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Description of a new species of *Niphargus* (Crustacea: Amphipoda: Niphargidae): the first record of a lake ecomorph in the Carpathian Mountains

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Abstract

We describe and phylogenetically characterize a new species *Niphargus mirocensis* from Mt. Miroč, eastern Serbia. This species shows distinct morphology typical for a lake ecomorph of niphargid amphipod, i.e. large and stout body, elongated appendages and raptorial gnathopods and presents the first record of this ecomorph in Carpathian Mountains. Phylogenetic analyses based on Cytochrome Oxidase Subunit 1 gene (COI), Histone (H3) and 28S rRNA (28S) suggests that species is nested within a clade of lake ecomorphs spread in Italy and Central Dinaric Region. The new finding is geographic extension of clade's range, the species of which are generally narrow endemics.

Key words: *Amphipoda*, *Niphargus*, lake ecomorph, Carpathians, *Niphargus mirocensis* sp. n., 28S rRNA, COI

Introduction

With over 300 described species, the genus *Niphargus* Schiödte, 1947 (Amphipoda: Niphargidae) is the largest genus of freshwater amphipods in the world (Väinölä *et al.*, 2008). Most of the species inhabit subterranean waters and constitute a substantial part of the European groundwater biodiversity (Zagmajster *et al.*, 2014). Taxonomy of the genus has been a challenge for decades already; still new species are discovered annually on both, molecular (Meleg *et al.*, 2013) and morphological basis (Ntakis *et al.*, 2015).

The genus is morphologically extremely diverse and several authors attempted to split it into different subgenera or species groups (S. Karaman, 1950a; S. Karaman, 1950c; S. Karaman, 1952b; Straškraba, 1972). Phylogenies based on molecular methods, however, reject monophyly of these groups (Fišer *et al.*, 2008). Recent research indicates that some morphologically distinct species evolved convergently in the process of adaptation to specific sub-compartments of subterranean ecosystem (Trontelj *et al.*, 2012).

No doubt, the most impressive genus representatives evolved in deep cave lakes and were traditionally recognized as the “orcinus-group”, or “subgenus *Orniphargus* S. Karaman, 1950” (Straškraba, 1972; S. Karaman, 1950b; S. Karaman, 1950c). These species comprise the largest and the most massive European amphipods (Fišer *et al.*, 2006), often with huge predatory gnathopods, spiny pleonal segments and extremely elongated appendages. These species independently evolved in France, Central Apennines, W Balkans, Middle East and Crimean Peninsula (Ginet, 1960; S. Karaman, 1950a; G. Karaman, 1984; Alouf, 1972; Alouf, 1973; Fišer *et al.*, 2006; Birstein, 1961). The highest number of species and the largest morphological diversity of this ecomorph have been reported from W Balkans, where three phylogenetically unrelated lineages come in contact (Fišer *et al.*, 2008). Considering that cave lake ecomorph has been reported also from Crimean Peninsula and Middle East, records from Central and Eastern Balkan Peninsula would be expected.

In the present paper, we fill this biogeography gap and describe a new lake ecomorph species from a geographical region where this ecomorph has not been reported yet; Carpatho-Balkan arc of Carpathian Mountains in eastern Serbia. A fact that *Niphargus* species are known to be poor dispersers (Trontelj *et al.*, 2009; Meleg *et al.*, 2013) and considering isolated geographic origin of herein described species, questions about its origin are evoked.