

ANOPHELES (ANOPHELES) CHIRIQUIENSIS, A NEW SPECIES  
OF ANOPHELES FROM PANAMA (DIPTERA,  
CULICIDAE.)<sup>1</sup>

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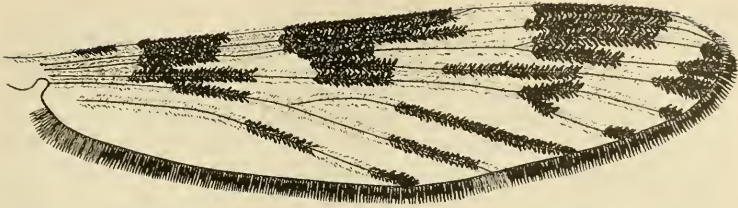
During a short visit to the region of the Chiriqui volcano, in northwestern Panama, several specimens of both sexes of a new Anopheline form were taken in hollow trees and under stream-banks. Further search discovered the breeding-place, and a number of larvae were taken. The larvae were found in fair numbers in a cold spring among rocks (temperature about 57° F.). Several pupae were also taken, from which female adults later emerged. The altitude at which the species was found was about 6,500 feet. The only other Anopheline encountered was one specimen of the larva of *Anopheles eiseni*, collected from the same spring, from which a female adult was obtained. Because of its apparently restricted habitat, and the low temperatures of the region, it is improbable that the species is a transmitter of malaria.

*Anopheles (Anopheles) chiriquiensis*, sp. nov.

*Adult female:* Proboscis long, slender, black, not heavily scaled, the labellae yellowish. Palpi long, the vestigial first joint and the second joint dark-scaled; third joint black with narrow band of white scales at base and apex; fourth joint broadly white-banded at base and apex, black in middle; terminal joint much elongated (about half the length of the penultimate joint), white-scaled, with many long projecting white hairs at tip. Occiput with erect triangular white scales, truncate at tips, on vertex; sides with similar erect but black scales; a few long black scales at eye-margin; a long tuft of white hairs projects forward between the eyes. Antennae with the torus pale, with few pale scales, contrasting strongly with the dark clypeus. Basal antennal joints light, the distal ones progressively darker.

Thorax with a broad central longitudinal grayish stripe, widened at middle, on mesonotum. Anteriorly there is a tuft of white hairs and narrow lanceolate scales on the anterior prominence; posteriorly there is a large brown spot also involving the scutellum. The grayish area is covered with a sparse vestiture of long fulvous hairs. Scutellum gray, with central brown area; a vestiture of long brown hairs. The sides of the mesonotum are dark brown. The prothoracic lobes are dark brown, and bear long dark hairs. Pleurae brown, with scattered areas of grayish pruinosity. Sternopleuron dark ventrally, as also the meron and epimeron. The sternopleural hairs are long and fulvous. The halteres are pale, with whitish scales. The abdomen is brown, with long tawny hairs; the terminal cerci are light. There is a grayish pruinose basal band on each abdominal segment.

<sup>1</sup> From the Gorgas Memorial Laboratory, Panama City, R. de Panama. Dr. H. C. Clark, Director.



Wing of *Anopheles chiriquiensis*, n. sp.

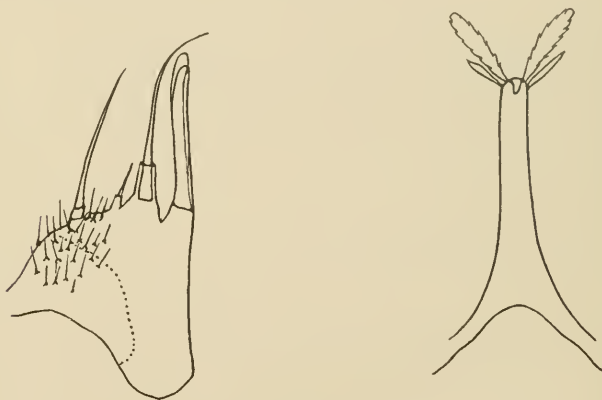
The legs are dark brown, with the exception of the coxae and trochanters, which are pale, contrasting strongly with the dark brown lower border of the pleurae. Femora blackish, with a few pale scales at both ends; tibiae blackish, with few apical white scales; those on the hind tibiae long and forming a distinct band; tarsi blackish-brown, with a few paler scales at the articulations, in no instance forming distinct bands. The wing-scales are very dark brown, yellow, and white. The costa has three large dark spots, as follows: (1) distal to the humeral cross-vein, and including costa, subcosta, and extending over 4th and 5th veins. (2) a larger central black spot, involving costa, subcosta, first vein, second vein, base of third vein, and area around cross-veins. (3) a smaller dark spot beginning beyond junction of subcosta with costa, and extending almost to junction of first vein with costa, and involving costa, first vein, and both branches of second vein. At the apex of the wing is a triangular dark spot, beginning at junction of first vein and costa, and including tips of both branches of second vein, becoming widest on tip of third vein, and narrowing to include only the tip of the anterior branch of the fourth vein. The wing-fringe included in the apical dark spot is also black. Other dark scale-spots as follows: base of third vein, to about one-third its length; bifurcation of fourth vein; distal two-thirds of anterior branch of fifth vein; apical half of posterior branch of fifth vein, except extreme tip, which is white; middle and apex of sixth vein.

