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Research article

The first finding of a Habitats Directive species *Vertigo angustior* Jeffreys, 1830 (Mollusca: Gastropoda: Vertiginidae) from the Republic of North Macedonia

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Abstract: Five adults and one juvenile specimens of *Vertigo angustior* Jeffreys, 1830 (narrow-mouthed whorl snail) were found near Dunjska River, Mariovo for the first time in the Republic of North Macedonia. The species is included in Annex II of the Habitats Directive, and Convention on the conservation of European wildlife and natural habitats (Bern Convention).

Keywords: Natura 2000, new locality, protected species, terrestrial snails, Western Balkans, wetland

Introduction

Vertigo (*Vertilla*) *angustior* Jeffreys, 1830 was previously unknown for the gastropod fauna of North Macedonian. The shell of *V. angustior* is sinistral, yellowish or reddish-brown, thinly and uniformly striated. The shape is oblong-ovoid, with 4.5–5 convex whorls. The aperture is heart-shaped and has 5–6 teeth – upper palatal denticle high and relatively long, the small lower palatal denticle (as tuberculum), nearly vertical columellar denticle and two parietal denticles. The shell size is: height: 1.6–1.8 mm, width 0.8–1.0 mm (Kerney & Cameron, 1996; Welter-Schultes, 2012).

V. angustior in Europe occurs in a wide range of open habitats, as grasslands, marshes, bogs, coastal salt marshes, wet depressions among dunes, etc., but the proper micro-habitats only (Pokryszko, 1990; Cameron et al., 2003; Hornung et al., 2003; Killeen, 2003; Zoltan, 2005; Cochard et al., 2006; Moorkens, 2006; Książkiewicz, 2008; Feher 2009). In Bulgaria the species occurs in dense wet deciduous forests (with dominant species of alder, hornbeam, ash, beech, oak and hawthorn), or habitats with over 75% cover of reed and rush and stable water level of the floodplain region (Antonova et al., 2015).

The species is included in Annex II of the Council Directive 92/43/EEC (Council of the European Communities, 1992). The threat status in Europe according IUCN list is Vulnerable (Moorkens et al., 2012).

Material and methods

The survey was carried out in the valley of Dunjska River, Mariovo, Republic of North Macedonia on 22.10.2021. Initially it was found in sandy sediments near the river, N41.21276 E21.71170, leg I. Dedov. Collection number – ID10924/ 3 adults and 1 juvenile specimens. The specimens were collected by soil sampling. The second collecting was conducted at the same location, among riparian vegetation on 6.05.2022. The soil sample was collected along the transect from a point N41.21926 E21.71149 to point N41.21531 E21.71082, leg I. Dedov. Collection

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Fig. 1. Distribution of *V. angustior* in North Macedonia. A – map of North Macedonia with depicted Mariovo Region, B. Mariovo Region with localities of *V. angustior*.

number – ID10938/ 2 adult specimens, soil sample (Fig.1). The material is deposited in Malacological collection of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia.

Following Dedov & Antonova (2015), suitable habitats were selected after the analysis of the terrain, from which soil was collected in canvas bags. The resulting sample was immersed in a standard bucket filled about 2/3 with water. With a suitable strainer (fine raster) the fraction that floats on the surface of the water were taken and put on rectangular plexiglass plate. The content was transferred in a thin sock and allowed to dry. In the laboratory each sample was sieved through a system of sieves of different mesh sizes and the specimens of the target species were separated and counted.

Results

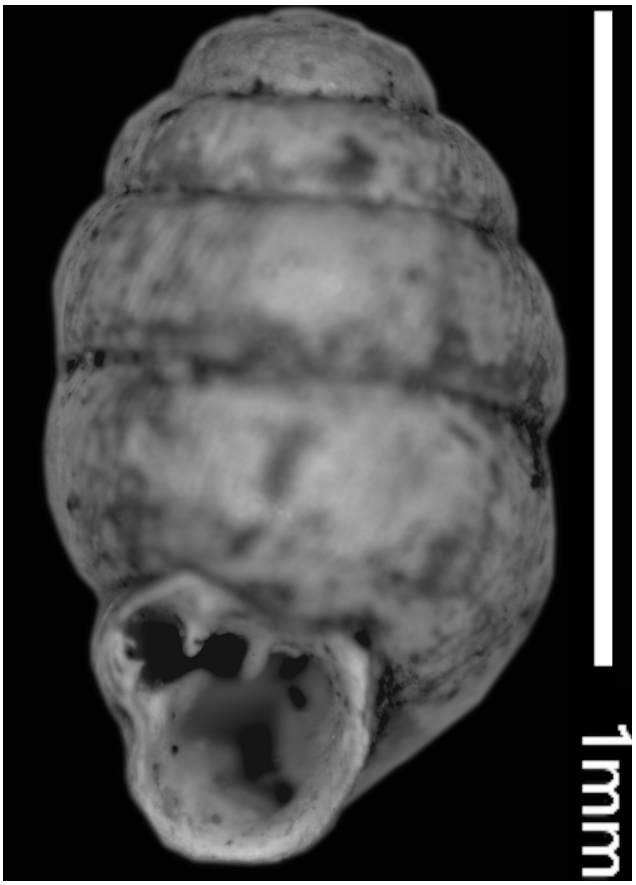
During the research conducted in Mariovo Region a total of five adults and one juvenile specimens of *Vertigo angustior* were found in the valley of Dunjska River. The specimens were collected along the river in sandy sediments and among riparian vegetation (Fig. 2). The shell characters of the specimens found fit to the published description of *V. angustior* (Kerney & Cameron, 1996; Welter-Schultes, 2012).

Discussion

Geographical aspect

Narrow-mouthed whorl snail is reported for all countries bordering North Macedonia: Albania, Bulgaria, Greek mainland, Kosovo and Serbia (Antonova et al., 2015; MolluscaBase eds., 2023). Given the presence of suitable habitats in North Macedonia, the finding of the species is not a surprise and fills an important gap in species distribution. The species is likely to be found in other localities in North Macedonia. The reason for such expectations are the relatively poorly studied wetlands of the country, as well as the possibility of *V. angustior* to spread.

Fig. 2. The area of Dunjska River, were the species *V. angustior* was found.



← Fig. 3. Adult specimens of *V. angustior,* collected along the Dunjska River.

Specimens can be transported by slugs, small mammals and by wind-blown plant debris (Cameron et al., 2003; Moorkens & Killeen, 2011).

Habitat and threats

In North Macedonia *V. angustior* was found in a narrow strip of riparian vegetation along the Dunjska River. The general habitat is not a typical *Vertigo* spot, but there appears to be a small number of suitable microhabitats where the species inhabits. We assume that abundance of the species is not large.

Mariovo is sparsely populated and remoted area (Melovski et al., 2013), and there are no direct threats to *V. angustior*. A potential threat could be the planned construction of a system of dams along the Crna River, which will inundate the newly discovered locality of the species in North Macedonia.

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