NEW AND LITTLE KNOWN FLORIDA TABANIDAE[1,2]

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ABSTRACT

Chrysops ifasi n. sp. is described and figured, and males of *Chrysops dorsopunctus* Fairchild, *C. dixianus* Pechuman, *C. abatus* Philip, *C. bistellatus* Daecke, and *C. fulvistigma* Hine are described for the first time. Notes on status and new distribution for these and an additional 12 species of *Chrysops* are given. *C. upsilon* Philip is a new state record. *Anacimas geropogon* Philip is shown to be a synonym of *A. limbellatus* Enderlein and the species is figured. *Whitneyomyia beatifica* var. *atricorpus* Philip is confirmed as a color form. *Stenotabanus daedalus* Stone is redescribed and figured from fresh material; the species is placed in *Tabanus*. *Tabanus cayensis* Fairchild is shown to be close to *T. campecheanu* Townsend from Mexico and both are figured. New distribution records for 1 species of *Hybomitra* and 3 of *Tabanus* are given.

The notes presented here pertain mostly to specimens and information accumulated since 1970, partly by the use of a flight trap designed by Dr. H. V. Weems, Jr., and used by him mostly at Torreya State Park, Liberty County, and by me at Austin Cary Memorial Forest, northeast of Gainesville, Alachua Co. Other material was taken by hand netting or supplied by numerous colleagues, who have sent specimens to the Florida State Collection of Arthropods for identification.

I have had the benefit of consultation with Drs. L. L. Pechuman and R. H. Roberts, most of whose suggestions have been incorporated in the text. The former also supplied many additional records. I also acknowledge with gratitude the help of Jayson Glick, who serviced the flight traps at Austin Cary Forest during my too frequent absences from Gainesville. Finally, Dr. C. B. Philip has loaned critical material with his usual generosity.

Chrysops abatus Philip 1941, Proc. Ent. Soc. Washington 43:120, female. Since our notes on this species (Philip et al. 1973) considerable additional material has turned up, including a single male. This specimen differs conspicuously from 2 males of *dorsovittatus* Hine in lacking thoracic stripes, in having a broader and less clear cut mid abdominal black stripe and with duller and brown-tinted lateral pale areas. The fore coxae are black (yellow in *dorsovittatus*) as in the females. The apex of the hyaline triangle is broader and blunter in *abatus* than in *dorsovittatus*, a condition also found in females. The wing further differs in having only the apex of 2nd basal cell hyaline, but with an extensive hyaline streak in *dorsovittatus*. Otherwise the 2 species are very similar. Plesiotype male, Wakulla Co.,

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Florida, Ochlochonee River State Park, 9-IV-77, flight trap, G. B. Fairchild, coll. Females were quite abundant, taken in a flight trap and netted at this locality and near McIntyre, across the Ochlochonee River in Franklin Co. An unusually pale specimen has the dark abdominal markings reduced to small geminate spots on tergites 3-5, and to a broadly dumbbell shaped spot on tergite 2, all well separated from each other. This specimen also has the legs largely yellow, including front coxae, but has the wing pattern of *abatus*. It is from St. Johns Co., Faver-Dykes State Park, 15-IV-73, Debra Weems coll.

Chrysops bistellatus Daecke 1905, Ent. News 16:249. The male appears to be undescribed, though Jones and Anthony (1964) mentioned seeing 1 from Mississippi. As they noted (p. 16), it is easily associated with the female on wing pattern. The eyes are holoptic, greatly enlarged, so that head is wider than thorax, the enlarged upper facets clearly differentiated and demarcated from the small facets and occupying about 2/3 of eye area. The upper point of the frontal triangle is shiny, and there is a short, median spur of pollinosity on the frontoclypeus. Color of body and appendages as in the female, except that 2nd basal cell (M) is 2/3 infuscated. Plesiotype male, Austin Cary Forest, Alachua Co., Florida, 22-24-V-1975, flight trap, G. B. Fairchild, coll. The species has been recorded from Florida only once previously, from Lloyd and Monticello, in Jefferson Co. (Fairchild 1937). It was common at these 2 localities, but taken only for about a month, 18-IV-21-V. Pechuman (in litt.) also found it abundant at Lloyd 1-2-V-1965. In 1975 it was quite abundant in Austin Cary Memorial Forest near Gainesville, where 148 females and 1 male were taken in a Weems flight trap between 28-IV-28-V. Concurrent collections with a hand net within 500 yards of the trap for about an hour on 14 days between 5-30-V yielded 432 specimens. D. A. Hurd took specimens 10.5 miles N. of Holt, Santa Rosa Co., 12-VI-1974 (Pechuman in litt.). In addition, there are 6 females from Blackwater River State Park, Santa Rosa Co., and 1 female from Camp Blanding, Clay Co., 3-V-1968 in F.S.C.A. The remarkably short flight season of this species may account for the scarcity of records. In 1976, in contrast, only 8 specimens were taken in the same trap at the same location in Austin Cary Memorial Forest, from 10-19-V.

Chrysops brimleyi Hine 1904, Can. Ent. 36:55. Jones and Anthony (1964) recorded the species only from Jefferson Co., based on Fairchild (1937). Recent collecting showed the species to be common in the northern part of the state, with specimens at hand from Escambia, Santa Rosa, Okaloosa, Jackson, Liberty, Wakulla, Franklin, Calhoun, Baker, Alachua, and Duval counties. It is an early spring species, most records being in March or April, with a few in May. One of the Duval Co. specimens was taken by D. W. Anthony, 19-IV-1954, perhaps misdetermined as *fuliginosus* Wiedemann and so recorded in 1964.

Chrysops callidus Osten Sacken 1875, Mem. Boston Soc. Nat. Hist. 2:379. Although common and widely distributed in N. America, this species is uncommon in Florida. Jones and Anthony (1964) saw no material, merely listing Fairchild's previous records and speculating that McIntyre might be a misprint for McIntosh in Marion Co. Actually McIntyre is a small settlement in the Apalachicola National Forest, in Franklin Co.,

and I have seen recent specimens from there collected 3-IV-1976 by L. L. Pechuman. There are also specimens from Escambia, Santa Rosa, Gulf, Liberty, Leon, and Wakulla counties taken in April and June of various years. The specimens from St. Augustine and Volusia Co. on which my records of 1937 were based have been re-examined in M.C.Z. The Volusia female is dated 11-V-1899, the St. Augustine male undated. There is also a female labelled Drayton Isl., Florida, 10-V-1897, a locality unknown to me.

Chrysops carbonarius Walker 1848, List Dipt. Ins. British Mus. 1:203. A long series was taken by H. V. Weems, Jr., at Torreya State Park, 30-IV-5-V-1973. These are very dark, the clear areas at tips of basal cells considerably reduced, the hairs at sides of thorax dull golden rather than whitish, and the 5th posterior cell (CU1) almost entirely infuscated except for the small, round, clear spot in its base. These show the same tendency to melanism as do *C. cincticornis nigropterus* Fairchild and *C. amazon hubbelli* Philip, though less than in the former but more than in the latter. A specimen from Highlands, North Carolina, seems to be intermediate between these dark Florida specimens and those from Canada, and there seems to be no necessity to formally recognize a Florida race. Torreya State Park, Liberty Co., remains the only locality where this species has been taken in Florida. Pechuman (personal communication) took it there also in 1965 and 1969.

