TABANIDAE (DIPTERA) FROM THE DOMINICAN REPUBLIC[1]

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ABSTRACT

Four new species, *Stenotabanus* (*Aegialomyia*) *barahona*, *Stenotabanus alticolus*, *S. marcanoi* and *Tabanus gymnorhynchus* are described and figured from the Dominican Republic, and a related species, *Stenotabanus wolcotti* is described from Puerto Rico. A key to the 29 Hispaniolan species definitely recognized is given, and the possible identity of 2 other species is discussed. *Tabanus commixtus* Walker and *T. vittiger guatemalanus* Hine are reported from Hispaniola for the first time.

The island of Hispaniola, the second largest in area and the most varied topographically of the greater Antilles, consists of 2 separate political entities: Haiti and the Dominican Republic. In 1940 Dr. Joseph Bequaert published a detailed review of the Tabanidae then known from all of the Antilles and listed 17 species recorded as occurring on the island of Hispaniola. Practically nothing on the fauna has been published subsequently. Philip (1957) added *Stenotabanus* (*Aegialomyia*) *jamaicensis* (Newstead) to the fauna. Fairchild (1967) showed that *Chrysops frontalis* Macq. 1838, described as from "Saint Domingue" is an African species. *Chlorotabanus inanis* (Fab.) listed by Bequaert (1940) as of doubtful occurrence in the Antilles, based on an early record by Palisot de Beauvois from "Santo Domingo," and discussed by Bequaert (l.c. p. 318), has still not been recorded from any of the West Indian islands save Trinidad. Two other species, not definitely recognized by Bequaert, are discussed below.

In April 1978, I had the good fortune to accompany Dr. Robert Woodruff on a 3-week expedition to the Dominican Republic, primarily to study the amber deposits in that country and to collect amber containing insects. We did not neglect opportunities to collect contemporary insects, and used both flight traps and U.V. light traps at a number of widely scattered localities. Tabanidae were surprisingly scarce, and we took by all methods only 16 specimens representing 5 species. Woodruff had taken 6 specimens of 3 species in U.V. light traps on a previous visit in 1976. The bulk of the material reported here, however, was secured through the great generosity of Prof. E. deJ. Marcano. Although primarily a botanist, Prof. Marcano is interested in all aspects of Dominican natural history and collects all phyla and all orders of insects. His smaller insects were preserved in glass tubes plugged with cotton, each tube with a numbered slip referring to his extensive notes on the locality and habitat of the specimens. He turned over to me for study over 60 specimens representing 10 species of Tabanidae; 2

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additional common species were seen in his collection but not further studied. This collection, I believe, is the largest ever taken in Hispaniola.

Prof. Marcano made extensive use of Holdridge's (1967) system of bio-climatic classification, and his localities in nearly all cases were characterized by abbreviations of the Spanish equivalents of Holdridge's categories. I give here the abbreviations used by Prof. Marcano on his labels and their equivalents in Spanish and English.

Me —Monte espinoso = Thorn woodland
Bs —Bosque seco = Dry forest
Bh —Bosque humedo = Moist forest
Bmh —Bosque muy humedo = Wet forest
Bp —Bosque pluvial = Rain forest
S —Subtropical = Subtropical
Mb —Montano bajo = Lower montane

Prof. Marcano's collecting, as revealed by the Tabanidae, covers a period of about 14 years, the earliest date being 1964. His numbers, which refer to his notes on all insects collected run from 740 to over 21,000, which gives an idea of the extent of his collecting as well as the relative scarcity of Tabanidae.

The Dominican Tabanid fauna as presently known consists of 14 endemic or precinctive species and 6 widespread species. The precinctive species consist of 1 *Chrysops*, 6 *Tabanus* and 7 *Stenotabanus;* the widespread species of 1 *Chrysops*, 1 *Lepiselaga*, 3 *Tabanus*, and 1 *Stenotabanus*. Future collecting and more detailed inter-island comparisons may show that some of the species now thought to be precinctive will prove to be better treated as subspecies. I have treated *S. parvulus* (Williston) as precinctive here, though Bequaert (1940) includes a specimen from Puerto Rico. Bequaert also included specimens from Hispaniola and Puerto Rico, as well as at least 3 species from Cuba in his *S. brunettii* Bequaert. Certainly Puerto Rican and Hispaniolan specimens of *parvulus* should be restudied carefully. I do not have the necessary comparative material to pursue these questions here. I give below a key for the identification of the species definitely known from Hispaniola, except *T. haitiensis* Krober and *S. picticornis* (Bigot), whose status is discussed in the text.

Key to females

1. Hind tibiae with paired spurs similar to those on mid tibiae. Frons wider than high and frontoclypeus and genae largely bare and shiny. First 2 antennal segments together much longer than 3rd ..... *Chrysops* 2

1′. Hind tibiae without spurs. Frons rarely as wide as high. First 2 antennal segments together not longer than 3rd 3

2(1). Wing with a brown pattern that leaves a clear oval fenestra in middle of discal cell. Apex of wing with an extensive apical spot filling most of wing apex. Abdomen yellow with a pair of slender black dorsolateral stripes on tergites 2 and 3 ..... *C. variegatus* (De Geer)

2′. Wing with discal cell entirely dark. Apical spot forming a well defined stripe in marginal cell extending to wing tip.

Abdomen largely black, with median and dorsolateral pale areas on segments 2 and 3 ..... *C. frazari* Williston

3(1′). Small shiny black species, the body and frons covered with metallic greenish scales. Wings basally black to end of discal cell, this cell strongly narrowed in middle. All tibiae greatly inflated, black, the basal tarsal segments white ..... *Lepiselaga crassipes* (Fabricius)

3′. Not as above, without greenish scales, swollen tibiae or constricted discal cell 4

4(3′). Basicosta lacking strong setae like those on adjoining costa, or these setae few and markedly less dense than on costa. Usually a tubercle with vestiges of ocelli, or at least a bare shiny spot at vertex ..... *Stenotabanus* 5

4′. Basicosta with setae as dense as on adjoining costa. Without a tubercle at vertex, at most a small discolored spot .... *Tabanus* 12

5(4). Frons broad, less than 4 x as high as basal width. Tubercle at vertex small, without vestiges of ocelli. At least mesonotum thickly pale gray pollinose ..... (*Aegialomyia*) 6

5′. Frons narrower, not less than 6 x as high as basal width. Tubercle at vertex prominent, usually with clear vestiges of ocelli. Mesonotum differently colored 7

6(5). Frons without a prominent bare patch at vertex. Abdomen pale brownish with faint pale gray hind marginal bands, and median triangles on at least tergites 2 and 3 in undenuded specimens. Eyes glaucous green with 4 narrow reddish transverse stripes ..... *jamaicensis* (Newstead)

6′. Frons with a prominent shiny black patch at vertex. Abdomen with 2 prominent rows of dorsal dark comma-shaped markings on a pale gray background. Eyes pale green with 2 broader purple stripes and the upper and lower borders purple ..... *barahona* Fairchild n. sp.

7(5′). Wings with spots or at least faint clouds at fork of 3rd vein, often also on crossveins. Mesonotum striped 8

7′. Wings blackish tinted or entirely clear, not spotted. Mesonotum unstriped 10

8(7). Abdomen with a prominent, moderately broad, middorsal pale stripe formed of contiguous narrow triangles. Hind margins of all tergites narrowly pale. Mid and hind tibiae and tarsi prominently bicolored. Crossveins and fork prominently spotted and wing apex tinted ..... *parvulus* (Williston)

8′. Abdomen without a continuous middorsal stripe 9

9(8′). Larger species, wing length over 10mm. Wing faintly yellowish brown tinted, the clouds on crossveins and fork small and diffuse. Antennae with flagellum long and slender, black except at extreme base. Abdomen dark brown with small yellowish-haired middorsal triangles on tergites 2 to 6 and very narrow pale hind borders on all tergites ..... *batesi* (Bequaert)

9′. Smaller species, wing length less than 9mm. Wing clear except for large and discrete dark clouds around fork and all crossveins with fainter and more diffuse clouds along apical

segments of all longitudinal veins. Basal plate of flagellum all yellow, contrasting with black style. Abdomen with broader hind marginal pale bands, but middorsal triangles low, merely a middorsal widening of the transverse bands, most noticeable on 2nd tergite ..... *alticolus* Fairchild n. sp.

10(7′). Wing entirely glass clear. Integument of body and appendages light brown. Mesonotum uniformly gray pollinose with mixed black and silvery hairs. Abdomen black haired, but with white-haired hind marginal bands widened in the middle into white triangles about half the length of their respective segments. Antennae brown, the style contrastingly black ..... *marcanoi* Fairchild n. sp.

10′. Wing blackish infuscated 11

11(10′). Whole insect blackish brown, the black abdomen bluish pruinose, without pattern, the tibiae and basitarsi of all legs contrastingly ivory white and white haired. Frons noticeably narrowed below, index of convergence about 2. Beard black ..... *fenestra* (Williston)

11′. Abdomen blackish but with narrow pale hind borders widened into low median triangles. Legs entirely dark. Frons nearly parallel sided. Beard white ..... *hispaniolae* (Bequaert)

12(4′). With a velvety black hair patch on prescutellum and base of scutellum, margined anterolaterally by a pair of long pale hair tufts 13

12′. Without a pale margined black spot on prescutellum and/or scutellum 17

13(12). Abdomen with median and dorsolateral rows of pale spots. Wings grayish hyaline, the veins not noticeably brown margined. Fore tibiae strongly bicolored 14

13′. Abdomen with a median row of pale triangles or small hair tufts, but without dorsolateral markings. Wing veins with more or less prominent brown margins 15

14(13). Subcallus largely bare and shiny. Dorsolateral pale spots of abdomen small and discrete, seldom reaching either margin of their respective segments. Small species, wing length not over 9mm. Stigma dark brown, costal cell tinted ..... *gymnorhynchus* Fairchild n. sp.

