



HELICODONTA OBVOLUTA (O. F. MÜLLER, 1774) (GASTROPODA: PULMONATA: HELICIDAE) – UP-DATED DISTRIBUTION IN POLAND, THREATS AND CONSERVATION STATUS

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ABSTRACT: *H. obvoluta* is endangered within its whole distribution range. It is a C. European species, distributed from the Pyrennees and the Atlantic coast of France to southern Slovakia and northern Hungary; it occurs also in Great Britain, Schleswig-Holstein, southern part of Moravy, Albania, Bosnia, northern Serbia and in Italy. In Poland it has few localities in the central Sudetes. It is a typical forest-dweller of montane areas, associated with dead timber which is necessary for its reproduction, feeding and hibernation. Its presence in ten sites in Poland has been confirmed. The main threats for the species are clear-felling and removal of dead timber.

KEY WORDS: *Helicodonta obvoluta*, snails, endangered species, distribution, ecology, conservation status

INTRODUCTION

H. obvoluta is threatened with extinction within all of its range (CAMERON 1972, WIKTOR & RIEDEL 1992, PAWŁOWSKA & POKRYSZKO 1998). In Poland it was red-listed in 1992 (WIKTOR & RIEDEL 1992) and included in the Red Data Book in 2002 (WIKTOR & RIEDEL 2002); since 2002 it has been under legal protection. Its localities mentioned in older literature are: nature reserve Wilczka waterfalls near Śnieżnik Kłodzki, vicinity of Bardo Śląskie near Kłodzko, vicinity of Cieszów near Świebodzice, Książ near Wał-

brzych, Ślęza massif and nature reserve Muszkowicki Las Bukowy near Henryków – all in south-western Poland (SCHOLTZ 1843, REINHARDT 1874, MERKEL 1894, URBAŃSKI 1948, WIKTOR 1956, 1959, 1964, 1972). Because it is endangered and because the Polish localities are on the northern distribution border of the species, it was decided to make an inventory of its surviving sites, an estimate of its abundance and an attempt at identifying the reasons for threat.

DISTRIBUTION

The distribution range of *H. obvoluta* (Fig. 1) includes Europe from the Pyrennees and the southern part of Atlantic coast of France to southern Slovakia and northern Hungary (RIEDEL 1988). Western France, southern Belgium and the Netherlands, southern part of Great Britain constitute the north-western border of its range (CAMERON 1972,

KERNEY et al. 1983, RIEDEL 1988). The northern border runs across the middle Sudetes in Poland and southern Germany, with isolated sites in Schleswig-Holstein (WIKTOR 1964, KERNEY et al. 1983, RIEDEL 1988, MALTZ 1999a). Eastwards the species reaches trans-Carpathian Ukraine. It is present in the southern part of Moravy and Slovakia and in the northern