Chrysops cincticornis nigropterus Fairchild 1937, Fla. Ent. 19:59. Previously known only from the type locality, Lloyd, Jefferson Co., the sub-species has been taken occasionally in Torreya State Park, Liberty Co., by H. V. Weems, Jr., in April and May of various years, and Goodwin (1976) recently reported a specimen from Santa Rosa County. In 1975, 2 females were taken in a Weems flight trap in Austin Cary Memorial Forest, Gainesville, 9-10-IV and 21-22-IV. This represents a considerable southeastern extension of range. The specimens are even darker than those from Torreya, the clear spots in distal ends of basal cells are reduced to very narrow, transverse stripes. The black of the anal and axillary areas is but slightly less intense than the rest of the wing. Tidwell (1973) felt that Philip's (1947) raising of this form from variety to subspecies status needed re-examination. Recent examination of Tidwell's intermediate material from Louisiana supports his view that *nigropterus* is no more than an extreme melanistic form. It is, however, geographically correlated, and the name is useful for the intensely black specimens from the southeastern periphery of the species' range. Pechuman (in litt.) reported the form from Chatham Co., Georgia, and we took it jointly in Franklin and Wakulla Counties in April 1977.

Chrysops cursim Whitney 1879, Can. Ent. 2:36. Since published Florida records are in part based on misdeterminations, it may be well to list the specimens from Florida I have seen, as follows: 5 females Putnam Co., Long Lake, 20-25-V-1971, light trap, H. Bishop, coll.; 1 female Putnam Co., Melrose, 21-V-1971, J. Butler, coll.; 2 females Alachua Co., 3 mi. E. of Micanopy on State Road 346, 14-VI-1973, Fairchild and Wilkerson, colls.; 2 females Alachua Co., Univ. Florida Hort. Sta., 10-25-V-1973, Wilkerson, coll. (Fig. 2); 3 females Sumter Co., Panasoffkee, 27-VI-1973, Carl Scheck, coll.; 1 female Highlands Co., Archbold Biological Station, Lake Placid, 17-V-1961, H. E. and M. A. Evans, colls. (L. L. Pechuman det.); 3 females

Alachua Co., Austin Cary Memorial Forest, Gainesville, 7, 12, 20-V-1975, netted, J. Glick, coll.; 2 females same locality, 2-5, 13-14-V-1975, flight trap, Fairchild and Glick, colls.; 2 females same locality, 28-V-1976, flight trap, Fairchild and Glick, colls. These records suggest that *cursim*, though sometimes taken with *ifasi* n. sp., has an earlier main flight season and different ecological preferences. One of the specimens from Long Lake listed above was compared and found to agree with topotypes of *cursim* in M.C.Z. I also have the remains, abdomen and 1 wing, of a specimen from New Jersey collected by Daecke and determined as *cursim* by Whitney. The eye pattern from a female collected at the University of Florida Horticultural Unit, Gainesville, Fla., 10-V-73, by R. Wilkerson is illustrated (Fig. 2).

Chrysops dixianus Pechuman 1974, J. New York Ent. Soc. 82:185-7. This recently described species was abundant in collections made with a Weems flight trap in Austin Cary Forest, near Gainesville, Alachua Co., 388 females and 1 male being taken between 6-V-31-VII-1975, and 158 females taken between 10-V-13-VIII-1976. It appears to have a shorter flight season than either *C. flavidus* Wiedemann or *C. reicherti* Fairchild which were taken in the same trap from 8- and 25-IV and 8-9-IX, respectively. The single male agrees closely with the females in color and pattern of thorax, abdomen, and wings, and in leg and antennal color. The eyes are holoptic, the upper enlarged facets well differentiated from the small, occupying about 2/3 of eye area, but not sharply demarcated from the small facets, there being a gradual increase in size extending over several rows of facets. Compared to a male of *C. reicherti*, the wing pattern easily separates the 2, and in addition the separation of the 2 sizes of eye facets is more abrupt in *reicherti*. Males of *C. flavidus*, in addition to different wing pattern, have swollen antennal scapes and pedicels and a pale pollinose triangle on 2nd tergite. The plesiotype male of *dixianus* is labelled Alachua Co., Gainesville, Austin Cary Forest, flight trap 24-25-V-1975, G. B. Fairchild.

Chrysops dorsopunctus Fairchild 1937, Fla. Ent. 19:59. This species was originally proposed as a variety of *fulvistigma* Hine 1904, based on 27 females from Lloyd, Jefferson Co., taken from 21-V-23-VI-1935. I also had seen specimens from Georgia in the U.S.N.M. In addition to the solid black truncated triangle on the 2nd tergite, the ocelli of *fulvistigma* are surrounded by a roughly square, black, shiny patch, while in *dorsopunctus* this area is usually largely pollinose in unabraded specimens. In *dorsopunctus* the mid and fore femora are often darkened at least at base and apex, while in *fulvistigma* they are usually clear yellow. Comparisons of measurements of height and width of frons, height and width of callus, and indices derived from these measurements do not indicate clearly significant differences, though in the small sample available, the frons and callus of *dorsopunctus* are generally slightly wider.

A male plesiotype, Bay Co., Econtina Creek, Highway 20, 8-VI-1975, K. J. Tennessen, coll., is easily associated with the female on color of abdomen, although the black median band is wider and more parallel sided than in most females, and the sides of tergite 3 are irregularly yellowish. The face is protuberant, shiny black with a shallow median groove which is yellowish gray pollinose and extends from antennal bases to base of proboscis. The eyes are greatly enlarged, head wider than abdomen, the upper

enlarged facets clearly demarcated and differentiated from the small facets and occupying about 2/3 of eye area. This area in the dried specimen is light tan, with all borders dark brown, and a dark brown band about 4 facets wide extending from just below ocellar tubercle to lower posterior corner of large facetted area. The wings are almost wholly hyaline, only faint traces of the weak crossband being visible. Two of the females of *dorsopunctus* from Alachua Co. have the median black figure on tergite 2 anteriorly dilute and irregularly tridentate, quite different from the 2-pronged figure of *fulvistigma*. Their ocelli are not surrounded by a bare patch, and I do not consider them intermediates between *dorsopunctus* and *fulvistigma*.

Tidwell (1973), with a series of over 100 specimens from several localities in southeastern Louisiana before him, found about 25% belonged to the *dorsopunctus* form, and there were specimens he considered intermediate. Both forms were taken together, and in view of the intermediates, he felt he was dealing with a single variable species. But the differences in the males, and the absence of intermediates in Tidwell's material, now at F.S.C.A., make it seem more likely that we are dealing with a species pair similar to *Chrysops niger* Macquart and *C. calvus* Pechuman and Teskey. Perhaps the larvae or pupae may throw more light on the problem. In the meantime it seems better to treat the 2 forms as separate species until their true relationship can be discovered, rather than ignore the question by retaining the nomenclaturally invalid varietal standing for *dorsopunctus*.

I have seen *dorsopunctus* from Alachua, Jefferson, Liberty, Bay, Okaloosa, and Santa Rosa counties, with dates ranging from 9-V-5-VII.

