

Catalogue of the stygobiotic and troglophilous freshwater snails (Gastropoda: Rissooidea: Hydrobiidae) of Bulgaria with descriptions of five new species

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ABSTRACT. New investigations of freshwater habitats in caves revealed five new species of the Rissooidea in Bulgaria. The new species: *Belgrandiella maarensis* n. sp., *Pontobelgrandiella tanevi* n. sp. (the second species from this genus ever known), *Bythiospeum simovi* n. sp., *Bythiospeum kolevi* n. sp., *Bythiospeum stoyanovi* n. sp. are described and types illustrated. A synopsis of all published data on this ecological gastropod group in the country was compiled and complemented by author's unpublished data to provide a catalogue of all known Bulgarian stygobiotic and troglophilous freshwater snails with their localities.

Introduction

The family Hydrobiidae (Gastropoda: Rissooidea) is one of the most speciose and taxonomically diverse mollusc families [Arconada, Ramos, 2003]. They originated in Laurasia during the transition period between the Carboniferous and Permian, around 280 million years ago [Knight *et. al.*, 1960]. The family consists of around 400 recent and fossil genera [Kabat, Hershler, 1993] and has more than 1000 described living species [Boss, 1971]. The majority of European Hydrobiids have a circum-mediterranean distribution that encompasses three regions: Balkan, Apennine and Iberian Penninsulas [Boeters, 1970, 1987, 1998; Schütt, 1972; Radoman, 1983, 1985; Giusti, 1979; Giusti, Pezzoli, 1980; Giusti, Bodon, 1983; Bodon *et al.*, 1992; Kabat, Hershler, 1993; Arconada, Ramos, 2003]. These areas could be considered as evolutionary centers especially for some stygobiotic species [Davis, 1982; Radoman, 1983]. For example, six endemic genera were described from Bulgaria: *Insignia* Angelov 1972, *Pontobelgrandiella* Radoman, 1978, *Cavernisa* Radoman, 1978, *Devetakia* Georgiev et Glöer, 2011, *Balkanica* Georgiev, 2011 and *Balkanospeum* Georgiev, 2012. The natural habitats of the species of this family are inland water basins that are well oxygenated and have a constant, mod-

erate flow. Stygobiont species make up almost all the molluscs fauna associated with subterranean continental waters [Bole, Velkovrh, 1986].

Shell morphology of the hydrobiids is often the main character for species and genera recognition, and also occasionally even used to diagnose some higher taxa [Hershler, Ponder, 1984]. That is sometimes the only way to describe such stygobiotic snail species, because there is no any possibility for the scientists to reach living populations in the underground and study the soft body of the gastropods. As an example, the Bulgarian species *Paladilhiopsis bureschi* Wagner, 1927, *Belgrandiella hessei* Wagner, 1927, *B. bureschi* Angelov, 1976, *B. pussilla* Angelov, 1959, and *Iglica acicularis* Angelov, 1959 are known only from empty shells found in the river deposits emerging from the caves [Angelov, 2000]. The genus *Insignia* with the species *I. macrostoma* Angelov, 1972 was also described only from empty shells. Many gastropods from other countries that live in caves and underground waters were also described in the same way [De Mattia, 2007].

The Bulgarian cave malacofauna is still insufficiently studied even though the study of Bulgarian biospeleology dates back to 1922 [Beron *et al.*, 2009], and the first stygobiotic snail species were described by Wagner [1927]. The family Hydrobiidae evidently has a hot spot of species radiation in this country [Angelov, 2000; Glöer, Georgiev, 2009] and intensive research on this group is needed. In this paper we (i) describe five new species from the cave waters of Bulgaria, and (ii) provide a catalogue of stygobiotic and troglophilous freshwater snail species with their localities in the country.

Material and Methods

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

Dissections and measurements of the shell were carried out by means of CETI stereo microscope and an ocular micrometer; photographs were taken with a camera system with a digital USB-adapter. The type material is stored in the Hungarian Natural History Museum, Budapest, Hungary.

Abbreviations used: H – shell height, W – shell width, AH – aperture height, AW – aperture width, ST – stygobiont (species living in subterranean waters), TR – troglobilous (species preferring to live in cave streams and in surface spring waters at cave entrances).

The catalogue of the Bulgarian stygobiotic and troglobilous freshwater snails was compiled by a critical overview and a synopsis of all available literature considering this gastropod group in the country [Wagner, 1927; Angelov, 1959, 1965, 1967, 1972, 1976, 2000; Glöer, Georgiev, 2009; Georgiev, 2009, 2011a, 2011b, 2011c, 2012a, b; Georgiev, Glöer, 2011, 2013], and some unpublished data of the author. Also additional GPS coordinates (or UTM-grid 10x10 km, where coordinates were not available) of the localities were provided according to Beron *et al.* [2009] or personal data.

Results

Descriptions of species

Genus *Belgrandiella* A. Wagner, 1927

Diagnosis: Shell minute, oval-conical to cylindrical-conical with elliptical aperture. The penis is simple and regularly broad without any outgrowth, 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 maarensis n. sp.

(Figs. 1-2)

urn:lsid:zoobank.org:act:88E08A4C-19BC-4F5C-B3FD-3F1A1D476C8E

Material examined: 31.10.2009, 7 spec. in ethanol, 2 shells, from the type locality (2 males dissected, the soft body of 7 spec. studied, 7 shells measured), D. Georgiev leg.

