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*DICERCOMYZON* DEMOULIN  
(EPHEMEROPTERA, FAM. TRICORYTHIDÆ)

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NEW SPECIES OF THE GENUS  
*DICERCOMYZON* DEMOULIN  
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By D. E. KIMMINS

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EARLY in 1954, Dr. G. Demoulin published a preliminary account of an extraordinary nymphal Ephemeropteran, under the name *Dicercomyzon femorale*. His specimens were from the Belgian Congo. When I received his paper, I already had in manuscript a description of a similar nymph from Nyasaland, which was subsequently published (Kimmins, 1955) as *Dicercomyzon* sp. The publication of these two papers attracted interest in these forms, and I have since received from Dr. M. T. Gillies examples of two more species from Tanganyika Territory and have found examples of the genus in collections made by Professor L. Berner in the Gold Coast. Dr. Demoulin has suggested that *Caenis* ? *sjoestedti* Ulmer from Kilimanjaro should be transferred to *Dicercomyzon* and Dr. Philip Corbet has informed me that he has seen examples of the nymphs in Uganda. The genus appears therefore to be fairly widespread in Equatorial Africa.

Dr. Demoulin had only a partly-transformed female subimago in addition to his nymphs upon which to base his generic diagnosis, so that the material which I have received from Professor Berner and Dr. Gillies represents a considerable advance in our knowledge of the genus. I should like to take this opportunity of thanking them both most sincerely for providing me with this material. I should also like to thank Dr. Demoulin for his kindness in answering a number of queries which I submitted to him and for sending me photocopies of more detailed drawings of *D. femorale* from a paper he had in manuscript.

To Demoulin's diagnosis of the genus (1954, 1954a) one can add that the eyes of the male are large, globular, set laterally on the head, with a diameter greater than the length of the head. The male forceps are two-segmented, terminal segment longer and narrower than the basal, set fairly wide apart on the forceps-base. Penis-lobes fused, stout, tapering or barrel-shaped in ventral view. Titillators acute, about as long as basal segment of forceps, extending beyond apex of penis-lobes.

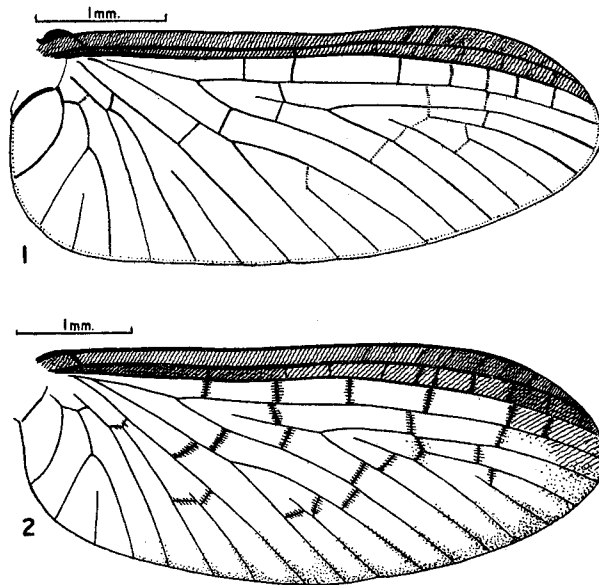
*Dicercomyzon femorale* Demoulin

I have seen nymphs which I refer to this species from the following Gold Coast localities:

Afram R., Mankrong, 13.ix.1950, (7); Koloe Stream, 18.viii.1950, (4); Asuboni Stream, Asuboni, 14.ix.1950, (1); Animi Stream, Bepong, 12.ix.1950, (1).

*Dicercomyzon costale* sp. n.

(Text-figs. 1, 3)

*Dicercomyzon* sp., nymphs, Kimmins, 1955, *Ann. Mag. n. H.*, (12) 8 : 876-878.GOLD COAST. Afram R., Mankrong, 13.ix.1950, 205 ♂, 89 ♀, 14.ix.1950, 18 ♂, 5 ♀ (*Lewis Berner*).TANGANYIKA TERRITORY. Amani, 3,000 ft., 31.iii.1956, 1 ♂ and nymph-skin ; Amani, R. Dodwe, 20.vi.1953, 1 ♀ and nymph-skin ; Gonja, 8.vii.1952, 3 nymphs, x.1952, 3 nymphs, 23.x.1952, 1 ♀ (*M. T. Gillies*).NYASALAND. Namwere, 11.viii.1952, 4 nymphs (*Lewis Berner*).FIGS. 1-2. Wings of (1), *Dicercomyzon costale* sp. n. and (2), *D. marginatum* sp. n.

