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COMPARATIVE FAUNISTIC AND OECOLOGICAL INVESTIGATIONS INTO THE AND LAND-MOLLUSKE OF THE KÖRTVÉLYES RESERVATION AREA

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Abstract

Author carried out sampling at 21 places between 1959—1981. The low number of (7 living species) caused by two factors. As it is a low inundation area, floods cover it 2—3 times a year. (This is well shown by the low numbers of diversity and eveness — Table 3) Agriculture an forestry decrease this number too.

The species composition of snails in indigenous foreststands corresponds to the situation in the other areas in Tisza valley (BÁBA 1980b).

The light intensity, the the cover of forest-stands influence the number of species and individuals (Table 2, 3, Fig). Light-shadow conditions influence the snails' distribution.

Mollusk-fauna of aquatic biotops is similar to that of other dead reaches andnavvy hol es. In different areas of the Low, Middle and Upper regions the defected differences of mollusk-faunae of dead branches and navvy holes (Table 1) are caused partly the unexploredness and partly by the differences, of the samplings of water vegetation's successive condition.

Survey of Körtvélyes dead reach was based on a mosaik-like reconstruction and their comparison of snail populations of different successive conditions. (Table 4) The mollusk-fauna of water biotops is similar to that of other dead reaches and navvy holes. The later ones were dryed out at Körtvélyes by forest settlement. The dead reach is to be found on a stage of natural aggradiation. Cultur-effect can be observed in the bottom's fauna (shell-decay). Vegetation disturbance is marked by the increase of individual number of few species and other ones disappeare. (Table 4; 4 Fig)

Area reconstruction is to be solved by providing the necessary oecological circumstances for the forests' soilfauna (shadow-effect, double foliage-level) and by the elimination of water-polluting and cultur effects.

Introduction

The Körtvélyes dead branch area of river Tisza is a well-known territory of the Southern part of the Great Hungarian Plain. It has been the favourite place of excurtion and spa of the Szeged and Hódmezővásárhely inhabitants since the beginning of our century. Having become a reservations area it remained a frequented fishing place and (today already prohitbited) spa.

Forestry and fishing are characterisic for the territory, which has it been discovered from scientific point of vieu of its popularity.

Reconstruction plan of the reservation area hasrequired its discovery.

Materials and Methods

Faunustis and phytocenological collections were carried out in 20 biotops here in 1959 and between 1976—81. Quadriting metod (25×25 cm) was used for collection, there were 10 quadrats in each biotop respectively. The same method was used when collecting from the bottom of shallow (50—70 cm) water of the dead branch (unter the examined water-plants).

Data collected were compared with those of other Tisza dead branches, navvy holes and flood-plains to explain wether the Körtvélyes-relations are characteristic for the other parts of the Tisza valley.

(BÁBA 1958, BÁBA—ANDÓ 1964, BÁBA 1965a, b, 1967a, b, 1970, 1970—71, 1972, 1973a, b, 1975, 1975a, b, 1978, 1979a, b, c).

Data of CZÓGLER 1927, 1935, ROTARIDES 1931, HORVÁTH 1958, 1962, 1972, and the data of species-spreading based on HORVÁTH's and BÁBA's collections and other authors finding lists (PINTÉR—RICHNOVSZKY—SZIGETHY 1979, RICHNOVSZKY—PINTÉR 1979) were used as well.

Diversity, evenness and zoogeographical distribution were taken into consideration when analyzing the collected landmaterial (BÁBA 1980a, b).

Collected snails of both livinig-spaces were examined from the wiew of their to the vegetation succes.

Examined collecting areas were as follows:

1. Pre-Tisza.
2. *Salicetum triandrae* 100 quadrats of the collecting area on 30. VIII. 1978 to explain distributive relations.

