

NOTES ON TABANIDÆ (DIPT.) FROM PANAMA
V. THE GENUS *TABANUS*, SUBGENUS
BELLARDIA RONDANI

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SUBGENUS *Bellardia* RONDANI

Bellardia Rondani, 1863, Arch. per La Zool., Modena, III, 1, p. 81. (with *T. albonotatus* Bell.). Enderlein, 1925, Mitt. Zool. Mus. Berlin, 2, p. 394. (Type, *T. oculus* Walker = *T. albonotatus* Bell.) Kröber, 1932, Rev. Ent., II, 3, pp. 290, 300 (in part). Borgmeier, 1933, Rev. Ent. III, 3, p. 288. Kröber, 1934, Rev. Ent., IV, 2, p. 261 (in part).

Lophotabanus Szilady, 1926, Biol. Hung., I (7), p. 25. Kröber, 1929, Zool. Anz., LXXXIII, p. 120 (14 species, no type). Kröber, in Borgmeier, 1933, Rev. Ent., III, 3, p. 295 (Type, *T. flavibarbis* Macq. 1845). Kröber, 1934, Rev. Ent., IV, 3, p. 295. Bequaert, 1940, Rev. Ent., XI, 1-2, p. 289 (Type, *T. bifloccus* Hine 1925).

The species included in *Lophotabanus* by Szilady (1926) and later authors are, in my opinion, not subgenerically separable from *T. oculus* Wlk., which is the genotype of *Bellardia* Rond. 1863. The only difference seems to be the presence of a closed first posterior cell in *oculus*, but as a number of other species have this cell strongly coarctate, while differing in no other important respect, it would seem best to discard *Lophotabanus* entirely. The limits of the group are not clearly definable, some of the species showing many points in common with *T. sorbillans* Wied., and *T. rubrofemorata* Kröb., species placed by Kröber in *Macrocornus* Lutz and *Bellardia* Rond. I am of the opinion that *T. ferrifer* Wlk., *T. olivaceiventris*, Macq. and other large species with a small black spot on the prescutellum only, show a greater resemblance to a group of large species in-

cluding *T. fuscus* Wied. and *T. cinerarius* Wied., for which Lutz proposed the names *Chelotabanus* and *Odontotabanus*, than they do to *T. oculus* and *T. albocirculus*. For this reason *T. ferrifer* and *T. importunus* Wied., which both have a small prescutellar black spot, are excluded from the group in the present paper.

The group may be characterized as follows: Medium to large sized flies. Eyes bare, unicolorous or with 2 or 3 green bands. Frons medium to narrow, 6 to 10 times as high as basal width. Frontal callus present, of variable shape. Vertexal tubercle absent or weakly developed. Subcallus pollinose. Antennæ variable, generally with a well marked angle above, rarely with a long tooth. Palpi moderately inflated. Proboscis but little longer than palpi, the labella fleshy. Subepaulet with macrotrichia. Wing venation normal, or with the first posterior cell closed or coarctate. Appendix on upper branch of third vein present or absent. Wings hyaline, smoky, or with clouds on the cross veins. Coloration variable, but the prescutellum and disc of scutellum clothed with dense black pubescence which is more or less completely encircled by light hairs. Abdomen generally with mid-dorsal triangles, sometimes with dorso-lateral spots. In a few species the abdomen is unicolorous. The males of some species have the large facets much larger than the small and sharply demarkated from them, while in others, the facets are not greatly differentiated. All described males seem to have a small tubercle at the vertex.

Key to females.

1. Large stout species, 20 mm. or larger. Legs dark brown, the fore tibiæ darker, unicolorous. Abdomen dark brown, black haired, unicolorous. Frontal callus a slender line*de-filippii*.
Smaller, more slender species, 18 mm. or less. Fore tibiæ bicolored, or abdomen with light median triangles, or frontal callus subquadrangular.2.
2. Fore tibiæ prominently white and white haired on basal two-thirds. Frontal callus black. Abdominal triangles pure white. Frons about 10 times as high as wide, narrowest below. First posterior cell narrowly open, rarely closed*albocirculus*.

