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New records of subterranean and spring molluscs (Gastropoda: Hydrobiidae) from Montenegro and Albania with the description of five new species

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Abstract
A short overview of subterranean Balkan hydrobid genera, with special focus on genus *Bythiospeum* Bourguignat, 1892 and *Iglica* A.J. Wagner, 1928 is given. In addition, based on recently collected material in Montenegro (Vitoja Spring) and Albania (Krumë), five new species are described, namely: *Bracenica vitojaensis* n. sp., *Islamia montenegrina* n. sp., *Lanzaia pesici* n. sp., *Bythiospeum szarowskae* n. sp. and *Pseudamnicola krumensis* n. sp. The holotypes and paratypes are depicted. In addition a re-description of *Bythiospeum gittenbergeri* (A. & P.L. Reischütz, 2008) is given and the types of the *Iglica* spp. deposited in the NHMW are depicted, some of them for the first time.

Key words: Hydrobiid snails, new species, taxonomy, Western Balkan.

Introduction

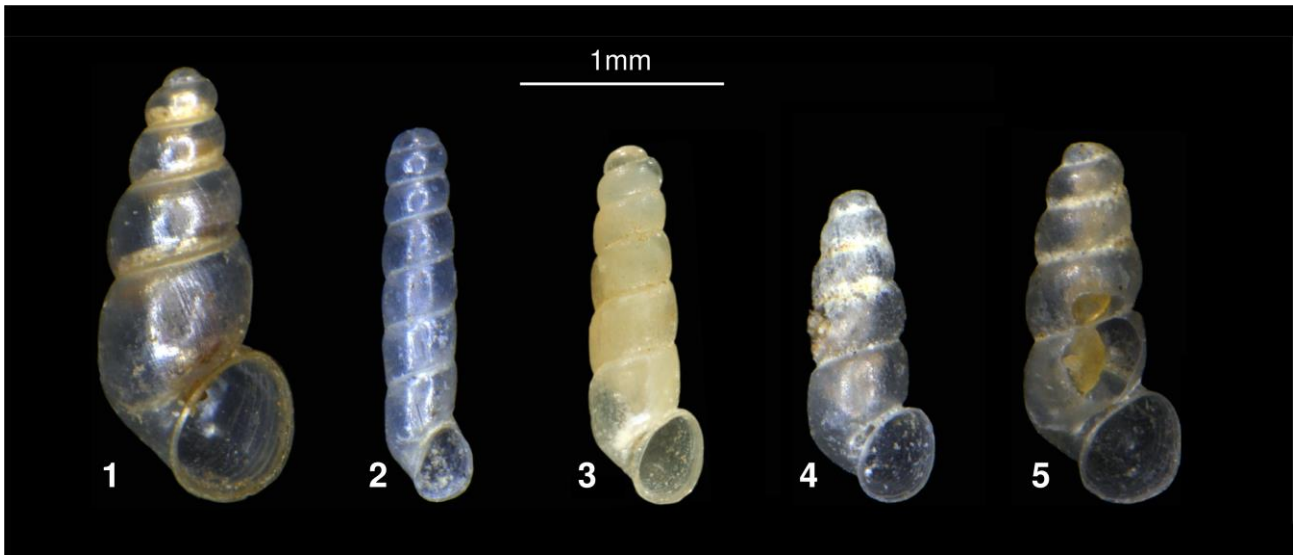
Species of the genus *Bythiospeum* Bourguignat, 1892 live in the interstitial water, they are very minute and even empty shells are only occasionally washed out to the surface. Thus living specimens are very hard to collect. Genus identification of subterranean species is not easy because not all known genera are well defined (Boeters 1998) and equipped with clear distinguishing features. The majority of the known species are narrow range endemics, many of them are known only from the type locality. The recent understanding of the genus *Bythiospeum* is rather poor and the distinguishing from *Paladilhiopsis* Pavlovic, 1913 is impossible only by shell morphology, and genital anatomy proves their close relationship too (Szarowska 2006). A molecular phylogenetic reconstruction placed them into the Moitessieriidae as closely related clades, although rejected their monophyly (Szarowska 2006). Already Haase (1995) and Boeters (1998: p. 30) synonymized *Paladilhiopsis* with *Bythiospeum* Bourguignat, 1882, but for example the Fauna Europaea check-list (Bank 2013) treat them separately. In this paper we use the name *Bythiospeum* in Boeters' sense. The shells of representatives of the genus *Bosnidilhia* look somewhat similar to *Bythiospeum*, but the shells of *Bosnidilhia* Boeters, Glöer and Pešić, 2013 are higher in spire, cylindrical, and the body whorl is less prominent. In *Bosnidilhia* the penis is broad with a small slim and acute penis tip (Boeters *et al*. 2013: p.

226, figs 3, 4) while the penis in *Bythiospeum* is more slender and slim over the full length (Boeters 1988: p. 54, fig. 5) or triangular (Glöer & Grego 2015: p. 311, Fig. 20). Radoman (1983: p. 111, fig. 56) depicted a penis similar to *Bosnidilhia* belonging to *Paladilhiopsis grobbeni* Kuščer, 1928. Closely related genera as *Montenegrospeum* Pešić & Glöer, 2013 have an outgrowth on the left side of the penis (Pešić & Glöer 2013a) and it is phylogenetically distinct from *Bythiospeum* (Falniowski *et al*. 2014). *Balkanospeum* Georgiev, 2012 has a red operculum in contrast with the yellowish one in *Bythiospeum* (Georgiev 2012).

