Caving for snails in northern Albania

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The troglophilous gastropod species that were recorded at three localities in northern Albania are dealt with. For these sites detailed co-ordinates and UTM 1-km square data are presented. *Agardhiella johanni* and *Virpazaria (Aemiliella) ripkeni arbeni* are described as new to science. A revised diagnosis is given for *Virpazaria (V.) deelemanorum dhorai*. *Hydrocena (H.) cattaroensis* is reported as new for Albania.

Key words: Gastropoda, taxonomy, troglobitic snails, distribution, Albania.

Introduction

During a short visit to northern Albania, mainly to collect a tissue sample of a *Virpazaria* species for DNA sequencing, two localities with species of that genus were visited. These places were recently described by Reischütz et al. (2010, 2011). A third locality with *Virpazaria* was additionally discovered. The new data that became available during this fieldwork are presented below. Arranged by locality, some corrections and additions to the literature on troglophilous gastropods are presented. To facilitate further research, the location of the three sites has been recorded with a Garmin GPS 12XL. In one case a photograph of a cave entrance is added for the same reason.

RMNH = Naturalis Biodiversity Center, Leiden (formerly Rijksmuseum van Natuurlijke Historie).

Shpella e Deleve

This small cave below the ruin at Drisht, NE of Shkodër, located at UTM CM851.647 (42°07'33.8"N 19°36'38.1"E) was visited by the author October 17th, 2011, assuming that it would be the type locality of *Virpazaria (Aemiliella) pastorpueri* A., N. & P.L. Reischütz, 2011. A local boy kindly guided me to the cave, which is situated below the local ruin of a castle. Even with detailed co-ordinates, the entrance cannot be found easily, because it is hidden between the bushes. Later on, P.L. Reischütz informed me that the type locality of this *Virpazaria* is not really a cave, but a niche along the road.

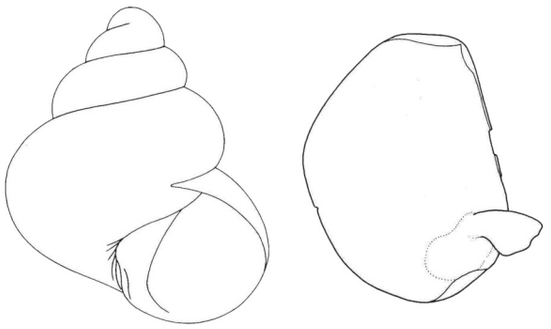
The Shpella e Deleve (= cave of the sheep), as it was called, can easily be entered on all fours as far as the narrowing dark end, where humans cannot crawl any further. Shells of *Virpazaria (Aemiliella) ripkeni pastorpueri* are very common there, with three additional troglobitic molluscan species. All four species are dealt with below.

Caenogastropoda, Hydrocenidae Troschel, 1857

Hydrocena (H.) cattaroensis (L. Pfeiffer, 1841) (Figs 1, 2)

Cyclostoma cattaroense L. Pfeiffer, 1841: 225.
Hydrocena (H.) cattaroensis - Gittenberger& Maassen, 1980.

Notes.– Five shells were found (RMNH 5003969/5), four of which with a circular boring hole, pointing to



Figs 1, 2. *Hydrocena (H.) cattaroensis* (L. Pfeiffer, 1841), Crna Gora, Kotor (= Cattaro), in water film on the city wall; A.C. Gittenberger-de Groot leg. **1**, shell (height 2.9 mm), with fine spiral lines, that are not indicated, and **2**, inside of the operculum, with the prominent apophyse (maximal diameter 1.2 mm). After Gittenberger & Maassen, 1980: 10, figs 2, 3.

an unknown predator. It is not surprising that this species, which has been described from Montenegro (= Crna Gora), also occurs in adjoining northern Albania. At its type locality Kotor (= Cattaro) it has been found at humid places, in the open air on the old city wall (personal observation). Its occasional occurrence in caves has been mentioned before (Gittenberger & Maassen, 1980).

