

# *Bythinella kazdaghensis* sp. n. (Gastropoda: Rissooidea) from the Mount Ida (Kaz Dağı), Northwestern Turkey

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**Abstract:** *Bythinella*, a highly diverse rissooidean genus, has a wide distribution area from the Iberian Peninsula to Asia Minor. More recent research about this genus revealed many taxa especially in the Balkan region. However, very few records were known from Turkey. This study aimed to describe a new species: *Bythinella kazdaghensis* sp. n. from the Mount Ida (Kaz Dağı) in Northwestern Turkey. *Bythinella kazdaghensis* sp. n. was compared with the species of Turkey and Greece as well. This new species was found to be similar to *B. turca* (Radoman, 1976) in terms of shell height.

**Key words:** Gastropoda, *Bythinella kazdaghensis* sp. n., Kaz Dağı (Mount Ida), New Description, Turkey.

## Introduction

The genus *Bythinella* Moquin-Tandon, 1855 has been known with a limited geographical distribution (ZHADIN 1965). These minute spring-snails are also regarded as endemics due to their adaptations to the local ecological conditions of springs and caves (BOETERS 1979, YILDIRIM 1999). Moreover, the genus is probably the most diverse rissoid genus in Europe (RADOMAN 1976). These minute gastropods occur throughout Europe, from Spain (BOETERS 1998) to Ukraine (SON 2006) – njama gi v spisaka na literaturata and to Turkey (RADOMAN 1976, YILDIRIM *et al.* 2006b). According to GLÖER, GEORGIEV (2011), recent studies have shown that the genus *Bythinella* is present with higher number of taxa than expected in the Balkans and possibly in Asia Minor.

According to a more recent study of BICHAIN *et al.* (2007), 80 species are known to belong to this genus in continental Europe. However, in a recent study by GLÖER, GEORGIEV (2011), it was emphasized that the Balkan Peninsula region is probably an important center of endemism for the genus *Bithynella*. In Turkey, *Bythinella turca* (Radoman, 1976), *Bythinella occasiuncula*

Boeters and Falkner 2001 and the *Bythinella opaca* (Schütt, 1965) were reported from different regions. According to the literature knowledge, despite the increase in species diversity of the genus *Bithynella* towards Eastern Europe, especially in the Balkans (GLÖER, GEORGIEV 2009, 2011), very few species are known from Turkey.

This paper aims to describe a new species of *Bythinella* named *Bythinella kazdaghensis* from the Kaz Dağı in Northwestern Turkey.

## Material and Methods

### Description of Sampling Site

The sampling site is situated in the western part of the Marmara Region in northwest of Turkey (Fig. 1). The area has the transition zone characteristics between the typical Mediterranean and the Black Sea climates due to its location (ANONYMOUS 2007). Kaz Dağı or Mount Ida (the ancient name) National Park (established in 1993), located in the southern part of the study area, and Troya Historical National Park (established in 1996), which is also located in the

study area, are regarded as special reserves of endemism playing an utmost important role for the protection of natural life (DEMIRSOY *et al.* 2005).

### Sampling

Gastropods were collected by hand under stones of a small spring on 9 September 2012 and were preserved in 75% lab-grade ethanol. The shell measurements were completed according to GLÖER (2002) and GLÖER, MEIER-BROOK (2002), – njama gi v spisaka s literaturata using a stereo zoom microscope (Olympus SZX16). The measurements of the digital images of the shell and soft body parts were performed by Microsystem Digital Camera 1.3.0.0. The dissections were carried out using a stereo microscope (Olympus C7). The type material is deposited at the Limnology Museum of Canakkale Onsekiz Mart University (COMULM) and Istanbul University, Science Faculty, Hydrobiology Museum, Istanbul (IUSHM), Turkey.

## Results

Our conchological and anatomical investigations revealed a new species belonging to the genus *Bythinella* (Table 1.).

### Family Bythinellidae Germain, 1931

Type Genus *Bythinella* Moquin Tandon 1855

*Bythinella kazdaghensis* sp. n.

**Material examined:** 29 ex. from type locality (29 shells measured and 3 males dissected), 09.09.2012, Serpil Odabaşı & Deniz Anıl Odabaşı leg.

**Holotype:** Shell height 2.65 mm, width 1.68 mm, ZMH 79653.

**Paratypes:** 5 ex. ZMH 79654, 5 ex. coll. Glöer (Hamburg, Germany), 5 ex. coll. Georgiev (Plovdiv University, Bulgaria), rest in coll. Odabaşı (Limnology Museum of Çanakkale Onsekiz Mart University, Turkey).