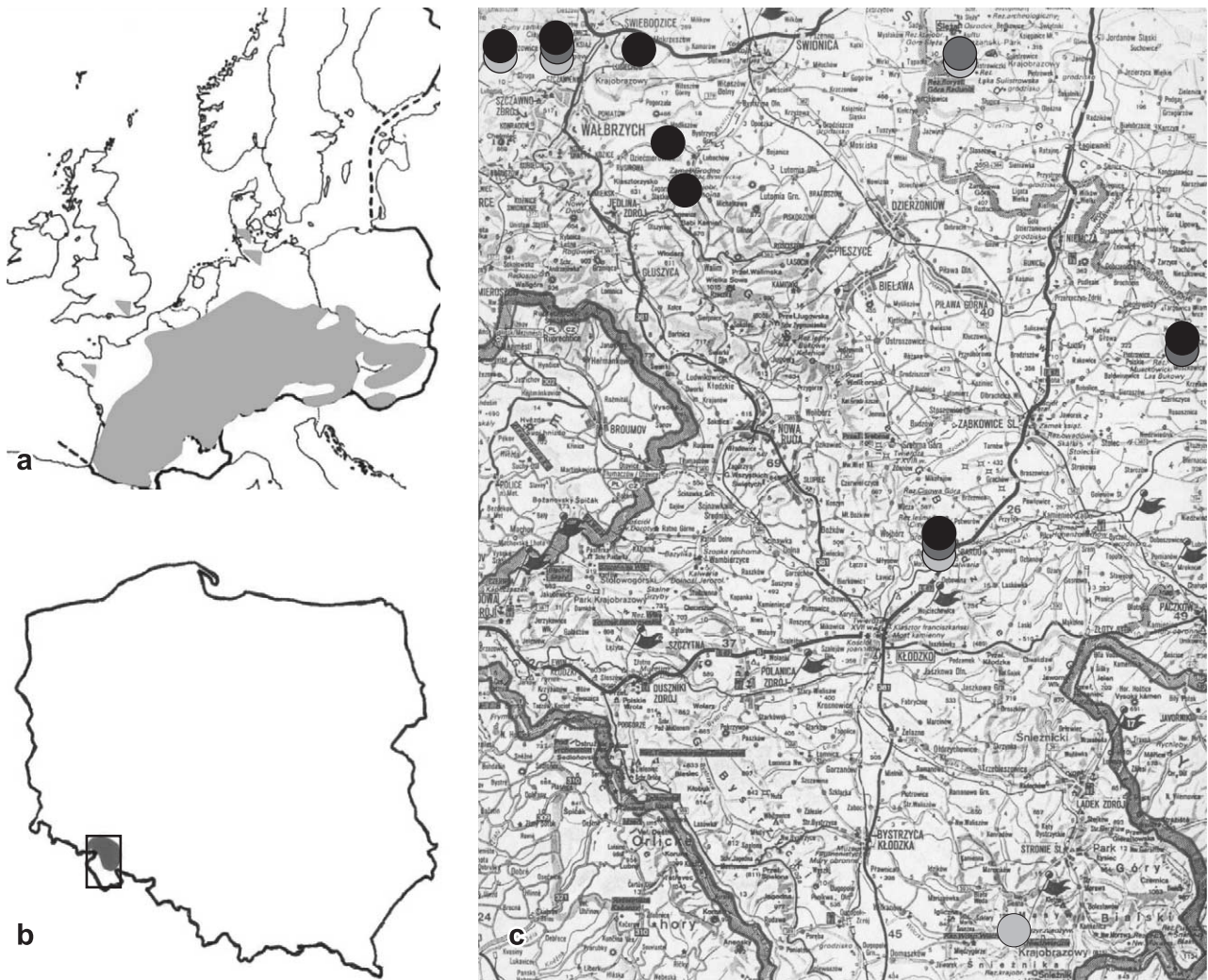


Fig. 1. Distribution of *H. obvolvata*: a – in Europe (modified from KERNEY et al. 1983); b – in Poland, c – in Lower Silesia: black circles – literature records, dark grey circles – sites reported by WIKTOR (1956, 1959, 1964, 1972), light grey circles – author's own sites

part of Hungary which are its south-easternmost sites. The middle part of the range includes the Czech Republic, Austria and Switzerland (LOŹEK 1955, KERNEY et al. 1983, RIEDEL 1988). In the south it can be found in Albania, Bosnia, northern Serbia and in the Appenninic Peninsula till Calabria (LOŹEK 1955, ZILCH 1959–1960). It is absent, except a few insular localities, in northern and north-western Europe, and in the northern part of central Europe, in the Carpathians and north of them (RIEDEL 1988). SHILEYKO (1978) considers it likely to be found in western Belarus which, according to RIEDEL (1988) is completely unjustified.

Because of its distribution, *H. obvolvata* is at present regarded as a central European element (KERNEY et al. 1983, RIEDEL 1988, KERNEY 1999, MALTZ 1999a), though earlier literature contains also different opinions. According to LOŹEK (1955) it is a southern European species, in papers of WIKTOR it is treated as a south-Alpine (WIKTOR 1956), southern or Alpine south-western, or else Alpine species (WIKTOR 1964).

