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Short Communication

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New Records of Geomitrid Gastropods: *Cochlicella acuta* (O. F. Müller, 1774) from Bulgaria and *C. barbara* (Linnaeus, 1758) from Montenegro

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Abstract: Two new localities of *Cochlicella acuta* in Bulgaria nearby the Black Sea coasts are recorded. With these new findings, the total number of known localities of the species in Bulgaria becomes three. *Cochlicella barbara* is reported for the first time from the territory of Montenegro.

Key words: new records, new localities, Bulgaria, Montenegro

Introduction

Cochlicella acuta inhabits Mediterranean and Atlantic coasts of South-Western Europe, including the south and west of England and Wales, islands off the west coast of Scotland, along the Irish coast, Northern France, Belgium and the Netherlands. The species has been introduced in the eastern Mediterranean, including Greece, Turkey, Israel and Egypt (Kerney & Cameron 1979, Baker et al. 1991, Heller 2009, Welter-Schultes 2012, AnimalBase, accessed 2020). It has also been introduced to Australia, being considered a pest species there (Baker et al. 1991).

Cochlicella acuta (O. F. Müller, 1774) was reported for first time for the Bulgarian fauna by Hudec & Vašatko (1973) from the surroundings of Burgas town, nearby the Arkutino beach. The authors believed that the specimens were introduced in Bulgaria. Afterwards, the snail had not been found again in Bulgaria for almost fifty years, regardless of the collecting efforts of many Bulgarian and foreign malacologists. Dedov (1998) considered the species rare for the Bulgarian fauna.

Cochlicella barbara (Linnaeus, 1758) inhabits the Mediterranean region where it is frequently found in xerophilous coastal habitats. It is introduced to Belgium and Great Britain but also to North America, Chile, Japan, South Africa, Australia and New Zealand, where it is known as a serious pest (Roth & Hertz 1997, Ali & Ramdane 2020, Ekin & Şeşen 2020). To our knowledge, *C. barbara* is not known from Montenegro, while two other species of the same genus, *C. acuta* and *C. conoidea* (Draparnaud, 1801), have been reported (Karaman 2014).

The present paper provides the first record of *C. barbara* from Montenegro and reports two new localities of *C. acuta* in Bulgaria.

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Materials and Methods

The specimens of both species were hand-collected. For information about the newly collected specimens and the locality reported by Hudec & Vašatko (1973), see Table 1.

Results

An empty shell of *C. barbara* (Fig. 1A) was collected in Sand Beach "Velika Plaža" in Ulcinj, Montenegro. It is the first finding of this species for Montenegro.

In 2011, one of the present authors (D. Georgiev) found a living population of *C. acuta* (Fig. 1B) in sandy terrains with psammophytic vegetation close to the estuary of Lisovo Dere River, nearby the village of Tsarevo. The next finding took place in 2020, when by the volunteer Kristina Kyumurdzhieva sampled the species in an artificial garden in the centre of town of Sozopol (Fig. 2A, B). At present, the species is known for Bulgaria from three localities near the Black Sea coasts (Table 1). Both newly-discovered populations of *C. acuta* are

