

MALACOFAUNISTICAL STUDY OF THE FLOOD-PLAIN OF THE MUREŞ RIVER IN THE ZAM REGION

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Abstract

We have studied the malacofauna of the flood-plain of the Mureş river in the Zam region, using samples taken along a 300 m long transect on the left bank of the river. There were four characteristic biotopes along the transect: *Salicetum albae-fragilis*, mowed meadow, unmowed meadow and *Salicetum cinerea*. There were taken eight samples in each biotope, using the quadratic method. Our purpose was to find out, if the four biotopes can be differentiated taking into consideration the malacofauna. In the same time, the migration of species along the transect was also examined. We found that along the transect two fluctuation zones can be differentiated: on the right side of the road, where the species disperse due to the river and to migration, and on the left side of the road, where the species dispersion arises from the nearby forest. The malacofauna indicates the microclimate of the different biotopes. We have represented graphically the quantitative distribution of species and ecological groups, as well as the diversity of the four biotopes. Based on these results, we have established the objectives of future investigations in the region.

Keywords: Mureş River, floodplain, malacofaunistical transect.

Introduction

Our study is part of a research with the target of surveying of the Mureş River valley as an ecological corridor. In the course of the research we accomplished, besides the botanical and the entomological surveys, the malacofaunistical examination of the sampling places, taking into consideration that the malacofauna of a biotope indicates precisely the morphological and the climatic states of the area and gives information about the natural value of the surveyed area.

Sampling site and method of collection

The survey was accomplished in the flood-plain of the Mureş river in the Zam region, on the verge of Sălciva village, along a North-South transect perpendicular to the river, on its left bank.

The transect encompasses four homogeneous, separated botanical areas with a peculiar microclimate :

a) 50 meters wide grove wood, situated right on the bank, which is rich in plant species, it is a jungle-like domain, interwoven by lianas and less accessible. Its microclimate is humid, cool and vaporous.

b), c) beyond the grove there are cultivated lands, hayfields next to each other, on each side of the transect. On the right side there is the scythed field, which had been scythed a little before our sampling took place, therefore it is a relatively dry, bare area, with hardly sprouting grasses. The field situated on the left had not yet been scythed in the year of our sampling, so it is covered by a vegetation made up of high-grown, aged, grassland gramineae. Its microclimate is cooler, more humid than that of the grassland, because it is a closed domain.

d) the fourth biotope is situated further along the transect, beyond the road which connects the villages Sălciva and Pojoga. The furze-field is a mixed botanical domain: different species can be found there, from the swamp species, through the species living in the mountains, to the common grassland species. Some time ago it was cultivated, but its cultivation was ceased and therefore it has become a domain with high grass, bushes and sedge. Its microclimate is humid, cool.

The furze-field closes the transect, but it is important to mention that beyond it there are grasslands again and finally the flood-plain is closed by the mountain slope covered by forests made up of alder and beech trees.

We took a total of 32 quadrates (25x25cm) of samples, 8 quadrates from each biotope. It is important to mention that the samplings took place at two different times: on the first occasion the weather was sunny, dry and warm, on the second one it was humid and moisty. Consequently, our results were not influenced by the weather.

Because the four biotopes are botanically distinct, our target was to find out whether these differences can or cannot be reflected by the malacofauna. Along the transect we also studied the migration of the species through the flood-plain.

Results

The sketch of the flood-plain can be seen in figures 1 and 2. The found species have been ranked in ecological groups. The classification has been performed on the basis of Lozek's work (1964). Merging the 10 groups used by Lozek, we have distinguished 5 groups of species: forest species, steppe species, mezophyle species, higrophyle species and aquatic species.

In figure 1 the found species are indicated by a continuous line under the biotope.

A high number of forest species has been identified in the willow-grove on the bank and in the furze-field, but two species have been also found in the grasslands.

The forest-species of the willow grove and those of the furze-field are completely different: in the willow-grove on the bank we have found euribionte species, well adapted to the changes of the environment: *Bradybaena fruticum*, *Helix pomatia*, *Perforatella vicina*. These species have been found in the course of our research that encompassed the whole river-valley, in almost every sampling-point), whereas in the furze-field the found species are typically forest type, which live in areas with a humid, cool climate and a closed vegetation (*Cochlodina marisi*, *Euomphalia strigella*, *Laciniaria plicata*, *Perforatella bidentata*, *Ruthenica filograna*).