According to Boeters 1998, the representatives of the genus *Bythiospeum* are distributed from France over Germany and Austria to the Balkans and as far as to the Caucasus Mountains and Uzbekistan. Radoman (1983) who has used *Bythiospeum* in the strict sense, did not mention any *Bythiospeum* from the Balkans just two *Paladilhiopsis* species, namely *P. robiciana* (Clessin, 1882) and *P. grobbeni*, from Slovenia. *Paladilhiopsis* is known from Montenegro (*P. serbica* (Pavlović, 1913)) in the Durmitor Mts (Páll-Gergely & Erőss 2011) and also from Albania. The latter one was tentatively identified as *P.* cf. *serbica* by Fehér & Erőss (2009) but supposed to be a distinct species by Reischütz *et al*. (2013). Recently five new *Bythiospeum* spp. were described from Bosnia (Glöer & Grego 2015) and two from Montenegro (Pešić & Glöer 2012, Glöer & Pešić 2014). In the eastern Balkans Georgiev & Glöer (2013) listed eight *Bythiospeum* spp. from Bulgaria and added two new *Bythiospeum* spp. from western Bulgaria (Georgiev & Glöer 2015). In Bulgaria, Wagner (1928) described *Paladilhiopsis bureschi* from Temnata Dupka cave, near Lakatnik. Later it was considered as *Bythiospeum* by Georgiev & Glöer (2013) but its taxonomy of course is still not clear.

In the Balkans species of the genus *Iglica* are mentioned from Slovenia (Schütt 1975, De Mattia 2007), Croatia, Bosnia, Serbia and Montenegro (Schütt 1975), Albania (Reischütz & Reischütz 2008, Reischütz *et al*. 2014), Kosovo (Schütt 1975), and Bulgaria (Angelov 1959) but the understanding of this genus is different, some look like *Bythiospeum* (Figs. 1, 4-5), others like *Bosnidilhia* (Figs. 2-3) though Wagner (1928: p. 295) compared the shell form with representatives of the genus *Acme* Hartmann, 1821, this means a cylindrical shell like figs 2-3. *Iglica* A.J. Wagner, 1928 has not yet been properly redefined and in all likelihood it belongs to *Bythiospeum* (Boeters *et al*. 2013). Due to above mentioned arguments we provisionally consider all the shells with slender and cylindrical form as members of *Bosnidilhia* with possible future reorganizing the species within the *Bythiospeum* complex (see Georgiev & Glöer 2013) and possible new genera based on soft part morphology and molecular data. With that respect we threat the placement of most of the Balkan representatives in genus *Bythiospeum* and *Bosnidilhia* as provisional, until more anatomical and molecular data would allow some deeper revision of these genera and justify its eventual split and allocate by specific criteria to other genera.

Pseudamnicola Paulucci, 1878 is known to occur in Croatia (Island Pag, the type locality of *P. conovula* (Frauenfeld, 1863) and Greece (Glöer *et al*. 2015) but not in Albania and Montenegro so far.



Figures 1-5. *Iglica* spp. from Balkans: **1** *Bythiospeum gittenbergeri* (Albania, Vau i Dejës, holotype NHMW 103716); **2** *Iglica xhuxhi* (Albania, Vjosa River near Novosele, holotype NHMW 108888); **3** *Iglica illyrica* (Kosovo, Dečani valley, HNHM 99715); **4-5** *Iglica karamani* (Macedonia, Rašče Spring near Skopje, paratypes, NHMW-E48801).

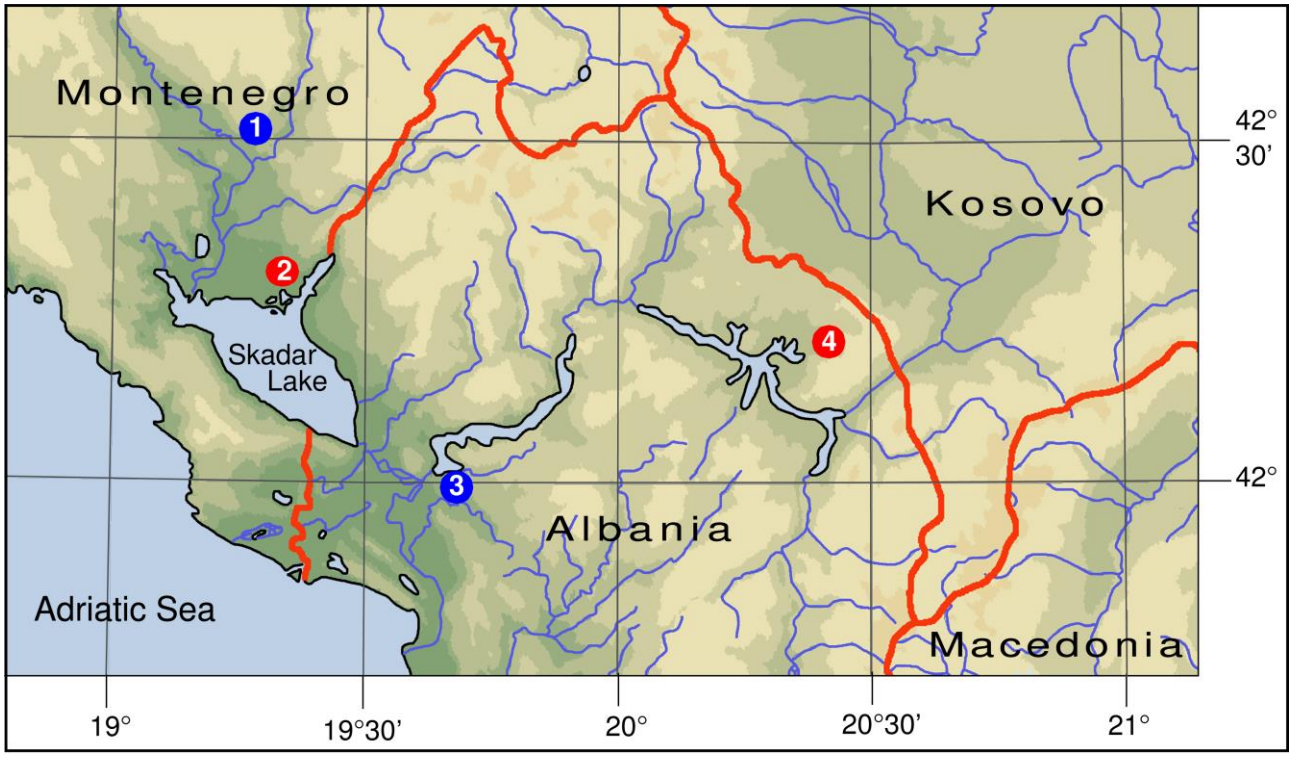
Representatives of the genus *Plagigeyeria* Tomlin, 1930 are distributed from Bosnia and Hercegovina, Dalmatia, Montenegro, Albania to Bulgaria. Schütt (1972) believed that all *Plagigeyeria* spp. which occur in Montenegro are subspecies of *P. zetaprotogona*. Because all these subspecies occur in a small region of the springs of Zeta River, some of them occur syntopically, this subspecies concept of Schütt (1972) proves untenable. The genera *Lanzaia* Brusina, 1906, *Plagigeyeria* and *Saxurinator* Schütt, 1960 are not well defined because their type species have not yet been anatomically examined (Radoman 1983).