- Fore tibiæ brown, the apex black haired, the basal two-thirds pale yellowish or brownish haired. Frontal callus brown or yellow. Abdominal triangles yellowish. Frons 8 times as high as wide, or wider3.
3. First posterior cell closed and petiolate*oculus*.
First posterior cell narrowly or broadly open4.
4. Abdomen with a series of prominent mid-dorsal pale haired triangles. Fore tibiæ light haired basally. Antennæ yellowish brown, palpi moderately inflated basally*pseudoculus*.
Abdomen unicolorous, at most with a faint yellowish mid-dorsal stripe. Fore femora, tibiæ and tarsi wholly black, other legs brown. Antennæ black, exceedingly slender, palpi brown, also very slender
..... *piraticus*.

Tabanus (Bellardia) de-filippii Bellardi (Figs. 2, 2a, 2b)

1859, Ditt. Mess., I, pp. 57-58 (♀; Mexico). Osten Sacken, 1878, Cat. Dipt. N. Amer., p. 61. Kertész, 1900, Cat. Taban., p. 47. Surcouf, 1921, Gen. Insect., Taban., p. 66. Hine, 1925, Occ. Pap. Mus. Zool. Univ. Michigan, No. 162, pp. 23, 28. Kröber, 1934, Rev. Ent., IV, 3, p. 295.

Four specimens, three from British Honduras (Stan Creek, Feb. 19, 1940, Komp coll., and Benque Viejo, Stanton Coll.) and one from Panama (Buena Vista, Chiriqui Mt., 1000 ft. May, '26, J. D. Smith coll.) have been compared with the specimens mentioned by Hine (l. c. 1925) and agree with them. *T. clarensis* Hine must be exceedingly close to the present species, the characters used to differentiate the two by Hine being largely intensity of color, *clarensis* being black, *de-filippii* dark brown. As I was unable to find any specimens of *clarensis* in the Hine collection, I am unable to state definitely what the differences between the two may be, if indeed they are distinct.

Female.—Length 20-23 mm., of wing 18-21 mm.

Frons, antennæ and palpi as figured. Frontal callus chestnut brown. Antennæ dull reddish, the annulate portion dusky. Palpi yellowish brown, black haired. Eyes green or greenish black in life, unbanded. Frons and face yellowish brown pollinose, the beard sparse, pale brown-

ish. Mesonotum and pleura rich cinnamon brown, clothed with orange brown hairs. In the Panama specimen there is a tuft of dark hair below the wing insertion, like *puncti-pleura* Hine, but very much more weakly developed. Prescutellum and disc of scutellum densely black haired, with two short white diagonal marks on the mesonotum just before the prescutellum. Posterior margin of scutellum whitish, with long orange hairs. Legs cinnamon brown, the fore pair darker. Wings lightly fumose, darker along the veins. Costal cell yellow. Abdomen dark cinnamon brown, immaculate, black haired above, greyish pollinose beneath. The description drawn mainly from a finely preserved specimen from British Honduras. The Panama specimen is the largest, a little darker, with slightly more slender antennæ and palpi.

Distribution: Mexico to Panama.

Panama records: 1 ♀, Buena Vista, Chiriqui Volcano, 1000 ft., May, 1926 (J. D. Smith).

Tabanus (Bellardia) albocirculus Hine (Figs. 4, 4a, 4b)

1907, Ohio Naturalist, VIII, 4, p. 227 (♀; Tucurrique, Costa Rica); 1925, Occ. Pap. Mus. Zool. Univ. Michigan, No. 62, p. 23. Dunn, 1934, Psyche, XLI, 3, pp. 173-174 (Chiriqui, Panama) (in part). Curran, 1934, N. Am. Dipt., p. 152, fig. 27 (head). Kröber, 1929, Zool. Anz., LXXXIII, pp. 122-123, fig. 5 (♀; Costa Rica); 1934, Rev. Ent., IV, 3, p. 295.