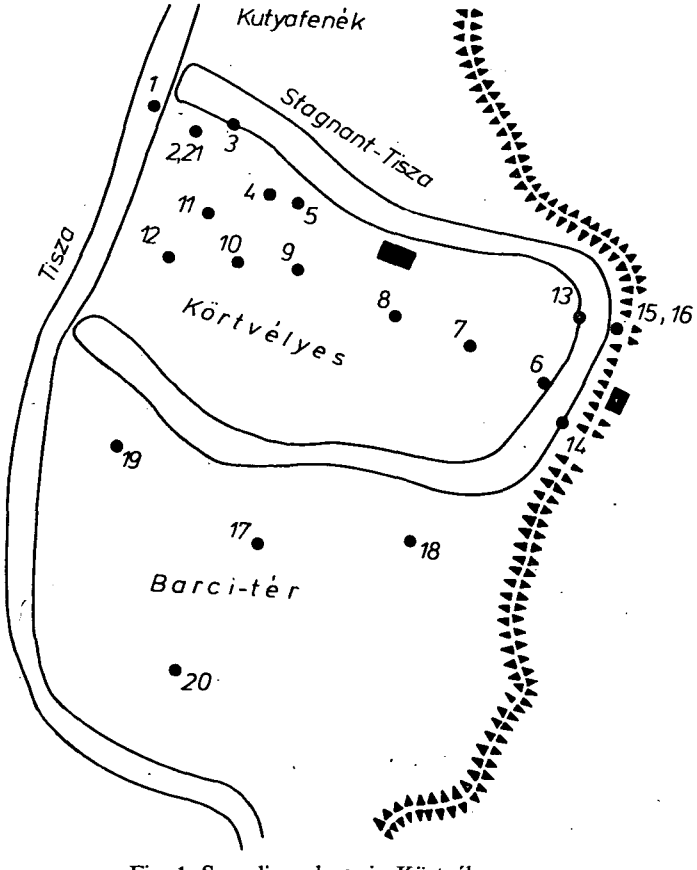


Fig. 1. Sampling places in Körtvélyes area.

3. *Salicetum albae-fragilis*. 1, 2, 3 on the dead branch's side near to „Kutyafenék" and Tisza. *Rubus, Aristolochia, Polygonum hydropiper* undergrowth.

4. Planted poplars, (with *Amorpha* shubbery in front of the research house. 5. *Amorpha* shrubbery. 6. Willowgrowes and the dead branch's bank. — Rubus *Xanthium strumarium* undergrowth. 7. Improved poplar- American ash-forest without undergrowth 70 km from the dead branch. 8. Selected oak-American ash-forest 150 km from the dead branch, level of shrubbery: *Amorpha*. 9. Ploughed meadow among young planted willows, *Xanthium*, meadow-willowy. 10. Drying-out pool, plash among old willowgrowes: *Rubus Carex*-cover. 11. Home-poplar group without undergrowth *Rubus*. 13. Dead branch with vegetation *Trapa natans*. 14. Dead branch without aquatic vegetation. 15. Navvy holes along thedike with wilowy-plants alongs ridges. 16. In 1959 a canal connecting navvy holes has built on the place of 15. collecting area. At some places Rubus. 17—20. „Barci-rét" (meadow area). Quadrating collection (50-50 quadrat each) was carried out in the 2. and 3. collecting areas, at 5 places in each, in the other places 10 quadrats were placed. 1, 10, 14, 15, 16 collecting areas are aquatic biotops. Localities of collecting areas are shown in 1. Figure.

Intensity of light was measured and registered in willow and poplar growes.

For providing chemical data I am greatful to DR. KLÁRA FÜREDI, to the head of the laboratory of waterchemistry of Water-economis management of Szeged. I owe a debt of gratitude to GY. BODROGKÖZY for the control of plant-oecological data.

Characterization of the collecting area

(A) Land collecting areas: Two important factors are characteristic for the Körtvélyes area and "Barci" meadow:

1. They belong to the lowest inundation areas, during spring, summer and autumn floods the water expands up to the dikes. In recent years except for the spring and autumn floods, the summer one had been covering the territory for a relatively lomg time. The above-mentioned conditions influenced the stocking of the fauna and its multiplication from two viewpoints: the snails' multiplication is inhibited by the long lasting spring-flood, while snails had been carried occasionally by the spring-flood are killed by the summer one.

2. Cultivation-effects are characteristic for the whole area, included by the dead ranch of Tisza at Körtvélyes. Natural vegetation is to be found on along the Tisza embankment and the dead ranch near Kutyafenék. In other parts of the area signs of successful and unsuccessful afforestation, are to be found. Improved poplars-with American ashes are dominant. *Amorpha fruticosa* runs wild after harvest. The majority of bare territories has been cultivated partly for agricultural production (maize) and partly for wilow plantations. Ypung willows were settled in lines. Naturism of a reservation area is not proper for its reconstruction.

(B) Aquatic collecting areas: can be divided i to three groups.

1. Temporarily water-covered places: plashes (collecting area No. 10.) navvy

(B) Aquatic collecting areas: can be divided into three groups. 1. temporarily water- covered places: plashes (collecting area No. 10.) navvy holes (coll. area No. 15). 2. "runhing" Tisza river (coll. area No. 1.). 3. dead branch.

1a. Temporarily water- covered places: plashes remain for a short time after flooding out quickly. The examined shallow navvy hole having planted with willows dried out quickly.

2. The running Tisza's fauna-condition depends on the river's current condition. (BÁBA 1977, TÓTH—BÁBA 1981.)

3. Dead branch is influenced by the following factors:
   (a) The sewage of till unknown quality and quantity carryed by the outer Hódmezővásárhely belt-canal, the so called Cigányér.
   (b) The illegal swimming and fishing.

