

New freshwater gastropod species of the Iran (Gastropoda: Stenothyridae, Bithyniidae, Hydrobiidae)

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Received on January 10, 2009, accepted on March 24, 2009.
Published online at www.mollusca-journal.de

> Abstract

In 2005 and 2007 Vladimir Pešić collected freshwater molluscs in the Iran. Some of the samples revealed new species that belong to the genus groups *Pseudobithynia* and *Pseudamnicola*. For one additional new species, a member of the family Stenothyridae, a new genus, *Farsithyra* n. gen., is introduced here.

> Kurzfassung

Neue Süßwassergastropoden aus dem Iran (Gastropoda: Stenothyridae, Bithyniidae, Hydrobiidae). – 2005 und 2007 sammelte Vladimir Pešić Süßwassermollusken im Iran. Einige Proben brachten neue Arten hervor, die zu den Gattungen *Pseudobithynia* und *Pseudamnicola* gehören. Für eine zusätzliche neue Art, einem Mitglied der Familie Stenothyridae, wird hier eine neue Gattung, *Farsithyra* n. gen., eingeführt.

> Key words

Farsithyra n. gen., *Farsithyra farsensis* n. gen. n. sp., *Pseudobithynia zagrosia* n. sp., *Pseudamnicola saboori* n. sp., *Pseudamnicola zagrosensis*, *Pseudamnicola kermanshahensis*, Iran.

Introduction

According to BIGGS (1936), the results of the first systematic collecting of molluscs in Iran (Italian Mission) have been published by ISSEL (1866), who described *Bythinia Uzielliana* from Persia as being new, with its type locality being in Kerman (Iranian Plateau). This species has also been listed by BIGGS (1936: 10, 1937: 349) from the region of Kerman as belonging to the genus *Bythinella*. STARMÜHLNER (1965) mentioned this species as *Pseudamnicola uzelliana* (sic!) and MANSOORIAN (1994) as *Gangetia (Iranothyra) uzielliana* (Issel, 1866). In the Arabian Peninsula *Gangetia milicea* (Nevill, 1880) is known from Oman (Dhofar area), possibly introduced there by human activities (NEUBERT 1998: 349), with its type locality in Port Canning, West Bengal, and it is also known from the Ganges at Patna (India) (NESEMANN et. al. 2007: 79). SCHÜTT (1973: 32) described the new subgenus *Iranothyra* its type species being *Gangetia (Iranothyra) uzielliana* (Issel, 1866).

BIGGS (1937) mentioned the species *Amnicola ejecta* Mousson, 1874, which he collected at Nagur, and *Pseudamnicola raddei* Böttger, 1890, found at Kushkuh, and MANSOORIAN (1994: 8) added *Bithynia badiella* (Küster, 1853), and *B. tentaculata* (Linnaeus, 1758). Of the neighbouring asiatic region North Seistan ANNANDALE & PRASHAD (1919) described *Amnicola sistanaica*.

The only identification key for Iranian freshwater molluscs (MONSOORIAN 1994) lists only one species each of the hydrobiid genus *Pyrgula* Christofori & Jan, 1832, and *Hydrobia* Hartmann, 1921. This shows that the fauna of freshwater molluscs of the Iran is poorly known and no complete snail survey of Iran have been done (MONSOORIAN 2001). In this mountainous country species diversity should be higher like it is in the neighbouring region of Turkey (YILDIRIM 1999, 2006).