This species is quite variable, both in size and color. Specimens from Chiriqui are largest and darkest, some quite black, and hence most closely agreeing with the type. Specimens from the Atlantic side are also dark, while those from the dry area along the Pacific coast are quite red and rather small. The condition of the first posterior cell is also somewhat variable. Nearly all specimens have it open, a few broadly so, but most strongly coarctate. One specimen from Chiriqui has the cell closed, stalked in one wing, closed at the margin in the other. The wings may be almost glass clear, strongly brown margined along the veins, or quite uniformly fumose. The eye has three broad green bands in life. *T. xipe* Kröber is exceedingly close. I have specimens from the states of Para, Bahia, Goyaz and Matto

Grosso in Brazil which I believe are that species; they average somewhat larger than the Panama specimens, and the structure of the front and callus is slightly but consistently different, as shown in Kröber's and my figures. (Figs. 5, 5a, 5b) Bequaert's record of *T. xipe* from Panama (1940, Bull. Ent. Res., III, 4, p. 449) should certainly be the present species.

Distribution: Costa Rica and Panama.

Panama records: Camp Pital, Chiriqui Prov., July 11-20, 1929 (Dunn); Changuinola Dist., Bocas del Toro; Mt. Hope, C. Z. Oct. 30, 1939, Dec., 1939; Ft. Davis, C. Z. Oct. 30, 1939; Moja Pollo, Chagres River region, May to November, 1940; Venado Beach, C. Z. June 22, 1939; Utevey, near Pacora, May 18, 1941; Pacora, Dec. 21, 1931 (Dunn.).

***Tabanus (Bellardia) oculus* Walker (Figs. 3, 3a, 3b)**

Tabanus oculus Walker, 1848, List Dipt. Brit. Mus., I, p. 157 (♀; Honduras and Colombia); 1854, Op. cit., V, Suppl. I, p. 190. Osten Sacken, 1878, Cat. Dipt. N. Amer., p. 61. Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 146. Bodkin and Cleare, 1916, Bull. Ent. Res., VII, p. 187, (British Guiana). Hine, 1925, Occ. Pap. Mus. Zool. Univ. Michigan, No. 162, p. 23. Bequaert, 1931, Jour. New York Ent. Soc., XXXIX, p. 540-541, fig. 1a. (♀; Yucatan, Guatemala, Honduras, Br. Honduras). Dunn, 1929, Am. J. Trop. Med., IX, p. 501 (Colombia; as *occulatus*).

Bellardia oculus Kröber, 1929, Zool. Anz., LXXXIII, p. 121; 1934, Rev. Ent., IV, 2, p. 261.

Tabanus albonotatus Bellardi, 1859, Ditt. Mess., I, p. 56, Pl. II, fig. 5. (♀; Mexico, Tampico). Osten Sacken, 1878, Cat. Dipt. N. Amer., p. 60; 1886, Biol. Centr. Amer., Dipt. I, p. 55. Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 139. Williston, 1901, Biol. Centr.-Amer., Dipt. I, Suppl., pp. 257, 260. Aldrich, 1905, Cat. N. Amer. Dipt., p. 200. Kertész, 1900, Cat. Tab., p. 38; 1908, Cat. Dipt., III, p. 219. Surcouf, 1921, Gen. Insect., Taban., p. 59. Bequaert, 1925, 13th Rep. United Fruit Company Med. Dept., (1924) p. 206.

Bellardia albonotatus Rondani, 1863, Arch. per la Zool., Modena, III, I, p. 81.

Tabanus bipartitus Walker, 1848, List. Dipt. Brit. Mus.,

I, p. 158 (♀; Honduras); 1854, Op. cit., V. Suppl. I, p. 190. Osten Sacken, 1878, Cat. Dipt. N. Amer., p. 60.

