1.6. CHANGES OF THE MOLLUSCS COMMUNITY IN FLOD AREA DURING SUCCESSION

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1.6.1. INTRODUCTION

The aquatic habitats of the inundation areas of rivers go through different developmental stages during their evolution in time, due to mineral and biological colmatation. These stages are: lateral branches (flow waters), dead branches, inundable pools, marshy lands and wetlands with semistatic waters. Spring and autumn floods play an essential role in the formation of these types of habitat. Freshets in the superior and middle sectors of rivers may give rise to anyone of the first three habitats mentioned above, and their future evolution will follow the enumerated steps. This succession of types of habitats is followed by a succession of aquatic mollusc communities (Sárkány 1977, 1983). These findings were made in the river meadow of the Mures at the time when this was still in a nearly natural state. In order to demonstrate the importance of the inundable meadow in the preservation of biodiversity and of the river as an ecological system, we set forth the above mentioned idea, supporting it by new data that emerged from a series of research experiments performed on the Somes, Cris, Olt, Bodrog rivers and on their affluents.

1.6.2. MATERIAL AND METHOD

From the investigated habitats of the inundable areas of the Mures, Olt, Bodrog, Latorca and Laborec rivers 85 natural habitats were selected and classified as follows (codifications correspond to those in Table 1):

I. Lateral branches with flow waters
- A. lateral branches with stony bottom and without vegetation
- B. lateral branches with silty bottom and with aquatic vegetation

II. Dead branches
- A. dead branches without aquatic vegetation, with gravel or with rough sand on the bottom
- B. dead branches with aquatic vegetation and with sitly bottom

III. Inundable pools
- A. inundable pools without aquatic vegetation, with gravel or rough sand on the bottom
- B. inundable pools with aquatic vegetation and with silty bottom

IV. Wetlands with semistatic waters
- A. without a specific aquatic vegetation
- B. with aquatic vegetation

The c% values in Table 1. indicate in what extent (expressed in percentage) the species is characteristic for the respective type of habitat. Bellow the mark "c%" the number of investigated habitats belonging to the corresponding subtype was taken down.

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1.6.3. RESULTS AND DISCUSSION

Examining the results shown in Table 1. one can find that the most euritope species is *Radix auricularia*, which occupies very quickly the newly formed aquatic habitats, being in most of the cases the pioneer species, and persisting until the evolution of these habitats to an advanced degree of eutrophication. The species *Radix peregra* is very similar, but it disappears from the strongly eutrophicated habitats. Even in these highly euriece species an optimal preference can be noticed, according to the "c" values. The presence of species in the different subtypes of habitats, with or without aquatic vegetation (marked with "A" and "B" in the table), indicates their preference towards the character of the habitat. Accordingly, the species Viviparus contectus, V. acerosus, Bithynia leachi, B. tentaculata, Acroloxus *lacustris*, *Lymnaea stagnalis* and many other live only in habitats that have a rich vegetation.

Table 1. The mollusc communities of the different habitat types

Habitat typs	I. Lateral branches		II. Dead branches		III. Inundable pools		IV. semistatic waters	
Habitat subtype	A	B	A	B	A	B	A	B
Number of studied h. subtyps	(7)	(14)	(3)	(18)	(11)	(18)	(7)	(7)
	c%	c%	c%	c%	c%	c%	c%	c%
Species								
Viviparus contectus				16				
Viviparus acerosus				16				
Lithoglyphus naticoides				5				
Bithynia leachi				5				
Bithinia tentaculata				11				
Acroloxus lacustris				38		11		
Physa fontinalis				5		5		
Physa acuta				5		17		
Aplexa hypnorum						11	14	28
Lymnaea stagnalis				50		17		14
Stagnicola palustris				22	9	41	57	42
Radix auricularia	57	50	66	38	27	29	14	14
Radix peregra	28	14	33	16	45	17		
Galba truncatula	14	50		33	27	23	28	
Planorbarius corneus		7		72		52	14	42
Planorbis planorbis				27		47	14	57
Gyraulus albus				27	9	11		14
Anisus spirorbis			33	11			14	28
Anisus vorticulus				5				
Bathyomphalus contortus				5		5		
Armiger crista						5		
Hippeutis complanatus				16		5		
Ancylus fluviatilis	14			5				
Ferrissia wautieri				5				
Unio pictorum	14	7		38				
Unio tumidus	14			22				
Unio crassus	14		33					
Anodonta cygnaea		14		50		29		
Anodonta anatina	14							
Anodonta woodiana		7		5				
Sphaerium corneum				5				
Spphaerium lacustris				11		11		

The sequence used by us in the enumeration of the types of habitat corresponds to the natural one, i.e. to their succession in time. In this order, one can observe an increase of the number of species to the dead branches with vetgetation, but afterwards their number decreases towards the inundable pools and semistatic waters. The dead branches still conserve some species that usually live in the river bed, but they also host a series of species which prefers still waters. This supports the fact that the succession of habitats is followed by an adequat succession of the mollusc populations. This succession can be revealed even better if we examine separately the habitats of the "B" subtype.

