

SELENOCHLAMYS YSBRYDA IN THE CRIMEAN MOUNTAINS, UKRAINE: FIRST RECORD FROM ITS NATIVE RANGE?

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Abstract One immature specimen of *Selenochlamys cf. ysbryda* Rowson & Symondson 2008 subterranean carnivorous slug, was found in the collections of 1989 from the Crimean Mountains in Ukraine. By the reduced eyes, structure of tentacle retractors and large size of the body this slug corresponds well to *S. ysbryda*, but not to the second species of this genus – *S. pallida*. However because of immaturity it is not certain that this slug belongs exactly to *S. ysbryda*. The specimen is compared with a specimen of *S. pallida* from the Caucasus. Habitat and biology of *S. cf. ysbryda* in the Crimea is discussed. It appears to be a native species.

Key words *Selenochlamys*, *Trigonochlamydidae*, slugs, Crimea, Ukraine

INTRODUCTION

The Crimean Mountains are a small mountain system located parallel to the Black Sea coast on the south of the Crimean Peninsula (southern Ukraine). Its extension is about 160 km and width is up to 50 km, highest point – 1545 m (Roman-Kosh Mountain). Origin of this mountain system and its biodiversity is connected with the Caucasus and the northern Pontic Mountains (Riedel, 1969; Zagorodniuk, 2004). Terrestrial molluscs of the Crimean Mountains were studied in detail as early as the late nineteenth century, beginning of the twentieth century, when most known now species were recorded. The 102 species of terrestrial molluscs registered here, include 20 endemics (Balashov & Gural-Sverlova, 2012). Several of these have been discovered for the first time in the last 60 years. Each mountain system contains very diverse habitat conditions, and some invertebrate populations can exist in a very restricted area of these and moreover live secretly. In this way a population of *Vertigo moulinsiana* (Dupuy 1849) was discovered in the Crimean Mountains as late as 2009. It inhabits a very small area of marshland (< 0.01 km²) in a ravine. This is its only known population in Ukraine (Balashov & Palatov, 2011). A further new and interesting find for the Crimea is the rediscovery of a *Selenochlamys* specimen in the material collected by Dr. A.A. Baidashnikov, in 1989.

MATERIAL AND METHODS

Material of this article was collected by Dr. A.A. Baidashnikov on 6 June 1989 on the southern slope of the Babugan Yayla (the highest plateau in the Crimean Mountains) above Zaprudne village (Alushta municipality, Autonomous Republic of Crimea). This was on the bottom of a small ravine in a broadleaf forest of beech, maple, aspen and hazel within the wider Crimean pine forests. Molluscs were collected under stones. Unfortunately the precise location of the collection point is unknown but is within an area of about 10 km², as Dr. Baidashnikov could not remember the details. Approximate coordinates: 44°36'N 34°18'E. Possible elevation above sea level is 600–1300 m.

Together with *Selenochlamys* were 13 species of terrestrial molluscs: *Lauria cylindracea* (Da Costa), *Peristoma rupestre* (Krynicky), *Mentissa canalifera* (Rossmässler), *Euconulus fulvus* (O.F. Müller), *Vitrea pygmaea* (O. Boettger), *Oxychilus diaphanellus* (Krynicky), *Oxychilus cf. subeffusus* (O. Boettger) (empty shells), *Oxychilus deilus* (Bourguignat), *Oxychilus kobelti* (Lindholm), *Bilania boettgeri* (Clessin), *Phenacolimax annularis* (Studer), *Vitrina pellucida* (O.F. Müller) and *Monacha fruticola* (Krynicky).

One specimen of *Selenochlamys pallida* O. Boettger from Abkhazia (Western Caucasus), which was collected in 2010 by Dmitry Palatov (Lomonosov Moscow State University), and on loan to the collection of my institution, was also examined.

All studied materials are kept in the Collection of terrestrial molluscs of Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (Kiev). Description of the slugs is given mainly in the terms used by Rowson & Symondson (2008).

