

## *HELIX LUTESCENS* ROSSMÄSSLER, 1837 (GASTROPODA: HELICIDAE) IN THE HOLY CROSS MOUNTAINS NATIONAL PARK AND ITS VICINITY

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**ABSTRACT:** The author recorded the occurrence of *Helix lutescens* Rossmässler, 1837 on five localities within the Holy Cross Mountains National Park and its protective zone, and on three localities in the city of Kielce. The presence of *H. lutescens* on the eight localities does not permit to establish its real origin, though the author suggests that in those particular habitats the species may be a postglacial or Late Holocene relict.

**KEY WORDS:** Świętokrzyski National Park, malacofauna, new localities

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INTRODUCTION

Helix lutescens Rossmässler, 1837 is a South-Eastern European species. Its distribution range covers South-Eastern Poland, Western Ukraine, Romania, and the east of Hungary and Czechoslovakia (Karney, Cameron and Jungbluth 1983). In Poland the north border of its distribution range covers the northern margin of the Little Poland Upland and Lublin Upland (Poliński 1924 and Urbański 1964).

The localities recorded from the area of the Holy Cross Mountains are as follows: Psie Górki near Kielce Bzinek near Skarżysko, Korytnica near Jędrzejów (Poliński 1917, 1924), Góra Wietrznia near Kielce (Czubiński and Urbański 1933), hot and dry hills between Pińczów and Skowronne (Urbański 1937), an old cementary in Kielce (Urbański 1964) (Fig. 1). The fact, that in spite of his thorough studies carried out in the Holy Cross Mountains, Piechocki (1981) did not find H. lutescens, suggests that the species is scarce in the region.

The specimens of H. lutescens, the present paper deals with (Fig. 3), had roundish shells 27 - 34 mm high and 28 - 35 mm broad. They were characteristic in a covered umbilicus, oval mouth - its height greater than



The present field study was carried out in July and October 1986. Ten years earlier the studied localities were the subject of the theses prepared by the students of the University of Teaching in Kielce, G. Czernik and Z. Irela.

#### STUDY AREA

New localities of *H. lutescens* were found in the central part of the Holy Cross Mountains: in the valley Dolina Baszowicka situated between the Łysogóry Range and Klondów Range, and on the slopes of the valley of the Pokrzywianka stream. The localities are situated within the area of the Holy Cross Mountains National Park or in its close vicinity (Fig. 2). The