The Gold Coast material consists largely of subimagines, many partly transformed to imagines, and some imagines.

♂ IMAGO (in alcohol). Head fuscous, short and broad, eyes large and globular, set laterally, diameter of eye greater than length of head. Antennae ochraceous. Pronotum fuscous, short, about as wide as head without eyes, posterior margin with a wide, rounded, median excision. Meso- and metanota shining fuscous. Legs ochraceous, apices of femora with three fine black lines, one dorsal, one ventral and one transverse, apical. Fore leg a little shorter than either mid or hind leg (96 : 117 : 123). Claws dissimilar, one hooked, the other large and blunt. Wing hyaline, venation pale fuscous to whitish, costal and subcostal areas warm brownish. Recurrent membrane of wing not projecting beyond apex of mesoscutellum. Venation

as in Text-fig. 1. Abdomen fuscous, tergites II–VIII each with a pair of median, hyaline spots at the base, sternites slightly paler. Cerci white, shaded with pale fuscous at base. Forceps-base pale fuscous, forceps white.

♂ GENITALIA. Forceps-base with apical margin slightly excised at centre. Forceps two-segmented, basal segment globularly swollen in basal two-thirds, terminal segment about twice as long as basal, its apical two-thirds slightly dilated and its surface finely reticulated and set with microscopic setae. Penis-lobes fused to form a subquadrate plate, a little shorter than the basal segment of forceps. From beneath, the sides are slightly convex and the apex is roundly bilobed. On either side of the penis-lobes is a large, acute titillator, about twice as long as the penis-lobes.

♂ SUBIMAGO (in alcohol). Coloration of body much as in imago. Wings slightly smoky, with brownish costal margin as in imago. A short recurrent membrane extending beyond apex of mesoscutellum.

♀ IMAGO (emerging from subimaginal skin, in alcohol). Head fuscous, short, broad, eyes globular, smaller than in male. Thorax light reddish brown. Legs ochraceous, with blackish markings as in male. Wings with costal border paler.

♀ SUBIMAGO (in alcohol). Darker than imago, wings as in male subimago with rather longer recurrent membrane. Subgenital plate parabolically rounded.

Length of wing, ♂, 4–6 mm.

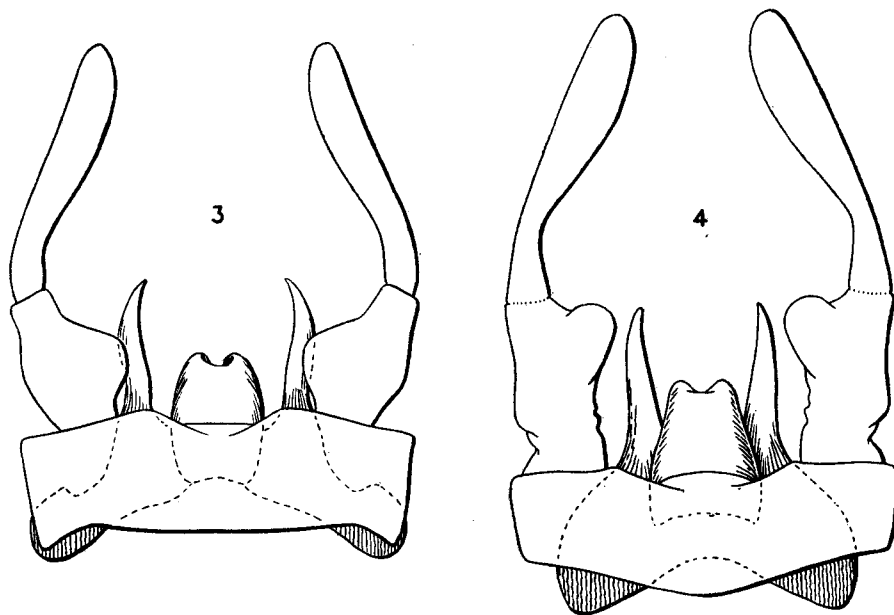
Dr. M. T. Gillies has sent me the following descriptions of the living insect, made from Tanganyika specimens. MALE IMAGO. "Thorax buff, fore legs yellow, other legs pale grey, with a minute, reddish brown spot at femoral tip. Abdominal tergites I–VIII white centrally, posterior margin narrowly mauve, broadening out laterally, IX–X sooty brown; sternites white; basal forceps segment yellow, distal segment white. Tails very long, yellow at base, white distally. Body, 4.5 mm.; wing, 5 mm.; tails 14–15 mm." FEMALE IMAGO. "Thorax and abdomen chestnut-brown, fore legs brown in distal half, pale basally, mid and hind legs with a brown knee spot." MALE SUBIMAGO. "Wings and body sooty grey, tails translucent white, yellowish at base, fore legs pale yellow, others pale grey."

