NOTES ON TABANIDAE (DIPT.) FROM PANAMA IV. THE GENUS LEUCOTABANUS AD. LUTZ.1

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Genus Leucotabanus Lutz

Genotype Tabanus leucaspis Wied. 1828

1913, Brasil Medico, XXVII, No. 45, p. 487 (no species); 1914, Mem. Inst. Osw. Cruz, VI, 3, p. 167. Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz VI, 2, p. 71 (with T. leucaspis Wied.). Lutz, Araujo and Fonseca, 1918, Mem. Inst. Osw. Cruz, X, 2, pp. 166–167. Lutz, 1922, Zoologia Medica, publ. sep. of Folha Medica, Rio de Janeiro, p. 12. Bequaert, 1924, Psyche, XXXI, 1, p. 28 (Type, T. leucaspis Wied.). Enderlein, 1925, Mitt. Zool. Mus. Berlin, XI, 2, p. 351 (= Pseudoselasoma Brèthes). Bequaert, 1926, Med. Rep. Harvard Exped. Amazon, Pt. II, p. 230 (= Tabanus L.). Kröber, 1929, Zool. Anz., LXXXIII, p. 58; 1930, Dipt. Patagonia, V, p. 139 (subgenus of Tabanus). Bequaert, 1931, J., New York Ent. Soc., XXXIX, pp. 549–551. Borgmeier, 1933, Rev. Ent., III, 3, p. 295 (subgenus of Tabanus). Kröber, 1932, Rev. Ent., II, 2, pp. 192, 200; 1934, Rev. Ent., IV, 2, p. 275. Stone, 1938, U. S. Dept. Agric. Misc. Publ., No. 305, p. 24.

Lutz characterized the present group only in a key (1913, 1914, 1922). Later (1928, p. 55), he states clearly that he considers it of subgeneric rank. Kröber (1930) and Borgmeier (1933) treated the group as a subgenus, but the former generally (1929, 1930, 1932 and 1934) considered the group as a full genus, as did Stone (1938). The main character, common to all the species I have seen, is the presence of well marked vestiges of ocelli, but this character alone is not sufficient to define the group, as a number of other apparently unrelated forms have equally prominent ocelli. In fact, all degrees of development of the ocelli from prominent to completely absent may be found in New World Tabaninae, thought it is doubtful if they are functional in any member of this subfamily. Nevertheless, the combination of structural and tinctorial characters which these species possess gives them a certain facies which seems to warrant their separation into a group of generic rank. They may be characterized as follows:

Female.—Eyes bare, unicolorous blackish or bronzy in life. Vertexal tubercle well developed, all three ocelli visible. Frons medium to narrow, 4 to 8 times as high as basal width, the callus often rather

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slender, occasionally reduced to a slender line. Subcallus pollinose, rarely bare. Antennae with basal two segments as in Tabanus, third segment never with a long tooth or spine, the dorsal angle sometimes poorly marked. Palpi moderately inflated, about as long as antennae. Proboscis fleshy, the labellae without chitinized plates. Subepaulet with macrotrichiae; wings hyaline, the costal cell sometimes yellowish. Venation normal, never more than a very slight stub of an appendix on the upper branch of the third vein. Males with the eyes contiguous, bare, the large facets occupying more than half the eye area, and sharply demarkated from the small facets. There is a small vertexal tubercle sunk between the eyes. Coloration rather characteristic; ground color black or brown, with the scutellum and more or less of the mesonotum clothed with white or yellow pubescence. Abdomen entirely dark, or with some or all tergites white margined behind, occasionally with white median triangles.

Although but three species of the genus appear to occur in Panama, I have thought it best to give a key and some discussion of the whole group while the opportunity offered. Enderlein (1925) placed both Leucotabanus Lutz and Pseudacanthocera Lutz as synonyms of Pseudoselasoma Brèthes, but the description of that genus and its two included species (An. Mus. Nac. Buenos Aires, Se. 3, Vol. VIII, p. 475) is so brief that it is impossible to recognize them. Brèthes compares his genus to Selasoma, with which the present group seems to have little in common. Pseudacanthocera Lutz, with P. sylveirii (Macq.) as type, is very close to Leucotabanus, if indeed they are separable. The species are more slender, the third antennal segment with but a vestige of an angle above, and the wings have a brown band along the costa as far as the apex. Kröber's (1929, Enc. Ent., Ser. B, Dipt., V, pp. 133-136 and figs.) treatment of the three recognized species seems adequate.