RESULTS

A single specimen of *Selenochlamys* collected near Zaprudne village (Fig. 1) has preserved length about 35 mm, diameter about 5 mm (soft fixation, slug semi-contracted). Body vermiform, cylindrical with detached head. Mantle very small (about 1.5×2 mm), broader than long, located on the hind end of body. Pneumostome located in the middle of the right side of the mantle. Mantle lobe is directed diagonally from the sole. Behind the mantle, in the tail part of the body, is located a very short but clear keel, length about 2 mm. Body wall thin. On the surface of the back four clear lengthwise dorsal grooves pass from mantle to head. A few more, not so clear, grooves pass along the sides of body. Sole very narrow, divided into 3 lengthwise stripes; width about 1/3 of body's diameter.

Upper tentacles short, semi-retracted. No eyes were found even after the detailed dissection of tentacles. Where tentacle retractor is connected with the integument, no specific structures are visible. The tentacles were semi-retracted, so it is easy to miss small colourless vestigial eyes. Normally developed, pigmented eyes, can however be ruled out, though present in most Limacoidea.

Most of the body interior is filled by a huge, elongate buccal mass. Opening of oesophagus is dorsomedial. Tentacle retractors are connected near genital opening and entry to the oesophagus is on the buccal mass. Shell was not extracted. Genitalia poorly developed (Fig. 2A), closely

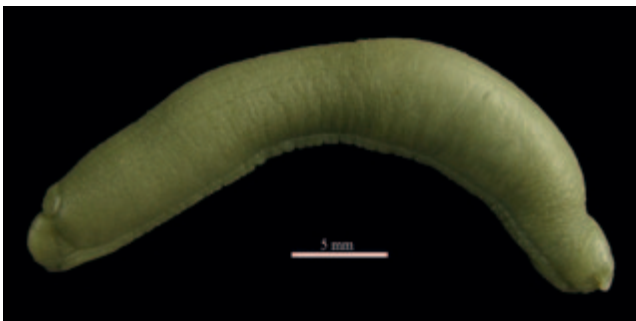


Figure 1 Immature specimen of *Selenochlamys* cf. *ysbryda* from the Crimea.

adpressed to body wall and difficult to see at first sight. Therefore the specimen is immature. Genitalia are not crossed by tentacle retractors. Atrium very long. Penis massive with detached thin flagellum. Penial retractor very long. Bursa copulatrix starts from atrium, its reservoir is not pronounced. Other parts of the genitalia are poorly formed and hard to recognise.

DISCUSSION

From the absence of an external shell and position and size of the mantle, the studied specimen can belong only to genus *Selenochlamys* of the Trigonochlamydidae and clearly differs from all other known genera of this family (Likharev & Wiktor, 1980; Forcart, 1983; Schileyko, 1988; Schileyko & Kijashko, 1999; Schileyko, 2003; Suvorov, 2003; Rowson & Symondson, 2008; Sysoev & Schileyko, 2009). By the complex of characteristics observed, no difference could be detected between this specimen and descriptions of *Selenochlamys* (Likharev & Wiktor, 1980; Forcart, 1983; Schileyko, 2003; Rowson & Symondson, 2008; Sysoev & Schileyko, 2009). Currently two species are recognized – *Selenochlamys pallida* O. Boettger 1883, which occurs in the Caucasus and northern Turkey (Likharev & Wiktor, 1980; Forcart, 1983; Schileyko, 2003; Sysoev & Schileyko, 2009), and *Selenochlamys ysbryda* Rowson & Symondson 2008, a “ghost slug”, which was recently described from urban domestic gardens in Wales, UK (Rowson & Symondson, 2008; Sysoev & Schileyko, 2009). The earliest known finding of this species in Wales was 2004, and several colonies are currently known there (Reise & Hutchinson, 2009). The native range of *S. ysbryda* was considered unknown, but probably located somewhere in the Caucasus (Rowson & Symondson, 2008; Sysoev & Schileyko, 2009).