Pulmonata, Strobilopsidae Wenz, 1915

Virpazaria (Aemiliella) ripkeni pastorpueri
A., N. & P.L. Reischütz, 2011 (Figs 3, 4)

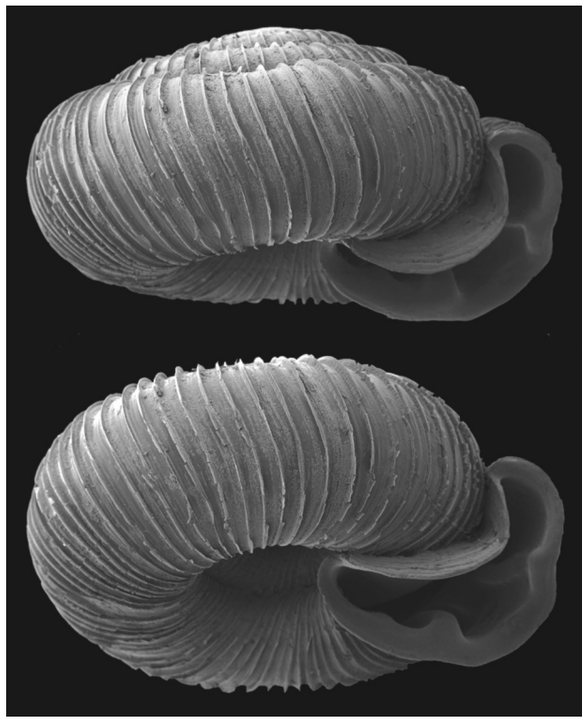
Virpazaria (Aemiliella) pastorpueri A., N. & P.L. Reischütz, 2011: 57.

Revised diagnosis.– Riblets more widely spaced than in the nominate subspecies, viz. less than 70 on the last whorl. The palatal lamella is connected in front with a more or less prominent knob on the peristome. In frontal view, two interconnected, white, palatal knobs are seen inside the aperture.

Description.– Shell discoid with a more or less strongly depressed spire. The umbilicus is widely open, measuring little more than ¼ of the total shell width. Apertural lip continuous, with a relatively thin parietal flap, and a reflected and strongly thickened basal and palatal peristome. The upper part of the palatal peristome, bordering the apertural sinus, is relatively narrow. There is a more or less prominent knob on the peristome where the palatal lamella contacts the apertural border.

The so-called palatal lamella is in fact a tripartite structure. Its short frontal part is connected to the upper one of two nearly parallel, elongated denticles, that have largely merged into a single, prominent callus pad, which is situated less than 1/8 of a whorl from the mouth-edge. In frontal view, this callus is seen as two prominent, interconnected, white knobs on the palatal wall, the lower one of which is situated slightly deeper inside the aperture. There is a prominent basal lamella, running less than ⅛ whorl inside the aperture and a much less prominent basal denticle halfway between this lamella and the columella. The 1½-1¾ protoconch whorls are coarsely granular; the following 3-3¾ teleoconch whorls have 52-66 calcareous radial riblets, which are doubled in height by thin periostracal lamellae. In between the riblets there are some irregular radial lines and no microsculpture of spiral lines.

Shells of *V. (A.) r. pastorpueri* measure 3.1-4.1 mm in width and 1.7-2.3 mm in height [n=52], versus 3.5-3.9 mm in width and 1.9-2.2 mm in height [n=8] in *V. (A.) r. ripkeni*. In the former subspecies the relative height of the spire varies; a relatively depressed shell



Figs 3, 4. *Virpazaria (Aemiliella) ripkeni pastorpueri* A., N. & P.L. Reischütz, 2011. Albania, NE of Shkodër, Shpella e Deleve, a small cave below the ruin at Drisht, located at UTM CM851.647 (42º07'33.8''N 19º36'38.1''E). Shell width 3.3 mm. SEM photographs by Dr. L.P. van Ofwegen.

measures 3.4 x 1.9 mm versus 3.7 x 2.2 mm for a shell with a relatively high spire.

Notes.– The sample of 52 fully grown shells (RMNH 5003970/52), collected near the type locality, necessitated a revised diagnosis and description. This taxon differs only slightly from the nominate subspecies and not at all in the characters that are indicated in the original diagnosis. The shells are neither smaller nor relatively higher and thicker discoid.

See also the description of *V. (A.) ripkeni arbeni* subspec. nov. below.

Pupillidae Turton, 1831

Agardhiella johanni spec. nov. (Fig. 5)

Material: Albania, Shpella e Deleve (= cave of the sheep) below the ruin at Drisht, NE of Shkodër, UTM CM851.647 (42°07'33.8"N 19°36'38.1"E); leg. 17.x.2011. Holotype (RMNH 5003971) and paratypes (RMNH 5003972/2).

