americas. Carnegie Inst. Wash., Pub. No. 387: 1-616, pls. i-xxxii.
- Galindo, Pedro, Stanley J. Carpenter, and Harold Trapido, 1949. Notes on forest mosquitoes of Panama. I. *Haemagogus spegazzinii* falcio Kumm et al., *Haemagogus iridicolor* Dyar, *Anopheles* (*Lophopodomyia*) *squamifemur* Antunes, and *Anopheles* (*Anopheles*) *fausti* Vargas, four new records for the country. Proc. Ent. Soc. Wash., 51 (6): 277-278.
- Galindo, Pedro, Harold Trapido, and Stanley J. Carpenter, 1950. Observations on diurnal forest mosquitoes in relation to sylvan yellow fever in Panama. (Studies on forest mosquitoes of Panama. II). Amer. Jour. Trop. Med., 30 (4): 533-574.
- Galindo, Pedro, Stanley J. Carpenter, and Harold Trapido, 1951. Ecological observations on forest mosquitoes of an endemic yellow fever area in Panama. (Studies on forest mosquitoes of Panama. III.). Amer. Jour. Trop. Med., in press.
- Howard, Leland O., Harrison G. Dyar, and Frederiek Knab, 1912-1917. The mosquitoes of North and Central America and the West Indies. Carnegie Inst. Wash., Pub. No. 159, 4 vols.: 1-1064.
- Knight, Kenneth L. and Roy W. Chamberlain, 1948. A new nomenclature for the chaetotaxy of the mosquito pupae, based on a comparative study of the genera. (Diptera, Culicidae). Proc. Helminth. Soc. Wash., 15: 1-18.
- Lane, J. and N. C. Cerqueira, 1942. Os sabetineos da America, (Diptera, Culicidae). Arq. Zool. Est. Sao Paulo, 3: 473-849.

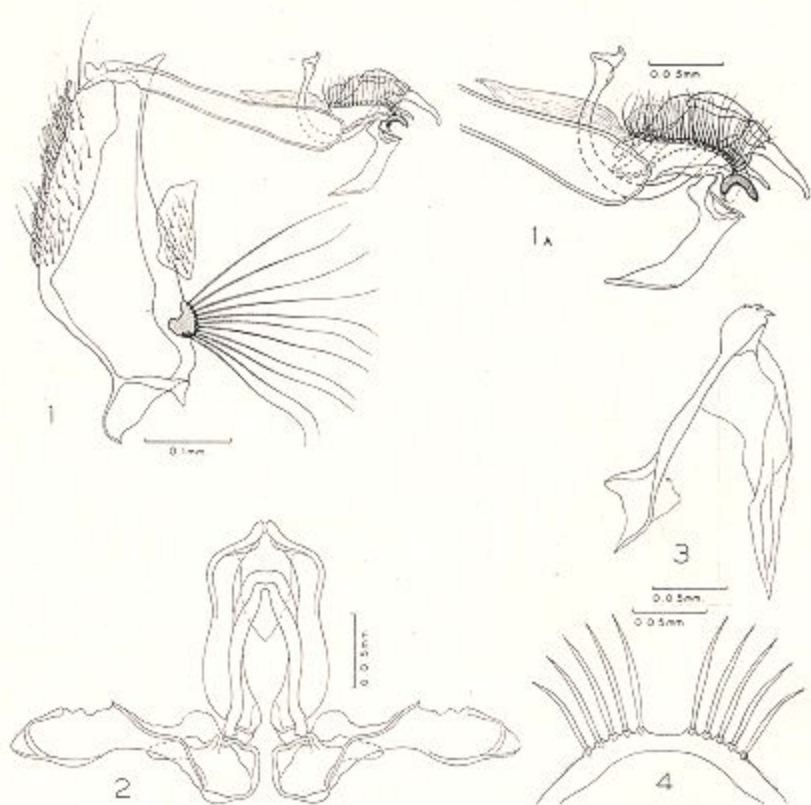


PLATE 18. MALE TERMINALIA OF *WYEMYIA* (*DAVISMYIA*) *ARBOREA*

Fig. 1, style; fig. 1A, terminal part of dististyle; fig. 2, mesosome; fig. 3, tenth sternite; fig. 4, ninth tergite.