Of the 23 names which seem to be applicable or to have been applied to members of this group, I retain 11; 8 for species of Leucotabanus and 3 for species of Pseudacanthocera. The 12 discarded names are listed below:

albicans Macq. 1845. Not albicans Macq. 1834 or 1838. albidocinctus Big. 1892. Type lost; probably a Stenotabanus, albovarius Walk. 1853. Not recognized since described, arvensis Brèthes 1910. Not recognizable from the description. albiscutellatus Macq. 1850. = leucaspis Wied. 1828. albiscutellatus Hine 1925. (not Macq.) = nigriventris Kröb. 1931. bicinetum End. 1925. = Acanthocera sp. = Diachlorus bicinetus F. acc. to Kröber. Type described as headless!

minusculus Krob, 1930. From the description, this is a Stenotabanus close to

maculifrons Hine.
nitida Brèthes 1910. Not recognizable from the description.
opaca Brèthes 1911. Not recognizable from the description. sarcophagoides Lutz 1928. Not in this group; near Stenotabanus. unicinctus Walk, 1857. Not unicinctus Loew 1856.

KEY TO FEMALES OF LEUCOTABANUS

	KEY TO FEMALES OF LEUCOTABANUS
	Thorax clothed with lemon yellow or yellowish grey tomentum; legs entirely black or brown, not bicolored
2.	Thorax rich lemon yellow. Abdomen above, palpi, and legs entirely jet black. Subcallus bare and shiny
3.	Palpi pale, yellowish or brownish, black or pale haired 5
4.	Thorax dark to light grey on the disc, unstriped, the sides and scutellum prominently white haired. At least the 2nd and 4th abdominal tergites, and often the 3rd, 5th, and 6th with narrow white hind margins, which may be incomplete. Stigma blackish, narrow
5.	Antennae black 6 Antennae brown or yellowish 7
6.	Mesonotum dark chocolate brown, black haired, and with a median and two dorsolateral white haired stripes, obsolete posteriorly and tending to coalesce. Sides of thorax and scutellum white haired. Abdomen chocolate brown, black haired. Tergite 1 with white hairs laterally, 2 with a median triangular and extensive lateral white patches, and 4 with a complete white hind marginal band, widened in the middle, and covering about two-thirds of the tergite. Beneath, the 2nd and 4th sternites bear white hind margins. Canithorax
	Mesonotum with four white stripes. 2nd and 4th tergites with continuous white transverse bands. 3rd tergite with a little white hair on the hind margin
7.	Subcallus denuded, shiny. From rather broad, the frontal callus an inverted "T." Whole insect light brown, the thorax white haired, and all abdominal tergites with white haired hind marginspallidus Subcallus pollinose
8.	Frontal callus well developed, nearly as wide as frons. Thorax pale brown, white pollinose and white haired, the stripes obsolescent. Abdomen pale brown, the first two tergites white haired, the last five black haired with prominent, broad, white haired mid-dorsal triangles and white hind margins. Frontal callus very narrow, or reduced to a slender line; abdomen not so
	Frontal callus very narrow, or reduced to a slender line; abdomen not so marked
9.	Small, 10-12 mm., pale brown species, the thorax white haired, the abdomen with all tergites white margined
10.	Whole insect black in ground color. Annulate portion of third antennal segment as long or longer than basal portion. Thorax uniformly grey. Abdomen with all tergites white margined, but the 2nd and 4th with much broader bands than the others. Legs prominently bicolored,
	Whole insect light to dark chocolate brown. Annulate portion of third antennal segment shorter than basal portion. Thorax distinctly striped. Abdomen with the 2nd and 4th tergites broadly white behind, the band expanded into a mid-dorsal triangle. Ist tergite dark, 3rd, 5th and succeeding tergites with a white mid-dorsal triangle, and with or without a narrow white hind margin. Legs obscurely bicoloredleuconotum

Leucotabanus flavinotum (Kröber)

(Figs. 1, a, b)

1934, Rev. Ent., IV, 3, p. 309 (Tabanus).

Tabanus nigriflavus Kröb. 1931, (nec. Kröber 1930). Konowia, X, 4, p. 292 (d. Amazonas).

The female of this striking little species seems not to have been described. Length 9-10 mm. Frons, antennae, and palpi as figured. Frontal callus and subcallus dark brown to black, the latter bare. Antennae wholly orange brown. Palpi jet black, black haired. Mesonotum, scutellum and upper third of pleura wholly rich lemon yellow haired, rest of insect jet black, black haired, except the first and second sternites, which are sparsely white haired.

