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New *Pseudamnicola* species of Turkey (Mollusca: Gastropoda: Hydrobiidae)

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Abstract
New samples of freshwater molluscs collected by the second author in the East Mediterranean region of Turkey revealed three new species of the genus *Pseudamnicola* Paulucci, 1878, i.e., *P. goksunensis* n. sp., *P. merali* n. sp., and *P. marashi* n. sp. Descriptions and photos of the species as well as the type localities are presented.

Key words: *Pseudamnicola*, Turkey, new species.

Introduction

Species of the genus *Pseudamnicola* are distributed in the W-Mediterranean (Spain, France, Italy), in N-Africa (Morocco, Algeria, Tunisia), and in the E-Mediterranean in Bulgaria, Greece and Turkey. In these countries a high α-diversity in this genus was observed, especially in the countries with a high investigation rate (Glöer *et al*. 2010). From Algeria 15 species of the genus *Pseudamnicola* are known (Glöer *et al*. 2010) eight species are known from Spain (Boeters 1988), and from Greece up to now 7 species of this genus have been reported (Schütt 1980). It is worth to mention that in the countries along the Adriatic coast no any species of the genus have been reported (Radoman 1983). Given the limited dispersal capabilities of these animals, it is difficult to explain the wide and disjunct distribution range of the genus in the Mediterranean region.

Until now, five species of the genus *Pseudamnicola* have been reported from Turkey, while only one species, *P. vinarskii* Glöer & Georgiev, 2012 occur in the Mediterranean region of Turkey (Yildirim 2006, Glöer and Georgiev 2012). The distribution of research on aquatic gastropods of the genus *Pseudamnicola* in Turkey is uneven, and many parts of the country are insufficiently studied. Further investigation will reveal more *Pseudamnicola* spp. of Turkey, especially in the mountainous regions of the country. Recently collected samples by M.E. Gürlek from the East Mediterranean region of Turkey revealed three new *Pseudamnicola* species. Additional field work is highly needed for an appropriate evaluation of the extant biodiversity of aquatic gastropods in Turkey.

This paper is intended to describe the new species and expand our knowledge on the biodiversity of aquatic gastropods in Turkey.

Material and Methods

The living snails were collected by 65x65 cm in size (200 µm mesh size) aquatic hand-scoop (Kick-net) and sieve. In springs samples were collected on stones and aquatic plants by hand. After that preserved in 75% ethanol. The dissections and measurements were carried out by using a stereo microscope (Zeiss) with an eye-piece micrometer, the photographs were made with a Leica digital camera system.

The holotype and part of the paratypes are stored in the Zoological Museum Hamburg (ZMH), some paratypes are deposited in the private collections of the authors (coll. P. Glöer, Hetlingen, Germany; coll. Gürlek, Kahramanmaraş Sütçü İmam University Department of Hydrobiology, Turkey).

