

AEDES LEUCOTAENIATUS, A NEW SPECIES OF AEDES ALLIED TO A. LEUCOCELAENUS D. & S.; AND DESCRIPTIONS OF THE MALE AND LARVA OF A. LEUCOCELAENUS D. & S. (DIPTERA, CULICIDAE.)

By W. H. W. KOMP,¹

*Senior Medical Entomologist, Office of Malaria Investigations,
U. S. Public Health Service.*

The renewed interest in various species of neotropical mosquitoes, in their roles as possible vectors of "jungle" yellow fever in South America, has recently been enhanced by the publication of a short note in "Science" (1) in which it is noted that several species, hitherto not incriminated, have been found infected in nature with the virus of yellow fever.

One of the species listed as transmitting the disease by its bite is *Aedes leucocelaenus* Dyar & Shannon.

This species was described by Lutz in 1904 (2), from females only, under the name *leucomelas*. The type localities were the States of Sao Paulo and Rio de Janeiro, Brazil. The name *leucomelas* being preoccupied, Dyar and Shannon proposed the name *leucocelaenus* in 1924 (3). No description of the larva or of the male terminalia of *leucocelaenus* exists in the literature, with the exception of a short description of the larva by Shannon (4), taken from a photomicrograph by da Costa Lima (5).

Dyar's (6) description and figure of the male terminalia of "*leucocelaenus*" were taken from material collected in the Panama Canal Zone. As the adults are indistinguishable on colorational characters, he assumed that the true *leucocelaenus* from Brazil and the Panama specimens were the same. Comparison of the Panama material in the U. S. National Museum, together with fresh material from Panama, with the male terminalia of specimens from Brazil, Argentina, Colombia, and British Guiana, shows that two distinct species are involved. The Panama material represents a hitherto unnamed species, for which the writer proposes the name *leucotaeniatus*. The material from South America is apparently all alike, and is the true *leucocelaenus* of Dyar and Shannon (*leucomelas* Lutz), the types of which came from Brazil.

Several marked differences have been noted in the male terminalia of the two species. The most striking of these differences is found in the shape of the filament of the claspette. The chaetotaxy of the side-piece is also quite different. A third difference is in the peculiar elongation of the ninth tergites of the Panama species, *leucotaeniatus*, which is absent in *leucocelaenus*.

¹ From the Gorgas Memorial Laboratory, Panama City, Rep. de Panama, Dr. H. C. Clark, Director.

These differences are well marked, as may be seen in the figures of the parts included in this paper.

In *leucoclaenus*, the stem of the claspette is more swollen than in *leucotaeniatus*; there are two or three very long, slender setae on the stem, their bases widely separated; the filament of the claspette is a long, curved, slender, flat blade, widest at the middle, and evenly curved to a sharp point. In *leucotaeniatus*, the stem of the claspette is more slender, and bears on its apical third inwardly two stout setae, inserted at the same level, and closely approximated; the filament of the claspette is shorter, and has a broad flat top, with a retrose point projecting in the opposite direction from the main blade.

The side-piece of *leucoclaenus* is much less hairy than that of *leucotaeniatus* from Panama, and the arrangement of the setae differs. In *leucoclaenus*, a number of long, slender, curved setae arise from prominent tubercles on the inner aspect, just below the apex. In *leucotaeniatus* from Panama, this area has a patch of dense, fine, short setae. The inner basal curve of the side-piece of *leucoclaenus* has a few sparse long setae. In *leucotaeniatus*, there is in this position a large, conspicuous patch of long fine setae, extending well up towards the apex. The area of the basal lobe is quite similar in both species, but the tubercles from which the setae arise are more prominent in *leucotaeniatus*.

The ninth tergite of the true *leucoclaenus* is undeveloped, without setae, being represented by a small chitinized ridge at the base of the tenth sternites. In *leucotaeniatus*, the ninth tergite bears two more or less triangular, flattened lobes, densely covered with fine microtrichia.

It is believed that these differences are sufficient to indicate that two distinct species occur, inseparable so far as gross adult characters are concerned, but easily separable by the characters of the male terminalia.

DESCRIPTION OF *Aedes leucotaeniatus* n. sp. (HERE DESCRIBED.)