Chrysops fulvistigma Hine 1904, Can. Ent. 36:55. Originally described from North Carolina, the species was first reported from Florida, without more definite locality, by Philip (1950). Fairchild (1937) did not collect it in Florida, but reported it from Oxford, Mississippi. Brennan (1935) reported the species from Georgia and Louisiana, but had at least 1 specimen of *dorsopunctus* Fairchild in his material. The specimens reported from Louisiana (Keachie and Osborn) by Hine (1907) appear also to belong to *dorsopunctus*, judging from his description, and as noted by Fairchild (1937:59). Jones and Anthony (1964) saw no Florida specimens. Tidwell (1973), reporting on the Tabanidae of Louisiana, felt that *dorsopunctus* could not be separated from *fulvistigma* due to the occurrence of intermediates, and reported both forms as occurring together in the southeastern part of that state. Tidwell's material, now in F.S.C.A., shows 250+ specimens of *fulvistigma* and 16 of *dorsopunctus*. All specimens were easily assignable to 1 or the other of these taxa.

In Florida the 2 forms seem to behave as separate species, and all material I have seen can be separated on several characters, as detailed under *dorsopunctus*. Florida specimens of *fulvistigma* available to me are all from west of Tallahassee, as follows: Liberty Co., Torreya State Park, many females 13-15-VI-1974, 1 female 4-VII-1965, 2 female 13-15-VI-1966, all Weems, coll. 7 females 20-21-VI-1973, Fairchild and Wilkerson, colls. 1 female Liberty Co., near Bristol, 26-VIII-1946; 1 female Eglin A.F.B., Okaloosa Co., no date.

Although Brennan (1935) mentioned seeing a male of *fulvistigma*, he did not describe it, merely saying it is like the female and easily associated.

A male plesiotype of *fulvistigma* from Oxford, Mississippi, VII-1934, no coll., now in M.C.Z., is much like the male of *dorsopunctus* in leg color and structure and proportions of the head and its appendages. It has the same pollinose midfacial stripe also. It differs most notably in having the wing pattern quite strongly pigmented, the dark markings on the pale tan, upper eye facets broader and heavier, and the abdominal pattern quite different. The 1st abdominal tergite is yellow, the middle 1/3 blackish, the dark portion with diffuse borders. The 2nd tergite has the middle 1/3 or slightly more black, with a narrow, middorsal, yellow triangle 2/3 the length of the segment, widest at the anterior border of the segment, tapering posteriorly to a sharp point. Third tergite largely black, with a yellow, inverted, middorsal triangle nearly length of segment and broader than the triangle on 2nd tergite; sides of tergite narrowly dull yellowish. Fourth tergite blackish brown, with a small dull yellow, inverted triangle less than 1/2 the length of the segment. Remaining tergites blackish.

Chrysops geminatus Wiedemann 1828, Auss. Europ. Zweifl. Ins. 1:205. Jones and Anthony (1964) saw no Florida specimens of this species, only listing the record of Fairchild (1937) from Jefferson Co. Since then, the species has been taken abundantly at Torreya State Park, Liberty Co. by Howard Weems, Jr., at Bristol, Liberty Co., and in Wakulla Co., in May and June of various years. M. A. Tidwell also took the species abundantly near Cantonment, Escambia Co., 26-27-V-1972, while L. L. Pechuman has it from Okaloosa Co., VI-1974, C. L. Smith coll.

Chrysops hinei Daecke 1907, Ent. News 18:143 and *C. beameri* Brennan 1935, Bull. Univ. Kansas 36:265. These 2 very similar species can be easily confused, and Philip (1955) suggested that both may be infra-specific variants of *C. sequax* Williston 1887. In Florida, 2 forms seem to be present, differing consistently only in the pattern of the abdomen as follows:

Chrysops beameri

Abdomen with slender, continuous, black, dorso-lateral stripes from 1st to 5th tergites. Paired dorsal stripes nearly always parallel and continuous.

Chrysops hinei

Abdomen either without dorsolateral black stripes or these represented by short dashes, rarely present on 1st and 2nd tergites. Paired dorsal stripes usually of slightly oblique dashes interrupted by the sutures, rarely completely parallel and continuous.

The wing pattern is nearly identical, though in *beameri* the hyaline triangle seems slightly wider on the average. Both species fly late in the year, August to October, rarely at other times, and have been taken in the same general areas, though not surely together. Jones and Anthony (1964) reported only a single collection of *beameri* from Alachua Co., taken 5-X-1940. One of these is before me, courtesy of Dr. Anthony, and agrees with my interpretation of *beameri* based on material compared with a paratype in M.C.Z. The specimens from Monticello, Florida, reported as *hinei* by

me (Fairchild 1937) are mostly *beameri*, but not all. I have also seen 2 females from Blackwater River State Park, Santa Rosa Co., 7-VIII-1976, Fairchild coll., and Santa Rosa Co., 22-VIII-1955 which I think are *beameri*. One has a nearly black callus, but is determined *beameri* by Stone.

C. hinei was present in small numbers at Austin Carey Forest near Gainesville from 27-VIII-4-XI-1976, both in a flight trap and netted flying about the collector. I also took a few in Monticello, Jefferson Co. in IX-1935, while Jones and Anthony (1964) reported the species from Alachua, Lafayette, Lake, Liberty, and Marion counties. To this may be added a female from Clay Co., 26-IV-1973, given to me by a student. L. L. Pechuman wrote that he has specimens from Highlands, Polk and Columbia counties. In addition there are also specimens in F.S.C.A. from Manatee, Volusia, Hillsborough, Pasco, and Bay counties so that the species seems to be widely distributed in Florida. Its comparative rarity in collections appears to be due to restricted choice of habitats as discussed by Jones and Anthony (1964:20), coupled with an unusually late flight season when, due to excessive heat, few entomologists are in the field.

Chrysops ifasi Fairchild, New Species
(Fig. 1, 1a, 1b)

A pale grey and yellow fly without black markings on abdomen and with narrowed and pale brownish crossband on wing.

Female. Length 7 mm; of wing 6.5 mm. Frons slightly higher than wide; index 1.26, slightly wider at base than vertex, black in ground color, thinly grey pollinose. Ocellar tubercle pollinose, except for small bare spots outward of each ocellus. Frontal callus yellow, not shiny, wider than high, obtusely pointed in middle of upper and lower margins. Subcallus, frontoclypeus, and genae yellow in ground color, the pollinose areas light yellowish, the bare areas shiny. Antennae (Fig. 1a) with segments, beginning with scape, having the proportions 15:10:31, so that 3rd segment is longer than preceding 2 combined. Style slightly longer than basal portion. First 2 segments dark yellow, shiny, quite inflated, clothed with black hairs, apical 1/2 of 2nd segment brown. Basal portion of 3rd segment dark yellow, the style black, contrasting. Palpi and theca of proboscis yellow, shiny, the former with sparse black hairs, labella black.

Mesonotum steel grey, very faint median and paired sublateral darker stripes visible in certain lights. Pronotal lobes dull yellow. Notopleural lobes dark grey. Pleura unstriped, grey, slightly paler than mesonotum. Scutellum grey at base, yellow at apex, whole thorax pollinose, without bare areas. Legs, including coxae, yellow, except for dusky apical 1/3 of fore tibiae and apical 2 or 3 tarsal segments of all legs. Wings as figured (Fig. 1), the crossband and apical spot more extensive than in *Chrysops delicatulus* Osten Sacken and *cursim* Whit., about as in *pudicus* Osten Sacken, but very pale brownish.