Diagnosis.– Shell more than 2 mm broad; aperture with a prominent columellaris and parietalis, a crenulate parietal side and nearly parallel, narrowly reflected columellar and palatal lips.

Description.– Shell cylindrical, with a short dome-shaped apical part; last whorl occupying more than half the total shell height. Protoconch with a granular surface. Teleoconch with sharp radial ribs, 6/mm on the penultimate whorl. Aperture with a broadly rounded base, nearly parallel columellar and palatal borders, and an oblique parietal callus with six crenulations, which correspond with the radial ribs. The apertural lip is clearly reflected, apart from the upper palatal third, which is curved backwards in side view. The columellaris and the parietalis are much more prominent than the short infraparietalis and the obsolete angularis. Initially increasing somewhat in prominence, the columellaris runs about half a whorl deep inside. The parietalis is bipartite, with a frontal segment that is about as long and high as the infraparietalis, and a clearly higher and longer part that runs as deep as the columellaris inside. The holotype has also a minute subcolumellar denticle. The umbilicus is very narrow, slit-like open.

The dimensions of the holotype (protoconch 1¾, teleoconch 5¼ whorls) and paratype 1 (protoconch 1½ , teleoconch 5⅛ whorls) are very similar, viz. height 5.1 mm and width 2.2 mm. Paratype 2 is damaged and cannot be measured.

Notes.– In a recent monograph considering the *Agardhiella* species from the countries bordering the Adriatic Sea, Subai (2008) dealt extensively with the various species in that area. As a consequence, recognizing an *Agardhiella* species from northern Albania as new to science was not difficult. *Agardhiella johanni* is not particularly similar to any of the known species. The shells are relatively broad, as in *A. dabovici* Gittenberger, 1975, *A. extravaganta* Subai, 2008, and *A. zoltanorum* Subai, 2008, all of which occur geographically close in northern Albania and Crna Gora (Montenegro). In these species, however, as well as in the species with smaller shells, the shell's apertural dentition is very different.

Derivatio nominis: the epithet *johanni* refers to Mr J.J.J. Teunissen, who facilitated my visit to Albania.

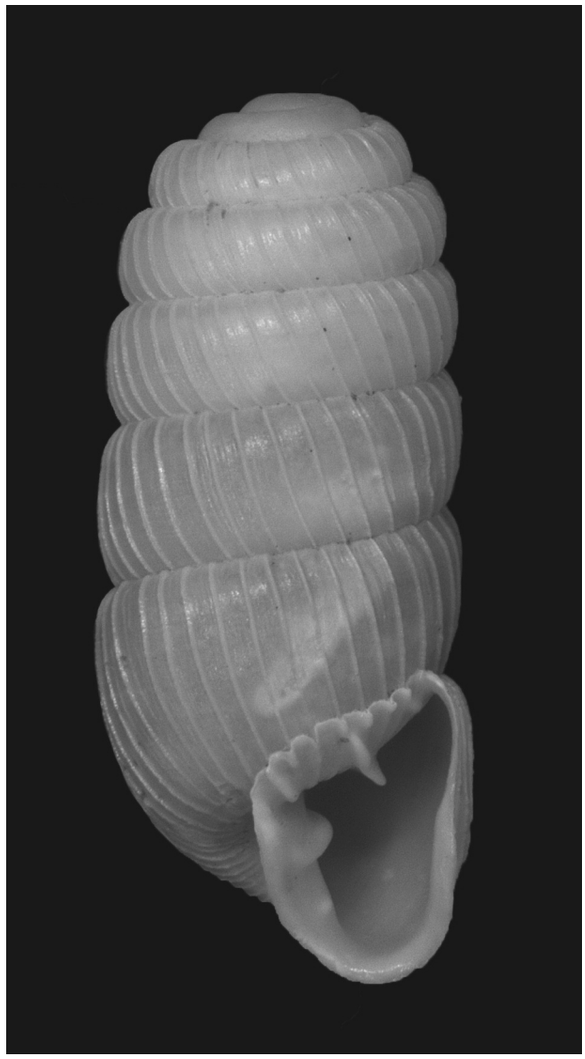


Fig. 5. *Agardhiella johanni* spec. nov. , holotype (RMNH 5003971), Albania, NE of Shkodër, Shpella e Deleve, a small cave below the ruin at Drisht, located at UTM CM851.647 (42º07'33.8"N 19º36'38.1"E). Measurements 5.1 × 2.2 mm. Macro-photograph by Dr. A.J. de Winter.