(c) The rotting water nut *(Trapa natans)* as had made the fishing difficult was taken of the water at some places.

Water-quality: can be followed since 1976 using the data recorded by the laboratory of water chemistry of Water economic management. The waters type in spring a Ca—Mg—HCO_3 which in summer changes for CaNa sometime parallelle containing is Ca Mg HCO_3 which in summer changes for CaNa sometime paralelle containing carbonate. Sometimes in Summer CO_3 is combined with SO_4 and Cl. With this pH becomes more alcaline varying between 7—8 pH. Comparing the total salt-content of this area to the other Tisza dead branches is low (300—500$^{\pm 50}$ mg/l.

1. Class water quality was measured from the viewpoint of organic material-quantity according to the Comecon specification with permanganate and chromat methods. The similar result was recorded in the case of dissolved oxygen (6.0 ml/l) that was as high as 18.1 ml/l in June 1976, and fell below 6.0 ml/l in September 1980. Biological oxigen demand (BOD) shows extreme changes: in June 1970 it was extremely high, that of 3rd class meaning polluted water. Sometime fishdeath was defected in the dead branch.

The mud of dead arm sporodically smells bad, especially where water nut. Is to be found quantity of NH_4 is below 1.5 mg/l, that shows a slowly increasing tendency in comparison with the 0.5—0.6 mg/l in 1976. This increace shows the moderate rise of human pollution. Quantities of NO_3, PO_4 and solved P are small. Chemical investigations of mud and pesticide weren't carried out. The ewater of the "Cigányér" examined either.

History of malacological researches in Körtvélyes area

This area hasn't drew the malacologists' attention for a long time. Since the 1920—30 ies only 9 species have been observed (Table 1. Column 2) By CZÓGLER (1927, 1935) and ROTARIDES (1931). All those species were aquatic, there were no landspecies collected.

Much better was studied the fauna, of the spongy area of Nagyfa, Atka, and Hódmezővásárhely's surroundings, which were examined besides the above-mentioned authors by HORVÁTH 1972, BÁBA 1964-as a result of which 14 aquatic species were found (Table 1. Column 1) Land-fauna was found here also sporodically, (Table 1. Column 1, 2), alltogether 9 species. The flood-area of Atka is situated higher that of Körtvélyes, consequently *Helicella obvia, Monacha, Truncatellina* can only be found in this area. *Unio crassus, Pseudanodonta* of aquatic species were found only in the Tisza during the previous collections, though the author of this paper couldn't find them, in marginal water. *Bithynia leachi* prefers oxygen rich water (RICHNOVSZKY—PINTÉR 1979), its lack in Körtvélyes is the possible consequence of other biological oxygen demand of water. Instead of *Acroloxus* species, *Ferrissia* was found in Körtvélyes. It is doubtful wether this lately identified species living in eutropic waters (alluvial) has outplaced *Acroloxus* from Körtvélyes. Tis datum of appearance in Mártély and Körtvélyes must have been based on earlier authors' misidentification. *Radix peregra* hass been found only in Körtvélyes until now (HORVÁTH 1972).

Datum of CZOGLER (1935) is an important information about the dead branch's aquatic flora. He found *Potamogeton crispus, Ceratophillum demersum* vegetation.

Discovered species and their description

(A) Land species: Number of discovered species is 7, that is 138 individuals. Inhibiting factors of species' stocking are: lowness floodarea, irregular floods. unsatisfactory closing of haves in forest-stands. According to light-measurements and Ant's

Table 1. *Aquatic and land species of Körtvélyes area compared with those of the Tisza dead reaches and navvy holes*