This paper is intended to add to the knowledge of the biodiversity of the Iran and to describe the new

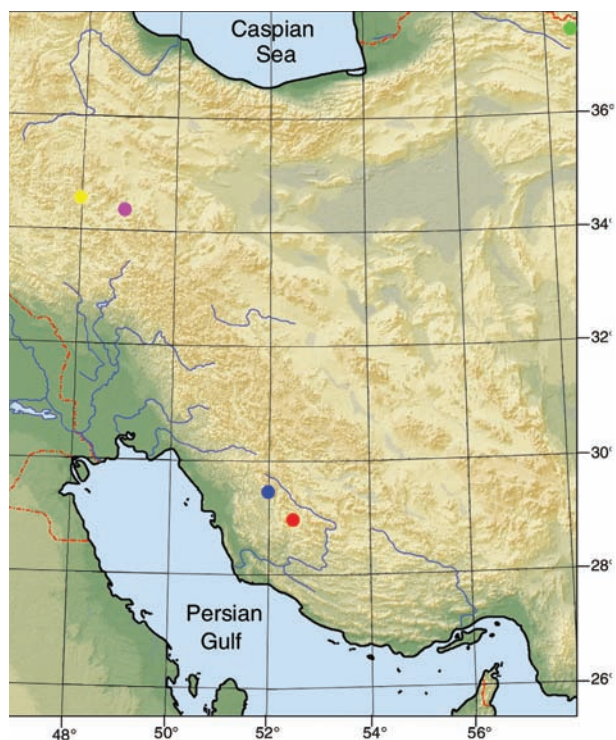


Fig. 1. The type localities of the new species. Blue dot: *Pseudobithynia zagrosia*, red dot: *Farsithyra farsensis*, green dot: *Pseudamnicola saboori*, yellow dot: *P. zagrosensis*, magenta dot: *P. kermanshahensis*.

genus and species: *Farsithyra farsensis* n. gen. n. sp., *Pseudobithynia zagrosia* n. sp., *Pseudamnicola saboori* n. sp., *P. zagrosensis*, and *P. kermanshahensis*.

The type material is kept in the Zoological Museum of Hamburg (ZMH).

Material and methods

The snails were collected in 2005 and 2007 by V. Pešić. The samples were put into 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 locations of the sampling sites are mapped in Fig. 1.

Results

The unknown species collected in Iran in 2005 and 2007 had to be compared with the species mentioned above. A problem arose when we tried to identify the genus of a species that belongs to the Stenothyridae.

No genus could be found to which this species belongs, so we have to introduce it as a new genus.

Family: Stenothyridae

Genus: *Farsithyra* n. gen.

Type species: *Farsithyra farsensis* n. sp.

Shell small, height about 3 mm, yellowish horn-coloured, thick-walled. Operculum horny and thin with a c-shaped ridge near the columella (Fig. 2.3). Tentacles long and thin with basal eyes. Penis simple and very long, similar to *Assimineia*.

Differential diagnosis: The shells of *Stenothyra* Benson, 1856, are triangularly flattened at the small aperture, and the penis bears a stylet at the tip (BRANDT 1974). The thick operculum of *Gangetia* Ancey, 1891, bears two diverged lamellae (NEUBERT 1998: 349) at the inner surface, and the suture is deep (BRANDT 1974: 114), vs. *Farsithyra* not. *Iranothyra* Schütt, 1973 bears two diverged lamellae with short apophysis and a furrow at the inner side of the aperture, onto which the operculum fits vs. *Farsithyra* has no furrow and no apophysis. The distinguishing features between the genus groups of the Stenothyridae are given in table 1.

Derivation of name: The type species has been collected in the Fars region, so we give this new genus a name of the combination of this region and the family name.

Farsithyra farsensis n. sp.

Material examined: 2 specimens from Iran, Fars Province, AtashKadeh spring, Ardeshir palace in Firouzabad (= Firooz Abad) city, limnocrenic spring, 1683 m asl., 28°51'7"N 52°31'58"E, and 4 specimens from type locality.

Holotype: Shell 3.0 mm high, 2.7 mm wide, Holotype ZMH 51398.

Paratypes: 1 specimen (shell height 2.6 mm, width 1.6 mm) in ethanol, ZMH 51399, 2 specimens in the collection Glöer, 2 specimens destroyed by dissection.

Locus typicus: Iran, Fars Province, Firouzabad (= Firooz Abad) city, Kay Zarrin village, 28°53'N 52°32'E.

