

## A second record of *Selenochlamys* (Stylommatophora: Trigonochlamyidae) from Crimea

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A live specimen of *Selenochlamys* was collected in a cave on the Ai-Petri massif of the Crimean Mountains in 2014. It is described and compared with the first Crimean specimen that was collected in 1989 on the Babugan massif. Both specimens are juvenile. Both seem to be more similar to *S. ysbryda* than *S. pallida*, and are considered as *S. cf. ysbryda*. Distribution and habitat preferences in Crimea are discussed. A second finding of *Selenochlamys* in Crimea suggests the first was not accidental and this slug is likely to be native in Crimea.

**Key words:** slugs, terrestrial molluscs, caves

### Introduction

Family Trigonochlamyidae is a small group of carnivorous subterranean slugs, for a long time known only from the Caucasus and the adjacent part of Turkey (LIKHAREV & WIKTOR 1980, SCHILEYKO & KIJASHKO 1999, SCHILEYKO 2003, SUVOROV 2003). The family consists of 9 genera of 1–2 recognized species each, including *Selenochlamys* Boettger, 1883. The type species of this genus, *Selenochlamys pallida* Boettger, 1883, was described from Georgia and another name, *Selenochlamys plumbea* Simroth, 1912, was introduced from Turkey but later considered as synonym of *S. pallida* (LIKHAREV & WIKTOR 1980). In the 2000s slugs of *Selenochlamys* genus were found in the urban environment of Wales (Great Britain) and considered as a new species, *Selenochlamys ysbryda* Rowson & Symondson, 2008, that was probably introduced there from the Caucasus (ROWSON & SYMONDSON 2008). The species has since been found in several towns in Wales and in neighbouring England (REISE & HUTCHINSON 2009, ROWSON et al. 2014). A few years later *Selenochlamys* was reported for the first time from Crimea (BALASHOV 2012). This report was based on a single juvenile specimen collected in a natural mountain habitat in 1989. This slug was more similar to *S. ysbryda* than *S. pallida*, and considered as *S. cf. ysbryda*. The slugs of Crimea are still not so well studied, with several probably native species recorded for the first time in recent years (GURAL-SVERLOVA et al. 2009, BALASHOV & GURAL-SVERLOVA 2012, BALASHOV & BAIDASHNIKOV 2012). Therefore the fact that *Selenochlamys* was not previously reported from Crimea is probably caused by the insufficient state of knowledge and does not necessarily imply recent invasion from Caucasus. Since in Wales *Selenochlamys* is clearly not a native species, this suggests that *S. ysbryda* may be a Crimean endemic. However, more specimens are needed to clarify the status and taxonomy of Crimean *Selenochlamys*. This paper reports

a second specimen of *Selenochlamys* from Crimea, collected in 2014.

### Material and methods

Material was collected by I. Turbanov on March 3, 2014 in Nassonova (Anlusha) cave on the Ai-Petri massif of the Crimean Mountains. This cave is located 2 km south of Rodnikovskoe village, 500 m a. s. l. (Fig. 1). Entrance to the cave is located in a ravine among large rocks in beech forest (Fig. 2). The slug was collected on the floor of a passage about 10 m from the cave entrance (Fig. 3). This cave is formed in the epikarst zone of karstified rock and is known to extend about 500 m. The live slug was preserved directly in ethanol. No other molluscs were collected at the same time. For comparison we examined two specimens of *Selenochlamys* mentioned in BALASHOV (2012): *S. cf. ysbryda* from Crimea, collected by A. A. Baidashnikov (I. I. Schmalhausen Institute of Zoology) on June 6, 1989 on the southern slope of the Babugan massif above Zaprudne village (Alushta municipality), and *S. pallida* from Abkhazia (Western Caucasus) collected in January 2010 in the valley of the Psyrzcha River near New Athos town by D. M. Palatov (Moscow State University). All three studied specimens are kept in the collection of terrestrial molluscs of the I. I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (Kiev).

### Results

In preservation, the specimen of *Selenochlamys* from Nassonova cave (Fig. 4) is about 20 mm long (completely contracted) and 3–7 mm wide. Body much enlarged in middle part, thinnest at the neck (head retracted). Body completely colourless (white). Mantle very small (0.5×1.2 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 directed diagonally

