

A New Species of *Belgrandiella* (Wagner 1927) (Mollusca: Gastropoda) from Caves in Northern Bulgaria

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Abstract: A new species of *Belgrandiella* named *Belgrandiella pandurskii* n. sp. was described from three caves on Devetashko Plateau, North Bulgaria: Devetashka cave, Urushka Maara and Vodopada. The species is rheophilic, stenothermic and troglophilic one and the only species from this genus with a lobed penis known from Bulgaria till now.

Key words: Hydrobiidae, new species, Balkans, stream

Introduction

The genus *Belgrandiella* (WAGNER, 1927) is one of the most diverse one on species in Bulgaria from all the Hydrobiidae (ANGELOV 2000). All of the known species are endemics and live in restricted localities as caves and springs in the country. The first species was described by WAGNER (1927) from Temnata Dupka cave near Lakatnik and named *Belgrandia* (*Belgrandiella*) *hessei* (WAGNER, 1927). About 30 years later ANGELOV (1959) described *B. pussila* ANGELOV 1959 from the nearby source of Petreska River. Same author described two more species later as *B. bulgarica* ANGELOV, 1972 (Izvara cave, Polaten, Teteven town district) and *B. bureschi* Angelov, 1976 (thermal spring at Bankya, Tran town area, near the Serbian border). During same period Pintér (1968) found another new species in springs at Shipka Pass (Stara Planina Mt) named *B. angelovi* Pintér, 1968. After another long period of time there were no any studies on the Bulgarian *Belgrandiella*, GLÖER & GEORGIEV (2009) described three more species found in springs: two from Rhodopes Mt (*B. dobrostanica* and *B. bachkovoensis*) and one from Stara Zagora town area (*B. zagoraensis*). Studies continued as GEORGIEV (2011) reported of some new localities and anatomical features of some taxa of Hydrobiid snails. The *B. pussila* was found in Temnata Dupka cave (Lakatnik) by empty shells, and *B. angelovi* in springs near village of Zeleno Darvo (Gabrovo) and its penis morphology was studied.

Our summary of the literature on the Bulgarian *Belgrandiella* showed that even this genus is possibly having a hot spot of species radiation in our country it is quite insufficiently studied. In this paper we describe a new species of *Belgrandiella* found in three caves of Northern Bulgaria.

Material and Methods

The living snails were collected and preserved in 75% ethanol. The shells were collected by sieving the cave river deposits by 1x1 and 2x2 mm mesh width sieves. The material from the smaller meshed sieve was then brought to the laboratory and dried.

After it was again put into water and the floating shells were collected by a strainer and small brush.

The dissections and measurements of the shell were carried out by means of CETI stereo microscope and an eye-piece micrometer; the photographs were made with camera system with a digital adapter. The type material is stored in the Museum für Tierkunde Dresden (= Zoological Museum of Dresden).

Abbreviations used: N – number of specimens, H – Shell height, W – shell width, AH – aperture height, AW = aperture width, MTD – Museum für Tierkunde Dresden.

Results

Genus *Belgrandiella* (WAGNER, 1927)

Diagnosis: Shell minute, ovoid-conical to cylindrical conical with ovoid to elliptical aperture. The penis is simple and regularly broad without any outgrowths or varying in width with a non-glandular lobe located in medial position on its inner edge (RADOMAN 1983, ARCONADA & RAMOS 2003, GLÖER & GEORGIEV 2009).

Belgrandiella pandurskii n. sp.

Material examined: 18.10.2009, 01.11.2009, 28 ex. in ethanol, many shells from loc. typ., 31.10.2009, 10 ex. in ethanol, many shells from Urushka Maara cave, 31.10.2009, 10 ex. in ethanol, Vodopada cave (both caves at village of Krushuna), 11 shells measured (7 from loc. typ., 1 from Urushka Maara, 3 from Vodopada cave), 3 males dissected (2 from loc. typ., 1 from Vodopada cave).

Holotype: H = 1.95 mm, W = 1.09 mm, AH = 0.73 mm, AW = 0.79 mm, Museum für Tierkunde Dresden, coll. № SNSD Moll S3177.

Paratypes: 20 ex., from loc. typ., Museum für Tierkunde Dresden – 12 ex. in ethanol, coll. № SNSD Moll S3178, 8 shells, coll. № SNSD Moll S3179, rest in coll. Georgiev (University of Plovdiv). **Locus typicus:** Devetashka cave, near village of Devetaki, Lovech town area, Devetashko plateau, Northern Bulgaria.

Distribution: Known from the rivers and streams of Devetashka cave (near village of Devetaki), Vodopada and Urushka Maara caves (near village of Krushuna), found also few meters and in the outer stretches of same streams, Lovech

town area, Devetashko plateau, Northern Bulgaria.