Holotype: H = 1.52 mm, W = 0.83 mm, AH = 0.63 mm, AW = 0.56 mm, Hungarian Natural History Museum, coll. no. HNHM 98821.

Paratypes: Museum für Tierkunde Dresden, coll. no. HNHM 98822.

Type locality: Urushka Maara cave, near village of Krushuna, Devetashko Plateau, Northern Bulgaria, 43°14'41.7"N, 25°02'45.4"E, 191 m alt.

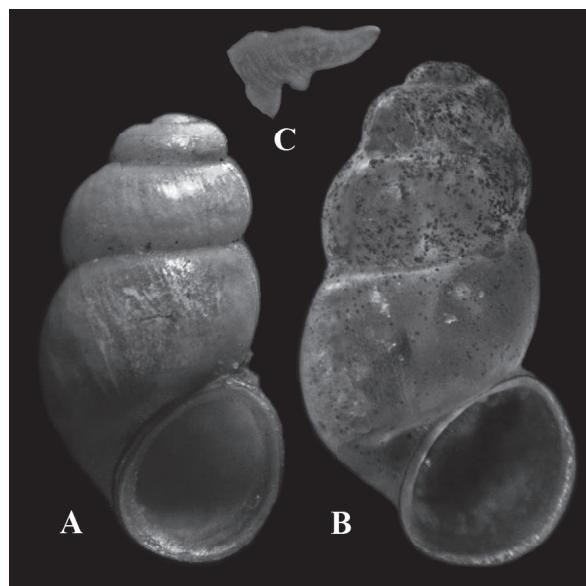


FIG. 1. *Belgrandiella maarensis* n. sp.: A – holotype, B – paratype, C – penis.

РИС. 1. *Belgrandiella maarensis* n. sp.: А – голотип, В – паратип, С – пенис.

Distribution: Known only from the type locality but could be expected in some neighboring caves of Urushka Maara.

Habitat and ecology: Stygobiont, rheophilic (living in running waters) and calcareous (living in waters rich in calcium) species. Found under stones. Urushka Maara is the richest cave on hydrobiid snail species known till now in Bulgaria. The newly described species lives together with *Belgrandiella pandurskii* Georgiev, 2011, and *Devetakia krushunica* Georgiev et Glöer, 2011 [Georgiev, 2011a, Georgiev, Glöer, 2011].

Etymology: Named after the Urushka Maara cave, where the species was found.

Description. Shell (Fig. 1): oval-conical to oval-cylindrical with oval aperture, the wall is translucent with glossy surface and fine growth lines, the whorls are 4-4.5, not very convex, with a clear suture, and uniformly increasing in diameter. The umbilicus is slit-like, the operculum is translucent, yellowish. H = 1.52-2.01 mm, W = 0.83-1.12 mm, AH = 0.63-0.79 mm, AW = 0.56-0.69 mm, W/H = 0.52-0.62, AH/H = 0.39-0.42, AW/W = 0.62-0.68.

Soft body: The entire animal is unpigmented, white-yellowish, and has no eyes (only small dark spots can be seen under the microscope, Fig. 2A). In preserved specimens the tentacles are shorter than the snout, with relatively broad bases, narrow distally and with blunt apices. **Penis morphology:** The penis is short, flattened, with a broad base, and a small lobe in the middle on its left side. It is slightly hunchbacked distally, with a regularly tapered apex (Fig. 1C, 2B).

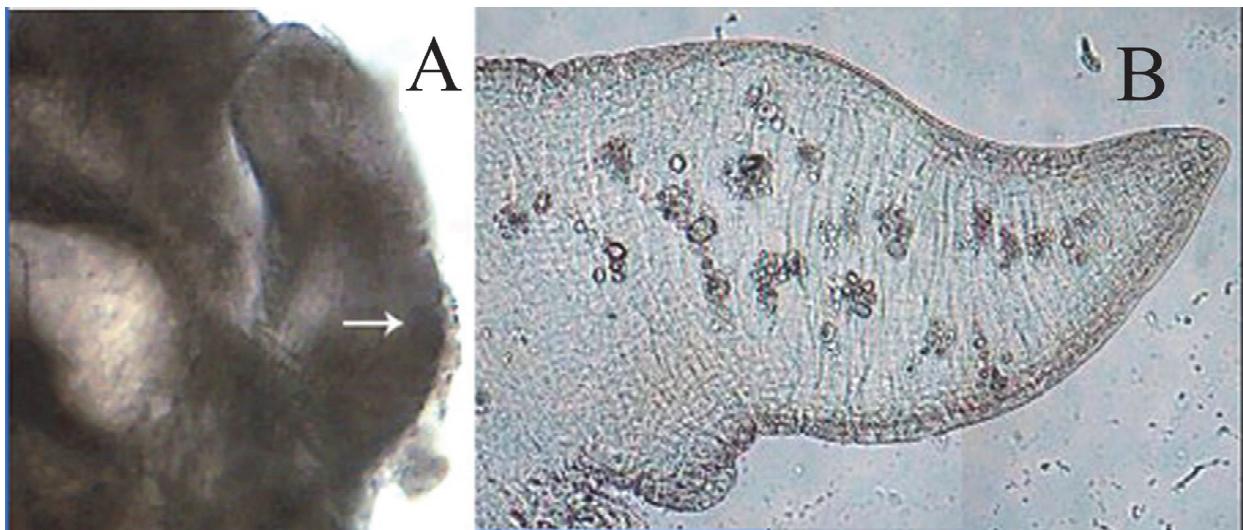


FIG. 2. *Belgrandiella maarensis* n. sp., light microscope photographs (40x): A – tentacle with rudimentary eye spot (pointed by an arrow), B – penis.

