

THE MORPHOLOGY OF SOME NEW CULICINE LARVAE FROM THE
SOUTHERN CAMEROONS, WITH NOTES ON *CULEX (CULEX)*
INGRAMI EDWARDS AND *CULEX (CULEX) TOROENSIS*
EDWARDS

By M. W. SERVICE

(Malaria Service, Federal Medical Department, Yaba-Lagos, Nigeria)

A SERIES of interesting Culicine larvae were collected in the course of field surveys carried out in the Southern Cameroons during 1957. Some of these can be identified as morphological variations of already existing species, while others are rather more interesting to a systematist and are described here as representing new species. No name has been given to them, as no corresponding adults are known, and they are treated as "sp. indet". The specimens are of considerable interest as their closest relatives are of East African distribution e.g. *C. toroensis*, *C. laticinctus* and *C. subrima*.

Culex (Culex) ingrami Edwards

Three fourth instar larvae of *ingrami* were found breeding in a forest pool at Tinto (situated about 25 miles from the town of Mamfe). They differ from the British Museum type forms and from the "Kampala" forms in the arrangement of the spines on the siphon and also in the subventral tufts. Typical specimens of *ingrami* have a siphonal index of 14, 12 paired spines in the pecten followed by 2-4 unpaired simple spines, and a group of 4-6 ventrolateral appressed spines near the tip of the siphon. Subventral tufts number 3 pairs and have 2-3 simple branches. Atypical "Kampala" forms have a shorter siphon (index of 8-10), and a pecten of about 25 paired spines which, towards the apex, alternate with simple spines and finally at the apex merge into a group of appressed siphonal spines.

The larvae found in the Cameroons have a much shorter siphon (index of about 5), a pecten of about 13 paired barbed spines, followed by an alternating group of about 7 paired and single simple spines. These finally merge into the apical group of 2-3 simple spines. Subventral tufts number 4-5 pairs, longer than the siphon with 3-5 simple branches (fig. 1).

The British Museum also has a specimen from Liberia, collected by Dr. W. Peters, which appears to be intermediate in morphological structure between the "Kampala" forms and those from the Cameroons. It has a siphonal index of 8, a pecten of 15 paired barbed spines, followed by 9 paired and single, simple spines, reaching to the tip of the siphon. The subventral tufts are longer than those of described material, but do not appear to be quite as long as those of the Cameroons specimens.

Culex (Culex) toroensis Edwards

Six fourth instar larvae were found, three in a rock pool at Besongabang (situated about 3 miles from Mamfe Town), the other three at Bansa in a muddy pool. All six are undoubtedly *C. t. toroensis* but the variation of their pecten

spines and apical group on the siphon is of interest. Below is a brief description of the larvae.

The three specimens from Besongabang.—Pecten of 13–14 paired spines, proximal ones with 3–5 basal denticles, distal with the same number or less, the latter 1 or 2 spines may be

