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.

ANOPHELES (NYSSORHYNCHUS) ANOMALOPHYLLUS, A NEW SPECIES OF ANOPHELES FROM PANAMA AND COSTA RICA (DIPT., CULICIDAE).[1]

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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 Wenham's 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

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

unfortunately died before pupating. Therefore the authentic material of this species consists of two males from Almirante, Panama, and two larvae and one male from Chase, Costa Rica. While it is impossible to associate the two larvae with adults bred from them, it is almost certain that they are the immature stages of this insect, for the following reasons: They were both taken from the same stream that produced the male bred in 1930; no other Anopheles larvae, with the exception of *A. bathanus*, were found in this stream at any time; the larvae conform in every respect to those of the *Nyssorhynchus* group; no other species of this group, so far as is known in Central America, at least, breeds in streams.

As mentioned above, the males when first seen were thought to be those of *A. tarsimaculatus* Goeldi, in spite of the peculiar habitat of the larva. Dyar, in "The Mosquitoes of the Americas," page 427, attempts a separation on color characters. There follows an abstract of his table:

"Tarsi, especially the hind pair, marked with white.....2
2. Hind tarsi more or less continuously white-marked.....3
3. Last three hind tarsals white or white-marked.....4
4. Fifth hind tarsal with a black ring.....8
8. Fifth hind tarsal only with a black ring.....9
9. Second hind tarsal less than or not more than one-third black.....11
11. Light-colored scales of wing usually white; second hind tarsal usually more than one-fourth black; white rings on fore tarsi narrower, especially that of the first fore tarsal.....*evansi* Brethes (*strodei* Root)
Light-colored scales of wing usually white; second hind tarsal usually less than one-fourth black; white rings on fore tarsi broader, including that of first.....*tarsimaculatus* Goeldi."

Now *strodei* Root has peculiar and characteristic male terminalia, with a dorsal lobe structure entirely different from that of any other American Anopheline, which does not resemble in the least that of *A. tarsimaculatus* Goeldi. On the other hand, the terminalia of the new species resembles that of *A. tarsimaculatus* in every respect save one, in that it has a pair of strong reflexed serrate leaflets on the mesosome.

There are four species of the Nyssorhynchus group of *Anopheles* in Panama which have a black band on the base of the fifth hind tarsal joint. They are *A. albimanus*, *A. tarsimaculatus*, *A. bachmanni*, and *A. strodei*. Curry (1) has lately shown that *tarsimaculatus* must be split up into two species, one, which is probably the true *tarsimaculatus*, which breeds in saline waters, called by him *A. aquasalis*, and the other, which breeds in fresh water, called by him *A. aquacaelestis*. He also states that the latter may be *A. oswaldoi* Perryassu, which Dyar sank in the synonymy of *A. tarsimaculatus*, on the authority of

Root (2) (Dyar, loc. cit., p. 439). The terminalia of the males of these two species, *aquasalis* and *aquacaelestis*, have been described and figured in Curry's paper, and through that worker's courtesy I have collected with him and examined a long series of both species. Neither of them possess leaflets on the mesosome, nor do any others of this group which have the black band on the fifth hind tarsal joint.

Photomicrograph of mesosome of *Anopheles anomalophyllus*, n. sp., showing serrate leaflets.

My scanty material was submitted to the late Dr. F. M. Root, who wrote: "I have made careful dissections of the hypopygia of males of *albimanus* (Costa Rica), *tarsimaculatus* (Brazil and Venezuela), *strodei* (Venezuela), and *bachmanni* (Argentine and Venezuela), and can say positively that none of them show anything approaching the conditions shown in your slides."

In view of these facts, and in spite of whatever the future may show in respect to the specific standing of this peculiar Anopheline, it is herewith described:

Anopheles (Nyssorhynchus) anomalophyllus, new species (here described.)

Female: Unknown.

Larva: Like that of *tarsimaculatus*, so far as the scanty material shows.

The anterior clypeal hairs are not so pinnate as in *tarsimaculatus*. The palmate hairs of the anterior internal thoracic group have twelve leaflets in each tuft, and the palmate hairs of the abdomen are typical of the larvae of the *Nyssorhynchus* group.

