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The larvae of *Drusus franzressli* Malicky 1974 and *Drusus spelaesus* (Ulmer 1920) (Trichoptera: Limnephilidae: Drusinae) with notes on ecology and zoogeography

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Abstract

Water quality monitoring is greatly dependent on identification tools for aquatic and semi-aquatic insects. Species-level identification improves resolution and precision of water quality assessment and requires comprehensive keys. With the aim of increasing the suitability of Drusinae for such applications, this paper gives a description of the hitherto unknown larvae of *Drusus franzressli* Malicky 1974 and *Drusus spelaesus* (Ulmer 1920). Information on the morphology of the larvae is given and the most important diagnostic features are illustrated. In the context of already available keys, the larvae of *D. franzressli* and *D. spelaesus* key together with *Metanoea flavipennis* (Pictet 1834), *M. rhaetica* Schmid 1956, *D. improvisus* McLachlan 1884, *D. nigrescens* Meyer-Dür 1875 and *Ecclisopteryx malickyi* Moretti 1991. These species are easily separated by differences in larval morphology (dorsal outline and sculpturing of pronotum, presence/absence of lateral gills at 2nd and 3rd abdominal segments, start of lateral fringe) and their distribution ranges. *Drusus franzressli* is endemic to the Hellenic western Balkans whereas *D. spelaesus* is endemic to the western Alps (Grenoble area). In addition, ecological characteristics are briefly discussed.

Key words: 5th instar larva, description, identification, distribution

Introduction

Caddisflies are considered primary indicator taxa for monitoring water quality (Barbour *et al.* 1999; Barbour & Yoder 2000; AQEM consortium 2002; Graf *et al.* 2002; Hering *et al.* 2006). This also fully applies to the subfamily Drusinae in which larvae are restricted to water quality classes I or I–II and are used as bioindicators (sensitive species) (Moog *et al.* 2002; Graf *et al.* 2002).

Unfortunately, no comprehensive and integrated effort has been made to complete the available keys to larval Drusinae. The recent taxon Drusinae, considered a tribe of subfamily Limnephilinae by Vshivkova *et al.* (2007), comprises 97 species restricted to Eurasian mountain ranges from the Caucasus in the east to the Iberian Peninsula in the south-west (Graf *et al.* 2008; Kučinić *et al.*, 2011a; Malicky 2004, 2005a; Olah 2010, 2011). From this large inventory, larvae from only 41 species (42%) have been described so far and included in keys (Botosaneanu 1959; Décamps & Pujol 1975; Despax 1927; Graf *et al.* 2011; Kučinić *et al.* 2008, 2010, 2011a, b; Moretti & Pirisinu 1981; Moretti 1983; A. Previšić, W. Graf & M. Kučinić unpublished data; Sipahiler 2002; Szczesny 1978; Vieira-Lanero 2000; Vieira-Lanero *et al.* 2005; Waringer *et al.* 2008, 2010; Waringer & Graf 2011).

In the present paper we take a further step at completing the larval taxonomy of subfamily Drusinae by