H. obvolvata is known from Pliocene and Pleistocene deposits of western Europe (SHILEYKO 1978). According to LOŹEK (1955) its Pleistocene distribution was much like it is today, at least in the southern, central and western parts of the range. Its northwards expansion could have started during the Mazovian interglacial, when the climate became much warmer (URBAŃSKI 1948). It is doubtful, however, if the present northern localities of the species date from that period, since its habitat requirements exclude that it could survive the subsequent glaciation. Recent northernmost localities of *H. obvolvata* (Great Britain, Schleswig-Holstein, Polish Sudetes) are remnants of its post-glacial Holocene northwards expansion (CAMERON 1972, STWORZEWICZ 1989). According to STWORZEWICZ (1989) the expansion could have taken place during the Atlantic climatic optimum during spreading of warm-loving deciduous trees which formed mixed forests favouring invasion of northern Europe by many woodland and mountain species from the western and southern parts of the continent.

ECOLOGY

H. obvolvata is a typical forest-dweller, living in montane areas, in humid and shady places, on fallen logs, in leaf litter and under stones, as well as in vegetation-covered ruins and screes (LOŹEK 1955, WIKTOR 1956, 1959, 1964, 1972, URBAŃSKI 1957, CAMERON 1972, SHILEYKO 1978, KERNEY et al. 1983, RIEDEL 1988, MALTZ 1999a).

An optimum habitat for the species is natural deciduous and deciduous-coniferous forests on calcium-rich substratum (Figs 2, 3). The main microhabitat influencing its presence are rotting logs where the snails stay from spring till autumn (CAMERON 1972). In such forests *H. obvolvata* is found in Great Britain, the Pyrennees, Switzerland, Poland and the Czech Republic (LOŹEK 1955, WIKTOR 1956, 1959, 1972, CAMERON 1972). According to CAMERON (1972) in the central part its range the species shows a wider habitat tolerance, inhabiting also shrub-covered areas or even hedges, and is found on substrata poorer in calcium compared to those on the distribution borders.

Some indications on the occurrence and habitat of the species may be found in malacocenoses of similar requirements. Such species, ecologically classified as forest-dwellers, include: *Ena montana*, *E. obscura*, *Arion circumscriptus*, *A. silvaticus*, *A. intermedius*, *Aegopinella pura*, *Daudebardia rufa*, *Limax cinereoniger*, *L. tenellus*, *Lehmannia marginata*, *Cochlodina laminata*, *C. orthostoma*, *Macrogastra plicatula*, *Clausilia pumila*, *Alinda biplicata*, *Laciniaria plicata*, and of Helicidae: *Perforatella incarnata*, *P. vicina*, *Arianta arbustorum*, *Isognomostoma isognomostoma*, *Causa holosericum* or *Cepaea hortensis* (RIEDEL 1988). The list of species accompanying *H. obvolvata* is presented in Table 1.



Fig. 2. Southern slope of the Pelcznica gorge



Fig. 3. Nature reserve Muszkowicki Las Bukowy near Henryków

Table 1. Malacofauna accompanying *H. obvolvata* at the studied localities: C – calciphile, E – endangered, Eu – euryoecious species, H – hygrophile, O – open habitat species, S – synanthropic, W – woodland species; list of endangered species after WIKTOR & RIEDEL (1992), ecological grouping follows RIEDEL (1988). A – ecological group and category, 1 – Left slope of the Pelcznica gorge (Książ), 2 – Slope above Szczawnik (Książ), 3 – Right slope of the Pelcznica gorge (Książ), 4 – Cisy castle, 5 – Lubiechów, 6 – Złoty Las, 7 – Grodno castle, 8 – Chojna mt., 9 – Nature reserve Muszkowicki Las Bukowy, 10 – Bardo Śląskie

