
Notes on Tabanidae (Dipt.) from Panama. I. The genera
Chlorotabanus and *Cryptotylus*¹

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(With 5 figures)

The flies considered in the present paper form a rather distinct group within the family Tabanidae. They are all bright green or greenish in life, the eyes light brown to chocolate brown without the green or purple iridescence so common in other members of the family. The frontal callus is either entirely lacking or weakly developed, the subepaulet is without macrotrichia, the labella bear shiny chitinized plates, and the palpi are moderately inflated. In the males, where this sex is known, the eyes are large, bare, holoptic and with an extensive area of sharply differentiated large facets. The early stages of but one species, *Chlorotabanus mexicanus*, have been studied. The larva is green, covered with a very fine silky pubescence, and with extensive fine, dark mottling, much resembling a large larva of *Lepiselaga crassipes*. The pupa has not yet been carefully studied, but it is hoped to publish a detailed description of both in the near future.

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The species of this group seem all to be crepuscular or even nocturnal, and at least three, *Chlorotabanus inanis*, *Chl. mexicanus*, and *Cryptotylus unicolor* are sufficiently abundant to be, at times, serious pests of stock.

Chlorotabanus Lutz

Genotype: *Tabanus mexicanus* L. 1767.

Lutz, 1909, Inst. Osw. Cruz em Manguinhos, p. 30 (*T. mexicanus* L. sole species); 1911, Int. Hyg. Ausst., Dresden, p. 35; 1913, Brazil Medico, N.º 45, p. 6 (reprint, key only); 1914, Mem. Inst. Osw. Cruz, VI, 3, p. 167 (reprint of 1913 paper). — Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz, VI, 2, pp. 70-71. — Bequaert, 1924, Psyche, XXXI, 1, p. 27. — Enderlein, Mitt. Mus. Berlin, XI, 2, p. 404 (= *Stenotabanus* Lutz). — Kröber, 1929, Ann. Nat. Mus. Wien, XLIII, p. 246; 1930, Zool. Anz. LXXXVII, 1-2, pp. 14-18, Figs. 12-13 (subgenus of *Tabanus*); 1932, Rev. Ent., II, 2, p. 201 (key, subgenus of *Tabanus*). — Borgmeier, 1933, Rev. Ent., III, 3, p. 289, with *Ommallia* End. as syn. and *mexicanus* L. as type). — Kröber, 1934, Rev. Ent., IV, 3, pp. 296-297 (as subgenus). — Stone, 1938, U. S. Dep. Agric., Misc. Publ. N.º 305, p. 27.

The species of *Chlorotabanus* are bright leaf green in life, whitish or yellow haired, with no vestige of a frontal callus, and the third antennal segment is broad and flat with an obtuse angle above. Besides the two species in our fauna, two others have been described, *crepuscularis* Bequaert from the southern United States, and *parviceps* Kröber from a single male from Brasil.

The four known species may be separated by the following key:

1. Wings entirely hyaline 2
- Wings with dark spots at least on the major cross-veins 3
2. Head of male wider than thorax *inanis* Fab.
- Head of male not wider than thorax (female unknown; Brasil). *parviceps* Kröb.
3. All cross-veins and apices of all veins posterior to the first longitudinal heavily black marked. Apices of all tibiae with black rings. *mexicanus* L.
- Only the major cross-veins with light clouds. Tibiae unmarked. (Southern U.S.) *crepuscularis* J. Beq.

Chlorotabanus inanis (Fab.) (Figs. 1, 1a, 1b)

Tabanus inanis Fabricius, 1794, Ent. Syst., IV, p. 368 (Cayenne). — Knab, 1916, Ins. Ins. Mons., IV, p. 99. — Bequaert, 1926, Med. Rep. Exped. Amazons, p. 232 (Pará, Brasil). — Dunn, 1934, Psyche, XLI, 3, p. 174 (Panamá).