14′. Subcallus pollinose. Dorsolateral pale spots of large, broad oblique patches, diffuse, generally reaching both margins of their respective segments. Larger species, wing length rarely less than 10mm. Stigma nearly colorless. Costal cell not tinted ..... *clenchi* Bequaert

15(13′). Integument of abdominal tergites 1 and 2 with a diffuse black median triangle. All femora black or infuscated, contrasting with paler reddish tibiae. Integument of thorax blackish, except reddish pronotal lobes. Wing length 12.5 to 13.5mm ..... *monops* Bequaert

15′. Integument of abdomen entirely reddish. Femora not infuscated. Integument of thorax brown. Wing length over 14mm 16

16(15′). Thorax and abdomen glossy, pollinosity thin or absent. Scutellar black spot small, confined to prescutellum. Wing veins strongly brown margined, more broadly so at fork of 3rd vein and crossveins. Wing length 17 to 19mm. Abdominal pale triangles white, broader than high ..... *darlingtoni* Bequaert

16′. Thorax and abdomen dull, normally pollinose. Scutellar black spot extending onto basal half of scutellum, wing veins less strongly brown margined, not accentuated on crossveins and fork. Wing length 14.5-16mm. Abdominal pale triangles taller than wide, nearly contiguous ..... *flocculus* Bequaert

17(12′). Subcallus inflated, entirely bare and shiny, yellow, as is frontal callus. Wings entirely hyaline. Legs entirely pale yellowish except black distal halves of fore tibiae and fore tarsi. Scutellum with a reddish tip. Median abdominal stripe of broad pale contiguous triangles, dorsolateral stripes of broad oblique contiguous patches, wider than the dark space separating them from median stripe ..... *claripennis* Bigot

17′. Subcallus flat, pollinose 18

18(17′). Coxae, femora and mid and hind tibiae pale reddish brown in ground color. Fore tibiae bicolored. Scutellum reddish at tip. Frons moderately wide, convergent below, the callus round or tapered above, yellow to brown, rarely black. Abdominal stripes broad and diffuse. Wings entirely glass clear ..... *vittiger guatemalanus* Hine

18′. Coxae, fore femora and basal 1/3 to 1/2 of mid and hind femora black. Fore tibiae bicolored, mid and hind tibiae yellowish, the tips of hind pair dusky. Scutellum black. Frons narrower, generally parallel sided, the square or oblong callus black. Mid abdominal stripe a series of narrow contiguous whitish yellow triangles; lateral stripes a series of contiguous oblique yellow to orange patches. Wings with a very faint small cloud on fork of 3rd vein ..... *commixtus* Walker

The sorting of the Hispaniolan Tabanidae into groups can only be tentative until the fauna of the whole West Indian area becomes better known. In general, Bequaert's divisions of *Tabanus* (1940) seem to me to reflect relationships quite well, though I am inclined to make some minor readjustments in status. I recognize *Stenotabanus* and *Chlorotabanus* as full genera, and would divide the first into 3 groups, while I as yet cannot recognize Bequaert's use of the subgenera *Lophotabanus, Macrocormus* and *Neotabanus,* though recognizing that, within the limited area of the Antilles, they have a certain utility.

The 3 groups of *Stenotabanus* seem to be the following:

Subgenus *Aegialomyia: jamaicensis* Newst., *barahona* n. sp.

Brunettii group: *parvulus* Will., *alticolus* n. sp., *batesi* Beq.

Fenestra group: *fenestra* Will., *marconoi* n. sp. and probably *hispaniolae* Beq.

This last group shows some resemblance to *Stypommisa* and *Leucotabanus,* but the callus filling the frons below seems to preclude placing them in either of these genera. Both the *brunettii* and *fenestra* groups seem to

represent independent Antillean developments from a *Stenotabanus* ancestor, parallel to but widely divergent from (*Aegialomyia*).

In *Tabanus*, all the precinctive species seem to me to belong to a single group whose nearest relatives appear to be the Central American *oculus* group (*Lophotabanus*). In spite of mostly lacking the scutellar black spot, the Jamaican species are structurally quite close. Bequaert (1940) puts these species in (*Macrocormus*), which I believe is closely related, neither the presence of a scutellar spot nor an appendix on fork of the 3rd vein being of paramount importance.

There remain 3 puzzling specimens which I am unable to place. The first is a small and poorly preserved female from La Vega Prov., D.R., Casabito, No. 4480, Bp, III-1967, E. Marcano coll. which may be *batesi* Beq. The wing is similar, but frons and antennae differ. The abdominal pattern is obscured. The second is a male from Port-au-Prince, Haiti, Mann coll. It somewhat resembles a very dark *T. commixtus* Wlk., but there are fundamental differences, and it is not like any other Antillean species. It may well be mislabelled as to locality, as it does not bear a regular Mann label. The third specimen is also a male labelled Puerto Cabello, Venez., 17-VIII, Pomerat coll. It agrees very closely with males of *T. clenchi* Beq., and should subsequent collections of females from the same area confirm this identification, it would be the only case of an endemic Antillean species being found on the mainland, with the exception of the beach inhabiting *S.* (*Aegial.*) *jamaicensis* mentioned herein. I suspect, however, that this is but another case of mislabelling.

Chrysops variegatus (De Geer)

Tabanus variegatus De Geer 1976, Mem. Serv. Hist. Ms. 6: 230, Fig. 7-8.
Chrysops variegata: Bequaert 1940, Rev. Ent. 11(1-2): 276-9.

Bequaert (l. c.) gives an extensive list of references to this species, and discusses its habits and wide distribution. It is widespread in the Neotropics, from Mexico to Argentina and on all the major islands of the Antilles. The present collection contains 16 lots collected by Marcano and 3 by Woodruff or Fairchild which it seems unnecessary to list in detail. These collections indicate that the species is widespread at lower elevations throughout the Republic.

Chrysops frazari Williston

Chrysops frazari Williston 1887, Trans. Kansas Acad. Sci. 10: 132-3. Bequaert 1940, Rev. Ent. 11(1-2): 282-4, Fig. 1.

This rare and little-known species was not represented in the present collection. Bequaert (1940) knew only the type specimen in the University of Kansas collection, which he figured. In 1946 Bequaert described *C. zayasi* from Cuba and differentiated it from *C. frazari* on the dark antennal scape and largely yellowish frontal callus, the opposite of the condition found in *frazari*. In the Hine collection at Ohio State University there is a specimen from Cuba (Pinar del Rio), 24km N of Viñales, 16-24 Sept. 1913, determined by Hine as *frazari* with a note stating "Type has first seg. antennae yellow. This can be nothing else however." This specimen seems to have formed the basis of the statement in Hine's key (1925) that the abdomen of *frazari*

has only a single row of spots. I compared this specimen with a topotype of *C. zayasi* Beq. and found it considerably darker in abdomen and legs, even darker than indicated by Bequaert for the type of *frazari*, though the frons, antennae and wings were the same as my topotype of *zayasi*. Bequaert's description of *zayasi* indicates specimens like Hine's, darker than my somewhat battered topotype. There thus seems considerable variation in the Cuban population. It is to be noted, that with the exception of the Hine specimen from Viñales, all reported specimens of *zayasi* have come from a single locality on the Isle of Pines. As Bequaert noted (1940: 282), *frazari* is very similar to Trinidad specimens of *C. bulbicornis* Lutz, though having the first antennal segment (scape) somewhat less inflated and the frontal callus black, partly yellow or brown in Trinidad specimens. Typical *bulbicornis* from Bolivia has the antennal scapes even more inflated, nearly black, while the frontal callus is clear yellow and so inflated as to hide the bases of the anennae when viewed from above. Two specimens from Leticia (Amazonas) and Puerto Asis (Putumayo), eastern Colombia, have the scapes apically reddish and the frontal callus black. Trinidad and South American specimens have the outer margin of the crossband nearly straight, with just a small notch in first posterior cell (5th R), while *zayasi* and *frazari* have the crossband narrower and outwardly much more irregular. Although obviously related to *bulbicornis*, and even more similar to the unnamed Trinidad population, I believe the Antillean populations are specifically distinct from the mainland and Trinidad forms. The Cuban and Hispaniolan forms, however, are so similar that I believe subspecific status would best indicate their relationships. The differences between the 2 pointed out by Bequaert (1940) are not as marked as those between either of them and Trinidad *bulbicornis*, nor between Bolivian and Trinidad *bulbicornis*. It is curious that no Hispaniolan specimens of *frazari* other than this type have come to light in over 90 years. If its habitat is like *zayasi* and the Trinidad *bulbicornis*, it should be searched for in the neighborhood of large fresh water swamps or lagoons. The forms of this complex can be separated by the subjoined key, but I see no necessity of further burdening the nomenclature by naming them at this time.