Species	A	1	2	3	4	5	6	7	8	9	10
<i>Acicula polita</i>	W	+		+						+	
<i>Carychium minimum</i>	H									+	
<i>Carychium tridentatum</i>	Eu		+	+						+	+
<i>Succinea putris</i>	H	+								+	
<i>Succinea oblonga</i>	Eu									+	
<i>Succinea elegans</i>	H									+	
<i>Cochlicopa lubrica</i>	Eu	+	+	+				+		+	
<i>Columella edentula</i>	Eu		+	+						+	
<i>Vertigo pusilla</i>	Eu			+	+						+
<i>Vertigo alpestris</i>	C			+							+
<i>Vallonia pulchella</i>	O				+			+		+	
<i>Vallonia excentrica</i>	O				+						
<i>Vallonia costata</i>	O				+			+		+	
<i>Acanthinula aculeata</i>	W	+	+	+	+					+	+
<i>Ena montana</i>	W	+		+	+			+		+	

Species	A	1	2	3	4	5	6	7	8	9	10
<i>Ena obscura</i>	W	+								+	
<i>Punctum pygmaeum</i>	Eu	+	+	+	+					+	+
<i>Discus rotundatus</i>	Eu	+	+	+	+	+	+	+	+	+	+
<i>Discus perspectivus</i>	W, E									+	
<i>Arion rufus</i>	H	+	+	+	+	+		+	+	+	+
<i>Arion subfuscus</i>	Eu	+		+	+	+	+	+	+	+	
<i>Arion distinctus</i>	S	+	+		+	+			+		
<i>Arion circumscriptus</i>	W					+					
<i>Arion fasciatus</i>	S						+			+	
<i>Arion silvaticus</i>	W									+	
<i>Vitrina pellucida</i>	Eu	+	+	+	+	+	+	+	+	+	+
<i>Eucobresia diaphana</i>	H, E	+	+		+	+	+		+	+	+
<i>Semilimax semilimax</i>	H, E	+									
<i>Vitrea diaphana</i>	H			+						+	
<i>Vitrea crystallina</i>	H		+								
<i>Aegopinella pura</i>	L	+	+	+	+		+	+		+	+
<i>Aegopinella nitidula</i>	H		+	+		+	+				
<i>Aegopinella minor</i>	C	+		+	+	+	+	+	+	+	+
<i>Nesovitrea hammonis</i>	Eu	+	+	+		+	+				+
<i>Oxychilus cellarius</i>	S	+		+	+	+		+	+	+	+
<i>Oxychilus draparnaudi</i>	S	+		+	+						
<i>Daudebardia rufa</i>	W	+	+	+	+	+				+	
<i>Zonitoides nitidus</i>	H	+								+	
<i>Tandonia rustica</i>	C, E	+	+	+	+						
<i>Limax cinereoniger</i>	W	+	+	+	+	+	+		+	+	+
<i>Limax tenellus</i>	W	+					+		+	+	
<i>Lehmannia marginata</i>	W	+	+	+		+	+	+	+	+	
<i>Deroceras laeve</i>	H									+	
<i>Deroceras agreste</i>	O				+						
<i>Deroceras sturanyi</i>	H									+	
<i>Deroceras reticulatum</i>	O									+	
<i>Deroceras praecox</i>	W, E									+	
<i>Boettgerilla pallens</i>	S			+	+	+					
<i>Euconulus fulvus</i>	Eu	+	+	+						+	+
<i>Cochlodina laminata</i>	W	+	+	+	+		+		+	+	+
<i>Cochlodina orthostoma</i>	W	+	+	+	+			+		+	
<i>Ruthenica filograna</i>	H	+	+								
<i>Macrogastra ventricosa</i>	W									+	
<i>Macrogastra plicatula</i>	W	+	+	+			+	+	+	+	
<i>Clausilia parvula</i>	C, E	+	+		+			+			
<i>Clausilia pumila</i>	W		+	+		+				+	
<i>Laciniaria plicata</i>	W	+	+	+		+					
<i>Alinda biplicata</i>	W	+	+	+	+	+	+	+	+	+	+
<i>Bradybaena fruticum</i>	H	+	+	+	+					+	
<i>Perforatella bidentata</i>	H									+	
<i>Perforatella incarnata</i>	W	+	+	+	+	+	+	+	+	+	+
<i>Perforatella vicina</i>	W	+	+	+						+	+
<i>Trichia hispida</i>	S	+		+		+				+	
<i>Euomphalia strigella</i>	O							+	+	+	
<i>Arianta arbustorum</i>	W	+	+	+	+	+	+	+	+	+	+
<i>Helicigona lapicida</i>	C, E	+	+	+	+			+			+
<i>Isognomostoma isognomostoma</i>	W		+	+	+						+
<i>Causa holosericum</i>	W, E	+		+			+				+
<i>Cepaea hortensis</i>	W	+	+	+	+			+	+	+	
<i>Cepaea nemoralis</i>	S	+		+							
<i>Helix pomatia</i>	W	+	+	+	+	+	+	+	+	+	
Total number of species:	71	43	35	42	33	22	19	22	19	51	23
– woodland species: (%)	27 (38.1)	20 (46.5)	16 (45.7)	19 (45.2)	12 (36.4)	10 (45.5)	11 (57.9)	10 (45.5)	10 (52.6)	23 (45.1)	9 (39.1)
– endangered species: (%)	8 (11.5)	6 (13.9)	4 (11.4)	3 (7.1)	4 (12.1)	0 (0.0)	2 (10.5)	2 (20.0)	1 (10.0)	3 (5.9)	3 (13.0)