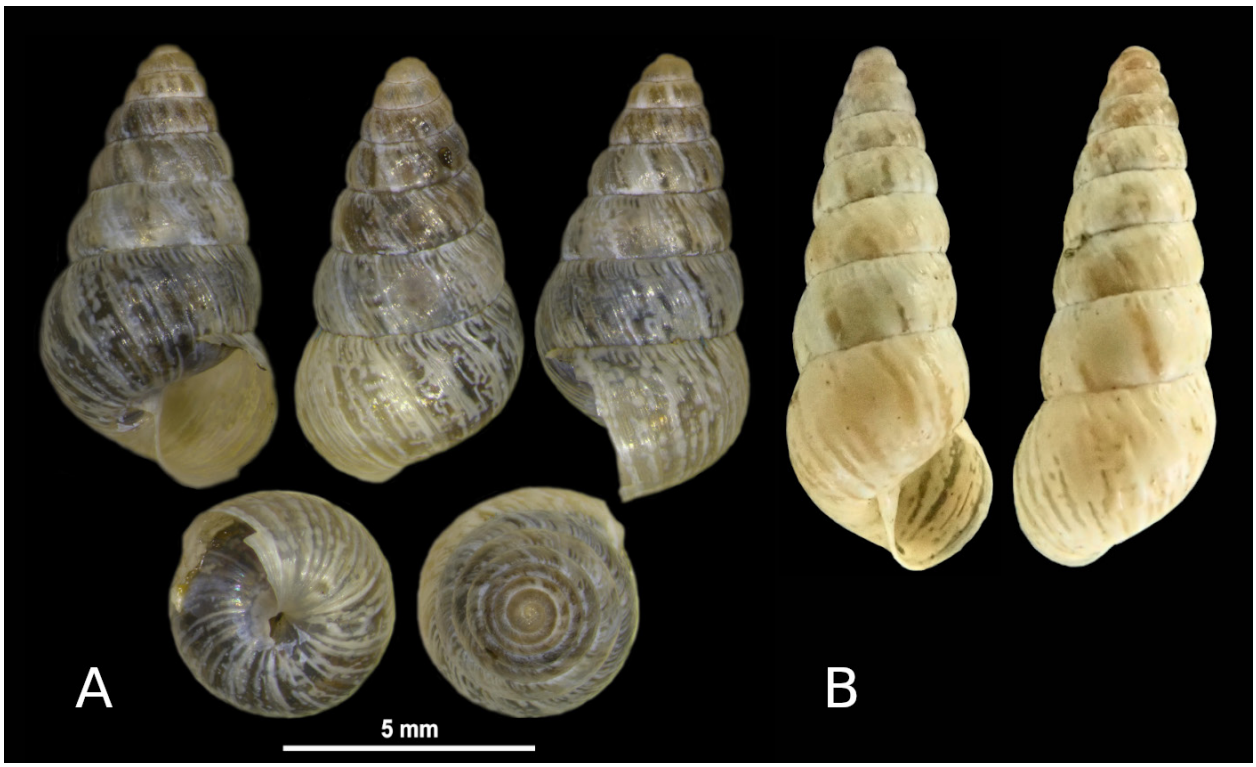

Fig. 1. *Cochlicella barbara* (Linnaeus, 1758), Montenegro, Ulcinj (A) and *Cochlicella acuta* (O. F. Müller, 1774), Bulgaria, Black Sea coast, Tsarevo (B)

Table 1. The localities of *Cochlicella acuta* in Bulgaria and *C. barbara* in Montenegro.

Date	Coordinates, altitude	Populations and specimens	Locality	Leg. (published by)
Cochlicella acuta				
2 VII 1971	N42.3320 E027.7293, 7 m (restored)	Locally abundant	Bulgaria, Arkutino Marsh; locality description not given	Ditrich & Kroupa leg. (Hudec & Vašatko 1973)
8 VI 2011	N42.1597 E027.8643, 7 m (restored)	Locally abundant, five empty shells collected	Bulgaria, Tsarevo Town, Nestinarka Beach, estuary of the rivulet Lisovo Dere; sandy terrains with psammophytic vegetation	D. Georgiev leg. (present study)
16 XII 2020	N42.4163 E027.6963, 17 m (restored)	Locally abundant, 16 alive specimens collected	Bulgaria, Sozopol Town, centre, artificial garden	K. Kyumurdzhieva leg. (present study)
Cochlicella barbara				
V 2013	N41.895278 E19.290556, 0 m (restored)	One empty shell collected	Montenegro, Ulcinj, sand beach "Velika Plaža" in Ulcinj, sandy terrain	M. Šćiban leg. (present study)

stable, with numerous alive individuals. Totally, 21 specimens were collected.

Discussion

According to Welter-Schultes (2012), *Cochlicella acuta* occurs in grasslands, dunes and sandy habitats, on limestone, open dry habitats, in coastal vicinity, often exposed to the sun. According to the later author, based on observations in Britain, this species is frost-sensitive, being found in frost-free habitats only. This possibly explains why in Bulgaria *C. acuta* was found on the Southern Black Sea coast only, where the climate is milder compared to the northern coast. Generally, the Bulgarian findings confirmed the ecological preferences of the species, i.e. dry sandy habitats near seashore. Although Hudec & Vašatko (1973) did not indicate the exact habitat of the species in Bulgaria, it can be assumed that these are open xerothermic terrains around Arkutino Marsh. This first finding of the species in Bulgaria was most probably due to an introduction happened shortly before record (Hudec & Vašatko 1973, Damyanov & Likharev 1975). The lack of reports for other localities, since the first finding suggests that the species has not spread much beyond the initial area where it had been introduced. In multiple collections of material from the Burgas Region, including Arkutino, in 2003–2022, *C. acuta* had not been found; most probably, it had disappeared from this spot. This may suggest that the newly-discovered populations around the beach "Nestinarka" in Tsarevo and in the centre of Sozopol are the result of recent introduction. Large numbers of live specimens were found in both studied localities of *C. acuta*. It is an indication that these populations are stable and survive during colder periods. For the time being, the species does not appear to be a serious pest and does not threaten populations of native species (compare Citrus Imports from the Arab Republic of Egypt 2002, Jourdan et al. 2019). Further studies are needed to clarify the role of *C. acuta* for the native populations.