The reason why the "A" subtypes are mentioned in all types of habitats is the fact that the freshets may create new aquatic milieus in the inundable meadows, which will firstly have a gravely bottom and will be populated by aquatic vegetation after a certain period of time. The habitats that pass from "A" to "B" category will develop further on the way of the "B" subtypes. The freshets may render the habitats "younger" by sweeping the mud and the detritus deposited on their bottom, they may transform the dead branches into lateral river beds, or may open the flooded lakes towards the river bed, converting them in dead branches. Consequently, the inundable meadows are characterized by a permanent dynamics. On its whole the inundable meadow can be conceived as a dynamics of the patches brought about by a sustainable disturbance (Margóczi, 1998; Gallé, 1998), caused mainly by periodic freshets. These communities exhibit a strong reziliance so that they return quickly after the action of the disturbing factors.

Succession of the communities implies, of course, more delicate intermediate aspects, fact that will be exemplified by the sequence in time of the eutrophication of an inundable pool. In a small flooded pool, generated after the inundation in 1970 in the vicinity of the locality Lunca Mure°ului during the autumn of that year, the species *Radix auricularia* was collected. In 1971 we identified the species *R. auricularia* (dominant), *Stagnicola palustris* (characteristic) and *Galba truncatula* (accessory). In 1972 the species *Planorbis planorbis* appears and becomes dominant, being followed by *S. palustris* and *R. auricularia*. In 1973, when the providing channel was embanked with a bank of sand, eutrophication became enhanced, *R. auricularia* disappeared, while *Pl. planorbis* and *S. palustris* reduced significantly the number of individuals until the autumn. In the same year, the species *Hippeustis complanatus* and *Aplexa hypnorum* made their appearance, the former one registering a very intense multiplicaton until the end of this year. In 1974 *A. hypnorum* becomes dominant, and a new species appears: *Gyraulus albus*, its natality overtaking the one of *Pl. planorbis*. The low water level causes the desiccation of this pool in the autumn of 1974, while the freshets of the spring of 1975 lead to the leveling by colmatation of the basin.

The example described above shows that in such environments with small surfaces the succession performs with a considerable speed. In the same time, one can conclude that each subtype of habitat examined by us represents only one of the multitude of intermediary phases of the succession. The qualitative and quantitative composition of the aquatic mollusc communities is determined by the configuration of the limiting abiotic factors, but it is also regulated by the interspecific retations of the populations (Padisák, 1998).

In the present state, the malacological biodiversity on the rivers of the Carpathian Basin depends mainly on the degree of anthropic modifications. Among the rivers from Transylvania, the Olt which is seriously polluted, bears a series of reservoir lakes and lacks many bends that had been cut off, still maintains a number of 41 species. But most of the species survived in the old bends, isolated from the river, bends that are able to maintain this abundance of species only until their complete colmatation, considering that they are rarely flooded. The fauna of this river, reconstituted on the base of bibliographical data, consists of 50 species (Sîrbu et al., 1999). In this respect, Olt is followed by the rivers Mures (31), Cirsul Negru (25), Somes (23), Crisul Repede (21), Crisul Alb (20) and Tur (17). In the basin of Bodrog a much more abundant fauna was found, but at the present we possess only a few data on it because only certain stations were investigated.

1.6.4. Summary

Freshwater molluscs communities were studied in different habitat types.

The dynamics of the habitats in flood areas is followed by a corresponding succession of the aquatic mollusc communities. On the whole of a natural river they function on the principle of the dynamics of patches, maintaining a high value of biodiversity.Examination of the fauna based on the types and subtypes of habitats reveals the preferences of species, fact that could be used in the typology of aquatic environments.

1.6.5. Conclusions

Biodiverstiy of the malacofauna in rivers is tightly dependent on the natural state of the inundable meadows.

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1.6.6. References

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