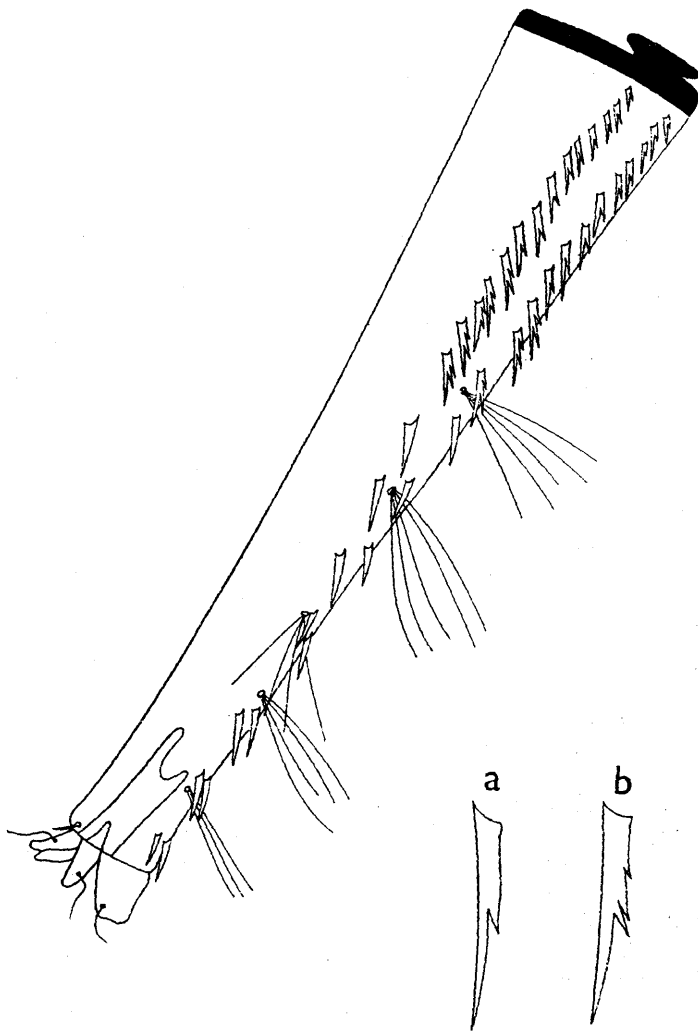


FIG. 1.—Siphon of *Culex* (*Culex*) *ingrami* Edwards, showing (a) distal and (b) proximal pecten spines.

simple and unpaired or all may be paired; 3 pairs of subventral tufts, simple and bifid. Apex of siphon with a group or 5, 1 or no dorsal spines; no ventral spines.

The three specimens from Banso.—Pecten of 12–14 paired spines, proximal ones with 2–5 basal denticles, distal spines may all be simple and unpaired, or with fewer denticles becoming simple; a more widely spaced unpaired simple spine may or may not be present;

2 or 3 pairs of subventral tufts, simple and bifid. Apex of siphon with a group of 2 or 4 simple spines; no ventral spines.

Specimens of *toroensis* in the British Museum from the Sudan and Kenya are typical in that they all (six specimens were examined) possess both ventral and dorsal spines at the apex. None of them showed the arrangement depicted by Hopkins (1952), with a large group of about 13 dorsal spines. The specimens examined had 1-3 ventral spines and 2-9 dorsal spines at the siphonal apex. Other specimens in the Museum, from the same locality, had either no spines at the apex or 1-2 dorsal spines only. Dr. D. J. Lewis presented the Museum with a specimen from the Sudan having neither dorsal nor ventral spines, but only a simple single spine mid-way between the end of the pecten and the siphon.

It would appear from the above account that *C. toroensis* is capable of exhibiting a great degree of variation in the spines of the siphon, and that the prominent appressed spines near its apex do not form reliable characters for the identification of this species. Its distribution is also possibly wider than previously thought, as its presence in the Cameroons has not previously been recorded.

Culex (Culex) sp. indet.

The British Museum has several larval specimens of *C. laticinctus* Edwards collected from Aden, Saudi Arabia, Eritrea, Yemen, Palestine and Greece. None of these show any morphological variations from the type form. Two larvae were found in a rock pool at Besongabang in the Cameroons and are identified from Hopkins' (1952) key as *C. laticinctus*. However, although these larvae resemble *laticinctus* morphologically, they are sufficiently different to be placed as either a new subspecies or a new species. Similar small differences are recorded as being of value for separating species of the *picipiens* group to which the above belong. The larvae are therefore described as if they represented a new species or subspecies, but as no adults are available no name is given to them.

Head.—Antennae strongly spiculate, basal portion with small brown patch, portion distal to tuft infusate, tuft of about 30 plumose branches at two-thirds. Setae *A*, *B* and *C* all plumose; *A* with 8 branches, *B* with 2 branches and *C* with 2 branches; seta *d* with 4-5 short simple branches. Mentum with 5 teeth on each side of a central tooth (fig. 2).

Abdomen.—Comb a patch of 35 scales. Siphon concave dorsally but appearing straight ventrally, index about 4-5; pecten extending to one-third, composed of 11 straight paired spines with 1-3 basal denticles, distal spines not appreciably more widely spaced. Subventral tufts 5, placed close to mid-ventral line and as long as diameter of siphon at point of attachment, each composed of 7-8 subplumose branches; a small tuft of 4 simple branches in a more lateral position near apex of siphon; no subdorsal tufts. Anal segment; distal edge of saddle smooth, broader than long (ratio 3:2); upper caudal seta with 3 branches, lower caudal seta single, lateral seta small and bifid. Ventral brush composed of about 6 pairs of many-branched tufts. Gills damaged, but appearing lanceolate and longer than saddle.