Habitat: Discovered in limnocrenic spring (Fig. 3) and stream, 1711 m asl.

Tab. 1. The distinguishing features between the genus groups of the Stenothyridae. * Though SCHÜTT (1998: 32) studied living collected materials, but he did not mention the anatomy, only the radula.

genus	shell	body whorl	operculum	aperture	penis	literature
<i>Stenothyra</i>	thin, smooth or sculptured with spiral grooves or pits	large, often bossed at the left side line	two short, high, diverging straight ridges, 1 low ridge	smaller than ½ of the body whorl	pointed tip often carries a curved stylet	BRANDT (1974)
<i>Gangetia</i>	thin, glossy, sometimes sculptured with lines or pits	somewhat compressed dorso-ventrally	thick, two short, high and diverging straight ridges	width about ½ of the body whorl	no stylet at the tip	BRANDT (1974), NEUBERT (1998)
<i>Iranothyra</i>	thick, transverse striae	large, not compressed	ridges with short apophysis, 3 spiral whorls	width about ½ of the body whorl	?*	SCHÜTT (1973)
<i>Farsithyra</i> n. gen.	thick, glossy	large, not compressed	c-shaped ridge, no apophysis	width larger than ½ of the body whorl	no stylet at the tip	

Derivation of name: Named after the region where the species lives.

Description: Shell yellowish horn-coloured, with a glossy and finely striated surface, thick-walled. The 5–5.5 slightly rounded whorls grow regularly and are separated by a clear suture. The oval operculum is slightly angled at the top, it is horny and thin with a c-shaped ridge near the columella (Fig. 2.2). The tentacles are long and thin with basally situated eyes (Fig. 2.3). Shell height 3.0–3.2 mm, width 2.7–2.9 mm.

Anatomy: Penis simple and very long, similar to *Assimineia* (Fig. 2.4).

Associated species: *Theodoxus fluviatilis*, *Melanopsis praemorsa*, *Physella acuta*.

Remark: MANSOORIAN (1994: 8) described a species with a conical globose shell that possesses the same c-shaped ridge at the inner surface of the operculum, and his detailed description of the penis morphology corresponds to the features of *F. farsensis*. He identified this species with *Gangetia uzielliana* under question mark. A topotype of *Gangetia uzielliana* has been depicted by SCHÜTT (1973: 34, Fig. 2), which is distinct from *F. farsensis* as well as from the species described by Mansoorian. Thus most probably that species MANSOORIAN (1994) described, represent an undescribed species. Furthermore we believe that there are more species of the genus *Farsithyra* n. gen that live in the Iran.

Family: Bithyniidae Troschel, 1857

Genus: *Pseudobithynia* Glöer & Pešić, 2006

Type species: *Pseudobithynia irana* Glöer & Pešić, 2006

Pseudobithynia zagrosia n. sp.

Material examined: 39 specimen from the type locality.

Holotype: Shell 5.2 mm high, 3.6 mm wide, ZMH 51400 (in ethanol).

Paratypes: 5 specimens in ethanol, ZMH 51401, rest in the collection Glöer.

Locus typicus: Iran, Fars Province, Dasht Arzhan village (in Shiraz to Kazerum road), 29°39'N 51°59'E.

Habitat: Discovered in the upper part of the stream, 2030 m asl.

Derivation of name: Named after the Zagros Mountains where the species lives.

Description: The glossy shells are reddish-horn-coloured. The 4–5 whorls are convex with a deep suture. The operculum is oval and not angled. The nucleus of the operculum is nearly central (Fig. 5.3). The umbilicus is closed to slit-like. A sexual dimorphism is not visible. The shell is 5.2–5.4 mm high and 3.6–4.0 mm wide.

Anatomy: The penis is simple with no appendices (Fig. 5.4).

Associated species: *Physella acuta*, *Planorbis intermixtus*.