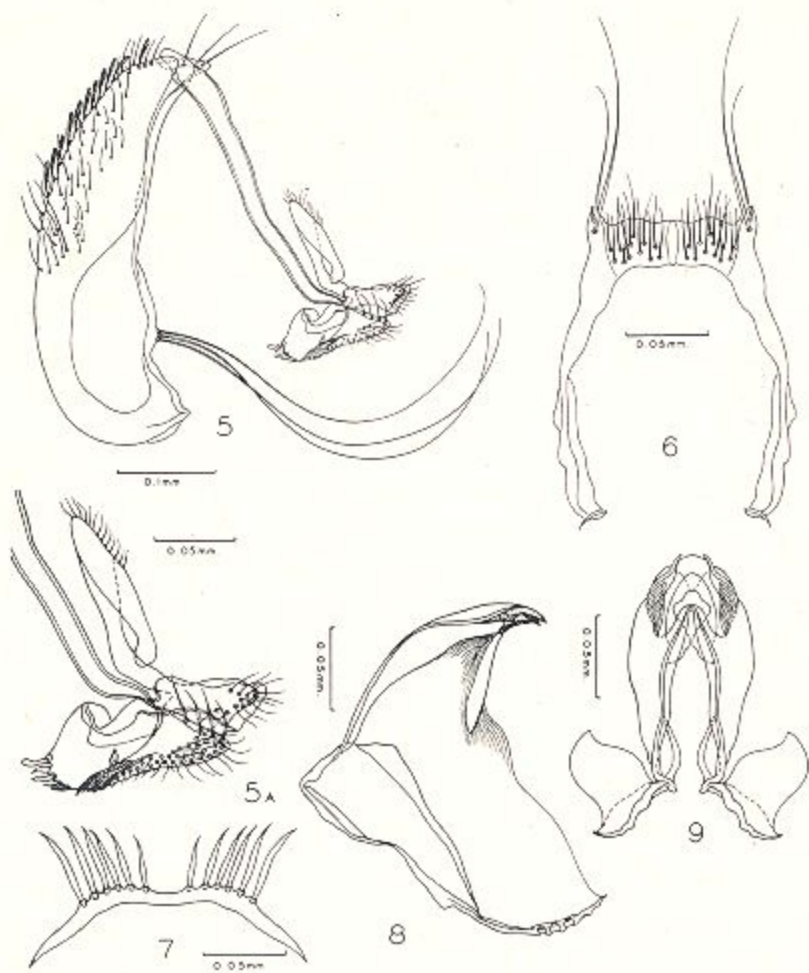


PLATE 19. MALE TERMINALIA OF *WYEOMYIA* (*WYEOMYIA*) *NIGRIFUBUS*

Fig. 5, style; fig. 5A, terminal part of dististyle; fig. 6, median plates of basistyles; fig. 7, ninth tergite; fig. 8, tenth sternite; fig. 9, mesosome.