The individual veins are marked as follows, beginning basally: Costa, B-1 short, white; then a longer dark area extending to humeral cross-vein; B-2 white, very short; then first large dark spot, about four times the length of the preceding white area; then a white spot beginning at junction of subcosta with costa and slightly longer than first basal white spot; then a long dark area about two-thirds the length of middle dark area; then a subapical white spot. Subcosta: base white; first dark area included in large dark basal marginal spot; then a light area, followed by large dark area of central marginal dark spot; extreme tip white. First vein: base white, followed by a dark area in basal marginal dark spot; then a light area followed by dark area in middle marginal dark area; followed by a light area about same length as adjoining white costal area; then the large dark area of subapical dark spot; extreme tip white. Second vein: base black (in middle dark area), followed by a white area to and including fork. Both branches dark-scaled, the area on the anterior branch longer than on posterior; then both branches white almost to tips, which are black. Third vein: Base black-scaled, to beyond cross-vein, then a small white area, followed by an area clothed with small grayish scales; then

a long white portion followed by a black tip. Fourth vein: Base with a few white scales, followed by a long black area ending on a level with the middle of white spot on the first vein, anterior to it. Then a white area, followed by a black area involving the cross-vein; then a white area extending to the fork; both branches of the fork shortly black-scaled, followed by white areas, that on anterior branch being the longer; tips of both branches black. Fifth vein: Base white, followed by a black area half as long as black area anterior to it on fourth vein; then a white area extending to and beyond the fork to about the middle of each branch; anterior branch then black-scaled to and including tip. Posterior branch black beyond basal white portion; extreme tip and wing-fringe white. Sixth vein: Base white, extending to middle of vein; then a black area, followed by a shorter white portion; extreme tip black. Entire posterior wing-fringe of long dark scales, except at tip of posterior branch of fifth vein, where there is a white fringe-spot.

*Adult male:* Coloration of the female. Palpi with last two joints enlarged, flattened, and bent at right angles outward. Many long yellow hairs arise from inner side of penultimate joint, and a long tuft from apex of third joint. At the base of the second segment is a white band, and at the apex of the penultimate segment is another yellowish band. The tip of the terminal segment is with yellowish-white scales and short yellowish hairs.

*Male terminalia:* Side-piece (coxite) nearly cylindrical, scarcely tapered. Style (clasper) very long, attenuated centrally, with a few setae towards tip; a very short infuscated conical terminal spine.



*Anopheles chiriquiensis*

Left, harpago of male terminalia.

Right, mesosome of male terminalia.

Side-piece with two parabasal spines, the inner shorter, projecting from a separate tubercle on an offset. The outer longer, with hooked tip, from a separate tubercle which is not prominent, nor inserted on an offset. Internal spine on outer aspect, situated about one-third the way down from tip of side-piece, rather thick, long, slightly curved.

Lobes of the claspette (harpago) minutely pilose towards tip; partially separated into dorsal (outer) lobe bearing 2 long flattened club-shaped filaments, somewhat fused, with blunt rounded tips. Inner lobe with a long spine (longer than clubbed filaments) projecting from a prominent tubercle, the spine stout, with outward-curving slender tip. Within is a small fine seta from a tubercle, the seta about one-fifth the length of the long spine at crest of lobe. The most mesially placed spine is long and very slender, from a small tubercle.

Anal lobe (proctiger) high, conical, the membrane minutely pilose; paraprocts poorly chitinized. Ninth tergite a slender ring, the two processes well separated, erect, not clubbed.