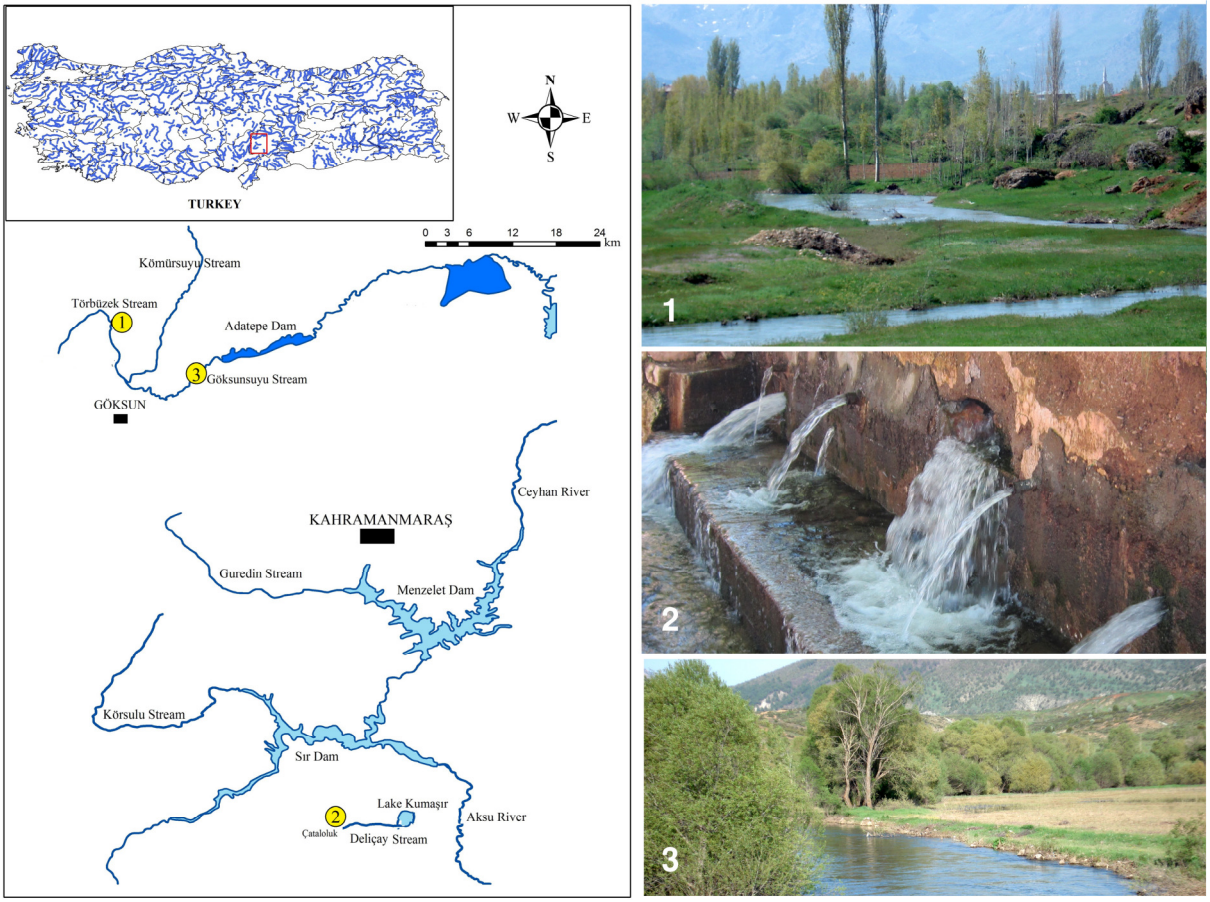

Figure 1. Left: map of the study area. Right: Photographs of the studied sampling sites: **1** – Törbüzek stream, **2** – Çataloluk water spring, 3 – Göksunsuyu stream (Photos: M.E. Gürlek).

Systematics

Genus *Pseudamnicola* Paulucci, 1878

The shells are conical to elongated conical with a shell height between 2-5 mm. Species of this genus can be identified by the triangular penis (Glöer *et al*. 2010). Because penis morphology and shell shape are suitable for species identification we did not dissect females.

Pseudamnicola goksunensis n. sp.

(Figs. 2A-C)

Holotype (ZMH 79803): shell height 4.5 mm, 3.4 mm width.

Paratypes: 3 specimens (juv.) from type locality (ZMH 79804); 3 specimens (1 adult, 2 juv.), 4 specimens. from Göksun suyu, 38°1'56.26" N, 36°34'19.32" E (Turkey, Kahramanmaraş Province, Göksun city) (3

specimens destroyed by dissection) in coll. Glöer, 5 specimens (juv.) from type locality (KSUZM 2014-101), 10 specimens (adult) from type locality, 4 specimens (adult) from Göksun suyu in coll. Gürlek.

Locus typicus: Turkey, Kahramanmaraş Province, Göksun city, Törbüzek stream, 38°5'39.41" N, 36°28'17.56" E.

Etymology: Named after the town (Göksun) where the new species was collected.

Description

Shell. The horn-colored solid shell is conical with 4.5 whorls which are slightly convex with a deep suture (Figs. 2A, C). The whorls are regularly fast growing with a prominent body whorl. The umbilicus is open to slit-like. The aperture is oval with an angle at the top and a thick periostome, flanged at the columella. Juveniles are spherical. The shells are 4.5 mm in height and 3.4 mm broad.

Body. The mantel is black with a whitish border, eye spots are visible. The operculum is yellowish transparent. The penis is triangular without any outgrowth, very broad at the base and acute at the distal end (Fig. 2B).