This paper contributes to the knowledge of the genera *Bythiospeum*, *Bracenica* Radoman, 1973, *Islamia* Radoman, 1973, *Lanzaia* and *Pseudamnicola*, and their distribution in Montenegro and Albania by description of additional new species.

Material and Methods

The snails were recently collected in Albania and Montenegro by the junior authors with a sieve and by hand and fixed in 75% ethanol. The dissections and measurements of the genital organs and the shells were carried out using a stereo microscope (ZEISS); the photographs were made with a digital camera system (Leica R8).

The following abbreviations are used: HNHM (Hungarian National History Museum, Budapest); NHMW (Naturhistorisches Museum, Wien).



Map 1. Sampling sites of the species under discussion: **1** spring Taban (type locality of *Bythiospeum bogici*); **2** Vitoja Spring; **3** Vau i Dejës, type locality of *Bythiospeum gittenbergeri*; **4** Krumë, Vrela Spring.

Systematics

I. Species from the Vitoja spring in Montenegro

Vitoja Spring is located in Montenegro, by the northeastern shore of the Skadar Lake, near the settlement Hasanoj close to the Albanian border pass Božaj on E762 rd. The lake was long believed to be ancient, but recent studies revealed that it is geologically very young, formed ca. 1200 years ago (Jabłońska *et al*. 2015). High rate of the lake's inflow comes from over 200 registered temporary and permanent karstic springs, many of them are sublacustrine (Radulović *et al*. 2015). Vitoja is a large karstic spring zone adjacent to the lake. It consists of one main spring affluent to two joined small spring lakes with several sublacustrine spring

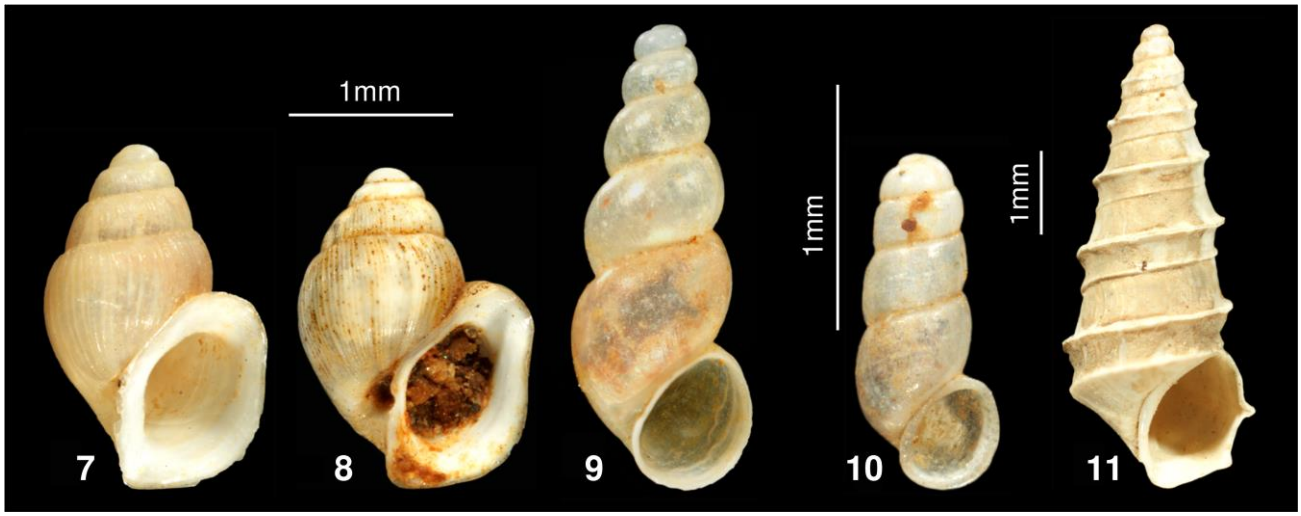
zones, and additional five side springs located within 150 m West of the main spring. During high-water, the whole spring system gets under the water level of the lake, and during the summer season, some of the side springs are just occasional or very small. All springs burst at the border between the massive limestone and the alluvium of the Skadar Lake (Fig. 6).