The chief differences between the above specimens and *laticinctus* are as follows:

Antennae with 30 plumose branches, *laticinctus* 35-40; setae *A* with 8 branches and *B* and *C* both with 2 branches, *laticinctus* setae *A* with about 10

branches, *B* and *C* both with 4 branches (*C* may have 3 or even 5 branches); *d* 4-5, *laticinctus d* single; pecten spines straight, *laticinctus* slightly curved; saddle broader than long, *laticinctus* longer than broad; upper caudal seta 3, *laticinctus* upper caudal seta 4 (Kirkpatrick records specimens with 5-6 branches); lower caudal seta single in both cases.

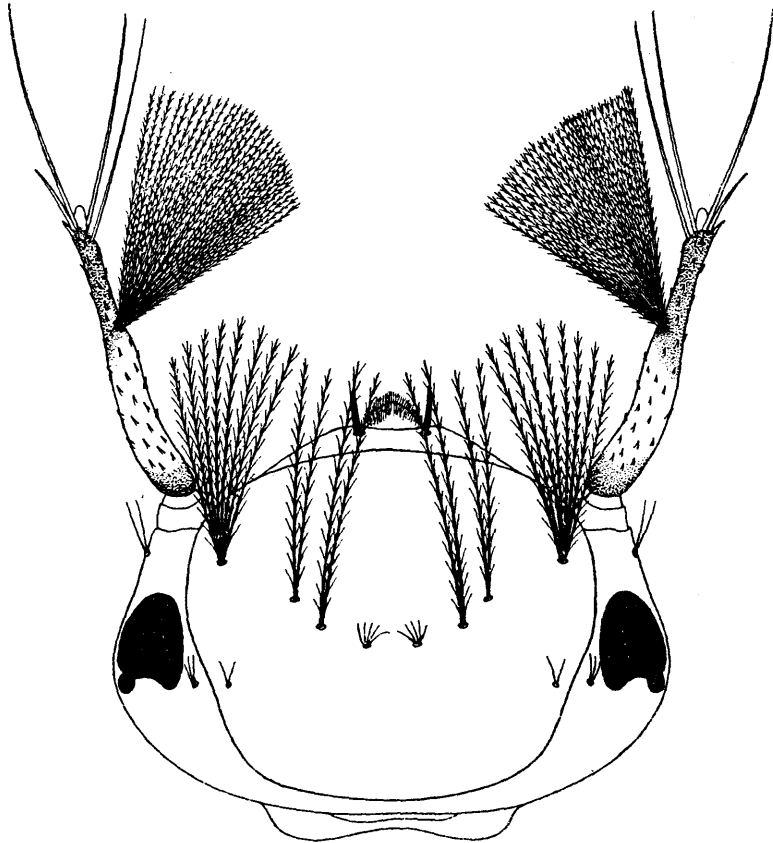


FIG. 2.—Head of larva of *Culex* (*Culex*) sp. indet. (near *laticinctus*).

Culex (*Neoculex*) sp. indet.

Two damaged larval pelts together with a fourth instar larva were collected from a marsh near Bamenda town. They are identified with the aid of Hopkins (1952) as *C. subrima* Edwards, but on a more detailed examination they differ sufficiently to justify being placed as a separate species, unnamed in the absence of any adult specimens. Below is a description based on the two larval pelts and the fourth instar larvae.

Head.—Antennae pale, spiculate, tufts of about 15 plumose branches at three-fourths. Setae *A*, *B* and *C* plumose, *A* with 8-9 branches, *B* and *C* both with 3 branches, about two-thirds length of head; *d* long and simple; *e* with 5-6 branches. Mentum with about

10 teeth on each side of central tooth, shape of mentum differs greatly from that of *subrima* and *rubinotus* (fig. 3).

Abdomen.—Comb a patch of 35–40 long narrow scales, distal ones tending to be larger than proximal. Siphon long and pale in colour, with both sides converging to apex, index 6–7; pecten of 8–10 paired spines, more closely set than in *rubinotus*, extending to nearly