РИС. 2. *Belgrandiella maarensis* n. sp., световые микрофотографии (40x): А – щупальце сrudиментарным глазом (указан стрелкой), В – пенис.

[Раковина] (Рис. 1): овально-коническая до овально-цилиндрической, с овальным устьем, стенка раковины полупрозрачная, блестящая, с тонкими линиями роста, из 4-4,5 слабо выпуклых, равномерно нарастающих оборотов, шов четкий. Пупок щелевидный, крышечка прозрачная, желтоватая. $H = 1,52\text{-}2,01$ мм, $W = 0,83\text{-}1,12$ мм, $AH = 0,63\text{-}0,79$ мм, $AW = 0,56\text{-}0,69$ мм, $W/H = 0,52\text{-}0,62$, $AH/H = 0,39\text{-}0,42$, $AW/W = 0,62\text{-}0,68$. **Мягкое тело:** непигментированное, желтоватое, глаза отсутствуют (под микроскопом видны только маленькие темные пятна, Рис. 2А). У фиксированных животных щупальца короче морды, со сравнительно широкими основаниями, узкие на концах и затупленные на вершине. **Морфология пениса:** пенис короткий, уплощенный, с широким основанием и маленькой лопастью в середине на левой стороне. Пенис слегка выпуклый дистально, с равномерно суженной вершиной (Рис. 1C, 2В).]

Differential diagnosis: The new species is distinguished from the sympatric *Belgrandiella pardurskii* Georgiev, 2011 by the lack of eyes, short and wide penis with a small lobe, the translucent operculum, and the smaller and slimmer shell (versus presence of eyes, long and narrow penis with a big lobe, reddish operculum, and larger and wider shell, Georgiev, 2011a). Of the remaining Bulgarian representatives of the genus known to live in caves, *B. maarensis* is most similar with *B. stanimirae* Georgiev, 2011 from Zmeyova Dupka cave (Stara Planina Mt.) [Georgiev, 2011b], but it has eyes, a very thick apertural edge, and rough shell surface. In addition, the penis of the last species is slimmer than that of *B. maarensis*.

Genus *Pontobelgrandiella* Radoman, 1978

Diagnosis: The shell is oval or elliptical with oval aperture. The penis is uniform broad with two small outgrowths on its left side [Radoman, 1983].

Pontobelgrandiella tanevi n. sp.

(Figs. 3-4)

urn:lsid:zoobank.org:act:FA7915E1-A0BC-4E83-9DC5-561CAD76BD0B

Material examined: 10.12.2011, 42 spec. in ethanol (7 dissected), from the type locality, Dilian Georgiev, Stanimir Stoyanov leg.

Holotype: $H = 1.95$ mm, $W = 1.09$ mm, $AH = 0.76$ mm, $AW = 0.79$ mm, Hungarian Natural History Museum, coll. no. HNHM 98823.

Paratypes: 5 spec. Hungarian Natural History Museum, coll. no. HNHM 98824, 10 spec. coll. D. Georgiev.

Type locality: Parnitsite cave, near village of Bezhanovo, Pre-Balkan area, Northern Bulgaria, $43^{\circ}12'02.1''N$, $25^{\circ}25'58.4''E$.

Distribution: Known only from the type locality.

Habitat and ecology: The cave is 2500 m long and is formed in Upper Cretaceous limestone (Maastricht). It has two entrances, connected by a meandered, branched gallery. It is 1-8 meters high and 0.7-15 meters wide. Sinter walls (made of calcium carbonate deposition) form a lot of lakes in the cave stream, which has deep clay and gravel deposits on its bottom [Beron *et al.*, 2009].

Etymology: The species was named after the speleologist and instructor on speleology Tanya Markov Taney (Speleological club “Salamandar – Stara Zagora”) who assisted the author during the collection of the material.

Description: **Shell:** oval-conical with oval aperture, the wall is translucent with glossy surface and fine growth lines, the whorls are 4-4.5, not very convex, with a clear suture, and uniformly increasing in diameter. The umbilicus is slit-like, the

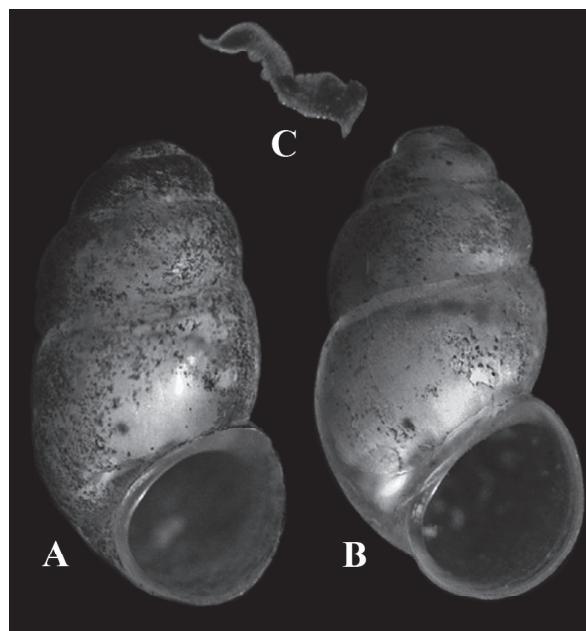


FIG. 3. *Pontobelgrandiella tanevi* n. sp.: A – holotype, B – paratype, C – penis. (Both shells at the same scale).