**Locus Typicus:** Ayazma Deresi, South of Evciler village at the Mount Ida (Kaz Dağı), Çanakkale-Turkey. N 39°44'41.87" E 26°50'33.80", 507 m a.s.l. (Fig. 1).

**Habitat:** The small creek, Ayazma Deresi, is clear and shallow, dominated by stony substrates covered by green algae. The temperature remains almost constant throughout the year and was 10.65°C at the time of the sampling. No macrophyte vegetation was observed in the water at the time of the sampling. The creek is always shaded by surrounding trees e.g. *Fagus orientalis* Lipsky, *Platanus orientalis* L., *Castanea sativa* Mill. and *Corylus* sp. *Bythinella* sp. n. was found under stones together with *Ancylus fluviatilis* O. F. Müller, 1774.



Fig. 1. Map of the sampling site

**Etymology:** The species was named after the Kaz Dağı, Turkey where it was found.

**Description:** The translucent shell is cylindrical and consists of 3½ – 4 whorls with a strongly developed last whorl and is slightly convex with rather deep suture. The thick walled shell has a pale surface. The apex is obtuse, the umbilicus is slit-like. The aperture is oval and angulated at the top. Shell height is between 2.16 and 2.65 mm, width is between 1.36 and 1.79 mm and the W:H ratio is 0.68 (n= 29).

**Anatomy:** The mantle is black with a white border. The head is grey but the snout and tentacles are white and tapered. The eyes are clearly visible. The white-colored penis has a rather constant width to the end, with rounded tip, and has an appendix which is slightly thickened at the end. The penis is slightly shorter than the penial appendix. The flagellum is not very long, and is thickened distally, but slimmer at the proximal end (Fig 2).

### Differential Diagnosis

The described new species in this study from the Kaz Dağı region differs from earlier records in Turkey. *Bythinella kazdaghensis* sp. n. can be distinguished from *B. turca* (RADOMAN 1976) by its slimmer shell and shallow sutures, rounded penis tip and shorter flagellum (*B. turca* has a long and curved flagellum, see YILDIRIM *et al.* 2006a). *Bythinella kazdaghensis* sp. n. also differs from *B. occasiuncula* Boeters and Falkner 2001 by its higher shell. *B. turca* (Radoman, 1976) and *B. occasiuncula* Boeters and Falkner 2001 have also restricted distributions in Eğirdir, southwest, and in Izmir west of Turkey, respectively.

### Ecology and Conservation

The type locality of *Bythinella kazdaghensis* sp. n. namely Ayazma brook (Deresi) is located at the upper slope of the Mount Ida (Kaz Dağı) that has

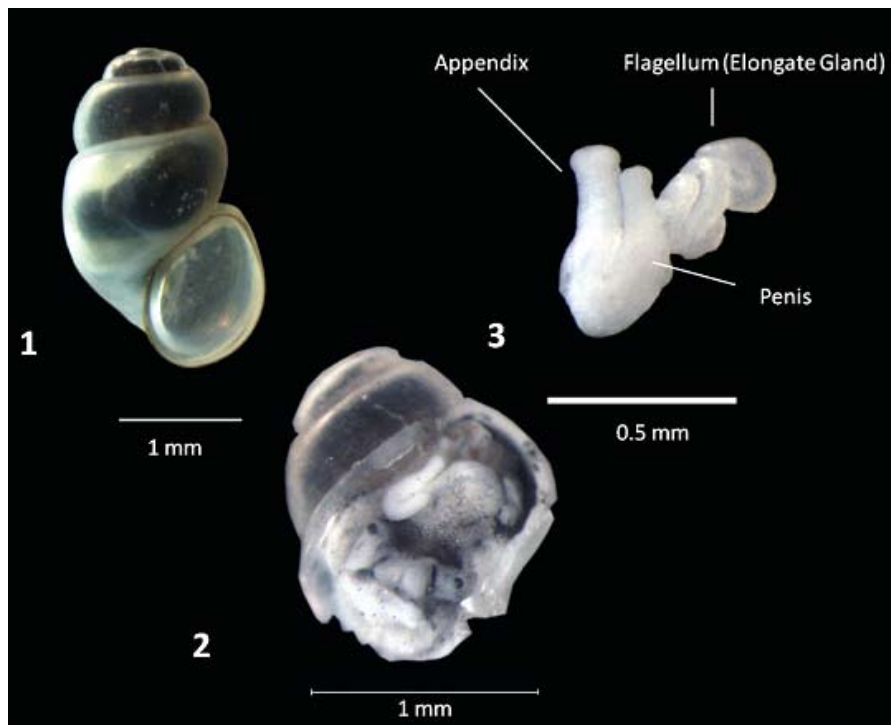


Fig. 2. *Bythinella kazdaghensis* sp. n.: 1 holotype; 2 penis in situ; 3 penis, penial appendix with flagellum

