

## NEW TAXA OF FRESHWATER MOLLUSCS FROM ARMENIA (CAENOCASTROPODA: TRUNCATELOIDEA: HYDROBIIIDAE)

PETER GLÖER<sup>1</sup>, ULRICH BÖßNECK<sup>2</sup>, FRANK WALTHER<sup>3</sup>, MARCO THOMAS NEIBER<sup>3</sup>

<sup>1</sup>Biodiversity Research Laboratory, Schulstraße 3, D-25491 Hetlingen, Germany (e-mail: [gloeer@malaco.de](mailto:gloeer@malaco.de))

<sup>2</sup>Natural History Museum of Erfurt, Große Arche 14, D-99084 Erfurt, Germany (e-mail: [uboessneck@aol.com](mailto:uboessneck@aol.com))

<sup>3</sup>Zoological Museum, Centre of Natural History, University of Hamburg, Martin-Luther-King Platz 3,  
D-20146 Hamburg, Germany (e-mail: [fw.walther@googlemail.com](mailto:fw.walther@googlemail.com), [mneiber@hotmail.de](mailto:mneiber@hotmail.de))

**ABSTRACT:** Only two hydrobiid species were known from Armenia, *Shadinia terpoghassiani* (Akramowski, 1952) and *Shadinia akramowskii* (Zhadin, 1952). Recent investigations in Armenia revealed two new species: *Shadinia bjniensis* n. sp. and *Nicolaia schniebsae* n. gen. n. sp. Both are described here and compared with all known hydrobiids from Armenia and adjacent countries.

**KEY WORDS:** Gastropoda, new species, new genus, identification key

### INTRODUCTION

There is relatively little information on freshwater prosobranchs from Armenia. The first prosobranch snail mentioned from Armenia was *Bythinia hebraica* Bourguignat, 1856 from Lake Sevan (ISSEL 1865, MARTENS 1874, SCHNEIDER 1878). However, these records were most probably erroneous, based on material with wrong locality data (AKRAMOWSKI 1976). No prosobranch molluscs were found in Lake Sevan again (e.g. BRANDT 1879, 1880, MARTENS 1880, ZHADIN 1928, AKRAMOWSKI 1976).

The first reliable data on Armenian freshwater prosobranchs come from the publications of ZHADIN (1952) and AKRAMOWSKI (1952, 1953, 1971a, b). ZHADIN (1952) mentioned the hydrobiid species *Hydrobia longiscata* Bourguignat, 1856, *Hydrobia akramowskii* Zhadin, 1952, and *Pyrgula terpoghassiani*

Akramowski, 1952 from Armenia. AKRAMOWSKI (1976) erected a new genus *Shadinia* for them and designated *Shadinia terpoghassiani* (Akramowski, 1952) as the type species. In the recent faunal list for Russia and adjacent territories (KANTOR et al. 2009) no further species was added.

Only an endemic *Falsipyrghula* Brusina, 1896 was listed from the adjacent East Anatolia (YILDIRIM 1999). GLÖER & PEŠIĆ (2009, 2012) described some hydrobiid snails from Iran, but not from the regions close to Armenia.

The aims of this paper are (i) to describe a new genus and two new species from Armenia and (ii) to expand the knowledge about the freshwater molluscs of the region.

### MATERIAL AND METHODS

The Hrazdan River is a major river in Armenia. It starts at the northwest extremity of Lake Sevan and flows south through the Kotayk Province and Armenia's capital, Yerevan. The Kasach River flows

in the same direction, to the north-west of the Hrazdan River (Fig. 1). Snails were recently collected in these rivers by U. BÖßNECK, F. WALTHER and M. T. NEIBER and fixed in 75% ethanol. The dissections