♂ holotype (imago), ♀ allotype (subimago), Mankrong, 13.ix.1950, in British Museum (Nat. Hist.), paratypes in Brit. Mus. (N.H.) and University of Florida. The nymphs from Tanganyika Territory agree reasonably well with those described by me as *Dicercomyzon* sp. from Nyasaland. The Tanganyika nymphs appear to have single-segmented maxillary palpi, whereas those from Nyasaland are two-segmented. However, the maxillary palpi in this genus are so much reduced in size as to be probably non-functional and I therefore do not attach any great importance to this difference. Nymphs from both localities have the abdominal tergites slightly elevated along the median dorsal line, a character shared with *D. femorale*. The imagines from the Gold Coast are slightly smaller than those from Tanganyika but there appears to be no difference in the male genitalia. These facts have led me to associate the Nyasaland nymphs with *costale* rather than with some nymphs with narrower femora from Koloe Stream, Gold Coast, which appear to belong to the following species (*D. marginatum*). Both nymphs show a darkening of the costal border of the wing-pads.

The ♀ subimago may be separated from that of *D. femorale* Demoulin by the dark band along the costal margin of the wing. The nymphs resemble those of *femorale* but differ in the processes of the wing-pads, which project over the margin and in the more rounded basal angles of the labium.

***Dicercomyzon marginatum* sp. n.**

TANGANYIKA TERRITORY. E. Usambara Mts., Amani, Sigi R., 31.viii.1951, vii.1952, xii.1952, i.1953, vii.1953, 1 ♂ imago, 1 ♂, 2 ♀ subim., 4 nymphs; Amani, Forest stream, 2,900 ft., 26.vi.1953, 2 ♀; Amani Forest, Lion stream, vii.1951,



FIGS. 3-4. ♂ genitalia, ventral of (3), *Dicercomyzon costale* sp. n. and (4), *D. marginatum* sp. n.

1 ♀; Amani, Kisuga Stream, 900 ft., 2,800 ft., 5.vi.1951, 2 nymphs; Gonja, 26.x.1954, viii.1955, 1 ♂, 1 ♂ subim.; tiny stream by Monga-Denena Rd., 17.viii.1952, 1 nymph; S. Pare, Sassaneh R., 5,000 ft., 21.v.1955, 3 nymphs; Kilimanjaro, Marangu, 25.x.1954, 4 nymphs; Arusha, under stone, 1.i.1956, 1 nymph, all collected by *M. T. Gillies*.

GOLD COAST. Koloe Stream, 1 8.viii.1950, 4 nymphs (*Lewis Berner*).

♂ IMAGO (in 2% formaldehyde solution). Head pale fuscous, marked with darker fuscous at antennal bases and between ocelli. Antennae whitish. Eyes greyish lavender. Prothorax fuscous. Meso- and metathorax ochraceous with paler markings. Legs pale ochraceous, tinged with fuscous at knees. Fore leg slightly shorter than hind leg. Wing hyaline, venation fuscous, paler in anal area; costal area, base and apex of subcostal area and apical margin of wing more or less brownish,

cross-veins margined with brown. Abdomen above with segments I-VIII whitish or faintly tinged with pinkish, IX pale fuscous, X darker, II-VIII with the outer apical angles filled with a roughly triangular, pale brownish patch, not reaching the anterior border and enclosing a whitish spot around the spiracles on II-VI. Abdomen beneath whitish, faintly fuscous laterally. Forceps-base and forceps whitish, cerci whitish at base, soon becoming pale fuscous.