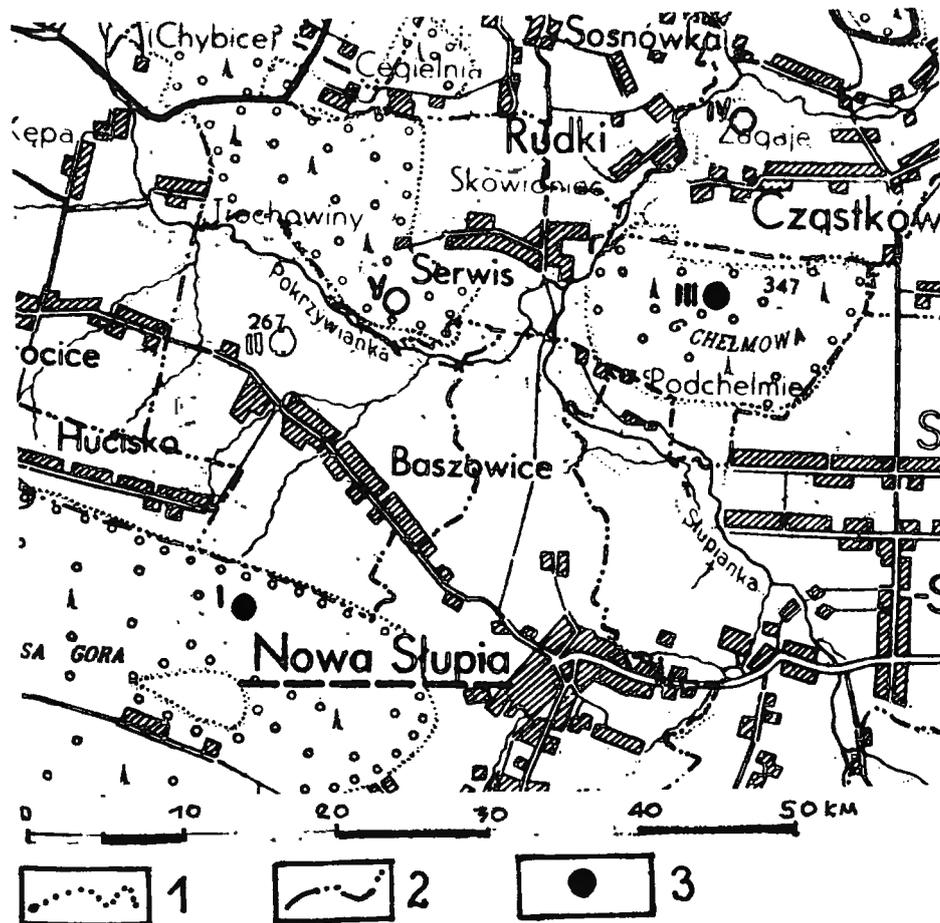


Fig. 2. New localities described in this paper: 1 - range of forest, 2 - border of the Holy Cross Mountains National Park, 3 - the localities.

substrate of the area of the localities consists mostly of quartzite, sandstone, greywacke and non-calcareous shale. The soil of the area is prevailingly barren and humid. In the valleys the soil is sandy, sandy-gravel and loamy with patches of loess.

The warmest area of the studied region comprises its western and south-eastern parts as well as the vicinity of the town of Nowa Słupia. In the Chęciny subregion the main elements of climate are as follows: mean annual air temperature: 7.2 - 7.4°C, mean air temperature in January: -3.0 - -2.2°C, mean air temperature in July: 17.9 - 18.2°C, number of sunny days per year: 35 - 42, number of cloudy days per year: 97 - 142, snow cover per year: 60 - 84 days, total annual rainfall: 600 - 650 mm. The remaining regions of the area are colder (Kozłowska-Szczęśna and Paszyński 1967).

The corresponding values for Nowa Słupia in the Łysogóry Range are as follows: mean annual air temperature: 7.7°C, mean air temperature in January: -3.7°C, mean air temperature in July: 16.8°C, number of sunny days per year: 54.2, number of cloudy days per year: 134, snow cover per year: 82 days, total annual rainfall: 840 mm (Dunikowski manuscript). According to data obtained from the station of the Institute of Meteorology and Water Management at Bodzentyn (the similar station at Nowa Słupia was liquidated) in 1986 the mean annual temperature was 6.9°C, annual rainfall: 557 mm, mean temperature in January: -1.7°C, mean temperature in July: 16.8°C, snowfall in January: 54 mm, rainfall in July: 91 mm.

#### NEW LOCALITIES AND THEIR MALACOFAUNA

Locality I: The Łysa Góra Mountain, northern slope near Nowa Słupia; position DB 93 in UTM system, altitude 400 m a.s.l. The substrate comprises sandstone and quartzite with intercalations of Upper Cambrian mudstone. The slope is overgrown with a fir forest with an admixture of Fagus silvatica L., Acer pseudoplatanus L., Tilia cordata Mill., Quercus robur L., Fraxinus sp., Ulmus campestris L. The ground cover consists of the following species: Dentaria glandulosa W. K., D. Anneaphyllos L., Asperula odorata L., Asarum europaeum L., and Allium ursinum L. occurring at humid places (Wolak manuscript).

In 1976 the locality was studied quantitatively by Czernik (manuscript) who recorded the following gastropod species: Arion hortensis Férussac, 1819, Helix pomatia Linnaeus, 1758 (dominants); H. lutescens, Deroceras reticulatum (O. F. Müller, 1774), and Oxychilus cellarius (O. F. Müller, 1774) (recedents).