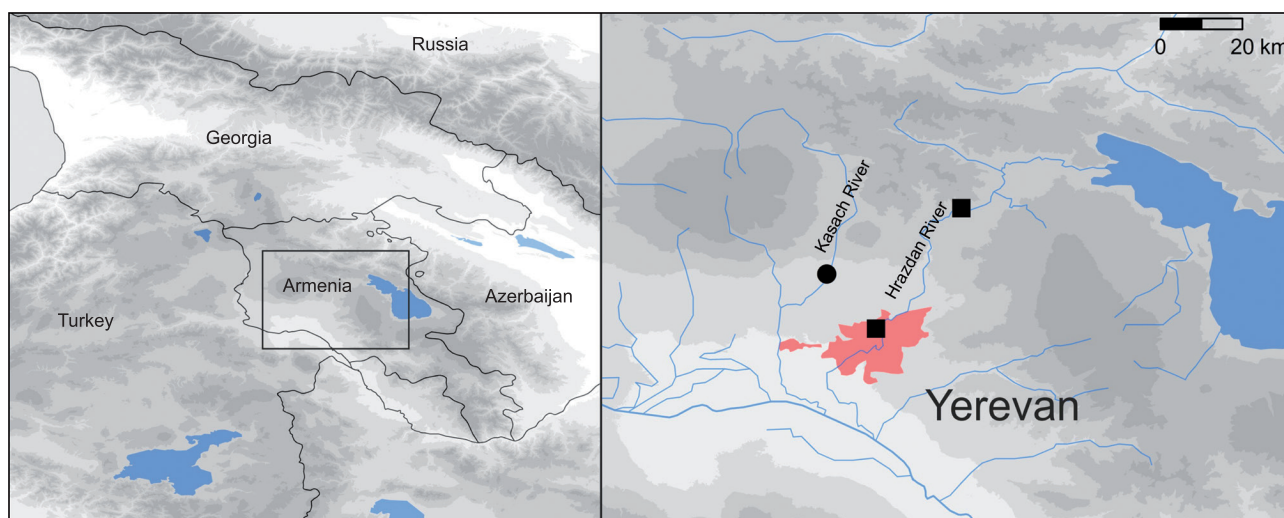


Fig. 1. Study area with sampling sites of *Shadinia bjniensis* n. sp. (squares) and *Nicolaia schniebsae* n. gen. n. sp. (dot)

and measurements of the genital organs and shells were carried out using a stereo microscope (ZEISS); the photographs were taken with a digital camera system (Leica R8). The authors directly responsible for a new name are identified explicitly along with

the introduction of the name. The type materials are stored in the Zoological Museum of Hamburg (ZMH) and in collections of ULRICH BÖßNECK (coll. Bößneck), PETER GLÖER (coll. Glöer) and FRANK WALTHER (coll. Walther).

## RESULTS

### Family: Hydrobiidae Stimpson, 1865

### Genus: *Shadinia* Akramowski, 1976

Type species: *Pyrgula terpoghassiani* Akramowski, 1952

**Diagnosis:** Shell elongated conical, surface finely striated, glossy. Umbilicus closed, aperture oval, slightly angled at the top. Operculum elongate-ellipsoidal, paucispiral. Penis triangular with a dark triangular spot at the distal part, or unpigmented. Oviduct black, two elongated receptacula.

**Differentiating features:** See description of *Nicolaia* n. gen.

### *Shadinia bjniensis* n. sp. Bößneck, Walther et Neiber (Figs 2–10)

**Holotype:** shell height 3.7 mm, width 2.3 mm, shell height to aperture height ratio about 2.4, ZMH 79907.

**Paratypes:** 10 specimens in ZMH 79908, 42 specimens in coll. Walther, 7 specimens in coll. Glöer, 5 specimens destroyed by dissection, all specimens from the type locality; Armenia, Yerevan Province, Hrazdan River, 40°12'10.9"N, 44°29'12.2"E, 980 m a.s.l., 08.09.2014 BÖßNECK leg.: 9 specimens in coll. Bößneck.

**Locus typicus:** Armenia, Kotyak Province, Bjni 1.5 km towards Hrazdan, Hrazdan River, 40°27'47.7"N,

44°40'26.6"E, 1,520 m a.s.l., 04.07.2014, WALTHER & NEIBER leg.

**Etymology:** Named after the village Bjni which is close to the type locality of the new species. Bjni is also the name of a well-known Armenian mineral water and therefore a symbol of clear, unpolluted water which is necessary not only for survival of freshwater snails.

