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THE INVASION CONTINUES – A NEW LOCALITY OF *MONACHA CARTUSIANA* (O. F. MÜLLER) (GASTROPODA: PULMONATA: HELICIDAE) IN THE ŚWIĘTOKRZYSKIE MTS (CENTRAL POLAND)

MARCIN GÓRKA

Faculty of Geology, University of Warsaw, Al. Żwirki i Wigury 93, 02-089 Warszawa, Poland
(e-mail: magurka@uw.edu.pl)

ABSTRACT: A new locality of *Monacha cartusiana* (O. F. Müller) was found in the city of Kielce, Central Poland. The colony of snails is located above the edge of an abandoned quarry. The new site may suggest that *M. cartusiana* keeps expanding its distribution range in Poland.

KEY WORDS: land snails, expansion, *Monacha cartusiana*, Poland.

Monacha cartusiana (O. F. Müller) is a submediterranean species; its natural distribution range includes Mediterranean countries, Asia Minor, Crimea and southern Ukraine, the Balkans, France, Belgium and the Netherlands, Hungary, southern fringes of England and westernmost part of Germany (WIKTOR 2004). It is a relatively new element in the Polish malacofauna. For over 150 years it has been repeatedly reported from the territory of Poland by several authors but only the latest records from sites in Wrocław and Poznań raise no doubts (RIEDEL 1988, CHOLEWA et al. 2003). Moreover, the first of these two sites is being turned into a housing estate which may soon lead to its destruction (WIKTOR 2004).

The new site of *M. cartusiana* was discovered on the 24th of June 2005 and is located at the Wietrznia Hill on the south-eastern periphery of the city of Kielce (Figs 1a and 1b), far from the continuous distribution range of this species. The city is situated in Central Poland, in the western part of the Świętokrzyskie Mts. The Wietrznia Hill represents the easternmost elevation in the Kadzielnia Chain that is built almost exclusively of Upper Devonian carbonates (predominantly limestones and marls; SZULCZEWSKI 1971). The large quarry of these rocks, located on the hill, and abandoned for over 30 years, is now a geological sanctuary. The malacofauna of the Wietrznia Hill was investigated by CZUBIŃSKI & URBAŃSKI (1933) and

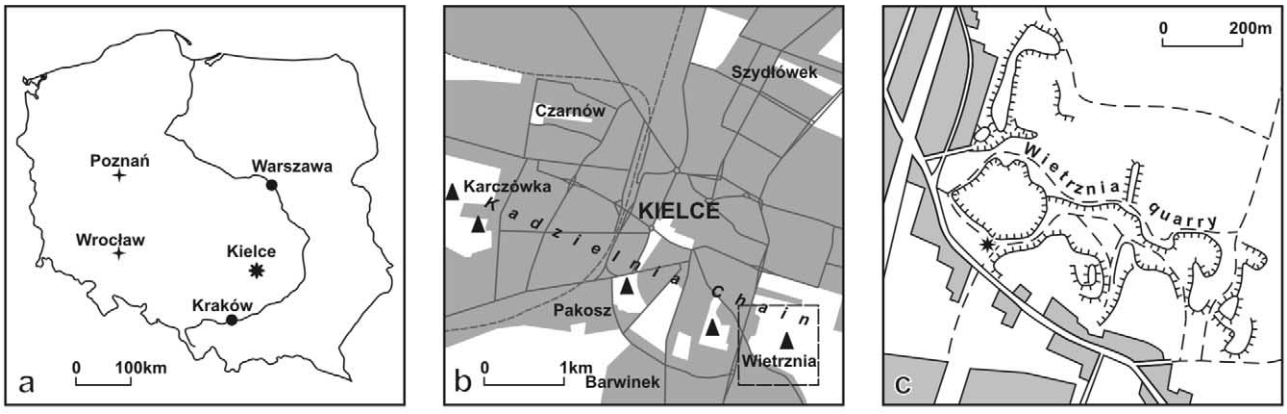

Fig. 1. Location of the new site of *M. cartusiana* (asterisk) and other localities mentioned in the text (crosses)

