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The genus *Hylebainosoma* Verhoeff, 1899 (Diplopoda, Chordeumatida, Haaseidae): Redescription of *Hylebainosoma tatranum*, description of a new troglobiont species and notes to the *Hylebainosoma–Romanosoma* species group

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Abstract

A revision of the taxonomy, distribution and ecology of the millipedes of the genus *Hylebainosoma* Verhoeff, 1899 in the Carpathians is presented. Based on the study of numerous specimens, we consider the subspecies of the species *Hylebainosoma tatranum* Verhoeff, 1899 described in the past as overrated, reflecting simply intrapopulational variation attributable to the rather extended area of species distribution, different habitats of its occurrence (surface and cave habitats, soil, litter and stony debris) and wide altitudinal range from the forest zone in foothills to the alpine zone above timberline. Besides the redescription of males, the morphology of female vulvae is presented for the first time. *Hylebainosoma tatranum* is endemic to the extensive area of the Western and Eastern Carpathians, involving Slovakia, Hungary, the Czech Republic, Poland and highly probably Ukraine. A new troglobiont species from the karst area near the Tisovec Town (Muránska planina Mts., Central Slovakia), *Hylebainosoma gulickai* **n. sp.** is described, and is considered as stenoendemic for this small karstic region, with occurrence in few nearby caves. *Hylebainosoma gulickai* represents the first troglobiont chordeumatid millipede found in the northern territories of the Carpathians and the northernmost troglobiont in Central Europe in general. Morphological characteristics of both males and females are presented.

Taxonomic relationships between the closely related genera *Hylebainosoma* and *Romanosoma* Ceuca, 1967 are discussed and replacement of the species *Hylebainosoma cavernicola* (Ceuca, 1967) n. comb., *Hylebainosoma oltenica* (Ceuca, 1967) n. comb. and *Hylebainosoma odici* (Ceuca, 1979) n. comb. into the genus *Hylebainosoma* is proposed. The fourth species described as *Romanosoma* (?) *birtei* Ceuca, 1967 we consider as invalid taxon. *Romanosoma* becomes a junior subjective synonym of the genus *Hylebainosoma.*

Key words: *Hylebainosoma*, redescription, gononopods, vulvae, postvulval structures, new species, troglobiont, Carpathians, distribution, key

Introduction

The genus *Hylebainosoma* Verhoeff, 1899 was erected for the type species *Hylebainosoma tatranum* Verhoeff, 1899, originally recorded from the soil of alpine habitats of the High Tatra Mts., Slovakia (historically as Nordungarn, part of former Austro-Hungarian Monarchy). The genus *Hylebainosoma* was considered as monotypic and endemic for the Western Carpathians (Central Europe). Later, Jawlowski (1938) announced new localities of this species, but again in the Slovakian part of the Tatra Mts. Based on the material collected in localities markedly separated from the type area, Verhoeff (1941) and Loksa (1962) described two subspecies, slightly different in some morphological characters from the original description, as *H. tatranum dudichi* Verhoeff, 1941 (Kremnické vrchy Mts., Central Slovakia) and *H. tatranum josvaense* Loksa, 1962 (Nagyoldal at Jósvafő, Aggtelek Karst, Hungary). Gulička (1951, 1960; see also Ložek & Gulička 1962) subsequently found *H. tatranum* in other orographic units of the Slovak Carpathians. Based on undetermined females he supposed that its area

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involves some localities in the flysh and volcanic East Carpathians in Slovakia and Poland (Fig. 39). Recently the species was found in the Bieszczady Mts., Poland (Tajovský & Wytwer 2010). Therefore, with regards to its high adaptability to various habitats, its area of distribution extends to more eastern parts of the Carpathians, to Ukraine or even Romania. Kosyanenko (2003, 2005) referred to undetermined specimens of *Romanosoma* in the high altitude regions of the Ukrainian Carpathians, but he compared them only with Romanian species disregarding the possible occurrence of *H. tatranum*. In past the inventory research was focused there only on selected localities or regions interesting from faunistic or nature protection point of view.

H. gulickai **n. sp.** is a dweller in karst caves that are connected hydrologically (except for the Kostolík and Rysie hniezdo Caves, which were probably in past also connected with the main system, but recently separated by valley, see Vlček 2010), from the zone of entrance shafts to the deeper parts. It is probably stenoendemic for the given Tisovec Karst, the karst island west from the Tisovec Town (Fig. 39). This new species represents the northernmost occurrence of a troglobiont millipede in the whole of Central Europe. Investigation of terrestrial invertebrates in other karst regions around the Tisovec Karst, such as adjacent parts of the Muránska planina Mts. or more distant karst system of the Revúcka vrchovina Mts. and other adjacent regions did not indicate the occurrence of any other troglobiotic millipedes in general (Papáč 2007 and unpublished data).

Hylebainosoma nontronensis, the species assigned with reasonable caution to this genus, is known only from the type locality, the foothill of the Massif Central, France (Mauriès & Kime 1999). Its occurrence completely outside the Carpathians is surprising. Nevertheless comparison of morphology actually of two Carpathian species with that one from the western part of Europe confirms without doubt the correctness of the generic affiliation.

The Romanian species were found in the same orographic unit, the Rodna Mts. in Romania, at two very close localities: *H. cavernicola* in the Avenul de la Zalion Cave (Pestera de la Jgheabul lui Zalion) and *H. odici* in the Peştera de la Tăuşoare Cave (Peşterea de la Tăuşoará) (Ceuca 1967, 1979). The first cave is rather short (535 m long) comparing to the second one with about 8,830 m, but both caves belong to the top ten deepest caves in Romania (-461 and -303 m, respectively). The distance between entrances of both caves is about 4 km and both caves are connected hydrologically (Bleahu *et al.* 1976). This area is surely an important diversity hot spot for these millipedes. No additional material, faunistic data or taxonomic comment was added after the description of these taxa (Tabacaru *et al.* 2002–2003). Collection of additional topotypical specimens is highly desirable.

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