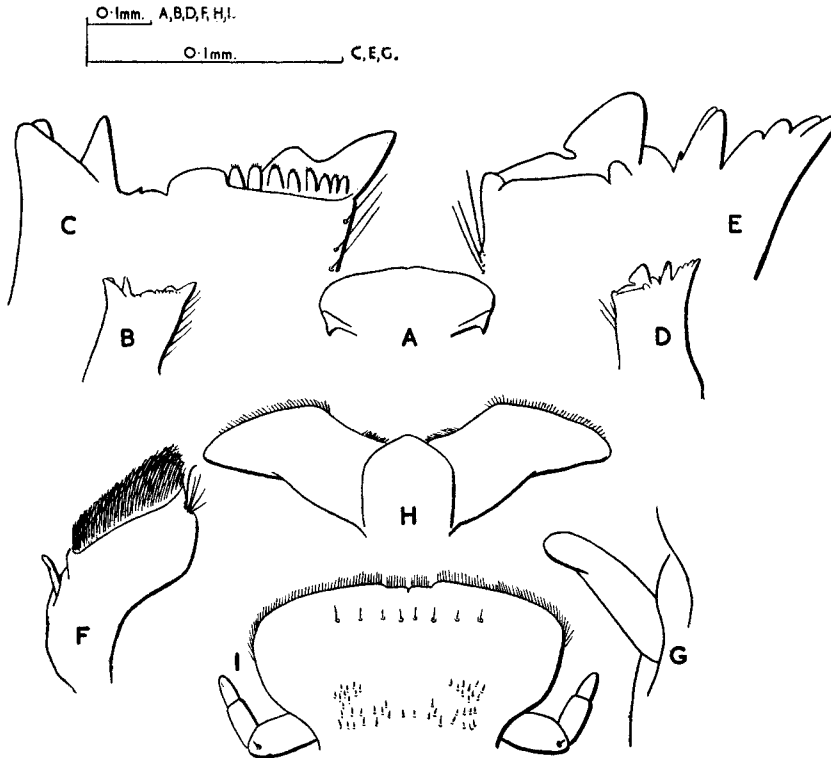


FIG. 5. *Dicercomyzon marginatum* sp. n. Nymphal mouthparts. (A), labrum; (B, C), right mandible, ventral; (D, E), left mandible, ventral; (F), right maxilla, ventral; (G), maxillary palp; (H), hypopharynx; (I), labium.

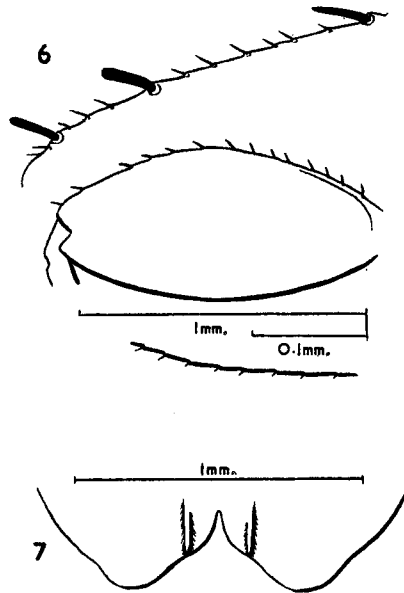
♂ GENITALIA similar in structure to *D. costale*. The joint between basal and terminal segments of forceps obscurely indicated. The basal segment is dilated on its inner surface, nearer the apex than in *D. costale*, slightly longer. Penis-lobes fused, tapering towards the excised apex; titillators acute, about as long as basal segment of forceps.

♂ SUBIMAGO. General colour pale fuscous, with piceous thorax. Eyes grey-black. Ocelli margined with blackish. Thorax with very pale fuscous, membrane between the sclerites. Wing smoky brownish, very slightly darker along costal margin, venation pale fuscous, cross-veins in centre of wing bordered with purplish

brown. Legs with femora pale fuscous, dorsal and ventral margins darker, tibiae and tarsi very pale fuscous. Abdomen above fuscous, with pale sutures, beneath paler. Forceps pale fuscous.

♀ IMAGO. Coloration of wings much as in male but with brownish suffusion of apical margin lacking. Abdomen pale fuscous, with a reddish suffusion above.

