

**DESCRIPTION OF THE LARVA OF *CORDULEGASTER MZYMTAE*
BARTENEFF, 1929, WITH A DISCUSSION OF ITS TAXONOMIC
POSITION (ANISOPTERA: CORDULEGASTRIDAE)**

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A young (F-2) female cordulegastrid larva from the northern slope of the Pontic Alps (NE Turkey) is described and illustrated. It obviously pertains to *C. mzymtae*, the only *Cordulegaster* from the mountain forests along the eastern Black Sea coast of which the larva was still undescribed. The taxonomic position of the species within the genus is discussed, on the basis of a morphological comparison with larvae of *C. boltoni*, *C. insignis* and *C. bidentatus*. Its closest relative is found to be *C. bidentatus*. Notes on the larval habitat are provided, and its significance for the distribution of *C. mzymtae* is stressed.

INTRODUCTION

Since its double description by BARTENEFF (1929, 1930), based on a defective female, *C. mzymtae* has remained an intriguing dragonfly. Only about a dozen specimens have been recorded up to now, and its relationship with other West-Palaeartic *Cordulegaster* species has been a matter of discussion in several previous studies.

During an extensive survey in the Pontic Alps, NE Turkey, one specimen of the hitherto unknown larva was collected on a marshy mountain slope between Artvin and Şavşat. Its morphology revealed significant information about the taxonomic position of *C. mzymtae* within the genus.

DESCRIPTION

***CORDULEGASTER MZYMTAE* BARTENEFF, 1929**

Figures 1, 2A-C

Material. — 1 ♀ F-2 larva: 12 km W of Şavşat, Artvin, Turkey (41°18'N, 42°15'E), alt. ca 1500 m,

16-VII-1986, L. Brendonck leg. —

Diagnosis. — A small hairy cordulegastrid larva, with no lateral spines on abdominal segments 8 and 9. Prementum robust and as broad as long. 4 + 1 palpal setae. Broad-shouldered; prothorax with epaulettes about 4/5 of the head-width.

Measurements (in mm). — Total length: 19; — head width: 5.19; — prothorax width: 4.22; — prementum length: 4.15; — prementum width: 4.15; — wingsheath length: 2.60.

Description. — Body colour light chestnut-brown. Labium and legs ochraceous; tibiae darker towards the knee, and femora with two brown transverse bands. Abdomen with an ochraceous median streak, flanked by a row of dark brown spots on segments 5 to 9, and a series of less pronounced brown markings along its sides.

Head square. Antenna with subspherical scapus and pedicel. First annulus of the flagellum rather long, about 0.85 times the combined length of annuli 4 and 5. Eyes black, prominent and convex. Occiput with long stiff bristles along the rear and side margins, its dorsum covered with fan-shaped-

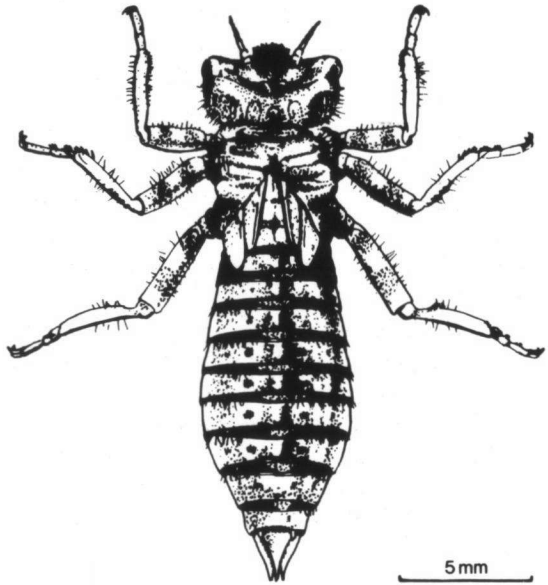


Fig. 1. *Cordulegaster mzymtae* Bartenef, 1929. Habitus of a female F-2-instar larva.

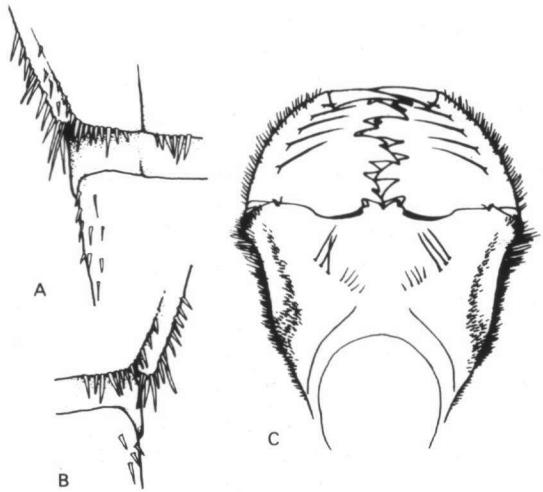


Fig. 2. *Cordulegaster mzymtae* Bartenef, 1929: (A) Right hind margin of sternite 8, ventral view; — (B) Left hind margin of sternite 9, ventral view; — (C) Labium, dorsal view.

setae. The same type of modified setae also covers part of the frons and the antennal segments, the upper side of the front tibiae, and the distal end of the front femora. On the postocular lobes, they are arranged in a typical cordulegastrid pattern of merging rows.