Chlorotabanus inanis Kröber, 1929, Ann. Nat. Mus. Wien, XLIII, p. 246 (in part); 1930, Zool. Anz., LXXXVII, pp. 15-17, fig. 12 (in part); 1934, Rev. Ent., IV, 3, p. 71 (São Paulo and Matto Grosso, Brasil).

Tabanus ochroleucus Moizon, 1804, Klass. u. Beschr. Europ. Zweifl. Ins., I, p. 172 (male, female; no locality); 1820, System. Beschr. Europ. Zweifl. Ins., II, p. 60 (male, female). — Bodkin and Cleare, 1916, Bull. Ent. Res., VII, p. 187 (Brit. Guiana).

Tabanus sulphureus Macquart, 1847, Dipt. Exot., Suppl. II, p. 19 (no sex; Brasil). — Walker, 1854, List Dipt. Brit. Mus., V, p. 215. — Hunter, 1901, Trans. Amer.

- Ent. Soc., XXVII, p. 144. — Lutz, 1907, Centralbl. Bakt. Parasitenk., Abt. 1, Orig., XLIV, p. 142. — Kertész, 1908, Cat. Dipt., III, p. 283. — Surcouf, 1921, Gen. Insect., Taban., p. 85.
- Tabanus viridi-flavus* Walker, 1850, The Zoologist, VIII, Appendix, p. LXVI (female; Brasil). — Lutz, 1907, Centralbl. Bakt. Parasitenk., Abt. 1, Orig., XLIV, p. 143.
- Tabanus inconspicuus* Walker, 1848, List Dipt. Brit. Mus., 1, p. 171. — Kertész, 1900, Cat. Tab., p. 55. — Surcouf, 1921, Gen. Insect., Taban., p. 71.
- Tabanus mexicanus* Fabricius, 1805, Syst. Antliat., p. 98 (in part, nec. Linn.). — Walker, 1854, List Dipt. Brit. Mus., V, p. 215 (as var. ?). — Bellardi, 1859, Sagg. Ditt. Mess., part 1, p. 59 (as a var.). — Aldrich, 1905, Cat. N. A. Dipt., p. 205 (in part, nec. Linn.). — Lutz, 1907, Centralbl. Bakt. Parasitenk., Abt. 1, Or g., XLIV, p. 141. — Kertész, 1908, Cat. Dipt., III, p. 260. — Lutz and Neiva, 1909, Mem. Inst. Osw. Cruz, I, pp. 30, 32. — Lutz, 1912, Mem. Inst. Osw. Cruz, IV, 1, p. 80; 1912, Comm. Lisha Telegr. Matto Grosso, App. 5, Zool., Taban., p. 3.
- Chlorotabanus mexicanus* Lutz, 1909, Inst. Osw. Cruz em Mangueiras, p. 30 (nec. *T. mexicanus* Linn.). — Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz, VI, 2, p. 71 (Rio de Janeiro). — Neiva and Penna, 1916, Op. cit., VII, pp. 94, 97. — Lutz, Araujo and Fonseca, 1918, Op. cit., X, pp. 166-167. — Lutz, 1928, Est. Zool. Parasit. Venezolanas, p. 56, pl. 9, fig. 6 (female).

Female: length, 11-12 mm., of wing, 10-11 mm.

Pale leaf green throughout in life, fading to straw color after death. Eyes pale tan or chocolate brown. Mesonotum with white or pale yellow pubescence. Abdomen often dusky in fed specimens. Proboscis brown or black. Wings hyaline, costal cell and basal cells yellowish. Third vein with a short stump or none. Male similar to the female. Apparently abundant throughout the Republic.

Distribution: I have seen specimens from Paraguay to British Honduras. Bellardi records it from Mexico.

Panama records: Camp La Vaca, nr. Puerto Armuelles; Chiriqui, II, 18-30 (Dunn). El Real; Darien (Dunn). Barro Colorado Is., C. Z., II-1-35 (Bates). Cabima, V-24-11 (Busck). Rio Bejuco (Schaus). Moja Pollo, Chagres River between Gamboa and Madden Dam, Jan. to June.