	1	2	3	4	5	6	7	8	9	10	11	12
Viviparus contectus (MILLET 1813)			+			+	+	+	+	+	+	+
Viviparus acerosus (BOURG. 1862)	+	+	+	+	+			+	+	+	+	+
Valvata cristata (O. F. M. 1774)								+				
Valvata piscinalis (O. F. M. 1774)								+		+	+	+
Valvata pulchella (STUDER 1820)								+				
Lithoglyphus naticoides (C. PFEIFF. 1828)		+	+					+			+	+
Bithynia tentaculata (L. 1758)	+		+	+		+		+		+	+	+
Bithynia leachi (SHEPP. 1823)		+						+				+
Acroloxus lacustris (L. 1758)	+	+					+	+	+		+	+
Lymnaea stagnalis (L. 1758)	+		+	+			+	+	+	+	+	+
Stagnicola palustris (O. F. M. 1774)	+		+			+		+	+	+	+	+
Stagnicola corvus (GM. 1788)								+				
Galba truncatula (O. F. M. 1774)							+	+	+	+	+	+
Radix auricularia (L. 1758)	+						+	+	+			
Radix peregra (O. F. M. 1774)	+						+	+	+			
Radix peregra f. *ovata* (O. F. M. 1774)			+	+		+	+	+	+	+	+	+
Aplexa hypnorum (L. 1758)								+				
Physa fontinalis (L. 1758)	+		+	+		+	+	+	+		+	
Physa acuta DRAP. 1805	+							+	+			+
Ferrissia wautieri (MIROLLI 1960)			+			+		+				
Planorbarius corneus (L. 1758)	+		+	+	+	+	+	+	+	+	+	+
Planorbis planorbis (L. 1758)							+	+	+	+	+	+
Anisus septemgyratus (RM. 1835)								+				
Anisus spirorbis (L. 1758)							+	+	+	+	+	+
Anisus vortex (L. 1758)								+			+	
Anisus vorticulus (TROSCH. 1834)								+				+
Gyraulus albus (O. F. M. 1774)	+	+	+			+	+	+	+	+	+	
Gyraulus laevis (ALDER 1838)								+				+
Armiger crista (L. 1758)	+						+	+	+			
Hippeutis complanatus (L. 1758)	+						+	+	+			
Segmentina nitida (O. F. M. 1774)								+	+	+	+	
Unio crassus (RETZIUS 1788)		+										
Unio pictorum (L. 1758)	+	+	+						+			
Unio tumidus (RETZ. 1788)	+		+				+	+	+			
Anodonta anatina (L. 1758)	+	+						+	+			+
Anodonta cygnea (L. 1758)	+	+	+		+	+	+	+	+			
Pseudanodonta complanata. (RM. 1835)	+	—	—		—	—	—	—	+			
Dreissena polymorpha (PALLAS 1771)	+	—	+		+			+	+			
Sphaerium corneum (L. 1758)							+	+			+	
Musculium lacustre (O. F. M. 1774)			+	+			+	+		+	+	
Pisidium henslowanum (SHEPP. 1823)								+				
Pisidium sp.			+	+								
together:	19	9	17	8	4	9	18	38	24	14	19	18
land species together: together:								40			24	

	1	2	3	4	5	6	7
Cochlicopa lubrica (O. F. M. 1774)	+						
Truncatellina cylindrica (FÉR. 1807)		+					
Vallonia pulchella (O. F. M. 1774)			+			+	
Chondrula tridens (O. F. M. 1774)	+	+					
Succinea oblonga (DRAP. 1801)							
Succinea elegans (RISSO 1826)	+		+	+	+		
Zonitoides nitidus (O. F. M. 1774)			+	+	+	+	0
Deroceras agreste (L. 1758)			+	+	+	+	+
Euconulus fulvus (O. F. M. 1774)			+			+	
Helicella obvia (HARTM. 1840)	+	+					
Monacha cartusiana (O. F. M. 1774)		+					
Perforatella rubiginosa (A. SCHM. 1853)			+	+	+	+	0
Cepaea vindobonensis (FÉR. 1821)	+						
Helix pomatia (L. 1758)							
together:	9		7	5	5	6	1

Key to the signs of land species:
1. DS 43, 44, 54 Hódmezővásárhely, Atka (according to PINTÉR—RICHNOVSZKY—SZIGETY in 1979)
2. Species found in the inundation area of Atka (BÁBA 1957)
3. Species found in Körtvélyes (BÁBA 1976—1981)
4. *Salicetum triandrae* — Low-Tisza region (BÁBA)
5. *Salicetum triandrae* (Körtvélyes)
6. *Salicetum albae fragilis* (Körtvélyes)
7. Settled forests (Körtvélyes)
   0 = dead samples

Key to the signs of aquatic species:
1. Species found in Atka, Mártély, Nagyfa, Sasér, Hódmezővásárhely by CZÓGLER, ROTARIDES, HORVÁTH and BÁBA
2. Species found by CZÓGLER and ROTARIDES (1927—1935)
3. Species found in Körtvélyes (BÁBA 1976—1981)
4. Species of wilow-populated navvy-holes and plashes (BÁBA)
5. Bottom of dead-reach without aquatic vegetation
6. *Trapetum natantis* in plant population
7. Fauna of the dead reach along the Upper-,
8. Middle-, and
9. Lower Tisza regions
10. Fauna of navvy holes along the Upper-,
11. Middle-, and
12. Lower Tisza region

Table 2. *Comparison of light-intensity of some plant-communities in shaded, half shaded and sunny areas*

Locality, vegetation	Average shade	Lihgt-values half-shade	sunlight	Number of species	indivials
willowy (Körtvélyes) 1978. 8. 30.	150	300	4 000	3	8
willow+poplar growes (Körtvélyes) 1976. 8. 6.	396	850	2 144	6	47
thinned out stand	1172	2040	4 525	—	—
poplar gallery-forest (Gemenc) 1976. 7. 21.	1277	9666	19 550	—	—
elm—oak—ash gallery-forest					
Bagiszeg 1975. 5. 22. (asperuletosum)	100	254	1 550	10	108
Bátorliget 1975. 8. 24. (asperuletosum)	62	312	1 400	14	168

publication in 1963 the discovered species are moderately light demanding: between 30—450 lux. The light are relations of the investigated area compared with those of other forest-stands in Table 2.

