

## Mollusca

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**Abstract:** In Czech republic live 240 molluscs species, there from are 2 species locally extinct, 23 species critically endangered and 30 in danger. 15 species are regarded as more data demanding (DD). In single categories of water habitats (V) don't characterize accurately the occurrence of meaningful species. Here is for example a narrow connection between the categories V2 and M3 as an environment for species of periodic pools. In terms of wetlands and springs (M and R) we find many endangered species, crucial factor for molluscs is here the chemism of wetlands. Alike the category of species living on cliffs and boulder screes (S) covers one strictly calcicolous endangered species. By boulder screes is then most important the exposition of the slope and the layer of the litter from the deciduous trees dropped on the stones. This has a larger meaning than the geologic substrate. Important species of alpine forest-free habitats area (A), are our country virtually not present. By secondary grasslands (T) is important the depth of the soil horizon, so that it is possible to divide these habitats in dry grasslands (T3) and sites with a deep humus horizon (T1). Big importance has also the humidity and chemism. Scrubs (K) have no characteristic species, which would with occur only there. Many sensitive species of molluscs are commonly in forests (L), however it does not mean, that they occur in all types of forests, they prefer forests with noble deciduous trees with citrate calcium in litter, which is together with the presence of dead lying trunks a crucial factor of those categories. Also in the terms of the category of habitats effected by man (X) we can find habitats hosting sensitive species, especially it is necessary to stress the meaning of castle remainders as refuges for endangered species. Molluscs are a group narrowly bound to the vegetation, that is why the protection of the habitats, even if not always accordingly defined, is for their protection crucial.

### Introduction

In Czech republic live currently 240 species of molluscs, there from 77 species of freshwaters, the rest are terestic (212 kind gastropods and 28 kind bivalves). 94 species - 40% of our molluscs is included to the red list. List of the species and the red list came out in the studies by Beran (2002) for water molluscs and by Jurickova et al. (2001) for all our molluscs. Both studies with the exception of a few news do correspond to the contemporary knowledge.

### System Natura 2000 monitors these molluscs species

*Anisus vorticulus* – *Planorbidae* - clean standing freshwaters with a rich vegetation in v alluvia of larger rivers

*Vertigo moulinsiana* – *Vertiginidae* – calcareous desiccating wetlands

*Vertigo geyeri* - *Vertiginidae* – calcareous mires

*Vertigo angustior* – *Vertiginidae* - wetlands

## *Unio crassus* – *Unionidae* – larger rivers

### **Indication importance of molluscs**

Molluscs are exceedingly appropriate as a model indication group, as already mentioned by Lozek (1981, 1988). The main reasons are: satisfactory knowledge of the ecology of single species; a relatively low total number of all species, they cover a large scale of water and land habitats; the possibility to be compared with the fossil material in calcareous deposits and capturing the trend in the association development in the youngest geologic past and last but not least also an easy method of collection and conservation, it is theoretically possible to collect through the whole year. All these facts show, that molluscs are exceedingly fitting to develop a model group of invertebrates for the study of the habitat and landscape development also because of their narrow bindings to geologic substrate and vegetation.

### **Occurrence of the most scarce species in ČR**

*Theodoxus danubialis* – on stones in larger and more nutrient rich streams; in ČR was its occurrence limited only to the lower streams of Morava and Dyje where it was found in the 19<sup>th</sup> century. After that we only know a few findings until 1997, when strong populations on the down stream of Kyjovka and Dyje in front of the inflow in Morava

*Viviparus acerosus* – in muddy sediments of slow flowing streams; in ČR only in the lowest parts of Morava a Dyje, after the building of Nové Mlýny reservoirs it is receding

*Lithoglyphus naticoides* – in muddy sediments or stones, in CR only on lower parts of streams of Morava and Dyje, currently rapidly receding – scarce localities on the junction of Morava and Dyje

*Acicula parcelineata* – moist screes forests, in CR on the border of its distribution, 2 localities in Beskydy mountains

*Bithynia leachi* – pools with rich vegetation and cutoffs, older data from the surroundings of Lednice haven't been proved currently, nowadays only in a canal in a flood-plain forest near Kostice

*Valvata macrostoma* – cutoffs and pools - shallow periodical waters, a few residual localities in Polabí, steps back perhaps naturally – glacial relict

*Stagnicola palustris* – pools and cutoffs, the only finding is from a cutoff on Labe (Cernínovsko near Libiš)

