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SPIXIANA	4	3	291–295	München, 1. November 1981	ISSN 0341-8391

Baetis balcanicus sp. n., a new species of the genus Baetis from Bulgaria and Greece

(Insecta, Ephemeroptera, Baetidae: atrebatinus group)

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Abstract

The larva and reared male of a new species of the genus *Baetis* belonging to the *atrebatinus* group from Bulgaria and Greece are described. The morphological characters distinguishing both larva and male from other species of the European *atrebatinus* group and the American *propinquus* group (MORIHARA & MCCAFFERTY, 1979) are given. Phylogenetic relationships are discussed.

Introduction

Presently in Europe there are three species of the *atrebatinus* group known within the genus *Baetis: Baetis atrebatinus* Eat., *B. tricolor* Tshernova and *B. calcaratus* Keffermüller. This paper deals with the description of a new species belonging to the same group.

Baetis balcanicus sp. n.

Material: 10♂♂, 5♀♀, 1♂ subimago, 2♀♀ subimagos, 152 larvae: Bulgaria, river Golyama (Goljama, tributary of the Marica, near Biser, ca. 10 km SE of Kharmanli, 28.6.1978, leg. T. Soldán (adults reared); 3 larvae: Bulgaria, estuary of the river Bistrica, near Sandanski, 5.6.1977, leg. T. Soldán; 2 larvae: Greece, river Strymon (Struma), near Siderocastron, 12.6.1976, leg. V. Švihla.

Holotype: adult male (Golyama, Biser) in alcohol; deposited in Zoologische Staatssammlung, München. Kat Nr. 1980/50.

Paratypes: slide preparations (2 adult males, 4 larvae) in the collection of Müller-Liebenau (Plön); material in alcohol in the authors' collection.

Description of larva: For morphological details of antennae, mouthparts, legs, and paraprocts see Fig. 1; for surface and hind margin of abdominal terga see Fig. 2.

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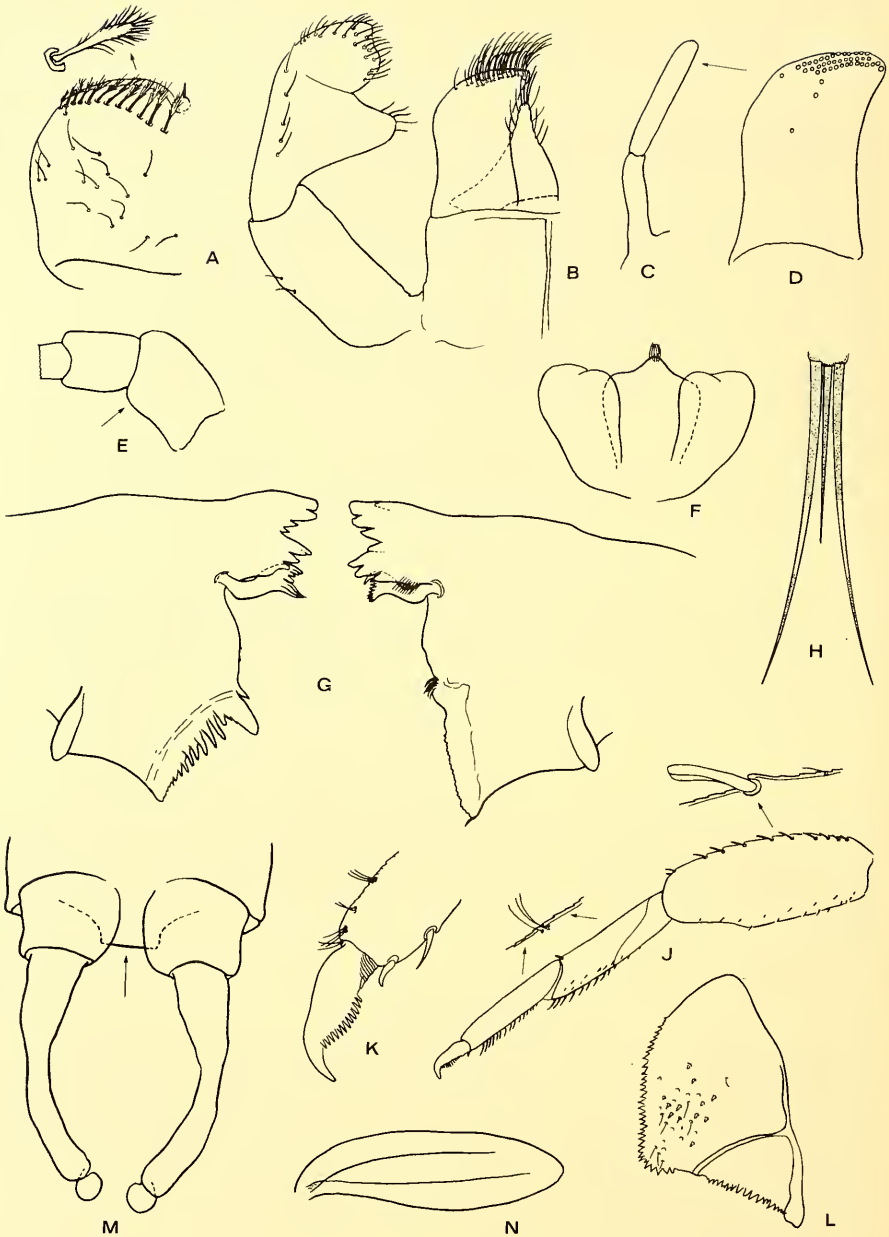