Labium of usual shape. Prementum stout; its maximal width (near the palpal articulation) equals its total length. Likewise, the proximal hinge area is relatively broad. On each side of the midline a row of three long and five short premental setae occurs. Labial palps with typical dentations on distal margin. Outer margin with four long palpal setae, and a small additional one at the base of the movable hook.

Prothorax broad-shouldered, about 4/5 of width of the head. Prothoracic processes (epaulettes) prominent. Hindwing-sheaths reaching halfway along the second abdominal segment.

Abdomen gradually attenuated towards its tip. Lateral spines on segments 8 and 9 lacking. Epiproct and paraprocts short and rather blunt; cerci small. The ovipositor processes are short, extending only about 2/5 along the length of the ninth sternite. The two latter features are typical for the not full-grown larva at hand.

DIFFERENTIAL DIAGNOSIS

The larva of *C. mzymtae* can be readily distinguished from that of *C. boltoni* by the absence of lateral spines on abdominal segments 8 and 9. As in *C. bidentatus* and *C. insignis*, the prementum is stout and about as broad as long: the length/width ratio equals 1.00 in *C. mzymtae* (Fig. 3). In *C. bidentatus*, the mean ratio is 1.02 (0.97-1.06; n=34). *C. boltoni* usually has a more slender prementum with a mean length/width ratio of 1.08 (1.03-1.13; n=57).

The relative length of the antennal segments also has some diagnostic value. The first annulus is about 0.85 times as long as the two distal annuli (4 + 5) together. In F-2 instar larvae of *C. boltoni* it is only about 0.70 times as long (n=2). During subsequent moulting towards the ultimate instar, the first annulus stretches further. In *C. bidentatus* (and probably also in *C. mzymtae*) it ultimately becomes longer than

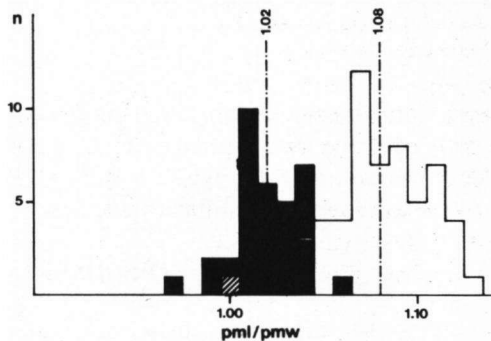


Fig. 3. Ratio of prementum length to prementum width in *Cordulegaster* larvae. — [Black: *C. bidentatus*; — white: *C. boltoni*; — hatched: *C. mzymtae*].

both apical segments combined, with a ratio of about 1.16 (1.03-1.35; $n=27$). In *C. boltoni*, the stretching is usually insufficient to overcome the size difference between annuli 1 and 4 + 5, and the mean ratio in ultimate instar larvae is 0.93 (0.79-1.02; $n=38$). Finally, our specimen of *C. mzymtae* bears two groups of five short premental setae. This number is highly exceptional in *C. boltoni* (usually 2 to 4), but normal in larvae of *C. bidentatus* and *C. insignis* (usually 5 or more).

Thus, on the basis of larval morphology, *C. mzymtae* is clearly more related to the latter two species than to *C. boltoni*.

The larva of *C. mzymtae* is broad-shouldered, with prominent prothoracic processes; the ratio head/prothorax is relatively small (1.23; cf. Fig. 4). It shares this character with *C. bidentatus*, the mean ratio of which is 1.24 (1.20-1.29; $n=34$). In *C. insignis* on the other hand, the epaulettes are markedly less prominent. This results in narrow shoulders, with a mean head/prothorax ratio of 1.33 (1.25-1.41; $n=52$).

Another easily checked discriminating character is the number of palpal setae. Our *C. mzymtae* bears 4 long palpal setae, which is the usual number for *C. bidentatus* (3 exceptions in 35 specimens checked)

whereas only 3 long setae are found in *C. insignis* (4 exceptions in 63 specimens).

With only one larval specimen of *C. mzymtae* at hand, we could not find reliable characters to distinguish it from *C. bidentatus*, which obviously is its closest relative in the West-Palaearctic area.