Adult female: Proboscis very long and slender, blue-black. Palpi short, about one-sixth the length of the proboscis, clothed with long flat blue-black scales. Clypeus wider than long, black, shining, nude. Antenna with torus black, with a few short, curved, black setae; flagellar segments with whorls of long black hairs at joints. Vertex with a median line of elongate, flat, silvery-white scales extending to clypeus anteriorly, and continuing posteriorly on to occiput; a few strong black setae project forward over clypeus. Occiput clothed with silvery-white scales centrally, the sides with flat bluish-black scales; posteriorly an area of erect black fork-tipped scales. Eye-margins narrowly white-scaled above, with a few black setae; lower third of head white-scaled.

Thorax with mesonotum densely clothed with dull metallic blue scales; a narrow median line of silvery-white scales extending from anterior promontory to antescutellar space. Anterior pronotum (prothoracic lobe) with dorsal angle

black, remainder clothed with silvery-white scales, and a few strong black setae. Posterior pronotum ("proepimeron") clothed with silvery-white scales. A large patch of silvery-white scales before wing-root. Scutellum trilobed, clothed with flat blue-black scales and long black setae. Pleura with sternopleuron nude, black on anterior portion; posterior portion clothed with silvery-white scales, which join with those on anterior pronotum above to form a white line. Epimeron with a similar patch of white scales extending dorsally over the prealar area and joining those at base of wing-root to form a second white line. Setae as follows: many curved black setae just below anterior promontory; prespiracular setae long, black, prominent; postspiracular setae more numerous, weaker; several sternopleural setae; prealar setae present; upper mesepimeral setae present.

Abdomen with tergites clothed with closely-appressed blue-black scales; a few white scales on posterior margin of sixth and seventh segments. Sides of first segment broadly white; all segments with oblique lateral white spots ventrally. Fifth, sixth and seventh sternites projecting ventrally, their apical margins with a few yellowish hairs.

Legs blue-black, the femora white-lined beneath, their tips very narrowly white; mid and hind femora with a white spot at middle, joined to the ventral

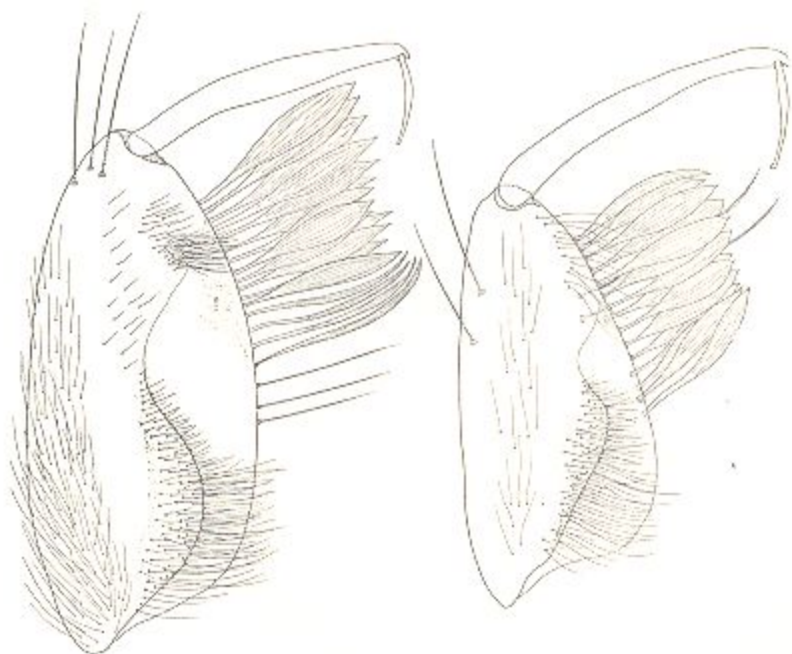


Fig. 1. Side-piece and clasper of *Aedes leucotaeniatius*, N. Sp.

Fig. 2. Side-piece and clasper of *Aedes leucoclaenus* D. & S.

Both figures to same scale.

white line. Tibiae and tarsi blue-black. Claws toothed on fore and mid tarsi, without teeth on hind tarsi.

Wings moderate, hyaline, clothed on the veins with elongate blue-black scales, somewhat more densely on costa and anterior veins.

DESCRIPTION OF MALE TERMINALIA OF *Aedes leucotaeniatus*, n. sp.