Fig. 1: *Baetis balcanicus* sp. n. Larva: A) left half of labrum; B) left half of labium; C) maxillary palp (without indentation near apex); D) paraglossa, ventral view; E) base of antenna (without distal lobe on scape); F) hypopharynx; G) left and right mandible; H) caudalfilaments; J) leg; K) claw; L) paraproct. – Male: M) genitalia, dorsal view; N) hind wing

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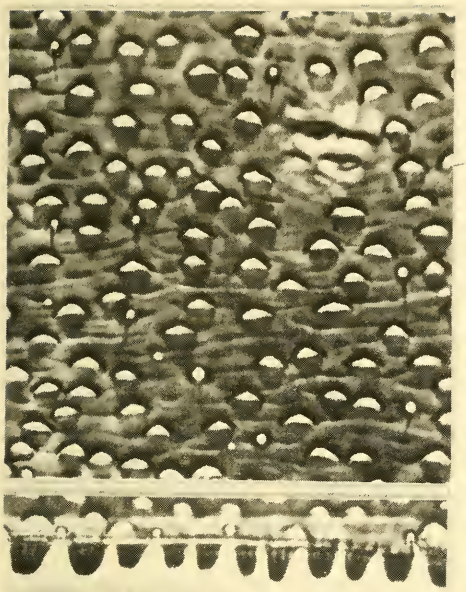

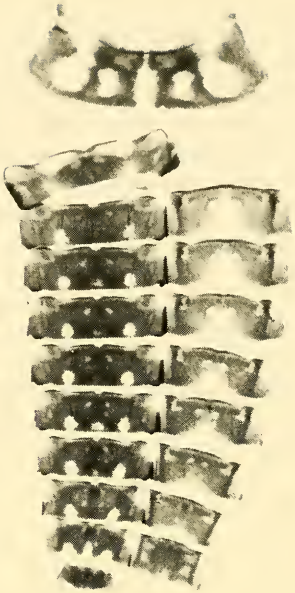

Fig. 2: *Baetis balcanicus* sp. n. Larva: surface and hind margin of abdominal tergum

Fig. 3: *Baetis balcanicus* sp. n. Larva: pronotum and abdomen (pronotum at higher magnification)

Color pattern as in Fig. 3. Legs pale yellow with dark spots in middle of femur and tibia, tarsus brownish. Caudal filaments brownish yellow, paler band behind middle.

Hind wing pads of normal size. – Gills: 7 pairs, gills 2–6 as long as two abdominal segments.

Body length: 5,0–5,5 mm, cerci ca. 5,3 mm, terminal filament ca. 2/3 length of cerci.

Description of adult male: For morphological details of hind wings and genitalia see Figs. 1M, N.

Color pattern: Turbinate eyes yellowish orange (in alcohol), facetted surface and shaft of same colour, not ringed. Head and thorax dark brown, abdomen light brown, unicolorous, without markings. Legs and cerci whitish or whitish yellow, unicolorous; wings translucent, pterostigma slightly milky.

Body length: 4,8–5,0 mm, forewing 4,0 mm, cerci 7,0–7,5 mm.

Differential diagnosis and phylogeny

Baetis balcanicus sp. n. occupies quite an isolated position within the European species of the *atrebatinus* group of the genus *Baetis*. It can be distinguished by the following combination of characters (Fig. 1): A: Larva: (1) scapus without anterolateral lobe, (2) labrum 1+10–14 branched submarginal setae; (3) distal segment of maxillary palp rounded without indentation at apex, (4) segment 2 of labial palp with well developed median lobe, (5) outer margin of femora with flat setae rounded at apex, (6) abdominal terga with

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conspicuous pale spots on outer hind corner (Fig. 3), (7) cerci brownish with pale band behind the middle. – B: Imago: (1) hind wings without costal projection, (2) turbinate eyes without darker ring, (3) penis cover medially oblong-shaped, not pointed, (4) apicomedial corner of the enlarged basal portion of the forceps rounded and not amplified, (5) apical segment of forceps spherical and well separated. The larval characters 1, 2, 4, 6, 7, and the adult character 3 separate this species from all European species of *atrebatinus* group *(B. atrebatinus, B. tricolor, B. calcaratus)*, the characters 1 and 4 separate them from all Nearctic species of the closely related *propinquus* group *(B. propinquus, B. dardanus, B. longipalpus, B. ephippiatus, B. frondalis,* Morihara & McCafferty, 1979).