Abdomen orange yellow in ground color, paler on 1st 2 or 3 segments, slightly darker terminally. Each segment from 2 to 5 inclusive, has a pair of poorly defined, semitransparent, dorsolateral spots which appear slightly darker. The surface is subshiny, beset with sparse yellowish hairs on hind and lateral borders of tergites, which form low median triangles on the hind borders; remainder of tergites sparsely black haired. Ventrally abdomen wholly dull yellow, sparsely yellow haired and not so shiny as dorsum.

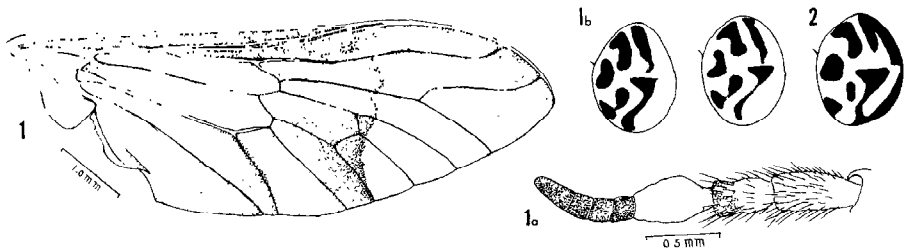

Fig. 1. *Chrysops ifasi* Fairchild n. sp. Wing, paratype. Monticello, Jefferson Co., Florida 27-IX-35, G. B. Fairchild, coll.; (a) antenna, holotype; (b) eye patterns of holotype and paratype.

Fig. 2. *C. cursim* Whitney. Eye pattern, female, University of Florida Horticultural Unit, Gainesville, Fla., 10-V-73, R. Wilkerson, coll.

Holotype female, Alachua Co., Florida, 3 miles east of Micanopy on State Road 346, 14-VI-1973, pine flatwoods, Fairchild and Wilkerson, colls. The species is named for the Institute of Food and Agricultural Sciences of the University of Florida, which has supported this work.

The eye pattern (Fig. 1b) was drawn for the holotype and 1 paratype. It is most similar to that of *pudicus* as figured by Daecke (1906) and of *cursim* (Fig. 2), but the dark pattern is considerably more reduced, the posterior margin having but faint traces or none of dark.

Paratypes (all Florida): 1 female, same data as holotype; 15 females, Monticello, Jefferson Co., 21-VIII-, 11-, 12-, 16-, 18-, 19-, 27-IX-1935, G. B. Fairchild coll.; 1 female, Greenville, Madison Co., 24-VIII-1935, G. B. Fairchild coll.; 1 female, Fruitland Park, Sumter Co., V-1921; 1 female, Withlacoochee State Forest, Sumter Co., 19-VII-1973, Fairchild and Wilkerson, colls.; 1 female, Ocala National Forest, Marion Co., 11-VII-1973; Fairchild and Wilkerson, colls.; 1 female, Ochlochonee River State Park, Wakulla Co., 22-VI-1973, Fairchild and Wilkerson, colls.; 1 female, 2 mi. N.W. Orange Springs, Putnam Co., 27-VIII-10-IX-1975, insect flight trap, J. Wiley, coll.; 1 female, Okaloosa Co., Holt Fish Hatchery, flight trap, 5-7-VIII-1976, G. B. Fairchild, coll.; 8 females, Smith Ranch, Umatilla, Lake Co., 26-VII-1954, on man (2) 3-IX-1953, on horse (6), Jones and Anthony, colls. One of the 1953 specimens was det. *C. cursim* by Stone, several others were det. *cursim* by Anthony, so that this appears to have been, at least in part, the species recorded as *cursim* in Jones and Anthony (1964). The specimens they listed from Dixie and Putnam counties, as well as the 3 reared females are not available to me, so that I cannot state whether they were this species or *cursim*. Finally, Dr. L. L. Pechuman lent me a single female, Floyd's Island, Okefenokee Swamp, Georgia, 17-VIII-1945, Fattig, coll. This was det. *cursim* by Stone and recorded as *cursim* by Fattig (1946).

The paratypes are somewhat variable, a few showing distinct dark stripes on mesonotum, and rarely the base of discal cell may be hyaline. The scutellum may be all grey or all orange yellow. The abdomen may show distinct traces of pollinose yellow, middorsal triangles, and very rarely there may be a faint brownish darkening of the dorsolateral, semitransparent spots.

Holotype and some paratypes to be deposited in F.S.C.A., other paratypes in M.C.Z., Cornell, U.S.N.M., and collections of L. L. Pechuman, C. B. Philip, and the author.

This species usually is readily separable from *cursim* by the lack of, or fainter, thoracic stripes, absence of black on abdomen, and broader crossband and apical spot. From *pudicus* it differs in lacking any black on the abdomen, usually lacking thoracic stripes, and having the wing pattern dilute brownish. Most *pudicus* also have the frontal callus at least narrowly black bordered above. I suspect that *ifasi* is most closely related to *pudicus*, while *cursim* is more related to *delicatulus*. Each may be a diluted expression of the earlier described species of the pair.

Both *cursim* and *pudicus* have been taken together with *ifasi*, but I have seen no intergrades. *Chrysops delicatulus* is recorded as far south as South Carolina, where it is known only from Cheraw State Park, Chesterfield Co., according to Pechuman, who wrote me that this is a disjunct population and the species is not otherwise known south of Maryland. A specimen from Gainesville, Alachua Co., Florida, 19-VIII-1929, E. R. Jones, coll., was det. *delicatulus* by C. B. Philip, but it is intermediate between *cursim* and *delicatulus*. The callus is yellow, as are legs, especially fore coxae, and it seems to me much better placed as a dark variant of *cursim*.

Chrysops montanus Osten Sacken 1975, Mem. Boston Soc. Nat. Hist. 2:282. This species was reported from Jefferson Co. by Fairchild (1937), the record repeated by Jones and Anthony (1964), but re-examination of 2 of these specimens in M.C.Z. shows them to belong to the following form.

Chrysops montanus perplexus Philip 1955, Rev. Brasiliera Ent. 3:111-2, (Fig. 7d). This subspecies was based on 1 male from North Carolina and 1 male from Orange Co., Florida. Subsequently Pechuman (1957) described the female from Welaka, Putnam Co., Florida. It differs from northern *montanus* chiefly in being slightly darker, the hind femora generally largely black, and the apical spot more extensive, often filling whole wing apex and leaving the hyaline triangle as a narrow stripe bordering the cross band. Intermediate specimens are not uncommon, even in Florida, so that the form is probably the end of a cline, like the dark forms of *C. carbonarius* Walker, *amazon* Daecke, and *cincticornis* Walker. It hardly seems to warrant even a varietal name. In addition to the localities listed by Jones and Anthony (1964), I have seen specimens from Leon, Jefferson, and Dixie counties. The species was fairly common in Austin Cary Forest near Gainesville, Alachua Co., in 1975 and 1976, 124 females being taken in traps and netted between 29-IV-27-V-1975 and 29-III-10-V-1976.

Chrysops nigribimbo Whitney 1879, Can. Ent. 11:35. Though reported from Florida by Philip (1947), Jones and Anthony (1964) recorded it only from Alachua Co. Specimens in F.S.C.A. and my collection are from Escambia, Santa Rosa, Wakulla, Alachua, Baker, Columbia, and Clay counties, with dates from 23-IV (Alachua Co.) to 7-VIII (Escambia Co.).

