

# New Data about Occurrence of Epibiotic Branchiobdellid (Annelida: Branchiobdellea) Species on the Stone Crayfish *Austropotamobius torrentium* (Schrank, 1803) in the Republic of Macedonia

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**Abstract:** Three *Branchiobdella* species, *B. pentadonta* Withman, 1882, *B. parasita* (Braun, 1805), and *B. hexadonta* Grube, 1883, were registered as epibionts of the stone crayfish *Austropotamobius torrentium* (Schrank, 1803) from the Orevochka River, the left tributary of the Crna River, Republic of Macedonia. A total of 64 branchiobdellid worms were found, 13 on male and 51 on female crayfish. The results of our study contribute to the knowledge of the presence and distribution of epibiotic worms in the Republic of Macedonia as well as of branchiobdellidan -crayfish associations.

**Key words:** *Branchiobdella pentadonta*, *B. parasita*, *B. hexadonta*, *Austropotamobius torrentium*, Orevochka River, Republic of Macedonia

## Introduction

Branchiobdellid species inhabit two disjunctive Palearctic regions: East Asia and Europe (GELDER 1999). Till 1996, seven *Branchiobdella* species, *B. astaci* Odier, 1823, *B. parasita* (Braun, 1805), *B. pentadonta* Whitman, 1882, *B. hexadonta* Grüber, 1883, *B. balcanica* Moszynski, 1938, *B. italica* Canegallo, 1928, and *B. kozarovi* Subchev, 1978, were known for European waters (GELDER 1996). Later, NESEMANN, HUTTER (2002) described a new branchiobdellid species, *Branchiobdella papillosa* Hutter, Nesemann, 2002, from Austria. The authors did not present details of the reproductive system, while SUBCHEV, GELDER (2010) recently made a detailed redescription of *B. papillosa* and confirmed its validity. Thus, the number of the branchiobdellid species recognised in Europe has risen to eight (for review, see SUBCHEV 2014).

The Balkan Peninsula is one of the best studied regions of Europe with regard to branchiobdellidans, and the Republic of Serbia is the only Balkan country where no members of this group have been reported yet (SUBCHEV 2011). The branchiobdellid worms were rarely reported from material collected on the territory of the Republic of Macedonia, and only in association with *Astacus astacus* (Linnaeus, 1758) and *Austropotamobius torrentium* (Schrank, 1803) (GEORGEVITCH 1955, KARAMAN 1970, SUBCHEV 2007, 2012, SUBCHEV, GELDER 2010).

New records of *Branchiobdella* species in the Republic of Macedonia are reported in this paper, thus contributing to the knowledge of their presence, branchiobdellidan – crayfish associations and distribution in this country.

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## Material and Methods

The hydrobiological studies of macroinvertebrates were carried out at three locations: L1 (41°23'50.53"N, 21°39'24.56"E), L2 (41°23'48.32"N, 21°38'02.75"E) and L3 (41°23'02.02"N, 21°36'48.91"E), alongside the Orevoecka River, a tributary of the Crna River, in August-September 2011. Three crayfish (Astacidae) specimens were collected from the sampling sites L1 (one specimen) and L2 (two specimens) situated close to springs and downstream of local fishpond in the woody part of the river basin, respectively. No crayfish were found at L3. The crayfish were preserved separately in 75% ethanol.

For identification of the crayfish specimens and their sex, the guide of PÁRVULESKU (2010) was used. The crayfish's surface and gills, as well as the debris in the jars, where crayfish were kept, were examined by means of stereomicroscope Olympus SZX9 for a possible presence of branchiobdellid epibionts. The branchiobdellidans found were identified mainly by their body shape and size, form and dental formula of the jaws, using the keys of SUBCHEV (1984) and SUBCHEV, STANIMIROVA (1998).

## Results

The investigation of the Orevoecka River showed that the stone crayfish, *A. torrentium*, inhabited sampling sites L1 (one female collected) and L2 (one

male and one female collected). No branchiobdellidans were found on the female at sampling site L1, while both specimens at L2 had epibionts. Based on morphological characteristics, three *Branchiobdella* species: *B. pentadonta*, *B. parasita* and *B. hexadonta*, were identified (Fig. 1). In total, 64 branchiobdellid specimens were found – 13 on the male and 51 on the female of the stone crayfish at sampling site L2. The species *B. pentadonta* (38 individuals or 59% of all worms) and *B. parasita* (17 individuals or 27%) were found on crayfish surfaces, while *B. hexadonta* (7 individuals or 11%) was only in the gill chamber of the host females. Two specimens (3%) of *B. pentadonta* were found in the debris of the jar where the female specimen was preserved.

## Discussion

GEORGEVITCH (1955, 1957), KARAMAN (1970) and, more recently, SUBCHEV (2007, 2012, 2014) and SUBCHEV, GELDER (2010), confirmed the presence of five *Branchiobdella* species: *B. parasita*, *B. pentadonta*, *B. hexadonta*, *B. balcanica*, and *B. astaci*, for the Republic of Macedonia. Among them (Fig. 1), *B. astaci* was reported for the Karadagh (today's name Skopska Crna Gora) Mountains (SUBCHEV 2007); *B. parasita* for Dojran (GEORGEVITCH 1955, SUBCHEV 2007); *B. pentadonta* for Dojran (GEORGEVITCH 1955) and Smrdiliva Voda (KARAMAN 1970); and *B. balcanica* for Skopje and Demir Kapija (KARAMAN 1970). *B. hexadonta* was found also in crayfish sam-



Fig. 1. The distribution of: ◆ – *B. astaci* ▲ – *B. balcanica* ■ – *B. parasita* ● – *B. pentadonta* ★ – *B. hexadonta*, on astacoidean crayfish in the Republic of Macedonia

ples from unspecified locations in the Republic of Macedonia in the crayfish collections of the Natural History Museums in Berlin (SUBCHEV 2007) and London (SUBCHEV 2012).

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