

On the occurrence of *Oxychilus camelinus* (Bourguignat, 1852) in Bulgaria (Gastropoda: Zonitidae)

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Adult shells and living specimens of the terrestrial gastropod *Oxychilus camelinus* were collected on Rahat Tepe Hill in Plovdiv city, and in Stara Zagora. These records confirm the findings of Hesse (1913) of the occurrence of this species in Bulgaria.

Key words: Zonitidae, anthropogenic habitat, synanthropy

Introduction

BOURGUIGNAT (1852) described a new species of zonitid from Lebanon and Syria named “*Helix camelina*” (later changed to *Oxychilus camelinus* (RIEDEL 1980)) with the type locality: “prope Heliopolim (Baalbek)”. The differential diagnosis was made by comparison with the most similar-appearing zonitid, *Helix frywaldskyana* Ross-mässler, 1842 (= *Balcanodiscus frywaldskyanus* (Ross-mässler, 1842)), from which *O. camelinus* differs by its narrower umbilicus, lack of angle on the last whorl and pigmented shell. The features of *O. camelinus* are: shell light horn-coloured, almost flat, with distinct radial growth lines, umbilicus narrow, 1/8 of shell diameter, up to almost 6 whorls, slowly increasing, suture deep, last whorl not much wider, flat at lower side, aperture obliquely depressed. D = 9–11 mm, H = 4–4.5 mm (BOURGUIGNAT 1852, RIEDEL 1980, WELTER-SCHULTES 2012).

About 60 years after Bourguignat’s finding, HESSE (1913) described a new subspecies from Bulgaria as “*Hyalinia camelinia thracica*”, collected in the flood debris of the Maritza River at Plovdiv city. Later RIEDEL (1992) reported *O. camelinus* from Greece (Kavála, Chaniá, Iráklío, Chalkída); DHORA & WELTER-SCHULTES (1996) from Albania (Shkodër); SCHÜTT (2001) from Turkey (Istanbul, Izmir, Bilecik, Bodrum); MIENIS (2002, 2003), HELLER (2009) and BÖSSNECK (2011) from Israel (Ramat Aviv a suburb of Tel Aviv); and VARDINOYANNIS et al. (2012) from Cyprus. From all these records it was clear that *O. camelinus* is a synanthropic species preferring relatively dry, rocky habitats (WELTER-SCHULTES 2012), and often found in gardens (MIENIS 2002). The species is considered as alien to Europe, but there are no studies to clarify where its area of origin is (ROQUES et al. 2009).

The urban malacofauna of Bulgaria is poorly known, (DEDOV & PENEV 2004). Surprisingly, *O. camelinus* was omitted from the “Fauna Bulgarica, Gastropoda terrestria” of DAMYANOV & LIKHAREV (1975). The species was

subsequently included in the annotated check list of Bulgarian terrestrial snails by DEDOV (1998), but was later listed as “under question” in HUBENOV (2007), and was omitted in the fauna of Bulgaria by IRIKOV & ERÖSS (2008). Therefore, on the base of literature sources, the occurrence of *O. camelinus* in Bulgaria remained uncertain. In this paper, two Bulgarian cities are reported as confirmed localities for this species.

Material and Methods

Empty shells and living snails were collected by hand on Rahat Tepe Hill in Plovdiv city on May 20, 2011, and in Stara Zagora city on November 28, 2013. Adult shells of *O. camelinus* in a good state of preservation were measured using calipers. The dry shell material is stored in the author’s collection. A binocular microscope was used to study the contents of excrement from one of the live-collected individuals. Two individuals were kept in a small terrarium and some observations on their behavior were made, from November 28, 2013 to February 13, 2014.

Abbreviations used: D – shell diameter, H – shell height, U – umbilical width, LW – width of last whorl.