РИС. 3. *Pontobelgrandiella tanevi* n. sp.: А – голотип, В – параптип, С – пенис. (Раковины в одном масштабе).

operculum is orange-reddish, with translucent yellowish periphery. H = 1.82-2.05 mm, W = 1.02-1.22 mm, AH = 0.73-0.86 mm, AW = 0.76-0.96 mm, W/H = 0.52-0.60, AH/H = 0.39-0.44, AW/W = 0.66-0.94. **Soft body:** The entire animal is white-yellowish and has well developed black eyes. **Penis morphology:** The penis is regularly broad with two closely situated lobes on its middle part, the apex is pointed.

[Раковина: овально-коническая с овальным устьем, стенка раковины полупрозрачная, блестящая, с тонкими линиями роста, из 4-4,5 слабо выпуклых равномерно нарастающих оборотов, шов четкий. Пупок щелевидный, крышечка красно-оранжевая, с прозрачным желтоватым краем. H = 1,82-2,05 мм, W = 1,02-1,22 мм, AH = 0,73-0,86 мм, AW = 0,76-0,96 мм, W/H = 0,52-0,60, AH/H = 0,39-0,44, AW/W = 0,66-0,94. **Мягкое тело:** желтоватое, глаза хорошо развиты, черные. **Морфология пениса:** пенис широкий с двумя близко расположенными лопастями в средней части, вершина заострена.]

Differential diagnosis: The new species differs from *Pontobelgrandiella nitida* (Angelov, 1972) by its shorter but broader shell (*P. nitida* has a shell often higher than 2 mm, and 0.70-0.75 mm wide), the lower number of whorls (which are 4 $\frac{3}{4}$ - 5 in *P. nitida*), and more closely spaced penis lobes. In addition, according to Angelov [2000], *P. nitida* is a stygobiont, while *P. tanevi* n. sp. is a troglobilous species, with well developed eyes.

Genus *Bythiospeum* Bourguignat, 1882

Diagnosis: The shell is small (2-5 mm), elongate-conical with oval to pyriform aperture



FIG. 4. *Pontobelgrandiella tanevi* n. sp., light microscope photograph of the penis (40x).

FIG. 4. *Pontobelgrandiella tanevi* n. sp., световая микрография пениса (40x).

[Glöer, Meier-Brook, 2003]. The penis is simple without any outgrowths [Bernasconi, 1990]. The similar genus *Balkanospeum* [Georgiev, 2012a] described recently from central Stara Planina Mt. (Bulgaria) differs from *Bythiospeum* by the outgrowth on the left side of its penis, the very long tentacles (passing far over the snout in preserved specimens), and more rounded whorls and aperture.

Bythiospeum simovi n. sp.

(Fig. 5)

urn:lsid:zoobank.org:act:FAF569E6-5FD5-4ABA-BB80-C3BA9C48DD91

Material examined: 29.12.1997, 3 shells, from the type locality, Nikolai Simov, J. Makulev leg.

Holotype: H = 1.95 mm, W = 0.83 mm, AH = 0.56 mm, AW = 0.56 mm, Hungarian Natural History Museum, coll. no. HNHM 98825.

Paratypes: 1 spec. Hungarian Natural History Museum, coll. no. HNHM 98826, 1 spec. coll. D. Georgiev.

Locus typicus: Zadanenka cave, near village of Karlukovo, Northern Bulgaria, 43°10'35.7"N, 24°04'14.1"E.

Distribution: Known only from the type locality.

Habitat and ecology: Zadanenka cave is mainly horizontal but has some vertical parts, having hardly reachable cave stream with a lot of clay pools and siphons and strongly varying water levels (Nikolai Simov, Tanya Tanev, pers. comm.).

Etymology: The species was named after the biospeleologist Nikolai Simov, an expert on parasitic Heteroptera, who collected the new species.

Description: Shell (Fig. 5): The shell is elongate-conic, thin walled, consisting of 4.5 whorls with fine growth lines and clear suture. The aperture is very small, oval, with well developed lip, umbilicus is closed. H = 1.95-2.05 mm, W = 0.89-0.93 mm, AH = 0.56-0.63 mm, AW = 0.50-0.56



FIG. 5. *Bythiospeum simovi* n. sp.: A – holotype, B – paratype. (Both shells at the same scale).

РИС. 5. *Bythiospeum simovi* n. sp.: А – голотип, В – парапти. (Раковины в одном масштабе).

mm, W/H = 0.40-0.42, AH/H = 0.29-0.32, AW/W = 0.63-0.68.

[Раковина: удлиненно-коническая, тонкостенная, из 4,5 оборотов, с тонкими линиями роста и четким швом. Устье очень маленькое, овальное, с хорошо развитой губой, пупок закрыт. H = 1,95-2,05 мм, W = 0,89-0,93 мм, AH = 0,56-0,63 мм, AW = 0,50-0,56 мм, W/H = 0,40-0,42, AH/H = 0,29-0,32, AW/W = 0,63-0,68.]