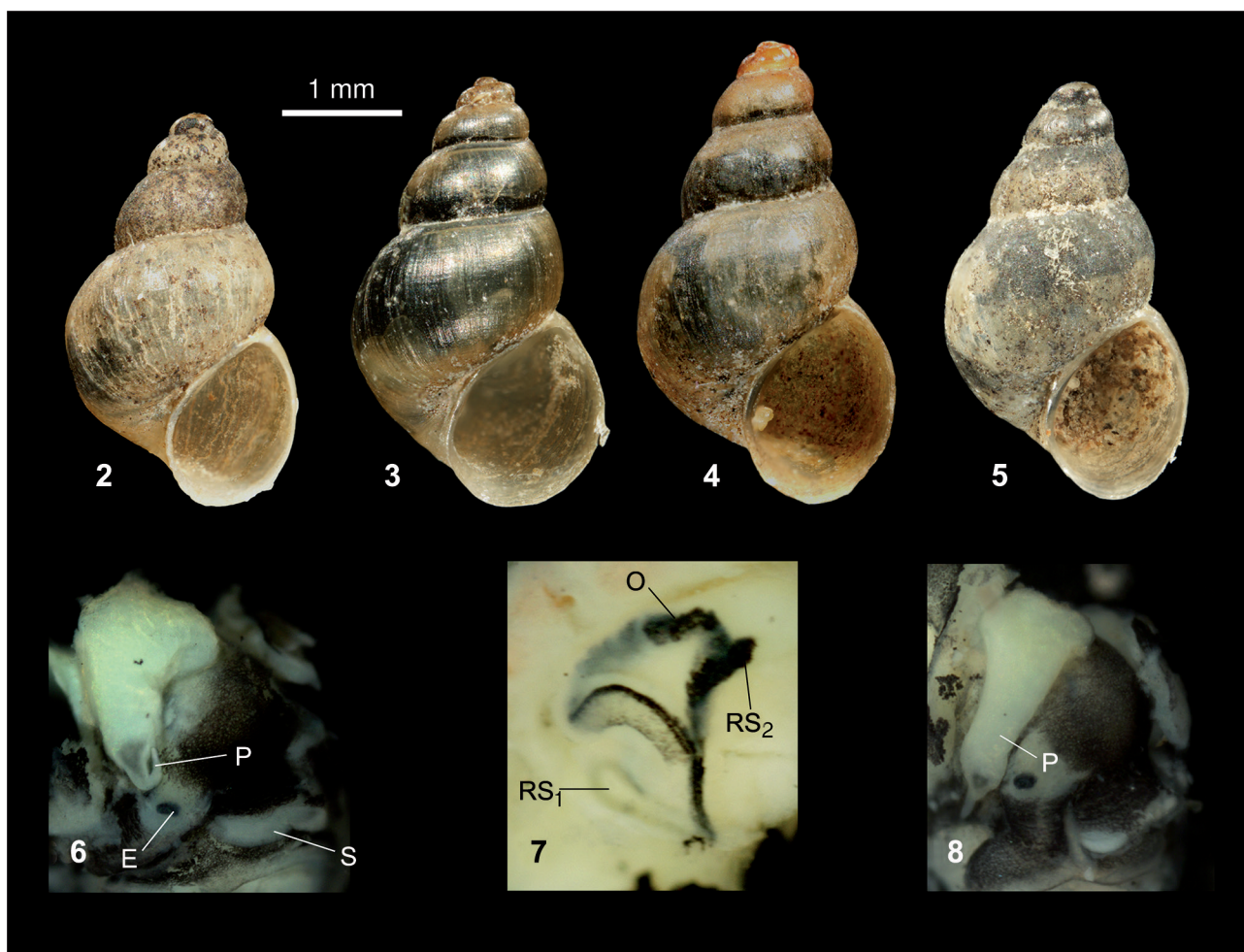
**Description:** The 5.5 horn-coloured whorls grow regularly. The whorls are slightly convex with a deep suture (Figs 2–5). The surface is smooth and glossy with fine growth lines (Fig. 3). Aperture ovoid with a weak angle at the top, umbilicus closed. Aperture height smaller than half of shell height. Shell height 3.6–4.0 mm, width 2.1–2.3 mm, spire height to aperture height ratio ca. 1.4.

The mantle is black with a white border. The tentacles are long and cylindrical with broad base. Eye spots large, at the base of tentacles (Figs 6, 8).

The penis is long and triangular, distally thin and pointed. Specimens from different sampling sites ( $n = 3$ ) had hooked penis tip. Distal part of the penis pointed with a black triangular spot. Oviduct black flexuose, with two elongated receptacula (Fig. 7). The bursa copulatrix is ovate.