Chlorotabanus mexicanus (Linn.). (Figs. 2, 2a, 2b)

- Tabanus mexicanus* Linnaeus, 1767, Syst. Nat., 12th Ed., 1, pt. 2, p. 1000 (no sex; S. America). — Fabricius, 1781, Spec. Insect., II, p. 457 (Surinam); 1787, Mantissa Insect., II, p. 355; 1794, Ent. Syst., IV, p. 367; 1805, Syst. Antl., p. 98. — Wiedemann, 1821, Dipt. Exot., 1, p. 76 (female S. America); 1828, Aussereurop. Zweifl. Ins., 1, p. 147 (male, female). — Macquart, 1838, Dipt. Exot., 1, pt. 1, p. 143 (in part). — Walker, 1854, List Dipt. Brit. Mus., V, Suppl. 1, p. 215. — Osten Sacken, 1886, Biol. Cent. - Amer., Dipt., 1, p. 56 (female; Brit. Honduras). — Kertész, 1900, Cat. Taban., p. 60 (in part). — Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 142 (in part). — Williston, 1901, Biol. Centr.-Amer., Dipt., 1, Suppl., p. 257. — Kertész, 1908, Cat. Dipt., III, p. 260 (in part). — Knab, 1916, Ins. Ins. Mens., IV, p. 96, fig. 1 (1). — Surcouf, 1921, Gen. Insect., Taban., p. 75 (in part). — Bequaert, 1926, Med. Rep. Exped. Amazons, p. 234.
- Chlorotabanus mexicanus* Kröber, 1930, Zool. Anz., LXXXVII, p. 18; 1931, Stett. Ent. Zeit., XCII, p. 91; 1934, Rev. Ent. IV, 3, p. 297.
- Tabanus olivaceus* Degeer, 1776, Mém. Serv. Hist. Ins., VI, p. 229, pl. XXX, fig. 6 (female; Sra.nam).
- Tabanus punctatus* Fabricius, 1787, Mantissa Insect., II, p. 355 (no sex; Cayenne); 1794, Ent. Syst., IV, p. 368.
- ? *Tabanus punctum* Rondani, 1848, in Baudi and Truqui, Studi Entom., I, p. 105 (male, female; Brasil). — Walker, 1854, List Dipt. Brit. Mus., V, Suppl. 1, p. 326. — Kertész, 1900, Cat. Tab., p. 66. — Hunter, 1901, Trans. Amer. Ent. Soc.,

XXVII, p. 143. — Lutz, 1907, Centralbl. Bakt. Parasitenk., Abt. 1, Orig., XLIV, p. 143. — Kertész, 1908, Cat. Dipt., III, p. 271. — Surcouf, 1921, Gen. Insect., Taban., p. 80.
Tabanus tetrapunctus Thunberg, 1827, Nova Acta Soc. Sci. Upsal., IX, p. 57, pl. 1, fig. 2 (no sex, but evidently female; Brasil and the islands of S. America).

Female: length, 12-13 mm., of wing, 11-12 mm.

Wholly pale leaf green in life, fading to dirty straw yellow in collections. Frons somewhat broader and dorsal angle of third antennal segment somewhat more pronounced than in *inanis*. Wings hyaline, costal cell yellowish, all cross veins and apices of all veins posterior to the first longitudinal (R_1) with prominent dark clouds. Apices of tibiae with dark rings, and tarsi dusky. Male similar to the female except for sexual characters. The wing spotting is somewhat variable, specimens from Darien having the spots paler and smaller than those from the Canal Zone region.

The probable synonymy of *T. tetrapunctus* Thunb. was pointed out to me by Dr. Bequaert, and the original description certainly fits the present species better than it does *Dichelacera alcornis*, in whose synonymy it is placed by Surcouf (1921, Gen. Insect., Taban., p. 92) and Kröber (1934, Rev. Ent., IV, 2, p. 264).

The species occurs in company with *Chl. inanis* and appears to be equally common.

