

HETEROMURUS (VERHOEFFIELLA) ANAGASTUMENSIS N. SP. (COLLEMBOLA, ENTOMOBRYIDAE), A NEW CAVE SPRINGTAIL FROM MONTENEGRO

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Abstract — A thorough analysis of a specimen of the collembolan family Entomobryidae from a cave in Montenegro has yielded a species new to science: *Heteromurus (Verhoeffiella) anagastumensis* n. sp. This is the first known cave-dwelling member of the subgenus *Verhoeffiella* Absolon in Montenegro. *Heteromurus (V.) anagastumensis* n. sp. is described, illustrated, and diagnosed; it is a phenetically close congener of *H. (V.) longicornis* (Absolon) from Herzegovina. Some biogeographical and evolutionary characteristics of this new *Verhoeffiella* species are discussed in the light of the origin of the North Mediterranean fauna.

Key words: Collembola, Entomobryidae, *Heteromurus*, cave fauna, Montenegro

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INTRODUCTION

The genus *Heteromurus* Wankel, 1860 (Entomobryidae) includes four subgenera: the nominal subgenus: *Verhoeffiella* Absolon, 1900; *Alloscopus* Börner, 1903; and *Heteromurtrella* Mari Mutt, 1979. *Alloscopus* was reviewed by Mari Mutt, 1978. The taxon *Verhoeffiella* was proposed as a subgenus of *Heteromurus* for *H. (Verhoeffiella) cavicola* (Absolon, 1900); subsequent authors treated *Verhoeffiella* as a subgenus until Denis (Denis, 1935) used the binomen *Verhoeffiella cavicola*. Some authors (Gisin, 1944; Gisin, 1960; Loksa and Bogojević, 1967) considered *Verhoeffiella* a subgenus, while others (Salmon, 1951; Salmon, 1964; Prabhoo, 1971; Thibaud and Massoud, 1973; Massoud and Thibaud, 1973) treated *Verhoeffiella* as a generic name.

The recent decision of Mari Mutt, 1980 to consider *Verhoeffiella* as a subgenus of *Heteromurus* is based on the macrochaetotaxy of *H. (Verhoeffiella) medius* (Loksa and Bogojević, 1967). However, the status of *Verhoeffiella* and its six known species is uncertain, very few specimens are in collections and these are not available for study. All species of *Verhoeffiella* are troglotic; a meaningful revision

of this taxon must therefore await the discovery of specimens for the study of important characters not mentioned in the original descriptions (Mari Mutt, 1980a).

In Serbia and Montenegro, a single species of *H. (Verhoeffiella)* has been found to date: *H. (V.) medius* Loksa & Bogojević, 1967. Additionally, six more species of the nominal subgenus are present in Serbia: *H. (Heteromurus) major* (Moniez, 1889), *H. (H.) sexoculatus* Brown, 1926, and *H. (H.) uzicensis* Lučić & Ćurčić, 2002 (Lučić et al., 2002); while *H. (H.) absoloni* Kseneman, 1937 and *H. (H.) gradgensis* Denis, 1936 inhabit Montenegro. Another two species — *H. (H.) nitidus* (Templeton, 1835) and *H. (H.) tetrophthalmus* (Börner, 1903) — live in both Serbia and Montenegro (Bogojević, 1968; Bogojević, 1989; Cvijović and Živadinović, 1991). Among *H. (Verhoeffiella)* representatives, only *medius* lives in epigeal habitats (Loksa and Bogojević, 1967).

MATERIAL AND METHODS

The collembolan specimen considered herein was dissected and mounted on slides in gum chloral medium. It was studied using STEMI 2000

and Axioscope stereomicroscopes (Jena, Germany). This example at present is deposited in the collection of the Institute of Zoology, Faculty of Biology, University of Belgrade, Belgrade, Serbia.

SYSTEMATIC PART

In a cave near Nikšić, Montenegro, two of the authors (Božidar P. M. Ćurčić and Srećko B. Ćurčić) collected a collembolan specimen on a field trip in Montenegro in 2000. This taxon appeared to be one new to science: *Heteromurus (Verhoeffiella) anagastumensis* n. sp.

We give below the results of a thorough study of this important taxonomic, evolutionary, and biogeographical novelty:

ENTOMOBRYIDAE BÖRNER, 1901

HETEROMURUS (VERHOEFFIELLA) *ANAGASTUMENSIS* LUČIĆ, NEW SPECIES (Figs. 1-3)

Etymology. – After Anagastum, the Latin name for Nikšić, in the vicinity of which the type-locality of the new taxon is found.