been modified as a recreational area serving to the daily tourism activities. The brook is also used by two trout farms and villagers who irrigate orchards and different fruit trees. Since the spring snails are quite intolerant to physical changes in the environment (YILDIRIM *et al.* 2006b), they are evidently very vulnerable to the negative anthropogenic factors (GLÖER, GEORGIEV 2009). Despite the fact that this recreational area is managed well, some conservation measures should be developed to protect the natural habitat. One probable precaution might be to limit the number of the daily visitors. This will help to decrease the waste amounts and the disturbance caused by them. This new species record is the first for the aquatic fauna of Mount Ida. This important data suggests maintaining freshwater ecology for this region, where many mining companies propose new mines.

## Discussion

The genus *Bythinella* is characterized by a cylindrical shell and a penis bearing a penial appendix with a flagellum. The shell of *Bythinella kazdaghensis* described here is distinguished from *B. turca* by its thickness and transparency. Although *B. kazdaghensis* showed nearly the same ranges in shell height as *B. turca*, it is apparently slimmer than that of *B. turca* with regard to maximum shell height and width

records (YILDIRIM *et al.* 2006a). In addition to the shell morphometry, *B. kazdaghensis* is distinguished by its uniform penis structure with a very short flagellum and pigmented head with tapered tentacles. Although *B. opaca* (Schütt, 1965) is considered to be with restricted distribution in Central Europe, it was recorded from İstanbul, Turkey, and this might be a new species (YILDIRIM *et al.* 2006b). This species also differs from *B. kazdaghensis* by shell characteristics. The shell of *B. opaca* is more slender and fragile than that of *B. kazdaghensis*. *B. occasiuncula* Boeters and Falkner 2001 was recorded nearby Izmir located in the Aegean region, the western part of Turkey. This species is distinguished by a smaller shell height than *B. kazdaghensis*. In distributional aspect, both, *B. turca* (Radoman, 1976) and *B. occasiuncula* Boeters and Falkner 2001 are possibly endemics, each occurring at only one location in Eğirdir (southwest of Turkey) and Izmir (west of Turkey), respectively. *Bythinella charpentieri cabirius* (Reischütz 1988) was recently recorded in Samothraki Island and the first anatomical descriptions were well defined by GLÖER, GEORGIEV (2012). Although, this Greek island is geographically very close to our research area, a similarity between this species and *B. kazdaghensis*, both from conchological and anatomical points of view, was not detected. The shell of *B. kazdaghensis* is smaller than that of *B. charpentieri cabirius* (Reischütz 1988). In addi-

**Table 1.** Characteristic features of *Bythinella* spp. recorded from Turkey. Legend: SH- Shell Height, SW- Shell Width, SW/SH- Shell Width: Shell Height ratio, MP- Mantel Pigmentation, P/PA- Penis : Penial Appendix ratio

<i>Bythinella</i> species	SH	SW	SW/SH	WN
<i>B.turca</i> (Radoman, 1976)	2.16-2.78	1.5-1.91	0.71	3 – 3½
<i>B. occasiuncula</i> Boeters and Falkner 2001	1.95	1.32	0.68	3½
<i>Bythinella</i> n. sp.	2.16-2.65	1.36-1.79	0.68	3½ – 4
<i>B. charpentieri charpentieri</i> (Roth 1855)	3.0	1.8	0.6	4½ – 5
<i>B. charpentieri cabirius</i> Reischütz 1988	1.9-2.5	1.1-1.2	0.49	4½

tion to the shell morphology, these species have apparently different penes and flagelli.

According to the data about geological evolution of Anatolia, Kaz Dağı (Mount Ida) was formed on the Aegean plate. In the geological process, especially in the late Miocene, it is assumed that the Aegean split into two plates and sea flooding has triggered speciation. Thus, the differences in species composition between Anatolia and Greece, as well as the Balkans were expected (ÇIPLAK 2004, DEMIRSOY 1999). We assume that *B. kazdagensis* briefly presented herein, is a new species, considering the high levels of endemism in the genus *Bythinella*, the zoogeographical features of Kaz Dağı and our conchological data.

In summary, the Mount Ida massive has been known by its rich flora and fauna including many

endemic taxa occurring in this water-rich area (AVCI 2005, DEMIRSOY *et al.* 2006). – ne e v spisaka Despite some malacological research performed in this region, there has not been any Risssoidea recorded. This new species record is the first for the aquatic mollusk fauna of Mount Ida. In conclusion, more comprehensive research focusing on the Risssoidea groups must be performed in Turkey, not only to increase the faunistic data but also to contribute to the development of environmental awareness.

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