Distribution: Recorded from Mexico to Venezuela and Trinidad.

Panama records: El Real, Pihuila, and Boca de Cupe, Darien, Feb. and March. Barro Colorado Is., C. Z., VI-3-35, 1 ♂ (Friedmann). Moja Pollo, Jan. to June. Pacora, IV-1939, 1 ♀ (ex larva). Cruces Trail, C. Z. III-12-39.

Cryptotylus Lutz

Genotype: *Tabanus unicolor* Wied., 1828.

Lutz, 1909, Inst. Osw. Cruz em Manguinhos, p. 29 (*T. unicolor*, sole species); 1911, Int. Hyg. Ausst. Dresden, p. 35 (translation of 1909 paper); 1913, Brazil Medico, N.º 45, p. 5 (in key, no species); 1914, Mem. Inst. Osw. Cruz, VI, 3, p. 165, 166 (reprint of 1913 paper); 1922, Zoologia Medica, Publ. sep. da Folha Medica, Rio de Janeiro, pp. 8 (with *unicolor*), 10 (in key); 1928, Est. Zool. Parasit. Venezolanas, p. 56 (*unicolor* Wied. and *ochraceus* Macq., in list). — Lutz and Machado, 1915, Mem. Inst. Osw. Cruz, VII, p. 47. — Lutz, Araujo and Fonseca, 1918, Mem. Inst. Osw. Cruz, X, p. 166. — Noiva and Penna, 1916, Mem. Inst. Osw. Cruz, VIII, p. 94. — Bequaert, 1924, Psyche, XXXI, 1, pp. 28, 30 (listed as nomen nudum). — Kröber, 1932, Rev. Ent., II, 2, p. 192 (listed as nomen nudum). — Borgmeier, 1933, Rev. Ent., III, 3, p. 290 (Type, *T. unicolor* Wied. Synonym of *Amphichlorops* Lutz 1909). — Kröber, 1934, Rev. Ent., IV, 3, p. 321 (syn. of *Amphichlorops*).

Ommallia Enderlein, 1923, Deutsche Ent. Zeitschr., p. 545; 1925, Mitt. Mus. Berlin, XI, 2, p. 388, (Type: *O. viridis* End.). — Kröber, 1930, Zool. Anz., LXXXVII, 1-2, p. 17 (= *Chlorotabanus* Lutz).