Specimen examined. – Holotype male from the Velja Peć Cave near the city of Nikšić, Montenegro; collected on 7 September 2000 by B. P. M. Ćurčić and S. B. Ćurčić. The type specimen is deposited in the collections of the Institute of Zoology, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia (IZB 2004).

Description. – Body length: 4.35 mm. Body color: yellowish. Eyes not developed (Fig. 1). Antennae almost five times longer than head. Basal part of antenna unclear. Antennal length to body length ratio 1.34: 1 (or 5.85 mm to 4.35 mm). Ratio of lengths of antennal podomeres I-IV: 1: 1.43: 3.78: 5.25. Dorsal cephalic macrochaetae present (Fig. 1).

Dorsal macrochaetae present on abdominal segment IV (Fig. 1).

Foot complex: claw with a single tooth, empodium with lamella and no teeth (Fig. 2). Furcal length 1.61 mm (manubrium 0.70 mm; dens 0.86

mm, and mucro 0.05 mm) (Fig. 3). Mucro with two distinct teeth; both manubrium and dens with setae (Fig. 3).

Differential diagnosis. – The new species differs clearly from its phenetically close congener *H. (Verhoeffiella) longicornis* in many important respects, such as: body size (4.35 mm vs. 5.30 mm); the body color (yellowish vs. snow white); the antennal length to body length ratio (1.34: 1 vs. 1.66: 1); the ratio of lengths of antennal podomeres I-IV [1: 1.43: 3.78: 5.25 vs. 1: 5.60: 8.40: 5.20 (Absolon, 1900)]; the presence/absence of claw teeth (present vs. absent); furcal length (1.61 mm vs. 2.70 mm); the manubrium length to dens length ratio [1: 1.22 vs. 1: 1.30 (Absolon, 1900)]; and distribution area (Montenegro vs. Herzegovina).

Remarks. – The new taxon is a typical troglobite inhabiting subterranean habitats in Montenegro. Since all *H. (Verhoeffiella)* species known to date are distributed in the North Mediterranean region (Absolon, 1900; Bonet, 1931; Kseneman, 1937; Loksa and Bogojević, 1967; Nosek, and Paoletti, 1985; present paper), it is probable that they originated there, from an ancestor which should be sought among the extinct or fossil forms; their great age and restricted distribution therefore support the assumption that members of the subgenus *Verhoeffiella* are either of the Paleocene or even earlier age.

CONCLUSION

At the present time, only seven species of *Heteromurus (Verhoeffiella)* are known: *H. (V.) absoloni* (Kseneman, 1937) (from the Dinaric Karst of the former Yugoslavia), *H. (V.) cavicola* (Absolon, 1900) (from Herzegovina), *H. (V.) dallaii* Nosek & Paoletti, 1985 (from Italy), *H. (V.) hispanica* Bonet, 1931 (from Spain), *H. (V.) longicornis* (Absolon, 1900) (from Herzegovina and the Dinaric Karst), *H. (V.) medius* (Loksa & Bogojević, 1967) (from Serbia), and *H. (V.) anagastumensis* n. sp. (from Montenegro).

However, a meaningful revision of the subgenus *H. (Verhoeffiella)* must await further discoveries of



Fig. 1-3. *Heteromurus (Verhoeffiella) anagastumensis* n. sp., holotype male, from Montenegro. 1 – Habitus; 2 – tarsal claws; 3 – distal part of furca with manubrium, dens, and mucro.

specimens for study of important characters, i.e., traits of considerable taxonomic value (or ones of the highest information content).

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HETEROMURUS (VERHOEFFIELLA) ANAGASTUMENSIS N. SP. (COLLEMBOLA, ENTOMOBRYIDAE), НОВА ПЕЋИНСКА КОЛЕМБОЛА ИЗ ЦРНЕ ГОРЕ

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Пажљивом анализом ентомобридне колемболе из једне пећине у Црној Гори дијагностификована је врста нова за науку: *Heteromurus (Verhoeffiella) anagastumensis* n. sp. Ово је први налаз пећинског подрода *Verhoeffiella* у Црној Гори. У раду је дат прецизан опис и дијагноза

нове врсте, која стоји најближе врсти *H. (V.) longicornis* (Absolon) из Херцеговине. Поред изнетог разматрана су и нека биогеографска и еволуциона својства овог новог таксона у светлу порекла фауне северног-Медитеранског подручја.