Figure 6. Vitoja Spring is located in Montenegro, by the northeastern shore of the Skadar Lake, near the settlement Hasanoj close to the Albanian border pass Božaj. (Photo Helmut Sattmann).

The Skadar Lake system is a well-known hotspot of freshwater gastropod biodiversity by its 50 gastropod species (38% endemicity) (Pešić & Göer 2013b). Vitoja Spring hosting eleven species out of which six are endemic to the Skadar Lake Basin.

Table 1. Species list of freshwater molluscs detected in the Vitoja Spring during our 2015 trip.

Theodoxus fluviatilis (Linnaeus, 1758)	*Plagigeyeria zetaprotogona* Schütt , 1960
Vinodolia scutarica (Radoman, 1973)	*Lanzaia pesici* n. sp.
Vinodolia matjasici (Bole, 1961)	*Pyrgula annulata* (Linnaeus, 1767)
Bosnidilhia vreloana Boeters, Glöer & Pešić 2013	*Gyraulus crista* (Linnaeus, 1758)
Islamia montenegrina n. sp.	*Gyraulus laevis* (Alder, 1838)
Bracenica vitojaensis n. sp.	



Figures 7-11. Freshwater mollusc species from the Vitoja spring: **7-8** *Plagigeyeria zetaprotogona*; **9** *Vinodolia matjasici*; **10** *Bosnidilhia* cf. *vreloana*; **11** *Pyrgula annulata*.

***Vinodolia matjasici* (Bole, 1961)** (Fig. 9)

Remark: This species is detected for the first time in the Vitoja Spring. So far it was known from only one site (a spring in Lipovik) and therefore it was assessed by the IUCN as Critically Endangered (Pešić 2010, Pešić & Glöer 2013). This record might indicate its wider distribution in the Skadar Lake Basin and might necessitate the re-consideration of the Red List assessment.

***Bosnidilhia* cf. *vreloana* Boeters, Glöer & Pešić, 2013** (Fig. 10)

Remark: The species has been described from Bosnia and Hercegovina (Republic of Srpska, area of Banja Luka city) (Boeters *et al*. 2013). Only one complete empty shell was found in the Vitoja Spring and some others with broken apex. As the shells are poor in shell characters it remains uncertain whether this population is conspecific with *B. vreloana*.

***Plagigeyeria zetaprotogona* Schütt, 1960** (Figs. 7-8)

Remark: Among hundred specimens collected from the Vitoja Spring all looked similar to *Plagigeyeria zetaprotogona* but they are much smaller (shell height 2.1–2.5 mm vs. 2.8–3.0 mm). On the other hand Schütt (1972) mentioned forms of *P. zetaprotogona zetatridyma* Schütt, 1960 and *P. z. pageti* Schütt, 1961 which differ in size and morphology of the aperture. Another subspecies has been described from Vitoja spring, *Plagigeyeria zetaprotogona vitoja* A. & P.L. Reischütz, 2008 which is large as *P. zetaprotogona*. Because *Plagigeyeria* spp. are variable in size of the shell and shape of aperture it seems to be that *P. z. vitoja* is conspecific with *P. z. zetaprotogona*.

Genus *Bracenica* Radoman, 1873

***Bracenica vitojaensis* n. sp.**
(Figures 12-14)

Type locality: Montenegro, Podgorica municipality, Vitoja Spring, near Skadar Lake, alt. 8 m asl, 42.3254ºN, 19.3628ºE.

Holotype: Type locality, leg. Erőss, Fehér & Grego, 05.07.2015 (NHMW 111260). Shell height 0.8 mm, shell width 1.5 mm.

Paratypes: Same data, NHMW 111261/2, HNHM 99722/3, further 2 specimens in coll. Glöer and 7, specimens in coll. Grego.

Ethymology: The new species is named after its type locality.

Description: The horn-coloured shell has 2.75 convex whorls with a deep suture and a low spire. The surface is smooth and shiny. The shell is valvatoid with a circular aperture. The peristome is sharp and the umbilicus is wide. Aperture height to shell height: 0.6, height of body whorl to height of spire 5.0, shell height 0.8 mm, shell width 1.1–1.5 mm.

Animal: unknown.

Figures 12-14. *Bracenica vitojaensis* n. sp. (holotype): **12** apertural view; **13** umbilical view; **14** apical view.

Differentiating features*:* It resembles *Hauffenia michleri* Kuščer, 1932 but this species is only known from its type locality (region of Ljubljana, Slovenia) far away. Other *Hauffenia* spp. are distributed in Austria, Italy and Slovenia (Bodon *et al*. 2009), Hungary (Erőss & Petró 2008) and Slovakia (Šteffek *et al*. 2011).

From *Islamia montenegrina* n. sp. it differs by valvatoid shape, size, lower spire and wider umbilicus. From *Bracenica spiridoni* Radoman, 1973 it differs by the more acute apex, the non-deflexed last whorl and the smaller size (*B. spiridoni* can be as large as 1.2 × 2.0 mm).

Associated species: See Table 1.