Chrysops pudicus Osten Sacken 1875, Mem. Boston Soc. Nat. Hist. 2:381. This variable species has been difficult to determine, and literature reports are often unreliable. I now have material compared with the lectotype in M.C.Z., as well as specimens det. by L. L. Pechuman, J. Bequaert, and C. B. Philip. Based on these specimens, the species can be characterized as follows. Third antennal segment subequal to or shorter than sum of 1st 2 segments, the latter slender or slightly inflated. Mesonotum and scutel-

lum dark steel grey, with at least traces of a narrow median and dorsolateral darker shiny stripes. Rarely the scutellum is tipped with yellow. Frons grey pollinose, nearly always clearly higher than wide. Ocelli on a pollinose tubercle, with only small bare spots or none. Callus usually yellow in center and below, the upper and lateral margins brown to black, but occasionally all yellow or all black. Facial callosities entirely yellow. Dark crossband of wing clear cut, slightly wider than length of discal cell, reaching hind margin only in 4th posterior cell (3rd M), with a separate, light infuscation along Cu2. Outer margin nearly straight, apical spot not or but slightly drop shaped, reaching to wing apex, not obscuring more than distal 1/2 of R4, usually less. Hind femora brown to black, mid and fore femora wholly or largely yellow. Abdomen yellow on 1st 2 tergites, the 1st with a small brown to black patch beneath scutellum, the 2nd with an inverted, broadly U-shaped, black mark whose apex reaches or nearly reaches anterior margin of the segment, and whose lateral arms generally fail to reach the hind margin. The size and shape of this figure vary considerably, being small and clear cut to large and somewhat diffuse, rarely with extensions laterally paralleling the hind border of tergite 2. Third and succeeding tergites largely dark, brown to black, with a pale hind border of variable width which may form a median triangle, acute to broad and obtuse; lateral borders wholly pale. Rarely there may be a little yellow on dorsolateral areas of tergites 3 and 4. Ventrally the abdomen is largely pale, but with median dark spots increasing in size from tergites 3 to 6.

The species most likely to be confused with *pudicus* in Florida is *C. dimmocki* Hine. This is usually a more robust species, the frontal callus nearly always black, the crossband strongly bowed outwardly, the apical spot clearly drop shaped, and the median black figure on tergite 2 more inverted V shaped, very often with lateral posterior extensions along the hind margin of the tergite.

Specimens are before me from Alachua, Gulf, Broward, Wakulla, Jefferson, Manatee, Dade, Lafayette, Highlands, and Jackson counties, with dates from 2-IV-1971, Highlands Co., to 27-IX-1935, Jefferson Co.

Chrysops tidwelli Philip and Jones 1962, Fla. Ent. 45:67. This species has been known hitherto only from the types from Escambia Co., taken in August 1960. I made a trip in early August 1976 to the same area, but was unsuccessful in securing specimens. I did, however, collect a single female at Blackwater State Park, Santa Rosa Co., 7-VIII-1976, netted while flying about my head along a trail through pine woods.

Chrysops upsilon Philip 1949, Ann. Ent. Soc. America 42:458-60. Although described from Georgia and taken abundantly in Louisiana (Tidwell 1973), this species was not mentioned by Jones and Anthony (1964), nor was Florida included in its range by Philip (1965), so that the following records appear to be the 1st for the state: 4 females, Liberty Co., Torreya State Park, 20-VI-1973, Fairchild and Wilkerson, colls.; 1 female, Liberty Co., Apalachicola River near Bristol, 14-VI-1972, P. H. and N. F. Carlson, colls.; Washington Co., Pine Log Creek at East River, 16-X-1970, P. H. Carlson, coll. L. L. Pechuman (in litt.) added Jackson Co., 31-V-1965, F. T. Moore, coll. The specimens recorded by Fairchild (1937) as "*univittatus* Macquart" have been re-examined. They are *C. macquarti* Philip,

as surmised by Jones and Anthony (1964:21), rather than the true *univittatus* Macquart.

Anacimas limbellatus Enderlein 1925, Mitt. Zool. Mus. Berlin 11:376 (Fig. 3, 4). In my opinion the specific name should date from 1925, as the 1923 reference given in the North American catalogue (Philip 1965) is a very brief definition of the genus, so that *limbellatus* was a nomen nudum at that time. I have now been able to study a total of 31 females, 5 males of this species, as listed here: (1) 1 male, Florida, Andreas Bolter collection, det. *Tabanus gracilis* Wiedemann? by C. W. Johnson, in C. B. Philip collection. This specimen was reported as *A. geropogon* by Philip (1952). (2) 1 male Springfield, Florida, 21-IV-1951, *ex* pitcher plant, C. B. Philip, coll. This specimen is in poor condition, greased, and with wings tattered; it is the "Allotype" of *limbellatus*, so labelled and designated by Philip (1952). (3) 1 male Alachua Co., 2 mi N.W. Gainesville, Florida, 16-II-1975, in G. B. Fairchild collection. (4) 1 female, Carolina Beach, North Carolina, 20-IV-1932, holotype of *A. geropogon* Philip in C. B. Philip collection. (5) 1 female, Jacksonville, Florida, Englehart, coll., teneral, alcoholic, in C. B. Philip collection. (6) 1 female, Dog Island, Florida, 17-X-1947, alcoholic reported as *geropogon* by C. B. Philip 1952, in C. B. Philip collection. (7) 1 female, Dewees Island, South Carolina, IV-1929, in M.C.Z. This specimen is closest to type of *geropogon*. It was det. *limbellatus* by Bequaert and bears a note on and sketch of the eye pattern done by him. The eye sketch is essentially like the eye figured in the present paper. I did not draw the antenna. (8) 1 female, Hancock Co., Mississippi, 3-IV-1975, R. H. Roberts, coll., det. *limbellatus* by Roberts. It lacks antennae, but except for minor differences in frontal characters and paler wings seemed the same as Florida specimens. (9) 1 female Florida, Franklin Co., Wright Lake, Apalachicola Natl. Forest, 21-IV-1971, flight trap, Weems and Fairchild, colls., wing length 9 mm, the smallest specimen measured. (10) 5 females, Alachua Co., Florida, Austin Cary Memorial Forest, N.W. of Gainesville, 27-III-7-IV-1975, flight trap, G. B. Fairchild, coll. (11) 17 females, same locality, 1-III-12-IV-1976, flight trap, G. B. Fairchild, coll. (12) 1 female, same locality as No. 9, 23-III-1973, Weems, coll., in F.S.C.A. Some of the above specimens were reported by Goodwin (1976). Drawings of eye pattern of 1 specimen from No. 11, is given here, as well as of frontal characters of No. 11, and antennae of Nos. 1, 2, 4, 5, 6, 9, and 10 (all 5). As can be seen from the figures, there is wide variation in the antennae, even within the series from Austin Cary Forest, so that little reliance can be placed on this character to separate *geropogon* and *limbellatus*. Frontal characters are also variable, but not correlated and not very striking. The type of *geropogon* seemed to be paler, more red sided, and the dark middorsal abdominal band more prominent than in my fresh Florida specimens. The same was true as to the Dewees Island, South Carolina specimen, but both are over 40 years old and the color differences noted may be due to fading. All except the Dog Island, Florida specimen were taken in Feb., March or April, and it is 1 of the earliest species on the wing. Dr. L. L. Pechuman showed me additional specimens on a recent visit, viz.: 1 female, Carteret Co., North Carolina, Gales Creek, 10-VI-1971, M. A. Tidwell, coll.; 1 male, Southern Pines, North Carolina, IV-1907; 1 male, Echolls Co., Georgia, 11-IV-1970, Beshear, coll.; and 1 female, Wakulla Co., Florida, Ochlochonee River State Park, 4-IV-1976, in CO_2 baited trap, L. L.