Locality II: Baszowice, a calcereous slope by the Pokrzywianka stream; position EB 03 in UTM system, altitude 265 m a.s.l. The substrate contains Quaternary silt and sand with lenses of the peat of the higher flood plain. The slope is overgrown with epilithic turf and numerous shrubs of Berberis

vulgaris L., Juniperus communis L., and Cotoneaster melanocarpa Lodd. Sunny places are overgrown with xerophiles as: Campanula sibirica L., Trifolium montanum L., Helianthemum ovatum (Viv.) Dun., Scabiosa ochroleuca L., Fragaria viridis Duch., Veronica spicata L., and Filipendula hexapetala Gilib.

Czernik (manuscript) gives the following gastropod species found on this locality: Helicella obvia (Menke, 1828) (eudominant); Helix lutescens, H. pomatia, Arion circumscriptus Johnston, 1828, and Deroceras agreste (Linnaeus, 1758) (dominants); Cochlodina laminata (Montagu, 1803), Discus rotundatus (O. F. Müller, 1774), Oxychilus cellarius, Arion subfuscus (Draparnaud, 1805), A. hortensis, Deroceras reticulatum, Bradybaena fruticum (O. F. Müller, 1774), Helicopsis striata (O. F. Müller, 1774), Perforatella incarnata (O. F. Müller, 1774), Chilostoma faustinum (Rossmässler, 1835), and Cepaea vindobonensis (Férussac, 1821) (subdominants).

Locality III: Góra Chełmowa; position EB 03 in UTM system, altitude 325 m a.s.l. The substrate contains Lower Devonian sandstone. This is a hill situated within the loess fields of the Waśniów Upland, and overgrown with a mixed forest of pine and oak (Pino-Quercetum) with an admixture of Larix polonica Rac., Quercus sessilis Ehrh., Q. robur L., Fagus sylvatica L., Abies alba Mill. The shrub species occurring on the slopes of the hill are as follows: Juniperus communis L., Crataegus monogyna Jacq., Evonymus europea L., E. verrucosa Scop., Sieglingia decumbens (L.) Lam. The ground cover comprises mostly Hieracium sp., Fragaria vesca L., Galium vernum Scop., Galeobdolon luteum Huds. This is a floristically rich community, its particular patches showing a considerable species diversity; some of them were created due to the degradation of rich habitats of a natural deciduous forest.

In 1976 the locality was studied quantitatively by Z. Trela (manuscript) who recorded the following gastropod species: Succinea oblonga Draparnaud, 1801, Arion subfuscus, A. circumscriptus, Perforatella incarnata, Isognomostoma isognomostoma (Schröder, 1784), Helix lutescens and H. pomatia (dominants); Succinea putris (Linnaeus, 1758), Balea holicata (Montagu, 1803), Cochlodina laminata, Discus ruderatus (Férussac, 1821), D. rotundatus, Aegopinella pura (Alder, 1830), Oxychilus cellarius, D. alliarius (Miller, 1822), Lehmannia marginata (O. F. Müller, 1774), Deroceras agreste, Euconulus fulvus (O. F. Müller, 1774), Helicella obvia, Chilostoma faustinum, and Arianta arbustorum (Linnaeus, 1758) (subdominants); Oxyloma elegans (Risso, 1826), Cochlicopa lubrica (O. F. Müller, 1774), Era montana (Draparnaud, 1801), Punctum pygmaeum (Draparnaud, 1801), Limax cinereoniger Wolf, 1803, Trichia hispida (Linnaeus, 1758), and Cepaea vindobonensis (recedents).

Locality IV: Rudki, the Zapusty nature reserve, a slope by the Pokrzywianka stream; position EB 03 in UTM system, altitude 325 m a.s.l. The slope contains Devonian shale. The reserve is situated within the protective zone of the Holy Cross Mountains National Park. The slope is overgrown with xerophiles. It is very steep, almost vertical, and exposed westwards (towards the stream). The surroundings of the slope is an arable land and partly meadows and grazing lands. Because the area is much sloping and rocky, it has maintained its natural character. The slope is undulated, what results in numerous alterations in its exposition: from south-westward, through westward, to north-westward. This considerably affects the plant and animal species composition on the locality. Besides initial soil which is due to the weathering of rocks, another type that occurs on the locality is brown soil which has originated mainly from Devonian loess. The microclimate of the reserve is warmer and drier than that of the Isogóry Range. The mean air temperature is 7.7°C, mean annual rainfall: 689 mm (the data from Chełmowa Góra).