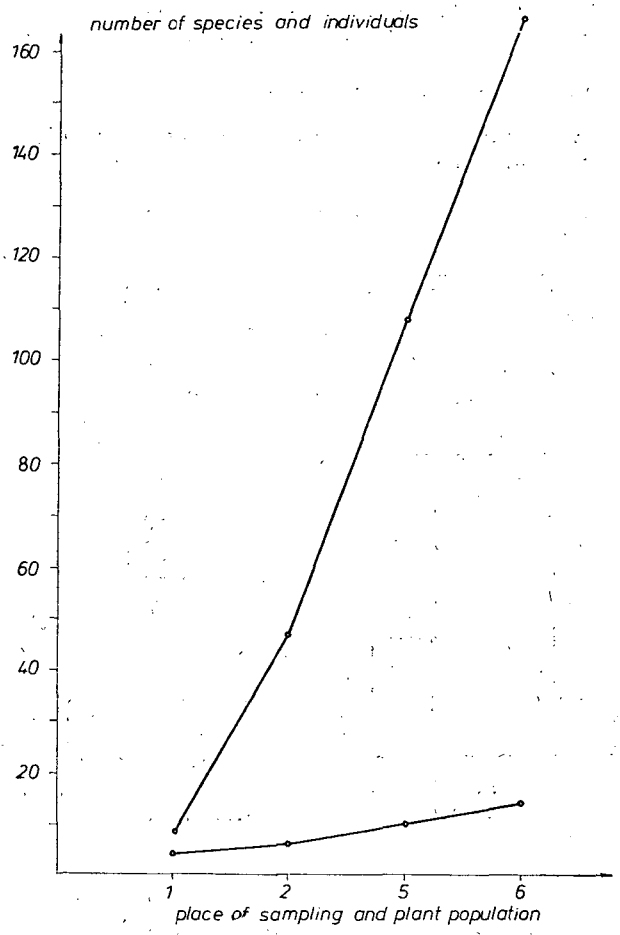


Fig. 2. Species and individual relation of the snail populations of the mineralogen plant-succesion in inundation and agricultural areas (according to the numbering of Table 2).

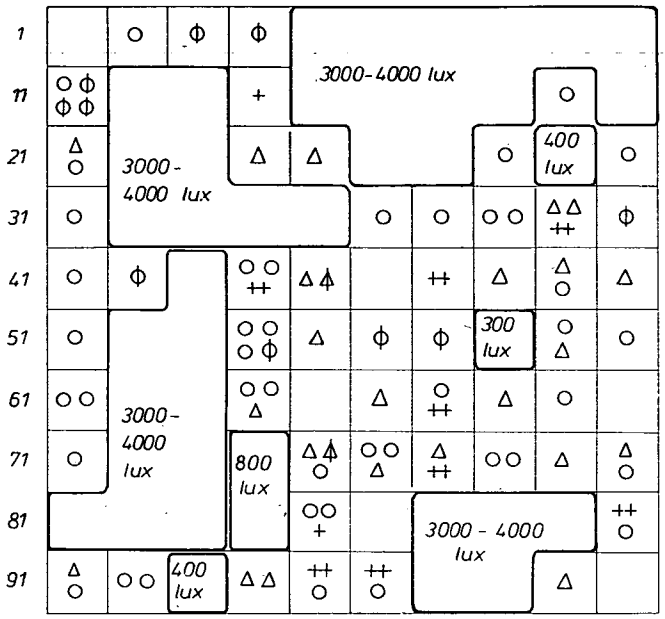
According to the Table is not cultivated or thinned out forest stands there are more shaded parts', as a consequence of this and that of hydrological conditions the number of snail species and individuals grows. 2. Figure well illustrates the species-individual relationship.

As a consequence of above-mentioned effects from the measured 260 quadrats there were only 15 containing snails, (quadrats in 5, 76).

Living individuals were found only in willowy and willow-poplar stands. In the 6th collecting area a living *Deroceras agreste* was found. One seedy shell of *Zonitoides* (7. collectingarea) and 2 of *Perforatella* were found in flood deposit. Living individuals were found in soil-rents and on the back of dried willow leaves.