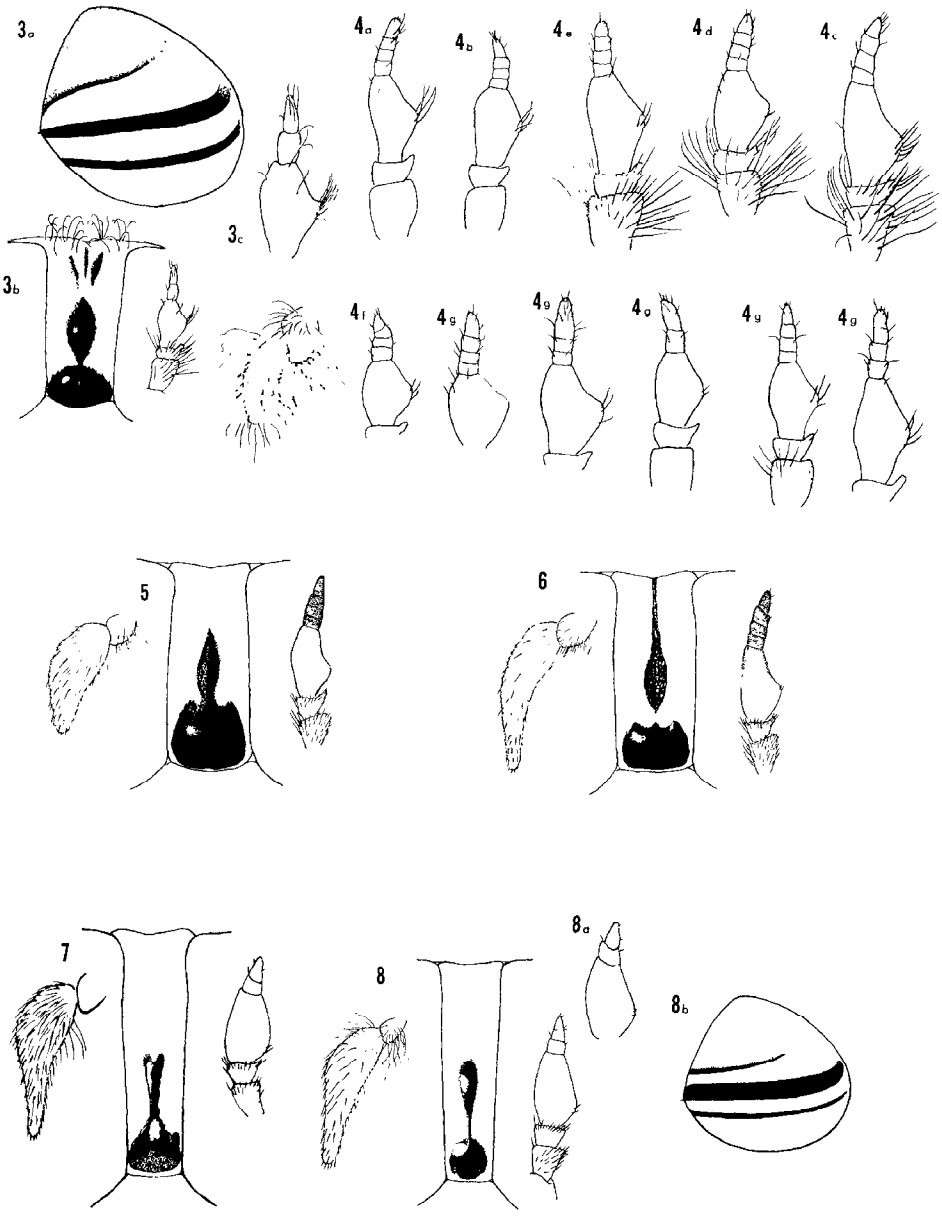

Fig. 3. *Anacimas limbellatus* Enderlein, female. Fla., Austin Cary Forest, Gainesville, 1-3-III-76; (a) eye pattern, white = reddish green; stippled = dull green; black = purple; (b) frons, antenna, palpus; (c) antenna at greater magnification.

Fig. 4. *Anacimas limbellatus* Enderlein. Morphological variation in antennae of some specimens listed in the text. (a) male, Fla., Andreas Bolter collection; (b) male, Fla., Springfield, 21, IV-1951, *ex* pitcher plant, C. B. Philip, coll.; (c) female, N. C., Carolina Beach, 20-IV-1932, holotype of

Pechuman, coll. More recently Pechuman, Goodwin and I took 5 males, 33 females at the last locality during the second week in April 1977.

I conclude that there seem to be no firm characters for separating *A. geropogon* Phil. 1936 from *A. limbellatus* End. 1925 (*New synonymy*). The species ranges from Mississippi to North Carolina, south to central Florida.

As to the position of *Anacimas*, it is placed in the Tabanini by Philip in 1947, but in the Diachlorini in 1965. The specimens before me have the basicosta unusually reduced in size, a small usually rounded knob, which may be entirely bare or variably setose, with the setae sometimes as dense as on adjoining costa. The frons is unusual in the great development of the median callus, which is more protuberant than in most other North American species, or in any Neotropical species. The vertex in the female is slightly inflated, but with a short median bare streak. In the male, there is a well marked tubercle between the eyes, though without vestiges of ocelli. The proboscis is unusually short, the labella small and pale, its tip barely exceeding the palpi. There seems no information on the biting habits, and the species may not be haematophagous, though Goodwin (1976) felt his specimen may have been attempting to bite. In any event, the species is not obviously Diachlorini, and I suspect that its diachlorine characters may be secondary, though until the larvae can be studied there seems no point in trying to place it. *Anacimas dodgei* (Whitney), the only other species in the genus, has a similar basicosta.

Whitneyomyia beatifica (Whitney) 1914, Can. Ent. 46:353 and var. *atricorpus* Philip 1950, Ann. Ent. Soc. America 43:122. Although described as a subspecies, Philip stated he believed *atricorpus* was only a melanistic variety, and reduced it to varietal status in 1965. Tidwell (1973) reported only the *atricorpus* form from Louisiana, while Philip (1950) reported 55 of the typical form from Apalachicola, Florida. There are in F.S.C.A. 1 female from the Apalachicola series reported by Philip and 2 females, St. Theresa, Franklin Co., 17-IV-1938, of the typical form, and 1 female, Mimmsville, Georgia, 24-V-1907, and 5 females, Umatilla, Lake Co., Florida, 4-V-1951, on horse, C. M. Jones, coll., of the dark form. In my collection there are 4 females of the typical form from Austin Cary Forest near Gainesville, 12-14-V-1975 and 3-V-1976, and the following specimens of *atricorpus*: 5 females, Austin Cary Forest, Gainesville, 22-24-IV-1975, 5- and 23-IV- and 12-V-1976; 1 female, Umatilla, Lake Co., 4-V-1951, C. M.