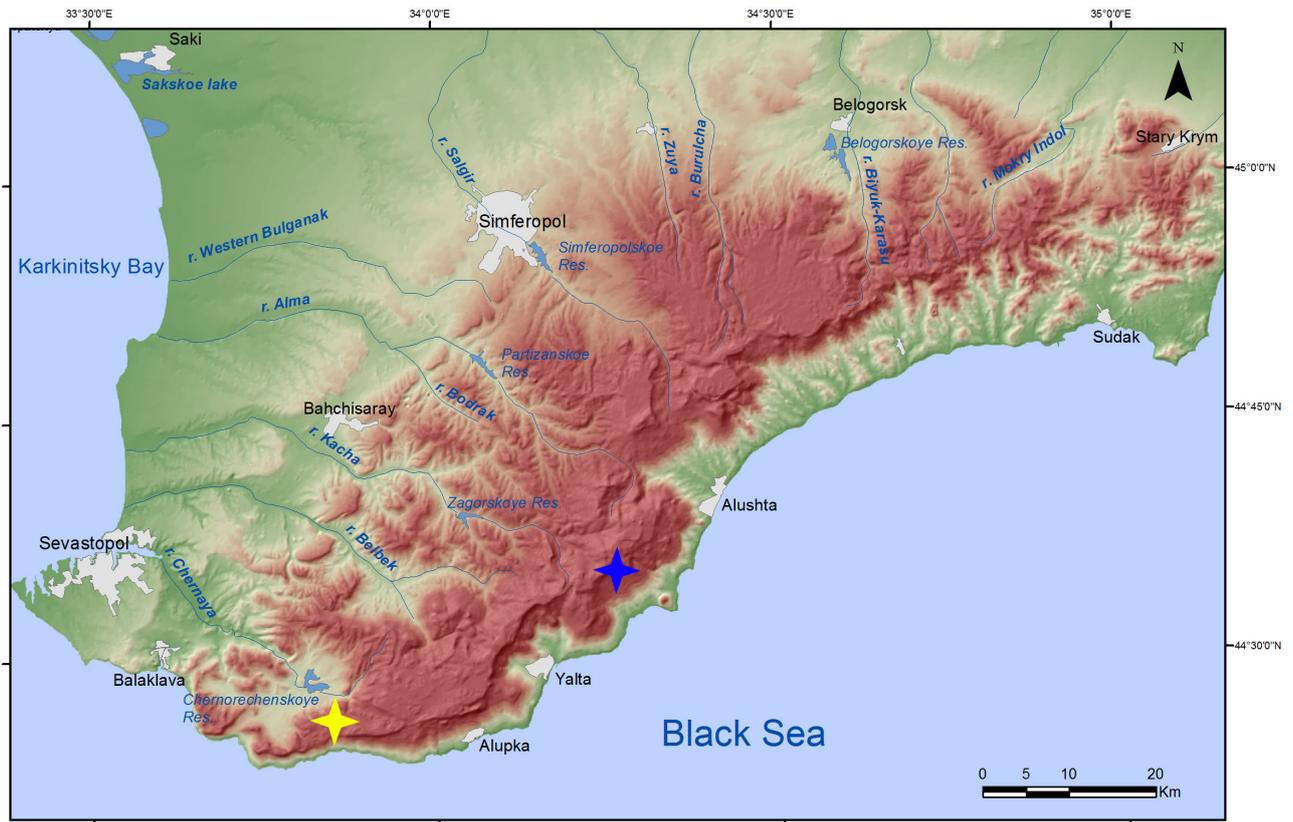


Fig. 1. Findings of *Selenochlamys* in Crimean Mountains: yellow mark – 2014, blue mark – 1989.



Fig. 2. Landscape around entrance (indicated by arrow) to Nassonova cave. Photo by I. Turbanov.

from the sole. Behind the mantle, is a very short but clear keel about 2 mm long and 1 mm high. Body wall moderately thin (about 0.3 mm). On the surface of the back four longitudinal dorsal grooves pass from mantle to head. A few more, not so clear, grooves pass along the sides of body. Sole very narrow (about 1.5 mm wide), divided into 3 lengthwise strips. Head and retractors contracted. There are no black eye spots inside retractors. Buccal mass inside body comparatively smaller than in the other two studied specimens. Opening of oesophagus dorsomedial. Tentacle retractors connected near genital opening, not crossed with genitalia. Shell was not extracted. Genitalia very small and poorly developed, closely adpressed to body wall. Atrium very long, male and female tracts passing into it, but not completely divisible into recognisable parts. Therefore the slug is clearly juvenile.