Remark: With no living specimens and opercula available, the new taxon is tentatively associated to the genus *Bracenica.* This is a genus which looks much similar to *B. vitojaensis* n. sp.

Distribution: Only known from type locality.

Genus *Islamia* Radoman, 1973

***Islamia montenegrina* n. sp.**
(Figures 15-17)

Type locality: Montenegro, Podgorica municipality, Vitoja Spring, near the Skadar Lake, alt. 8 m asl, 42.3254ºN, 19.3628ºE.

Holotype: Type locality, leg. Erőss, Fehér & Grego, 05.07.2015 (NHMW 111256). Shell height 1.8 mm, shell width 2.0 mm.

Paratypes: Same data, HNHM 99716/15 + many broken shells, NHMW 111257/15, further 8 specimens in coll. Glöer and 30 specimens in coll. Grego.

Etymology: Named after Montenegro, the country where the species is found.

Description: The horn-coloured shell has 3.75 convex whorls with a deep suture. The surface is smooth and shiny. The shell is valvatoid with a circular aperture. The peristome is sharp and the umbilicus is wide. Aperture height to shell height: 0.5, height of body whorl to height of spire 3.8, shell height 1.5–1.8 mm, width 1.8–2.0 mm.

Animal: unknown.

Figures 15-17. *Islamia montenegrina* n. sp. (holotype): **15** apertural view; **16** umbilical view; **17** apical view.

Differentiating features: *I. valvataeformis* (Möllendorff, 1873) is higher than broad, vice versa in *I. montenegrina* n. sp. *I. steffeki* Glöer & Grego 2015 has more whorls and the spire is higher than in *I. montenegrina* n. sp. *I. bosniaca* Radoman, 1973 is smaller in height, and the shell of *I. dmitroviciana* Boeters, Glöer & Pešić 2013 is much smaller, the other *Islamia* spp. are endemic to Croatia or Greece (see also Boeters *et al*. 2013).

Associated species: See Table 1.

Distribution: Only known from type locality.

Genus *Lanzaia* Brusina, 1906

***Lanzaia pesici* n. sp.**
(Figures 18–21)

Type locality: Montenegro, Podgorica municipality, Vitoja Spring, near Skadar Lake, alt. 8 m asl, 42.3254ºN, 19.3628ºE.

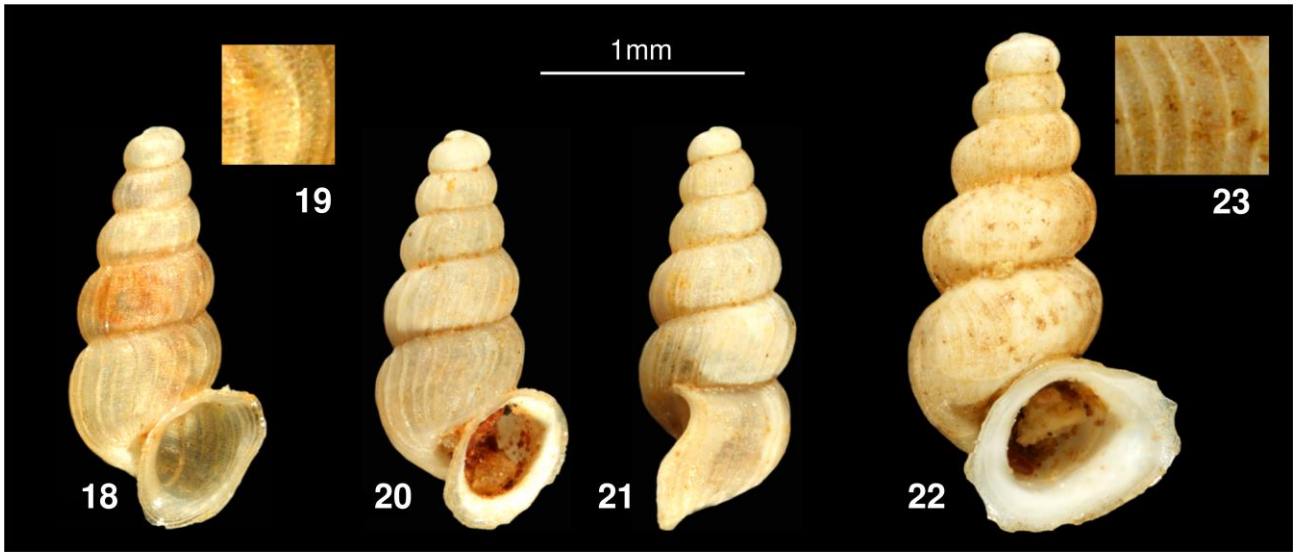
Holotype: Type locality, leg. Erőss, Fehér & Grego, 05.07.2015 (NHMW 111252). Shell height 1.95 mm, width 2.0 mm.

Paratypes: Same data, HNHM 99717/2 specimens + some broken shells, further 2 specimens in coll. Glöer and 3 specimens in coll. Grego.

Etymology: Named after Prof. Dr. Vladimir Pešić to honour his research on freshwater molluscs in the Balkans and adjacent countries.

Description: The horn-colored shell has 5.5 convex whorls with a deep suture. The surface has strong axial sculptures, and if existing weaker spiral sculptures. The shell is elongate-conic with a wide oval aperture with an oblique axis. The peristome is large. From lateral view the peristome is sinuated. Aperture height to shell height: 0.35, height of body whorl to height of spire 0.5, shell height 1.8–2.0 mm, width 0.9–1.0 mm.