Male: Only one whole male specimen has been preserved, and this is mounted in balsam, and is somewhat distorted. The scales of the wings seem to be white instead of yellowish. The black band on the base of the fifth hind tarsal joint is plainly visible. The amount of black on the second hind tarsal joint comes closest to that on the second hind tarsal of *A. strodei*, being somewhat less than half the length of the joint, and much greater in extent than is found in *A. aquacaelestis* Curry.

The terminalia are like those of *tarsimaculatus;* the side-piece is conical outwardly, about twice as long as wide. Parabasal spine single, stout, arising from a pedunculate base, and directed mesially; there are two stout, hooked accessory spines arising near the middle of the side-piece, from a common sclerotized base. Just apical to these, and on the dorsal aspect of the side-piece, is a small curved internal spine. The ventral lobe (harpago) of the claspette consists of a rounded projection bearing at its tip three flattened filaments, somewhat expanded centrally, with pointed tips, and curving ventrally and then outwardly around the sides of the anal lobe. The dorsal lobe of the claspette exceeds the mesosome slightly. It has the typical *tarsimaculatus* structure, consisting of two lobes divided by a median sulcus running from the tip of the ventral margin around to the dorsal margin, gradually becoming deeper and wider and here dividing the lobes into two distinct apron-like portions. The tip of the lobe is ridged, and outwardly beyond these ridges the entire area of the lobes is covered with long hairs, longest at the basal margins of the lobes. The mesosome is rather stout, about as long as in *tarsimaculatus*, with two stout serrate reflexed leaflets arising from the sides a short distance down from the tip, and extending downwards nearly half the length of the mesosome. These are stouter than the leaflets in *A. argyritarsis*, and are not curved inwards as is usual in this species.

The type is a male adult, mounted in balsam, with terminalia mounted separately on the same slide. It was bred from a pupa taken at Wenham's Farm, near Almirante, R. de Panama, in February, 1929. A topotype is the male terminalia of one specimen, mounted on a slide, from the same locality at the same time; a metatype, the male terminalia of another specimen,

mounted on a slide, from a stream in Chase, Costa Rica, January, 1930. Two larvae, mounted in balsam, taken in February, 1932, are also among the material. All this material has been deposited in the U. S. National Museum.

References.

1. Curry, D. P.
Some Observations on the Nyssorhynchus Group of the Anopheles (Culicidae) of Panama. Am. Jl. Hyg., No. 2, March, 1932.
2. Root, F. M.
Further Notes on the Male Genitalia of American Anopheles. Am. Jl. Hyg., 4, No. 5, Sept., 1924.

DISTRIBUTIONAL AND SYNONYMICAL NOTES ON THE BEET LEAFHOPPER, EUTETTIX TENELLUS (BAKER).

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For the purpose of this paper, and until a completely satisfactory generic disposition can be made of the species, the writer prefers to retain the name *Eutettix tenellus* (Baker) for the beet leafhopper, because of its frequent occurrence in literature. However, he is of the opinion that *tenellus* is much more closely related to *Thamnotettix* Zetterstedt than to *Eutettix* Van Duzee. The synonymy of the species is as follows:

Thamnotettix tenellus Baker, Psyche, vol. 7, Suppl., p. 24, 1896.
Thamnotettix rubicundula Van Duzee, Bul. Buffalo Soc. Nat. Sci., vol. 8, No. 5, p. 70, 1907. (New synonymy.)
Thamnotettix indivisus Haupt. Bul. Agric. Expt. Sta., Tel-Aviv, Palestine, No. 8, p. 35, 1927. (New synonymy.)

Because of its importance as a vector of the causative organism of the "curly-leaf" of beets in the western part of the United States, records extending the known range of the beet leafhopper are of more than passing interest. Its occurrence, under favorable conditions, over most of the western half of the United States has been a matter of common knowledge for several years, and more recently Van Duzee,[1] DeLong,[2] and Davis,[3] have added Lower California, Florida, and western Canada, respectively, while explorations by Henderson[4] have

[1] Van Duzee, E. P., Proc. Calif. Acad. Sci., vol. 12, p. 184, 1923.
[2] DeLong, D. M., Jour. Econ. Ent., vol. 18, p. 637–638, 1925.
[3] Davis, E. W., Jour. Econ. Ent., vol. 20, p. 581–586, 1927.
[4] 1928 California Agricultural Experiment Station Annual Report 1927–28, p. 75–76.