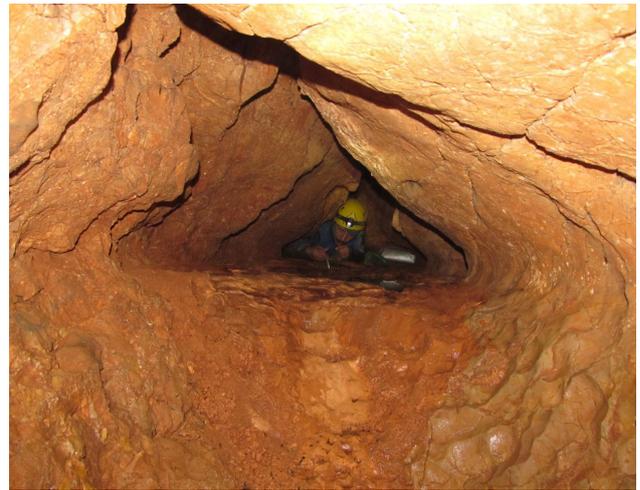
### Discussion

The Nassonova cave specimen is similar to the only other specimen known from Crimea. These specimens were fixed in different ways one contracted and one extended, making comparison difficult. The new slug is much smaller than the previous one (35×5 mm). Partly this may be caused by different fixation. The new Crimean specimen is very similar in size and shape to the one from Abkhazia (same 20 mm length) that was fixated in an identical way (put alive into ethanol). However the Abkhazian specimen is mature, with a massive reproductive system and buccal mass. Thus it appears the Crimean specimen would be larger at maturity. Body size is one difference between *S. ysbryda* and *S. pallida*, the former being much larger (ROWSON & SYMONDSON 2008).

The Nassonova cave specimen is completely colourless, while the older Crimean specimen is pinkish. At the same time the Abkhazian slug is slightly yellowish. It has been suggested that *S. ysbryda* is more adapted to live deep in the ground than *S. pallida* (ROWSON & SYMONDSON 2008) therefore it is expected to be less pigmented. But it is hard to explain why two Crimean specimens are pigmented differently. Perhaps it is intraspecific variability.

The tentacle retractors in both Crimean specimens are arranged as in *S. ysbryda* rather than *S. pallida* (ROWSON & SYMONDSON, 2008). There are no black eye spots on the retractors of Crimean specimens, but there are such spots in the Abkhazian specimen. Therefore Crimean *Selenochlamys* has probably no developed eyes similar to *S. ysbryda*, but not to *S. pallida* with usual stylommatophoran eyes (ROWSON & SYMONDSON 2008). Consequently, it seems that new Crimean specimen, same as previous one, is more likely belongs to *S. ysbryda*, than to *S. pallida*. Nevertheless, because of their juvenile age and absence of full-valued possibility to study their tentacles with eyes, we cannot unambiguously declare that Crimean species is *S. ysbryda*. In our opinion it should be referred to as *S. cf. ysbryda* until more specimens can be studied.

Importantly this new *Selenochlamys* record suggests that previous specimen was not accidental for Crimea. Both were found in natural habitats, in the rocks under beech mountain forest in ravines, quite far from the nearest settlement (2 km and about 4.5 km in the first case). This



**Fig. 3.** Our colleague Dr. Robert Vargovitch in the passage where *Selenochlamys* specimen was collected (Nassonova cave). Photo by I. Turbanov.

suggests *Selenochlamys* is probably native in Crimea and, if proven to be *S. ysbryda*, should be considered a Crimean endemic.

In spite of the fact that the two known locations of *Selenochlamys* are not divided by any rivers, they are located relatively far from each other (36 km, Fig. 1), in different mountain massifs (Babugan and Ai-Petri) of Crimean Mountains. Thus the known range of *Selenochlamys* in Crimea differs from that of some other species of molluscs found with it on the Babugan and mainly related to this massif – *Oxychilus kobelti* (Lindholm, 1910), *Oxychilus deilus* (Bourguignat, 1857) and the recently described endemic *Taurinellushka babugana* Balashov, 2014 (BALASHOV 2012, 2014). Since there are no other species that are known from these two territories only, the real range of *Selenochlamys* in the Crimean Mountains is probably much wider.

Earthworms, possibly *Eisenia fetida* (Savigny, 1826) (determination should be confirmed), are frequent in Nasonova cave. Slugs of *Selenochlamys* probably could hunt this species. No other molluscs were found in Nasonova cave in spite of the fact that it was studied a few times in search of cave organisms, and many invertebrates from other groups were collected here (Turbellaria, Lumbricina, Isopoda, Diplura, Collembola, Coleoptera, Diptera, Chilopoda, Pseudoscorpiones, Opiliones, Aranei, Acari, etc). Therefore the cave itself is probably not a main habitat of *Selenochlamys*. It probably lives in the soil and in small cavities among rocks, as was suggested for Crimea before (BALASHOV 2012). However it may live relatively deep underground. The first Crimean specimen was collected under a large stone at the bottom of a deep ravine; such occurrences near the surface could be occasional. The Crimean Mountains are a karst region deeply penetrated by small cavities and caves over wide areas. If small karst cavities rather than caves are the favoured habitat, probably such habitats in the Crimean Mountains should be studied more deeply. This may reveal more *Selenochlamys* specimens and perhaps some other interesting subterranean invertebrates.



Fig. 4. Specimen of *Selenochlamys* from the Nassonova cave: view from the right side and from the sole. Photo by I. Balashov.

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