Results

Oxychilus camelinus (Riedel, 1980)

Hyalinia camelina thracica Hesse, 1913: HESSE (1913)

Oxychilus camelinus thracicus (Hesse, 1913): DEDOV (1998)

Oxychilus camelinus (Bourguignat, 1852): HUBENOV (2007)

Oxychilus camelinus thracicus (Hesse, 1913): IRIKOV & ERÖSS (2008)

Material examined: 1 shell, May 20, 2011, Rahat Tepe Hill, Plovdiv city, Upper Thracian Lowland, 42°09'06.6"N, 24°45'05.9"E, 175 m above sea level, N. Mustafa and N. Mintcheva lgt.; 3 shells and 3 live individuals, November 28, 2013, near an uncultivated garden of a house in

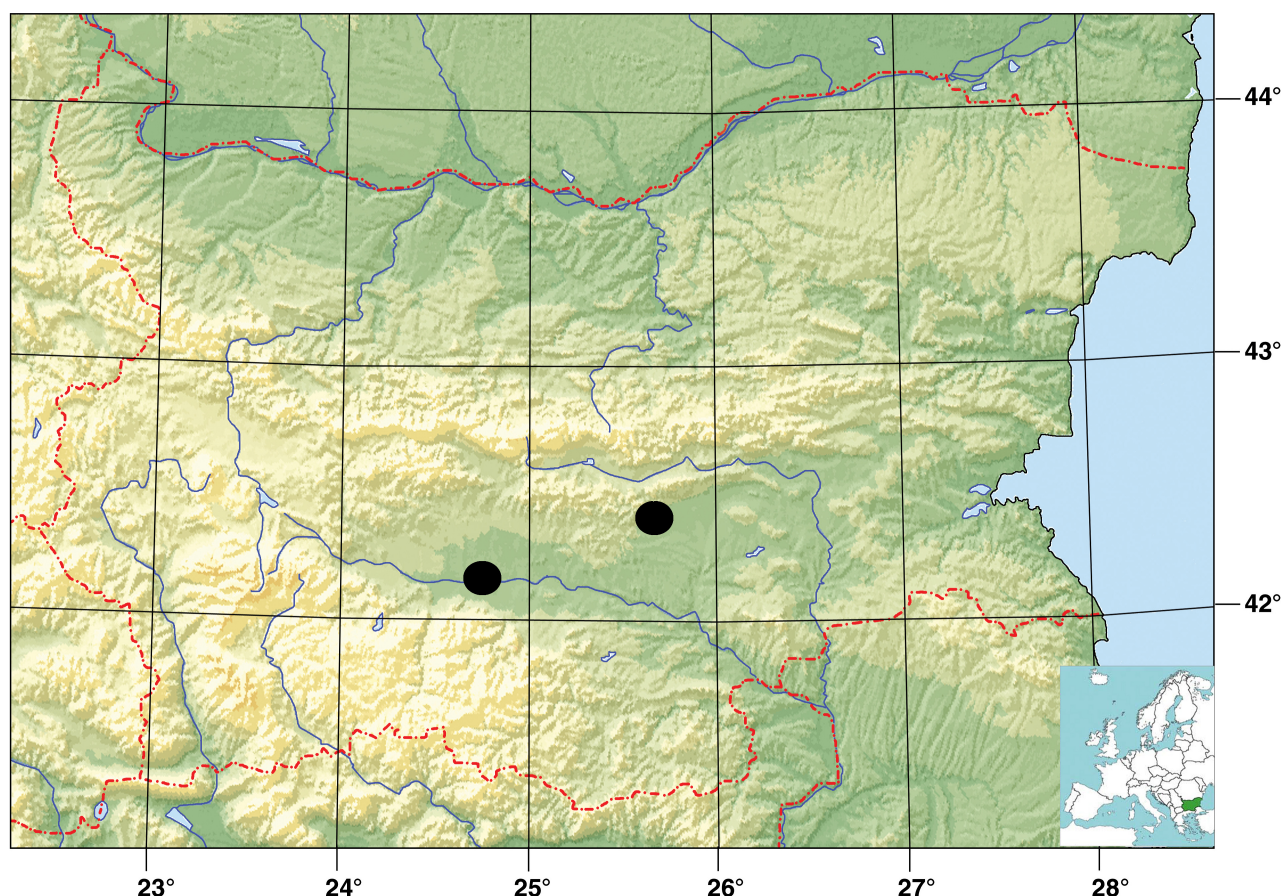


Fig. 1. Known localities of *Oxychilus camelinus* in Bulgaria: left – Plovdiv, right – Stara Zagora.