3. Figure illustrates the effect of illumination on the snails; distribution in *Salicetum triandrae* stand. The frequency of the young individuals of the discovered 4 species correspond to the conditions of the year 1976 (Table 3). There were no living snails in sunny places at 3—4000 lux light. As a rule they were to be found-

between 30—150 lux. The changing numbers of individuals in quadrats must be connected with the surface-soil's humidity conditions. Estimation with *Zonitoides nitidus* $\frac{S^2}{\bar{x}}$ shows uneven. distribution The number of *Zonitoides nitidus* is the gratest in this area. Exept for *Succinea elegans* (holomediterran) all the, species belong to the Siberian-Asiatic fauna (BÁBA 1980a).



		number of individuals	D%	F%	Juv%
O	*Zonitoides nitidus*	51,9	58,62	36=40	17,64
Φ	*juv.*				
Δ	*Perforatella rubiginosa*	26,2	29,88	22=20	7,65
4	*juv.*				
+	*Deroceras agreste*	2	2,29	2=10	-
++	*Succinea oblonga*	8	9.19	8=10	-
		87,11	99,98		12,64

Fig. 3. Distribution in the forest-stand of Salicetum triandae in Körtvélyes area 30. 8. 1978.

(B) Aquatic species: 229 individuals of 16 species were found on 60 quadrates. Number of living species is 101 (in 14th coll. area *Dreissena* was found). In aquatic-biotops more living species were found in comparison with land areas. Tables compare species found in Tisza's dead branches (Table 1, Columns 7—9) along the Upper- (Tiszabecs), Middle- (Szolnok) and Lower reaches of Tisza (up to the forntier) on the base of BÁBA's and HORVÁTH's collections, completing the previous

data of Körtvélyes. *Bythnia tentaculata, Ferrissia* wautieri haven't been found in Tisza's Lower reach collections. At the same place there were no *Physa fontinalis Musculium lacustrae* and *Pisidium sp.* in navvy holes (Table 1, Columns 10—12).

Diversion in species-distribution in the dead branches of different reaches and navvy holes are partly caused by the limited number, of examinations, and by the fact that collections were carried out in diverse vegetation-associations (BÁBA 1967, ÖKLAND 1979). Dead branches of the Upper and Lower Tisza reaches are less discovered. There is a much less diversion in the navvy holes' fauna alomg the three courses. Differences in the species-number of dead branches and navvy holes are due to their differences in water quantity. The navvy holes' vegetation-poverty and changing water-level (frequent drying out) also explain these differences. Determinant factors of the navvy holes' fauna are its the bottom's character the hole's extension, age and water-depth (BÁBA 1964).

Of the 68 water-snail species, indigenous for Hungarian fauna (PINTÉR 1974), 13 species must be excluded as they live in river brooks and caves and *Anisus leucostoma* the appearance of which is uncertain and shallow-water *Bathyomphalus.* Excluding 4 of the 23 shell species, that are positively found in running waters, the estimated number of mollusks in dead branches and navvy holes is 51. According to the Columns 3, 7.12 of Table 1. 41 species of them have already been found. New elements are to be exoected from *Pisidium* soecies first of all, though they live mainly in sandy shallow and marsh-waters.

The fact, that species found in 13, 14 collecting areas and in all aquatic biotops, exept for that of the Upper course of Tisza, are detritus cinsumers and live in beta-meso saprob waters (FRÖMMING 1956, HÄSSLEIN 1966, RICHNOVSZKY—PINTÉR 1974, GULYÁS 1976) strikingly illustrates the effect of the water's qualitaty and quantitaty. The algae and other green plants and bacteria concumung *Lymnaea stagnalis* and *Physa fontialis* are unuque: *Dreissena* is also exeption prefering oligo-beta mesosaprob conditions.

Phytocenological and zoogeographical results

(A) Land snails: Snail-groups found in plant-associations *Salicetum triandrae* (2. collecting area) and *Salicetum albae-fragilis* (3. coll. area) well illustrated the differences characteristic for the snails-groups of two plant-associations reflected by the species and individual number (Table 3).

Frequent dominant species is in both cases *Zonitoides nitidus.* Similarly to other low inundation areas of the Tisza-valley, the Shannon- Wiener function and eveness are low in Körtvélyes as well. The effect of higher level is detectable in case of wilow and ppplar-growes only in species-number, but in the increase of individual number, in species densyty and the increase of young individuals (BÁBA 1980b).

According to the data of earlier investigations (BÁBA 1980b) differences in the succesive phases beetween the two forest-associations can be well demonstrated: biotops have become dryer in consequence of the higher level (W=8.5—7.2) so the individual number, the A/m^2 value and the species density increase.