Differential diagnosis: The new species has the most slender shell of all Bulgarian representatives of the genus (W/H = 0.40-0.42). From all these species *B. simovi* n. sp. is most similar to *Bythiospeum copiosus* (Angelov, 1972) but it has a thicker and more developed aperture lip, sharper apex, and narrower shell.

Bythiospeum kolevi n. sp.

(Fig. 6)

urn:lsid:zoobank.org:act:FC56A7B7-7152-4DD6-BCDA-7B23AC2C7CED

Material examined: 09.12.2011, 4 shells, 3 fragmented shells, 1 female in ethanol, Dilian Georgiev, Slavi Kolev leg.

Holotype: H = 1.95 mm, W = 0.83 mm, AH = 0.56 mm, AW = 0.56 mm, Hungarian Natural History Museum, coll. no. HNHM 98827.

Paratypes: 1 spec. Hungarian Natural History Museum, coll. no. HNHM 98828, 3 spec. coll. D. Georgiev.

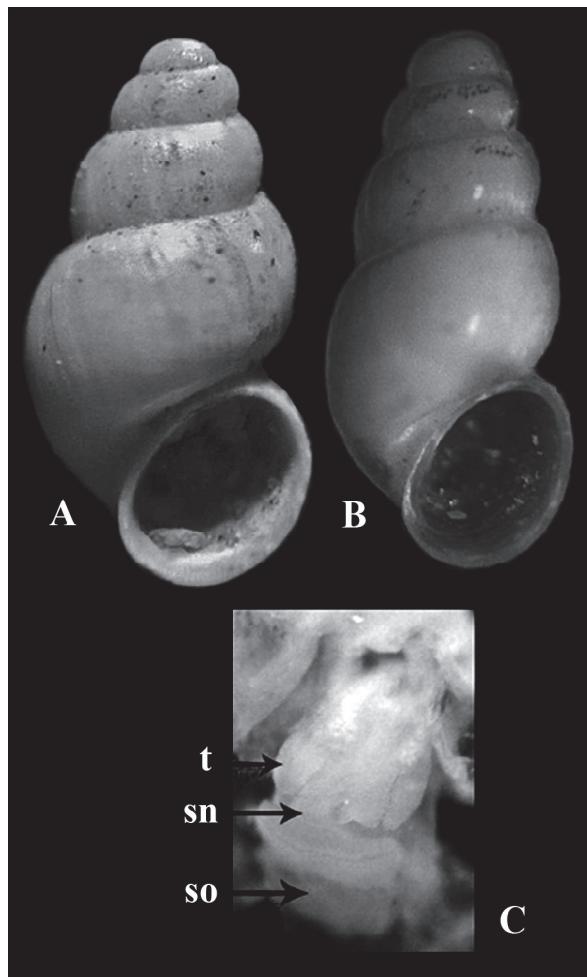


FIG. 6. *Bythiospeum kolevi* n. sp.: A – holotype, B – shell of the dissected specimen, C – head, so – sole, sn – snout, t – tentacle. (Both shells at the same scale).

РИС. 6. *Bythiospeum kolevi* n. sp.: А – голотип, В – раковина вскрытого экземпляра, С – голова, со – подошва, sn – морда, t – щупальце. (Раковины в одном масштабе).

Locus typicus: Golyamata Mikrenkska cave (Mandrata), Stara Planina Mt., Northern Bulgaria, 43°03'44.0"N, 24°31'29.9"E.

Distribution: Known only from the type locality.

Habitat and ecology: Golyamata Mikrenkska cave is 1921 m in length, formed in Maastricht limestone (Lower Cretaceous). It is an asymmetric, labyrinth cave, width of galleries is 0.5-22 m, height 0.3-7 m. There are well developed sinters in the stream, which is with variable outflow [Beron et al., 2009]. Abundant sharp calcite crystals were found on the stones on the sandy bottom of the cave stream.

Etymology: The species was named after the speleologist and cave rescuer Slavi Kolev (Speleological club “Salamandar – Stara Zagora”) who assisted the author during the collection of the material.

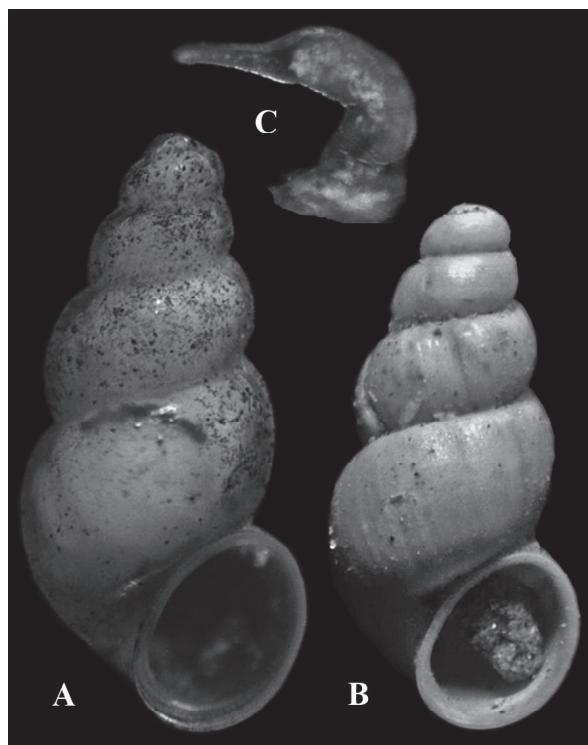


FIG. 7. *Bythiospeum stoyanovi* n. sp.: A – holotype, B – paratype, C – penis. (Both shells at the same scale).