Figs 6, 7. The entrance of the Shpella e Rozafës (= cave of Rozafa) below the Rozafa castle in Shkodër, UTM CM 753.562 (42º02′55.5′′N 19º29′37.6′′E), photographed while standing on the pavement along the street, with Mr Arben Kraja (standing at the right) and the author (creeping at the left). Photographs by Ms Dr. A.C. Gittenberger - de Groot.

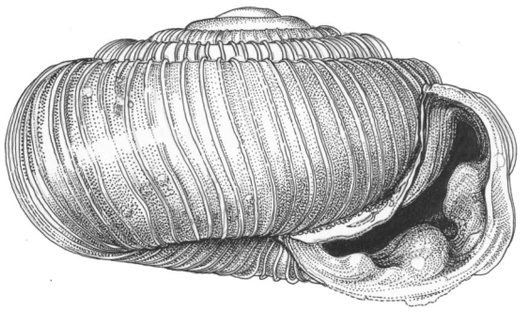


Fig. 8. *Virpazaria (Aemiliella) ripkeni arbeni* subspec. nov., holotype (RMNH 5003974), Albania, Shpella e Rozafës in Shkodër, UTM CM 753.562 (42º02'55.5''N 19º29'37.6''E). Shell width 3.1 mm. Ms I. van Noortwijk del.

Pristilomatidae T. Cockerell, 1891

Vitrea subrimata (Reinhardt, 1871)

Hyalina subrimata Reinhardt, 1871: 39. Lectotype (design. Pintér, 1972: 225 [17]): SMF 3482/1.

Vitrea subrimata – Kerney & Cameron, 1979: 118, 3 figs. Horsák et al., 2013: 100, figs 420-423. Pintér, 1972: 225 [17], figs 31-45, pl. 3 figs 31-45.

Notes.– In a sample of 14 shells (RMNH5003973/14), the largest specimen has 5¼ whorls and measures 3.8 x 1.8 mm. As compared to the figures in the literature, the shells are relatively broad, thus less high. Near the aperture, the last whorl is twice as broad as the penultimate one, or less.

For a detailed analysis regarding this very variable species, or species-complex, see Pintér (1972).

Shpella e Rozafës

The narrow corridor below the Rozafa castle in Shkodër, here called Shpella e Rozafës (= cave of Rozafa) was known to my guide Mr Arben Kraja as playground during his childhood. The photographs (Figs 6, 7) should assist in localizing the entrance at UTM CM 753.562 (42°02'55.5''N 19°29'37.6''E). I did not enter the corridor as far as total darkness, partly because inside turning over is impossible so that one has to crawl backwards with legs first to get out. Maybe it acts as a water-course after heavy rain, because there was very few bottom material to collect. Nearly all shells turned out to be of species living nearby at the surface. A single *Virpazaria* shell, overlooked while collecting, was the exception. On my request, Ms M. Slooff visited the same place in May 2013 and collected two more specimens.

Strobilopsidae Wenz, 1915

***Virpazaria (Aemiliella) ripkeni arbeni* subspec. nov.**
(Fig. 8)

Material: Albania, Shpella e Rozafës in Shkodër, UTM CM 753.562 (42°02'55.5''N 19°29'37.6''E); E.G. leg. 18.x.2011 (holotype, RMNH 5003974); M. Slooff leg. v.2013 (paratypes, RMNH 5003975/2).

Diagnosis.– The upper palatal lamella does not or hardly reach the apertural lip, which is not thickened by a knob-like callus at the (near-)contact site. In frontal view, the internal palatal callus is not provided with two knobs. Shells relatively small.

Notes.– Because the 52 specimens of *Virpazaria (Aemiliella) ripkeni pastorpueri* that are mentioned above differ slightly from the 3 shells that are referred to here, a new subspecies is described.

The three shells of the type-series are as small as the smallest among 52 shells of *V. (A.) ripkeni pastorpueri*; they measure 3.1 × 1.7 mm, 3.1 × 1.8 mm, and 3.2 × 1.8 mm, respectively.