Habitat and ecology: The species was found on stones which were covered with green algae at the outer streams of the caves. Inside the caves the river deposits were full with remains of bat guano. Water temperature at the type locality measured on 18.10.2009 was 10.6° C. Rheophilic, stenothermic and troglophilic species, not found to live far than few meters from the caves in the outer river streams.

Etymology: Named after Dr Ivan Pandurski (Institute of Zoology, BAS) a specialist on stygobite Copepoda who firstly registered the Devetashka cave as a locality of Hydrobiidae snails.

Description: The shell measurements are: H = 1.75-2.11, W = 0.86-1.12, AH = 0.73-0.89, AW = 0.73-0.86, W/H = 0.48-0.57, AH/H = 0.37-0.43 (Table 1). The shell is translucent and its shape varied from elongate-ovoid to cylindrical with obtuse apex, having 3 ½ – 4 ½ sharply growing convex whorls with fine well visible growth lines. The last whorl is about 2/3 from the shell in height. The aperture is oval and rounded to pyriform and slightly angled at its upper side, the umbilicus is slit like, the operculum is reddish brown. The mantle is colorless and the eyes are black, and well visible. The penis has a broad base, thinner middle part which bears an elongate rounded lobe on its left side and hunch-backed distal part which is sharply tapered at its end (Fig. 1).

Table 1. Shell measurements of *Belgrandiella pandurskii* n. sp. The abbreviations were explained in the text in ‘Material and Methods’.

| N | H | W | AH | AW | W/H | AH/H |
|---------|------|------|------|------|------|------|
| 1 | 1,95 | 1,09 | 0,73 | 0,79 | 0,56 | 0,37 |
| 2 | 1,91 | 1,06 | 0,79 | 0,83 | 0,55 | 0,41 |
| 3 | 2,08 | 1,06 | 0,83 | 0,79 | 0,51 | 0,40 |
| 4 | 2,01 | 1,02 | 0,83 | 0,83 | 0,51 | 0,41 |
| 5 | 2,01 | 0,96 | 0,86 | 0,76 | 0,48 | 0,43 |
| 6 | 1,98 | 0,96 | 0,86 | 0,76 | 0,48 | 0,43 |
| 7 | 1,75 | 0,86 | 0,73 | 0,73 | 0,49 | 0,42 |
| 8 | 1,88 | 1,06 | 0,76 | 0,79 | 0,56 | 0,40 |
| 9 | 2,05 | 1,06 | 0,79 | 0,76 | 0,52 | 0,39 |
| 10 | 1,98 | 1,12 | 0,76 | 0,86 | 0,57 | 0,38 |
| 11 | 2,11 | 1,06 | 0,89 | 0,76 | 0,50 | 0,42 |
| Average | 1,97 | 1,03 | 0,80 | 0,79 | 0,52 | 0,41 |

