Two instead of one: citizen science and range clarification of *Helix thessalica* and *H. pomatia* (Gastropoda: Helicidae) in Ukraine

NINA GURAL-SVERLOVA & ROMAN GURAL

State Museum of Natural History, National Academy of Sciences of Ukraine, Teatralna 18, UA-79008 Lviv, Ukraine, e-mail: sverlova@pip-mollusca.org (corresponding author), b https://orcid.org/0000-0002-3892-5338 https://orcid.org/0000-0002-1546-1956

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Numerous observations by amateur naturalists, together with some literature data and the malacological collection of the State Museum of Natural History in Lviv, helped to clarify the present ranges of two large and similar land snails, which were previously considered to be one species, *Helix pomatia*. It has been confirmed that the true *H. pomatia* is widespread in Ukraine, both within its probable natural range and due to anthropochory. The known range of *H. thessalica* extends in a rather narrow strip from the west to the east of the country. In Western Ukraine, it avoids both the mountainous part of the Ukrainian Carpathians and many plain areas. It also avoids the mixed forest zone in the north of Ukraine and the steppe zone in the south. This paper completes a series of publications on the present distribution of *Helix* species in Ukraine.

Key words: land molluscs, Roman snail, Helix, Ukraine

Introduction

Previously, it was believed that the genus Helix Linnaeus, 1758 is represented in Ukraine by four species (SCHI-LEYKO 1978, GURAL-SVERLOVA & GURAL 2012, BALASHOV 2016a): H. pomatia Linnaeus, 1758, H. lucorum Linnaeus, 1758, H. lutescens Rossmässler, 1837, and H. albescens Rossmässler, 1839. However, according to KORÁBEK et al. (2023a), two similar species occur here: the true Roman snail H. pomatia and Helix thessalica Boettger, 1886, only recently redescribed from the Balkan Peninsula (KORÁBEK et al. 2016). As Ondřej Korábek informed us, already URBAŃSKI (1963) mentioned H. pomatia serbica, the description of which corresponds to *H. thessalica*, for some localities in Western Ukraine. Genetically verified records of H. thessalica are already known for the Chernivtsi, Ternopil, Khmelnytskyi, Cherkasy and Kirovohrad regions, as well as for the south of the Kyiv region (see supporting information to KORÁBEK et al. 2023a). On the one hand, this indicates a fairly large range of H. thessalica in Ukraine (the species also occurs in some nearby areas of Russia, see Discussion). On the other hand, it is unclear which species is mentioned in a number of literature sources as H. pomatia. This is especially relevant for those administrative regions of Ukraine where both H. thessalica and true H. pomatia have already been reliably recorded.

Therefore, there was an urgent need to clarify the pattern of present distribution in Ukraine not only for *H. thessalica*, but also for the true *H. pomatia*. To obtain the most

complete and reliable picture, it would be necessary to revise the collection's conchological materials from Ukraine, stored in different museums and scientific organizations both within the country and abroad. However, this is a rather lengthy process, significantly complicated by military actions. The same applies to the possibility of targeted collection of new materials. In addition, it is not always possible to reliably identify empty shells with lost periostracum and worn surface sculpture. Difficulties may also arise with specimens that have been stored in collections for a long time (KORÁBEK 2016). Another source of difficulties may be hybridization (KORÁBEK & HAUSDORF 2024), although in Ukraine *H. thessalica* and *H. pomatia* are usually found separately.

To some extent, the above difficulties can be compensated by citizen science. *Helix* species are easily noticeable in nature due to their large size and are often observed by amateur naturalists (INATURALIST 2025, UKRBIN 2025). This has already made it possible to significantly clarify the present distribution of *H. albescens* (GURAL-SVERLO-VA & GURAL 2024a), *H. lucorum* (GURAL-SVERLOVA & LYZHECHKA 2024) and *H. lutescens* (GURAL-SVERLOVA & GURAL 2024b) in Ukraine. In particular, the recent expansion of the range of *H. lutescens* to the east, as well as the appearance of *H. lucorum* in Kyiv, were promptly recorded thanks to amateur observations. Furthermore, differences in the shell colouration between *H. thessalica* and *H. pomatia* (KORÁBEK et al. 2016) are often more visible in photographs of live snails than in museum specimens. Therefore, the aim of this publication was to tentatively clarify the ranges of *H. thessalica* and *H. pomatia* in Ukraine with the maximum use of citizen science data.