FIG. 7. *Bythiospeum stoyanovi* n. sp.: A – голотип, В – параптип, С – пенис. (Раковины в одном масштабе).

Description: Shell (Fig. 6): The shell is elongate-conic to ovate conic in some specimens, thin walled, with 4-4.5 whorls with fine growth lines and glossy surface. The aperture is oval with a small lip, umbilicus is closed. The operculum is translucent, yellowish. H = 1.62-1.85 mm, W = 0.83-0.86 mm, AH = 0.56-0.63 mm, AW = 0.56-0.59 mm, W/H = 0.46-0.51, AH/H = 0.34-0.37, AW/W = 0.68-0.69. **Soft body:** The entire animal is colorless and has no eyes. The tentacles in preserved specimen are relatively thick with rounded apical part and not passing over the snout length.

[**Раковина:** удлиненно-коническая до овально-конической у некоторых экземпляров, тонкостенная, оборотов 4-4,5, блестящая, с тонкими линиями роста. Устье овальное, с небольшой губой, пупок закрыт. Крышечка прозрачная, желтоватая. H = 1,62-1,85 мм, W = 0,83-0,86 мм, AH = 0,56-0,63 мм, AW = 0,56-0,59 мм, W/H = 0,46-0,51, AH/H = 0,34-0,37, AW/W = 0,68-0,69. **Мягкое тело:** бесцветное, глаза отсутствуют. Щупальца у фиксированных экземпляров сравнительно толстые, с закругленной вершиной, не длиннее морды.]

Differential diagnosis: The new species is most similar to *Bythiospeum stoyanovi* n. sp. from which it differs by its lower number of whorls with not so well defined growth lines and so deep suture, and the higher ratio AH/H.

Bythiospeum stoyanovi n. sp.

(Fig. 7)

urn:lsid:zoobank.org:act:BE97CB45-F2B8-4E25-BC57-E8CC662118AC

Material examined: 10.12.2011, 7 shells, 9 spec. in ethanol (2 spec. dissected), Dilian Georgiev, Stanimir Stoyanov leg.

Holotype: H = 2.05 mm, W = 0.92 mm, AH = 0.69 mm, AW = 0.63 mm, Hungarian Natural History Museum, coll. no. HNHM 98829.

Paratypes: 2 spec. Hungarian Natural History Museum, coll. no. HNHM 98830, 3 spec. coll. D. Georgiev.

Locus typicus: Parnitsite cave, near village of Bezhanovo, Pre-Balkan area, Northern Bulgaria, 43°12'02.1"N, 25°25'58.4"E.

Distribution: only the type locality.

Habitat and ecology: The cave is 2500 m long and is formed in Upper Cretaceous limestone (Maastricht). It has two entrances, connected by a meandered, branched gallery. It is 1-8 meters high and 0.7-15 meters wide. The cave river forms a lot of lakes, which has thick clay and gravel deposits on its bottom [Beron *et al.*, 2009].

Etymology: The species was named after the speleologist Stanimir Stoyanov (Speleological club “Salamandar – Stara Zagora”) who assisted the author during the collection of the material.

Description: Shell (Fig. 7): The shell is elongate-conic, thin walled, of 4.5-5 whorls, with easily visible growth lines, relatively rough surface and deep suture. The aperture is oval with a small lip, umbilicus is closed. The operculum is translucent, yellowish. H = 1.85-2.05 mm, W = 0.89-0.92 mm, AH = 0.59-0.69 mm, AW = 0.53-0.63 mm, W/H = 0.45-0.49, AH/H = 0.30-0.34, AW/W = 0.59-0.68.

Soft body: The entire animal is colorless and has no eyes. The tentacles in preserved specimens are relatively thick with thinner bases, rounded apices and shorter than the snout. The mantle is very thin and translucent. **Penis morphology:** The penis is simple, conical, tapered distally, and with a rounded apex (Fig. 7C).

[**Раковина:** удлиненно-коническая, тонкостенная, из 4-4,5 оборотов с четкими линиями роста, сравнительно грубой поверхностью и глубоким швом. Устье овальное, с небольшой губой, пупок закрыт (Рис. 7). Крышечка прозрачная, желтоватая. H = 1,85-2,05 мм, W = 0,89-0,92 мм, AH = 0,59-0,69 мм, AW = 0,53-0,63 мм, W/H = 0,45-0,49, AH/H = 0,30-0,34, AW/W = 0,59-0,68. **Мягкое тело:** бесцветное, глаза отсутствуют. Щупальца у фиксированных экземпляров сравнительно толстые, с более тонким основанием, закругленной вершиной, короче морды. Мантия очень тонкая, прозрачная. **Морфология пениса:** пенис простой, конический, сужающийся спереди и с закругленной вершиной (Рис. 7C).]