A specimen from British Honduras is before me, and as "Honduras" was a type locality for both Walker's names, it may be taken to represent the typical form. This specimen, and another from Panama, have the eyes (revived) with 2 broad green transverse bands and the lower margin green. Four females from Mexico, two of them from Osten Sacken's collection and determined by him as *albonotatus* Bell., and two from Vera Cruz (Crawford), differ from the Honduras and Panama specimens in having an additional short green stripe on the eyes, above the other two, and in the frons being slightly narrower and more convergent. If further material should show these slight differences to be constant or correlated with geographical distribution, *albonotatus* might be retained in a varietal or subspecific sense. Bequaert, (1931, Journ. New York Ent. Soc., XXXIX, p. 541), discussing material from Yucatan and Honduras, remarks that most of his material has the eye two-banded, but that more rarely there is a third band above the other two. The records of Bodkin and Cleare and Dunn probably refer to other species.

Distribution: Mexico to Panama; "Colombia" (Walker).

Panama records: 1 ♀, Camp Pital, Chiriqui Province, July 11-20, 1929 (L. H. Dunn).

Tabanus (Bellardia) pseudoculus sp. nov. (Figs. 1, 1a, 1b)

Female.—Length 13-17 mm., of wing, 12-15 mm.

Frons, antennæ and palpi as figured. Eyes purple, with 2 narrow green bands and the lower margin narrowly green. Antennæ wholly reddish yellow, the first two segments black haired. Frontal callus light reddish brown. Palpi whitish, with black and white hairs. Subcallus, fronto-clypeus and genæ with greyish yellow pollen, the latter with a sparse whitish beard. Mesonotum brown, with grey pollinosity and sparse yellowish pubescence. Pleura grey, yellowish grey haired. Spot on scutellum covering prescutellum and disc of scutellum, completely encircled by yellowish white hairs. Legs light brown, mostly white haired, the apex of fore tibiæ and all tarsi darker and black haired. The fore tibiæ are not prominently bicolored. Wings hyaline, the

veins sometimes narrowly brown margined. First posterior cell always narrowly open; appendix on third vein constant, generally longer than the distance from its origin to the furcation of the vein. Abdomen brown, greyish pollinose and black haired. The first to fifth tergites bear small median triangles of yellowish hairs. Venter lighter, wholly yellowish haired, except the last sternite which bears erect black hairs.

Male.—Similar to the female in coloration. Large eye facets distinctly differentiated and demarkated from the small, occupying about half to two thirds of total eye area. Large facets pale tan, small facets purple, with a narrow band and the lower margin green in life. A small tubercle is present between the eyes at vertex.

Holotype ♀, Moja Pollo, Chagres River region, Panama, Dec. 6, 1939; Allotype ♂, same locality, June 12, 1940; 39 ♀ Paratypes, same locality, Dec. 6, 1939, (6) Jan. 19, (2) Jan. 23, (1) Jan. 31, (1) Feb. 16, (8) May 2, (1) May 15, (4) May 27, (4) June 12, (2) June 24, (3) July 8, (1) July 23, (2) Aug. 4, (1) Aug. 18, (1) Sept. 1, (1) and Sept. 7 (2), all 1940. 3 ♀ Paratypes, El Real, Darien, Panama, Feb. 10, 1940. 2 ♀ Paratypes, New San Juan, Chagres River region, Panama June 28 and July 2, 1939. 1 ♀ Paratype, Juan Mina Station, Chagres River region, C. Z. May 9, 1939. 1 ♀ Paratype, Camp Pital, Chiriqui, Panama, July 11-20, 1929 (Dunn). Besides the above, I have numerous females unpinned from Moja Pollo, with dates ranging from March 1940 to March 1941. Holotype, Allotype, and 3 Paratypes to be deposited in the M. C. Z.

This species was confused by Dunn (1934) with true *albocirculus* Hine, from which it may be distinguished by the characters in the key. It flies in company with that species, and appears to be about equally abundant. The relationship between the present species and *oculus* Wlk. appears to be very close, the main differences being the much narrower green bands of the eye, the open first posterior cell and the somewhat broader and parallel sided frons of *pseudoculus*. Ordinarily, little importance could be attached to the venational character, but in this case it appears to be relatively stable, all specimens of *oculus* seen having the cell closed and long petiolate, while in *pseudoculus* it is always very clearly open.