Stara Zagora city, Upper Thracian Lowland, 42°25'42.8"N, 25°37'58.6"E, 183 m above sea level, D. Georgiev lgt. (Fig. 1).

Description of specific features of specimens found: Shell smaller than the minimal adult shell size known for the species: D = 7.1–8.3 mm, H = 4.0–4.1 mm, U = 0.7–1.1 mm, LW = 1.9–2.0 mm (Table 1). The tentacles, head and neck are light-grey, the sole is white-yellow.

Habitat: The area of the Rahat Tepe Hill in Plovdiv consists of granite rocks with a mosaic of grassland, broad-leaf bushes, and trees (*Tilia* sp., *Acer* sp.) around old houses. The second site, located in Stara Zagora, was a house yard with a thick layer of leaf detritus, stones and bricks (Fig. 2). All the living snails were found under bricks.

Notes on the diet: the excrement of one of the living specimens contained green plant matter (fine, short cellulose fibers), translucent plant matter (long rough cellulose fibers which might be paper remains), detritus (brown matter with small sand particles), and remains of an small insect (cf. Hymenoptera). In terrarium conditions, the snails ate pieces of cucumber, aquarium fish food, and pork meat.

Activity: The snails kept in the terrarium were active during all winter months when the air temperature was higher than 11.8 °C.

Notes on reproduction: Copulation was observed on January 21, 2014, 9:30 a.m. when the air temperature was 15 °C. Two individuals were in close contact, with contracted tentacles, on the terrarium floor, and the umbilical shell surfaces were side to side (Fig. 3). On February 11, 2014, one of the two individuals was found dead. Some eggs had been deposited in the soil. A total of eight eggs were found, one single laid, and two groups of 3 and 4, respectively. The egg diameter was 1.7 mm. The second specimen was found dead on February 13, 2014.

Discussion

Although the report for the Plovdiv area is a confirmation of the Hesse's finds (HESSE 1913), Stara Zagora city is a newly reported area of *O. camelinus* occurrence in Bulgaria. Considering the mild climate conditions and presence of many suitable habitats in South Bulgaria, this species' occurrence over a wider range can be expected there.

According to HESSE (1913), the subspecies *Oxychilus*

Table 1. Shell measurements of *Oxychilus camelinus* collected in Bulgaria. Abbreviations used: D – shell diameter, H – shell height, U – umbilical width, LW – width of last whorl.

No. of specimen	D	H	U	LW	H/D	U/D	LW/D
1 (Plovdiv)	8.3	4.0	1.1	1.9	0.5	0.1	0.2
2 (St. Zagora)	7.4	4.0	0.7	2.0	0.5	0.1	0.3
3 (St. Zagora)	7.4	4.1	1.0	2.0	0.6	0.1	0.3
4 (St. Zagora)	7.1	4.0	0.8	1.9	0.6	0.1	0.3



Fig. 2. *Oxychilus camelinus* from Stara Zagora city (Bulgaria): 1 – shell; 2, 3 – two living specimens collected; 4 – living specimen at its habitat; 5 – habitat of collected specimens.

camelinus thracicus differs from the nominal subspecies in its shell size. All the collected specimens were smaller than the minimal width of the nominal species (9 mm), and thus may be this subspecies, however, further research is needed to clarify the taxonomic position of *O. c. thracicus*. It is not clear whether it is a valid subspecies or if the small shell size might result from unfavourable environmental conditions differing from those in the original distribution area (if the species is introduced). It is likely that

this species might be of synanthropic origin, which makes it difficult to discuss any morphological differences. As the urban malacofauna of the Balkans and Turkey is still poorly known, *Oxychilus camelinus* may well have a much wider distribution in this area. It can be assumed that the recent species range is not interrupted, and extends from Syria and Lebanon, though Turkey and Greece to Bulgaria and Albania. However, intraspecific variability and subspecies taxonomy remain unclarified.



Fig. 3. The individuals of *O. camelinus* kept in the terrarium in copulation, and a clutch of four eggs.

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