Distribution: I have seen material from Costa Rica, Panama, Colombia and Venezuela. The type was from Amazonas, Brazil.

Panama records: 5 Q, Moja Pollo, May 2, 15 and 27, 1940.

Leucotabanus itzarum (I. Bequaert)

1931, J. New York Ent. Soc., XXXIX, pp. 548-551, fig. 3 (♀; Yucatan) (Tabanus). Kröber, 1934, Rev. Ent., IV, 3, p. 310 (Tabanus).

The species has not been taken since the original series was secured in Yucatan. It is closest to flavinotum Kröb., from which it may be separated by the characters in the key.

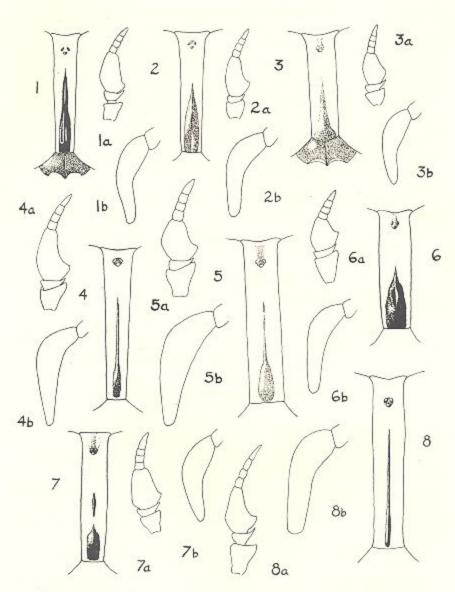
Leucotabanus leucaspis (Wiedemann)

(Figs. 7, a. b)

1828, Auss. Zweifl. Insect., I, p. 179 (♀; Brasil) (Tabanus). Walker, 1854, List. Dipt. Brit. Mus., V, p. 199. Kertész, 1900, Cat. Tab., p. 57. Lutz, 1909, Inst. Osw. Cruz em Manguinhos, p. 30. Lutz and Neiva, 1909, Mem. Inst. Osw. Cruz, I, Osw. Cruz em Mangunnos, p. 30. Lutz and Neiva, 1909, Mem. Inst. Osw. Cruz, 1, 1, pp. 30, 32; 1914, Mem. Inst. Osw. Cruz, VI, 2, p. 71. (Leucotabanus). Lutz, 1912, Comm. Linhas Telegraphicas Matto Grosso-Amazonas, Annexo 5, Hist. Nat., Zoologia, Tabanideos, p. 3. Enderlein, 1925, Mitt. Mus. Berlin, XI, 2, p. 351. Hine, 1925, Occ. Papers Mus. Zool. Univ. Michigan, No. 162, p. 34. J. Bequaert, 1926, Med. Rep. Harvard Exp. Amazons, p. 229. Lutz, 1928, Est. Zool. Parasit. Venezolanas, p. 57, Pl. 8, fig. 5. Kröber, 1929, Zool. Anz., LXXXIII, p. 59; 1929, Konowia, VIII, 2, p. 175, Pl. 5, fig. 1. J. Bequaert, 1931, New York Ent. Soc., XXXIX, p. 551. Dunn, 1984, Psyche, XLI, 3, p. 174. Kröber, 1934, Rev. Ent., 1972, p. 275. Begusert, 1940, Rull Ent. Res. XXX. Pt. 4, p. 450. IV, 2, p. 275. Bequaert, 1940, Bull Ent. Res., XXX, Pt. 4, p. 450.
Tabanus cingulifer Walk., 1857, Trans. Ent. Soc. London, (N. S.) IV, 5, p. 123.

(9; Amazon Region, Brazil). Tabanus albiscutellatus Macq., 1850, Mem. Soc. Sci. Lille, (1849) p. 342, Pl. 2, fig. 9; 1850, Dipt. Exot., Suppl. IV, p. 34, Pl. 2, fig. 9 (♀; Mexico) Osten Sacken, 1878, Smithson. Miscell. Coll., No. 270, p. 60. (nec Hine 1925, nec Bequaert 1926).

This is the most common and widespread species of the group, ranging from Mexico to Northern Argentina and Paraguay. The abdominal pattern is subject to considerable variation; tergites 3, 5 and 6 may be either wholly dark, with small white median patches, or with a complete white hind margin.



