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=== SHORT COMMUNICATION ===

First record of *Bryocamptus (Bryocamptus) mrazeki* (Minkiewicz, 1916) in the Romanian harpacticoid fauna (Copepoda, Harpacticoida)

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SUMMARY. The harpacticoid copepod species *Bryocamptus (Bryocamptus) mrazeki* (Minkiewicz, 1916) is reported for the first time for the Romanian fauna. The species was identified in a small eucrenal spring from the Retezat Mountains, next to other taxa characteristic to the benthic habitats of clean waters. The present paper represents a necessary addition to the species distribution in Europe, since *B.(B.) mrazeki* was mostly found in mountain habitats from the Carpathian Ecoregion.

Keywords: harpacticoid copepods, new record, Romanian fauna, spring habitat, the Retezat Mountains.

Introduction

Springs, defined as the place of apearance on the surface of groundwaters as a result of sediment permeability, are unique ecotonal habitats between surface and hypogean areas, characterized by stable environmental conditions, a high biodiversity and generally good water quality (Cantonati *et al*., 2012).

Crustaceans are the dominant group in groundwaters and their related spring habitats (Stoch, 1995). Crustacean meiofauna: copepods, cladocerans or ostracods, is numerically abundant and rich in species in these environments (Dole-Olivier *et al*., 2000; Galassi *et al*., 2009). Harpacticoid copepods dominate the benthos of both lotic and lentic water bodies, with aproximatively 1000 species and subspecies (Dole-Olivier *et al*., 2000).

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The Retezat Mountains, and the homonymous National Park, located west in the Southern Romanian Carpathians, represent a unique area of protected ecosystems, including more than 20 mountain peaks higher than 2,000 meters in altitude and dozens of glacial lakes (Schreiber and Sorocovschi, 1993).

Previous studies on meiofauna from the region focused mainly on glacial lakes (Prunescu-Arion and Toniuc, 1967; Onciu and Radu, 2006; Battes, 2008). Godeanu (1974) reported faunal data from several habitats adjacent to Lake Gemenele: small lentic pools, slow-flowing waters with *Sphagnum* sp. or the Știrbul Rivulet. Meleg *et al.* (2014) investigated copepod diversity and distribution in relation with environmental drivers in the caves of the Romanian Carpathians, including the Retezat Mountains.

The aim of the paper is to improve the current knowledge of the harpacticoid copepod *Bryocamptus (Bryocamptus) mrazeki* (Minkiewicz, 1916) distribution, by reporting its first record for the Romanian fauna. The species was previously found in Central Europe (Slovakia, Czech Republic, Poland, Slovenia), in clean mountain waters. In Romania *B. (B.) mrazeki* was identified in a small spring from the Retezat Mountains, the Southern Carpathians.

Materials and methods

The species was identified in a spring located in the Retezat Mountains (N:45^{0}23’38”; E:22^{0}52’55”) at an altitude of 1550 m (Fig. 1) in 14th of September 2014. The spring was almost circular in shape, with gravel, boulders and coarse sand on the bottom. The width was about 0.5 m, and the maximum depth 0.1 m (Fig. 2) The water temperature reached 7^{0}C.

Figure 1. Location of the sampling site in the Retezat Mountains, Romania

Figure 2. The sampling site and strategy

The qualitative sample was collected using a 80 μm mesh size net and preserved in the field in 4% formaldehyde. Copepods were identified to the species level (Damian-Georgescu, 1970; Janetzky *et al*., 1996).

Results and discussion

Three harpacticoid copepod species were present at the sampling spring in the Retezat Mountains: *Attheyella (Attheyella) wierzejskii crenophila* Damian 1955; *B. (B.) mrazeki* and *Bryocamptus (Limocamptus) echinatus* (Mrazek 1893) (Fig. 3). Nine other taxa were identified, as follows: oligochaetes (Annelida, Oligochaeta); nematods (Nematoda); flatworms (Plathelminthes); stoneflies (Arthropoda, Insecta, Plecoptera); caddisflies (Arthropoda, Insecta, Trichoptera); chironomids (Arthropoda, Insecta, Diptera, Chironomidae); collembols (Arthropoda, Entognatha, Collembola); side-swimmers (Arthropoda, Malacostraca, Amphipoda); ostracods (Arthropoda, Ostracoda) (Fig. 3).

Up to the present, *B. (B.) mrazeki* was only found in central Europe, in Slovenia, Czech Republic, Slovakia and Poland (Sowa, 1965; Drzycimski, 1985; Illyová, 2001; Novikmec *et al*., 2007; Illyová *et al*., 2011; Boxshall, 2013; de Yong *et al*., 2014; Hřívová and Zhai, 2016). *B. (B.) mrazeki* is not included in the Romanian key for harpacticoid copepods (Damian-Georgescu, 1970), nor in later updates of the Romanian copepod fauna (Iepure, 2007; Iepure *et al.,* 2016).