Animal: unknown.



Figures 18-23. *Lanzaia pesici* n. sp.: **18** holotype; **19** surface; **20** paratype; **21** paratype from lateral view. **22** *Lanzaia bosnica* (topotype, Livona district, Donji Kamengrad 4 km W of Sanski Most, ex. coll Glöer); **23** surface of *L. bosnica*.

Differentiating features: *Lanzaia bosnica* Bole, 1970 is the only known *Lanzaia* from the Balkans. The shells of this species are larger than *L. pesici* n. sp., the whorls are more convex and the suture is deeper.

Associated species: See Table 1.

Distribution: Only known from type locality.

Remark: In the genus diagnosis Radoman (1983: p. 106) reports on "strong but rare axial and weaker spiral sculptures". In topotypes of *Lanzaia bosnica* and *L. pesici* n. sp. we found some shells with spiral striae and some others without these striae.

II. Species from Albania

Genus *Bythiospeum* Bourguignat, 1882

***Bythiospeum gittenbergeri* (A. & P.L. Reischütz, 2008)**
(Figures 24-27)

Material examined: Shkodër district, Vau i Dejës, outflow of waterworks, alt. 65 m asl, 42.0081°N, 19.6435°E, leg. Erőss, Fehér & Grego, 04.07.2015 (NHMW 111253/6 dry+ 18 in ethanol, HNHM 99720/7 dry+18 in ethanol, further 1 dry and 3 ethanol stored specimens in coll. Glöer, 6 dry and 15 ethanol stored specimens in coll. Grego.

Re-description: The whitish, translucent shell has 5.5 convex whorls with a deep suture. The surface is smooth and shiny. The shell is elongated-conic. The aperture is ovate. The peristome is sharp and not

thickened at the columella. The umbilicus is closed. Aperture height to shell height: 0.4, height of body whorl to height of spire 0.6, shell height 1.9–2.4 mm, width 0.8–1.1 mm.

Animal: The animal is white with an unpigmented mantle; eye spots are not visible.

Male copulatory organ: The penis is simple without any outgrowth.

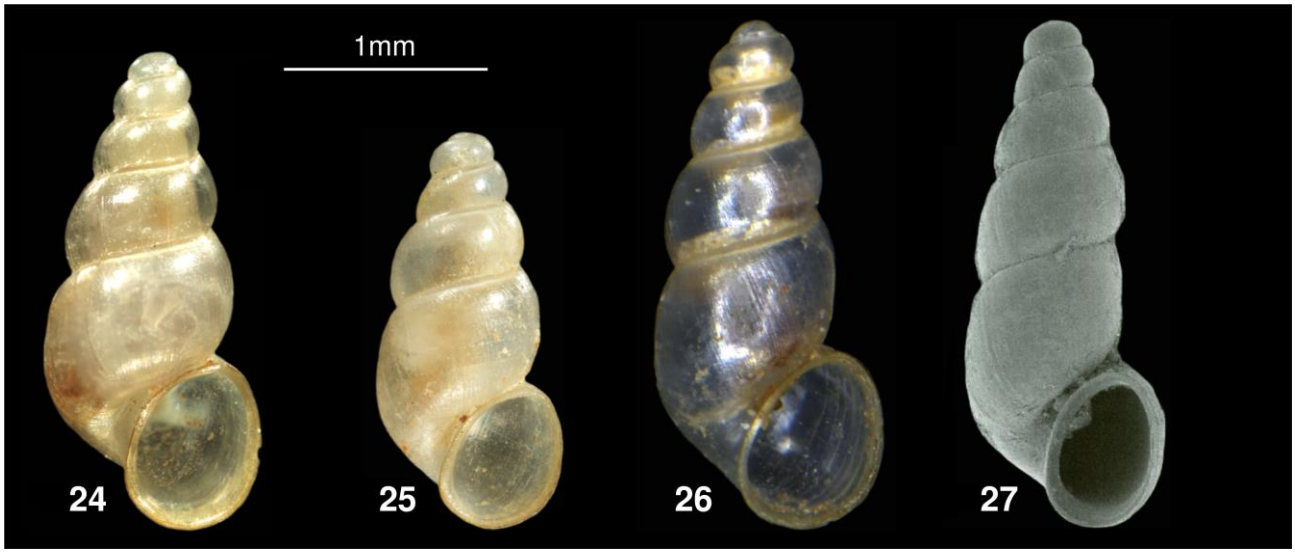


Figure 24-27. *Bythiospeum gittenbergeri*: **24-25** topotypes; **26** holotype (NHMW 103716); **27** paratype (scan copy of paratype specimen depicted in Reischütz & Reischütz 2008: p. 145, Fig. 2, coll. Reischütz).

Associated species: *Radomaniola curta* (Küster, 1852) lives in the surface water.

Distribution: Only known from type locality.

Remarks: Reischütz & Reischütz (2008) described *Iglica gittenbergeri* from the outflow of the waterworks in Vau i Dejes, east of Shkodër. The same locality was sampled by the junior authors in July 2015. In this sample the shells were 2.5–2.6 mm high and ca. 1 mm wide The paratype specimen, which was depicted in the original description is apparently different from the holotype (Fig. 26) and, compared to the new material, is obviously atypical. The short original description refers partly to paratypes ("Mündung … oval, … , abgelöst" ["aperture … oval, … , detached"]) and partly to the holotype ("… oder nur schwach angeheftet …" ["… or weekly attached …"]). Considering the measurements, the holotype is 1.1 mm wide, whereas the depicted paratype is 1.0 mm as it is in the original description. The measurements of the aperture are given with 0.7 × 0.5 mm, this calculates to a ratio of h:d = 1.4. The ratio of the holotype is 1.5 and that of the paratype 1.3.