Figs. 1, a, b. Leucotahanus flavinotum (Kröb.). Figs. 2, a, b. L. albibasis (Brèthes). Figs. 3, a, b. L. pallidus Kröb. Figs. 4, a, b. L. canithorax nom. nov. Figs. 5, a, b. L. leuconotum nom. nov. Figs. 6, a, b. L. sebastianus sp. nov. Figs. 7, a, b. L. leucaspis (Wied.). Figs. 8, a, b. L. nigriventris Kröb.

All figures are of the frons, antenna and palpus of female specimens, and all are to the same scale. The vestiture of hairs on the palpi and basal antennal segments has been omitted,

Panama records: Camp Pital, near Puerto Armuelles, Chiriqui Prov. July 16, 1929 (Dunn). Escobal, near Gatun, May 4, 1931 (Dunn). Darien (Dunn). New San Juan and Moja Pollo, Chagres River above Gamboa, moderately abundant throughout the year with a peak in October and November. Changuinola District, Bocas del Toro (Pechuman).

Leucotabanus sebastianus sp. nov.

(Figs. 6, a, b)

Female.-Length 13.5 mm., of wing 10.5 mm.

Frons about 5 times as high as wide, slightly narrowed below, white pollinose. Vertexal tubercle prominent, black, the ocelli fairly well marked. Frontal callus black, narrower than frons, about three times as high as wide, tapering to a point above. Eyes bare, probably unit colorous blackish in life. Subcallus, fronto clypeus and genae whitish pollinose, the last with a sparse white beard. Antennae wholly black, as figured. Palpi black, black haired, rather slender, about as long as antennae. Proboscis black, the fleshy labellae more than half of its total length.

Mesonotum dark chocolate brown, whitish pruinose, with a median and two broad lateral white haired stripes, otherwise black haired. Scutellum and pleurae white haired. Legs black, except the basal three-fourths of all tibiae, which are white. Wings with subepaulet with macrotrichiae. Base of wing proximal to the humeral cross vein strongly brownish, otherwise wing entirely hyaline. Veins normal,

black, the stigma black, broad and unusually prominent.

Abdomen above deep chocolate brown, black haired. The first tergite is white haired laterally, the second laterally and with a patch of white hairs in the middle of the hind margin, and the fourth bears a broad complete white hind marginal band, broadest in the middle.

Beneath, the first, second and fourth sternites broadly white, the

third narrowly so.

Holotype Q, Rio de Janeiro, Brazil. Feb.-March, 1937, (R. C. Shannon, coll.). To be deposited in the Mus. Comp.

Zool., Cambridge, Mass.

This species is very close to leuconotum (= unicinctus Walk.), but is smaller, the palpi are black, and the stigma is much more prominent.

Leucotabanus canithorax nom. nov.

(Figs. 4, a, b)

Tabanus albicans Macquart, 1845, Dipt. Exot., Suppl. I, p. 37 (nec T. albicans Macq. 1834 and 1838). Walker, 1854, List. Dipt. Brit. Mus., V, p. 215. Kertész, 1900, Cat. Tab., p. 37. Hunter, 1901, Trans. Am. Ent. Soc., XXVII, p. 139. Surcouf, 1921, Gen. Insect., Taban., p. 58. Kröber, 1930, Zool. Anz., LXXXIII, p. 61 (? in part). Bequaert, 1931, Jour. New York Ent. Soc., XXXIX, p. 552. Kröber, 1934, Rev. Ent., IV, 2, p. 275.

The type, a male, came from Colombia. Kröber describes the female, also from Colombia, but his description fits much better specimens from Rio de Janeiro which I consider to be albibasis Brèthes. Kröber also lists specimens from Guatemala, Colombia, Venezuela, Brazil and Paraguay, and I suspect that his description may have been drawn from a Brazilian or Paraguayan specimen. There appear to be three rather similar appearing species in this group which Kröber may have confused. Specimens from southern Brazil are smaller and lighter. and agree very well with Brèthes' very brief description of albibasis. Specimens from British Honduras and Panama constitute a quite distinct species, agreeing best with Kröber's description and figure of unicinctus Walk., while a third species, of which I have specimens from British Guiana, Iquitos, Peru, and Belem, Para, agrees best with Kröber's description of the male of albicans Macq. However, the type of unicinctus came from Para, while Kröber's figure and description, drawn from the type, show a number of inconsistencies. He states that the frons is 8 times as high as wide, which would agree fairly well with my Para material, but his figure shows it to be but 61/2 times as high as wide, like my Panama material. He also states that the type was in poor condition, so that the white median triangles on the 3rd, 5th and 6th tergites may have been rubbed off, causing the abdomen to appear like that of the Panama species. Since both albicans and unicinctus are preoccupied names, it would seem best to consider that the former was applicable to the species from Central America and Colombia, and the latter to the species from British Guiana and the Amazon basin.