Key to Females of *Chrysops bulbicornis* Group

1. Dark crossband of wing clearly wider than length of discal cell, its outer border relatively straight and even, with but a small notch in first posterior cell. Antennal scape always greatly inflated 2
1′. Dark crossband of wing barely wider than length of discal cell, its outer border markedly irregular. Scape inflated or not 4
2(1). Frontal callus very much inflated, yellow, overhanging bases of antennae. Antennal scapes basally nearly spherical, black, their apices and pedicels yellow ..... *bulbicornis* (Bolivia)
2′. Frontal callus black or brown, at least dorsally 3
3(2′). Scapes somewhat less inflated, clear yellow. Frontal callus orange to brown, its dorsal margin darkened ..... Trinidad *bulbicornis*
3′. Scapes black basally, frontal callus black ..... Colombian *bulbicornis*
4(1′). Antennal scape reddish, moderately inflated, pedicel brownish, flagellum black. Callus black, quite protuberant ..... *frazari frazari*

4′. All antennal segments black, the scapes slightly inflated viewed from above, nearly cylindrical in side view. Callus yellow with dorsal black margin ..... *frazari zayasi*

Lepiselaga crassipes (Fabricius)

Haematopota crassipes Fabricius 1805, Syst. Anth., p. 108.
Lepiselaga crassipes: Bequaert 1940, Rev. Ent. 11(1-2): 285-6.

The larvae of this species live in floating vegetation such as *Pistia*, and the adults are likely to be found in the vicinity of swamps and lakes. Prof. Marcano had specimens in his collection from a number of localities but I failed to take notes on them. We did not take the species. Bequaert (l. c.) records it from Sanchez, at the mouth of the Yuna river and from Puerto Plata, both on the north coast.

Stenotabanus (*Aegialomyia*) *jamaicensis* (Newstead)

Atylotus jamaicensis Newstead 1909, Ann. Trop. Med. Parasit. 3: 465.
Tabanus (*Stenotabanus*) *jamaicensis:* Bequaert 1940, Rev. Ent. 11(1-2): 330-2, Fig. 19.
Stenotabanus (*Aegialomyia*) *jamaicensis:* Fairchild 1951, Ann. Ent. Soc. Amer. 44(3): 461. Philip 1957, Amer. Mus. Novitates, No. 1858, p. 10-11; 1958, Op. cit. No. 1921, p. 4. Fairchild 1971, Cat. Dipt. S. Amer. 28: 48. Cruz and Garcia, 1974, Poeyana, No. 125 p. 22-5, Fig. 2A-C.

Like Philip (1958) I cannot distinguish Jamaican, Hispaniolan and Bahamian populations of this species, and believe they are at most faintly marked insular races. The species also occurs on the mainland, as I have recently seen a male from Progreso, Yucatan, Mex. 23-VII-1962, H. E. Evans coll., and a female from Puerto Juarez, Quintana Roo, Mex. 25-VI-1970, R. E. Beer coll. which agree precisely with Bahamian specimens of both sexes.

In the Dominican Republic the species seems to occur around the coast in suitable beach habitats. Specimens have been seen from the following localities: Barahona Prov., Paraiso, 6-IX-1969, No. 5049, Bh-S., E. Marcano coll. 1 ♀; Barahona Prov., vic. Barahona, 29-IV-1978, in car on beach, G. B. Fairchild coll., 1 ♀; Pedernales Prov., Cabo Rojo, 4-IV-1969, No. 5075, Bs-S, E. Marcano coll., 1 ♀; La Romana Prov., Batey Diego, 18-VII-1970, No. 7630, Bh-S, E. Marcano coll., 1 ♀; Higuey Prov., Cabeza de Toro to Macao, 22-III-1975, No. 18077, Bh-S, E. Marcano coll., 2 ♀; Bani, Las Calderas, 8-VI-1975, No. 1870, Me-S, E. Marcano coll., 1 ♀; Azua, Playa Monte Rio, 11-VI-1977, No. 21444, Me-S, E. Marcano coll., 1 ♀; Altagracia Prov., Nisibon, 6-V-1978, netted on beach, G. B. Fairchild coll., 1 ♀. Santo Domingo, D.R. 3-IX-1971, T. E. Rogers, 1 ♂. The specimen above from Barahona taken by me had pale glaucous green eyes with 4 narrow reddish transverse lines, agreeing with the pattern of a homoeotype of *jamaicensis* from Palisadoes, Jamaica.

Stenotabanus (*Aegialomyia*) *barahona* Fairchild, NEW SPECIES

Fig. 1.

A slender, gray, broad-fronted species with lightly spotted wings and strongly patterned abdomen.

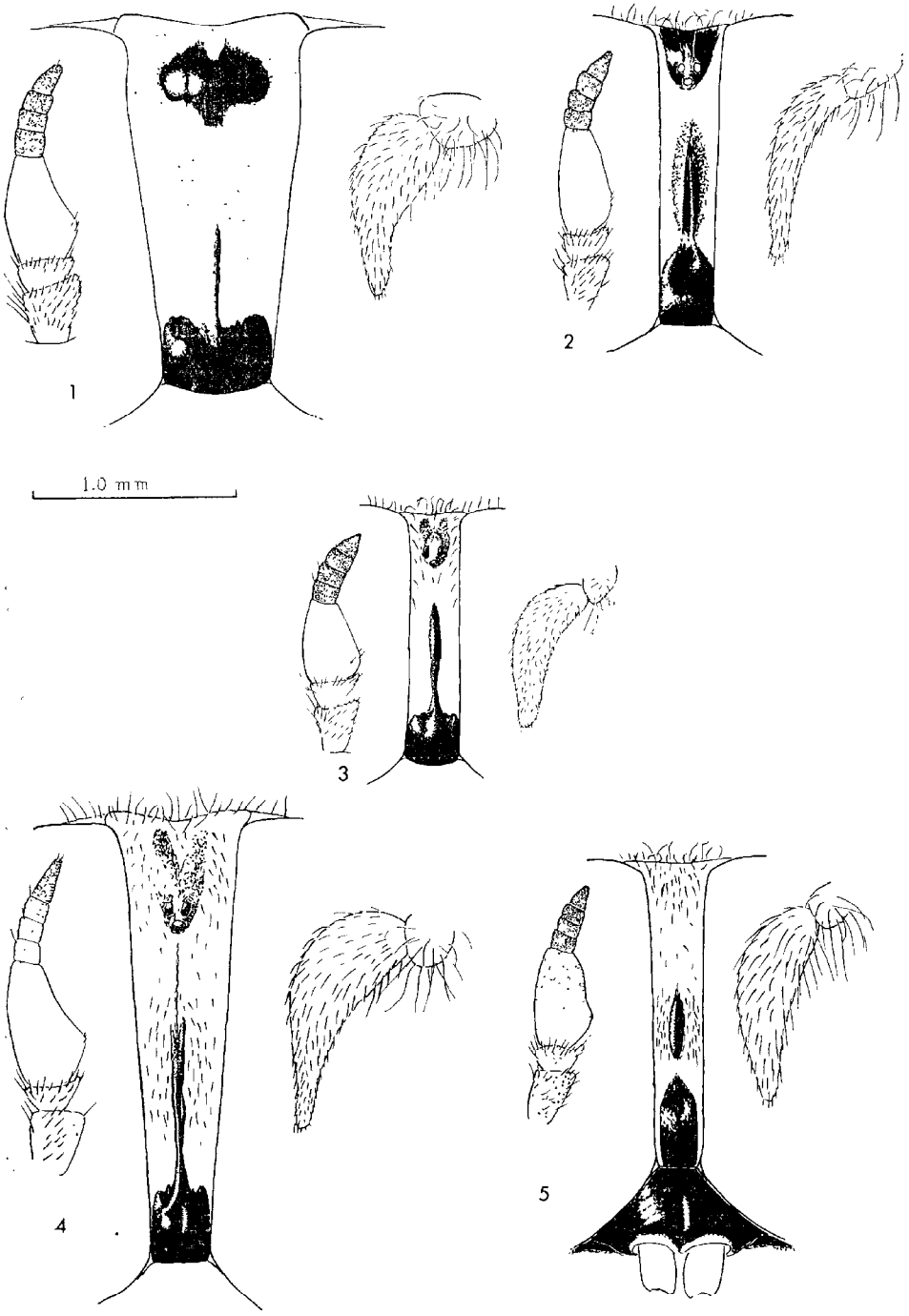

Fig. 1-5. Frons, antenna, and palpus of female tabanids. 1) *Stenotabanus (Aeg.) barahona* n. sp. Holotype. 2) *Stenotabanus alticolus* n. sp. Holotype. 3) *Stenotabanus wolcotti* n. sp. Holotype. 4) *Stenotabanus marcanoi* n. sp. Holotype. 5) *Tabanus gymnorhynchus* n. sp. Holotype. All are drawn to the same scale.

FEMALE. Length 11.5mm, of wing 8.5mm. Eyes bare, green in life, with upper and lower borders and 2 narrow transverse stripes purple. The eye could be described as purple with 3 very broad transverse green bands. Head structures as figured. Frons slightly yellowish white pollinose, the basal and ocellar calli shining dark brown. No vestiges of ocelli present and the short curved occipital hairs not visible in front view. Subcallus and upper inner corner of genae colored as frons, remainder of genae and frontoclypeus pure white, densely short white-haired. Scape and pedicel of antennae yellow, beset with short black hairs. Basal plate orange yellow, the style contrastingly black. Palpi white, white pollinose, beset with mixed black and white hairs, the former much the more visible. Proboscis brownish black, short, but little longer than palpi, the labella wholly membranous.