*Stagnicola fuscus* – pools and cutoffs, currently the only locality in cutoff of Ohře near Kynšperk

*Anisus septemgyratus* – periodic pool in wold major river, 4 locations in alluvia of Moravia and Dyje near Nejdeč and Břeclav

*Anisus vorticulus* – clean stationary eutrophic waters with sufficient flora in alluvium of major rivers, residual populations in Polabí near Mělník and in Poodří near Studénka

*Pupilla alpicola* – lime mires, probably extinct on a locality in Český ráj, relict of cold periods of Pleistocene

*Truncatellina costulata* – in litter of calcareous rocks, the only locality is on Dívčí hrad on Pálava, relict from older Holocene, today naturally receding

*Vertigo geyeri* – lime mires, the only locality on a spring area near Žehrov in Český ráj, boreoalpine element, a relict from moistener periods of glacial

*Vertigo ronneyensis* – damper parts of mountain forests, boreoalpine element, three locations in Bohemian Forest near Knížecí Stolec

*Pseudofusulus varians* – mountain forests, under bark and in dead wood, alpine element, in our country on the north of its distribution area, insular occurrence in Krušné Hory, in Beskydy probably extinct

*Macrogastera latestriata* – damper mountain forests, on decaying wood, 9 locations in Beskydy and 1 in Javorniky, Carpathian species of moister periods of Holocene, today naturally receding

*Vestia gulo* – damp parts and marshes in mountain forests, Carpathian element, in our country are its limits of distribution, several locations in Beskydy

*Lehmania nyctelia* – lime springs, two locations in Bílé Karpaty

*Petasina Edentula*– damp vegetation of flea-dock in mountain forests, alpine elements in our country are its limits of enlargement - a slight occurrence in a drainage area of the brook Debrník in Bohemian Forest

*Candidula unifasciata* – narrow-leaved grasslands of a steppe character on calcite, residual populations, in our country margins of its enlargement (near Prague and in eastern Bohemia)

*Candidula soosiana* - narrow-leaved grasslands of a steppe character on calcite, some authors regard this species as only a races of previous species, in our country very rarely on calcite near Hanušovice and round Štramberk

*Helicopsis striata* – steppes on calcareous sands and loess with deeper soil horizon, relict from the period of glacial loess steppes, in our country almost extincted, only known locality near Prague perhaps with an imported population

*Pisidium pseudosphaerium* – shallow ponds or cutoffs and pools, quite filled, a few scattered locations in central Polabi, in Poodri and Litovelské Pomoraví

*Pisidium moitesserianum* – sand-muddy places of slower flows, known only from three region (near to Ohře, Labe, Pardubice and on the south from Dolnomoravský úval)

*Pisidium tenuilineatum* – slower flowing parts of clean streams with sandy bottom, new data only from Psovky and Liběchovky, from Ploučnice and on northern Moravia from tributary of Ostravice, else evidently extinct

## List of formation groups

### V – water bodies and reservoirs

In categories V1 and V4 is for mollusca important the quality of the river bottom, so that some species may be included in both of these categories, if the river flows slowly. It is important, whether the bottom is muddy or stony. Category V2 together with category M3 are relatively well characterized by the environment of species of periodic waters, important is here even the shade of the pool. In category V4 it depends on the flow velocity and the size of the stream, so that essentially other species may be found in mountain torrents and others in slowly flowing rivers, which cannot be caught up in the catalogue. Categories V3 and V6 are for mollusca a considerably unfavorable environment, so that we can find here only common stress-tolerant species. In category V5 the most important factor is the chemism. A completely missing category is underground crack waters and spring gulleys.

### M – wetlands and riverine vegetation and R – springs and mires

In both of these categories we can find many species, for which the chemism of the site is crucial, again rare species live on sites with a high content of calcium, and oligotrophic sites are hosted by stress-tolerant species. This is valid for the gradient of the

subcategories in the categories M1, R1 and R2. Category M2 hasn't for mollusca a special meaning and category M3 is a habitat of water species of periodic waters (see V). In category M4 we can find just a few stress-tolerant species. Category M5 is important for mountain species more dependent on dampness generally, however these species can live also on damper places with other vegetation in mountain forests. Categories M6 and M7 are important for hygrophilous species generally. On raised bogs of category R3 are mollusca almost missing.

