

ON THE PRESENCE OF *CORDULEGASTER MZYMTAE* BARTENEFF,
1929 IN TURKEY, WITH A DISCUSSION OF ITS GEOGRAPHIC
DISTRIBUTION AND TAXONOMIC POSITION (ANISOPTERA:
CORDULEGASTRIDAE)

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C. mzymtae is reported from 4 localities in the northeastern Pontic Alps, Turkey; a considerable range extension of this sp., which was previously believed to be endemic to the western Caucasus. The new material (4 ♂) is described, and the taxonomic position of the sp. within the genus is discussed. It apparently belongs to the *C. boltoni*-group (which also includes *C. insignis*, *C. coronatus*, etc.), and not to the *C. bidentatus*-group, as is still widely believed. The dichotomy within *Cordulegaster* is in fact so deep, that it seems unavoidable to remove the *bidentatus*-group from that genus and accomodate it closer to *Anotogaster*.

INTRODUCTION

Cordulegaster mzymtae is one of the most enigmatic dragonfly species of the west-palaeartic area. After its double description by BARTENEFF (1929, 1930), based on a single defective female, it took until AKRAMOWSKI & SHENGELIA (1967) to see a male (one out of a series of three collected in the Georgian S.S.R., two of which were subsequently lost) associated with it. In later papers, SHENGELIA (1974, 1975) provided some details on the environmental conditions in which the species lives. We here report on four more specimens, all males, collected in the northeastern Pontic Alps, Turkey.

CORDULEGASTER MZYMTAE BARTENEFF, 1929

Figures 1-15

Cordulegaster mzymtae BARTENEFF, 1929: 60 (♀, no figs); — 1930: 12 (thorax and abd. segments 2-6 of the same ♀, figured in lateral view); — AKRAMOWSKI & SHENGELIA, 1967: 313-318 (head, habitus, anal app. and occiput figured on ♂ from Genzwischi, Georgian SSR); — SHENGELIA, 1974: 55 (3 ♂, the same as cited in the previous publication, but more details given on the collecting sites: Cena, I-VIII-1964; Dolamisis, 30-VII-1964; Gencvishi, Mt Hutiya, 24-VIII-1964); — 1975: 72 (the same date as in the preceding reference).

Cordulegaster mymzae [sic!] Barteneff, 1929 ST. QUENTIN, 1965: 54! (no new records).

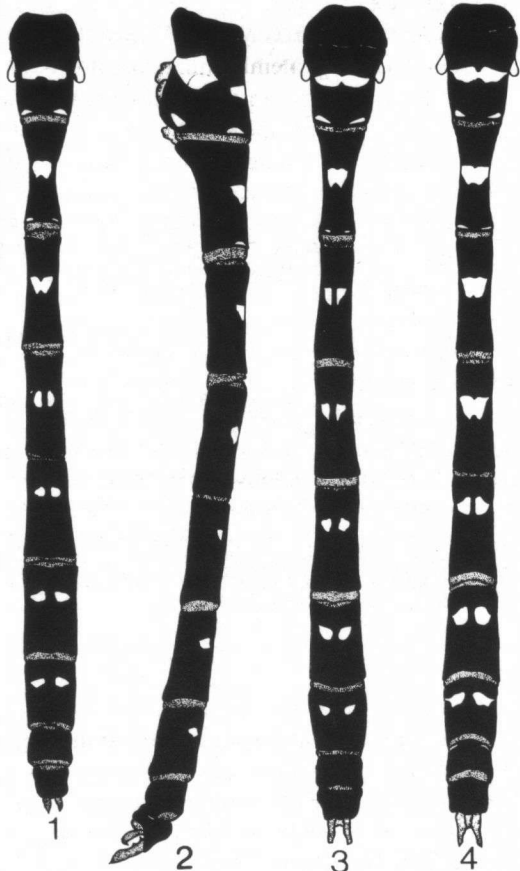
Material. — 1 ♂, Sivrikaya (40° 41'N, 40° 42'E), 20-VIII-1959, alt. ca 1330 m; — 1 ♂, Gümüşane nr Trabzon, Zigana Dağları (40° 27'N, 39° 29' E), 13-VII-1960, ca. 1400 m; — 1 ♂, Artvin, above Artvin (41° 01'N, 41° 49'E), 6-VI-1962, ca 830 m (all K.M. Guichard leg., det. A.R. Waterston, repository: Royal Scottish Museum Edinburgh); — 1 ♂, Akçaabat (Trabzon) (41° 01'N, 39° 34'E), 6-VII-1975, alt. not stated (B. Osella leg.).