Mesonotum and scutellum ashy gray in ground color, faintly yellowish gray striped, whitish pollinose and white-haired. Pleura steel gray, white pollinose and white haired. Coxae yellowish, white pollinose and white haired. Fore and hind femora yellowish except apical 1/4 dusky in ground color, pale pollinose and white haired except for black hairs apically and on inner aspect of fore femora. Mid femora entirely pale and pale-haired. All tibiae yellow, with black hairs predominating apically, pale hairs basally. The hind tibiae are largely black-haired outwardly and fore tibiae obscurely bicolored due to apical integumental infuscation accentuated by apical black hairs. Basitarsi yellowish, remaining segments brown, all largely black haired. Wings glass clear, including costal cell. Small dark clouds at fork of 3rd vein, end of discal cell and ends of basal cells. Fork of 3rd vein with an appendix. Stigma pale yellow, veins brown. Halteres pale yellow, the stem basally dusky. Basicosta white, pointed, without macrotrichiae.

Abdomen dorsally yellowish brown in ground color, whitish pollinose in a pattern which leaves subshiny brown areas in narrow bands across anterior borders of tergites 2 to 5, and pairs of sublateral dorsal comma-shaped marks roughly defining gray median triangles on tergites 2 to 6. Tergite 1 has a slender semicircular dark mark on each side of the mid line. Vestiture of hairs essentially follows the color of the pollinosity except that black hairs cover most of the anterior and dorsolateral areas of each tergite, pale hairs the median triangles and posterior and lateral borders. Beneath the abdomen is faintly pinkish gray, entirely white pollinose and sparsely white haired.

HOLOTYPE ♀: Dominican Republic, Prov. Barahona, Barahona Agric. Exp. Sta., 29-30-IV-1978, flight trap. To be deposited in Florida State collection of Arthropods (F.S.C.A.)

PARATYPE ♀: Barahona Prov., D.R. 1-VI-1967, L. H. Rolston coll. In coll. L. L. Pechuman. The paratype differs slightly from the holotype in having a long appendix at fork of 3rd vein, in the right wing this joins with the preceding vein, R_1. The abdomen is also darker, the brown marking more extensive, giving the appearance of brown abdomen with a uniform white middorsal stripe and narrow white transverse hind marginal bands. The square dorsolateral spaces thus outlined have their centers largely occupied by paler patches, much as in *S. stigma*, though the pattern is less well defined. The specimen bears determination labels of Pechuman, Philip, and myself as both *jamaicensis* and *stigma*.

The most similar species appears to be *S.* (*Aeg.*) *farri* Philip described

from a single ♀ from S. Caicos Id., Bahamas. The present species will easily key to *farri* in Philip's (1958) key to the sub-genus *Aegialomyia*, but differs in broader and less convergent frons, index 3.2, index of convergence 1.6 instead of 3.5 and 2.0 as in *farri*. Although Philip's text gives 3.5 as the frontal index, measurements of his figure give 4.0. The index of convergence is the width of frons at vertex divided by the width of frons at base. Although S. Caicos Island is only about 175km N of the north coast of Hispaniola, Barahona is on the south coast, an additional 190km further south. *S.* (*Aeg.*) *alayoi* Cruz and Garcia described from a single female from an inland locality in eastern Cuba appears related here also, but seems to differ in abdominal coloring (perhaps greasy?) and in having a broader, (index 3.) and less convergent frons (index of convergence 1.3). Adequate comparative series of these 3 island forms may well show that they are no more than geographic races. The only other species of the genus so far known from Hispaniola, *jamaicensis*, has a slightly less convergent frons, lacks the prominent bare ocellar callus, has an entirely gray unpatterned abdomen and is found only on white sand beaches. The holotype of *barahona* was taken in an unbaited flight trap set up in the yard of the Barahona Agric. Exp. Sta., which is surrounded by xeric woodland and is several kilometers from the coast.

Stenotabanus (*?Aegialomyia*) *picticornis* (Bigot)

Atylotus picticornis Bigot 1892, Mem. Soc. Zool. France, 5: 662.

Tabanus (*?Stenotabanus*) *picticornis:* Bequaert 1940, Rev. Ent. 11(1-2): 344.

?Stenotabanus (*Aegialomyia*) *picticornis:* Fairchild 1971, Cat. Dipt. S. Amer. 28: 49.

This species was based on a male from Haiti and has remained unrecognized since. Bequaert (l.c) saw the type in B.M. and thought it possibly the male of *parvulus* Will. or *batesi* Beq. I unaccountably failed to study the specimen on 2 visits to the British Museum, but if the type agrees with the description, there are several statements in the description which make both of these attributions seem unlikely. The length given for *picticornis*, 11.5mm, is seemingly too large for *parvulus*, since the original description of the latter gives 7mm for the female and my 2 complete specimens are 6.5 and 8mm. *Stenotabanus batesi* approaches *picticornis* in size, but is a brown species with largely blackish antennae, striped mesonotum, banded abdomen and essentially unspotted wings. The description of *picticornis*, however, indicates a pale grayish species with bicolored yellow and black antennae, spotted wings, unicolorous mesonotum and abdomen pale brown with a very indistinct gray dorsal band. This description seems to me to fit much better *jamaicensis* than it does either *parvulus* or *batesi*. In any case recomparison of specimens with Bigot's type is obviously indicated, since *picticornis* would be the senior synonym for this beach-inhabiting species. In 1940 I saw a ♀ in Hine's collection at Columbus, OH, from Monte Cristi, D. R., 6-V-1915, labelled as Comp. with the type of *picticornis*. I noted it was close to *psammophilus* O.S., but with clear, not milky, wings. Probably it was a specimen of *jamaicensis* of the present publication.

Stenotabanus parvulus (Williston)

Tabanus parvulus Williston 1887, Trans. Kansas Acad. Sci. 10: 135, 141. ♀, Santo Domingo.

Tabanus (*Stenotabanus*) *parvulus:* Bequaert 1940, Rev. Ent. 11(1-2): 343-4, Fig. 26 (synonymy).

Stenotabanus parvulus: Fairchild 1971, Cat. Dipt. S. Amer. 28: 47.

Three females from the following localities have been seen: Independencia Prov., La Florida to Jimani, 20-IV-1973, No. 13347, Me-S, E. Marcano coll., 1 ♀; Neyba Prov., Lago Henriquillo en la Clavellina, 19-V-1973, No. 14018, Me-S, E. Marcano coll., 1 ♀; San Juan de la Maguana Prov., Jorgillo to El Cercado, 22-VII-1973, No. 14375 Bs-S, E. Marcano coll., 1 ♀. No. 14375 lacks most of abdomen, but is otherwise well preserved. The species is easily recognized among the small spotted-winged group by the broad pale middorsal abdominal stripe. Whether Puerto Rican examples are actually the same as thought by Bequaert will need additional study in view of the distinctness of other Puerto Rican members of this group.

Stenotabanus batesi (Bequaert)

Tabanus (*Stenotabanus*) *batesi* Bequaert 1940, Rev. Ent. 11(1-2): 321-3, Fig. 14. ♀. Haiti.

Stenotabanus batesi: Chvala and Stary 1967, Acta Ent. Bohemosl. 64(5): 395. Fairchild 1971, Cat. Dipt. S. Amer. 28: 45. Cruz and Garcia 1974, Poeyana, No. 125, p. 45.

The present collection contains a single female of what I take to be this species: Pedernales Prov., Los Arroyos 17-VIII-1973, No. 15456, Bmh-S, E. Marcano coll. It differs from a paratype of *batesi* from LaVisite, LaSelle range, Haiti, in being darker with distinctly blackish femora and more distinctly spotted wings. Structure of frons is the same, and antennae are apparently the same, though the Dominican specimen lacks the terminal segments of both antennae. Bequaert (l.c.) says holotype had blackish femora, so this character appears to be variable or the paratype has faded, since its femora are pale brown, like the tibiae. The ocelli are at the apex of a discolored triangle whose margins are somewhat raised and may be bare and shiny. This is evident in both specimens before me.

Stenotabanus alticolus Fairchild, NEW SPECIES
Fig. 2, 6.

A small dark brown species with large dark spots on crossveins and fork of third vein, bicolored antennae and prominently pale banded abdomen.

FEMALE: Length 8.5mm, of wing 8mm. Eyes bare, in life (? or relaxed) purple with 2 transverse green bands. Head structures as figured. Frons gray pollinose, yellowish tinged around median callus and below. Subcallus brown pollinose as are upper genae to level of lower margin of antennal sockets, thence downward abruptly gray to white pollinose on remainder of genae and frontoclypeus, the sparse beard white. Frontal callus nearly black, the median callus narrowly joined to it above. Median callus black, broad and rugose, its margins indefinite. Tubercle at vertex with clear vestiges of 3 ocelli, set in the apex of a black shiny triangle whose base is nearly width