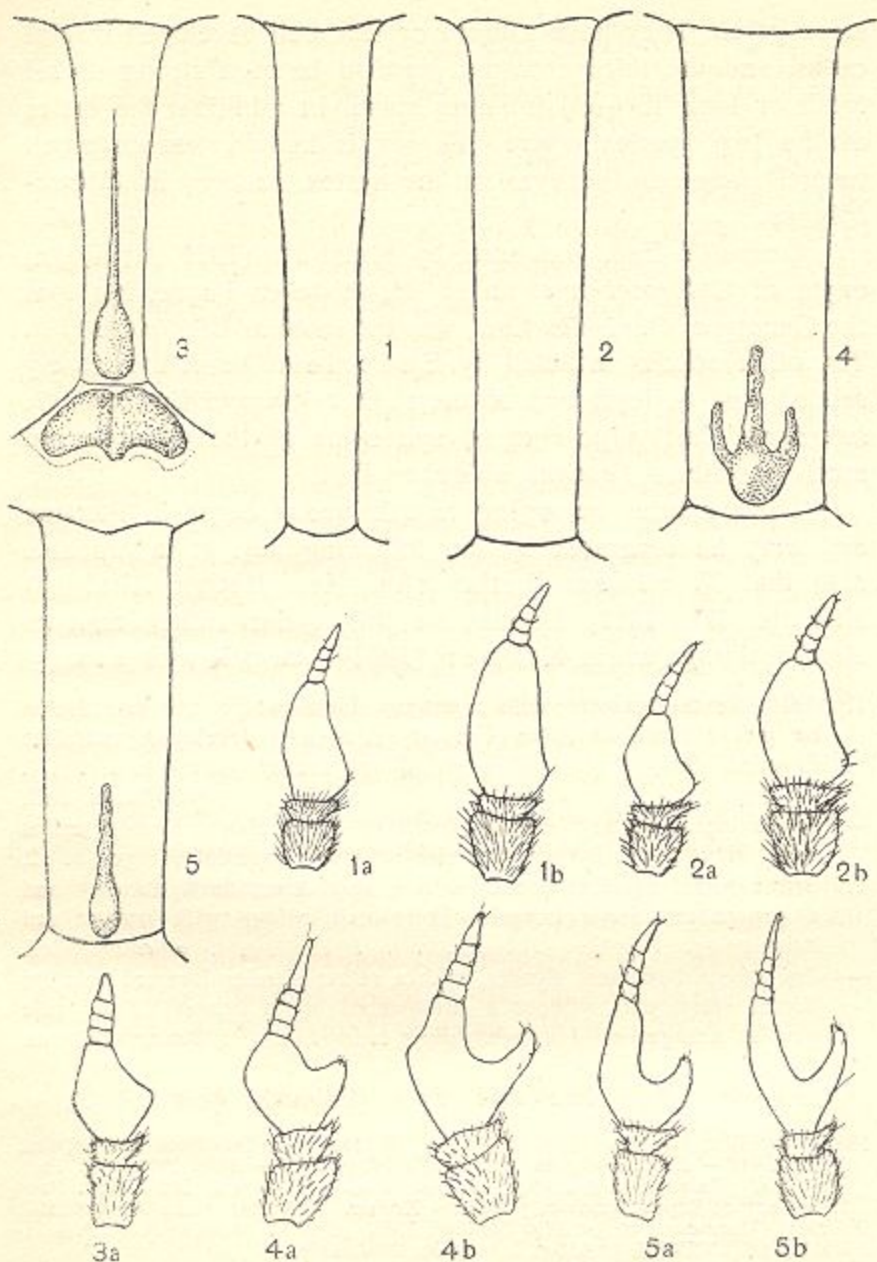


Fig. 1 *Chlorotabanus inanis* (Fabr.), frons; 1a, antenna of female; 1b, antenna of male — Fig. 2. *Chlorotabanus mexicanus* (Linn.), frons; 2a, antenna of female; 2b, antenna of male. — Fig. 3. *Cryptotylus luteostavus* (Bell.), frons; 3a, antenna of female. — Fig. 4. *Cryptotylus unicolor* (Wied.), frons; 4a, antenna of female; 4b, antenna of male. — Fig. 5. *Cryptotylus limonus* (Townsend), frons; 5a, antenna of female; 5b, antenna of male.

The species of *Cryptotylus* are darker colored than those of *Chlorotabanus*, yellow to brown, with the less pigmented

areas green. They have a more or less well developed frontal callus, and the third antennal segment bears a strong dorsal tooth or long forward pointing spine. In addition, the males of the two species where this sex is known, bear a small tubercle between the eyes at the vertex, lacking in *Chlorotabanus*.

Ommallia End. was sunk by Kröber (1930) as a synonym of *Chlorotabanus*, under the mistaken impression that the Genotype, *O. viridis* End., was the same as *Chl. inanis* (F.). The other species included by Enderlein seem not closely related, and at least two of them, *O. thiemeana* End. and *O. interrupta* End. appear to be synonyms of the variable and much described *Tabanus subruber* Bell.

Three species belonging to this group occur in Panama and may be separated by the following key. It is probable also that *T. princeps* Brèthes (An. Mus. Buenos Aires (3) XIII, p. 478. 1910) belongs in this genus rather than in *Amphichlorops* where Kröber (1934) places it with a query.