Mesosome (phallosome) long, tubular, well chitinized, not widely flared at base. Two pairs of leaflets at tip, the larger somewhat obovate, with both margins coarsely serrate; the smaller inner pair thick, not serrate, about one-third the length of the larger pair.

#### LARVA.

Much as in *Anopheles eiseni* Coq. but immediately distinguishable by the long simple hair on the 3d abdominal segment. Inner preclypeal spines weak, short. Internal clypeal hairs very close together (so close that another tubercle could not be inserted between them), long, simple. Outer clypeals inserted slightly caudad of internal clypeals, widely separated from these; about half as long, usually simple, but sometimes finely feathered. Posterior clypeals long (about half the length of inner clypeals), usually simple, but sometimes forked beyond middle, inserted well caudad of outer clypeals, and more widely separated than internal clypeals. Six frontal hairs, rather short, pinnate. Inner occipital (sutural) hair long, usually simple, but sometimes forked beyond middle. Outer occipital hair usually simple, but often forked or branched. Anteantennal hair long, strong, pinnate.

*Antenna:* Rather short, slender, minutely spinulate. Antennal hair small, many-branched, inserted at slightly less than one-fifth distance from base to tip. Sabres at tip very long, serrate on one side. Terminal hair very long, slender, bifid from middle.

#### THORAX.

Inner submedian prothoracic hair very long, about three-fifths the length of the middle submedian hair; strongly feathered. Middle submedian prothoracic hair long, strong, feathered. Outer submedian prothoracic hair simple, slender, about three-tenths the length of the middle hair.

The large dorsal hair on the mesothorax (No. 1 of Martini, Root and Puri) is longer and thicker than the middle submedian thoracic hair, and is much feathered. Hair No. 2, the simple slender hair beside it, is not half as long as the large dorsal hair. A pair of delicate thoracic palmate tufts are present on the metathorax.

#### ABDOMEN.

Six pairs of large palmate hairs are present on abdominal segments 2-6, absent on the first segment. Each palmate hair has from 18 to 22 elements, the single element long, lanceolate, slightly shouldered, with faint notches at

shoulder; the tip ends in a long finely pointed filament. Lateral hairs double on first and second segment, heavy, feathered. On the 3d abdominal segment is a very long, strong, single hair, minutely and sparsely long-pinnate. Lateral hairs of the 4th and 5th segments single, shorter, very slender. The spiracular apparatus is normal, with no distinguishing characters. The comb or pecten bears from 22 to 27 serrate teeth; towards the middle of the comb they are irregularly alternately long and short, the longer teeth being about twice the length of the shorter. The anal segment is minutely spinose dorso-laterally, with a very long slender lateral hair, much longer than the segment. The inner submedian caudal hairs are slender, not as long as the outer, branched, the branches beginning at the base of the hair. The outer submedian caudal hairs are heavier, with about 12 branches beginning near the base, and with hooked tips.

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ANOPHELES (NYSSORHYNCHUS) ANOMALOPHYLLUS,  
A NEW SPECIES OF ANOPHELES FROM PANAMA  
AND COSTA RICA (DIPT., CULICIDAE).<sup>1</sup>

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During the course of malaria research in the plantations of the United Fruit Company in Panama in 1929 and 1930, under the direction of Dr. M. A. Barber, many *Anopheles* larva surveys were made by the writer. During the course of the surveys, material was collected from a shaded running stream at Wenhams Farm, near Almirante, Panama. Two male *Anopheles* adults emerged from pupae among this material; it was immediately noted that they differed from males of *Anopheles albimanus* in the smaller amount of black on the second hind tarsal joint. These males were tentatively identified as *A. tarsimaculatus* Goeldi, although it was recognized that here a difficulty presented itself, as running streams are not the breeding places of this species. The terminalia of the two males were stained and mounted, and the difficulty, instead of being resolved, became greater, for the mesosome showed a pair of long, heavily sclerotized, coarsely serrate leaflets. In the press of more "practical" work, the matter could not be followed up, and the slides were put aside for further study. In the winter of 1930, a similar male emerged from material taken in a running stream along with larvae and pupae of *Anopheles (Chagasia) bathanus* Dyar, at Chase, Costa Rica, just across the Sixaola River, which forms the frontier of Panama at this point. This male was likewise mounted and preserved. In February, 1932, this same stream was searched thoroughly, and two larvae, one in third stage and the other in fourth, were found. Both

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