Derivatio nominis: The epithet *arbeni* refers to Mr Arben Kraja (Shkodër), my guide in northern Albania, who remembered the area with the corridor as playground during his childhood.

Roadside rock crevices NE of Xhaj

Reischütz et al. (2010) mentioned a site N of Shkodër, NE of Xhaj along the road from Koplik to Bogë, where crevices in the rocks contain mud with shells of a *Virpazaria* species, which they described as *V. dhorai*. The place could be located at UTM CM802.857 (42°19'50.5"N 19°36'21.1"E) by comparing the photograph of the landscape (Reischütz et al., 2010: figs 3, 4) with the actual surroundings while slowly walking along the road. Here shells of two troglophilous species were found, viz. *Virpazaria (V.) deelemanorum dhorai* A., N. & P.L. Reischütz, 2010, and *Gyralina (Spelaeopatula) candida* (A.J. Wagner, 1909).

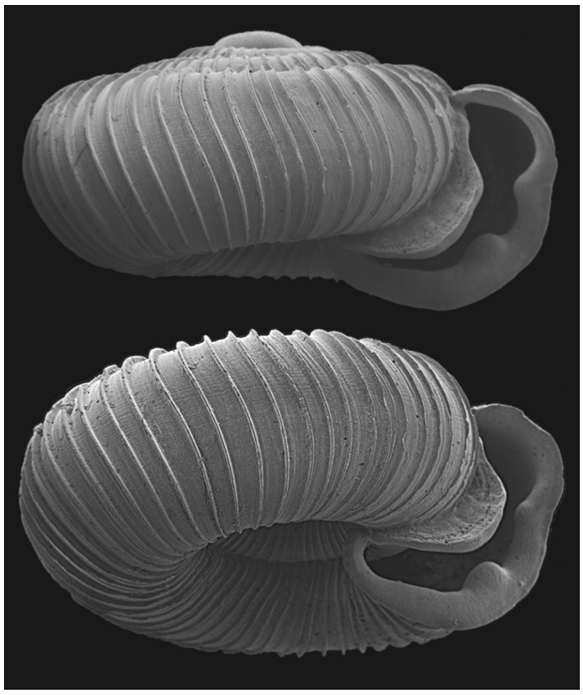
Pulmonata, Strobilopsidae Wenz, 1915

Virpazaria (V.) deelemanorum dhorai
A., N. & P.L. Reischütz, 2010 (Figs 9, 10)

Virpazaria dhorai A., N. & P.L. Reischütz, 2010: 29.

Revised diagnosis.– Palatal part of the peristome with two knobs, the lower one of which is the most prominent. Microscupture with irregular radial lines crossed by very fine, incised spiral lines.

Description.– Shell discoid, with 4-4½ whorls, and



Figs 9, 10. *Virpazaria (V.) deelemanorum dhorai* A., N. & P.L. Reischütz, 2010, Albania, roadside rock crevices N of Shkodër, NE of Xhaj along the road from Koplik to Bogë at UTM CM802.857 (42º19'50.5"N 19º36'21.1"E). Shell width 3.4 mm. SEM photograph by Dr. L.P. van Ofwegen.

a more or less strongly depressed spire. The umbilicus is widely open, measuring c. ¼ of the total shell width. Apertural lip continuous, with a thickened parietal flap, and a reflected and strongly thickened basal and palatal peristome. Only the upper part of the palatal peristome, bordering the apertural sinus, is relatively narrow. There is a prominent knob on the peristome about halfway its palatal side and a very prominent one near the palatal to basal transition. The 1⅝-1¾ protoconch whorls are coarsely granular, vaguely radially arranged; the following c. 2¾ teleoconch whorls have 46-51 calcareous radial riblets, which are doubled in height by thin periostracal lamellae. In between the riblets there are some irregular radial lines. In specimens that are not weathered, a very fine microsculpture of incised spiral lines is discernible. Shell measuring 3.1-4.0 × 1.8-2.1 mm.

Notes.– Judging after the descriptions and figures, Welter-Schultes (2012: 212) considered *Virpazaria dhorai* a junior synonym of *Virpazaria (V.) deelemanorum* Gittenberger, 1975.