1. 3rd antennal segment with a strong dorsal angle, but not drawn out into a tooth or spine. Frontal callus well developed, subcallus decauded. Body dusky yellowish. Wings faintly yellowish *luteoflavus* Bell.
- 3rd antennal segment with a tooth or spine above. Frontal callus weak, subcallus pollinose. Body rich rufous to greenish orange 2.
2. 3rd antennal segment broad, with a stout erect tooth dorsally and a pronounced angle beneath. Body rich rufous with orange red hairs *unicolor* Wied.
- 3rd antennal segment slender, with a rather slender forward pointing dorsal spine, and without a pronounced angle beneath. Body pale greenish orange, with orange yellow hairs *limonus* Towns.

Cryptotylus luteoflavus (Bellardi) (Figs. 3, 3a)

1859, Sagg. Ditt. Mexicana, I, p. 60 (female, Mexico). — Osten Sacken, 1878, Cat. Dipt. p. 61. — Knab, 1916, Ins. Ins. Mens., IV, p. 100. — Hine, 1925, Occ. Pap. Mus. Zool. Univ. Michigan, N.º 162, pp. 31-32. — Boquert, 1926, Med. Rep. Rice-Harvard Exped. Amazon, p. 234. — Kröber, 1934, Rev. Ent., IV, 3, p. 297. *Tabanus* (*Macrocornus*) *pallidus* Kröber, 1930, (nec. *T. pallidus* P. de P. 1821) Zool. Anz. LXXXVII, p. 4, fig. 1. (female, Guatemala).
Tabanus (*Macrocornus*) *pallidulus* Kröber, 1934, Rev. Ent., IV, 3, p. 303.

In addition to the characters given in the key, the following may be useful in identification. Length of body and head 12-14 mm, of wing, 10-12 mm. Whole insect dusky yellowish to orange brown, with no conspicuous markings, slightly greenish in life. Eyes in life with a shifting pattern of dark spots on a pale brownish ground; in some specimens

a faint dark, median, transverse line is visible. Frontal callus distinct, yellow, rounded, about half as wide as frons and prolonged above in a thin line. Subcallus denuded and shiny, in most specimens with a median pollinose groove. Palpi as long or longer than antennae, moderately inflated, yellowish with mixed yellow and black hairs. Proboscis with the labella occupying at least half its total length, the shiny chitinized plates reduced to a narrow strip along the anterior margins. Wings distinctly dusky, yellowish along the costa and basally, and in all my specimens with a moderate to long appendix on the third vein.

A careful study of Bellardi's description leads me to the above synonymy. He says «... fronte iatiuscula, ad basim antennarum nitida;» which would seem to indicate a denuded subcallus. Of the third antennal segment he says «tertio valde lato, compresso, profunde anguloso, dense obtuso,» which I interpret as rather broad, flattened, and with a strong thickly obtuse angle. It is to be noted that Bellardi invariably referred to antennae with a long tooth as «falcato.» Hine's (1925) material seems to have been correctly identified, except that he mentions neither the shape of the antennae nor the denuded subcallus.

The species is not rare in certain localities in Panama, but is crepuscular and hence not so often noticed. The male is so far unknown.

Distribution: Mexico (Bellardi, Walker), Guatemala, Honduras (Hine), Panama.

Panama records: Juan Mina Sta., C. Z. II-8-39. Moja Pollo, R. de P., Dec., Jan., Feb., March, April, May, June.

Cryptotylus unicolor (Wied.). (Figs. 4, 4a, 4b)