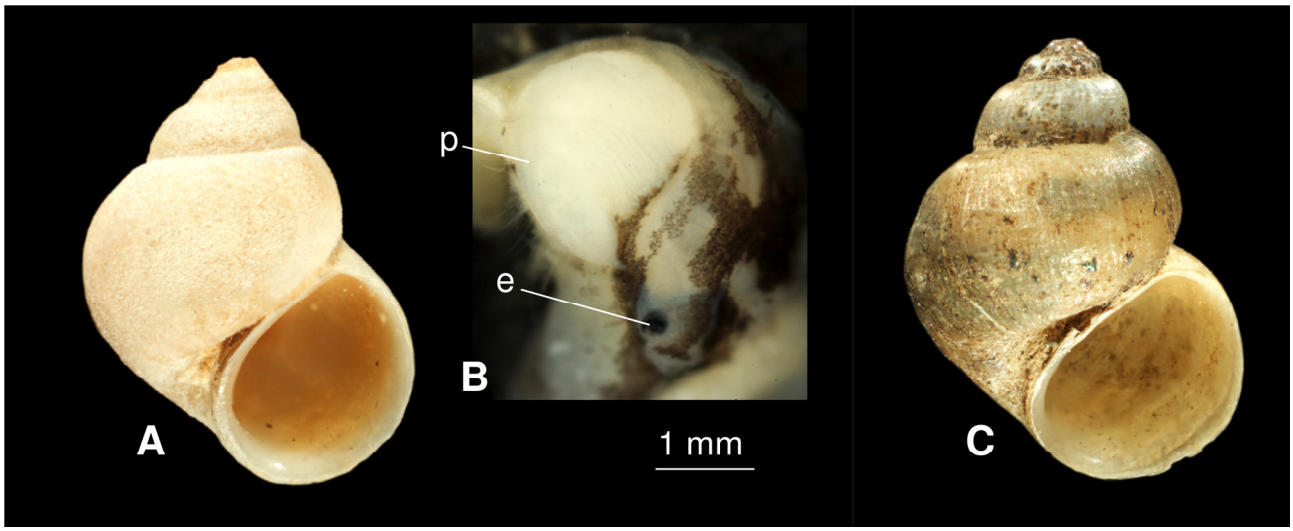

Figure 2. *Pseudamnicola goksunensis* n. sp. **A**: shell of holotype, **B**: penis in situ, **C**: paratype (Göksun suyu). Abbreviations: e = eye spot, p = penis.

Differentiating features: The new species can be easily be distinguished from *P. vinarskii* Glöer & Georgiev, 2012 by the shell shape (conical in *P. goksunensis* vs. elongated-conical in *P. vinarskii*). Furthermore, additional differences are found in the shell's size of the compared species (2 mm in *P. vinarskii* vs. 4.5 mm in *P. goksunensis*).

Habitat: The type locality of *Pseudamnicola goksunensis* n. sp. is a fast flowing stream (with associated canals and pools), with a poorly developed vegetation and a stony bottom. The new species was collected from a small canal. The second locality, Göksunsuyu stream is a big and fast flowing stream (Fig. 1C). It is worth to note that both localities are not typical habitats for pseudamnicolid snails.

***Pseudamnicola merali* n. sp.**
(Figs. 3A-B)

Holotype (ZMH 79805): shell height 2.6 mm, 1.3 mm width.

Paratypes: 15 specimens from the type locality (ZMH 79806), 15 specimens in coll. Glöer, 10 specimens from the type locality (KSUZM 2014-102), 35 specimens in coll. Gürlek.

Locus typicus: Turkey, Kahramanmaraş Province, Göksun city, Törbüzek stream, 38°5'39.41" N, 36°28'17.56" E.

Etymology: Named in memory of Meral Gürlek (1957-2006), the mother of the second author Mustafa Emre Gürlek.

Description.

Shell. The horn-colored shell is elongated conical with 4.5-5 whorls which are slightly convex with a deep suture (Fig. 3A). The whorls are regularly fast growing. The umbilicus is closed. The aperture is oval with an acute angle at the top. The shells are 1.9-2.6 mm in height and 3.4 mm broad.

Body. The mantel is black with a whitish border, eye spots are visible. The operculum is light orange and transparent. The penis is triangular without any outgrowth, broad at the base and acute at the distal end (Fig. 3B).