Both taxa are at least closely related indeed. However, the 4 shells of the type series of *V. (V.) deelemanorum* in RMNH (nos 55031, 55032, 55033 and 55034), measuring 3.7-4.2 × 2.1-2.3 mm, are not only slightly higher than the 34 shells of *V. (V.) dhorai* (RMNH

Fig. 11. *Gyralina (Spelaeopatula) candida* (A.J. Wagner, 1909), Albania, roadside rock crevices N of Shkodër, NE of Xhaj along the road from Koplik to Bogë at UTM CM802.857 (42º19'50.5"N 19º36'21.1"E). Shell width 5.5 mm.

5003976/34). They differ also by the lower palatal knob being more prominent than the upper one, and maybe by the presence of very fine, incised spiral lines, which are not discernible in the shells of the type series of the nominate subspecies.

Pristilomatidae T. Cockerell, 1891

Gyralina (Spelaeopatula) candida (A.J. Wagner, 1909) (Fig. 11)

Zonitoides candidus A.J. Wagner, in Wohlberedt, 1909: 626 [42].
Retinella ? (Spelaeopatula) candida – Zilch, 1959: 252, fig. 891.
Gyralina (Spelaeopatula) candida – Riedel, 1980: 44, 165, figs 112-114.

Notes.– The glossy, white, discoid shells, with a wide umbilicus, which measures 3/10 of the total shell width, are devoid of any spiral sculpture. The largest of 7 specimens (RMNH 5003977/7) has 4⅛ whorls and measures 5.7 × 2.5 mm. In agreement with the original description, the whorls are inconspicuously angled at the upside ('.. über der Peripherie schwach kantig ..').

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References

Gittenberger, E., 1975. Beiträge zur Kenntnis der Pupillacea. V. Die Spelaeodiscinae, erster Nachtrag. – Zoologische Mededelingen 48 (23): 263-277.

Gittenberger, E. & Maassen, W.J.M., 1980. *Hydrocena (H.) cattaroensis* (L. Pfeiffer, 1841) (Prosobranchia, Neritacae) und ihre Lebensbedingungen. – Basteria 44 (1-4): 9-10.

Horsák, M., Juřičková, L. & Picka, J., 2013. Molluscs of the Czech and Slovak republics: 1-265. Kabourek, Zlín, Czech republic.

Kerney, M.P. & Cameron, R.A.D., 1979. A field guide to the land snails of Britain and North-west Europe: 1-288. London.

Pfeiffer, L., 1841. Beiträge zur Molluskenfauna Deutschlands, insbesondere der österreichischen Staaten. – Archiv für Naturgeschichte 7 (1 (4/5)): 215-230.

Pintér, L., 1972. Die Gattung *Vitrea* Fitzinger, 1833 in den Balkanländern (Gastropoda: Zonitidae). – Annales Zoologici 29 (8): 209 [1]-315 [107].

Reinhardt, O., 1871. [Über die in Deutschland vorkommenden Hyalinen aus der *Crystallina*-Gruppe]. – Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin 2: 39-41.

Reischütz, A., N. & P.L., 2010. Beiträge zur Kenntnis der Molluskenkunde Albaniens. – Nachrichtenblatt der Ersten Vorarlberger Malakologischen Gesellschaft 17: 29-31.

Reischütz, A., N. & P.L., 2011. Anmerkungen zur Verbreitung von *Virpazaria* Gittenberger 1969 (Spelaeodiscidae: Gastropoda) und bemerkenswerte Mollusken aus Albanien. – Nachrichtenblatt der Ersten Vorarlberger Malakologischen Gesellschaft 18: 57-60.

Riedel, A., 1980. Genera zonitidarum: 1-197. Dr. W. Backhuys, Rotterdam.

Subai, P., 2008. Revision of the Argninae, 1. The species of *Agardhiella* from the countries bordering the Adriatic Sea. – Archiv für Molluskenkunde 137(1): 75-103.

Welter-Schultes, F., 2012. European non-marine molluscs, a guide for species identification: A1-A3, 1-674. Planet Poster Editions, Göttingen.

Wohlberedt, O., 1909. Zur Fauna Montenegros und Nordalbaniens (Mollusken, Käfer, Isopoden, Chilopoden, Diplopoden). – Wissenschaftliche Mitteilungen aus Bosnien und der Herzegowina 11: 585-722.

Zilch, A., 1959. Euthyneura. Handbuch der Paläozoologie, 6 Gastropoda 2(2): 201-400. Bornträger, Berlin.