Tabanus (Bellardia) piraticus n. sp. (Figs 7, 7a, 7b)

Lophotabanus fumomarginatus Kröber, 1929, Zool. Anz., LXXXIII, pp. 131-132, fig. 11. Dunn, 1934, Psyche, XLI, 3, p. 174. (nec *T. fumomarginatus* Hine, 1920, Ohio Journ. Sci., XX, 8, pp. 315-316.).

Female.—Length 13-16.4 mm., of wing 12-15 mm.

Frons, antennæ and palpi as figured. Frons and face dull yellowish brown, beard sparse, brownish. Callus orange yellow. First two antennal segments yellow, black haired, the third nearly black. Palpi dull brownish yellow, black haired. Proboscis blackish, the labellæ fleshy, more than half total length of proboscis. Eyes bare, dark greenish black, unicolorous in life.

Mesonotum orange brown, sparsely brown haired. Pleura and coxæ somewhat more greyish. Prescutellum and disc of scutellum with a prominent large spot of black pilosity, completely encircled with pale golden hairs. Legs light brown, dark haired, the fore femora, tibiæ and tarsi darker; the tibiæ not bicolored. Wings quite smoky, either rather uniformly so, or with the veins broadly brown margined. First posterior cell broadly open and no vestige of an appendix on the third vein. Abdomen orange brown in ground color, clothed with dark and light brown hairs, the latter forming an exceedingly faint, broad mid-dorsal stripe or series of broad connected triangles, which are only visible in perfect specimens with light of proper incidence. Beneath, the abdomen is somewhat lighter with sparse light hairs.

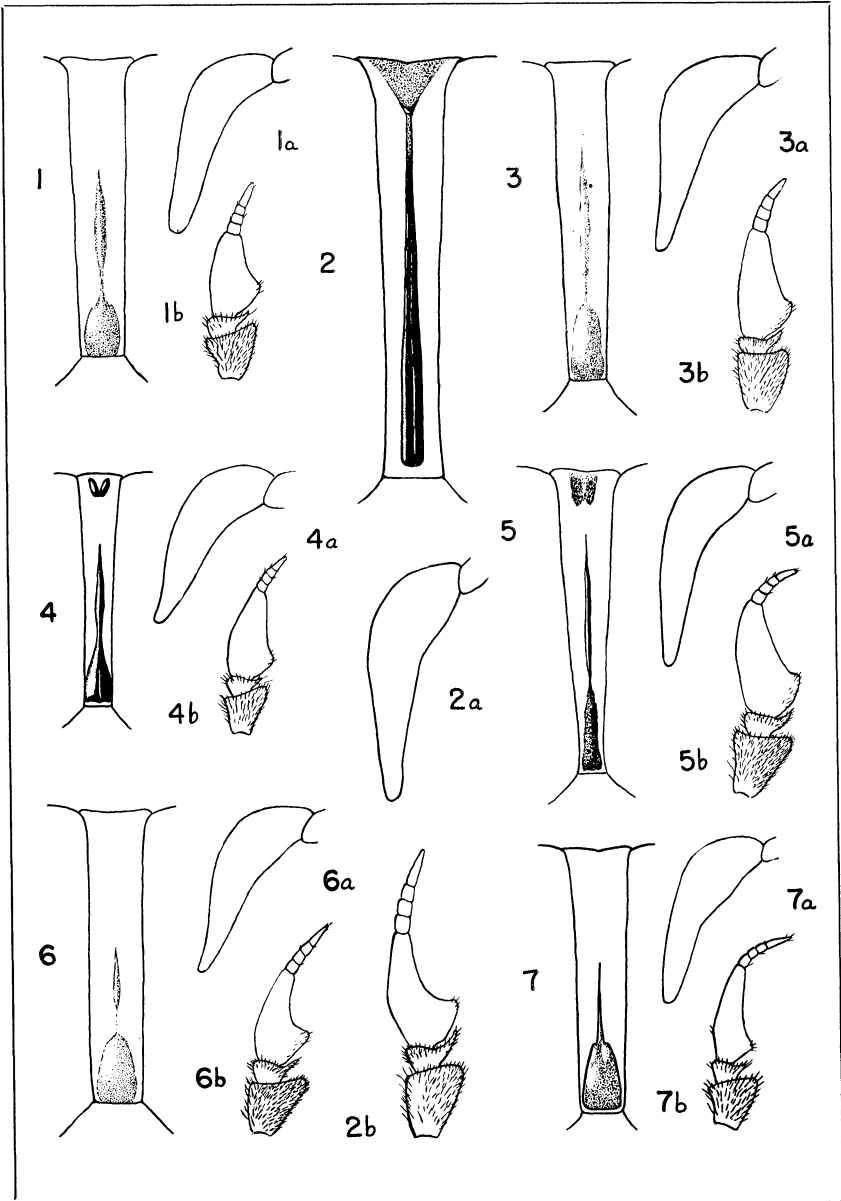
Holotype ♀, Old Cruces trail, Canal Zone Forest reserve, Nov. 19, 1939; Paratypes, 2 ♀, same data; 8 ♀, Cruces trail and C. Z. forest reserve, July 8, Oct. 11, Oct. 23, and Nov. 6, 1939; 3 ♀, Barro Colorado Is., C. Z. Nov. 10-13, 1939; 1 ♀, Barro Colorado Is., Oct. 20 (M. Bates, coll.); 1 ♀, Camp Pital, Chiriqui Prov., Panama, July 12, 1929 (L. H. Dunn coll., det. as *fumomarginatus* Hine); 7 ♀ Rio Pequeni, Panama, Aug. 21, 1940; 1 ♀ El Valle, Coclé Prov., July, 1939. Holotype and 3 paratypes to be deposited in the Museum of Comparative Zoology, Harvard University, other paratypes to be deposited in U. S. N. M. and author's collection.