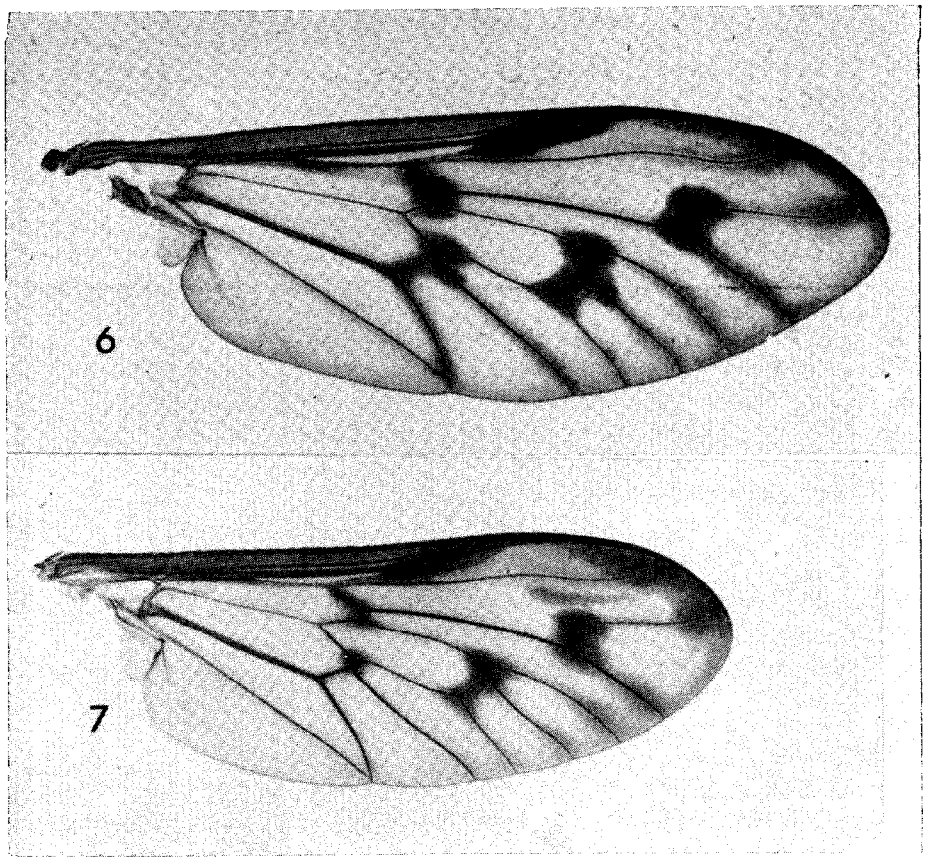

Fig. 6-7. Wings of 6) *Stenotabanus alticolus* n. sp. Paratype, Constanza, right wing (ca. 8mm long). 7) *Stenotabanus wolcotti* n. sp. Paratype, Luquillo National Forest, right wing.

of frons at apex. Postocular hairs short and sparse. Scape, pedicel and basal plate of antennal flagellum orange yellow, sparsely beset with short black hairs dorsally. Style contrastingly velvety black. Palpi pale brown, thinly gray pollinose, beset with mainly dark hairs with sparse pale hairs basally. Proboscis dark brown, the labella unsclerotized, the stylets slightly longer than palpi.

Mesonotum dark brown in ground color, dark brown pollinose with a median slender and 2 pairs of dorsolateral broader pale pollinose stripes, not very distinct. Hairs short, sparse and mainly blackish. Notopleural lobes concolorous with mesonotum, pale pollinose. Scutellum dark brown basally, orange to yellowish brown on posterior margin, with sparse long brassy hairs on posterior margin. Pleura paler and more grayish pollinose than notum, the sparse hairs long and whitish. Wings as figured, the basicosta pointed, yellowish brown, without strong setae. Legs yellowish brown, the fore and hind femora and all tarsi slightly darker, as is apical half of fore tibiae. Coxae are whitish pollinose, remainder of legs subshiny, beset with black and brassy hairs, the black hairs predominating on distal

parts of tibiae, tarsi, and dorsal aspects of femora. No hind tibial fringe. Halteres with yellow stem and brown head, the latter darkened at base.

Abdomen cinnamon brown, lighter anteriorly, becoming nearly black terminally, all tergites except the last broadly pale margined behind and more narrowly so laterally. Pollinosity is thin, its colors following the underlying colors, brown on dark parts, ivory white on pale margins. Hairs are sparse, blackish on dark parts, whitish on pale. In certain lights the pale hairs can be seen to form low and indistinct median triangles on first 3 or 4 tergites, hardly reflected in the underlying color or pollinosity. Sternites largely pale and pale pollinose and haired, but bases of segments increasingly dusky towards posterior end of abdomen, so that venter of abdomen appears dark banded.

HOLOTYPE ♀: "Constanza, Aug. '38, Dom. Rep., 3-4000 ft. Darlington." It also bears a label in Bequaert's hand giving the information on the eye color. PARATYPES: 3 ♀ same data as holotype, 1 ♀ "Valle Nuevo, S.E. Constanza, Aug. '38, Dom Rep. c. 7000 ft., Darlington."

Two of the Constanza paratypes are slightly smaller and paler than holotype, while the specimen from Valle Nuevo is slightly larger and darker. Holotype and 1 paratype are in Museum of Comparative Zoology (M.C.Z.); 3 paratypes are in my collection.

This little species will key out to *S. staryi* Fchld. in Cruz and Garcia's (1974) key to the Cuban species. It differs from paratypes of that species in larger size, broader frons and much more heavily spotted wings. *S. alticolus* closely resembles smaller specimens of *S. brunettii* Beq. in wing pattern and body coloration, but differs in having shorter bicolored antennae, broader frons and widened median callus.

Although not from Hispaniola, I take this opportunity to describe the Puerto Rican member of this group of species. It is remarkable that what Bequaert (1940) considered a single species has now been split into 8 taxa, *alticolus* in Hispaniola, the following species in Puerto Rico and 6 species in Cuba, keyed and described by Cruz and Garcia (1974).

Stenotabanus wolcotti Fairchild, NEW SPECIES
Fig. 3, 7.

A small yellowish brown species with extensively apically spotted wings, bicolored antennae and narrow abdominal bands.

FEMALE: Length 6.5mm, of wing 6.5mm. Eyes bare, pattern unknown. Head structures as figured. Frons yellowish gray pollinose, the tubercle at vertex pollinose, the vestiges of ocelli obscure, with 2 small bare streaks above the tubercle. Basal callus dark reddish brown, narrowly connected to the slender concolorous median callus. Subcallus and adjoining upper corner of genae orange pollinose, becoming abruptly pale gray pollinose on genae and frontoclypeus, with sparse white beard. Antennae with scape, pedicel and basal plate yellowish orange, thinly pollinose, the first 2 beset with short black hairs. Tip of basal plate somewhat infuscated. Style velvety black. Palpi pale tan in ground color, white pollinose, entirely black haired. Proboscis dark brown, wholly membranous, the stylets slightly longer than palpi.

Mesonotum pale brown in ground color, thinly grayish brown pollinose, not obviously striped, beset with short blackish hairs and longer semi-

recumbent silvery hairs, the latter more abundant on posterior third of notum. Notopleural lobes concolorous, with denser longer dark hairs. Scutellum paler, nearly yellow, the hairs mostly lost. Pleura, sternum and coxae pale tan, thinly whitish pollinose and pale yellowish haired. Wings as figured, the basicosta bare, the dark clouds about end of discal cell and fork of 3rd vein larger and more prominent than basal clouds. Wing apex extensively infuscated, but all dark markings brownish, dilute. Halteres yellowish, the knob slightly brownish. Mid legs, bases of fore and hind tibiae clear yellow, remaining leg segments dull pale brown, hairs mostly yellowish, with some black hairs on darkest parts of tibiae and tarsi.

Dorsum of abdomen yellowish brown in ground color, the posterior margins of all tergites very narrowly whitish. Pollinosity thin, concolorous. Hairs moderately dense, black, except for sparse pale hairs on posterior margins and on midline, the latter forming a very indefinite mid stripe or series of more or less contiguous triangles. Sides of tergites paler, pale pollinose and sparsely brassy haired. Venter like dorsum, except the segmental pale bands broader and whole venter pale haired.

HOLOTYPE ♀ : Puerto Rico, Maricao State Forest, 3-VII-1953, at light, J. A. Ramos coll.

MALE: Length, 8.5mm, of wing 8mm. Eyes holoptic, bare, with a small tubercle in notch at vertex and a row of long, forward curving post-ocular hairs. Upper facets greatly enlarged and well demarcated from the small facets, occupying about 1/2 total eye area and with a band of small facets extending to vertex. Antennae missing. Palpi banana-shaped, thick, curved, yellowish pollinose and with long mostly black hairs. Coloration as in female, but paler, more yellowish, with more yellow hairs on both thorax and abdomen.

ALLOTYPE ♂ : Puerto Rico, El Yunque Sta., Luquillo Forest, 10-16-VII-1969, H. and A. Howden colls.

PARATYPES: 1 ♂, 4 ♀ same data as allotype; 1 ♂ 1 ♀ 5 mi. N.E. Jayuya, 17-19-VII-1969, H. and A. Howden colls.; 1 ♀ P. R., Las Marias, at light, no date or collector.

Holotype in M.C.Z., allotype and 2 paratypes in Canadian National Collection, remaining paratypes in collections of C. B. Philip and the author.

The holotype lacks the tip of 1 antenna, but was selected because the abdomen was less rubbed. Its thorax is somewhat broken also. The holotype bears a det. label of Stone's as *Stenotabanus brunettii* Beq. The specimen recorded as *brunettii* by Bequaert (1940) from Puerto Rico is not before me but it and others in collections from Puerto Rico are probably *wolcotti*. The species is named for G. N. Wolcott, a prominent early worker on the insects of Puerto Rico.

Stenotabanus marcanoi Fairchild, NEW SPECIES
Fig. 4

A small grayish brown species with glass-clear wings, narrow convergent frons, slender antennae and pale brown femora.

FEMALE: Length 11mm, of wing 10mm. Head structures as figured. Eyes purple with 2 horizontal green bands about as wide as the interval between them. Frons yellowish gray pollinose, the callus and upper median prolongation bare, brown. Ocellar tubercle brown, thinly gray pollinose, the

ocelli dark. A roughly V-shaped bare area extends above ocelli to vertex. Subcallus pinkish gray pollinose, without hairs. Frontoclypeus and genae whitish pollinose, markedly paler than subcallus, with sparse white hairs. Antennae orange brown, beset with black hairs on first 2 segments and dorsal angle of basal plate. Palpi pale brown, white pollinose, beset with short white hairs on about basal 2/3, predominantly black haired apically. Proboscis pale brown, about 2x length of palpi, the labella wholly membranous.