Family: Hydrobiidae

Genus: *Pseudamnicola* Paulucci, 1878

Type species: *Bythinia lucensis* Issel, 1866

Shell oval or conical with a large body whorl. Oviduc-tual loop pigmented black. Penis usually triangular, flattened, without any appendices.

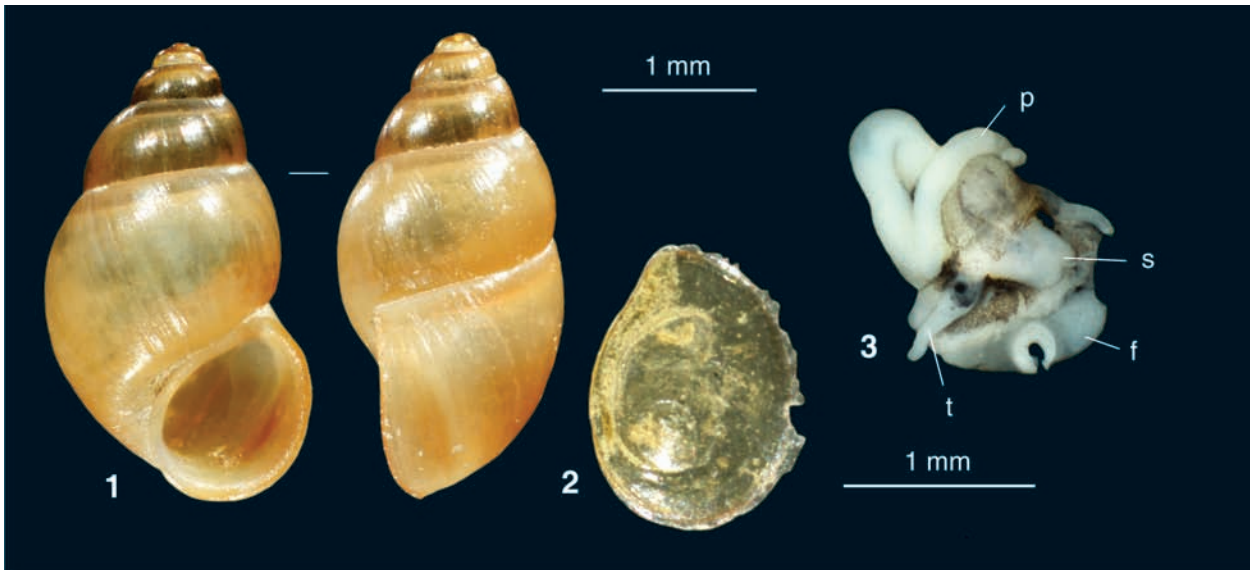


Fig. 2. *Farsithyra farsensis* n. gen. n. sp. **1:** shell, **2:** operculum with c-shaped ridge, **3:** head with penis in the neck. – **f** = foot, **p** = penis, **s** = snout, **t** = tentacle.



Fig. 3. Type locality of *F. farsensis*.

Pseudamnicola saboori n. sp.

Material examined: 57 specimens from type locality, and 25 specimens Markazi Province, Bolagh stream 10 km apart from Shahzand city (33°56'8 N 49°24'30 E), at the Shahzand to Pole Doab Road, 21.07.2003, leg. Pešić.

Holotype: Shell 4.4 mm high, 3.0 mm wide, ZMH 51402.

Paratypes: 5 specimens ZMH 51403, and collection of the senior author.

Locus typicus: Khorrasan Province, Zou Eram spring in Zou Eram village (near Shirvan city), 37°20'N 57°40' E.

Habitat: Discovered in the spring and stream, ca. 1100–1600 m asl.



Fig. 4. Type locality of *Pseudobithynia zagrosia*.

Derivation of name: This species is named after Professor Alireza Saboor (Karaj), who organised all the trips of V. Pešić to the Iran, and spent a lot of time and energy by helping him to sample.