The penis morphology of the recently collected topotypical material revealed that this species belongs to *Bythiospeum*.

***Bythiospeum szarowskae* n. sp.**
(Figs 28-31)

Type locality: Albania, Has district, Krumë, Vrela, alt. 453 m asl, 42.1920ºN, 20.4167ºE.

Holotype: Type locality, leg. Erőss, Fehér & Grego, 02.07.2015 (NHMW 111254). Shell height 2.0 mm, shell width 1.2 mm.

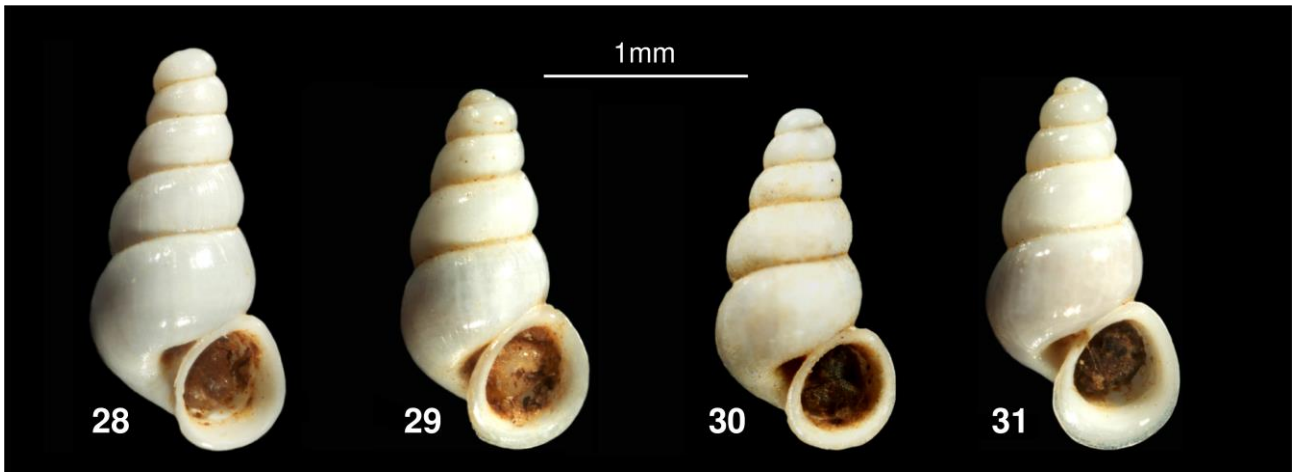
Paratypes: Same data, NHMW 111255/20, HNHM 99694/16, further 2 specimens in coll. Glöer and 25 specimens in coll. Grego.

Other material: several broken and fragmented shells in coll NHMH.

Etymology: Named in honour of the untimely deceased Polish malacologist, Dr. Magdalena Szarowska (Jagellonian University, Kraków), who greatly contributed to the knowledge of Balkan Hydrobiidae and Moitessieriidae.

Description: The white shell has 5.5 convex whorls with a deep suture. The shell is elongate-conic the whorls of which are regularly increasing in width. The aperture is ovate, the peristome is flanged, sharp and thin. The umbilicus is open. Aperture height to shell height: 0.3, height of body whorl to height of spire 1.1, shell height 1.8–2.0 mm, width 1.0–1.3 mm.

Anatomy: unknown.



Figures 28-31. *Bythiospeum szarowskae* n. sp.: **28** holotype; **29-31** paratypes.

Differentiating features: From *B. gittenbergeri* (A. & P. L. Reischütz, 2008) it differs by the flanged peristome and the open umbilicus. From *B. plivensis* Glöer & Grego, 2015 it differs by smaller size (shell height of *B. plivensis* is 2.7–2.8 mm). From *Montenegrospeum bogici* it differs by absolute size and the shell height/body whorl height ratio. Shell height of *M. bogici* is larger (2.3 mm in max vs. 2.0 mm), and at the same time the body whorl is smaller.

Associated surface species: *Radomaniola curta* (Küster, 1852), *Ancylus fluviatilis* O.F. Müller, 1774, *Pseudamnicola krumensis* n. sp.

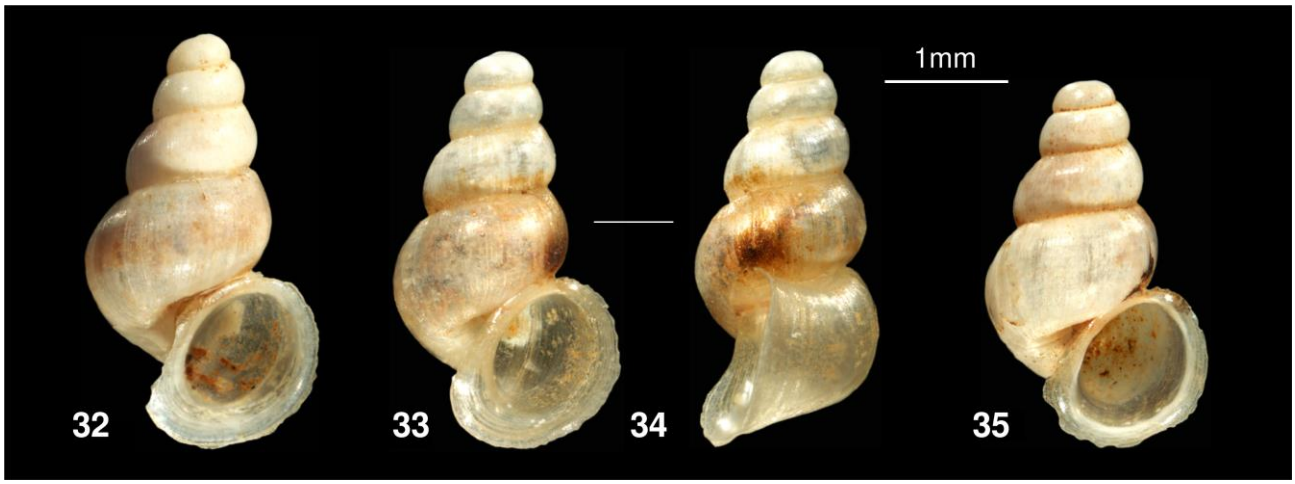
Associated subterranean species: *Plagigeyeria gladilini* Kuščer, 1937.