**DESCRIPTION OF MALE No. 1
(SIVRIKAYA)**

A small, very dark species of *Cordulegaster*.

Measurements. — Abdomen (excl. app.): 47.0 mm, right fore wing: 40.8 mm; right hind wing: 39.5 mm; Pterostigma (right fw.): 3.0 mm, (right hw.): 3.6 mm.

Head (Figs 9-10). — Labium brownish white, middle lobe darker; maxillae and mandibles dark brown; labrum yellow, broadly bordered with black, with a dropshaped extension on the middle of the black basal margin; the latter broadly connected with the anterior margin by a brown band; anteclypeus black laterally, brown in the middle;



Figs 1-4. *Cordulegaster mzymtae*, male abdomen: (1-2) from Sivrikaya; — (3) from Gümüşane; — (4) from above Artvin.

postclypeus yellow with black anterior border; paired impressions black and broadly connected with the marginal black; front of frons yellow with a black transverse bar; postfrons and antennae dark brown; dorsal part of occiput black; occipital crest with long brown setae; posterior part of occipital triangle tumid, yellow, with very weak longitudinal impression; rear of eyes black except for a narrow band of creamy white extending from the base of the mandibulae backwards along about one third of the eye margin.

Thorax. — Prothorax black except for a lateral yellow spot on each middle lobe. Pterothorax as in Figs 5, 8. Legs black, except for a yellow spot on the pro- and mesocoxae.

Wings. — Anal triangle 3-celled, anal loop 4-5 celled; membranula basally white, light brown apically; discoidal cell 2-celled (in one specimen left forewing and right hindwing 1-celled); pterostigma black; nodal index:

left fw. 15 — 15 / 15 — 13 right fw.

left hw. 15 — 11 / 11 — 16 right hw.

A brownish tinge on all four wings, darker at apices.

Abdomen (Figs 1-4, 6-7). — Black, sparsely marked with yellow. Segments 2 and 3 with apical lunules. Segments 9 and 10 totally black. Superior anal appendages, seen from above, parallel-sided, constricted in their apical third, pointed. A strong basal, external spine near the base of the appendix, and a smaller internal spine at the first one-third of the appendix. Inner surface of basal spine a smooth and shiny hollowed-out surface which extends as far as the internal spine. Inferior appendix short, squarish, with concave apex. An indented tubercle on each side of its apex.



Fig. 5. *C. mzymtae*, male lateral view of synthorax (Gümüüşane).

VARIATION

Only minor variation was observed among the specimens studied.

Size. — Abd. 49.5-50.5; hw 40.5-41.5; fw. 39.5-40.5; Pt. fw. 3.0-3.5; Pt. hw. 3.5-3.9.

Head. — The relative extent of black and yellow markings tends to vary, e.g. on the labrum, the virgule may or may not (1 specimen) be connected with the black margin on the anterior border of the labrum; similarly, the paired impressions on the postclypeus may have isolated black spots, and the transverse bar on the front of the frons may be relatively narrow or very broad.

Thorax. — Between the yellow spots on the middle lobe of the pronotum two additional small yellow spots may occur, and a pair of triangular yellow spots are sometimes present on the hind lobe of the pronotum.

Wings. — The wings may be completely hyaline; anal triangle 3-4 celled; the number of ante- and



Figs 6-9. *C. mzymtae*, male (Akcaabat): (6-7) abdomen; — (8) synthorax, lateral view; — (9) head, front view.

postnodal crossveins may vary by 4-5 cells.

Abdomen. — The relative size of the yellow spots varies. On segments 3-5 the left and right basal

spots may be confluent across the dorsum, or not. In one specimen, small apical lunules were seen on segment 4; in another case, smallest yellow lunules were seen on segment 9 (cf. Figs 1-4, 6-7).

