



<https://doi.org/10.11646/zootaxa.4418.2.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:9E217635-C99F-4FEA-BC82-7A2865ECD283>

## DNA-based association and description of the larval stage of *Apatania theischingerorum* Malicky 1981 (Trichoptera, Apataniidae), with notes on its ecology

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### Abstract

The hitherto unknown larva of *Apatania theischingerorum* Malicky 1981 is described, based on the association with adult females using sequence data from the mitochondrial cytochrome *c* oxidase region. Genetic data confirmed the distinct status of this taxon within the parthenogenetic *Apatania muliebris* complex (Schmid 1954). We provide information on the morphology of the larva and figure the most important diagnostic features. *Apatania theischingerorum* is morphologically close to *A. fimbriata* (Pictet 1834). In the context of the Apataniidae key of Waringer *et al.* (2015), the species pair can be separated by pleural setation patterns on abdominal segment I and by their distribution ranges in Europe: *A. fimbriata* is known from the Alps, the western and central highlands, the western plains, the Hungarian lowlands and the Carpathians, whereas *A. theischingerorum* has been recorded exclusively on the Iberian peninsula.

**Key words:** 5th instar larva, description, key, phylogeny, distribution

### Introduction

Apataniidae Wallengren 1886 consists of approximately 200 northern species inhabiting montane habitats in Asia, Europe, and North America (Holzenthal *et al.* 2007). Subfamily Moropsychinae Schmid 1953, with two genera, is restricted to the East Palearctic and Oriental Regions. The largest genus, *Apatania* Kolenati 1848 (nearly 100 species), together with 11 smaller genera, belongs to subfamily Apataniinae Wallengren 1886. In addition, there is a group of four Nearctic and Eastern Palearctic genera forming a monophyletic group separate from either subfamily (Holzenthal *et al.* 2007).

The European inventory of genus *Apatania* comprises 35 species (Botosaneanu & Giudicelli 2004; Graf *et al.* 2008; Malicky 2004, 2005; Oláh 2006) with only 13 species known in the larval stage (Waringer *et al.* 2015). Recently, however, M.A. González, L. Martín, and J. Martínez collected fifth instar larvae, pupae, and adult females of the parthenogenetic *A. theischingerorum* at two Spanish locations (Martín *et al.* 2015). The aims of this study were (1) to assess if the identified females could be fully associated with the collected larvae using standard molecular sequence data, and given a successful association, (2) to include the larva of *A. theischingerorum* in the Apataniidae key of Waringer *et al.* (2015).

### Material and methods

Fourteen fifth instar larvae and pupae and 15 adult females of *A. theischingerorum* Malicky 1981 were collected by