DISCUSSION

BARTENEF (1929, 1930) alternatively assigned *C. mzymtae* to the *C. boltoni*- and to the *C. bidentatus*-group. Upon examination of a male, AKRAMOWSKI & SHENGELIA (1967) supported the latter point of view, and considered *C. bidentatus* as its closest West-Palaearctic relative. The same affinity can also be derived from WATERSTON's key to the males of Old World *Cordulegaster* species (1976). DUMONT & SCHNEIDER (1984), on the other hand, considered the *C. bidentatus*-group as non-existing. *C. bidentatus* itself would be a western vicariant of an Asiatic genus, while *C. mzymtae* and *C. insignis* were

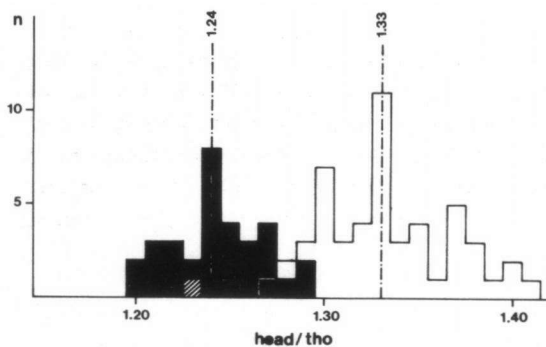


Fig. 4. Ratio of Head to Prothorax width in *Cordulegaster* larvae. — [Black: *C. bidentatus*; — white: *C. insignis*, — hatched: *C. mzymtae*].

believed to belong to the *C. boltoni*-group.

However, a detailed comparative study on the larvae of all 13 West-Palaeartic *Cordulegaster*-races (Verschuren, in preparation) has revealed that this point of view has to be revised and that the two species-groups, as generally considered, are valid. The *C. boltoni*-group comprises *C. boltoni* s.l., *C. princeps*, *C. pictus* and *C. heros*, while *C. bidentatus* s.l., *C. mzymtae* and *C. insignis* constitute the *C. bidentatus*-group. Within the latter species-group, there are substantial differences between *C. insignis* and the two remaining species, which are very closely related, based upon larval morphology.

NOTES ON THE LARVAL HABITAT

The larva was found in pine forest, crawling in slushy mud between the stems of *Lysimachia* sp., on a marshy mountain slope above a fast-running rivulet. This type of habitat is common on the northern slope of the Pontic Alps and the southwestern slope of the Great Caucasus, which are subject to heavy westerly rainfall from the Black Sea (Fig. 5). Although the larvae live in small, apparently stagnant pools, their water is well-oxygenated and renewed regularly. Summer-long floods of melting water from the permanently snowcapped summits strengthen this effect.

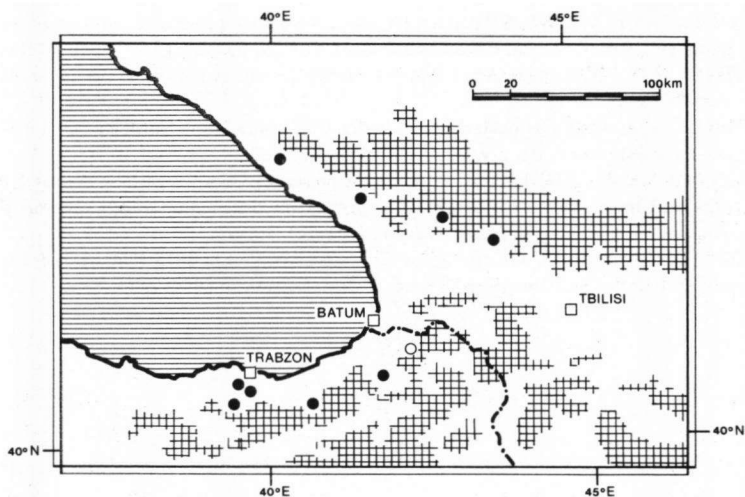


Fig. 5. Distribution of *Cordulegaster mzymtae* in NE Turkey and the U.S.S.R., along the eastern Black Sea coast. — [Open circle: locality where the larva was found; — cross-hatched: area above 2000 m].

CONSERVATION

The mountain chain of the eastern Pontic Alps is sparsely inhabited, except for some townships situated at the mouth of river valleys on the narrow coastal plain. Except for mining activities, mainly limited to the area around Artvin, and hazelnut and tea plantations at the lower altitudes of mountain slopes east of Trabzon, human influence is limited. Few proper roads give access to the mountains, so that tourism is restricted to famous historical monuments, such as the monasteries of Meryemana (at Sumela), and Kizlar. Along with a surrounding buffer zone, these are classified as protected areas, and thus relatively well safeguarded. In addition, the Turkish government has started to establish a number of national parks in the eastern Pontic Alps, e.g. at Kackar, in the mountains above Findikli. The apparent scarcity of *C. mzymtae* may therefore safely be attributed to lack of study, rather than to actual rarity, and its existence does not seem to be threatened.

ACKNOWLEDGEMENTS

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