A. geropogon Philip; (d) female, Fla., Jacksonville, Englehart, coll., (e) female, Fla., Dog Island, 17-X-1947; (f) female, Fla., Franklin Co., Wright Lake, Apalachicola Natl. Forest, 21-IV-1971, Weems and Fairchild, colls.; (g) females, Fla., Alachua Co., Austin Cary Memorial Forest, N.W. Gainesville, 27-III-7-IV-1975. G. B. Fairchild, coll.

Fig. 5. *Tabanus campecheanus* Townsend. Cancun, Quintana Roo, Mexico, Rosel, coll. Palpus, frons, antenna.

Fig. 6. *Tabanus cayensis* Fairchild. Florida, Cedar Island, Taylor Co., Weems, coll. Palpus, frons, antenna.

Fig. 7. *Tabanus daedalus* Stone. Florida, Austin Cary Forest, Gainesville. 8-IX-75, J. Glick, coll. Palpus, frons, antenna.

Fig. 8. *Tabanus daedalus* Stone, holotype, palpus, frons, antenna; (a) antenna of specimen from Jacksonville, Fla. mentioned in text; (b) eye pattern of specimen from Austin Cary Forest, Gainesville, Fla., 6-VIIII-76. White = greenish bronze; black = dull brown.

Jones, coll.; 1 female Shady Lake, Gainesville, Florida, 11-VI-1953, on mule, D. W. Anthony, coll.; 1 female, Alachua Co., Hatchett Creek, 11-IV-1974, K. J. Tennesen, coll. There thus does not seem to be any geographic separation of the 2 forms, and the species appears to be dimorphic in respect to the abdominal hair colors.

Hybomitra difficilis (Wiedemann) 1828, Auss. Zweifl. Ins. 1:165. This species was known in Florida only from a single collection by H. V. Weems, Jr., at Torreya State Park, Liberty Co., 12-IV-1960; it was first reported by Philip (1961) and repeated by Jones and Anthony (1964). Since then a long series of both sexes has been taken there by Weems in April and May in various years and by Pechuman in 1969. Frank Mead took a female, Gainesville, Alachua Co., 20-III-1964, labelled "edge of hammock," and in 1974, 1975, and 1976, I took a short series in hardwood forest at the University of Florida Horticultural Station, 23-27-III-1975, 12-22-III-1976, and 2-IV-1974. Harold Greenbaum took specimens at Florida Caverns State Park, Jackson Co., 25-26-III-1972. L. L. Pechuman also took specimens in a CO_2-baited canopy trap in Wakulla Co. in April 1977. *Hybomitra difficilis* thus appears to be an early spring species favoring deciduous hardwood forest. Greenbaum's and my specimens were taken in flight traps, as was much of Weems' material.

Stenotabanus daedalus Stone 1938, U.S.D.A. Misc. Publ. 305:32 (Fig. 11). Although described from Gainesville, Florida, this has remained one of the most rarely collected and least known of North American Tabanidae. Stone (1940) reported the 2nd specimen from 8 mi. N.W. of Gainesville. Philip (1941) described the male (from Volusia Co., Florida, 6 mi. W. of Barberville, 6-IX-1938) and noted that it was not a *Stenotabanus*. He suggested that it might be better placed in *Glaucops* Szilady on account of the 2-segmented style, but the type species of that genus, *hirsutus* (Villers), has a bare basicosta and very different frons according to Chvala, Lyneborg, and Moucha (1972:397), although 3 males and 2 females seen by me have the basicosta sparsely setose. Philip (1947) placed *daedalus* in *Glaucops*, but in 1965 he returned it to *Stenotabanus*. P. W. Fattig (1946:14), listed the species from Fort Valley, Georgia, Aug., and Reidsville, Georgia, Sept. Jones and Anthony (1964) reported 2 females taken from a horse in Lake Co., Florida. I have studied the holotype from Gainesville, Florida, 26-IV-2-X-1914, now in A.M.N.H. and the following additional material: 1 female, Lee's Ranch, Lake Co., Florida, 17-VIII-1951, horse, A. J. Graham, coll., no doubt 1 of the specimens reported by Jones and Anthony (1964) as it was given me by the latter. 1 female, Jacksonville, Florida, 15-IX-1943, T. Aitken, coll., labelled as comp. with type by L. L. Pechuman Sept. 1960, and det. 1949 as *Glaucops daedalus* by C. B. Philip. 1 female, Alachua Co., Austin Cary Memorial Forest, 8-IX-1975, in truck, J. Glick, coll. 1 female same locality, 19-IX-3-X-1975, flight trap, J. Glick, coll. 23 females same locality, 2-, 6-VIII-, 3-24-IX-, and 8-X-1976, flight trap, G. B. Fairchild, coll., and CO_2-baited Malaise trap, R. Roberts, coll.

As can be seen by the accompanying figures, (Fig. 7, 8) there are no unusual characters, other than the reduced number of segments in the 3rd antennal segment, which would warrant separation of this species from *Tabanus*, and it is herewith placed as *Tabanus daedalus* (Stone) NEW COMBINATION. Based on the specimens I have seen, the species may be redescribed as follows: *Female*, length 9-11.5 mm, of wing 7.5-9 mm. Eyes

bare, greenish bronze, with 3 narrow dark bands, as figured, very similar to eyes of *T. zythicolor* Philip. Frons nearly parallel sided, index 4.3 to 4.5 dark yellowish-grey pollinose, as is subcallus. Frontal callus dull yellow, rounded to subquadrate, well separated from eye margins, narrowly or barely attached to the small and irregular, brown to black, median callus. No tubercle, bare or discolored patch or markedly differentiated hairs at vertex, the postocular fringe of short inconspicuous pale hairs. Antennae dull yellowish brown, the scape and pedicel neither enlarged nor notably hairy, the style slightly darker than basal plate, with 2 or 3 annuli. Palpi moderately inflated basally, the apex rather slender, white with mixed black and white hairs. Frontoclypeus and genae pale grey, white haired, except upper margins between antennal bases and eyes, which are brownish and dark haired.

Mesonotum blackish, grey pollinose, sparsely golden haired, the notopleural lobes paler, dark haired. Pleura and coxae dark grey, white haired. Legs dull yellowish brown, mostly black haired, the apices of fore tibiae and all tarsi slightly darker, but tibiae not strongly bicolored. Wings with venation normal, no appendix at fork, greyish hyaline, veins yellow to brown, the costal cell distinctly yellowish. Basicosta with setae about as dense as on adjoining costa.

Abdomen mainly dull yellowish brown in ground color, with an ill-defined, darker, median triangle on tergites 1 and 2, mainly sparsely dark haired, but with small, paired, dorsolateral spots, hind and lateral margins of at least tergites 1 to 4, and small median triangles on all tergites, sparsely yellow haired. Pollinosity accentuates the hair colors, pale under pale hairs, darker under black hairs, but the pattern is in any case not very pronounced or clear cut.

All recorded specimens were taken in August, September or October, and from a relatively small area from central Georgia to north central Florida, eastward to the coast. The short late flight season and inconspicuous appearance of this species may have caused it to be overlooked or confused with some member of the *longus* group, or even taken for a dwarf specimen of *pallidescens* Philip or *fulvulus* Wiedemann.