MATURE NYMPH. General colour tawny yellow, faintly shaded with fuscous. Eyes black, ocelli margined internally with blackish. Wing-pads containing dark, crumpled wings. Mouthparts somewhat resembling those of *D. femorale*. The maxillary palp is one-segmented. The apical margin of the labium is more rounded



FIGS. 6-7. *Dicercomyzon marginatum* sp. n., nymph. (6), mid femur, with dorsal and ventral armature, more enlarged; (7), apex of wing-pads.

than in *D. femorale*, with rounded apical angles. The armature of the ventral surface differs, the median group of teeth being replaced by a transverse row. Wing-pads reaching apex of fourth abdominal segment, inner apical margin of each carrying a short, raised, longitudinal ridge, not extending beyond the margin. Femora thin, flattened, elongate-oval, narrower than in *D. costale*, margins finely setose, dorsal also with sparse, longer setae. Abdomen with fringed gills on segments II-VI, which are narrower and pointed. Apical margins of tergites with blunt setae, forming a dense patch on each side of a bare median line, elsewhere sparse. Cerci yellowish.

IMMATURE NYMPH paler, wing-pads with costal margin of included wing shaded with pale purplish, darker at base and apex.

Length of wing, ♂, 5 mm.



♂ holotype (Sigi R., 2.vii.1953) in 2% formaldehyde solution, one wing mounted dry, and paratypes in British Museum (Nat. Hist.). The male differs from *D. costale* in the more extensive brownish suffusion of the wing, which has margined cross-veins, and in the differently formed genitalia.

With an earlier consignment of *Dicercomyzon* material, Dr. Gillies sent the following note on the habits of the nymphs.

"Nymphs of this genus are very common in streams in the forested areas of the eastern Usambara mountains. They harbour almost exclusively on the underside of fallen leaves held up in the current by twigs and branches or wedged between small rocks. They are found in tiny forest trickles at Amani, 3,000 feet, in water less than an inch deep and in the main Sigi River at all levels down to 700 feet, which is the lower border of the forest. Leaves are seldom held up anywhere except

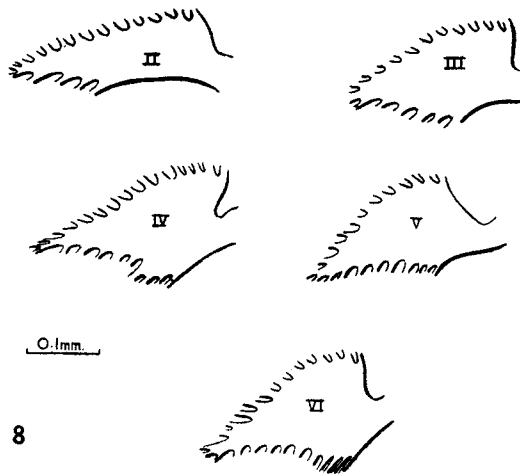


FIG. 8. *Dicercomyzon marginatum* sp. n. nymph. Outlines of gills of abdominal segments II-VI, filaments omitted.

near the surface and only where there are obstructions that cause turbulence and eddy formation. Consequently by their choice of habitat the nymphs live under conditions of maximum aeration and, in contrast to *Prosopistoma*—another lotic form—die very rapidly in still water. For this reason their safe transport to the laboratory for rearing presented considerable difficulties and more than a year elapsed before the first adult was successfully bred out."

Professor Lewis Berner has sent me the following details of the Afram River, at Mankrong, where he took *D. costale* abundantly.

"River flows over boulders and rock outcrops, forming a small cascade, not impressive but nice. River about 100 to 150 feet wide, rather shallow at the rocks, but deeper above and below. Banks heavily wooded. River shallow enough at low water for trucks to drive across. I was told that the river was exceptionally low for this time of year; it should be 8 to 10 feet higher. Flow at the cascades

is as rapid as the less swift sections of the Kpong rapids in the Volta River. Mayfly nymphs were present but scattered. Fauna and conditions in the river reminiscent of those of the Dayi River. There was little vegetation in the water. Water relatively clear, banks of yellow, moderately coarse sand. Tsetse flies numerous. Caught mayflies on porch of rest house which faces stream and is about 200 feet from the river. Began to come about 6.45 p.m. on into evening. The small blackish adults were very numerous after 8.30 p.m."

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