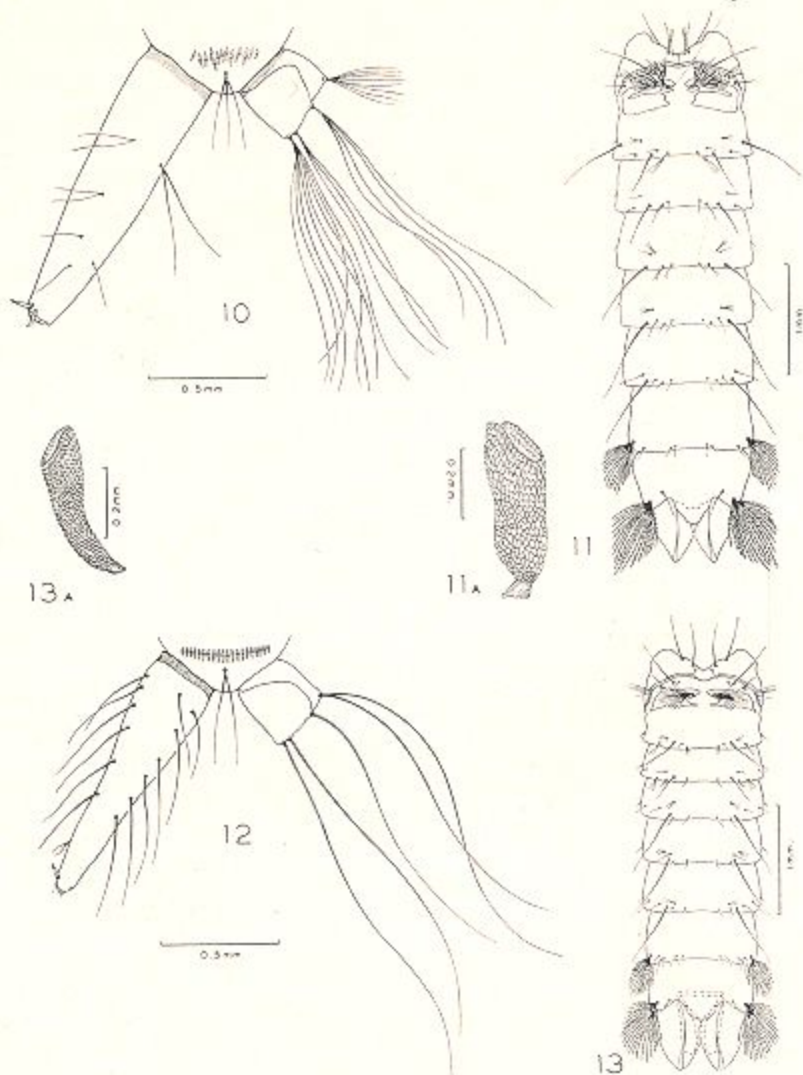


PLATE 20. LARVAE AND PUPAE OF *WYEOMYIA (DAVISMYIA) ARBOREA* AND *WYEOMYIA (WYEOMYIA) NIGRITUBUS*

Fig. 10, terminal segments of larva of *Wyeomyia (Wyeomyia) nigriritubus*; fig. 11, abdomen of pupa of *Wyeomyia (Wyeomyia) nigriritubus* (dorsal view); fig. 11A, respiratory trumpet of pupa of *Wyeomyia (Wyeomyia) nigriritubus*; fig. 12, terminal segments of larva of *Wyeomyia (Davismyia) arborea*; fig. 13, abdomen of pupa of *Wyeomyia (Davismyia) arborea* (dorsal view); fig. 13A, respiratory trumpet of pupa of *Wyeomyia (Davismyia) arborea*.

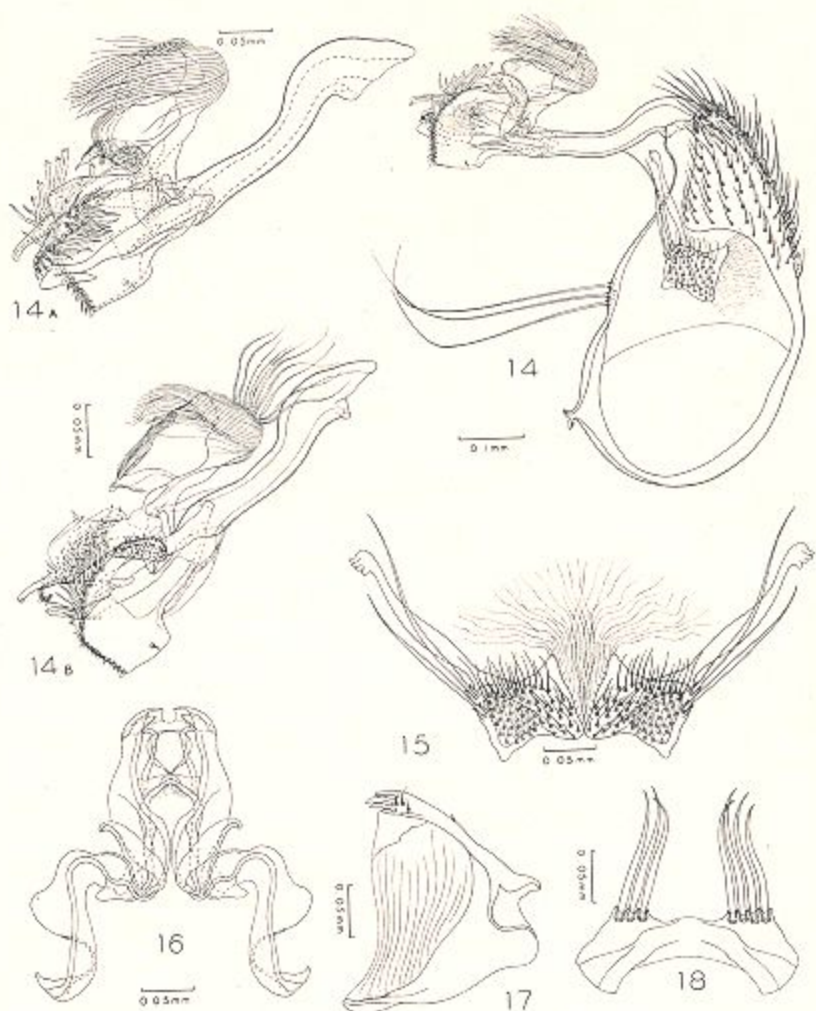


PLATE 21. MALE TERMINALIA OF *SABETHES* (*SABETHES*) *TARSOPUS*

Fig. 14, Style; fig. 14A, dististyle (lateral view); fig. 14B, dististyle (dorso-lateral view); fig. 15, median plates of basistyles; fig. 16, mesosome; fig. 17, tenth sternites; fig. 18, ninth tergite.