**Differentiating features:** It differs from *S. terpoghassiani* in the absence of keel and in the penis pigmentation, and from *S. akramowskii* in its shell shape, less convex whorls and penis pigmentation. In *Hydrobia*





Figs 2–8. *Shadinia bjniensis* n. sp.: 2 – shell of holotype, 3–5 – shells of paratypes, 6 – penis in situ, 7 – female genitalia, 8 – penis in situ. Abbreviations: E – eye spot, O – oviduct, P – penis, RS<sub>1</sub>, RS<sub>2</sub> – receptacula, S – snout

*longiscata* sensu ZHADIN (1952) the penultimate whorl is higher than in *S. bjniensis*; its shell is slimmer and up to 5.5 mm in height, which is larger than *S. bjniensis*.

**Distribution:** Hrazdan River (Fig. 9).

**Ecology:** The new species has been found in the fast-running parts of Hrazdan River, attached to

stones and submersed parts of plants, especially in the axils of *Typha* and *Sparganium* (Fig. 10). AKRAMOWSKI (1976) mentioned *S. teroghassiani* from springs next to the river.



Fig. 9. Type locality of *Shadinia bjniensis*

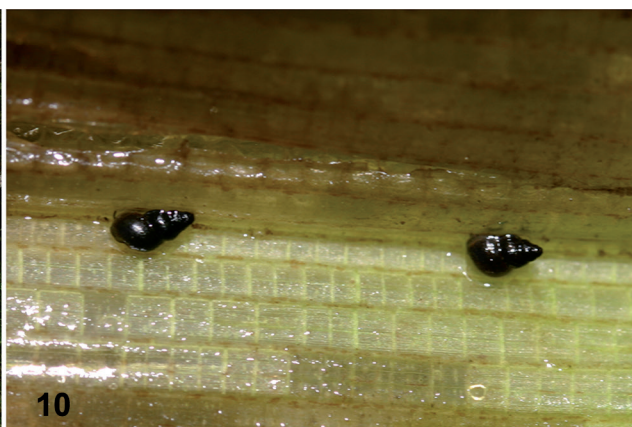


Fig. 10. *Shadinia bjniensis* on *Typha*

**Genus: *Nicolaia* n. gen. Glöer, Bößneck, Walther et Neiber**

Type species: *Nicolaia schniebsae* n. gen n. sp. Glöer et Bößneck

**Etymology:** Named for Nicolai Akramowski in recognition of his work on prosobranch molluscs from Armenia.

**Diagnosis:** Shell elongated conical, silky surface slightly spirally and radially striated, peristome sharp, umbilicus slit-like. Operculum with about 1.5 whorls. Oviduct with one receptaculum, bursa copulatrix oval. The penis is triangular, bent in its middle part and acute at the distal end, which is dark pigmented.

**Differentiating features:** It differs from the genus *Shadinia* in the shell surface sculpture. In *Shadinia* it is finely striated, not cancellated, and it lacks the radial striae. In addition females of *Nicolaia* have one receptaculum while those of *Shadinia* have two (Figs 7, 18) and the penis morphology in the two genera is different (Figs 6, 8, 17).