### **S – Cliffs and boulder screes**

In this category is for many species important the difference in the chemism of the rocks (there are strictly calcicolous species, but again only acid-tolerant), so that rocks may be divided according to their chemism and according to the shade. In the case of boulder screes is important also the surrounding vegetation respectively which litter falls on the screes. Just one well-built lime-tree or maple to compensate the lack of calcium in the substrate. Genuine troglobiota are not among our mollusca, so that into the caves often go above all species from the surroundings, whereas some tend to inhabit caves notably more often, although they are not speluncar. Missing is here a category for terricolous species.

### **A – alpine treeless habitats**

In Czech republic are in principle no meaningful species in alpine treeless habitats, that would live only here.

### **T – secondary grassland and heathlands**

For this category is important the depth of soil horizon, so that it is possible to divide these habitats in dry grasslands (T3) and sites with a deep humus horizon (T1). Big importance has also the moisture and chemism. Habitats in category T1 inhabit rather common types of open sites. For category T3 may we find our most important steppe elements, above all on calcite substrate. Categories T2, T4, T5, T6 and T8 have for mollusca not so much meaning. In category T7 can occur some wetland species.

### **K – scrubs**

There are no characteristic species just occurring in this category.

### **L – forests**

Many sensitive species of mollusca are commonly forest species, however this doesn't mean, that they occur in all types of forest, they prefer forests with noble deciduous trees with citrate calcium in the litter. The influence of the basis is often scraped by the highly applied chemism of the litter. Especially category L4 often treats thanks to those phenomenon many rare species. In category L5 the species diversity depends on the intensity of the admixture of these deciduous trees, on moisture and geological substrate. Categories L1 and L2 host very similar communities. Categories L3, L6, L7, L8 are for mollusca not a very favorable environment, so that there live more stress-tolerant species. Category L9 has resembling species to category L52, where is a meaningful presence of *Sphagnum* are molluscs almost absent.

### **X – habitats strongly influenced by man**

Communities of these categories are mostly dependent on the succession degree of the given habitat. This means, that on sites with annual disturbances in categories X2, X5 we can find mostly field snails. On sites of categories X3, X4, X6, X7, X8, X9, X10 occur euryvalent species living in the surroundings. In terms of category X1 is the succession degree crucial – in old parks and on cemeteries is possible to expect generally rich communities often with surprising species, in younger buildings we can find again common euryvalent species. A single category would certainly deserve remainder of castles, where live many isolated populations of rare species, perhaps even abandoned villages, that have often been even in cultural forests important islands of biodiversity.

### **Factors mostly endangering mollusc**

Except of natural changes in the composition of molluscs communities in connection with the climatic change during last time (e.g. natural retirement of some forest species, that have had its peak in damp phases of Holocene) is the strongest factor the influence of man. From the broad spectrum of the anthropogenic influences are most important following ones:

1. Influence of industrial pollutants and on them tied phenomena, that has resulted especially into the mortification of mountain forests. Communities of mountain forests are ones of the most endangered.
2. Changes in hydrological regime by drainages and ingrowths – threatens especially wetland habitats and their communities (e.g. several species of the genus *Vertigo*).
3. Pollution of watercourse by chemical products from industry and agriculture and regulations of watercourses.
4. Changes of landscape management – dilapidation and finally ingrowths of once scythed and pastured habitats as are natural steppes, especially on deeper soils, but also grasslands or alluvial meadows. From these sites vanish not only their aborigine inhabitants, but also the modern immigration inhabitants, which means e.g. our thermophilous *Helicellinae*. Its influence has often also a direct liquidation of adequate habitats (around cities e.g. spreading of "amorphous" suburban landscape).

### **Literature**

#### ***Published red lists***

With the exception of the newest data summarize recent knowledge about the degree of endangering studies by Beran (2002) a Juříčková a kol. (2001).

#### ***Recent faunistics***

With the exception of the newest data summarize recent knowledge about the number of species and in the case of water species also about the development of populations again studies by Beran (2002) a Juříčková a kol. (2001). Summary of older faunistic data and the development of malacofauna in quaternary studies by Ložek (1956, 1964). Práce Juříčková a kol. (2001) summarizes then data after 1956 (Ložek 1956).

#### ***Ecological data***

Data summarizing basic ecological demands of our water molluscs have been published by Beran (2002), terrestrial Gastropods have been studied by e.g. Ložek (1956, 1964), Kerney a kol. (1983), Turner a kol. (1998). The communities of concrete habitats are processed in detail by Dvořák (1999), Horsák & Hájek (2003), Juříčková & Kučera (2005), Ložek (1949, 1974, 1972, 1980, 1983, 1990, 1998), Pflieger (1996).

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