DISTRIBUTION AND HABITAT

C. mzymtae is not a West-Caucasian endemic as suggested by AKRAMOWSKI & SHENGELIA (1967), but extends over a considerable distance to the south-west along the Pontic Alps. Possibly, its true limits of western extent are well beyond our present insights. The range of *C. mzymtae* is thus reminiscent of that of *C. insignis charpentieri* (DUMONT, 1976), although it seems unlikely that the former may occur as far west as Bulgaria and Roumania. In a broader context, this means that other so-called Caucasian endemics may now also be expected to inhabit the little-known humid, temperate Pontic Alps as well. Likely candidates among the Odonata are *Lindenia inkiti* Barteneff and *Leucorrhinia circassica* Barteneff.

With regard to habitat, a preference for altitudinal, wooded biotopes appears manifest. The type was collected at 1335 m, and the Georgian specimens were found between 1900 and 2200 m, while the Turkish specimens were captured between 830 and 1400 m. The species thus rarely seems to occur below 1000 m. AKRAMOWSKI & SHENGELIA (1967) think that it is typical of coniferous forest. The Turkish records, however, suggest that it may also occur in temperate deciduous forest.

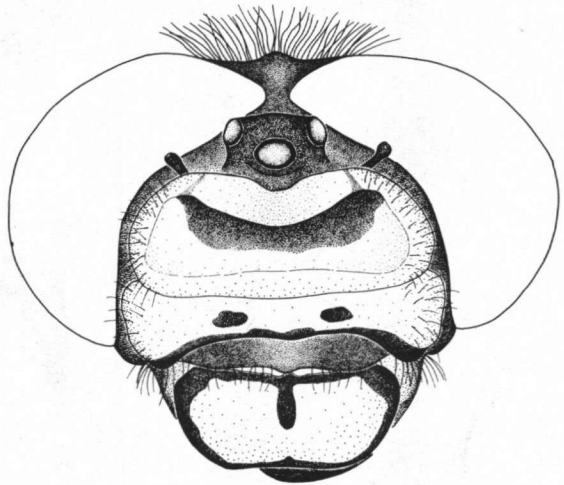
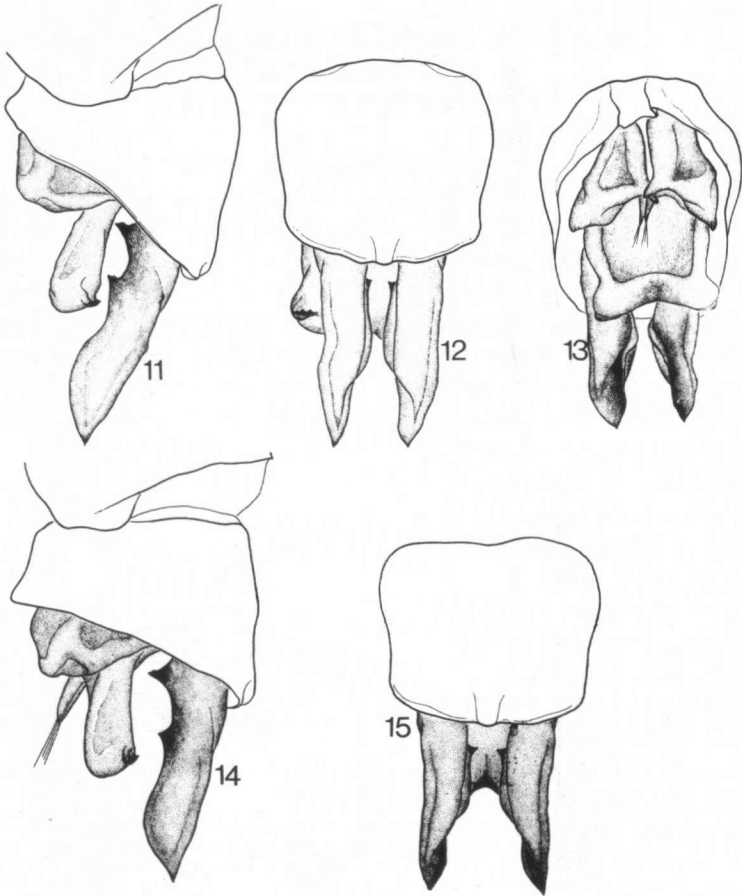


Fig. 10. *C. mzymtae*, male (Artvin): head, front view.