Cochlicella barbara occurs in the same type of habitat as *C. acuta*, occasionally in slightly more hu-

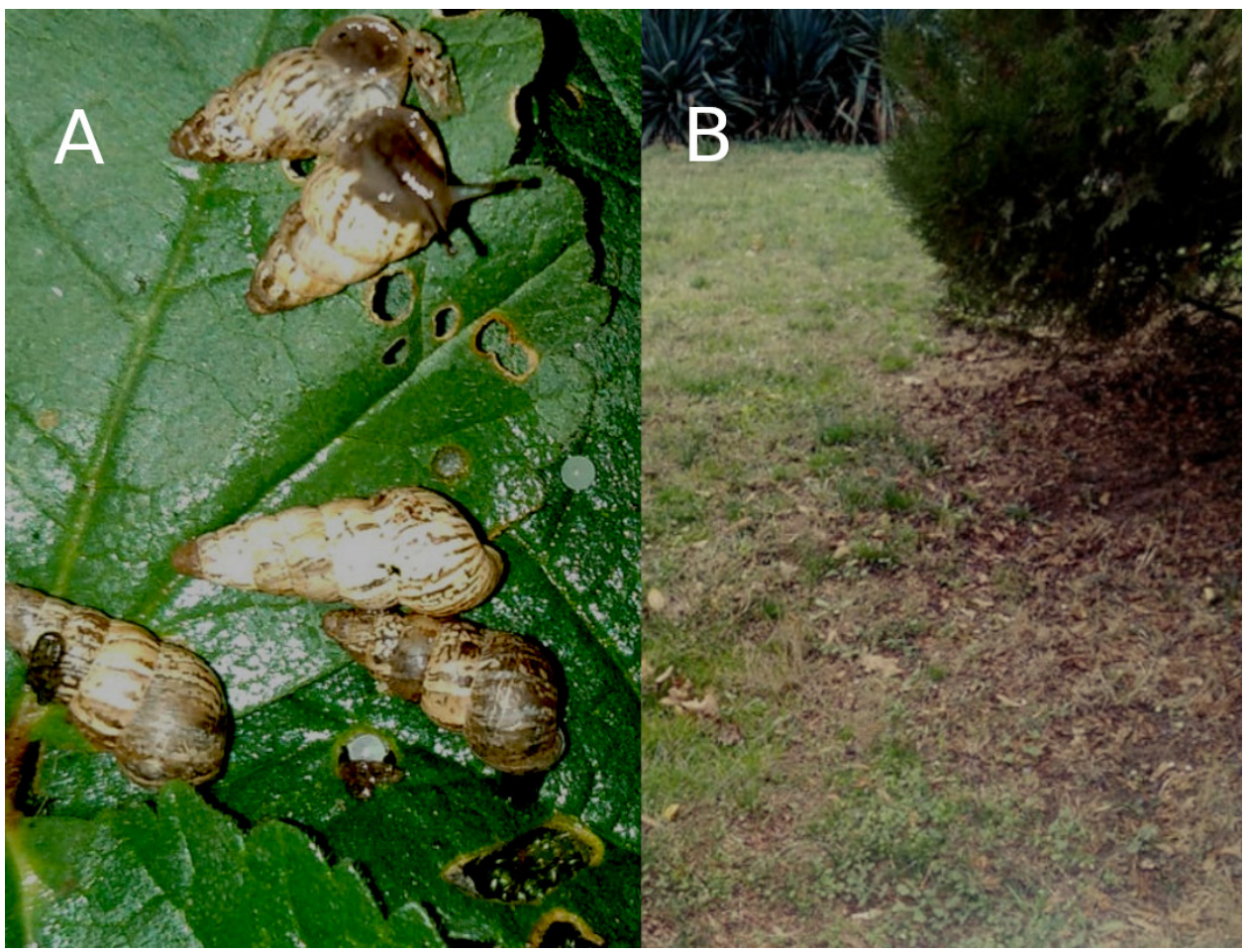

Fig. 2. *Cochlicella acuta* (O. F. Müller, 1774), Bulgaria, Black Sea coast, Sozopol. Alive specimens (A) and a general view of the locality (B)

mid areas (Welter-Schultes 2012). These two species are generally similar in their external appearance but can be distinguished based on the shape of the shell. In *C. acuta*, the shell is more slender and pointed than in *C. barbara*, which is broader at its base and, therefore, less slender than the former species. Additionally, *C. barbara* is usually more brownish in colour. Juveniles of *C. acuta* are more sharply carinated at the periphery of the last whorl, while *C. barbara* is rounded (Welter-Schultes 2012, Ali & Ramdane 2020). Finding a fresh shell of *C. barbara* in Montenegro is a possible indication of the presence of the species in the country. Further field research is needed to confirm this suggestion.

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