***Nicolaia schniebsae* n. sp. Glöer et Bößneck (Figs 11–19)**

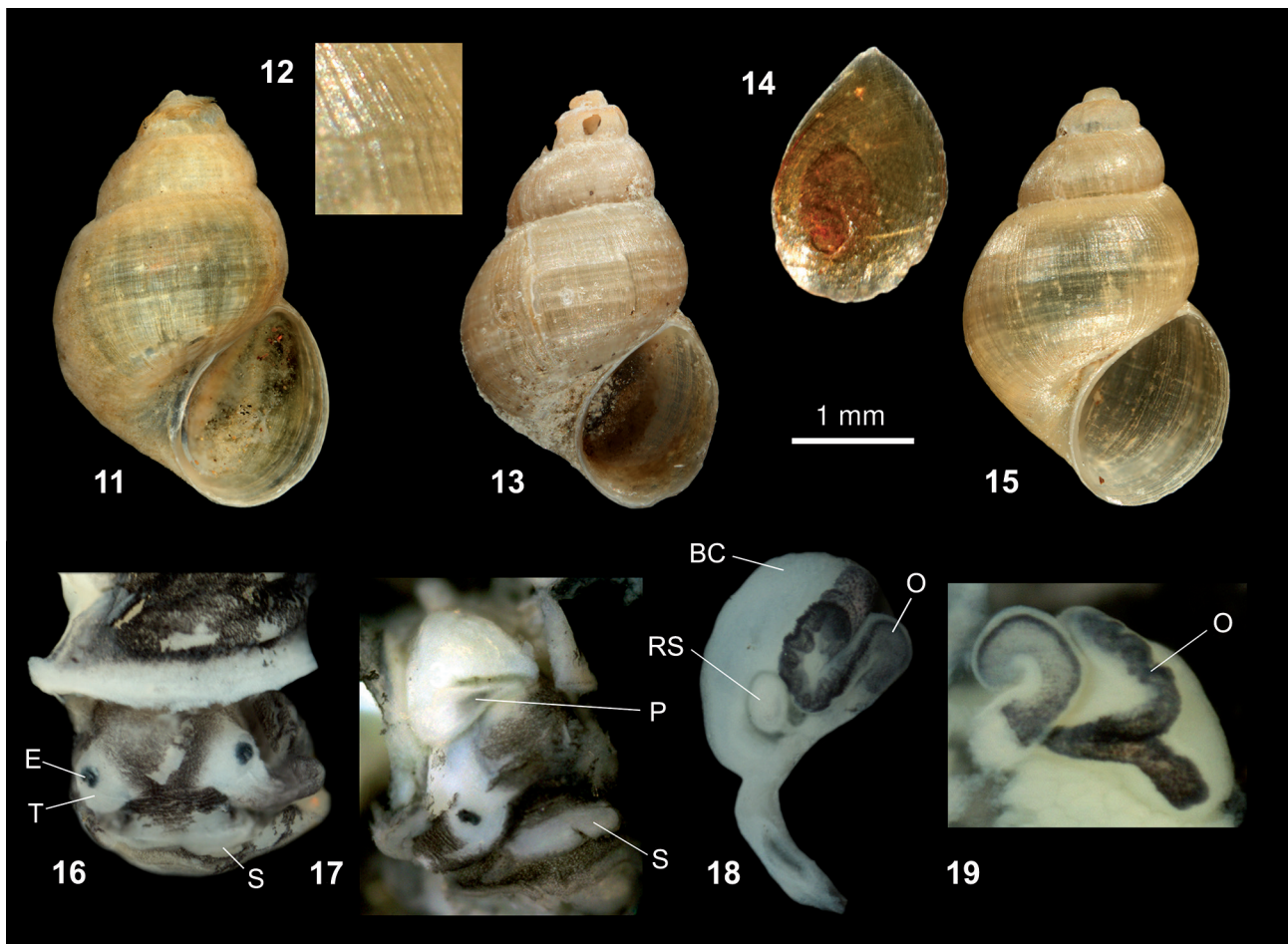
**Holotype:** shell height 3.5 mm, width 2.3 mm, shell height to aperture height ratio 2.2, ZMH 79909.

**Paratypes:** 3 specimens destroyed by dissection.

**Locus typicus:** Armenia, Aragatsotn Province, Karbi, Kasach River, 40°19'19.2"N, 44°22'42.3"E, 1,180 m a.s.l., 07.09.2014 BÖßNECK leg.

**Etymology:** Named for Katrin Schniebs in recognition of her work on Lymnaeidae.

**Description:** The 4.5 light yellow to horn-coloured whorls grow regularly. The whorls are slightly convex with a deep suture (Fig. 15). The surface with weak radial and spiral striae and a greasy sheen (Fig. 12). Aperture ovoid with a weak angle at the top. Umbilicus slit-like. Operculum oval, angled at the top (Fig. 14). Aperture height about half of shell height. Shell height 3.0–3.5 mm, width 2.2–2.3 mm, spire height to aperture height ratio about 1.2. The mantle is black with a white border (Fig. 16). Tentacles long and cylindrical with a broad base. Eye spots large at the base of tentacles (Figs 16–17).



Figs 11–19. *Nicolaia schniebsae* n. gen. n. sp.: 11 – shell of holotype, 12 – shell surface structure, 13, 15 – paratypes, 14 – operculum, 16 – head, 17 – penis in situ, 18 – female genitalia, 19 – oviduct loop. Abbreviations: BC – bursa copulatrix, E – eye spot, O – oviduct, P – penis, RS – receptaculum, S – snout, T – tentacle





The penis is long and triangular, bent in its middle part. Distal part of the penis pointed with a black triangular spot. Oviduct black, flexuose (Figs 18, 19), with one receptaculum (Fig. 18). Bursa copulatrix oval.