SYSTEMATIC POSITION

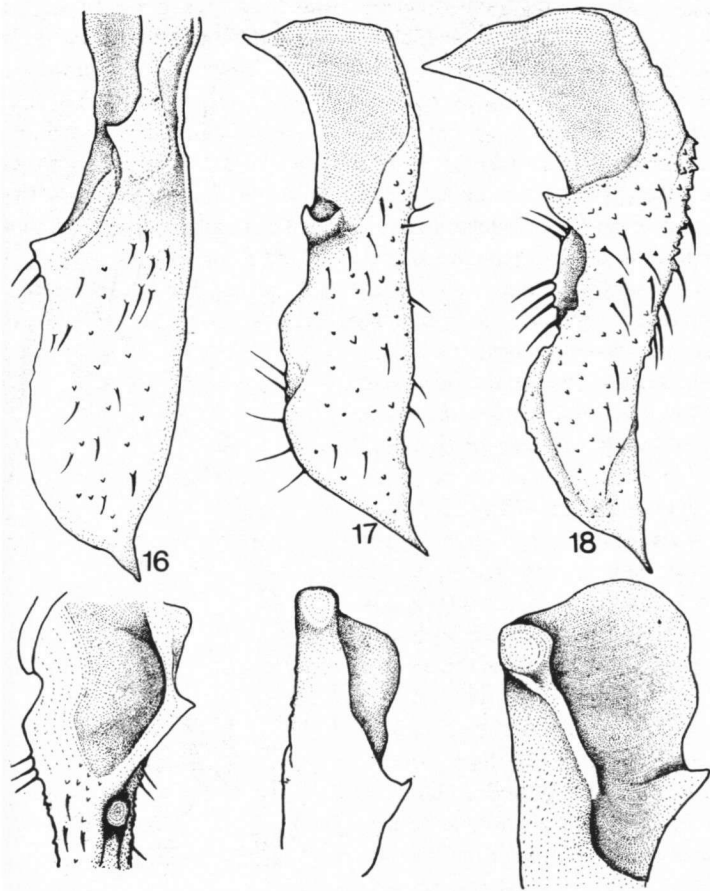
BARTENEFF (1929, 1930) alternatively stated that *C. mzymtae* belongs to the *C. boltoni*- and to the *C. bidentatus*-group. AKRAMOWSKI & SHENGELIA (1967) support the latter point of view. However, our present views on the relationship of the two species-groups that occur in the west-palaearctic are



Figs 11-15. *C. mzymtae*, anal appendages: (11-13) specimen from Sivrikaya; — (14-15) specimen from Artvin; — (11, 14), lateral view; — (12, 15) dorsal view; — (13) ventral view.

mis-construed, because based on such superficial and unreliable characters as colour pattern, and gross morphology of the male superior appendages (2 spines = *bidentatus*-group; "1" spine = *boltoni*-group, while in fact both groups have 2 spines). Although this is not the place to revise the genus *Cordulegaster*, it is necessary to dwell upon the structural characters that really separate both species-groups. These appear, indeed, sufficiently important to warrant their separation into distinct subgenera or even genera.

The appendix superior in the *boltoni*-group has a base which is strongly expanded into a basal, external tooth, while a much smaller, internal tooth is found roughly at the first third of the appendix. The space between both, on the



Figs 16-18. Superior appendages of different *Cordulegaster* species in internal and ventral view: (16) *C. bidentatus* Sel. (Yugoslavia); — (17) *C. insignis* (Schneider) (Turkey); — (18) *C. boltoni* (Don.) (Belgium).

ventrum of the appendix, is a smooth, concave articulating surface. This type of structure is also found in *C. insignis*. The internal spine is slightly smaller and sits somewhat further distad here, but these differences are of a minor nature. *C. mzymtae* conforms to this basic pattern.

In *C. bidentatus*, a very different arrangement is found. Both spines are small, implanted more or less in line in a ventral position, and the basalmost tooth is not part of the base of the appendix, which is not expanded. The smooth articulating surface is short and situated externally and basad to the two spines.