The phylogeny of the *propinquus* group has been outlined by Morihara & McCafferty (1979). If we consider *B. balcanicus* sp. n. as a species of origin within the *propinquus* group as defined by Morihara & McCafferty (1979) it can be placed into an independent lineage which includes only *B. ephippiatus.* This lineage, sharing a common ancestor with the remaining species of the *propinquus* group except for *B. longipalpus,* is characterized by branched submarginal setae on the labrum and the arrangement of forceps base of male genitalia.

However, the larva of *B. balcanicus* sp. n. does not possess a distal lobe on the antennal scape and no indentation on the maxillary palp. According to Morihara & McCafferty (1979), these derived characters distinguish the *propinquus* group as monophyletic within the genus *Baetis.* Moreover, some adult characters of *B. balcanicus* sp. n. (hind wings with two longitudinal veins and without costal projection, arrangement of forceps) "are apparently evolutionarily convergent within some other *Baetis* species" (Morihara & McCafferty, 1979). These facts make the presumption of monophyletic origin of the *propinguus* group doubtful. Since there are a number of undescribed species of this species group especially in the Oriental region (Müller-Liebenau, in press) new data elucidating the phylogenetic relationships of these *Baetis* species are to be evolved in future studies.

Distribution and biology

Baetis balcanicus sp. n. is known at present only from two localities in Bulgaria and one locality in Greece. Since it is lacking at numerous localities in the Danube basin, which was carefully investigated by several authors, it is possible to suppose that its distribution is restricted to South-Eastern Balcan (Regions No. 6 und 7 in the classification by Illies, 1978). All the known localities are situated in the basins of the rivers Struma and Marica. The Golyama River (SE Bulgaria, tributary of the Marica River), where the larvae of *B. balcanicus* sp. n. are very abundant, is a shallow (30–40 cm in depth in June), small river with mostly sandy bottom and permanent, relatively warm water (20–25° C in July). The river is moderately eutrophicated by gees-farming but not polluted. The larvae apparently prefer vascular hydrophytic microhabitats; they never occur on sandy bottoms or gravel. They live among floating plants or tree roots near the banks being very rare in hydrophytes at the streamline and prefering the places with moderately flowing water. The larvae of *B. balcanicus* sp. n. never occur in separated pools. In floating hydrophytes they were found together with larvae of *Ephemerella ignita* and *Caenis macrura;* other

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mayfly species of this locality are as follows: *Baetis fuscatus, B. vernus, Pseudocloeon inexpectatum, Centroptilum pennulatum, Cloeon dipterum, Isonychia ignota, Ecdyonurus aurantiacus, Heptagenia flava, Ephemera danica,* and *Ephoron virgo.*

In general, the larval biology does not resemble that of the other species of the *atrebatinus*-group. While *B. tricolor* and *B. calcaratus* larvae live mostly in larger rivers with relatively cold and rapidly flowing water (Bogoescu & Tabacaru, 1957; Keffermüller 1960, 1972) and those of *B. atrebatinus* in both streams and rivers (Macan, 1979) the larvae of *B. balcanicus* sp. n. prefer small rivers with numerous pools and warm water.

The subimagos of *B. balcanicus* sp. n. emerge only at late afternoon (16.00–18.00 h), adults fly at dusk (20.00–21.30) usually together with the adults of *B. fuscatus.* Contrary to the latter species, no adults were observed before sunrise in the morning. Adults of *B. balcanicus* sp. n. fly at the end of June and at the beginning of July; only older or mature larvae occur at the localities in this period.

This species has undoubtedly a second generation in late August or September (the fertilized eggs hatch in 10–15 days). *B. balcanicus* sp. n. and other species of the *atrebatinus* group, probably are „summer species" (Landa, 1968); deposited eggs remain in diapause until spring the following year and quick development of larvae follows during spring months.

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Angenommen am 3.12.1980

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Zeitschrift/Journal: Spixiana, Zeitschrift für Zoologie

Jahr/Year: 1981

Band/Volume: 004

Autor(en)/Author(s): Müller-Liebenau Ingrid, Soldan Tomas

Artikel/Article: Baetis balcanicus sp. n., a new species of the genus Baetis from Bulgaria and Greece (Insecta, Ephemeroptera, Baetidae: atrebatinus group) 291-295