

*ANOPHELES (ANOPHELES) NEOMACULIPALPUS*. A NEW  
SPECIES OF THE *ARRIBALZAGAIA* GROUP OF  
*ANOPHELES* FROM PANAMA.\*

By

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Ten species of the speckled-legged *Arribalzagaia* group of *Anopheles* are listed by Root (1929) as occurring in the American tropics; several have been described from incomplete data, therefore some of these may not be valid species. Until recently there have been known from the immediate vicinity of the Panama Canal but two species of this group, viz., *A. apicimacula* and *A. punctimacula*; a third one, *A. vestitipennis*, has been taken at Almirante in the western part of the Republic of Panama, and Dr. Dyar (1925) believed that a fourth one, *A. medio-punctatus*, should be found here also.

Larvae of *A. apicimacula* and *A. punctimacula* are found chiefly in well shaded pools, frequently being associated together and with other shade-preferring species, viz., *A. eiseni*, *A. bathanus*, *A. nimbus*, and a recently discovered new member of the *Nyssorhynchus* group which may prove to be *A. oswaldoi* Peryassú.

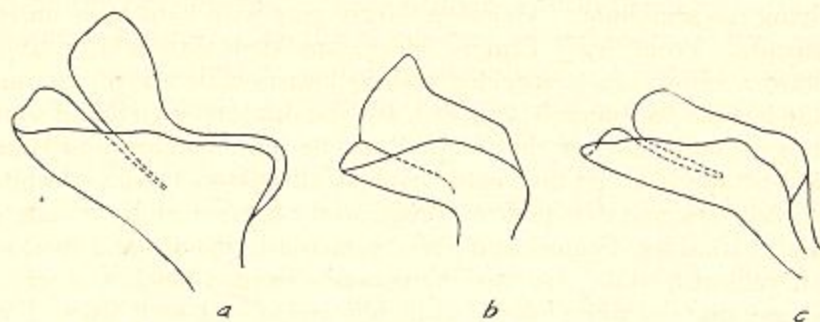
Larvae of *A. neomaculipalpus* (new species) have been taken in considerable numbers from water in cattle tracks exposed to the sun in low lying marshy pastures, on the Atlantic side of the Isthmus near Gatun and on the Pacific side in the flat coastal savannas east of Panama City. The larvae differ from those of *A. apicimacula* and *A. punctimacula* in the clypeal hairs. Like *A. punctimacula* they usually have small, smooth-leaved, transparent, palmate float-hairs on the posterior angles of the thorax and on the first and second abdominal segments; these are most easily seen on the cast-off skin of the last larval stage.

There are other minor differences between the larvae of these species, such as the habit of *punctimacula* larva to assume an "S" shape on the surface of the water when slightly disturbed, and its frequent manifestation of a lighter color of the thorax and the third and

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eighth abdominal segments; among hundreds of larvae of this species separated by me this tendency to bicolorism was noted in many, in some quite markedly, in others but faintly. The larvae and pupae of *neomaculipalpus* exhibited in every instance a diffuse but distinct white stripe down the dorsum of the thorax and abdomen. In not a single *apicimacula* larva was a tendency to bicolorism noted in any degree. While color markings on *Anopheles* larvae are not ordinarily considered to have any significance, in this case the phenomenon has been so strikingly limited in each case to one species as to merit comment.

As shown in the accompanying key and by the drawings, the breathing trumpets of the pupae of the three species differ so markedly as to furnish easy and reliable characters for separation of the species in this stage.



Camera lucida drawings (at equal magnifications) of breathing trumpets of pupae of (a) *Anopheles punctimacula*, (b) *A. apicimacula*, and (c) *A. neomaculipalpus*.

The adults of *A. neomaculipalpus* have been compared with the descriptions of the other species of the group as published by Dyar (1928) and by Root (1929) and they differ from all of these. The wings are especially characteristic; there is a large black spot at the apex of the wing, as in *A. apicimacula*, but only two prominent black spots on the costal border, instead of three as in *A. apicimacula* and *A. punctimacula*; a less prominent subapical spot lies between the apical spot and the large costal one involving the fork of the second vein, this subapical spot being separated from each of the others by a white line. The male genitalia are also sufficiently different from those of *A. apicimacula* and *A. punctimacula* to enable one familiar with them to distinguish one from another.

The name proposed for this new species, *A. neomaculipalpus*, should not be taken to indicate a close relationship with or similarity to *A. maculipalpis* of the Old World tropics but simply as a term somewhat

descriptive of this new addition to the known anophelines of the American Neotropics.

Description of *Anopheles* (*Anopheles*) *Neomaculipalpus*, *New Species* (here published).