Material and methods

To compile maps and analyze the present distribution of *H. thessalica* and *H. pomatia* in Ukraine, data from the following sources were used.

1) The genetically studied records listed in the supporting information to KORÁBEK et al. (2023a) are shown in red on the distribution maps.

2) The results of the revision of conchological materials previously identified as *H. pomatia* and stored in the State Museum of Natural History in Lviv (hereinafter referred to as SMNHL) are marked in blue on the maps unless they duplicate the collection sites from a previous source. In total, we reviewed 122 samples (more than two thousand shells) from 15 administrative regions of Ukraine, most of which belonged to the true *H. pomatia*. Some shells of both species are shown in Figure 1. SMNHL has one of the largest collections of land molluscs in Ukraine, which contains samples from the second half of the 19th century (BĄKOWSKI 1891) to the present day (GURAL-SVERLOVA & GURAL 2020).

3) Occurrences found by analyzing images from two citizen science databases (INATURALIST 2025, UKRBIN 2025) and some thematic Facebook groups are marked in green on the maps if they do not duplicate previous data. We did not take into account those images whose identification was questionable (poor quality of photographs, lighting that could have severely distorted the shell colouration, worn surface of the shell, etc.).

All records in the same settlement or its immediate surroundings were marked on the maps with one dot. A similar approach has sometimes been used for several small settlements adjacent to each other.

When identifying live snails or well-preserved empty shells in photographs, we were guided by the following differences in the shell colouration of the two species.

1) The shells of *H. thessalica* are characterized by a distinct yellowish or ocher tint (Fig. 1C, 2 A–C), which is absent in *H. pomatia*. The shells of *H. pomatia* with a well-preserved periostracum are usually brownish (from dark to light brown), occasionally monochromatic and light, more reminiscent of the colouration of *H. lutescens* (Fig. 1F, 2E). However, due to the lack of yellowness characteristic of *H. thessalica*, even the light shells of *H. pomatia* look duller.

2) Spiral dark bands can be expressed to varying degrees on the shells of both species: from distinct to barely noticeable, partially or completely absent. When the bands are well developed, they are more visible in *H. thessalica* due to the lighter shell ground colour. In addition, *H. thessalica* often has unevenly coloured bands, so they may appear discontinuous or spotted. KORÁBEK et al. (2016) call them marbled.

3) The non-uniform, marble-like colouration in *H. thessalica* can be observed not only on the dark spiral bands, but also on the light spaces between them (Fig. 2C). It is often more visible on the penultimate whorl (Fig. 1A, B, 2A), which is caused by the uneven loss of the periostracum (KORÁBEK et al. 2016).

When identifying museum specimens, attention was also paid to the finer surface sculpture in *H. thessalica*. At the end of the penultimate whorl (above the shell aperture) in adults it usually appears finely granular (Fig. 1B). In *H. pomatia*, the sculpture of this part of the shell is also formed by the intersection of radial wrinkles and spiral lines (Fig. 1E). However, in this species the granules are usually larger, can vary in size, and the sculpture as a whole often appears more latticed than granular. The last whorl of adult *H. pomatia* usually has very coarse radial wrinkles, which are much smoother in *H. thessalica*.

Other conchological differences between *H. thessalica* and *H. pomatia* related to the shape and proportions of the shell, the thickness of the shell walls, etc., described in detail by KORÁBEK et al. (2016), are not so reliable and may be partially overlapped by intraspecific variability. When working with conchological collections, they can be used in combination with more reliable differentiating features. When analyzing photographs taken by amateur naturalists, it is usually difficult or even impossible to use them.

Results and discussion

The analyzed data confirmed that the true H. pomatia is widespread in Ukraine (Fig. 3). Its reliable findings are known from almost all administrative regions, with the exception of Kherson and Zaporizhzhia in the south of the country. In 1993, an attempt was made to introduce H. pomatia into the forest biotopes of the Crimea (POPOV 1996). For this purpose, snails collected in the Vitebsk region of Belarus were released in the Bilohirsk and Bakhchysarai districts of the Crimea (400 kg in each). The dry summer of 1994 caused high mortality among released molluscs. However, in the first years after release, the appearance of large numbers of juveniles and self dispersal of H. pomatia to adjacent areas were observed. The further fate of H. pomatia in the Crimea is unclear. LEONOV (2009) included H. pomatia in the list of land molluses of the Crimea. BA-LASHOV (2016b: 222) suggests that the species may have become completely extinct in the Crimea by now. In particular, the citizen science database INATURALIST (2025) contains about 400 Helix observations from the Crimea. All of them show either native H. albescens or alien H. lucorum, and none of them show H. pomatia.