Side-piece rather short, not sharply tapering towards tip; inner distal margin with several rows of long, broadly lanceolate, striate scales and a few long setae. On inner aspect, just below apex, is a distinct area of long, slender, dense setae. Area of basal lobe clothed with many long setae from prominent tubercles. Dorso-lateral aspect of side-piece clothed with many very long, fine setae, extending well towards apex of side-piece. Clasper about half as long as side-piece, slightly enlarged centrally, tapering towards tip; terminal spine moderate, about one-third the length of the clasper, slightly swollen centrally, tapering to a blunt tip.

Claspette with slender sinuate stem, somewhat angled just beyond middle, densely clothed basally with fine setae; apical one-third of stem bare; two very stout, curved setae with bases closely approximated arise on inner aspect at apical third, their tips nearly reaching tip of filament; opposite these two setae and slightly below them, is a single much smaller seta. Filament of claspette broad, flat-topped, with a retrose point opposite the elongated, striate, sharp-pointed tip.

Tenth sternites large, erect, the tips recurved, hood-shaped, and striate; a few setae just below the tips.

Ninth tergite peculiarly elongated, forming two more or less triangular lobes with rounded tips, the whole surface covered with minute microtrichia.

Mesosome small, broad, somewhat narrower at base, slightly constricted just beyond middle, then widened before apex; tip with a small V-shaped excavation; dorsal face of mesosome with a low median ridge; dorsal basal opening small, nearly oval; ventral opening apical, small.

Holotype male, from Comacho, Panama Canal Zone, April 22, 1922 (J. B. Shropshire, collector). Male terminalia mounted on slide No. 1689. The slide is labeled *Haemagogus leucomelas* Lutz. Paratype male, from Comacho, Panama Canal Zone, April 22, 1922 (J. B. Shropshire, collector), the terminalia dissected and mounted on a modified Cobh mount. Allotype female, from Comacho, Panama Canal Zone, June 1, 1922 (J. B. Shropshire, collector). Also 5 females from Barro Colorado Island, Panama Canal Zone (R. C. Shannon, collector), July 8 and 9, 1923.

DESCRIPTION OF THE MALE TERMINALIA OF *Aedes leucocelaenus* D. & S.

Side-piece short, moderately tapering towards tip; inner distal margin with several rows of long, broadly lanceolate, striate scales and a few long setae. On inner aspect, just below tip, is an area with a few long curved setae from prom-



Fig. 3. Claspette and filament of *Aedes leucotaeniatus*, N. Sp.

Fig. 4. Claspette and filament of *Aedes leucocelaenus* D. & S.

Both figures to same scale.

inent tubercles, not forming a definite patch. Area of basal lobe covered with many long, stout setae from prominent tubercles. Dorsolateral aspect of side-piece nearly bare, with only a few slender setae. Clasper long, slightly more than half the length of the side-piece, slightly enlarged centrally, tapering towards tip; terminal spine long, slender, slightly swollen centrally, tapering to a blunt tip; about one-third the length of the clasper.

Claspette with a thick, sinuate stem, broad basally, tapering on distal third; base of stem clothed with fine setae, a very long, slender seta from a prominent tubercle just above base, on outer aspect; two long, slender, curved setae on inner aspect, their bases widely separated, their tips nearly reaching the filament of the claspette. Filament of claspette a long, curved, slender, flat blade, widest at the middle, evenly curved to a sharp point.

Tenth sternites moderate, erect, the tips recurved, hood-shaped, and striate; a few setae just below tips.

Ninth tergite undeveloped, without setae, being merely a narrow chitinized strip dorsal to base of tenth sternites.

Mesosome small, broad, somewhat narrower at base, slightly constricted just beyond middle, then widened before apex; tip with a small V-shaped excavation; dorsal face of mesosome with a low median ridge; dorsal basal opening small, nearly oval; ventral opening apical, small.

Described from the characters of three male specimens, one from Brazil, one from Argentina, and one from Colombia.

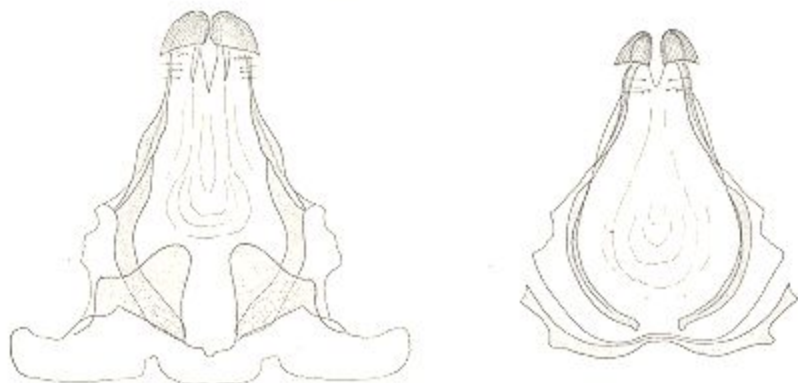


Fig. 5 Tenth sternites and ninth tergite of *Aedes leucotaeniatus*, N. Sp.