I have compared the present species with a paratype of *fumomarginatus* Hine in the Hine collection, and believe it to be abundantly distinct. *Fumomarginatus* is larger, 18 mm., stouter, and with a broader frons and different antennæ. Specimens of the present species in the Hine collection are labelled *unipunctatus* Bigot, but in Hine's MS notes there is a statement that *unipunctatus* Bigot = *jilamensis* Hine. Specimens of *jilamensis* before me from Lancetilla, Tela, Honduras, (Figs. 6, 6a, 6b) agree perfectly with Hine's description, and are practically topotypes. They differ quite markedly from the present species in the shape of the frontal callus and antennæ, in the rather prominent mid-dorsal abdominal stripe, and in the green banded eye. On the other hand Kröber (1939, p. 133), stating that the type of *unipunctatus* is a poorly preserved specimen, uses the name for specimens from French Guiana, which appear to be different from *jilamensis* Hine, *fumomarginatus* Hine, and the present species. Kröber's *fumomarginatus*, from Costa Rica, is with little doubt the present species. In view of the reported condition of Bigot's type, it is still possible that Hine and Kröber were wrong, and that the present species is really *unipunctatus*, but since anything approaching certainty in the matter is at present impossible, it seems better to describe the present species as new. The specimen mentioned by Osten Sacken (1868, Biol. Centr.-Amer., Dipt., I, p. 56) from Bugaba, Panama, may well have been this species.

EXPLANATION OF PLATE 1

- Figs. 1, 1a, 1b. *T.(B.) pseudoculus* n. sp. Paratype.
 Figs. 2, 2a, 2b. *T.(B.) de-flippii* Bell.
 Figs. 3, 3a, 3b. *T.(B.) oculus* Walk.
 Figs. 4, 4a, 4b. *T.(B.) albocirculus* Hine.
 Figs. 5, 5a, 5b. *T.(B.) xipe* Kröber.
 Figs. 6, 6a, 6b. *T.(B.) jilamensis* Hine.
 Figs. 7, 7a, 7b. *T.(B.) piraticus* n. sp. Paratype.

Figures are of frons, palpus and antenna, and are all drawn to the same scale.



Fairchild — Tabanidæ of Panamá



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