**Differentiating features:** *N. schniebsae* differs from all other Armenian hydrobiids in its cancellated shell surface. It differs from *S. terpoghassiani* in the aperture height, which in *S. terpoghassiani* is smaller than half of shell height. In *S. akramowskii* the whorls are fast growing (vs. regularly growing in *N. schniebsae* n. sp.) and the body whorl is more prominent. Besides, the shell of *N. schniebsae* is smaller, 3.0–3.5 mm vs. 5.2 mm. The new species differs from *S. akramowskii*

in its shell shape (the penultimate whorl is lower in *S. akramowskii*) and size, 3.0–3.5 mm vs. 4 mm in *S. akramowskii*. The penis morphology is different, and *Shadinia* have two receptacula while *Nicolaia schniebsae* has only one. *Hydrobia longiscata* sensu ZHADIN (1952) has a slimmer shell, up to 5.5 mm in height and thus much larger than in *N. schniebsae*.

**Distribution:** Only known from the type locality.

**Associated species:** *Physa acuta* (Draparnaud, 1805), *Radix persica* (Issel, 1865) (= *Radix lagotis* (Schrank, 1803)) det. K. Schniebs, *Planorbis intermixtus* Mousson, 1874 (anat. det.), *Pisidium casertanum* (O. F. Müller, 1774), *Pisidium milium* Held, 1836.

## DISCUSSION

AKRAMOWSKI (1976) mentioned a non-keeled form of *Shadinia terpoghassiani* and introduced a new name, *S. terpoghassiani* morpha *ecarinata*, for it. However, this designation is deemed to be infra-specific under the regulations of the Code (Art. 45.6.2) and therefore not available. We cannot exclude that this morph is conspecific with *Shadinia bjniensis*.

AKRAMOWSKI (1952) described *Pyrgula terpoghassiani* from Armenia; later (AKRAMOWSKI 1976) he designated it as the type species of the new genus *Shadinia*, possibly on account of the keeled whorls, a characteristic feature of *Pyrgula*. He assigned also *Hydrobia akramowskii* Zhadin, 1952 to this genus, though the species is not keeled and the female genitalia and penis morphology depicted by him are different. Besides, the shells shown in the photos (ZHADIN 1952: pl. 1, figs 8, 9) do not indicate that the two species belong to the same genus. It has to be added that another species (?), very different in appearance from *Pyrgula terpoghassiani*, was mentioned by him as a “morpha *ecarinata*” of *P. terpoghassiani*, possibly already depicted by ZHADIN (1952: fig. 181).

Thus it is not easy to ascertain the meaning of the genus *Shadinia*. In our opinion *Shadinia akramowskii* (Zhadin, 1952) represents a distinct genus.

ZHADIN (1952: 225, fig. 148) mentioned *Hydrobia longiscata* Bourguignat, 1856 from Armenia, a spring in the vicinity of Yerevan. This is actually a different species from the Mediterranean (Syria) (VAN DAMME & KEBAPÇI 2015) but different from all other known hydrobiids from Armenia (Table 1). There is in all likelihood a higher species diversity in this region and more research is needed.

## ACKNOWLEDGEMENTS

We are grateful to the Volkswagen Stiftung for funding the project “Biogeography of the land snails of the Caucasus Region”. We thank KATRIN SCHNIEBS for the translation of the Russian description of *Shadinia*, MAXIM VINARSKI for Akramowski’s book and LAURA HAURTYUNOVA (Institut of Zoology, Yerevan) for her great hospitality during our stay in Yerevan. Our thanks go to the two anonymous reviewers for their helpful comments.

Table. 1. Identification key to hydrobiid species of Armenia

01. Shell surface smooth, females with two receptacula	2
01'. Shell surface with weak radial and spiral striae and greasy sheen, females with one receptaculum	<i>Nicolaia schniebsae</i>
02. Shell keeled, shell height ca. 4.5 mm, spire height to aperture height ratio 2.0, suture shallow	<i>Shadinia terpoghassiani</i>
02'. Shell without keel	3
03. Shell height 4.5 mm, width 2.1 mm	<i>Hydrobia longiscata</i> sensu Shadin
03'. Shell smaller and broader	4
04. Shell height 4.0 mm, width 2.3 mm, spire height to aperture height ratio ca. 1.4, suture shallow	<i>Shadinia bjniensis</i>
04'. Shell height 4.0 mm, width 3.5 mm, spire height to aperture height ratio ca. 1.1, whorls convex with deep suture	<i>Shadinia akramowskii</i>