Description: Shell conical oval, light horn-coloured, surface glossy, finely striated, apex small rounded, 4–4.5 slightly convex whorls with a clear suture, umbilicus slit-like, spire regularly increasing, aperture oval and slightly angled at the top, periostome sharp, shell height 4.0–4.5 mm, width 2.9–3.0 mm.



Fig. 5. *Pseudobithynia zagrosia* n. sp. 1–2: shells; 3: operculum; 4: head with penis. – p = penis, s = snout, t = tentacle.

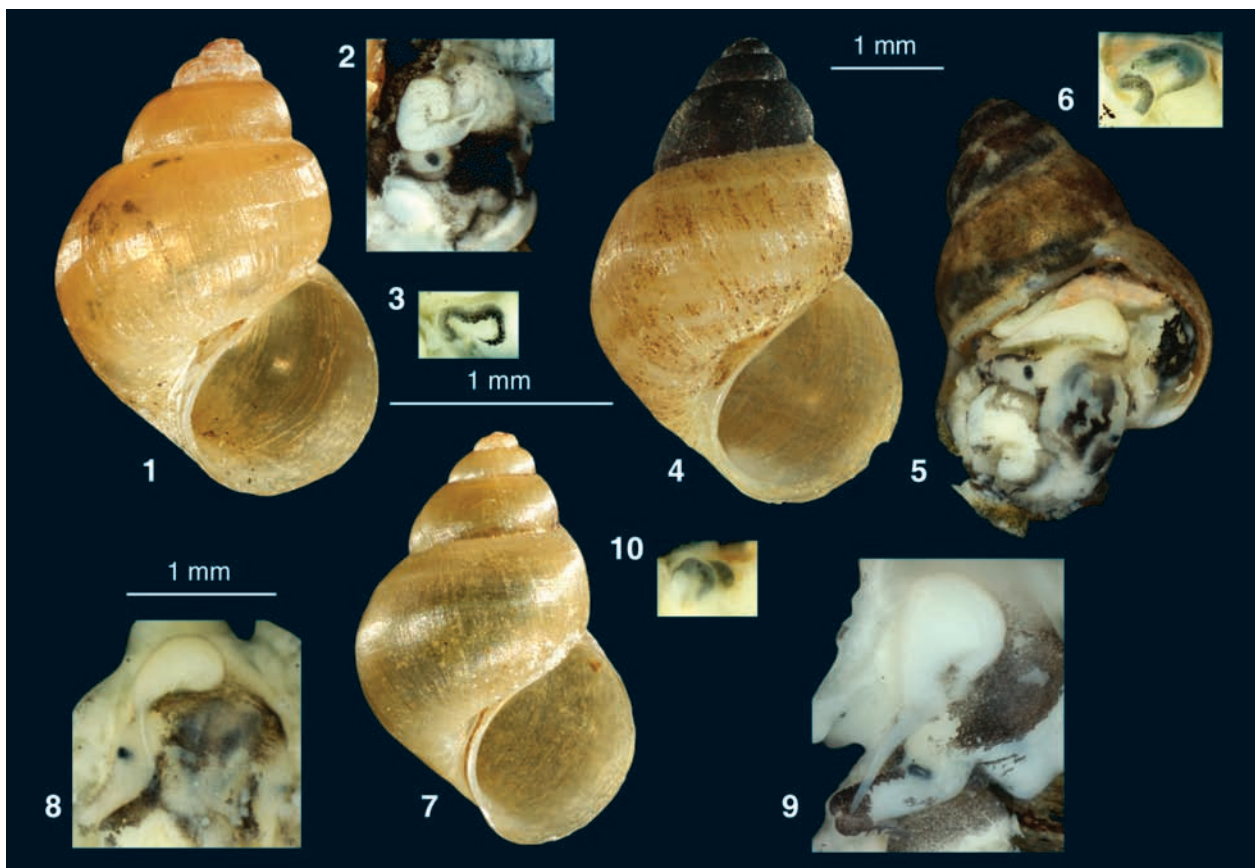


Fig. 6. The new *Pseudamnicola* spp. 1–3: *Pseudamnicola saboori* n. sp., 1: shell, 2: penis, 3: oviductal loop; 4–6: *P. zagrosensis* n. sp., 4: shell, 5: penis, 6: oviductal loop; 7–10: *P. kermanshahensis*, 7: shell, 8–9: penis, 10: oviductal loop.