*Female.* Proboscis slightly curved, shaggy basally, black with a few scattered yellowish-white scales. Palpi as long as proboscis, black and scattered yellowish-white scales on each joint, a few more white scales at the articulations, last joint white tipped. Occiput black, with erect scales, mostly brownish-white in front, a tuft of white hairs between the eyes. Mesonotum gray, covered with white hair-like scales anteriorly, the rest yellowish; a small round black spot on each side of the middle, a third black spot in the mid-line posteriorly, involving the scutellum. Abdomen darkly gray with light hairs on the segments. Front legs: Femora black, speckled with white; tibiae yellowish below, black, speckled with yellowish-white above; 1st tarsi white banded and spotted; 2nd, 3rd, 4th and 5th tarsi with broad white bands at both ends of the joints. Middle legs: Femora and tibiae yellowish speckled; 1st tarsi many banded, alternately black and white; 2nd, 3rd, 4th and 5th tarsi narrowly white banded at both ends of joints. Hind leg: Femora and tibiae numerous banded and speckled with yellowish-white; 1st tarsi numerous banded black and white; 2nd and 3rd tarsi white banded at middle and at each end; 4th and 5th tarsi white banded at each end only. The leg markings may vary somewhat. Wing scales ovate-lanceolate, somewhat broader on the basal part, black and white; two large black spots on the costal side of wing and one at apex, partly outlined in white; a somewhat less pronounced spot between the apical spot and the large one involving the fork of the 2nd vein; other costal spots reduced in size; membrane beneath spots infuscated; 3rd vein mostly white; 6th vein rather evenly spotted black and white with a larger black spot at the middle.

*Male.* Coloration about as in the female; palpi with yellowish hairs and spots on the last two segments, and many white spots on the ante-penultimate segment; all the black spots along the wing border reduced in size. Hypopygium: A stout spine and a longer slender one from a sclerotized pedicel near the base of the side piece, and a long slender one from about the middle of the inner side; claspers long, somewhat attenuated centrally, with a small, stout, inserted terminal spine; mesosome moderately sclerotized, bearing at the tip one pair of long wide leaflets, not margined, and one to four pairs of very slender ones parallel to and nearly as long as the wide ones; sclerotized lobes

of the claspette with two fused blunt spines at apices, the hairy membranous parts with a long stout spine at each apex and two weaker ones subapically; anal lobe entirely membranous.

*Larva.* Inner anterior clypeal hairs close together, very long; outer anterior clypeal hairs approximately half as long as the inner ones, bifid at about the middle, each branch sometimes again subdivided near the end into two or more short terminal hairs; a pair of small, smooth-leaved, transparent, palmate float hairs on the posterior angles of the thorax and on the 1st and 2nd abdominal segments; float hairs on the 3rd to 7th abdominal segments deeply infuscated or pigmented on the basal greater part, transparent and notched on the outer extremity of the leaflets; long lateral hairs of 4th and 5th abdominal segments single and unbranched, occasionally, as in *A. punctimacula* also, a bifid one is seen; combs of the 8th segment each with six long teeth with one or two minute short ones between the long ones.

*Pupa.* Breathing trumpets with narrow, deep, V-shaped incision on outer free margin, the two sides of the trumpet about equal and symmetrical.

KEY TO THE PANAMA SPECIES OF THE *Arribalzagaia* GROUP OF *Anopheles*.

*Adult:*

- Wings with three large black spots on costal border, a diffuse group of spots at apex, light scales creamy yellow; antennae and distal two segments of palpi of male tawny yellow . . . *punctimacula*
- Wings with three large black spots on costal border and one at apex, light scales pure white; antennae and palpi of male almost entirely black . . . *apicimacula*
- Wings with two large black spots on costal border and one at apex, light scales creamy white; palpi of male with yellowish hairs and spots on distal two segments, white spots on antepenultimate segment; antennae blackish . . . *neomaculipalpus*

*Male hypopygium:*

- Membranous lobes of claspettes thickly covered with short hairs, two long stout spines from heavily sclerotized tubercles at tip; mesosome rather heavily sclerotized, bearing at tip a pair of long wide leaflets with broad transparent margins and 1 to 3 pairs of slightly shorter, very slender ones . . . *punctimacula*
- Membranous lobes of claspettes thickly covered with long hairs, two slender weak spines at apex; mesosome rather heavily sclerotized, bearing at tip a pair of long leaflets, not margined, and 2 to 6 pairs of secondary leaflets which are progressively shorter, the last (proximal) pair being very short . . . *apicimacula*

Membranous lobes of claspettes rather sparsely covered with short hairs, one long stout spine at tip and two weaker ones nearby; mesosome only moderately sclerotized, bearing at tip one pair of long wide leaflets, not margined, and 1 to 4 pairs of very slender ones nearly as long as the wide ones. . . . . *neomaculipalpus*

*Larva:*

1. Outer anterior clypeal hairs long and prominent, dichotomously branched into about 10 or 12 terminal branches; long lateral hairs of 4th and 5th abdominal segments single (occasionally a bifid one is seen) . . . . . *punctimacula*

Outer anterior clypeal hairs not prominent; single or bifid, inconspicuously branched . . . . . 2

2. Outer anterior clypeal hairs usually single, sometimes bifid or branched near tip; long lateral hairs of 4th and 5th abdominal segments bifid or trifid . . . . . *apicimacula*

Outer anterior clypeal hairs usually bifid near middle, the branches sometimes again inconspicuously branched near tip; long lateral hairs of 4th and 5th abdominal segments single (occasionally a bifid one is seen) . . . . . *neomaculipalpus*

*Pupa:*

Breathing trumpets triangular in shape, the upper anterior and posterior margins remote outwardly, but nearly approximate inwardly in a sinuous curve . . . . . *punctimacula*

Breathing trumpets with margins remote, the outer posterior angle acutely produced, curving upward . . . . . *apicimacula*

Breathing trumpets with the margins remote, the two sides about equal and symmetrical . . . . . *neomaculipalpus*

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