Fig. 6. Tenth sternites and ninth tergite of *Aedes leucocelaenus* D. & S.

Both figures to same scale.

DESCRIPTION OF THE LARVA OF *Aedes leucocelaenus*, D. & S.

The writer obtained larvae of this species at Restrepo, Colombia, and at Mazaruni, British Guiana. Males reared from these larvae had the terminalia as described for *leucocelaenus*. The larva of *leucotaeniatus* is still unknown.

Head: rounded, somewhat globular, widest between the eyes. Anterior head-hairs double, long, stout; intermediate head-hairs long multiple tufts, exceeding the anterior margin of the clypeus; their insertions are in line with the insertions of the anterior head-hairs. Posterior head-hairs usually triple (sometimes double), long, finer than the anterior head-hairs. Outer occipital hair a long, three- or four-haired tuft. Inner occipital hair long, single or double. Ante-antennal hair a long tuft of about 6 to 8 fine hairs.

Antenna long, slender, evenly tapering, the shaft sparsely spined with small spines; antennal hair single, at or beyond middle, extending to tip of antenna.

Thorax and abdomen with integument glabrous; secondary abdominal hairs in short, stiff, stellate tufts. Lateral abdominal hairs in three on first segment, in two on second to sixth segment, single on seventh segment. Comb of eighth segment of 5 or 6 moderate, sharp-pointed scales, curved like a cat's claw, not fringed at the tip.

Air-tube moderate, about three times as long as wide, slightly bulging at middle, tapering gently beyond; pecten of about 15 to 20 closely spaced spines, becoming progressively smaller from tip to base of tube; each spine a long tooth, with a few very small teeth at base. Pecten closely followed by a stout two-haired tuft, the hairs extending to tip of air-tube.

Anal segment cylindrical, not ringed by the plate. Plate large, extending well down sides of segment; dorsal posterior margin fringed with about 12 long spinules. Lateral hair long, double or triple. Ventral brush moderate, of about

8 paired tufts from the barred area; a few short single tufts ventrally, beyond barred area. A small triangular plate on each side of barred area. Inner submedian caudal hairs long, strong, simple; outer submedian caudal hairs triple, about two-thirds the length of the inner hairs.

Remarks. It should be stated that the palpi of the males of *Aedes leucotaeniatus* and *A. leucocelaenus* are long, slender, nearly as long as the proboscis.

In general the larva of *Aedes leucocelaenus* resembles those of the closely related species of *Haemagogus*. The comb of the eighth abdominal segment consists of a row of a few scales, as in the larvae of *Haemagogus janthinomys*, *H. equinus*, *H. anastasionis*, and *H. mesodentatus*, N. sp. (7). It may be separated from the larvae of *janthinomys* by the smooth integument, as that of *janthinomys* is densely pilose; the scales of the eighth segment are more numerous, and on a plate, in *janthinomys*, while they are free in *leucocelaenus*. From *equinus*, it may be separated by the character of the posterior head-hairs, which are single in *equinus*, and double or triple in *leucocelaenus*; the spines of the eighth abdominal segment in *equinus* are finely fringed, but are not fringed in *leucocelaenus*. The larva of *anastasionis* also has these spines finely fringed, and the posterior head-hairs are single. The larva of *mesodentatus* N. sp. has a finely pilose integument, and the anterior and posterior head-hairs are all single.

The larva of *leucocelaenus* is smaller and more slender than the larger, stockier larvae of the *Haemagogus* species, but this character is variable. All the species are addicted to water in tree-holes. However, *leucocelaenus* has been found only in South America, where *equinus*, *anastasionis* and *mesodentatus* have not yet been found to occur; in the faunal region in which *leucocelaenus* occurs, two yet unknown larvae, those of *albomaculatus* and *uriartei*, may resemble it; that of *janthinomys* is easily separable.

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