## REFERENCES

- AKRAMOWSKI N. N. 1952. O nakhozhdanii sovremennogo predstavatelya roda *Pyrgula* Cristof. et Jan v doline srednego techeniya Araksa (Gastropoda – Prosobranchia, Hydrobiidae). Dokl. Akad. Nauk SSSR 84: 631–632.
- AKRAMOWSKI N. N. 1953. Novyy vid novogo dlya fauny SSSR roda *Pyrgula* Cristof. & Jan iz Sovetskoy Armenii (Prosobranchia, Hydrobiidae). Dokl. Akad. Nauk Arm. SSSR 15: 149–152.
- AKRAMOWSKI N. N. 1971a. Nekotorye itogi izucheniya sovremennoy fauny mollyuskov Armenii. In: Mollyuski puti, metody i itogi ikh izucheniya. Akademiya nauk SSSR, Zoologicheskii Institut, Leningrad.
- AKRAMOWSKI N. N. 1971b. Kratkiy katalog sovremennoy fauny mollyuskov Sevetskoy Armenii. Biol. Zhur. Arm. 24: 3–12.
- AKRAMOWSKI N. N. 1976. Fauna Armyanskoy SSR, Mollyuski (Mollusca). Akademiya Nauk Armyanskoy SSR, Institut Zoologii, Yerevan.
- BRANDT A. 1879. Von den armenischen Alpenseen. Zool. Anz. 2: 522–527.
- BRANDT A. 1880. Von den armenischen Alpenseen. II. Zool. Anz. 3: 111–115.
- GLÖER P., PEŠIĆ V. 2009. New freshwater gastropod species of the Iran (Gastropoda: Stenothyridae, Bithyniidae, Hydrobiidae). Mollusca 27: 33–39.
- GLÖER P., PEŠIĆ V. 2012. The freshwater snails (Gastropoda) of Iran, with description of two new genera and eight new species. ZooKeys 219: 11–61. <http://dx.doi.org/10.3897/zookeys.219.3406>
- ISSEL A. 1865. Catalogo dei Molluschi dalla Missione italiana in Persia aggiuntavi la descrizione delle specie nuove o poco note. Separtum. (Published in 1866 in Mem. Reale Acad. Sci. Torino 23: 387–439, pl. 1–3).
- KANTOR Y. I., VINARSKI M. V., SCHILEYKO A. A., SYSOEV A. V. 2009. Catalogue of the continental mollusks of Russia and adjacent territories. Online-version 2.3. 2009.
- MARTENS E. VON 1874. Ueber vorderasiatische Conchylien nach den Sammlungen des Prof. Hausknecht. Novit. conch. Suppl. 5: 1–127, pl. 1–9.
- MARTENS E. VON 1880. Aufzählung der von Dr. Alexander Brandt in Russisch-Armenien gesammelten Mollusken. Bull. Acad. Imp. Sci. St. Pétersb. 26: 142–158.
- SCHNEIDER O. 1878. Kaukasische Conchylien. In: SCHNEIDER O. (ed.). Naturwissenschaftliche Beiträge zur Kenntniss der Kaukasusländer, aufgrund seiner Sammelbeute. Burdach, Dresden, pp. 11–34.
- VAN DAMME D., KEBAPÇI U. 2012. *Hydrobia longiscata*. The IUCN Red List of Threatened Species 2012. <http://www.iucnredlist.org/details/188995/0>
- YILDIRIM M. Z. 1999. Türkiye Prosobranchia (Gastropoda: Mollusca) Türleri ve Zoocoğrafik Yayılışları. 1. Tatlı ve Acı Sular. Turk. J. Zool. 23: 877–900.
- ZHADIN V. I. 1928. K izucheniuyu izmenchivosti presnovodnykh mollyuskov *Limnaea stagnalis* L. var. *goktschana* Mouss. Russ. Gidrobiol. Zhur. 7: 146–150.
- ZHADIN V. I. 1952. Mollusks of fresh and brackish water of the U.S.S.R. Zoological Institute of The Academy of Sciences of The Union of Soviet Socialist Republics. Translated 1962 by Israel Program for Scientific Translations Jerusalem. No: 46.

Received: July 24th / 25th, 2015

Revised: September 29th / October 22nd /  
November 4th, 2015

Accepted: November 4th, 2015

Published on-line: December 4th, 2015