Tabanus cayensis Fairchild 1935, Fla. Ent. 18:53-54 (Fig. 6). This small species has been seldom collected, and the male remains unknown. Comparison with the, until recently, poorly known *Tabanus campechianus* Townsend 1897 (Can. Ent. 29:197) from the Yucatan peninsula of Mexico, shows the 2 to be very similar. The frontal indices of *cayensis* range from 2.50-2.96, mean of 6 specimens = 2.64, while 4 specimens of *campechianus* range from 2.36-2.67, mean = 2.47. These differences hardly seem to be significant. Since *campechianus* has never been figured, I give here figures of both species for comparison (Figs. 5, 6). The more slender palpi and broader antennae of *cayensis*, together with the dark coxae and femora will probably serve to separate the species. It seems likely that the 2 species had a common ancestry not too far in the past, and in fact subspecific status for *cayensis* might better reflect their supposed relationship. However, since males of neither are known, it seems better to defer making any change until further evidence accrues. I have seen, in addition to the types, the following specimens of *cayensis*, all females and all from Florida: 1, Big Pine Key, Monroe Co., 7-V-1961, Weems, coll., Philip, det.; 1, Collier Co., 14-V-1949, Fairchild det.; 1, Big Pine Key, 26-V-1950, J. S. Harger, coll.,

Pechuman det.; 1, Cedar Island, 16 mi. N.W. Steinhatchee, Taylor Co., 16-V-1969, Weems, coll., Philip det.; 1, Bonita Springs, Lee Co., 15-IV-1975, Vingst, coll., Fairchild det.; the Everglades, 25-IV-1928, Fattig, coll., Pechuman det.; Stock Island, 18-VIII-1975, Pierce, coll., Pechuman det.; Adams Beach, Taylor Co., 14-V-1965, Pechuman, coll. et det.; Marco Beach, Collier Co., IV-1955, H. E. Evans, coll., Pechuman det.; Cape Coral, Lee Co., 8-V-1964, Pechuman, coll. et det.; Sanibel Island, Lee Co., 1-5-VI-1973, A. Lewis, coll., Pechuman det.; and same loc., 11-V-1973, W. Wirth, coll., Fairchild det. The species appears to be restricted to the Gulf coast of Florida and the lower keys, but may be more widely distributed, being easily confused with dwarf specimens of *nigrovittatus* Macquart unless studied carefully. The latter has a quite different and rarely overlapping frontal index, 2.93-4.17, mean of 29 specimens = 3.44.

I have studied only 5 specimens of *campechianus*, as follows: 1 female, Corozal, British Honduras, 15-V-1960, J. Strangways-Dixon, coll.; 1 female, Mexico, Campeche, 48 mi. N. Puerto Real, 22-VI-1966; 2 females, Cancun, Quintana Roo, Mexico, 24-25-VII-1973, Pletch and Rosel, colls., Philip det. (Fig. 5); 1 female, Campeche, Mexico, V-1963, F. S. Blanton, larger and yellower than the others. The Corozal specimen was relaxed and shows a green eye with 1 slender, faint, median, dark stripe.

Tabanus nigrovittatus fulvilineis Philip 1957, American Mus. Novit. 1858:3-6, (Fig. 2). This subspecies was based primarily on the color and pattern of the abdomen, the median as well as dorsolateral stripes said to be yellow, while in *nigrovittatus* the median stripe is said to be gray. This character is difficult to assess in denuded specimens, since the underlying pollinosity seems always grey, only the hairs varying in color, and then not much. I first thought that the 2 forms could be separated on color of the coxae and femora, as was done by Jones and Anthony (1964:70), yellow in *fulvilineis*, black in *nigrovittatus*, and indeed pale specimens do look different, with little or no underlying black on abdomen, and abdominal hair stripes broad and yellowish. These color characters, however, are unsupported by structural differences, the frontal indices and degree of divergence of the frons in a series of 18 pale-legged specimens, including 2 Florida paratypes, not being significantly different from the same indices taken from 29 black-legged specimens, including 2 Bahama paratypes, and specimens from Massachusetts, North Carolina, New York, and Mexico, as well as Florida. Philip's holotype had a narrower frons than any of the 4 paratypes seen, or than any other specimen measured by me. I give here the ranges and means of the measurements and indices I took. Pale-legged specimens: frontal length 43-57, mean = 49.83; basal width 12-16, mean = 13.67; vertex width 14-17, mean = 15.22; frontal length/ basal width (frontal index) 3.21-4.08, mean = 3.65; vertex width/basal width (divergence index) 1.00-1.29, mean = 1.12. A divergence index of 1.00 indicates a completely parallel-sided frons. Black-legged specimens: frontal length 38-56, mean = 49.79; basal width, 11-18, mean = 14.48; vertex width, 13-19, mean = 16.03; frontal index 2.93-4.17, mean = 3.44; divergence index, .94-1.29, mean = 1.11. Measurements were taken by measuring the image of the frons as seen through a camera lucida with a millimeter rule. I have seen pale-legged specimens only from the Gulf coast of Florida, from Pinellas Co. to Okaloosa Co. Philip (1957) recorded pale-legged specimens from Ship Island, Mississippi, and Hernando Co., Florida, as well as within the range

given above. All material from the east coast of Florida, as well as the Keys and southern tip of the state, has been black-legged, as is the Bimini, Bahamas material reported by Philip. Unfortunately, too many specimens are intermediate in regard to leg color and cannot be clearly placed on this character. In general, the paler, more yellow specimens are smaller and may more often have yellow or brown frontal calli. I conclude that *fulvilineis* probably represents a paler, more yellowish moiety of a more yellowish southern population of *nigrovittatus*, which I, at least, cannot consistently separate. The name remains available should future studies reveal biological differences indicating reproductive isolation of this form.

Tabanus subsimilis Bellardi 1859, Saggio Ditt. Messicana 1:66. Under the name of *Tabanus vittiger schwardti* Philip, Jones and Anthony (1964) recorded this species as having been taken in Bay, Escambia, and Dade counties, although they themselves seem not to have seen Florida specimens. One of the paratypes of *T. vittiger schwardti* was said to be from Everglades Exp. Sta., Dade Co. (Philip 1942), while in 1952 Philip recorded males and females taken in pitcher plants (*Sarracenia flava* Linnaeus) in the outskirts of Panama City (Bay Co.). I have not traced the source of the Escambia Co. record in Jones and Anthony. Although I was inclined to query these records, especially the 1 from Dade Co., feeling that there might have been confusion with *T. vittiger guatemalanus* Hine, I have now seen an undoubted female specimen shown to me by L. L. Pechuman. It was collected at Pomona Park, Putnam Co., 19-V-1961, by A. and H. Deitrich, and is now at Cornell Univ. Both Pechuman (in litt.) and I are still sceptical of the Dade Co. record, though accept provisionally those from N.W. Florida.

Tabanus vittiger guatemalanus Hine 1906, Ohio Nat. 7(2):24. As suggested by Philip (1957:7), this appears to be a coastal form throughout its extensive range in the Caribbean and Central America as well as in Florida. Jones and Anthony (1964) listed the species from Dade, Monroe, and Pinellas counties, and Pechuman (in litt.) recorded specimens from Collier Co., while a specimen from Naval Air Station, Jacksonville (Duval Co.), June 1969, taken at porch light by L. W. Teller furnishes a surprising extension of range. The specimen is in excellent condition and seems unlikely to have been a stray brought in from further south by aircraft.

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