- Tabanus unicolor* Wiedemann, 1828, Auss. Zweifl. Ins., 1, p. 141 (female; Brasil). — Walker, 1854, List Dipt. Brit. Mus., V, Suppl. 1, pp. 215, 326. — Williston, 1895, Kansas Univ. Quart., III, 3, p. 195. — Kertész, 1900, Cat. Taban., p. 76. — Hunter, 1901, Trans. Amer. Ent. Soc. XXVII, p. 144. — Lutz, 1907, Contrabl. Bakt. Paras., Abt. 1, Orig., XLIV, p. 143. — Kertész, 1908, Cat. Dipt., III, p. 290. — Lutz and Neiva, 1909, Mem. Inst. Osw. Cruz, I, 1, p. 30. — Surcouf, 1921, Gen. Insect., Taban., p. 87. — Bequaert, 1925, Med. Rep. Harvard Exped. Amazons, p. 232. — Dunn, 1934, Ecology, XV, 3, p. 330. (larva in *Pistia*; no descr.).
- Cryptotylus unicolor* Lutz, 1909, Inst. Oswaldo Cruz em Manguinhos, p. 29. — Lutz and Machado, 1915, Mem. Inst. Osw. Cruz, VII, p. 47. — Neiva and Penna, 1916, Loc. cit., VIII, p. 94. — Lutz, Araujo and Fonseca, 1918, Loc. cit., X, p. 166. — Lutz, 1928, Est. Zool. Parasit. Venezolanas, p. 56.
- Amphichlorops unicolor* Kröber, 1929, Anu. Naturh. Mus. Wien, XLIII, p. 245 (female; Amazonas, Peru); 1934, Rev. Ent., IV, 2, p. 271.
- Gymnocheila* (*Amphichlorops*) *unicolor* Kröber, 1932, Rev. Ent., II, 1, pp. 90-91.
- Stigmatophthalmus unicolor* Enderlein, 1925, Mitt. Mus. Berlin, IX, p. 387.
- ? *Tabanus ferrugineus* Thunberg, 1827, Nova Acta Soc. Sci. Upsal., IX, p. 55 (Cayenne; nec *T. ferrugineus* Meigen 1804).

Tabanus ochraceus Macquart, 1838, Dipt. Exot. I, 1, p. 149; 1845, Mem. Soc. Sci. Arts Agric. Lille, (1844), p. 174 (Cayenne); 1846, Dipt. Exot. Suppl. 1, p. 42. — Walker, 1854, List Dipt. Brit. Mus., V, Suppl. 1, p. 265. — Kertész, 1900, Cat. Taban., p. 64. — Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 143. — Kertész, 1900, Cat. Dipt., III, p. 64. — Hunter, 1901, Trans. Amer. Ent. Soc., XXVII, p. 143. — Kertész, 1908, Cat. Dipt., III, p. 266. — Surcouf, 1921, Gen. Insect., Taban., p. 78.

? *Cryptotylus ochraceus* Lutz, 1928, Est. Zool. Parasit. Venezolanas, p. 56. (? nec. Macquart).

Atylotus aurisquammatum Bigot, 1892, Mém. Soc. Zool. France, V, p. 665 (female; Brasil).

Tabanus aurisquammatum Kertész, 1900, Cat. Taban., p. 41; 1908, Cat. Dipt., III, p. 226. — Surcouf, 1921, Gen. Insect., Taban., p. 61.

Chlorotabanus inanis Kröber, 1929, Ann. Naturh. Mus. Wien, XLIII, p. 246, fig. 2 (in part, male only).

Female: length, 14-16 mm., of wing, 12-14 mm.

Wholly rich orange rufous, with a trace of greenish showing through on legs and antennae in life. Wing hyaline, costal and basal cells tinged with orange, appendix on third vein occasionally present, but generally absent in Panama material. Male much lighter, greenish yellow with golden yellow pilosity.

Dr. Bequaert, with access to the original description, has suggested the synonymy of *T. ochraceus* Macq. Kröber (1934, p. 371) lists it as a synonym of *T. planiventris* Wied.

The species seems quite abundant in at least the eastern half of the Republic.

Distribution: Southern Brasil to Panama. I have seen material from southern Matto Grosso (Maracajú), Goyaz (Anapolis), Trinidad and Panamá.

Panama records: El Real, Darien, II-10-40 (Jobbins). Miraflores, C. Z. May, 1930 (Dunn). Cruces Trail, C. Z. VII-8-39. Moja Pollo, Jan. to June. Summit, C. Z. VII-23-32.