The appendix inferior also differs: in *C. bidentatus* it is elongated, almost twice

as long as wide, but distinctly tapering towards its tip (Fig. 19). In this respect, it is closely allied to *Anotogaster* Selys, from temperate Asia and Japan. In *C. boltoni*, but also in *C. insignis*, *C. coronatus*, *C. mzymtae*, and in the Himalayan *C. brevistigma*, the appendix inferior is short, squarish, with concave apex. The counterpart of these differences in the males is found back in the occipital region of the females. In *C. bidentatus*, the occiput is flat, not elevated above the line uniting the rear of the eyes. Viewed from behind, it presents two poorly expressed, lense-shaped elevations (Fig. 22). In tandem linkage, the male inferior appendix grasps across the meeting zone of the complex eyes, and leaves scratch marks behind the lateral ocelli but does not damage the eye surface itself, while the superior appendix grasps across the posterior elevations, and leaves scratch marks beside these (Fig. 22).

In the *boltoni*-group, the occiput is tumid behind, and elevated above the line that unites the rear of the eyes. Depressions may, however, occur on the rear of the occiput (Fig. 21), as in the *boltoni*-group s.s., while in the *insignis*-complex, the rear of the occiput is smoothly rounded (Fig. 20). There is, in every case, a deep V-shaped incision between the side of the occiput (hind view), and the rear of the compound eye. This is the site where the basal tooth of the superior appendix fits during tandem linkage, while the more apical tooth scratches the body of the occiput (Fig. 21). The appendix inferior is too short and wide to reach across the compound eyes. Its apical concavity fits over the tumid top of the occiput, but its apical denticles

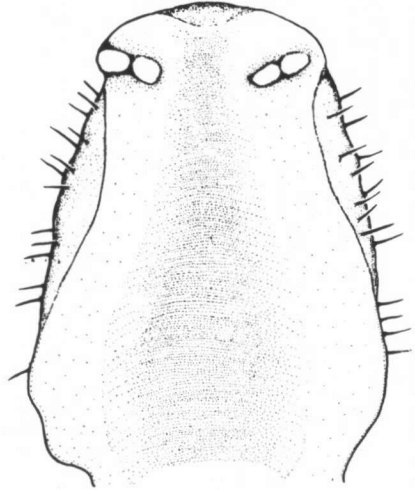
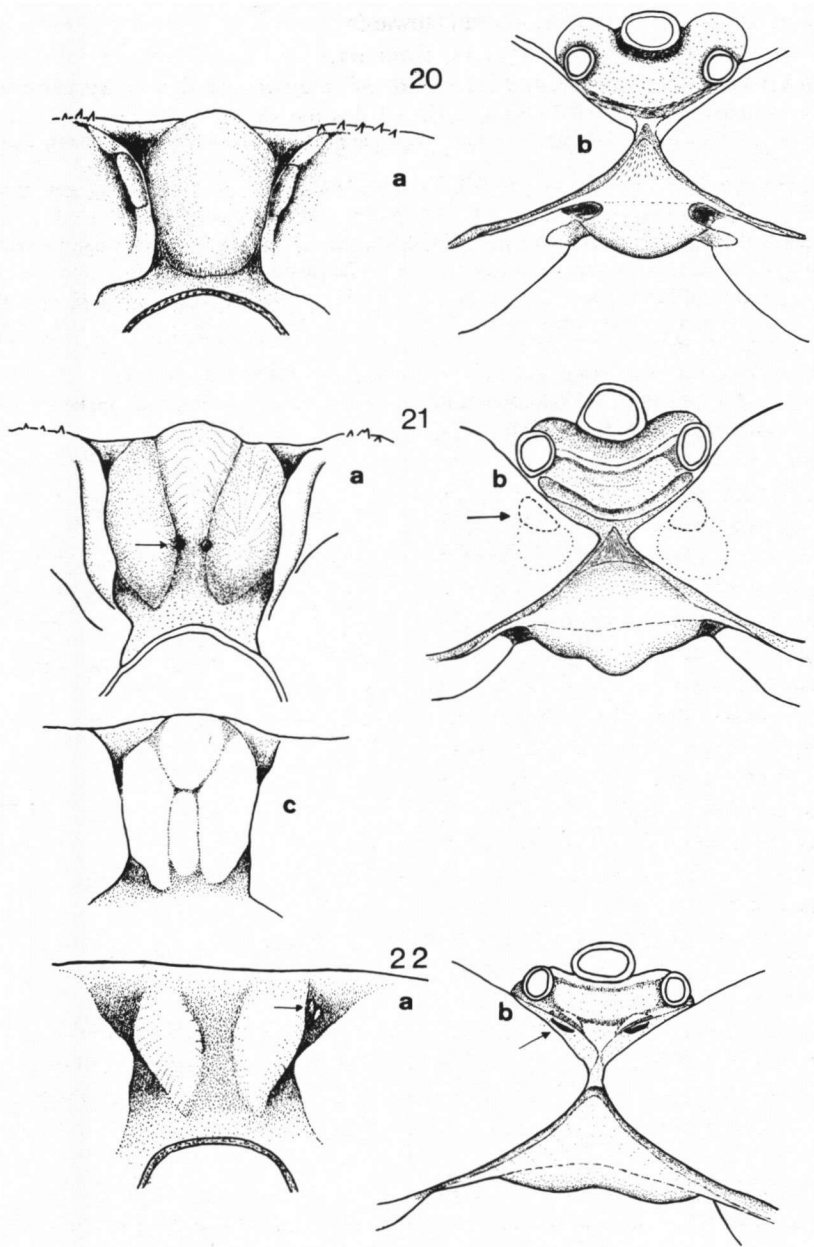