Mesonotum and scutellum light brown in ground color, thinly pale gray pollinose dorsally, more densely so laterally, beset with mixed short silvery and longer black hairs, the pale hairs predominating. Pleura and coxae white pollinose and wholly white haired, only the notopleural lobes with some erect black hairs. Legs pale brown, mainly white haired, the fore tibiae obscurely bicolored, the remaining tibiae apically, and all tarsi, with black hairs. Basicosta acutely pointed, pale yellowish, without macrotrichia. Wings entirely glass clear including costal cell, the veins and stigma brown with a short appendix at fork of 3rd vein. Halteres orange brown.

Abdomen above pale brown, grey pollinose, black pilose with posterior margins white pilose, beneath paler, wholly white haired.

HOLOTYPE ♀: No. 14491, Republica Dominicana, Prov. La Estrella, Rio Cana, between Rancho de la Guardia and Hondo Valle, Bmh-S, 17-V-1973 E. Marcano coll. The specimen lacks the style of 1 antenna, right fore and left mid leg, but abdominal vestiture is the best preserved.

MALE: Length 11mm, of wing 9mm. Head much enlarged, wider than thorax, the upper facets of eye much enlarged, pale tan in color, sharply differentiated and demarcated from the dark lower facets, occupying about 2/3 of eye area, the facets along occipital margins of eye smaller. A small yellow tubercle sunk between eyes at vertex and an occipital fringe of forward curving dark hairs present. Antennae more slender than in female, but color and vestiture essentially as in female. The specimen was collected in alcohol and now lacks most abdominal vestiture, though what remains is all dark.

ALLOTYPE ♂: Dominican Republic, Prov. Pedernales, 21km N of Cabo Rojo, 19-20-VI-1976, flight trap, R. Woodruff coll.

PARATYPES: No. 1425, D. R., Prov. Tamboril, Licey Almedio, 200m Elev., Bh-S, 18-VI-1965, E. Marcano coll. 1 ♀; same data as allotype, 2 ♀. The 2 ♀ from Cabo Rojo are smaller than the holotype and lack most of their vestiture. The ♀ from Tamboril matches the holotype closely. Holotype and Allotype to be deposited in F.S.C.A. Paratypes are in my collection pro tem.

This species is very similar structurally to *S. fenestra* Will., though entirely different in color.

Stenotabanus fenestra (Williston)

Tabanus fenestra Williston 1887, Trans. Kansas Acad. Sci. 10: 136. Hine 1917, Trans. Amer. Ent. Soc. 43(765): 295. Hogue and Fairchild 1974, Rev. Biol. Trop 22(1): 12.

Stenotabanus fenestra: Bequaert 1940, Rev. Ent. 11(1-2): 336-7, Fig. 22.

Hine (1917) reported specimens from Costa Rica, and Sanchez, Dominican Republic. Bequaert (1940) studied Williston's type and 1 of Hine's Costa Rican specimens, but doubted the Costa Rican provenance of Hine's

specimen as did Hogue and I (l. c.). I borrowed both Costa Rican and Dominican specimens through the courtesy of Dr. C. A. Triplehorn and agree with Bequaert that they are the same. They also agreed with the single ♀ specimen in the present collection from Santiago Prov., Las Cumbres, 3000 ft elev. 15-17-VI-1976, flight trap, R. E. Woodruff coll. This specimen has 2 narrow green bands on the eye (in alcohol) and the antennae are largely blackish, not yellow as stated by Hine. Williston says the antennae are brownish red. Bequaert's (1940) figure of the holotype is adequate, although my fresher specimen does not show the denuded spots on the subcallus that he figures, nor do the wings of my specimen have the lighter "fenestrae" which Bequaert indicates and which no doubt suggested the name. Hine's (1917) Dominican specimen is labelled Sanchez, Dominican Rep. 17-21-V-1915. Nothing similar to this species is known from Central America, and I am convinced that Hine's Costa Rican specimens were mislabelled. The basicosta of my specimen is black, acutely pointed and lacks macrotrichiae.

Stenotabanus hispaniolae (Bequaert)

Tabanus (*Stenotabanus*) *hispaniolae* Bequaert 1940, Rev. Ent. 11(1-2): 341-3, Fig. 25.

Stenotabanus hispaniolae: Fairchild 1971. Cat. Dipt. S. Amer., 28: 46.

This species appears to be known only from the type specimen from 2-3000 ft. on Mt. Quita Espuela, Dominican Republic. It somewhat resembles *S. fenestra*, with blackish body and wings, but is smaller, with unicolorous dark legs, abdomen with narrow pale sutural bands, and frons parallel sided.

Tabanus gymnorhynchus Fairchild, NEW SPECIES
Fig. 5.

A small dark brown species with narrow frons, bare subcallus, black scutellar spot and 3 rows of conspicuous pale spots on abdomen.

FEMALE: Length 9.5mm, of wing 8mm. Eyes bare, pattern (revived) consisting of a broad purplish black median transverse band on a bronzy green background. Head structures as figured. Frons yellowish gray pollinose, the vertex with a blackish pollinose spot and black hairs, but post-ocular hairs short and pale. Basal and median calli reddish brown, the former quite flat and somewhat wrinkled or rugose. Subcallus noticeably inflated, largely bare and shiny, reddish brown. Pollinosity at apex of subcallus and bases of antennae yellowish gray. Genae with upper corners between eyes and subcallus dark, shiny to subshiny, becoming whitish gray with a sparse white beard below. Frontoclypeus slightly tinged yellowish. Antennae with scape and pedicel dark orange brown, beset with black hairs, thinly pollinose. Third segment with basal plate orange brown at base, becoming dark brown apically, the style concolorous. Palpi brownish, thinly brown pollinose, sparsely beset with black hairs dorsally and pale hairs ventrally. Proboscis brown, longer than palpi but less than head height, the labella membranous.

Mesonotum dark brown, subshiny, with 3 longitudinal stripes and the lateral margins gray pollinose, sparsely beset with short erect dark hairs and recumbent golden scale-like hairs. Base of scutellum and adjoining prescutum with short dense black hairs and dark pollinosity, margined an-

teriorly and laterally with longer yellowish hairs. Posterior margin of scutellum broadly gray pollinose, pale haired. Wings hyaline, the costal cell distinctly yellow, the stigma brown, venation normal, no appendix on 3rd vein. Basicosta pointed, beset with short black setae about as dense as an adjoining costa. Coxae and femora brown, grayish pollinose, the latter largely dark-haired dorsally, pale-haired ventrally. Tibiae of fore legs contrastingly bicolored, white on basal third, black on apical 2/3. Tibiae of mid and hind legs obscurely bicolored, the basal 1/4 to 1/3 paler and pale haired, the remainder and all tarsi brown, black haired.

Abdomen dark brown in ground color, with a median row of nearly equilateral pale pollinose nearly connected triangles on tergites 1 to 6, and dorsolateral pairs of more or less rounded pale pollinose spots on tergites 2 to 5. The hind margins of all tergites are narrowly pale pollinose, expanded at sides to form pale lateral margins. The pale pollinose pattern is beset with pale hairs, while the dark portions are brown pollinose and black-haired. Beneath the sternites are dark pollinose on basal 1/2 to 2/3, pale pollinose distally so that the abdomen beneath under low magnification appears prominently banded. Venter wholly beset with long pale hairs.

Holotype ♀ No. 13909 and 3 ♀ paratypes, Nos. 13909 (1) and 13937 (2), Dominican Republic, Prov. Estrelleta, Higuerito-Banico, Bs-S, 17-V-1973, E. Marcano coll.; 1 ♀ paratype, Dominican Republic, Jimani, Me-S, 3-III-1972, No. 11335, E. Marcano coll. Holotype will be deposited in F.S.C.A.; paratypes are in my collection pro tem.

The specimen selected as holotype has the last 3 segments of abdomen crushed and is somewhat denuded of pollinosity, but is the only specimen retaining antennae. The paratypes vary from 9.5 to 11mm in body length, and from 8 to 9mm in wing length. The median abdominal row of gray triangles may be connected or unconnected and the dorsolateral pale spots not or barely touching anterior or posterior borders of their respective segments.

Although obviously related to such species as *T. gracilicornis* Hine and *T. clenchi* Beq., it is smaller than any described species of this group and is unique in having a bare and shiny subcallus.

Tabanus clenchi Bequaert

Tabanus clenchi Bequaert 1940, Rev. Ent. 11(1-2): 314-6, Fig. 11 (*Lophotabanus*).

The species was described from the ♀ holotype from Barahona and 2 ♀ paratypes from L. Henriquillo and "Haiti." The present material consists of 2 ♂ 19 ♀ as follows: Azua Prov., Playa Monte Rio, Me-S, 10-X-1970, No. 7944, 1 ♀; same locality, 11-VI-1977, Nos. 21441, 21435, 21444 and 21447, 4 ♀; Azua Prov., Estebania, Me-S, 17-VI-1972, 12447, 1 ♀; No. 14697, 1 ♀; No. 57, 1 ♀; Valverde Prov., Esperanza, Bs-S, 25-VI-1965, No. 1515, 2 ♀; San Juan de la Maguana Prov., El Guanito, Bs-S, 18-VI-1972, No. 12573, 2 ♀; La Estrelleta Prov., Higuerito to Banica, Bs-S, 17-V-1973, 1 ♀; Independencia Prov., Jimani to Florida, Me-S, 19-V-1973, No. 14724, 1 ♀; San Juan de la Maguana Prov., secc. Punta Cana, Bs-S, 18-V-1973, No. 15051, 1 ♀ all E. Marcano coll. Baoruco Prov., Los Rios, 30-IV-1978, salt flats on shore of Lago Henriquillo, attacking man, G. B. Fairchild coll. 1 ♀; Santo Domingo, vic. Boca Chica, electrocuted in U.V. light trap in restau-

rant, 23-IV-1978, G. B. Fairchild coll., 1 ♀. Haiti, 10 mi N of Port-au-Prince, 16, 18-V-1973, B. K. Dozier coll., 2 ♂ 1 ♀.