Female.—Length 13–16 mm. Frons, antennae, and palpi as figured. Antennae dark brown on first two segments, wholly black on third. Frontal callus chestnut brown. Palpi pale brownish, the basal two-thirds white haired, the apices black haired. Legs jet black, except most of all tibiae, which are yellowish with white hairs. Mesonotum purplish brown, white haired, but with a pair of broad dark haired longitudinal bands, which coalesce at the level of the wing and extend as a unit to the scutellum. The white haired area between these bands is often indistinctly striped. Sides of mesonotum, pleura, and scutellum white haired, with a narrow line of dark hair from wing bases to anterior spiracle. Abdomen dark chocolate brown to black, densely black haired. Tergite 1 with conspicuous patches of white hairs on the lateral hind margins, tergite 2 with similar but larger patches and a large median white triangle unconnected to the side patches. Tergite 4 bears a continuous white hind marginal band, narrow at the sides, but nearly

as wide as the tergite in the middle. Rest of abdomen entirely black haired. Old specimens lose most of their hair, and appear much lighter.

Distribution: Aside from Panama specimens, I have seen material only from British Honduras (Stann Creek, March, 1940. Komp coll.).

Panama records: Darien (Dunn); Moja Pollo, Chagres River, Jan. 19, March 12, March 28, April 15, and May 15,

1940; Jan. 25, 1941.

Leucotabanus ambiguus Stone

1938, U. S. Dept. Agric., Misc. Publ. No. 305, p. 26, fig. 88.

Tabanus albiscutellatus Hine (nec. Macq.) (in part), 1925, Occ. Papers Mus. Zool. Univ. Michigan, No. 162, p. 34.

This species, which is close to canithorax and leuconotum, is known only from the southwestern United States. The eyes of the female are said to be sparsely pubescent.

Leucotabanus pallidus Kröber

(Figs. 3, a, b)

1929, Konowia, VIII, 2, p. 191, Pl. 3, fig. 23 (9; Bolivia); 1929, Zool. Anz., LXXXIII, p. 60. Bequaert, 1931, Journ. New York Ent. Soc., XXXIX, p. 552. Kröber, 1934, Rev. Ent., IV, 2, p. 276.

A female specimen in the U. S. N. M. (Bolivia, W. M. Mann coll.), agrees quite well with Kröber's description and figure, except that the basal part of the third antennal segment is much wider, nearly as wide as long and with a well marked angle above. The specimen was apparently preserved in alcohol, and most of the vestiture is lost, but what remains agrees with the description. The species differs markedly from most of the other members of the group in the swollen and shiny subcallus and relatively broader frons. The vertexal tubercle, not shown in Kröber's figure, is present, as in other members of the group, but it is pollinose except for the ocelli, and hence not so noticeable.

Leucotabanus albibasis Brèthes

(Figs. 2, a, b)

1910, An. Mus. Nac. Buenos Aires, (3), XIII, p. 777. (no sex; Formosa, Argentina). Kröber, 1934, Rev. Ent., IV, 3, p. 306 (Tabanus).

Kröber (1. c.) recognized no material of this species, but it is possible that his albicans (1929, Zool. Anz., LXXXIII, p. 61) included specimens of the present species. Slightly rubbed specimens have much the appearance of large examples of annulatus.

Female.—Length 12 mm. Frons, antennae and palpi as figured. Frontal callus dark brown. Antennae pale brownish, the annulate portion black. Palpi yellowish white, mostly white haired. Mesonotum and scutellum white pollinose and white haired, the indistinct dark stripes of the chitin faintly showing through the vestiture. Pleura and coxae brownish, with white vestiture. Femora brown, white haired, the fore pair darker. Tibiac yellowish, white haired, the apices and the tarsi black and black haired. Abdomen light reddish brown, the first two tergites wholly white haired, the third to terminal black haired. with large mid-dorsal white triangles and white hind margins, which broaden to the width of the tergites at the sides. Beneath, all sternites with narrow white haired hind margins. Description drawn from a specimen from Angra dos Reis, Japuhyba, Estado do Rio de Janeiro, Brasil, Dec., 1932 (Travassos coll.). Another specimen before me, from Mangaritiba, Rio de Janeiro, Brasil, March, 1939 (Brasilian Yellow Fever Service) has lost most of the abdominal vestiture, so that the abdomen appears brown with whitish segmental bands. It was determined by Dr. O. Castro as albicans Macq.