Fig. 2. *Monacha cartusiana* in its habitat at the newly discovered site at Wietrznia, Kielce (all photos of the author): 1. General view of the new site: A – grass-covered area, B – coppice; 2. *M. cartusiana* among herbaceous plants; 3. *M. cartusiana* among grass blades; 4. *M. cartusiana* on a blade of *Arrhenatherum elatius;* 5. Snails on a trunk of *Robinia pseudoacacia*: M – *M. cartusiana*, A – *Arianta arbustorum*, C – *Cepaea nemoralis*, L – *Laciniaria plicata*; 6. Juvenile *M. cartusiana* on a trunk of *R. pseudoacacia*, with an adult *L. plicata* (L); 7. *M. cartusiana* on dead leaves under the trees; 8. *M. cartusiana* among young specimens of *Aegopodium podagraria*

PIECHOCKI (1981); more recently its quarry dumps were studied by BARGA-WIĘCŁAWSKA (1997).

The area occupied by *M. cartusiana* is ca. 3,000 m^2 and is situated above the south-western edge of the quarry, some 300 metres from a main transit road to Tarnów. From the south this area adjoins the Wojska Polskiego Street, which is running south-east to Bukówka. Along the opposite (southern) side of the street there are suburban houses and repair shops. The area lacks any buildings and is mostly covered by a xerothermic sward that occurs in the western and southern parts of the discussed site (A; Fig. 2.1). The dominant plants are *Arrhenatherum elatius* (L.), *Medicago falcata* L., *Medicago sativa* L., and *Trifolium pratense* L., a few small patches (approx. 1 m^2 each) of *Aegopodium podagraria* L. and *Lamium album* L. are present, as well as small trees and shrubs, mainly young *Prunus domestica* var. *syriaca* (Borkh.), *Rosa rugosa* Thunb., and *Fraxinus excelsior* L. In north-eastern part of the site the number of trees increases. A group of trees with *Robinia pseudoacacia* L., *Salix caprea* L., *Populus tremula* L., and *Acer platanoides* L. forms a small coppice there (B; Fig. 2.1). Shrubs of *Rubus idaeus* L. together with *Arrhenatherum elatius* (L.) and *Convolvulus arvense* (L.) are frequent beneath the trees, but in more shady places there commonly occur large patches of soil covered only with leaf-litter, or overgrown by *Aegopodium podagraria* L.

M. cartusiana is very abundant at the site. It occurs usually among the vegetation, attached to the grass blades and stems of herbaceous plants. In such situation the snails were observed on hot and sunny days of the 24th of June and the 3rd of July 2005. The snails were more active on the 22nd of July, after a heavy rain, and on a rainy morning of the 6th of August 2005, being then very numerous (locally over 10 specimens per m^2) all over the investigated site. The snails could be found among the herbaceous plants and grasses (Figs 2.2–2.4). Large number of specimens were observed climbing tree trunks, along with other snail species (Figs 2.5 and 2.6). Among the trees, snails were also crawling on the soil surface (Fig. 2.7) or among young plants of *Aegopodium podagraria* L (Fig. 2.8) where some empty and broken shells, clearly damaged by birds, were also found.

The population of *M. cartusiana* seemed to be dominated by adult or almost fully grown individuals (with fully developed lip, or at least a thickened peristome), of shell height 7.4–9.7 mm and width 12.5–16.6 mm. Adult snails were accompanied by juveniles, of a size varying from 5 to 7 mm (see Fig. 2.6).

At the site, *M. cartusiana* is accompanied by abundant *Helix lutescens* Rossmässler, *Cepaea nemoralis* (L.), and *Arianta arbustorum* (L.); less frequent are *Cepaea vindobonensis* (Férussac) and *Helicella obvia* (Menke). Most of these species co-occured with numerous *Laciniaria plicata* (Draparnaud) on tree trunks after rain (Figs 2.5 and 2.6).

The mass occurrence of *M. cartusiana* and the presence of juvenile specimens suggest that the population of the Wietrznia Hill lives in optimal environmental conditions and is likely to expand at the site in the forthcoming years. The locality is most probably an effect of introduction by man, and is probably associated with the presence of a main transit road in its vicinity. It is not excluded that further sites of *M. cartusiana* may be discovered in the Świętokrzyskie Mts, since anthropogenic habitats, such as quarries and their dumps are, according to BARGA-WIĘCŁAWSKA (1997), main routes of migration of south European snails invading Central Poland. Finding more localities in other parts of Poland may throw a light on the main immigration routes of the species.

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