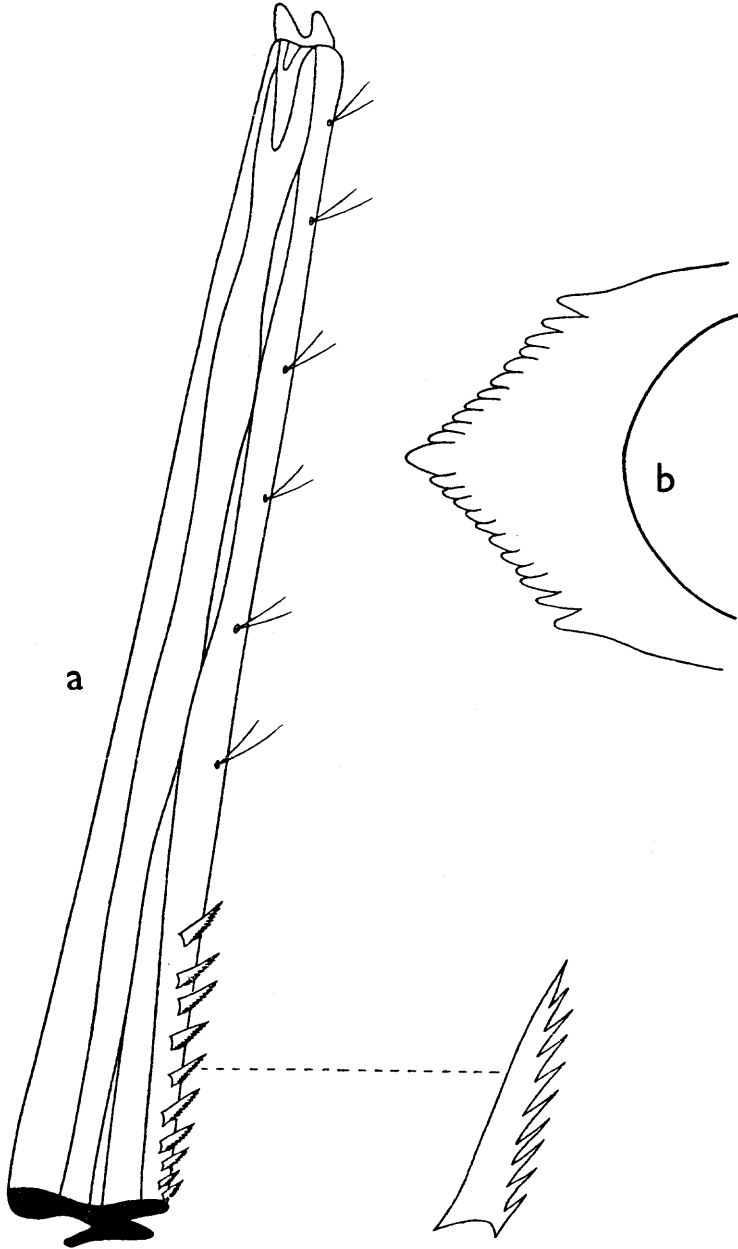


FIG. 3.—(a) Siphon and (b) mentum of *Culex* (*Neoculex*) sp. indet. (near *subrima*).

one-fourth length of siphon, each spine with numerous (about 10) fine denticles all along ventral side; subventral tufts 5-6 pairs each with 2-3 branches, small but distinctly visible under low magnification. Anal segment with complete saddle, distal edge smooth, upper and lower caudal seta single, lateral seta 4-6 branches. Ventral brush appears to be of 5 pairs of many branched tufts, longer than saddle. Dorsal pair of gills twice length of saddle, ventral pair shorter.

It can be seen from the above description that the larvae resemble *rubinotus* Theobald, but, more closely, *subrima* Edwards. However, they differ from both these species in several respects, the chief of which are set out below:

Antennal tuft of 15 plumose branches, *subrima* about 30; mentum of an entirely different shape, as shown in figure 3; siphon with sides converging for entire length, *subrima* converging for two-thirds then diverging slightly to apex; pecten of 8-10 straight spines, *subrima* 8-10 spines that are slightly arched dorsally; subventral tufts 5-6 pairs, small but distinctly visible under low magnification, *subrima* 2-3 exceedingly small pairs, not visible under low magnification; upper and lower caudal seta single, *subrima* upper caudal seta 3, lower caudal seta single; ventral brush appears to have 5 tufts and not 6 as in *subrima*.

ACKNOWLEDGMENTS

Thanks are due to Sir Samuel L. A. Manuwa, C.M.G., O.B.E., Chief Medical Adviser to the Federal Government of Nigeria, for permission to publish this paper. The author also wishes to thank Mr. P. F. Mattingly, of the British Museum (Natural History), for his valuable advice and help and also for putting the British Museum material at his disposal.

REFERENCES

- HOPKINS, G. H. E., 1952, *Mosquitoes of the Ethiopian Region, Part 1*. London. British Museum (Nat. Hist.).
KIRKPATRICK, T. W., 1925, *Mosquitoes of Egypt*. Cairo.