The specimens before me are somewhat variable in color, the frontal calli varying from brown to black, and the antennae with basal plate orange brown to nearly black. Femora, especially the fore pair, may be quite black to pale brownish. The denuded lines on each side of median dark stripe above basal callus shown in Bequaert's (1940) figure are present in denuded specimens, but not evident in most fresh specimens. The abdominal pattern seems easily rubbed, and most specimens show only a blurred indication of the 3 rows of pale spots. The species seems widespread throughout the island at lower elevations.

The male of this species does not seem to have been described. It agrees closely with the female in color and non-sexual features, but has a markedly pointed abdomen. The head is moderately broadened, the upper eye facets bare, brown, enlarged and clearly demarcated and differentiated from the lower small facets. The area of large facets occupies about 1/2 the eye area, while the small facets extend in a narrowing band behind practically to the vertex. There is a small pollinose tubercle between the eyes at vertex. Palpi are sausage shaped with a small acute terminal point, white pollinose and beset with long white hairs. Antennae are a little paler at base of flagellum and slightly more slender than in female. Description based on a specimen from 10 mi N of Port au Prince, Haiti, 18-V-1973, B. K. Dozier coll.

Tabanus monops Bequaert

Tabanus (*Lophotabanus*) *monops* Bequaert 1940, Rev. Ent. 11(1-2): 307-8.

Six specimens of what seem to be this species are in the present collection from the following localities: Constanza Prov., El Montazo, 2000m elev., 30-VII-1967, No. 4281, Bmh-Mb, E. Marcano coll., 1 ♀; same locality, 8-VII-1973, No. 14023, E. Marcano coll., 1 ♀; Peravia Prov., El Bejucal to Ocoa, 11-IV-1976, No. 19725, Bmh-S, E. Marcano coll. 1 ♀; Peravia Prov., La Horma to Ocoa, 15-V-1976, Nos. 19995, 19996, Bmh-S, E. Marcano coll., 2 ♀. No. 19996 was compared and agreed with holotype at M.C.Z., except that this specimen was smaller; La Vega Prov., Constanza, El Convento, V-1973, No. 14802 Bmh-Mb., E. Marcano coll. 1 ♂. This ♂ is easily associated with the ♀ on color characters, especially the nearly wholly infuscated femora. The eyes are bare and the upper eye facets neither enlarged nor demarcated from the small facets. All of the above specimens except the ♂ are considerably denuded. These specimens measure from 13 to 14mm in length, the ♂ a trifle over 14mm. In addition I have seen another ♂ from La Vega Prov., D. R. 4-VIII-67, L. H. Rolston coll., lent to me for study by L. L. Pechuman. It is slightly larger than the Constanza ♂, but otherwise identical.

Tabanus (*Lophotabanus*) *darlingtoni* Bequaert

Tabanus (*Lophotabanus*) *darlingtoni* Bequaert 1940, Rev. Ent. 11(1-2): 302-4, Fig. 5. Fairchild 1971, Cat. Dipt. S. Amer. 28: 91.

Of 4 specimens which I compared with the types in M.C.Z. none were in close agreement with the holotype, while 1 agreed quite well with a para-

type from Valle Nuevo, Constanza. It seemed to me that the paratype from Loma Rucilla was more probably *T. flocculus* Beq. The holotype is larger than any of my specimens and has black antennae and an arowhead shaped dark marking at vertex, lacking in the paratypes. The basal angle on 3rd antennal segment of holotype is also considerably more prominent than on the paratypes and on my 2 specimens which retain antennae. My specimens are labelled as follows: Constanza Prov., La Nevera, 8-VII-1973, No. 14024, Bmh-Mb, E. Marcano coll. 1 ♀ agreeing with paratype of *T. darlingtoni;* Santiago Prov., Piquito de Yaque, 2900 m elev., 11-VIII-1964, No. 740, E. Marcano coll., 1 ♀; Constanza, La Cienaga de las Culatas, 23-VII-1967, No. 4587, Bmh-mb, E. Marcano coll., 1 ♀, lacks abdomen and antennae; Elias Pina Prov., Pyramides 204, 31-V-1975, No. 18423, Bmh-S, E. Marcano coll., 1 ♀, lacks antennae. This last specimen is somewhat different from the other 3, having a very shiny dark brown abdomen with small tufts of dark golden orange hairs on mid posterior margins of tergites, and golden haired palpi, rather than white hairs. The wings have the veins heavily margined in brown. It would key out to *darlingtoni* but did not agree with any of the types. An additional specimen lent by L. L. Pechuman agrees closely with No. 18423. Pechuman compared it with the type of *darlingtoni,* noting some minor differences (personal communication). It is labelled Baoruco Prov., D. R. VIII-1967, and variously as *darlingtoni* or *haitiensis* Kröb.

Tabanus flocculus Bequaert

Tabanus (*Lophotabanus*) *flocculus* Bequaert 1940, Rev. Ent. 11(1-2): 304-6, Fig. 6.

The 16 specimens in the collection which run to this species in Bequaert's key (l.c. p. 294) are quite variable. They range from 14 to 18mm in length, and the color and size of the abdominal triangles and shape of antennae are slightly different in nearly every specimen. One specimen, No. 16739, is indistinguishable from *monops* except for having red femora and red basal plates of antennae, in this agreeing with the Cuban *T. bifloccus* Hine. A single ♀ from Haiti, Furcy is again different, having the abdomen with orange-haired hind marginal bands slightly widened into low median triangles. The antennae are black, seemingly stouter than in *flocculus,* the legs all reddish and the wing veins heavily brown margined. It may in reality represent *T. haitiensis* Kröber.

The specimens in the present collection are from the following localities, all collected by E. Marcano: San Cristobal Prov., confluence Rio Duey y Rio Haina, 2-VII-1967, Nos. 4203(2), 4204(2), Bmh-S, on pigs, 4 ♀; Dajabon, Restauracion, 20-IV-1973, Bmh-S, No. 13202, 1 ♀; Peravia Prov., El Canal to Ocoa, 15-V-1976, No. 20006, Bmh-S, 1 ♀; La Vega Prov., La Cienaga de Manabao, 10-VI-1972, No. 12422, Bmh-S, 1 ♀; San Juan de la Maquana, Jorgillo to El Cercado, 22-VII-1973, Bs-S, Nos. 14068, 14069, 14070, 3 ♀; Santiago Prov., Rio Anton zape-San Jose de las Matas, 4-IV-1970, No. 6886, Bmh-S, 1 ♀; Santiago Prov., Mata Grande-San Jose de las Matas, 4-IV-1970, No. 6890, Bmh-S, 1 ♀; Santiago, Rio Bao en los Montones, 16-IV-1973, No. 13178, Bmh-S, 1 ♀; Santiago, Rio con de Piedra-San Jose de las Matas, 10-IV-1974, Bmh-S, No. 16771, 1 ♀; Independencia, Puerto Escondido, 20-VII-1974, Bmh-S, No. 16739, 1 ♀.

Tabanus haitiensis Kröber

Tabanus haitiensis Kröber 1931, Konowia 10(4): 297-8. Bequaert 1940, Rev. Ent. 11(1-2): 366-7 (not recognized). Fairchild 1966, Studia Ent. 9(1-4): 372-3 (type seen).

Bequaert (l.c.) did not recognize this species and while I did not, unfortunately, make any drawings of the type when I studied it in 1964, I felt that it was distinct from the 2 most similar species treated by Bequaert, *T. darlingtoni* Beq. and *T. flocculus* Beq. It is a very large species, 20.5mm according to Kröber's description. I cannot surely match any specimens with Kröber's description or my notes on the type. The type in Vienna was from Port-au-Prince, Haiti. It is old, greasy, denuded and pest eviscerated. Bequaert (l.c) thought it nearest *T. flocculus*, but noted it seemed to lack a black scutellar spot or abdominal triangles. The condition of the specimen is so bad that both of these characters are not now evident, but could have been present. Only careful recomparison of the type with a series of specimens can resolve its identity.

The 4 Hispaniolan species *darlingtoni, flocculus, haitiensis* and *monops* are exceedingly similar in structure, seemingly differing chiefly in details of coloring. The same seems to be true of their Cuban and Jamaican counterparts. Only long series of well preserved specimens from a variety of localities, possibly supplemented with genitalic studies, will enable the relations of this difficult group to be understood. The prospects of securing such material is growing vanishingly less likely as the destruction of natural habitats and the massive misuse of chlorinated hydrocarbon insecticides accelerates.

Tabanus claripennis Bigot

Tabanus claripennis Bigot 1892, Mem. Soc. Zool. France, 5: 675. Fairchild 1971, Cat. Dipt. S. Amer. 28: 90.

Tabanus hookeri Knab 1915, Ins. Ins. Mens. p. 48. Bequaert 1940, Rev. Ent. 11(1-2): 361-5, Fig. 32.

There seems no need to repeat the extensive synonymy given in the Catalogue. Bequaert (l.c) has given a complete summary of the distribution in the Antilles and elsewhere, and an excellent figure. He records specimens from Mariani and Port-au-Prince, Haiti, as well as from Cuba, Jamaica, Puerto Rico and some lesser islands.