The steppe-species can be found in the furze-field and in the grasslands in increased number. *Cepea vindobonensis* is an euribionte species, similar to the above-mentioned ones. The abundant presence of the steppe species in the furze-field indicates the openness of the domain. The presence of *Pupilla muscorum* only in the hay-fields shows that these areas are much drier than the furze-field.

The mezophyle species can be found mainly in the willow-grove on the bank. We have found reference in the literature to the fact that in the forest the proportion of the mezophyle species is greater than in open areas (Domokos).

The higrophyle species are present in all of the studied biotopes, but they are the most numerous in the grove on the bank, because this is right beside the water. Among the higrophyle species *Succinea oblonga* and *Zenobiella rubiginosa* are also species with a good adaptability, and have been found throughout the whole river valley.

The sole aquatic species (*Lymnea stagnalis*) was found in the furze-field, but the sub-fossile character of the empty shell hints to the fact that it had been carried there by former floods.

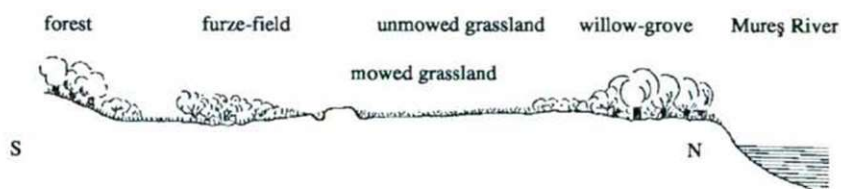
The band-diagrams in figure 2. illustrate the percentage of the species-groups in the four biotopes. It indicates that in the willow grove the forest species, the mezophyle and the higrophyle species are present in a nearly equal proportion. The forest-species demonstrate the presence of woody vegetation, the mezophyle species prove the closeness of the vegetation, and the higrophyle species indicate the proximity of water and the humidity of the air. In the grasslands the steppe species predominate, but the mezophyle, higrophyle and forest-species are also present, in a lower extent. This fact proves the migration of the species. In the furze-field the proportion of the forest-species is similar to that of the steppe one, because the area is bushy, but it is characterised by open vegetation and the presence of the higrophyle species indicates the humidity of the area.

To demonstrate the differences in diversity between the biotopes, we drew the species-number-log.abundance graph (fig. 3.), where every biotope is indicated by a line. The steepness of the lines indicates the uniformity of the distribution, i.e. the steeper the line is, the greater is the difference between the numbers of the species within a biotope.

The uniformity of the willow-grove and that of the furze-field are similar and so is the steepness of the two lines of the grassland but in the cultivated lands there are less species and the steepness of the lines indicates the great difference in the number of the species. The diversity of the grassland is smaller than that of the more natural areas. The diversity of the hay-field is the smallest.

Mureş floodplain

The road between Sălciua and Pojoga



Forest sp.

Bradybaena fruticum	-----	-----
Cochlodina laminata	-----	-----
Cochlodina marisi	-----	-----
Euomphalia strigella	-----	-----
Helix pomatia	-----	-----
Laciniaria plicata	-----	-----
Perforatella bidentata	-----	-----
Perforatella vicina	-----	-----
Ruthenica filograna	-----	-----

Steppe sp.

Cepaea vindobonensis	-----	-----
Granaria frumentum	-----	-----
Helicella obvia	-----	-----
Monacha cartusiana	-----	-----
Pupilla muscorum	-----	-----
Vallonia pulchella	-----	-----
Vertigo pygmaea	-----	-----

Mezophyle sp.

Cochlicopa lubrica	-----	-----
Punctum pygmaeum	-----	-----
Vitrea crystallina	-----	-----

Higrophyle sp.

Oxyloma elegans	-----	-----
Succinea oblonga	-----	-----
Succinea putris	-----	-----
Zenobiella rubiginosa	-----	-----

Aquatic sp.