Habitat: Empty shells of the new species had been collected in the sandy sediment of the spring water outlet at the bottom of the broad and shallow spring zone. Left bank of the spring zone is covered by a large municipal waste deposit, which directly endangers the spring habitat and the outflowing rivulet. The karstic spring has a permanent outflow inside the right side of shallow pond at the foot of scree slope with a seasonal upper spring outflow, situated at about 5 m higher and ca. 50 m far from the active spring.

Distribution: Only known from type locality.

***Plagigeyeria gladilini* Kuščer, 1936**

Remark: This species was only known from Peć in southwestern Kosovo (Schütt 1972: p. 114). We have found this species in the Vrela Spring in Krumë, which is the first record of this species in Albania extending its formerly known range ca. 50 km to the south.



Figures 32-35. *Plagigeyeria gladilini* Kuščer, 1936.

Genus *Pseudamnicola* Paulucci, 1878

***Pseudamnicola krumensis* n. sp.**
(Figs 36-39)

Type locality: Albania, Has district, Krumë, Vrela, alt. 453 m asl, 42.1920ºN, 20.4167ºE.

Holotype: Type locality, leg. Erőss, Fehér & Grego, 02.07.2015 (NHMW 111258). Shell height 2.7 mm, shell width 1.8 mm.

Paratypes: Same data, NHMW 111259/15, HNHM 99719/15, further 10 specimens in coll. Glöer and 20 specimens in coll. Grego.

Etymology: Named after Krumë village where the new species was found.

Description: The horn-coloured shell has 4.5 slightly convex whorls with a deep suture and a prominent body whorl. The surface is smooth. The shell is conic with an oval aperture, detached from the body whorl. Aperture height to shell height: 0.5, height of body whorl to height of spire 3.7, shell height 2.7–2.9 mm, width 1.8–1.9 mm.

Animal: unknown.

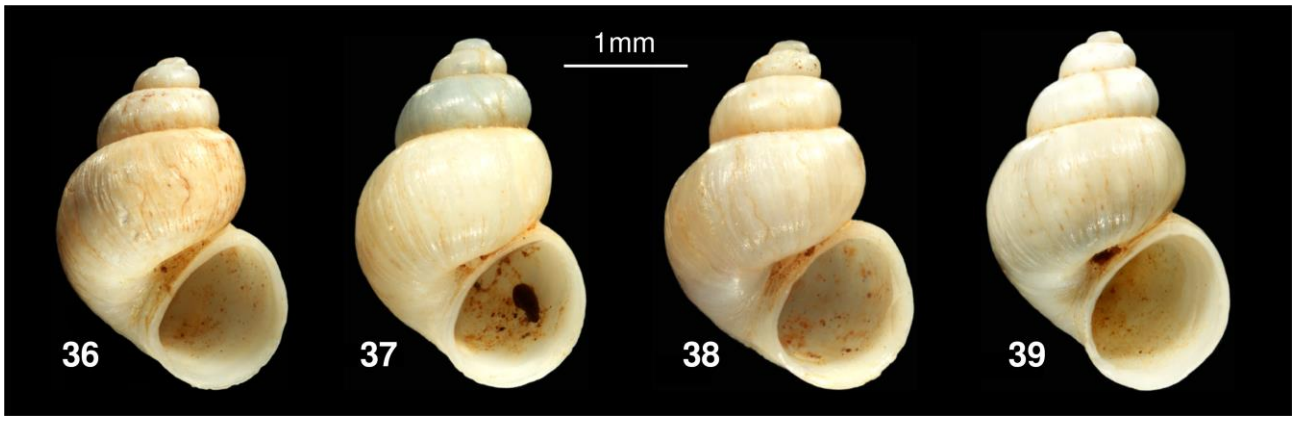
Differentiating features: *Pseudamnicola* spp. are not known from this part of Balkans (Glöer *et al*. 2015).

Associated surface species: *Radomaniola curta* (Küster, 1852), *Ancylus fluviatilis* O.F. Müller, 1774.

Associated subterranean species: *Plagigeyeria gladilini* Kuščer, 1937, *Bythiospeum szarowskae* n. sp.

Habitat: Empty shells of the new species had been collected from the sandy sediment of the spring water outlet at the bottom of the broad and shallow spring zone (see habitat of *Bythiospeum szarowskae* n. sp.).

Distribution: Only known from type locality.



Figs 36–39. *Pseudamnicola krumensis* n. sp.: **36** holotype; **37-39** paratypes.

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