Material in the present collection consists of 2 ♂ and 6 ♀, as follows: Prov. Puerto Plata, Laguna Grande, La Isabella, Bh-S, 15-IX-1974, No. 17072, E. Marcano coll. 2 ♀; Prov. Santiago, Quiniqua, Bs-S, 26-I-1966, No. 3030, E. Marcano coll. 1 ♀; Prov. Valverde, Esperanza, Bs-S, 25-VI-65, No. 1515, E. Marcano coll. 1 ♀; Bonao, in restaurant, 6-VIII-66, G. B. Fairchild coll. 1 ♀; Prov. Barahona, 38km N. of Barahona, 30-IV-1978, in car in salt desert, G. B. Fairchild coll. 1 ♀; Prov. Barahona, Barahona Agric. Exp. Sta., flight trap, 29-30-IV-1978, G. B. Fairchild coll. 2 ♀.

The species ranges over the whole of South America, including Chile, but is apparently absent from Central America. The absence of forms of *T. lineola* and *T. dorsiger*, present in 1 or another of the other Greater Antilles is curious, but may merely be due to inadequate collecting.

Tabanus commixtus Walker

Tabanus commixtus Walker 1860, Trans. Ent. Soc. London (N.S.) 5: 273. Fairchild 1956, Smiths. Mis. Colls., 131(3): 13. Stone 1970, Proc. Ent. Soc. Wash. 72(2): 189-90.

Tabanus maya Bequaert 1931, J. N. Y. Ent. Soc. 39(4): 546, Fig. 2. Fairchild 1942, Ann. Ent. Soc. Amer. 35(2): 176, Pl. 2, Fig. 19.

In 1971 I catalogued this species as a synonym of *T. truquii* Bellardi 1859, following Philip (1965). Subsequently C. B. Philip wrote me (in litt. 1973) that further study had convinced him that Bellardi's ♂ type of *truquii* was in reality *T. colombensis* Macq. as it has pilose eyes, as stated by Bellardi. The eyes of ♂ *commixtus* are bare, as noted by me in 1942 (l.c.).

The present collection consists of 1 ♂ 10 ♀ from the following localities: Prov. San Cristobal, Loyola Univ. campus, Bh-S, 17-III-1970, E. Marcano coll. 1 ♀; Prov. Altagracia, Nisibon, 8-10-V-1976, U.V. light trap, R. E. Woodruff coll. 2 ♀; same locality, 5-7-V-1978, flight trap, G. B. Fairchild coll. 1 ♂ 3 ♀; Prov. Barahona, Barahona Agric. Exp. Sta., 29-30-IV-1978, flight trap, G. B. Fairchild coll. 3 ♀; Prov. Independencia, vic. Mella, in car in salt desert, 30-IV-1978, G. B. Fairchild coll. 1 ♀.

These records appear to be only the second report of this species from the Antilles. Neither Bequaert (1940) nor Cruz and Garcia Avila (1974) mention its occurrence, and Stone's (1970) report of a specimen from Dominica seems to be the first. In addition, I have seen a single ♀ taken in a U.V. light trap at Ste. Anne, Martinique, 21-VI-1971, Baranowski coll. The species is otherwise known around the Caribbean from Vera Cruz, Mexico, to Venezuela and Trinidad. I cannot now trace the source of the Argentina record in the Catalogue (Fairchild 1971), but suspect it may refer to specimens of the similar *T. triangulum* Wied.

Tabanus vittiger guatemalanus Hine

Tabanus guatemalanus Hine 1906, Ohio Nat. 7(2): 24. Guatemala. Philip 1978, Pan.-Pac. Ent. 54(2): 123.

Tabanus subsimilis guatemalanus: Philip 1965, Ann. Ent. Soc. Amer. 58(6): 877; Fairchild 1971, Cat. Dipt. S. Amer. 28: 102.

Tabanus vittiger caymanicus Fairchild 1942, Ann. Ent. Soc. Amer., 35(2): 180. Cayman Islands.

Tabanus vittiger bellardii: Pechuman 1957, Ent. News 68(5): 118. Florida.

Tabanus bellardii Szilady 1926, Biol. Hungarica 1(7): 23, pl. 4, Fig. 15. Cuba.

Tabanus lineola guatemalanus: Cruz and Garcia Avila 1974, Poeyana No. 125, p. 73-5, Fig. 3 L-N. Cuba.

Tabanus vittiger guatemalanus: Fairchild 1978, Fla. Ent. 61(3): 137. Florida.

Tabanus truquii: Bequaert 1940, Rev. Ent. 11(1-2): 252-7, Fig. 30. Not *truquii* Bellardi, misident. Puerto Rico and Cayman Ids.

Though not taken by Prof. Marcano or us, nor reported previously from Hispaniola, Dr. L. L. Pechuman (in litt) identified a specimen taken in Barahona Prov., 13-VI-1967, by L. H. Rolston as this species. The specimen is deposited in the Department of Entomology, Texas A & M University. In

view of the wide distribution of this species in the Caribbean area, its occurrence in Hispaniola is not surprising, and only emphasizes how little collecting has been done there.

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DEVELOPMENT AND FECUNDITY OF THE WHITE PEACH SCALE[1] AT TWO CONSTANT TEMPERATURES[2]

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ABSTRACT

White peach scale, *Pseudaulacaspis pentagona* (Targioni-Tozzetti), required a minimum of 110.8 days to complete a generation at 13.3±2°C and 40.4 days at 26.4±0.3°C. Adult maturation and oviposition encompassed the longest intervals. Females began laying eggs 50 days after molting to the

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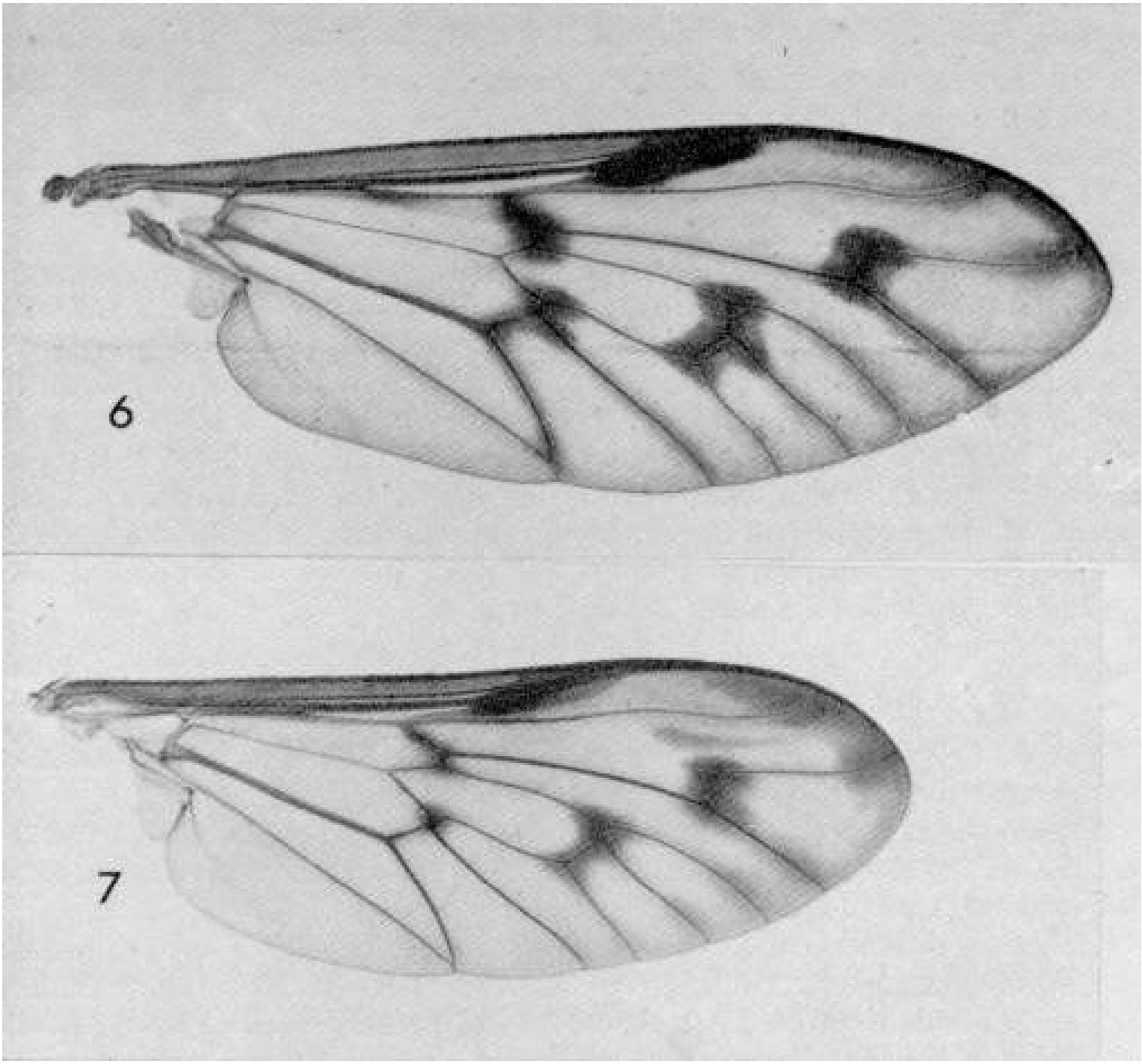
[2]Florida Agricultural Experiment Stations Journal Series No. 1810. Accepted for publication 14 November 1979.



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