Cryptotylus limonus (Townsend) (Figs. 5, 5a, 5b)

Tabanus mexicanus var. *limonus* C. H. T. Townsend, 1897, Ann. Mag. Nat. Hist., (6), XX, p. 21. — Knab, 1916, Ins. Ins. Mens., IV, p. 100 (= *luteoflavus* Bell.).

— Hine, 1925, Occ. Pap. Mus. Zool. Univ. Michigan, N.º 162, p. 31 (= *luteoflavus* Bell.). — Kröber, 1934, Rev. Ent. IV, 3, p. 297 (= *luteoflavus* Bell.).

Ommallia viridis End. 1925, Mitt. Mus. Berlin, XI, p. 389. — Kröber, 1930 Zool. Anz. 87, 1-2, p. 17 (= *inanis* F.); 1934, Rev. Ent., IV, 3, p. 396 (= *inanis*).

Female: length, 13-14 mm., of wing, 12-13 mm.

Frons about 4 times as high as basal width, slightly wider at vertex, orange yellow pollinose. Frontal callus weakly developed, shiny yellow, rather irregular in outline but roughly twice as high as wide and prolonged above in a thick line. Its greatest width is less than one-third the width of the frons. No vestige of a vertexal tubercle. Fronto-clypeus and genae orange yellow pollinose. Palpi as long or longer than

antennae, somewhat inflated basally, tapering to a slender point. Proboscis about as long as head height, yellow basally, the labella rather small, black, and with shiny chitinized plates. Eyes bare, in life light brown with shifting darker spots. Antennae orange yellow, the third joint slender, without an angle beneath, and with a slender forward pointing dorsal spine which does not quite reach the first annulus.

Mesonotum, pleura and scutellum concolorous, orange yellow pollinose, and with golden yellow hairs. Legs orange yellow, the terminal segments dusky. Wings hyaline, the base, and first basal cells tinged with yellow. Third vein with a short to long appendix. Abdomen concolorous with thorax, the whole insect with a greenish tinge in life.

Male similar to female but lighter colored and with more abundant yellow hair. Antennae more slender. Eyes with the large and small facets sharply separated, the large facets occupying about two-thirds of the eye area. A small tubercle is present between the eyes at the vertex.

In color and general appearance, *limonus* stands intermediate between *inanis* and *unicolor*, being more brownish than the former and more greenish than the latter. The presence of a frontal callus and antennal tooth will separate it immediately from *inanis*, while the shape of the antennae, smaller size and stump vein should serve to distinguish it from *unicolor*. *Luteoflavus* is darker, more slender, and has a shiny subcallus as well as lacking the long antennal tooth of *limonus*.

The above synonymy may seem to be a little unusual, but I believe it to be correct. Townsend describes his specimen, a male, as having a long tooth on the third antennal segment, a character lacking in *luteoflavus*, of which only the female is known. Kröber (1930), in discussing his placing of *Ommallia viridis* End. in the synonymy of *Chl. inanis* F., says that he had 13 males from Santarem, Brasil, which showed great variation in the antennae, some having a long tooth, others a mere stump, with some intermediate forms. It seems probable that he was dealing with 3 species, *limonus* Towns., *unicolor* Wied., and *inanis* F. The males of these three species are almost indistinguishable in color and habitus, only the antennae being quite constantly different. Kröber's figure of the male antenna of his supposed *inanis* is certainly that of *unicolor*. It is, of course,

possible that both Townsend and Enderlein had males of *unicolor*, but an examination of their types would be necessary to settle this point. Hine (1925) places *T. purus* Wlk. in the synonymy of *luteoflavus* Bell., but Kröber (1934, p. 313) puts it in *Tabanus* s. s. Walker's original description is not available to me but it is possible that this is an earlier name for the present species.

Distribution: Mexico to Northern Brasil and Trinidad, B. W. I.

Specimens examined. 1 ♂, 40 ♀ from Panama, 1 ♂ from Trinidad.

Panama records: New San Juan, R. P. VII-7-39, 1 ♀. Moja Pollo, R. P. V-27-40, 1 ♂, 4 ♀; VI-12-40, 36 ♀.