Fig. 19. *Cordulegaster bidentatus*, appendix inferior.

inflict damage to a field of ommatidia situated behind the lateral ocelli (Fig. 21). Although we have not seen females of *C. mzymtae*, the occipital structure in *Cordulegaster* males is known to be rather similar to that in females, so that, in this respect too, *C. mzymtae* must be considered as pertaining to the *boltoni*-group.

These differences in the lock-antilock system of tandem linkage mechanics identify two different evolutionary lines within *Cordulegaster* sensu lato. They strongly suggest that a revision of that group is needed, and that probably the *C. bidentatus*-group will need to be removed from *Cordulegaster* sensu strictu, and accommodated either in *Anotogaster* or in a subgenus allied to it.



Figs 20-22. Occipital area of different *Cordulegaster* females in rear (a) and dorsal (b) view: (20). *C. insignis* (Turkey); — (21) *C. boltoni* (Belgium), (c) *C. princeps* Morton, (Morocco); (22) *C. bidentatus* (Yugoslavia).

REFERENCES

- AKRAMOWSKI, N.N. & E.S. SHENGELIA, 1967. Neue Angaben über *Cordulegaster mzymtae* Barteneff, 1930. *Dt. ent. Z. (N.F.)* 14: 313-321.
- BARTENEFF, A.N., 1929. Neue Arten und Varietäten der Odonaten des West-Kaukasus. *Zool. Anz.* 85: 54-68.
- BARTENEFF, A.N., 1930. Die paläarktischen Arten der Untergattung *Cordulegaster* Leach. *Rab. sev.-kavk. gidrobiol. Sta. gorsk. sel'.-khoz. Inst.* 3: 1-32. (Russ., with Germ. s.).
- DUMONT, H.J., 1976. *Aeschna charpentieri* Kolenati 1846, a synonym of *Cordulegaster insignis* Schneider, 1845, and on the correct status of *Cordulegaster charpentieri* Auctorum (Anisoptera: Cordulegasteridae). *Odonatologica* 5: 313-321.
- SHENGELIA, E.S., 1974. K faune strekoz (Odonatoptera) Gruzii. *Materialy Faune Gruzii* 4: 55-56. (Russ.).
- SHENGELIA, E.S., 1975. Strekozy Gruzii. *Materialy Faune Gruzii* 5: 61-81. (Russ.).
- ST. QUENTIN, D., 1965. Zur Odonatenfauna Anatoliens und der angrenzenden Gebiete. *Annl. naturh. Mus. Wien* 68: 531-552.