The mantle is black with a small grey border. The tentacles are black with a white spot around the eyes, broad, and obtuse.

Anatomy: The penis is situated at the neck behind the right tentacle (Fig. 6.2), it is regularly broad over the full length and tapered and darkly pigmented at the distal end. Oviductal loop not coiled (Fig. 6.3).

Associated species: *Theodoxus fluviatilis*, *Radix* sp., *Melanopsis praemorsa*, *Planorbis intermixtus*.

Pseudamnicola zagrosensis n. sp.

Material examined: 78 specimens from type locality, 27.06.2005, leg. Pešić.

Holotype: Shell 4.5 mm high, 3.0 mm wide, ZMH 51406.

Paratypes: 5 specimens ZMH 51407, and collection of the senior author.

Locus typicus: Kermanshah Province, Sar Pol Kangarar stream at Sar Pol Kangarar village, 34°30'N 47°55'E.

Habitat: Discovered in the stream.

Derivation of name: Named after the mountains where the species lives.

Description: Shell elongated conical, horn-coloured, surface glossy and finely striated, apex small, rounded, 5–5.5 slightly convex whorls with a clear suture, umbilicus closed, spire regularly increasing, aperture oval and angled at the top, periostome sharp, Shell height 4.0–4.5 mm, width 2.9–3.0 mm.

The mantle is light grey with a small white border. The tentacles are broad, and obtuse.

Anatomy: The penis is situated at the neck behind the right tentacle (Fig. 6.5), triangular and tapered at the distal end. Oviductual loop not coiled (Fig. 6.6).

Associated species: —

Pseudamnicola kermanshahensis n. sp.

Material examined: 82 specimens from type locality, 27.06.2005, leg. Pešić.

Holotype: Shell 4.0 mm high, 2.7 mm wide, ZMH 51404.

Paratypes: 5 specimens ZMH 51405, and collection of the senior author.

Locus typicus: Kermanshah Province, spring near Sarabe – Sahneh (= Sarabe – bede – Sarkh) city.

Habitat: Discovered in the spring.

Derivation of name: Named after the region where the species lives.

Description: Shell elongated conical, light horn-coloured, opaque, surface glossy, finely striated, apex small rounded, 5–5.5 slightly convex whorls with a clear suture, umbilicus closed, spire regularly increasing, aperture oval and angled at the top, periostome sharp, shell height 3.0–4.0 mm, width 2.5–2.7 mm.

The mantle is black with a broad grey border. The tentacles are broad, and a little tapered at the distal end.

Anatomy: The penis is situated at the neck behind the right tentacle (Fig. 6.8, 6.9), the second half in length is strongly tapered. Oviductual loop is coiled twice (Fig. 6.10).

Associated species: *Radix* sp.

Discussion

It cannot be said for sure that all *Pseudamnicola* spp. described here as being new belong to the genus *Pseu-*

damnicola in fact, because the penes of *P. kermanshahensis* n. sp. looks somewhat distinct from the others, but the oviductual loop is also pigmented in black, and the shell shape is similar to the other species'. That the generic classification of closely related species is not unambiguous in all cases, has been pointed out by SZAROWSKA et. al. (2007) by means of DNA sequencing.

The genus *Pseudamnicola* in this region is only known from North-East Iran and the neighbouring countries Turkey, Turkmenistan, and Afghanistan (BĂNĂRESCU (1991: 1077), but not in the Fars and Kermanshah Provinces, where V. Pešić collected the new species described above. This scant knowledge is due to the poorly investigated mollusc fauna of the Iran and further investigation is necessary.

Acknowledgements

We would like to express our gratitude to David Walker for helping to smooth our English.

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