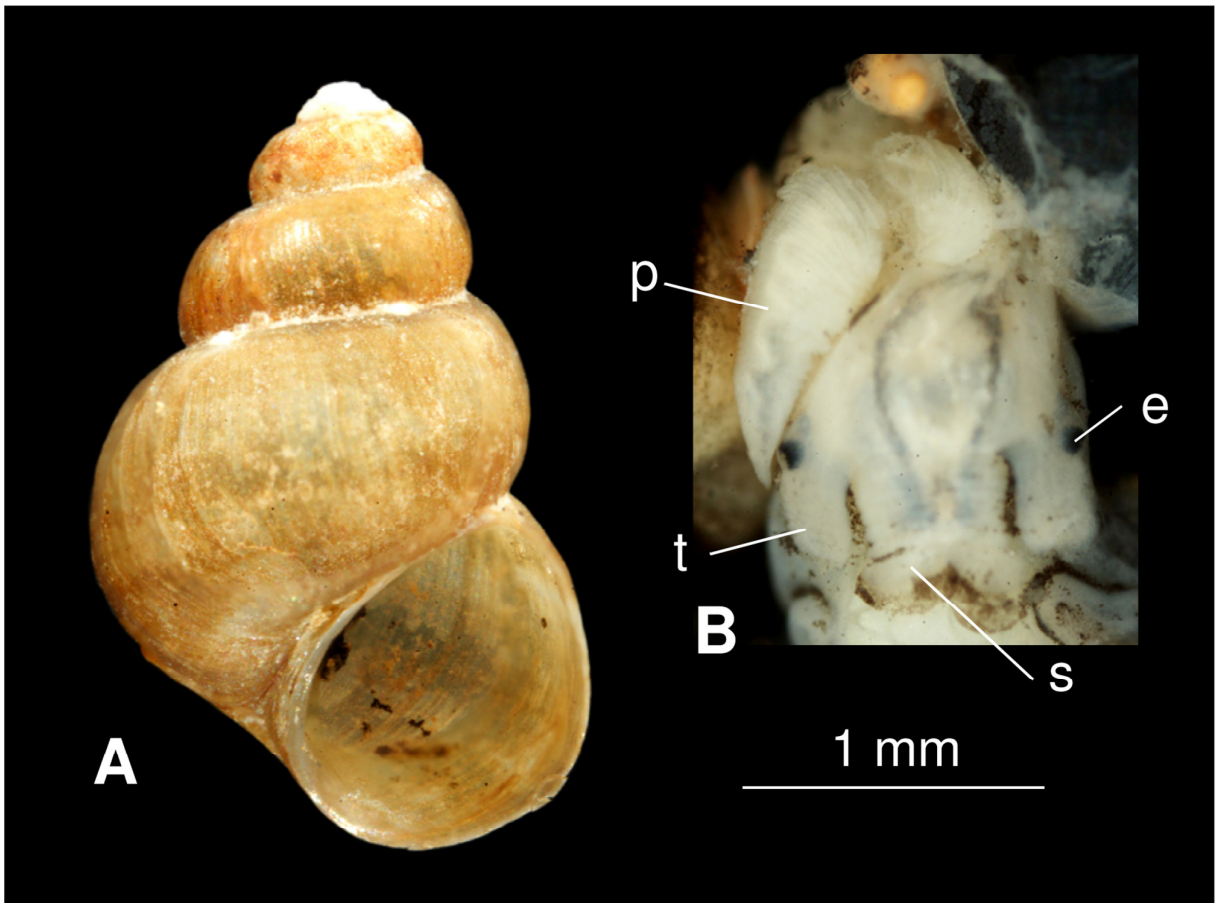

Figure 3. *Pseudamnicola merali* n. sp. **A**: shell of holotype, **B**: penis in situ. Abbreviations: e = eye spot, p = penis, s = snout, t = tentacle.

Differentiating features: Due to the shape of the shell the new species resembles *P. vinarskii*, but clearly differs from the latter species by the shape of the penis which is more drop-shaped (vs. slim triangular in *P. vinarskii*). In addition, *P. merali* is larger than *P. vinarskii* (2.6 mm vs. 2.0 mm).

Habitat: A fast flowing stream, with a poorly developed vegetation and a stony stream bottom (Fig. 1A). The new species were collected from the small canal.

***Pseudamnicola marashi* n. sp.**
(Figs. 4A-B)

Holotype (ZMH 79807): shell height 2.0 mm, 1.8 mm width.

Paratypes: 20 specimens from the type locality (ZMH 79808), 20 adult + numerous juvenile specimens in coll. Glöer, 15 specimens from the type locality (KSUZM 2014-103), 35 adult + numerous juvenile specimens in coll. Gürlek.

Locus typicus: Turkey, Kahramanmaraş Province, spring Çataloluk, 37°27'2.11" N, 36°45'33.62" E.

Etymology: Named after the province and city (Kahramanmaraş) where the new species was collected.