From the viewpoint of plant. geography both forest-types are warm-continental (MAYER 1968). The forest-snail populations- have also continental character. The distribution of snails in willowy: 33.3% holomediterranean, 66.7% Siberic-Asiatic; in willow-poplargrowes 100% Siberic-Asiatic, that is snails with continental climatic requirements.

Table 3. *Number of individuals*

	Salicetum triandrae			*Salicetum albae-fragilis*		
	individual	D%	F%	individual	D%	F%
Vallonia pulchella	—	—	—	1	2.12	10
Succinea elegans	1	12.5	10	—	—	—
Succinea oblonga	2	25.0	20	2	4.25	25
Zonitoides nitidus	5	62.5	40	40	85.10	90
Deroceras agreste	—	—	—	1	2.12	10
Euconulus fulvus	—	—	—	2	4.25	20
Perforatella rubiginosa	—	—	—	1	2.12	10
Σ individual	8	100		47	99.96	
A/m²	12.8					75.2
Juv. %	12					68
species frequency	0.7					1.6
Shanon-W.	1.360					0.9401
JA	0.8586					0.3637
T, W, localities' average	5 8.5					5 7.2

(B) Aquatic mollusks: different types of Waters are frequented by different dominant species. The only species in shell is *Musculim lacustrae* that well bears the plash's drying out, 4 dead samples of it were found.

Navvy holes of Körtvélyes are poorer in species compared to those of Atka (BÁBA—ANDÓ 1964). Species-composition of 1959 and 1981 surveys is different which is caused by the hole's drying and the wilow-stockings. *Viviparus acerosus* was both cases frequently dominant (Table 4, (1959) Columns 1. 2, (1981)).

Mollusks of the plantless shallow dead branches edge are similar to those of the fauna-composition "Hosszú Böge" (1972) of Tisza 11. reservoir area (Table 4, Colums 3, 4) (3 Hosszú-göbe).

In both areas *Anodonta cygnea* is frequently-dominant.

Mollusk-composition of the dead reach's plant-associations can be discussed by comparing the successive conditions before and adter the water-nut period. Vegetation described by CZÓGER in 1935- must have been the weedy preceiding the water-nut one (Column 5: *Myriophyllo-Potametum myriopylletosum spicati* SOÓ 1957, 18. VII. 1969. Kerek Böge, Bagi Reservoir. Weedy condition is followed by the monocultura of *Nymphaeto albo-luteae*. The so called water-nut-condition, Which represents a stage of natural eutrofisation. (Column 6: Abádszalók, dead brach of Tisza, 19 VII. 1972. Column: 7: Körtvélyes, 22. IX. 1981. water-nut, Column 8: Borzanati, dead branch of Tisza and Nagy-Varjas (Bagi Reservoir 18. VII. 1969) *Scirpo-Phragmitetum schoenoplectosum* SOÓ 1928 and *Nymphoidetum peltatae* (ALLORGE 1922) are the combination of the reed-period following the water-lily and water-nut ones. Mollusk-associations of different periods' plant successions can be casily distinquished with the help of Table in respect for their species stock, individual number and frequently dominant species in the different dead reaches. It must be stressed, that the weed's subfrequent dominant species becomes dominant in the

Table 4. *Comparison of aquatic-mollusk populations*

	1			2			3			4			5			6			7			8		
	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%	Σ	D%	F%
Viviparus contectus																1	3.03	10	4	6.06	20	3	3.15	30
Viviparus acerosus	9	26.47	60	7	63.63	60	1	2.27	10	8	7.01	70				—	—	—	—	—	—			
Valvata puchella													8	9.20	30									
Bithynia tentaculata	4	11.76	30	—	—	—							49	56.35	100	5	15.15	30	14	21.21	50	7	7.35	40
Acroloxus lacustris													4	4.60	20							43	45.15	80
Lymnaea stagnalis	4	11.76	40	1	9.09	10							3	3.45	30							4	4.20	40
Stagnicola palustris																1	3.03	10	3	4.54	20			
Galba truncatula																						1	1.05	10
Radix peregra																1	3.03	10	—	—	—			
Radix peregra f. ovata	10	29.41	60										12	13.80	70	13	39.39	50	15	22.72	90			
Physa fontinalis				1	9.09	10													10	15.15	40	10	10.50	50
Ferrissia wautieri																1	303	10	17	25.75	80			
Planobarius corneus	3	8.82	30	2	18.18	20							8	9.20	60	1	3.63	10	1	1.51	10	21	22.05	80
Anisus vortex																						12	12.60	50
Anisus vorticulus																						1	1.05	10
Gyraulus albus													2	2.30	20	4	12.12	30	1	1.57	10	2	2.10	10
Unio pictorum							8	18.18	20	—	—	—				1	3.03	10						
Anodonta anatina																2	6.06	20						
Anodonta cygnea							35	79.54	100	105	92.10	100				3	9.09	30	1	1.51	10			
Dreissena polymorpha							—	—	—	1	0.87	10												
Sphaerium corneum																						1	1.05	10
Musculium lacustre	3	8.82	30	—	—	—							1	1.15	10									
Pisidium sp.	1	2.94	10	—	—	—																		
Together:	34	99.98	—	11	99.99	—	44	99.98	—	114	99.98	—	87	100	—	33	09.99	—	66	99.96	—	95	100	—