The middle and southern parts are overgrown with epilithic and turf plants, and with scarce shrubs comprising predominantly the following species: Cotoneaster melanocarpa Lodd., Cornus sanguinea L., and Evonymus verrucosa Scop. Xerophiles occur there in two characteristic plant communities: Peucedano-Coryletum and Adonido-Brachypodietum pinnati. The communities comprise many rare species which cannot be found on any other locality within the Holy Cross Mountains National Park and its protective zone, as for instance: Aster amellus L., Sempervivum sp., Anthemis tinctoria L., Asperula cynanchica L., Campanula sibirica L., Echinops sphaerocephalus L., Libanotis montana Cr., Filipendula hexapetala Gilib., Scabiosa ochroleuca L., Thesium linophyllum L., Cimicifuga europaea Szipc., Galanthus nivalis L., Lilium martagon L., Neottia nidus-avis (L.) Rich., Primula elatior (L.) Grufb., P. officinalis (L.) Hill., Convallaria maialis L., and Anemone silvestris L.

The northern part of the slope is covered with a thin, young forest of Fagus sylvatica L., Quercus robur L., Betula verrucosa Ehrh., Illia cordata Mill., and Ulmus campestris L. The undergrowth comprises the following shrub species: Padus avium Mill., Evonymus europaea L., Sorbus aucuparia L., and Viburnum opulus L.

Irela (manuscript) recorded the following gastropod species to occur on the locality: Helix lutescens, H. pomatia, and Helicella obvia (eudominants); Arion circumscriptus, Limax cinereoniger, Helicopsis striata, Euomphalia strigella (Draparnaud, 1801), and Chilostoma faustinum (dominants); Cochlodina laminata, Arion subfuscus, A. hortensis, Deroceras agreste, D. reticulatum, Euconulus fulvus, and Cepaea vindobonensis (subdominants).

Locality V: Serwis-Dąbrowa, the forest that overgrows the eastern part of the valley Dolina Baszowicka; position EB 03 in UTM system, altitude 250 m a.s.l. The substrate consists of Quaternary sand and fluvioglacial gravel, and partly of Pleistocene sand. A less productive habitat of sour, brown soil is overgrown with a mixed forest of the Pino-Quercetum type. Apart from Pinus silvestris L. and Quercus robur L., the forest is composed of Picea excelsa (Lam.) Lk., Carpinus betulus L., Ulmus campestris L., Fraxinus sp., Tilia cordata Mill., Acer platanoides L., A. pseudo-platanus L., Fagus silvatica L., and Betula pubescens Ehrh. The undergrowth of the forest comprises mainly Corylus avellana L., while the ground cover consists of Vaccinium myrtillus L., Melampyrum pratense L., Sieglingia decumbens (L.) Lam., and Calluna vulgaris (L.) Salisb. The forest margins adjacent to an arable land are overgrown with a synanthropic vegetation, as for instance Syringa sp. and Rosa canina L.

Trela (manuscript) found the following gastropod species to occur on the locality: Helix lutescens, Discus rotundatus, Arion circumscriptus, Lehmannia marginata, Perforatella incarnata, Isognomostoma isognomostoma, and Succinea oblonga (dominants); S. putris, Oxyloma elegans, Aegopinella pura, Oxychilus cellarius, Arion subfuscus, Limax cinereoniger, Deroceras reticulatum, Trichia hispida, Arianta arbustorum, Perforatella rubiginosa (A. Schmidt, 1853), and Helix pomatia (subdominants).