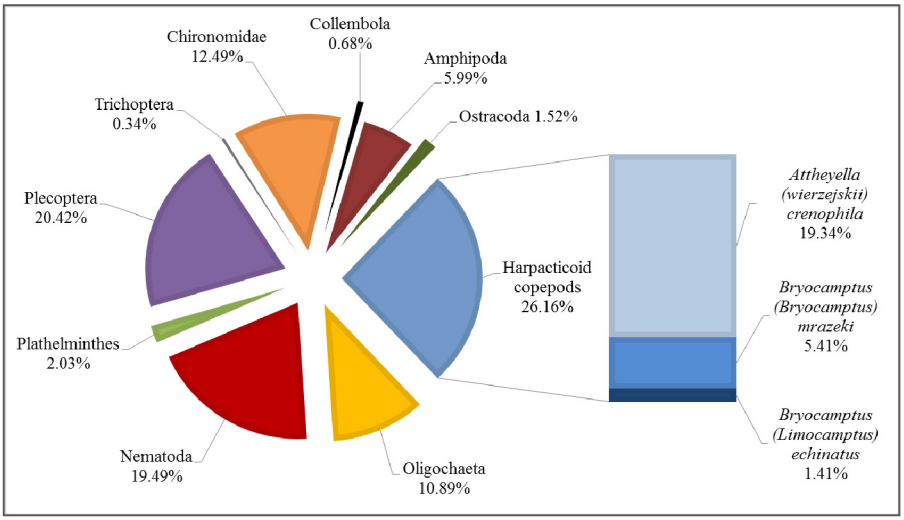

Figure 3. The relative abundance of all taxonomic groups present in the sampling site, next to the percentage of harpacticoid species

In the Retezat Mountains, Godeanu (1974) found cyclopoid and harpacticoid copepods in several aquatic habitats adjacent to Lake Gemenele. Three harpacticoid species were recorded: *Bryocamptus (Arcticocamptus) bryobates* (Monard, 1928) and *Bryocamptus (Arcticocamptus) cuspidatus* (Schmeil, 1893) in shallow habitats dominated by *Sphagnum* sp., and *Canthocamptus (Canthocamptus) staphylinus* (Jurine, 1820) in small stagnant pools and in the Știrbul Rivulet.

In the sampling spring, *B. (B.) mrazeki* was represented by 44 females, 19 males and 1 copepodite. Figures 4 - 6 depict several taxonomic features of the species. The swimming legs (Fig. 4 A - D) include P1 with a 3-segmented endopodite, different from *Bryocamptus (Rheocamptus) zschokkei* (Schmeil, 1893), and with the second segment of the exopodite bearing a long hair on the inner side, differing from *Bryocamptus* subg. *Limocamptus* Chappuis, 1929. The swimming legs P2-P4 have 2-segmented endopodites (Fig. 4). The swimming leg P4 in males has the last segment of the endopodite with 3 hairs, unlike *Bryocamptus (Bryocamptus) vejdovskyi* (Mrazek, 1893) (Fig. 5 A). Other distinctive features are the seminal receptacle in females (Fig. 5 B) and the anal somite (Fig. 6).

B. (B.) mrazeki clearly prefers clean, high altitude waters. It has been already recorded in interstitial habitats from the Eastern and Western Carpathians in Slovakia (Illyová, 2001; Novikmec *et al*., 2007; Illyová *et al*., 2011), from headwater streams in the Western Carpathians in the Czech Republic (Hřívová and Zhai, 2016), from spring fens in the Western Carpathians (Zhai *et al*., 2015) or in lake benthic habitats in the Tatra Mountains, Poland (Sowa, 1965). Thus, its distribution in the Carpathian mountain range should not be considered accidental, and new citations from Ukraine or the Romanian Eastern Carpathians could be expected.