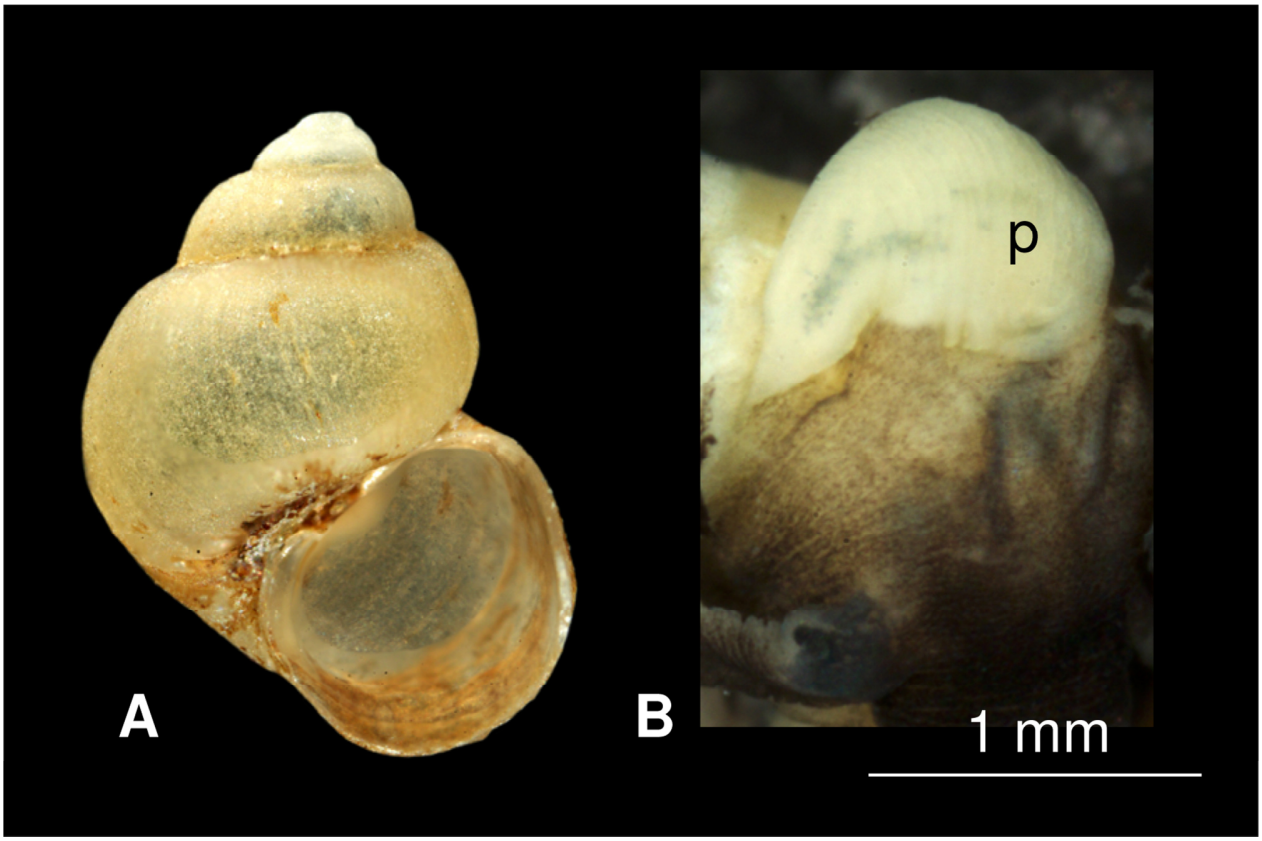

Figure 4. *Pseudamnicola marashi* n. sp. **A**: holotype, **B**: penis (p) in situ.

Description.

Shell. The horn-colored shell is conical with 4.5-5 whorls which are slightly convex with a deep suture (Fig. 4A). The whorls are regularly fast growing with a prominent body whorl. The umbilicus is closed. The aperture is oval. The shells are 2.2-2.3 mm in height and 1.8 mm broad.

Body. The mantel as well as head and snout are black, eye spots are visible. The operculum is light orange. The penis is triangular without any outgrowth, very broad at the base and acute at the distal end (Fig. 4B).

Differentiating features: The conical shape of the shell makes the new species close to *P. goksunensis* n. sp. However, the latter species can easily be distingushed from *P. marashi* n. sp. by the larger shell dimensions (4.5 mm vs. 2.3 mm in *P. marashi* n. sp.).

Habitat: Spring, with a well developed vegetation and a muddy bottom.

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