Selenochlamys ysbryda differs from *S. pallida* mainly by the reduced (vestigial) eyes, the structure of the tentacle retractors and the much larger size of its body (Rowson & Symondson, 2008). On these characteristics the Zaprudne specimen belongs to *S. ysbryda*. Even though immature, the Zaprudne slug is larger than any known specimen of *S. pallida* (Rowson & Symondson, 2008). No eyes were detected, and at best were reduced in the examined specimen. As shown in figures of *S. ysbryda* (Rowson & Symondson, 2008) the tentacle retractors are connected near the genital opening.

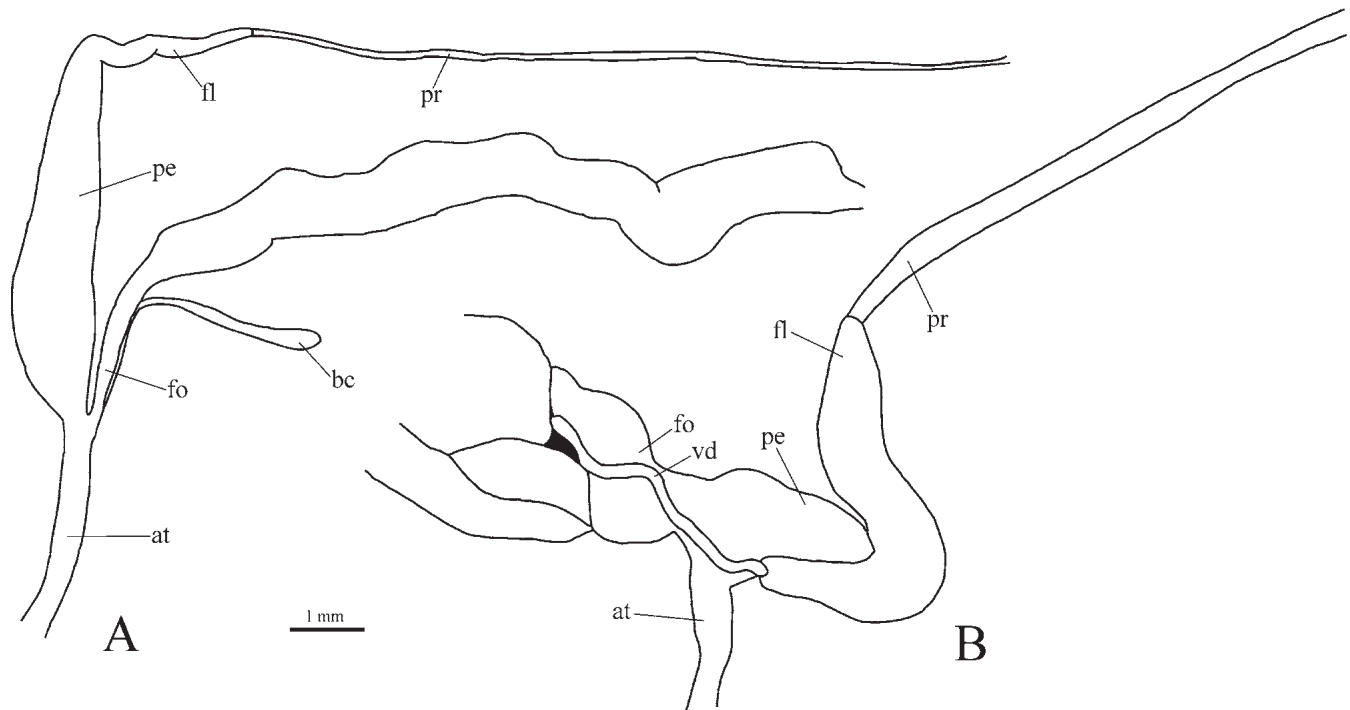


Figure 2 Reproductive system of: A – immature *Selenochlamys* cf. *ysbryda* from the Crimea; B – adult *Selenochlamys pallida* from the Caucasus. Legend: at atrium; fo free oviduct; bc bursa copulatrix; vd vas deferens; pe penis; fl flagellum; pr penial retractor.