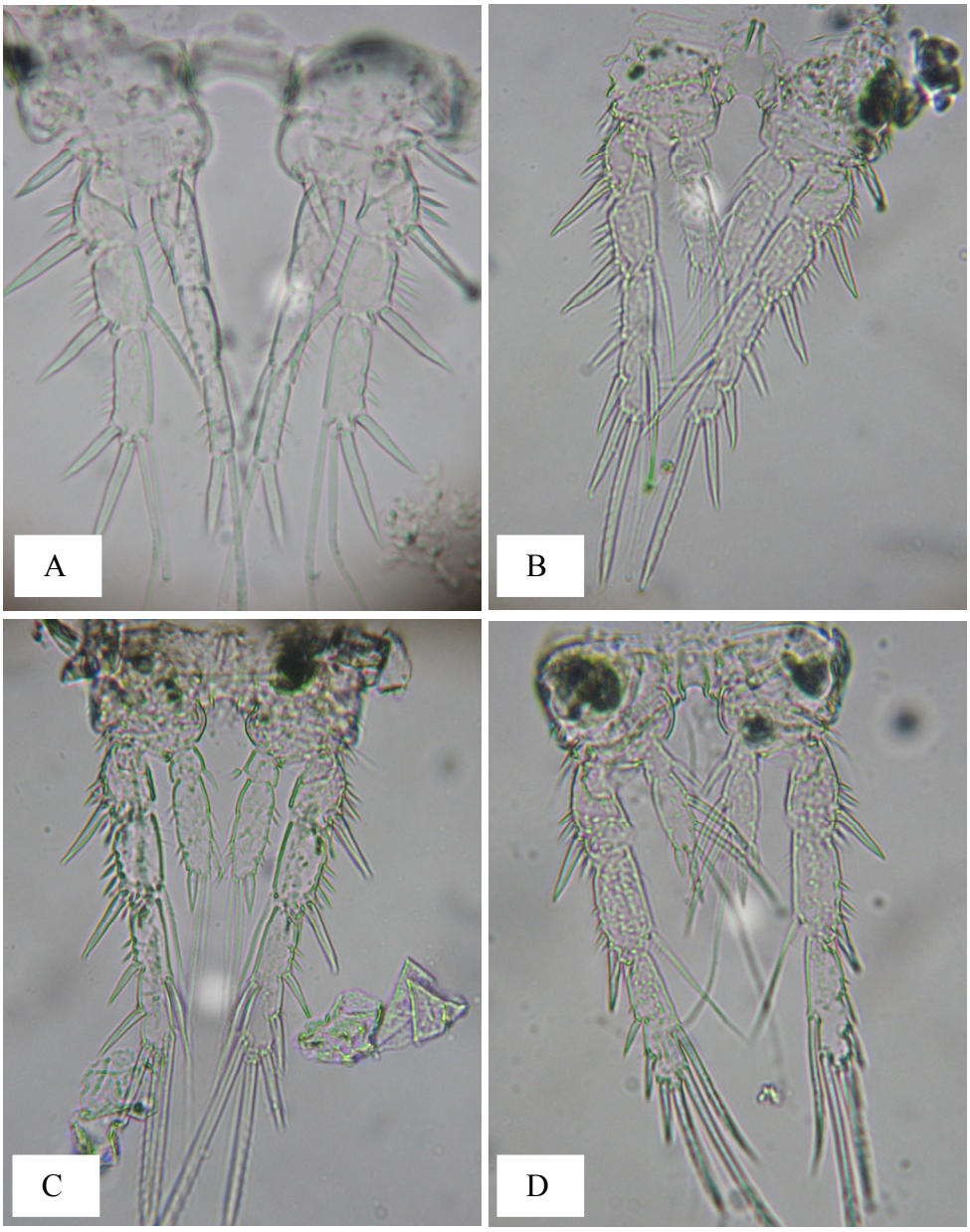

Figure 4. *B. (B.) mrazeki* ♀ from the sampling spring in the Retezat Mountains: the swimming legs: **A**: P1; **B**: P2; **C**: P3; **D**: P4

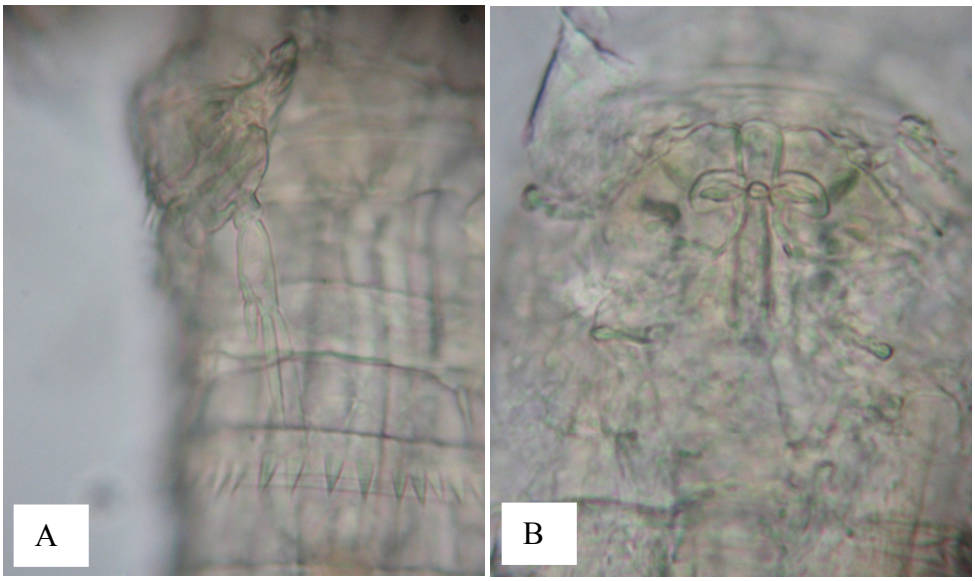

Figure 5. *B. (B.) mrazeki* from the sampling spring in the Retezat Mountains: **A**: ♂ - swimming leg P4, endopodite; **B**: ♀ - genital area

Figure 6. *B. (B.) mrazeki* ♀ from the sampling spring in the Retezat Mountains: the anal somite with 4 distinct strong teeth; and the caudal rami (the line represents approx. 100 μm)

Conclusions

The present paper represents the first record of *B. (B.) mrazeki* in the Romanian harpacticoid fauna. The species was identified from a small eucrenal spring from the Retezat Mountains. The species distribution in Europe include different clean water habitats from mountain regions, mostly from the Carpathian range, thus its citation in the Romanian Retezat Mountains cannot be accidental.

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