

# How many species/individuals can coexist in small areas of spring fens: preliminary results

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## INTRODUCTION

The relationships between the number of mollusc species and area have been rather low studied in terrestrial habitats. Excluding island studies there are only few published studies concerning the species/area relationship: Lloyd-Evans (1975), Nekola & Smith (1999) and Cameron (2002). This topic was investigated only at a large scale e.g. comparison among regions, countries, continents... Yet no work dealing with species/area relationships on a small scale within individual sites has been done.

## STUDIED SITES

In 2005 we studied species/area relationships in the Western Carpathian spring fens (Fig. 1). Altogether, 10 sites differing in their mineral richness were chosen, out of which three were extremely mineral rich with strong tufa precipitation, four were mineral rich but without tufa precipitation (including the cases with individual tufa grain occurrence), and three were mineral-poor rich *Sphagnum*-fens.

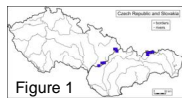


Figure 1

## AIMS

- Ø to study how many species/individuals can coexist in small plots of spring fens
- Ø to evaluate how the sites heterogeneity is reflected by the plot size 75<sup>2</sup> cm<sup>2</sup>

## RESULTS

Considering only live specimens we found 2-10, 4-14, and 5-16 species in the quadrates 25<sup>2</sup>, 50<sup>2</sup>, and 75<sup>2</sup> cm<sup>2</sup>, respectively. When considering both live individuals and empty shells the number of species increases significantly (2-17, 7-19, and 8-23 species in the quadrates 25<sup>2</sup>, 50<sup>2</sup>, and 75<sup>2</sup> cm<sup>2</sup>, respectively), especially in the case of the 25<sup>2</sup> cm<sup>2</sup> quadrate (Fig. 3). In average, 87 % of all species (together with the 12 litres sample) were recorded in 75<sup>2</sup> cm<sup>2</sup> quadrate. This shows that the 75<sup>2</sup> cm<sup>2</sup> plot represents the site's heterogeneity reflected by the mollusc assemblage very well (Fig. 4). The number of individuals are shown in Figure 5.

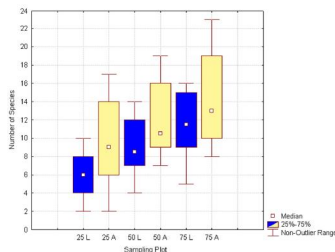


Figure 3. Number of species recorded in individual sampling plots.

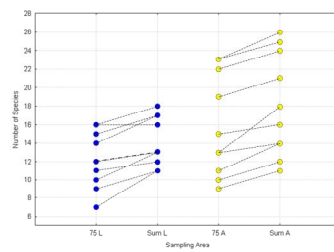


Figure 4. Comparison between the number of species found in plot 75<sup>2</sup> cm<sup>2</sup> (75) and the total number of species found in each site (Sum).

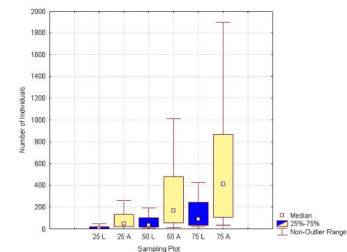


Figure 5. Number of snail individuals recorded in individual sampling plots.

Abbreviations: 25 – 25<sup>2</sup> cm<sup>2</sup>, 50 – 50<sup>2</sup> cm<sup>2</sup>, 75 – 75<sup>2</sup> cm<sup>2</sup>, L – live individuals considered, A – all individuals (including empty shells) considered.

## METHODS

We have sampled a set of three quadrates (25<sup>2</sup>, 50<sup>2</sup>, and 75<sup>2</sup> cm<sup>2</sup>) by using the nested sampling design in each site (Fig. 2). Each plot was cut out and removed (including herbaceous vegetation, mosses, litter and the upper soil layer). To obtain data about the site's heterogeneity we also collected a 12 litres sample in the area of 16 m<sup>2</sup> located around the quadrates. Molluscs were then extracted from all samples using the "wet wash method" (Horsák 2003). The number of individuals as well as the number of species of molluscs from each sample were counted and analysed. Live individuals and empty shells were counted separately.



Figure 2. Sampling plots with the 25<sup>2</sup> cm<sup>2</sup> quadrate removed.

*Vertigo geyeri*, an endangered relic fen species listed in Annex II of the European Union Habitats and Species Directive (EUHSD).  
Shell up to 1.6 mm



## PERSPECTIVES OF FURTHER DATA ANALYSES

- Ø to explore how the number of species increases with the increasing plot size and see if there is any difference among studied mineral fen types
- Ø to compare species/area relationships between molluscs and plants within the same sampled set of quadrates
- Ø to analyse if the sampling areas' heterogeneity (expressed as variation in vegetation) is correlated with the increase of mollusc species

## REFERENCES

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