



## NEW DATA ON SINISTRAL AND SCALARIFORM SHELLS AMONG ROMAN SNAIL *HELIX POMATIA* LINNAEUS, 1758 IN POLAND

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**ABSTRACT:** As seen from the literature, each occurrence of sinistral and scalariform shell abnormalities among gastropods may have importance for variously aimed studies (e.g. ecological, developmental, genetic) due to the rarity of such abnormalities in nature. Three new records of atypically developed shells of the Roman snail: one sinistral (Wielkopolskie Province) and two scalariform (one record in Wielkopolskie Province and one in Mazowieckie Province) are reported.

**KEY WORDS:** *Helix pomatia*, shell abnormalities, Poland

Shell abnormalities have long been of interest to malacologists (e.g. HARTMANN 1841–1844, ROSSMÄSSLER 1853, MEISENHEIMER 1912, DROZDOWSKI 1962, KORALEWSKA-BATURA 1997, JACKIEWICZ et al. 1998, 1999). Malformations have been described in case of both aquatic (e.g. JACKIEWICZ 1972, 2000, CHECA & JIMÉNEZ-JIMÉNEZ 1997, OKUMURA et al. 2008, ZUYKOV et al. 2011, 2012) and terrestrial snails (e.g. OKUMURA et al. 2008, KSIĄŻKIEWICZ 2011), and several factors have been pointed out as producing deformities, such as genetic abbreviation (e.g. related with radiation), disturbances during embryonic development, population density as well as parasites (BIDWELL et al. 1986, PANOVA et al. 1999, ŻBIKOWSKA & ŻBIKOWSKI 2005, ZUYKOV et al. 2011, 2012).

Two types of shell deformities have been intensively studied: sinistral (deviato sinistrorsa) and scalariform (deformatio scalaris) (e.g. CHECA & JIMÉNEZ-JIMÉNEZ 1997, OKUMURA et al. 2008, ZUYKOV et al. 2012). Some of studies on the occurrence of sinistral and scalariform shells have concerned the Roman snail *Helix pomatia* Linnaeus, 1758 and emphasised rarity of such deformations. For example MEISENHEIMER (1912) reported that amongst 20,000

dextral individuals of the Roman snail only one was sinistral. Such data were confirmed by KILIAS (1960) and NIETZKE (1963). NIETZKE (1963) also noticed that the frequency of shell deformations was higher under breeding conditions. In his studies 455 shells were regularly developed and 10 were sinistral (2%). Also DZIABASZEWSKI (1977) recorded one horn-shaped individual of the Roman snail in such conditions. WŁOSIK & MUSIAŁ (1982) reported only one sinistral specimen among 585 dextral individuals and only one scalariform amongst 1,140 individuals. Images of such abnormal shells are provided by FÉRUSAC & DESHAYES (1820–1851), GEYER (1927) and GERMAIN (1929) in their publications.

In 2008–2014 we conducted monitoring of the Roman snail populations across whole Poland as well as intense quantitative studies on its local populations in the vicinity of the Adam Mickiewicz University in Morasko (northern part of Poznań, Wielkopolskie Province, Fig. 1). The studies were conducted in accordance with the general methodology developed for this species. The snails were searched visually along transects in previously designated areas (BŁOSZYK & KALINOWSKI 2015, in press). We pinpointed a



Fig. 1. Localities where the abnormal specimens of Roman snail were found (solid circles): Poznań (one sinistral individual and one scalariform individual) and Duchnice (one scalariform individual)

total of 15,000 individuals of the Roman snail (Fig. 2) whereas only one snail was abnormal. The living, sinistral individual (Fig. 3) was found in a pine forest near a housing estate and Różany Potok stream ( $52.4667391^{\circ}\text{N}$ ,  $16.9344401^{\circ}\text{E}$ ) in 2014.

Another two abnormal, scalariform specimens were found by accident. A scalariform shell (Fig. 4) was found on the railway embankment near residential buildings, in 2012 (Wielkopolskie Province,  $52.4149^{\circ}\text{N}$ ,  $16.91519^{\circ}\text{E}$ , Fig. 1). A live, adult scalariform Roman snail (Fig. 5) was found in Duchnice village (Mazowieckie Province,  $52.195429^{\circ}\text{N}$ ,  $20.798583^{\circ}\text{E}$ , Fig. 1). The individual was found near a compost storage, in an area covered with ruderal vegetation and partially shaded by a birch plantation



Fig. 2. A Roman snail with regularly developed, dextral shell (height 55.0 mm, width 47.5 mm) photographed in its natural habitat. Photo: T. KALINOWSKI



Fig. 3. The sinistral Roman snail (height 36.3 mm, width 37.3 mm) photographed in its natural habitat (Morasko near Poznań). Photo: T. KALINOWSKI

and pine forest. The population size of the Roman snail in the area is difficult to estimate (probably a few hundred individuals), because the species was not subject to detailed surveys in this site. The sinistral as well as the two scalariform specimens were deposited in the Natural History Collection, the Malacology Section (Faculty of Biology, Adam Mickiewicz University, Poznań).

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Fig. 4. The scalariform shell (height 40.9 mm, width 28.7 mm) found on the railway embankment in Poznań. Photo: T. KALINOWSKI



Fig. 5. The scalariform individual from Duchnice (height 52.5 mm, width 27.4 mm). Photo: J. MUSIAŁ

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