One specimen of *S. pallida* from the Caucasus was available for comparison. Its length was 20 mm (contracted), but the slug had a well developed, massive, reproductive system (Fig. 2B). In size, nevertheless, the body is several times smaller than the immature Zaprudne slug. The tentacle retractors seem not to be connected to the area of the genital opening, as shown also for Caucasian *S. pallida* (Rowson & Symondson, 2008). However it is difficult to compare muscle groups in contracted specimens. The tentacles were completely retracted but normal dark eyes were visible inside.

Despite the above, an adult specimen of the Crimean *Selenochlamys* should ideally be studied to confirm its identity as the true *S. ysbryda*. In light of this I refer to it as *Selenochlamys* cf. *ysbryda*.

The specimen of *S. cf. ysbryda* was collected in natural habitat, together with 13 native Crimean species including 5 endemics (see “Material and methods”). One of these species, *Oxychilus kobelti*, is considered a rare and threatened species, listed in the Red Book of Ukraine (official national red list of threatened species). The natural territory round about is minimally disturbed and adjoined by two large protected areas, the

Crimean Nature Reserve and Yalta Mountain Forest Nature Reserve. It is possible that the slug was collected within the Yalta reserve, near its eastern border. Consequently, *Selenochlamys* cf. *ysbryda* should be considered a probable native species in Crimea. The possibility of introduction cannot be entirely discounted, but is minimal.

The Zaprudne slug represents a first finding of Trigonochlamydidae in a natural habitat outside the Caucasus and Pontic Mountains. The origin of the fauna of the Crimean Mountains is related to that of the Caucasus and the northern Pontic Mountains. In the Pliocene these mountains systems were probably connected (Riedel, 1969; Zagorodniuk, 2004). *Oxychilus kobelti* occurs both in the Crimean Mountains and in the Pontic Mountains of northern Turkey (Riedel, 1972; 1995). Endemic species closely allied to *O. kobelti* occur in the Caucasus (Riedel, 1972). More importantly, *O. kobelti* lives in Turkey in the same region as that from which *S. pallida* is recorded (Forcart, 1983; Riedel, 1995). Consequently, the genus *Selenochlamys* in the Crimea may have a similar origin to that of *O. kobelti*.

Rowson & Symondson (2008) noticed that a Turkish specimen of *S. pallida* they examined had tentacle retractors similar to those of *S. ysbryda*,

but not to those of the Caucasian *S. pallida*. A reinvestigation of the taxon represented by the Turkish *Selenochlamys plumbea* Simroth 1912, synonymised with *S. pallida*, may therefore be necessary.

Selenochlamys ysbryda is considered a subterranean, deeply edaphobitic (soil-dwelling) or maybe even troglobitic (cave-dwelling) species (Rowson & Symondson, 2008). The Crimean Mountains are a cave region, with more than 1000 caves currently known, the longest of which reach more than 20 km (Zagorodniuk, 2004). About 50 troglobiont (obligate cave-dwelling) endemic species are recorded but most are arthropods, with no known troglobiont molluscs (Zagorodniuk, 2004). Therefore maybe species may be related to caves. However, it seems highly likely that *S. ysbryda*, rather than a troglobiont, is simply a soil-dwelling animal, like *S. pallida* (Likharev & Wiktor, 1980; Forcart, 1983). Certainly, the soil environment is occupied in its adopted Welsh habitats.

The extreme difficulty in detecting it, even at close range within urban gardens in Wales (Rowson & Symondson, 2008), underlines the problems of recording it within a natural area, such as that of the Crimea. Considerable effort may therefore have to be expended to establish its true range and to provide more material for study.

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