Differential diagnosis: The new species is most similar with *Bythiospeum kolevi* n. sp. from

which it differs by the more numerous whorls with well defined growth lines, deep suture and more pointed apex, and the lower ratio AH/H.

Catalogue of the known Bulgarian stygobiotic and troglophilous freshwater snails (Gastropoda: Risooidea) with their localities

Subfamily *Belgrandiinae* De Stefani, 1877
Genus *Belgrandiella* A. Wagner, 1927

Belgrandiella hessei A. Wagner, 1927 – ST, Temnata Dupka cave, near Lakatnik town, Stara Planina Mt., 43°05'19.9"N, 23°23'10.6"E

Belgrandiella pussila Angelov, 1959 – ST, The source of Petreska River, near Lakatnik town, Stara Planina Mt. (Type locality), 10x10 km UTM grid FN97; Temnata Dupka cave, near Lakatnik town, Stara Planina Mt., 43°05'19.9"N, 23°23'10.6"E

Belgrandiella bulgarica Angelov, 1972 – ST, Karst spring at the village of Polaten, Teteven town, Stara Planina Mt., 10x10 km UTM grid KH75

Belgrandiella burenschi Angelov, 1976 – ST, Karst spring at the village of Bankya, Tran town district, West Bulgaria, 10x10 km UTM grid FN34

Belgrandiella dobrostanica Glöer et Georgiev, 2009 – TR, Gargina Dupka cave, near village of Mostovo, Rhodopes Mt., 41°51'00.4"N, 24°55'57.1"E

Belgrandiella pandurskii Georgiev, 2011 – TR, Devetashka cave, near village of Devetaki, Lovech town area, Devetashko plateau, 43°14'06.9"N, 24°53'04.4"E (Type locality); Urushka Maara cave, near village of Krushuna, Devetashko Plateau, 43°14'41.7"N, 25°02'45.4"E; Vodopada cave, near village of Krushuna, Devetashko Plateau, 43°14'33.2"N, 25°02'09.2"E

Belgrandiella stanimirae Georgiev, 2011 – ST, Zmeyova Dupka cave, near Tryavna town, Stara Planina Mt., 42°52'35.0"N, 25°28'35.1"E

Belgrandiella maarensis n. sp. – ST, Urushka Maara cave, near village of Krushuna, Devetashko Plateau, 43°14'41.7"N, 25°02'45.4"E

Belgrandiella sp. – TR, Izvora (Padaloto, Yantra) cave, near village of Sulari, Gabrovo town district, Stara Planina Mountain, Central Bulgaria, 42°57'23.08"N, 25°18'52.30"E

Genus *Pontobelgrandiella* Radoman, 1978

Pontobelgrandiella nitida (Angelov, 1972) – ST, Karst spring at the village of Polaten, Teteven town, Stara Planina Mt., 10x10 km UTM grid KH75 (Type locality); Water cave at the village of Glozhene, Teteven town, Stara Planina Mt., 10x10 km UTM grid KH76

Pontobelgrandiella tanevi n. sp. – TR, Parnitsite cave, near village of Bezhanova, Pre-Balkan area, Northern Bulgaria, 43°12'02.1"N, 25°25'58.4"E

Genus *Bythiospeum* Bourguignat, 1882

Bythiospeum burenschi (A. Wagner, 1927) – ST, Temnata Dupka cave, near Lakatnik town, Stara Planina Mt., 43°05'19.9"N, 23°23'10.6"E

Bythiospeum copiosus (Angelov, 1972) – ST, The source of Petreska River, near Lakatnik town, Stara Planina Mt., 10x10 km UTM grid FN97

Bythiospeum simovi n. sp. – ST, Zadanerka cave, near village of Karlukovo, Pre-Balkan area, 43°10'35.7"N, 24°04'14.1"E

Bythiospeum kolevi n. sp. – ST, Golyamata Mikrenksa cave (Mandrata), Stara Planina Mt., 43°03'44.0"N, 24°31'29.9"E

Bythiospeum stoyanovi n. sp. – ST, Parnitsite cave, near village of Bezhanova, Pre-Balkan area, 43°12'02.1"N, 25°25'58.4"E

Bythiospeum devetakium Georgiev et Glöer, 2011 – ST, Urushka Maara cave, near village of Krushuna, Devetashko Plateau, 43°14'41.7"N, 25°02'45.4"E

Bythiospeum pandurskii Georgiev, 2012 – ST, Vodna Pesht cave, near village of Lipnitsa, Stara Planina Mt., 43°00'40.3"N, 23°44'46.2"E

Bythiospeum dourdeni Georgiev, 2012 – ST, Chuchura cave, near village of Veltchovtsi, Tryavna town district, Stara Planina Mt., 42°47'58.0"N, 25°34'23.7"E

Bythiospeum sp. (unsurely determined by Georgiev, 2011b as *B. copiosus*) – ST, Glava Panega spring, near village of Zlatna Panega, Stara Planina Mt., 10x10 km UTM grid KH67

Genus *Balkanospeum* Georgiev, 2012

Balkanospeum schniebsae (Georgiev, 2011) – ST, Izvora (Padaloto, Yantra) cave, near village of Sulari, Gabrovo town district, Stara Planina Mt., 42°57'23.08"N, 25°18'52.30"E (Type locality); Machanov Trap cave, near village of Zdravkovets, Stara Planina Mt., 42°57'59.70"N, 25°13'30.23"E

