Zootaxa 3915 (4): 551–568
www.mapress.com/zootaxa/
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Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3915.4.6
http://zoobank.org/urn:lsid:zoobank.org:pub:9766C52E-A688-4C7F-98C0-782B0BBE07B2

Redescription of *Ecdyonurus* (*Ecdyonurus*) *russevi* Braasch & Soldán, 1985 (Ephemeroptera: Heptageniidae)

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Abstract

This study is focussed on the redescription of *Ecdyonurus* (*Ecdyonurus*) *russevi* Braasch & Soldán on the basis of the type material (holotype and paratypes) and topotypes collected in the Strandzha Mts. (Bulgaria). Female imago and subimago, larva and egg of the species are described for the first time and the male imago is redescribed in detail. The features distinguishing the species from other representatives of the genus *Ecdyonurus* are presented. *Ecdyonurus russevi* differs by the combination of several characters in the colour pattern of abdominal terga and wings, colour of lateral portion of male eyes and male genitalia structure in adults; some overlap has been observed in the number of groups of setae, bristles and hair-like setae on maxillae and labial palps, shape of pronotal projection and colour of tarsi in larvae; and insignificant number of knob-terminated coiled threads on exochorion, with only a few such attachment elements on one pole in eggs. Biology and present distribution of the species are discussed.

Key words: mayflies, taxonomy, differential diagnosis, adults, larvae, eggs, distribution, biology, Bulgaria

Introduction

Many years ago, one of us (T. Soldán) took the opportunity to collect mayflies in South Bulgaria, including the Strandzha Mountains (Müller-Liebenau & Soldán 1981; Soldán 1982; Braasch *et al.* 1985; Braasch & Soldán 1985, 1988; Sowa *et al.* 1988). The material from the Ropotamo River at Novo Panicharevo village in June 1976 comprised adults of the genus *Ecdyonurus.* During the visit of Dietrich Braasch (Potsdam, Germany) in České Budějovice, this material was studied and compared with the male adults collected by him in the same region, Dyavolska River at Yasna Poliana village, in July 1968. The material represented a new species subsequently described as *Ecdyonurus russevi* Braasch & Soldán, 1985. The type series consisted of male adults collected in the Ropotamo River (Braasch & Soldán 1985). The holotype and paratypes (their number not presented) from the Ropotamo River were deposited in the collection of the Entomology Institute in České Budějovice. Remaining two paratypes (male adults) were kept in the Dietrich Braasch collection in Potsdam, Germany. Bauernfeind & Soldán (2012) confirmed the presence of the above-mentioned material in these collections. Additional material (not types) of two male adults from Dyavolska River is deposited in the Dietrich Braasch collection.

Simultaneously with the type material, female imago and subimago, and larvae of the same genus were collected at the type locality. Since no other species of *Ecdyonurus* inhabited the type locality and adjacent streams, the whole material with high certainty is conspecific. However, this material was not included in the type series (Braasch & Soldán 1985) and these mature and immature stages have not been described yet.

In 2005–2013, mayflies of the Strandzha Mountains, including the basins of rivers Ropotamo, Veleka and Dyavolska, were investigated by the authors. Additionally to the Strandzha material, several samples were

Accepted by M. Sartori: 12 Jan. 2015; published: 5 Feb. 2015

Sea river basin district (Kamchia and Veleka rivers) and R11- Small and medium-size rivers in the Black Sea river basin district (Ropotamo, Karaagach and Fakiyska rivers). Except R10, the other two types include more or less heterogeneous streams, which usually become dried in some periods. As a whole, the rivers in Strandzha Mts. are characterized by strongly expressed annual irregular flow. During the summer they are extremely shallow and the frequent drying up modifies the benthic communities. This is proved by the ecological state values, assessed by the Irish Biotic Index (IBI) in the period 2002−2004. During the high water level in May 2004, all the studied rivers were in a very good ecological state (IBI=4.5), while in periods of low-water level (July 2002 and October 2003) the values were lower for the rivers with less water flow (such as Ropotamo and Karaagach rivers) (Vidinova *et al.* 2005). Thus they become vulnerable to pollution, as the damages to the aquatic biota are caused mainly by anthropogenic impacts. In case of a point source pressure, the impact is expressed in increased organic matters level, altered oxygen regime, toxic effect on aquatic fauna, alteration of invertebrate communities and finally – the loss of habitats (e.g. in the Ropotamo River, near Veselie village, May 2009, authors' personal observations). The same fully applies to the segment of the Ropotamo River within the typical locality. Repetitive studies and macrobenthos collections from this section in July 2011 (and also upstream and downstream from Novo Panicharevo village) have shown the total lack of the *Ecdyonurus* species (Figs 49, 50).

Within Vrana River, larvae were collected predominantly on stony substrates in littoral part of watercourse, with grassy vegetation along the river banks. The flow is an alternation of swift current and rapid sections. A dominant substratum is large rock pieces, stones and gravel. Typical values of conductivity (μS/cm) are 92.1−304; pH 7.72−8.23 and dissolved oxygen 7.2−10.57 mg/l; oxygen saturation 80−120% (August 2005). The macroinvertebrate community is composed of the following taxa: *Limnodrilus hoffmeisteri* (Oligochaeta), *Gammarus* spp. (Amphipoda), *Baetis lutheri* Müller-Liebenau, 1967, *B. vernus* Curtis, 1834, *B. rhodani* (Pictet, 1843), *Ecdyonurus* (*Helvetoraeticus*) sp. (Ephemeroptera), *Rhyacophila* gr. *vulgaris* (Trichoptera), *Chironomus* sp. and Simuliidae, gen. sp. (Diptera). The river upstream Prolaz is close to the limit values of SPUB (1.5) for category II (Soufi & Uzunov 2008).

Acknowledgements

We would like to cordially thank Dr. J. Bojková (Masaryk University, Brno) and Dr. A.V. Martynov (National Museum of Natural History, NASU, Kiev) for their comprehensive assistance during manuscript preparation, and both anonymous reviewers for the valuable comments on the manuscript. We are grateful to R. Soufi, B. Zadneprovski, Dr. V. Tyufekchieva and Dr. I. Yaneva for providing part of the material and environmental data, as well as to Dr. D. Iliev for the linguistic correction of the manuscript.

This study was supported by the Czech Science Foundation (206/08/1389) and institutional support RVO: 60077344 (Institute of Entomology, Biology Centre, CAS). The field research was supported by the Ministry of Education, Youth and Sports of the Czech Republic (AKTIVITA MOBILITY 2014−2015: 7AMB14SK003) for RJG. Our thanks are also due to the support of the interacademic exchange between the Czech Academy of Sciences and the Bulgarian Academy of Sciences.

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