

## FIRST RECORD OF PONTO-CASPIAN AMPHIPOD *COROPHIUM ROBUSTUM* IN SLOVAK SIDE OF THE DANUBE RIVER

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**Abstract:** The occurrence of Ponto-Caspian amphipod *Corophium robustum* (Sars, 1895) was reported on a Slovak side of the Danube River. Specimens were found during the investigation of the Danube River between years 2007 and 2011 and near to the inlet of the Hron River. Until now, two species of genus *Corophium* were known to be present in Slovak section of the Danube River; the *Corophium curvispinum* (Sars, 1895) and *Corophium sowinskyi* (Martynov, 1924).

**Key words:** *Corophium robustum*, invasive species, first record, Danube River, Slovakia.

### INTRODUCTION

All of the non-indigenous amphipods occurring in the main course of the middle Danube are of Ponto-Caspian origin. Ponto-Caspian amphipod species in the main course of the Slovak section of Danube include *Dikerogammarus haemobaphes* (Eichwald, 1842), *D. bispinosus* Martynov, 1925, *D. villosus* (Sowinskij, 1849), *Echinogammarus ischnus* (Stebbing, 1898), *E. trichiatus* (Martynov, 1932), *Obesogammarus obesus* (Sars, 1894), *Corophium curvispinum* Sars, 1895), *C. sowinskyi* (Martynov, 1924) and *C. robustum* (Sars, 1895). *Echinogammarus trichiatus* (Martynov, 1932) recorded in 2007 near Bratislava was until now the newest element of this water region (BORZA 2009). Further study of BORZA et al. (2010a) and BORZA (2011) indicated the possible occurrence of another Ponto-Caspian species in the Slovak section of Danube, the *C. robustum* recording it on the Hungarian side of the river. *Corophium robustum* was found for the first time for Hungary in 2007 (occurring at one site) and then later

in 2009 (found at several sites) (BORZA et al. 2010b and BORZA 2011). Despite, the species was overlooked in middle section of Danube River in “Joint Danube Survey 2” (BORZA et al. 2011). Until now the species was found occurring only on the right side of the river from Nyergesújfalu (rkm 1843) to Nagymaros (rkm 1694) showing strong dominance (618 individuals of *C. robustum* in contrast to six individuals of *C. sowinskyi* and three records of *C. curvispinum* at Komárom site) over other species of the genus (BORZA 2011). The species is known to be present in the Main River, Germany, where it was discovered in 2002 (BERNERTH & STEIN 2003). Few years later the species occurred in the Rhine River at harbour in Karlsruhe and Mannheim (BERNAUER & JANSEN 2006). In 2007 *C. robustum* was recorded in the upper Danube at the Geisling power plant, Germany and at Greifenstein and Klosterneuburg, Austria (BORZA et al. 2010a). Further spreading of this species is also recorded in the Dnieper River, Belorussia (SEMENCHENKO et al. 2009).

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## MATERIAL AND METHODS

Material was sampled by kick and sweep method in littoral zone of the Danube River at approximately depth of 0.5 m. Samples were taken from eighteen sites through the whole Slovak section of Danube River (main course) during the years 2009 – 2011, of which the specimen occurred at four. Macro-photography was done by camera Canon EOS 5D equipped by Canon macro photo lens MP-E 65 mm. Images were stacked by the software Combine ZP to final image with higher focus depth (fig. 1). Specimens were identified in Zeiss stereomicroscope Stemi DV4 and microscope Zeiss Axioskop 40 using publications of CĂRĂUȘU (1943), JAŹDŹEWSKI & KONOPACKA (1996) and BORZA et al. (2010). Morphological detail of the II antenna of the species is shown in fig. 2. Material was fixed in 96% of ethanol and is deposited at the Department of Zoology, Comenius University in Bratislava, Slovakia.

## SAMPLING SITES

### Veľkolélsky ostrov

Samples were taken during year 2011. Sampling site is situated at the bank of the Veľkolélsky ostrov Island in the Danube River main channel (rkm 1781, 47°44'58.78"N 17°57'1.08"E). The bottom at sampling site is formed by sand and gravel with groups of stones. The main channel in this section keeps natural character of the bank with moderate slope of ripal zone.

### Mužlianska Sihot'

Site is situated near the arrow weir between river bank and the island (rkm 1734, 47°46'6.63"N 18°32'18.82"E). The weir is submerged during high water levels but emerged during autumnal low discharges of river. Bottom deposits are formed by soft gravel and sand, influenced by higher current velocity.

The main channel exhibit moderate slope of ripal zone, however the uniformity of the main channel bottom is disturbed by the weir what results into higher diversity of habitats in the area.

### Bratislava – „Pri kameňolome“ site, the Danube River

The specimen was found near the stone quarry above the Bratislava in the littoral zone of the Danube River at the river km 1878 (48°09'22.72"N 17°00'33.61"E) on 23. 5. 2012. The habitat was made of rip-rap and gravel.

### Inlet of the Hron River to Danube

Second locality of occurrence was near by the inlet of the Hron River at the Danube river km 1716, near the village of Kamenica nad Hronom (47°48'55.56"N 18°44'25.36"E), sampled 10. 11. 2011. The habitat of the Danube River at this locality was made of gravel and mud.

Identification of specimens was done according to SARS 1894, CĂRĂUȘU 1943 and BORZA et al. 2010a. Taxonomy and nomenclature of the *Corophium*



**Figure 1.** Specimen of *Corophium robustum* (Sars, 1895) captured on Slovak side of Danube River.



**Figure 2.** Detail of the second pair of *Corophium robustum* male antenna.

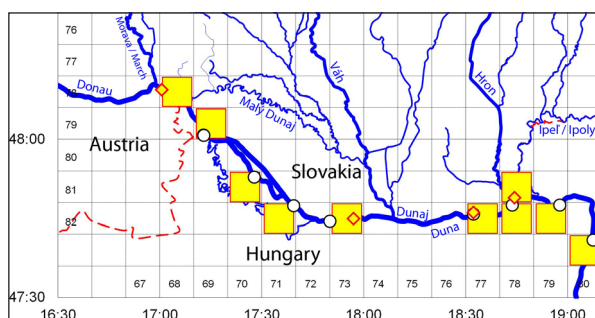
genus was adopted according to database of Fauna Europaea (BOXHALL 2012).

## RESULTS AND DISCUSSION

*Corophium robustum* (Sars, 1895) (figs 1, 2) was reported at four sites situated on the Slovak side of the Danube River main channel during years 2007 – 2011.

Considering the absence of species in the middle Danube (NESEMANN et al. 1995, BRTEK 2001) it is

unlikely that occurrence of the species is a result of upstream spreading from the lower Danube, where the *C. robustum* is considered to be native (DUDICH 1967). Presence of *C. robustum* in Slovak-Hungarian section of Danube River can be explained by downstream migration of the species from the upper Danube (fig. 3) although the human mediated transport can also be one of the possibilities for introduction of *C. robustum* to this river section. First record of the species has been done in 2007, when the species was reported on Hungarian side of the Danube River, represented with one specimen in sample at Nyergesújfalu (BORZA 2011). This study provides the evidence of the *C. robustum* presence also at the Slovak side of the Danube River.



**Figure 3.** Occurrence of *Corophium robustum* in Slovak section of the Danube river.

Diamonds – site of occurrence at the territory of Slovakia; square – grid map square of the Databank of Slovak Fauna indicating known distribution of *C. robustum* in the Danube River between Bratislava and Budapest; circles – sites of occurrence at the territory of Hungary.

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