Genus *Devetakia* Georgiev et Glöer, 2011

Devetakia krushunica Georgiev et Glöer, 2011 – ST, Vodopada cave, near village of Krushuna, Devetashko Plateau, 43°14'33.2"N, 25°02'09.2"E (Type locality); Urushka Maara cave, near village of Krushuna, Devetashko Plateau, 43°14'41.7"N, 25°02'45.4"E

Devetakia pandurskii Georgiev et Glöer, 2011 – ST, Devetashka cave, near village of Devetaki, Lovech town area, Devetashko plateau, 43°14'06.9"N, 24°53'04.4"E

Devetakia sp. – ST, Mandrata cave, near village of Chavdartsi, Lovech town district, Devetashko Plateau, 43°14'32.2"N, 24°58'08.8"E

Genus *Cavernisa* Radoman, 1978

Cavernisa zaschevi (Angelov, 1959) – ST, Dushnika cave, near village of Iskrets, Stara Planina Mt., 43°59'53.1"N, 23°14'09.9"E (Type locality); Yanata cave, near village of Tserovo, Planina Mt., 10x10 km UTM grid FN96

Genus *Iglica* Wagner, 1927

Iglica acicularis Angelov, 1959 – ST, Dushnika cave, near village of Iskrets, Stara Planina Mt., 43°59'53.1"N, 23°14'09.9"E

Genus *Hauffenia* Pollonera, 1898

Hauffenia lucidula (Angelov, 1967) – ST, A deep well in south Dobrudza, near Taukliman Bay, Black Sea coast, 10x10 km UTM grid PJ20

Genus *Insignia* Angelov, 1972

Insignia macrostoma Angelov, 1972 – ST, A cave at the village of Polaten, Teteven town, Stara Planina Mt., 10x10 km UTM grid KH75

Genus *Plagigeyeria* Tomlin, 1930

Plagigeyeria procerula (Angelov, 1965) – ST, Karst spring at the village of Opitsvet, Sofia region, Stara Planina Mt., 10x10 km UTM grid FN64

Genus *Grossuana* Radoman, 1973

Grossuana derventica Glöer et Georgiev, 2012 – TR, Dratchi Dupka cave, near village of Melnitsa, Derventski Heights, 42°02'52.8"N, 26°32'17.9"E

Genus *Balkanica* Georgiev, 2011

Balkanica yankovi Georgiev, 2011 – ST, Izvora (Padaloto, Yantra) cave, near village of Sulari, Gabrovo town district, Stara Planina Mt., 42°57'23.08"N, 25°18'52.30"E

Subfamilia *Amnicolinae* Tryon, 1862

Genus *Bythinella* Moquin-Tandon, 1856

Bythinella markovi Glöer et Georgiev, 2009 – ST, Gargina Dupka cave, near village of Mostovo, Rhodopes Mt., 41°51'00.4"N, 24°55'57.1"E

Bythinella gloeeri Georgiev, 2009 – ST, Lepenitsa Cave, near Velingrad town, West Rhodopes Mt., 41°57'14"N, 24°0'043.3"E

Bythinella stoychevae Georgiev, 2011 – ST, Manuilova Dupka cave, near village of Ribnovo, West Rhodopes Mt., 41°42'53"N, 23°46'58"E

Bythinella sp. – ST, Goloboitsa cave, near village of Mogilitsa, West Rhodopes Mt., 10x10 km UTM grid LF09

Discussion

Considering the high endemism of the Bulgarian Rissooidea, we suppose that the unidentified species that were reported in the list above are new species, and accept this statement in our calculations. It showed that till now a total of 35 species from 14 genera of freshwater snails (Gastropoda: Rissooidea) were known to live in the Bulgarian caves, of which most are stygobiotic (30 species), and a small part are troglophilous species (5 species) inhabiting the underground waters and the

streams at the cave entrances. The dominant genera are *Belgrandiella* (9 species) and *Bythiospeum* (9 species). The rest of the genera were represented only by 1-4 species. All species are endemic to Bulgaria, with six endemic to the country genera known (*Pontobelgrandiella*, *Cavernisa*, *Insignia*, *Devetakia*, *Balkanospeum* and *Balkanica*), all occurring in Stara Planina Mt. or its foothills (Pre-Balkan area). In this mountain occurs the richest fauna of rissooid species known in Bulgaria. So this mountain and its caves could be named as a center of species radiation, with great species diversity and endemism, while in the Rhodopes only species of *Belgrandiella* and *Bythinella* were found.

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Каталог стигобионтных и троглофильных пресноводных брюхоногих моллюсков (Gastropoda: Rissooidea: Hydrobiidae) Болгарии с описанием пяти новых видов

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РЕЗЮМЕ. Новые исследования пресноводных пещерных местообитаний выявили пять новых видов Rissooidea в Болгарии. Описаны новые виды: *Belgrandiella maarensis* n. sp., *Pontobelgrandiella tanevi* n. sp. (второй известный вид рода), *Bythiospeum simovi* n. sp., *Bythiospeum kolevi* n. sp., *Bythiospeum stoyanovi* n. sp., типы иллюстрированы. Проанализированы все опубликованные данные и с дополнением неопубликованных данных автора составлен каталог всех известных Болгарских стигобионтных и троглофильных пресноводных брюхоногих моллюсков с их распространением.