Distribution: Argentina, Southern Brazil, and probably Paraguay.

Leucotabanus annulatus (Say)

1823, Journ. Acad. Nat. Sci. Philadelphia, III, pp. 32-33, Stone, 1938, Op. cit., p. 25, fig. 8A (Full references).

A small slender species so far known only from the Southeastern United States. Like its Neotropical congeners, it appears to be crepuscular.

Leucotabanus nigriventris Kröber

(Figs. 8, a, b) .

1931, Stett. Ent. Zeit., XCII, p. 92. (9; Chiapas, Mexico); 1934, Rev. Ent., IV, 2, p. 276.

Tabanus albiscutellatus Hine (nec. Macq. 1850) (in part)

1925, Occ. Pap. Mus. Zool, Univ. Michigan, No. 162, p. 34.

Kröber's description is unusually brief, but seems to fit the present species fairly well. The specimens studied by Hine have the abdomen somewhat rubbed in the middle, so that middorsal triangles are not apparent. The white hind margin of the third tergite is present in one specimen, obsolete in the other. Both are labelled "Cayuga, Guat. VI-'15. Wm. Schaus coll."

Leucotabanus leuconotum nom, nov.

(Figs. 5, a, b)

Tabanus unicinctus Walker, 1857, Trans. Ent. Soc. London (NS.), IV, p. 122 (9; Para, Brasil). Kertész, 1900, Cat. Tab., p. 76. Surcouf, 1921, Gen. Insect. Taban., p. 87. Kröber, 1930, Zool, Anz., LXXXVI, p. 260, fig. 6 (Leucotabanus).

Bequaert, 1931, J. New York Ent. Soc., XXXIX, p. 552. Kröber, 1934, Rev. Ent., IV, 2, p. 276. Stone, 1938, U. S. Dept. Agric. Misc. Publ. No. 305, p. 26. (nec Tabanus unicinctus Loew, 1856, Neue Beitr., IV, 27, 7. Kröber, 1925, Bull. Soc. Roy, Ent. d'Egypte, p. 106, fig. 6; in Lindner, Flieg. Pal. Reg., No. 19, p. 130, Efflatoun, 1930, Mem. Soc. Roy. Ent. d'Egypte, IV, 1, pp. 108-109, figs. 127-128). ? Tabanus albiscutellatus Bequaert, 1926 (nec Macq. 1850, ? nec Hinc, 1925) Med. Rep. Harvard Exped, Amazon, Pt. 2, p. 230.

Female.—Length 14-17 mm. Frons, antennae and palpi as figured. Frontal callus chestnut brown. Antennae orange brown, the annulate portion of the third segment black. Palpi light brown, almost wholly black haired. Mesonotum and scutellum white haired and white pollinose, with a narrow median and broader dorso-lateral dark stripes. Sides of mesonotum and pleura thinly white haired. Legs brown, the tarsi, apices of tibiae, and bases of femora black and black haired. Tibiae, except apices, and apical halves or less of femora with white hairs. The legs are not nearly so prominently bicolored as are those of canithorax. Abdomen brown to black, black haired. Tergite 1 with a very small median tuft of white hairs, 2 with a broad, continuous, white hind marginal band, widened in the middle and at the sides, 3, 5 and 6 with white median triangles, and 4 with a band like that on 2. The third tergite bears a narrow white band also, on occasional specimens. All specimens before me show a peculiar lateral flattening of the terminal abdominal segment, much more marked than in other species of the group, so that the abdomen appears to bear a pointed terminal spine.

Specimens examined: 1 2 Rio Essequibo, Br. Guiana (J. Ogilvie); 2 9 Iquitos, Peru, Mar.-Apr., 1931 (R. C. Shannon); 1 ♀ Belem, Pará, Brazil, Apr. 14, 1941 (W. H. W. Komp); 1 9 Aurá, Pará; 8 9 Ilha de Marajó, Pará, Brazil (R. Damasceno).