

Historical development of the White Carpathian spring fens based on palaeomalacological evidence

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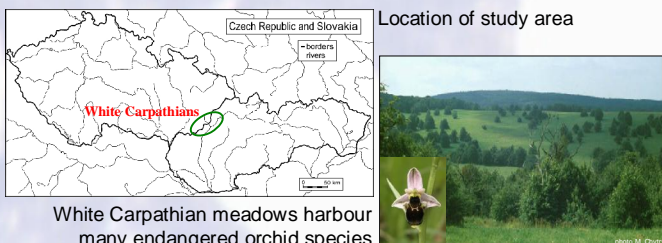
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INTRODUCTION

Molluscs are frequently used for reconstruction of the past environment. They reflect climatic and environmental changes well. There is a close correlation between specific mollusc assemblages and sediments or soils of particular phases of the climatic cycle. Thus, they are of prime importance to Quaternary ecostratigraphy. Although fossil molluscs have been collected for a long time, their importance was underestimated or misinterpreted till recent time (cf. LOŽEK 2000).

AREA UNDER STUDY

White Carpathians Mts are a small mountain range (ca 2000 square km) on the borderland between the Czech Republic and Slovakia. The whole territory is currently preserved as a bilateral Protected Landscape Area and Biosphere Reserve of Unesco.



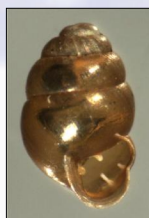
Location of study area

White Carpathian meadows harbour many endangered orchid species

The White Carpathians Mts are located on the western margin of the Western Carpathians and forms a part of the Western Carpathians flysch belt. Flysch is a kind of bedrock where in each geological stratum sandstone and claystone alternate. White Carpathian flysch is unique because of an extremely lime-rich character. Therefore, tens of tufa forming spring fens occurred within the study area and in most cases they are treeless.

STUDIED SITES

I dealt with treeless extremely base-rich (= tufa forming) spring fens. These sites are valuable from the nature conservation point of view, because of many endangered plant and mollusc species which occurred there (e.g. *Vertigo moulinsiana* and *V. angustior*). They are very small in their total area (from 20 m² to 500 m²) with different habitats in their surrounding.



Vertigo moulinsiana is recently documented within the study area only from 9 sites. It inhabits lowland tufa forming spring fens. Shell up to 2.5 mm.

Vertigo angustior prefers mineral rich and well water soaked fens. Both species belong to the threatened animals listed in Annex II of the European Union Habitats and Species Directive (EUHSD). Shell up to 1.6 mm.



AIMS

- 1) To elucidate historical development of White Carpathian treeless tufa-forming spring fens.
- 2) To determine the age of the treeless phase – how old are recent communities?
- 3) To determine when the relic *Vertigo moulinsiana* has appeared at the first time there.

RESULTS

So far, three profiles were processed. Because of the limited space, only the oldest and the most informative profile, called Tistá hora (Slovakia), is presented here. It was sampled at a dug out exposure 290 cm deep and one litre sample was taken from each visible layer (determined according to the structure and colour of sediments). 12 layers were distinguished where 10,734 shells were identified. The age of four layers was determined by using ¹⁴C dating.

The lower eight layers up to 70 cm represented forest habitats. The layers 110-90 cm and 90-70 cm represented flysch Carpathian forest climax; both included assemblages consisted of 42 species. More than 30 % of all these were strictly forest species (sensu LOŽEK 1964). *Macrogastra latestriata* represented a crucial indicator species of the climax state; three specimens were found in the layer 90-70 cm (650 years B.P., based on ¹⁴C dating). The paradox is that immediately after the appearance of *M. latestriata*, the studied site was completely deforested and the mollusc community totally changed. Nineteen snail forest species became extinct and species of open habitats appeared. Common open-landscape snails *Vertigo pygmaea* and *Vallonia pulchella* were fairly abundant. In the layer 58-32 cm (the second layer after deforestation) *Vertigo moulinsiana* appeared for the first time. The results from other profiles are available in HORSÁK & HÁJKOVÁ (2005).



Macrogastra latestriata

CONCLUSIONS

The treeless state of all studied sites is quite young, which is the result of human deforestation ca 650 years ago (during the main Walachian colonisation, in progress 700-600 years ago). *Vertigo moulinsiana*, a threatened relic from the Late Holocene in Central European landscape, has penetrated into target area in the same period from lowland refugia situated southward. The finding of young age of these habitats and communities is firmly connected with the issue of nature conservation. If we want to maintain the present state of these sites and their threatened communities, we have to provide regular site's management (i.e. grazing or mowing).

REFERENCES

- HORSÁK, M. & HÁJKOVÁ, P. (2005) The historical development of the White Carpathian spring fens based on palaeomalacological data. *Ecology and palaeoecology of spring fens in the western part of the Carpathians* (ed. by A. Pouličková, M. Hájek and K. Rybníček), pp. 63-68. Palaeoecology, Olomouc, Czech Republic.
- LOŽEK, V. (1964) *Quartermollusken der Tschechoslowakei*. Rozpravy Ústředního Ústavu Geologického, Praha.
- LOŽEK, V. (2000) Palaeoecology of Quaternary Mollusca. - *Sborník geologických věd, Antropozoikum*, 24: 35-59.

