



## Taxonomy of the *Oulimnius tuberculatus* species group (Coleoptera: Elmidae) based on molecular and morphological data

FEDOR ČIAMPOR Jr.<sup>1,3</sup> & JÁN KODADA<sup>2</sup>

<sup>1</sup>Institute of Zoology, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84506, Bratislava, Slovakia. E-mail: f.ciampor@savba.sk

<sup>2</sup>Faculty of Natural Sciences, Comenius University, Mlynská dolina B-1, SK - 842 15, Bratislava, Slovakia.

E-mail: kodada@fns.uniba.sk

<sup>3</sup>Corresponding author

### Abstract

Two mitochondrial (cytochrome oxidase subunit I, 16S RNA) and one nuclear (18S RNA) gene fragments were used to analyse relationships within the *Oulimnius tuberculatus* species group. The results of molecular data analysis are compared with morphological characters, and the distributional patterns and taxonomic status of recognized taxa are addressed. Based on molecular data, *Oulimnius perezi* is re-validated as a distinct species, and the discovery of a possible new species from northwest Italy is reported. The possible origins and times of speciation within the species group are discussed.

**Key words:** phylogeny, DNA, Elmidae, *Oulimnius*, distribution, Palaearctic

### Introduction

Molecular taxonomy of beetles uses, as diagnostic features, characters gained from the analysis of DNA, and is applied in an increasing number of studies and revisions (e.g. Papadopoulou *et al.* 2009, Hendrich *et al.* 2009). If compared with traditional, morphology based arrangements, it offers a new and often less subjective view on species separation, systematic position and evolutionary relations. Morphological examination is still very important, as it serves for species identification prior to any molecular survey and also as an alternative source of data for comparison.

Within Elmidae, which include more than 1400 species in the recent fauna (Kodada & Jäch 2005), molecular data are still very scarce. Except for a few studies using DNA barcodes for grouping larvae with conspecific adults (Čiampor Jr. & Ribera 2006, Čiamporová-Zaťovičová *et al.* 2007), describing relationships among elmid genera (Čiampor Jr. & Ribera 2006, Čiampor Jr. & Čiamporová-Zaťovičová 2008), analysing ITS sequences in *Elmis* (Guglielmino & Olmi 2001) or a phylogenetic study using elmid DNA data to infer family position within higher taxonomic groups (Hunt *et al.* 2007), we completely lack molecular data on this family.

As is clear from taxonomic works using DNA data, molecular data are very useful and can improve our understanding of relationships within taxonomic groups, and help to discover new taxa or correct previous hypotheses (e.g. Audisio *et al.* 2009, Cardoso *et al.* 2009, Hebert *et al.* 2004).

The genus *Oulimnius* (Gozis, 1886) has a holarctic distribution, including 16 species and two subspecies. The position of the nearctic species is still questionable (Berthélemy 1979), however, without supporting data, they cannot be transferred to another genus. The Palaearctic species form a monophyletic group. Morphologically, the related species are very similar, and without doubt the most reliable diagnostic features are found on the male genitalia. Recently we examined numerous *Oulimnius* specimens, including *O. tuberculatus tuberculatus* (Müller, 1806), *O. tuberculatus perezi* (Sharp, 1872), *O. bertrandi* Berthélemy, 1964 and *O. cyneticus* Berthélemy, 1980, and we found some morphological differences suggesting the