New localities in Kielce: In July 1987 the author of this paper found new localities of H. lutescens, situated within the area of Kielce. The city is located within the Central Depression of the Holy Cross Mountains; position DB 73 in UTM system, altitude 268 m a.s.l. The substrate is of Devonian limestone. Main elements of climate are as follows: mean annual temperature: 7.0 - 7.5°C; mean temperature in January: -3.8 - -3.5°C; mean temperature in July: 17.5 - 18.0°C; total annual rainfall: 634 mm; snow cover per year: 88 days (Kłysik 1974 and 1976). In 1987 the mean temperature in January was -11.7°C, while in July: 17.7°C (data obtained from the Suków Hydro-Meteorological Station of the Institute of Meteorology and Water Management).

In Kielce H. lutescens occurred in isolated populations not far from the centre of the city. It was found inhabiting gardens in the vicinity of Jeleniowska Street, the Czarnów district. Other gardens it was found to occur quite numerous in were by Wietrznia as well as by Prosta Street and Lenin Avenue. A rather numerous population of the species was also found to inhabit an old cementary.

## DISCUSSION

The earlier known localities of H. lutescens, recorded from the Holy Cross Mountains by Poliński (1917 and 1924) and Urbański (1937), need verification, since most of them are now covered by a zone of a strong human impact.

The localities of H. lutescens described in the present paper differ in altitude, substrate and habitat type. The most favourable habitats are the limestone slope by the Pokrzywianka stream near Baszowice and the Zapusty reserve at Rudki. These are dry, warm and sunny habitats of a rich xerophilous vegetation. Such habitats are typical of the species. The forest that covers the Góra Chełmowa Hill is the kind of habitat in which H. lutescens is unnumerous (Tab. 1).

Table 1

Numbers of Helix lutescens specimens from particular localities

	1986			1976		
	a	b	Σ	a	b	Σ
I	9	5	14	16	14	30
II	15	10	25	20	12	32
III	5	2	7	9	6	15
IV	12	10	22	11	11	22
V	4	2	6	12	8	20
Σ	45	29	74	68	51	119

In forest habitats H. lutescens prefers sunny and warm localities of deciduous trees, especially Fagus silvatica L. and Quercus robur L., as well as forest margins overgrown with shrubs and herbs. The three forest localities described are not typical of the species. It seems to live there in the habitat which hardly corresponds with its needs, however, it not only shows no expansive tendency but here and there is found receding. H. lutescens often occurs sympatrically with H. pomatia. Such cases of the common domination of the two species are known only from South-Eastern Poland (Urbański 1948).

The occurrence of H. lutescens on the eight localities in the Holy Cross Mountains, the author deals with, does not permit to judge whether the species is an interglacial relict or a postglacial pseudo-relict. Owing to its quite large size resulting in a favourable proportion between the bo-

dy weight and surface, it loses less energy, so less energy needs to warm up its body. The size, however, makes impossible its survival in unfavourable conditions in a small shelter. Hence, it is hardly acceptable that the species was able to survive through the glacial period. The warm and dry subboreal period favoured the spreading of south-eastern xerophilous species as *H. lutescens*. The presence of the latter on the localities in the Holy Cross Mountains suggests rather its being a postglacial pseudo-relict or Late Holocene immigrant.

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HELIX LUTESCENS (ROSSMÄSSLER, 1837) (GASTROPODA: HELICIDAE)  
W ŚWIĘTOKRZYSKIM PARKU NARODOWYM I JEGO OKOLICACH

Streszczenie: Autorka ustaliła występowanie Helix lutescens (Rossmässler, 1837) na pięciu stanowiskach w Świętokrzyskim Parku Narodowym i jego otulinie, oraz trzech stanowiskach w Kielcach. Obecność H. lutescens na ośmiu stanowiskach w Górach Świętokrzyskich nie pozwala rozstrzygnąć o jego pochodzeniu, autorka sugeruje jednak, że w tych siedliskach może on być reliktem postglacjalnym lub późnholocenijskim imigrantem.



Fig. 3. Creeping specimens of Helix lutescens (author's photograph)