H. obvoluta is a component of malacocenoses including 19–51 gastropod species. The proportion of typically woodland species ranges from 36.4 to 57.9%, that of endangered species (data from WIKTOR & RIEDEL 1992) from 0 to 20%. The number

of Polish localities (10) where the presence of *H. obvoluta* has been recently confirmed is an alarming signal of changes which are taking place in forest habitats.

THREATS

The inventory of localities of *H. obvoluta* in Lower Silesia made it possible to ascertain that out of the ten surviving localities only in one (nature reserve Muszkowicki Las Bukowy) the snail seemed to be abundant, i.e. an hour's search yielded from 26 to 64 (on an average 48) individuals, and the age structure (MALTZ in prep.) indicated a prosperous, reproducing population. The presence of such a population indicates that the climatic conditions of Lower Silesia favour *H. obvoluta* and thus do not constitute a limiting factor. At the same time, the structure of the forest (species composition, storeys, species richness and diversity of plants, natural character of the habitat), and especially abundance of dead timber, create favourable conditions for the snail.

Survival of the species in forests depends first of all on the presence of fallen tree trunks of adequate size and at a fairly advanced stage of decomposition. They constitute the place of egg-laying, feeding, provide shelter in daytime and hibernation sites in winter. The snails stay on their surface during the vegetation season, they mate there and can move along the forest floor due to them (MALTZ 1999b). These are the conditions found in the nature reserve Muszkowicki Las Bukowy, and only because the area was taken under legal protection rather early (SEMBRAT 1971).

The present distribution range of *H. obvoluta* in Poland is limited to the south-eastern part of the Sudete foreground where the snail is usually not

abundant and occurs at single localities (cf. Fig. 1c). Serious changes took place in the 19th and 20th c. in forest habitats of the area, as a result of human activity (agriculture, industry, urbanisation) (WALCZAK 1968). Consequently, natural deciduous and deciduous-coniferous forests have been preserved only in very few places. No doubt this fact accounts for the rarity of *H. obvoluta* in Lower Silesia. At the end of the 50s and in the 60s of the 20th c. the species was still present in the Ślęza massif (WIKTOR 1956) and in several sites near Bardo Śląskie (WIKTOR 1964). Out of these sites, the presence of *H. obvoluta* was confirmed only at the Kapliczna mt. (Bardo). Remnants of natural deciduous and deciduous-coniferous forests preserved in Lower Silesia are most often areas under legal protection or of topography preventing timber exploitation or other forms of economic use, for example the gorges near Książ where *H. obvoluta* is still rather numerous (WIKTOR 1959, MALTZ 1999a). It follows from the above that the main reason for recession of this species from parts of its natural distribution range is clear-felling (PAWŁOWSKA & POKRYSZKO 1998) and, most of all, removal of dead timber.

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