Lymnaea sp.	-----	-----
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Fig. 1. The 300 m long N-S oriented malacofaunistic transect on the Mureş/Maros floodplain (07-12.08.2001)

Mureş floodplain

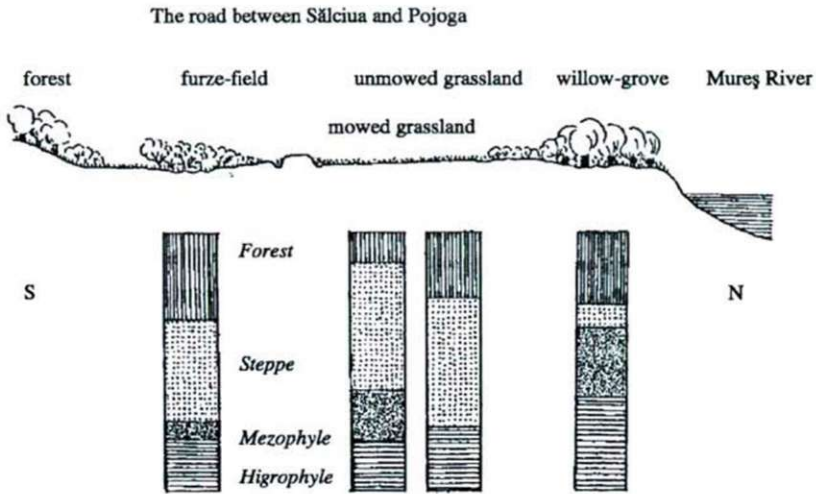


Fig. 2. Band diagrams of the Lozek's species groups on the Mureş/Maros floodplain based on the transect (07-12.08.2001)

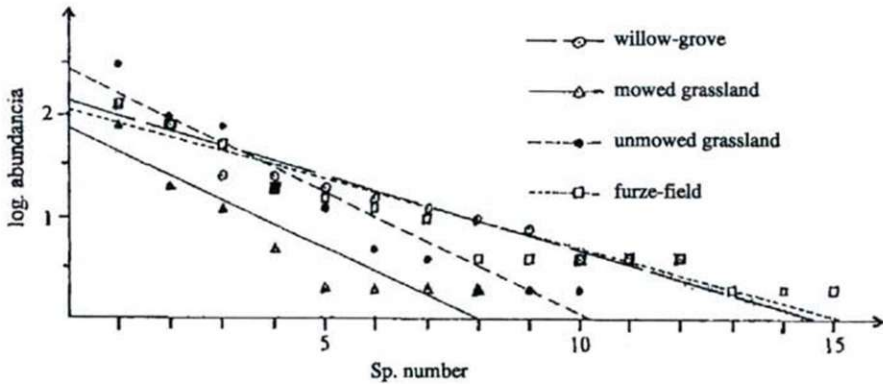


Fig. 3. Species number - log abundance graph.

Conclusions

In the course of the data analysis we have come to the conclusion that there are two fluctuation zones along the transect, on both sides of the road connecting the grasslands and the furze-field. Because the forest-species of the willow-grove and those of the furze-field are different, the species found in the willow-grove must have been carried into this biotope by the river, by the way of hydrochor expansion. As we have already mentioned, these species have been found in many places along the whole river. The forest-species of the furze-field must have come from the neighbouring forest on the mountain slope.

In the course of our research the hypothesis that the malacofauna clearly indicates the microclimate of the area has proven to be true, despite the fact that the species' migration tends to merge the differences existing between the biotopes, because the species exhibiting a pronounced ecological resistance are present in most of the biotopes.

Due to human activity, the diminution of the diversity of the malacofauna becomes manifest. The diversity of the willow-grove and that of the furze-field (which is no longer cultivated) are bigger than that of the hay-fields.

Further tasks

Our results point to the necessity of further research and determine its line:

– to examine in detail the fragmenting effect of the road; to take samples from the grasslands and the furze-field in those places that are close to the road. By comparing these results with each other, we can get an answer to the questions concerning the effect of the road on migration.

– to investigate in detail if the fluctuation present in some biotopes comes or not from the area that we suppose; we should examine the alluvial deposits on the banks of the Mureş river and we should expand the transect to the forest situated on the mountain slope.

– to take samples from the right bank of the river along a similar transect and to compare the results with the above-mentioned ones; on this basis we could deduce the presence and effects of the hydrochor expansion and of the migration through the flood-plain.

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