The present distribution area of *H. pomatia* in Ukraine has been significantly expanded due to anthropochory (SVER-LOVA et al. 2006). This process began long ago: as an edible species, *H. pomatia* could be deliberately released on estates or near monasteries (ROSEN 1903). The southeast of Ukraine can be confidently considered the most recent part of its current range. In the Donetsk and Luhansk regions, *H. pomatia* is so far known only from recent (2018–2023) records in regional centres (INATURALIST 2025, UKRBIN 2025). In the Dnipropetrovsk region, in addition to the regional centre (Dnipro), this species was also found in some other settlements. The initial appearance in regional centres or their immediate environs can generally be considered quite typical for introduced species of land molluscs. In the future, this can significantly accelerate the spread of alien species in the corresponding administrative regions, thanks to the developed system of transport and trade links between the regional centre and its subordinate territories. Western Ukraine, where *H. pomatia* is often found in both natural and urbanized habitats (SVERLOVA et al. 2006), is traditionally considered as a probable part of the natural range of this species (SCHILEYKO 1978, BALASHOV 2016b, KORÁBEK et al. 2023a: fig. 2). BALASHOV (2016b, 2023) admits that the natural range of *H. pomatia* may extend



Fig. 1. Some shells of *H. thessalica* (A–C) and *H. pomatia* (D–F) from the malacological collection of SMNHL: A – Horodnitsa, Ternopil region, 1880; B – Demshyn, Khmelnytskyi region, 2005; C – Uman, Cherkasy region, 2005; D – Zhovti Vody, Dnipropetrovsk region, 2006; E – Pivdenne, Kharkiv region, 2005; F – Lviv, shells from different samples that demonstrate the colouration variability. B and E show the surface sculpture at the end of the penultimate whorl. All photos by N. Gural-Sverlova.

much further to the east – along the forest-steppe zone of Ukraine and up to the border with Russia. However, according to a recent study (KORÁBEK et al. 2023a), this may apply to *H. thessalica* rather than *H. pomatia*. On the other hand, we consider it quite probable that marginal natural populations of *H. pomatia* may live along the Southern Bug River in the Mykolaiv region (western part of the steppe zone), similar to those of *H. lutescens* (GURAL-SVERLOVA & GURAL 2024b). Individuals from this area have relatively small shells (KRAMARENKO & SVERLO-VA 2005), which may be due to unfavourable climatic conditions, and the brownish shell colouration characteristic

of H. pomatia (Fig. 2D).

The largest number of known records of *H. pomatia* in Central Ukraine is concentrated in the Kyiv region. In Eastern Ukraine it is in the Kharkiv region (Fig. 3). For the Kyiv region, *H. pomatia* has been mentioned since the second half of the 19th century. JELSKI (1863) wrote that this species is rare in the vicinity of Kyiv, but is found in large numbers in the park of Bila Tserkva (a city located 80 km south of Kyiv). Apparently, he was talking about the Oleksandriia dendrological park, founded at the end of the 18th century, where *H. pomatia* could have been brought in along with the plants. Currently, *H. pomatia* is still



Fig. 2. Shell colouration in living specimens of *H. thessalica* (A–C) and *H. pomatia* (D–F) from some administrative regions of Ukraine: A – Perekhody near Chortkiv, Ternopil region, 2024; B – Shkarivka near Bila Tserkva, Kyiv region, 2021; C – Khotyn, Chernivtsi region, 2013; D – Pervomaisk, Mykolaiv region, 2023; E – Kamianets-Podilskyi, Khmelnytskyi region, 2013; F – Uzhhorod, Transcarpathian region, 2015. Photos by N. Gural-Sverlova (C, E, F), M. Zakharova (A), S. Oksenenko (B), A. Sydorak (D).



