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A NEW AFRICAN SPECIES OF *SIMULIUM* (DIPTERA, SIMULIIDAE) IN PHORETIC ASSOCIATION WITH MAYFLY NYMPHS.

By PAUL FREEMAN.

ALTHOUGH only the early stages of this species are available, associated with mayfly nymphs of the genus *Elassoneuria*, it is possible to describe it as a new species because its characters are such as to distinguish it clearly from the early stages of all other known phoretic species. In addition, adults will almost certainly be obtained only by breeding from pupæ and they will therefore be readily identifiable. They are unlikely to be the early stages of an already described species because pupæ are known of all the species of *Simulium* so far described from the Ethiopian Region with the sole exception of *S. speculiventre* Enderlein, described from the Seychelles.

It is with pleasure that I name it after its collector, Professor Lewis Berner of the University of Florida. Professor Berner has very generously placed the holotype and some paratypes in the British Museum (Natural History).

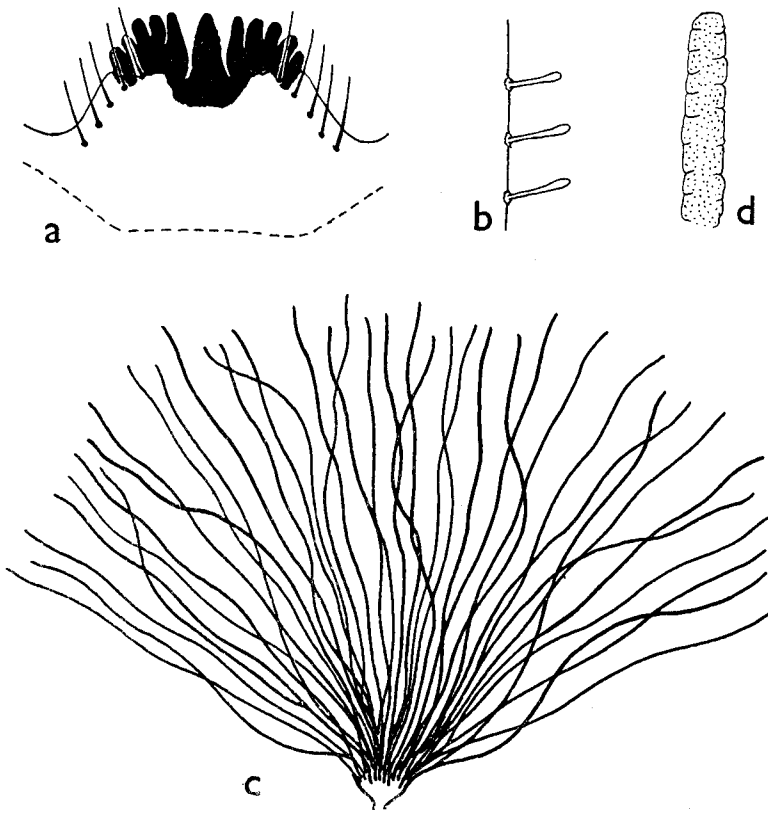
Simulium berneri, sp. n.

Allied to *S. copleyi* Gibbins and *lumbwanus* de Meillon on pupal filament characters, but readily distinguished by the abdominal armature ; larval submentum quite different from any so far described from the Ethiopian Region. An additional difference is afforded by the attachment of the larvæ ventrally on the head and thorax of the nymph, instead of dorsally on the first abdominal segment as described by Marlier (1950, Rev. Zool. Bot. Afr. xliii, 141–2) in *S. copleyi* form *marlieri* Grenier and *S. ?neavei* (=*S. diceros* Freeman & de Meillon).

Larva.—The material consists of both very young and older larvæ, all are attached ventrally to the mayfly nymphs or else are loose in the tubes containing the nymphs. The very young larvæ have feeding brushes with about 20 bristles, submentum with fewer lateral teeth and a papillæ with three simple lobes. Older larvæ develop as many as 50 bristles in the feeding brushes, five teeth side on the submentum and about six secondary lobes to each branch of the anal papillæ. *Submentum* (fig. *a*) with five blunt teeth each side of a deeply sunk large central tooth ; this arrangement is quite different from any other Ethiopian species known to me and contrasts with the arrangement of enlarged lateral teeth seen in *lumbwanus* and *copleyi* ; other mouth-parts normal. *Cuticle* covered with short hairs which appear quite dense under low power ; under high power they are seen to be clubbed (fig. *b*).

Pupa.—Length 2·8 mm. *Head and thorax* with disc-like tubercles and short bristle-like trichomes. *Respiratory organ* of the single known pupa

with 38 branches (fig. *c*) arising from a common base, very similar to that of *lumbwanus* ; whole organ longer than in *lumbwanus*, at least half as long as entire pupa ; individual filaments of even width and untapered with transverse wrinkles and superficial dots (fig. *d*). *Abdomen* with a normal arrangement of hooks which contrasts with the high number found in *lumbwanus* and *copleyi* (both of which have short cocoons) :



Simulium berneri.

a, submentum of larva ; *b*, cuticular hairs of larva under high magnification ; *c*, pupal respiratory organ, semi-diagrammatic ; *d*, apex of one respiratory filament under high magnification.

segments 3 and 4 with the usual rows of four hooks each side dorsally ; ventrally, segment 4 with a single hook each side, segment 5 with a close set pair each side, segments 6 and 7 with a wider spaced pair each side ; no terminal hooks. In addition there are some colourless spines but these

are distinct from the sclerotized hooks. *Cocoon* well developed, full-sized, enclosing abdomen and thorax of pupa, without neck, placed dorsally on thorax of mayfly nymph with opening facing backwards.

Habits.—Found attached by mayfly nymphs of the genus *Elassoneuria* as described by Professor Berner. One nymph had two larvæ, one nearly full grown ; the nymph carrying the pupa also had a larva and probably two more young larvæ as well because there were two loose in its container.

Holotype pupa and paratype larvæ Gold Coast, Dayi River, at Kpandu-Hohoe Road, 17. viii. 1950 (*L. Berner*).