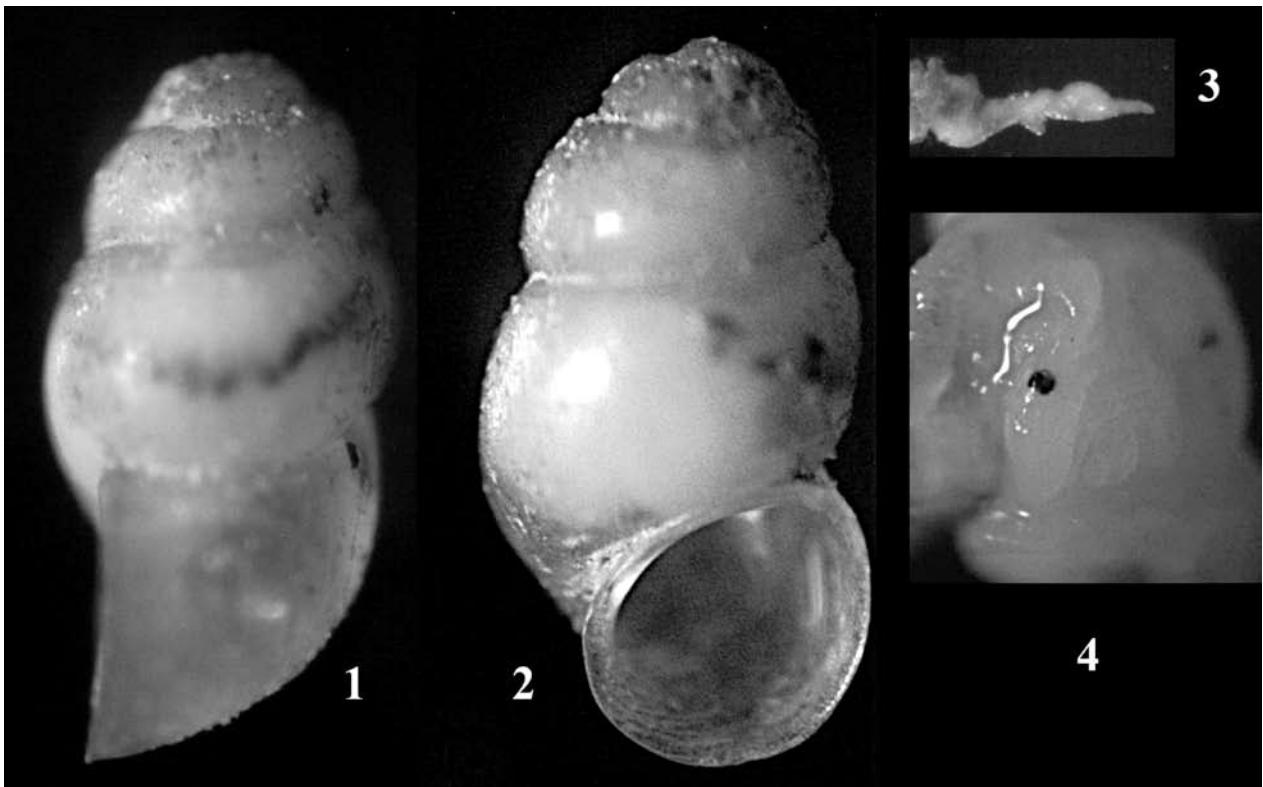


Fig. 1. *Belgrandiella pandurskii* n. sp. Legend: 1 – side view of the shell of the holotype, 2 – front view of the shell, 3 – penis of specimen from Vodopada cave (the lobe and the pointed distal part are visible), 4 – head of specimen from Devetashka cave (tentacles, eyes, snout and the penis above the right tentacle are visible).

Table 2. Shell sizes and proportions of the Bulgarian *Belgrandiella* species. Previously described species according to literature data were compared with those of the new species, and where possible the minimal and maximal values were given. The abbreviations were explained in the text in ‘Material and Methods’.

| <i>Belgrandiella</i> species | H | W | AH | AW |
|--|-----------|-----------|-----------|-----------|
| <i>B. hessei</i> (Wagner, 1927) | 2.00-2.30 | 1.00-1.20 | - | - |
| <i>B. pussila</i> Angelov, 1959 | 1.40-1.60 | 0.75-0.85 | 0.50-0.60 | 0.45-0.50 |
| <i>B. angelovi</i> Pintér, 1968 | 1,90 | 0,98 | - | - |
| <i>B. bulgarica</i> Angelov, 1972 | 2.05-2.25 | 1.15-1.35 | 0.75-0.90 | 0.75-0.85 |
| <i>B. bureschi</i> Angelov, 1976 | 1.20-1.40 | 0.65-0.80 | 0,50 | 0,50 |
| <i>B. zagoraensis</i> Glöer & Georgiev, 2009 | 1.80-2.00 | 1.10-1.20 | - | - |
| <i>B. dobrostanica</i> Glöer & Georgiev, 2009 | 1.70-1.90 | 0.90-1.00 | - | - |
| <i>B. bachkovoensis</i> Glöer & Georgiev, 2009 | 1.90-2.00 | 1.00-1.10 | - | - |
| <i>B. pandurskii</i> n. sp. | 1.75-2.11 | 0.86-1.12 | 0.73-0.89 | 0.73-0.86 |

Differential diagnosis: The lobed penis discerns *B. pandurskii* from the rest of the Bulgarian representatives of the genus with studied anatomy (*B. bulgarica*, *B. angelovi*, *B. zagoraensis*, *B. dobrostanica*, *B. bachkovoensis*) which have regularly broad penes without any outgrows. From *B. hessei* it differs by its narrower umbilicus, not well devel-

oped aperture lip and flatter whorls with weaker suture, from *B. pussila* – by its larger size, fast growing whorls, and elongate-ovoid shell shape, and from *B. bureschi* – by its larger size, more elongate shell, and ecology (*B. bureschi* is a stygobite and lives in a thermal spring with water temperature 19.6°C).

Discussion

The two main ecological groups of the Bulgarian *Belgrandiella* species according to their habitats are the stygobite and the spring ones. The first are known to live in underground waters in caves, and have no any eyes and body pigmentation. These species are local endemics occurring in only one cave or a cave system. The second are known to inhabit surface spring waters and to have eyes. These species can be more easily dispersed (for example by birds or floods) and can invade new habitats. That is and the possible main reason that such *Belgrandiella*-s were found in more than one locality as *B. angelovi*, *B. zaboraensis*, *B. dobrostanica* and the newly described *B. pandurskii*. So we consider that the last one could be expected and in some more springs and streams emerging from caves known to be abundant in the karstic area of the Devetashko Plateau.

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