Fig. 3. Distribution maps of *H. pomatia* (above) and *H. thessalica* (below) in Ukraine: in red – genetically verified records according to Korábek et al. (2023a); in blue – the malacological collection of SMNHL; in green – according to citizen science (for more details, see Material and methods). The numbers indicate the following administrative regions of Western Ukraine (1 – Volyn, 2 – Rivne, 3 – Lviv, 4 – Ternopil, 5 – Khmelnytskyi, 6 – Transcarpathian, 7 – Ivano-Frankivsk, 8 – Chernivtsi), Central Ukraine (9 – Zhytomyr, 10 – Kyiv, 11 – Chernihiv, 12 – Sumy, 13 – Vinnytsia, 14 – Cherkasy, 15 – Poltava, 16 – Kirovohrad, 17 – Dnipropetrovsk), Eastern Ukraine (18 – Kharkiv, 19 – Donetsk, 20 – Luhansk) and Southern Ukraine (21 – Odesa, 22 – Mykolaiv, 23 – Kherson, 24 – Zaporizhzhia, 25 – Crimea). Large circles with black borders show records in regional centres.

found in the park as well as in other areas of Bila Tserkva (INATURALIST 2025), although another species, H. thessalica, has been recorded in small forests near the neighbouring village of Shkarivka (INATURALIST 2025, UKRBIN 2025). According to some local observers, *H. pomatia* began to spread widely in the capital and the Kyiv region only at the end of the 20th century, possibly since the early 1980s. Paradoxically, even at the turn of the 20th and 21st centuries, TAPPERT et al. (2001: table 3) mentioned H. pomatia only for Kyiv, but not for the Kyiv region outside it. Unlike H. pomatia, the known range of H. thessalica extends in a rather narrow strip from west to east of the country (Fig. 3), avoiding the mountainous part of the Ukrainian Carpathians and the vast plain areas of Western Ukraine (in particular, the westernmost part of the Podolian Upland), as well as the mixed forest zone (Ukrainian Polissya) in the north and the steppe zone in the south. In Central and Eastern Ukraine, the distribution of H. thessalica more or less coincides with the forest-steppe zone. In the west of the country, this species is found in the southern part of the broad-leaved forest zone (the south of the Ternopil and Khmelnytskyi regions, part of the Chernivtsi region) and the adjacent southeastern part of Ciscarpathia (in particular, Chernivtsi). In Left-bank Ukraine, only a few records of H. thessalica are known so far from the Poltava and Kharkiv regions (compared to numerous finds of *H. pomatia* in the Kharkiv region, see above). It is possible that scattered marginal populations of H. thessalica inhabit this area. KORÁBEK et al. (2023a) also mention one record of *H. thessalica* in the Belgorod region of Russia, near its border with the Kharkiv region of Ukraine. Further east, H. thessalica probably occurs in the Voronezh region of Russia (INATURALIST 2025).

According to KORÁBEK et al. (2023a), *H. thessalica* often occurs in broadleaved forests with a dense understory, and seems to be more tolerant of warm and dry summers than *H. pomatia*. However, the present range of *H. pomatia* in Ukraine extends further to the south and southeast than that of *H. thessalica* (Fig. 3). Most of the known records of *H. thessalica* in Ukraine (KORÁBEK et al. 2023a, INAT-URALIST 2025, UKRBIN 2025) were indeed made in forest biotopes, often located near rivers. In the west of the country, they are concentrated mainly along the Dniester River and its tributaries. In general, in Ukraine *H. thessalica* seems to demonstrate less ecological plasticity than *H. pomatia* and is less common in urbanized areas.

Recently, a significant expansion of the ranges of different *Helix* species in Ukraine has been recorded as a result of human activity. *H. albescens*, which has a Crimean origin (KORÁBEK et al. 2023b) and was previously known only for the south of Ukraine (SCHILEYKO 1978), now occurs locally even in the Kyiv and Kharkov regions (BALASHOV & VASYLIUK 2007, GURAL-SVERLOVA & GURAL 2024a). The range of *H. lutescens*, native to Western Ukraine, has significantly expanded to the east (GURAL-SVERLOVA & GURAL 2024b). In the capital of Ukraine alone, three introduced species of this genus have been first recorded since the beginning of the 21st century: *H. albescens* (BALASHOV & VASYLIUK 2007), *H. lutescens* (GURAL-SVERLOVA & GURAL 2024b) and *H. lucorum* (GURAL-SVERLOVA

& LYZHECHKA 2024). Only *H. thessalica* seems to break the general trend. Its known range in Ukraine appears to be continuous and natural. It is possible that *H. thessalica* has not yet been introduced even to cities of Ternopil and Khmelnytskyi, although it is quite common in the south of the corresponding administrative regions (Fig. 3).

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