waternut period *(Radix peregra f. ovata)*. Waternut period wins 8 snail and shell species respectively and looses 3 snail and shell species during the change of successive phase. The metod of comparing the results of different localities of a successive period is supoorted not only by the species-identity (8 out of 12 species) of mollusks at two different water-nut areas, but the their common frequently dominant species: the *Radix peregra* f. *ovata.* In the case of the common species levels of frequency and dominancy are similar with a deviation of 10—20%. It must be noted, that *Stagnicola palustris* in both water-nut areas belongs to the form turricola (Held) Pieczhocki stated that it is independent species (1979) in the review of PINTÉR—RICHNOVSZKY—SZIGETHY it is marked as *Stagnicola* aggl. (Between the individual numbers of the two water-nut areas there is a difference of 50%. The species-number of Körtvélyes-ares is lower, showing the ares's being disturbed, the water nut's lifting out).

Disturbing effect is followed by increase of individual number and the species-number is small. (FELFÖLDY 1974, p. 52) This is illustrated by the species-individual relation (Fig. 4).

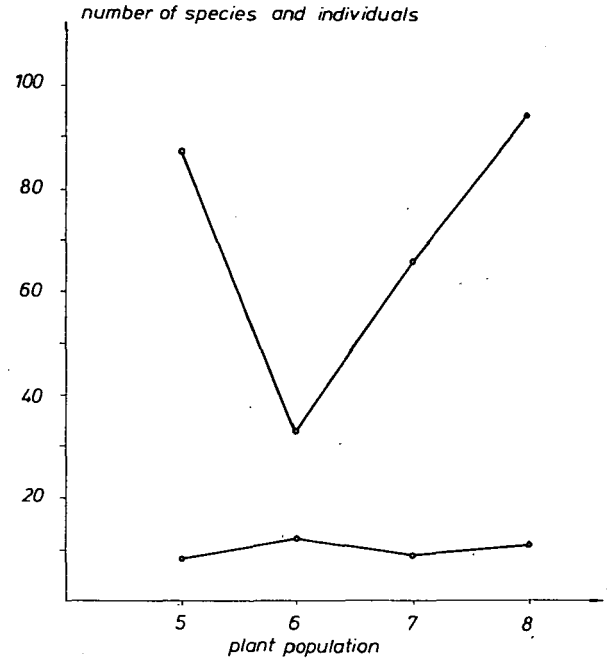


Fig. 4. Relation of species and individual numbers in weedy, water-nut, reed and water-lily successive conditions in the surveyed dead reaches (according to the numerating of Table 4).

The autor of the present paper hasn't got any data on the successive condition immediately following the water-nut period. A further condition is illustrated by the water lilly complex of the Column 8. This complex differs from the water-nut period both in species-composition and frequently dominant species *(Acroloxus lacutris, Planorbarius corneus)*. Snail-composition of similar plant complexes (BÁBA 1967a) also differs from that of the water-nut period.

Discussion

Comparing the results of the Körtvélyes land and samplings those of other areas, the next conclusions can be drown on the area's condition.

The land biotops are poor both in species and individuals caused by the area's low level. Individual number was also decreased by the strong cultur influences (agricultures, stocking are relatively richer in light than indigenous forest, because of the method of new forest (willoies settlement).

Navvy holes have been changed by their ploughing and by forest-settlements along ridges. Polluted waters of Cigányér (meaning the irregular fluctuation of BOL_5) water-nut's lifting out, resulted in swimming which is prohibited and in natural aggradiation, eutropization of the dead reach (this is marked by the apperance of *Trapa*). Culture-effects results in the relatively higher individual number of the few species and the great shell decay.

The next suggestions can be made to the planned area-rekonstruktion:

1. New-forest settlements of indigenous species (willow, Willow-poplar, sporodically in higher areas oak) — with second foliage level. The modern largescale forest-settlement methods must be adapted especially in the case of navvy holes along the dams. It results in the changing the character of aquatic and land biotop. The water at the bottom of the dam's slope disppears, the upper-soil of the forest-biotpo becomes dryer.

2. The water of Cigányér conducted into the dead reach, must be being cleaned if we want to protect' this area. The aquatic plant's lifting out must be stopped (controls, fees). The fishing cooperative of the area must be made consider strictly the area-reservation rules.

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A Körtvélyesi Tájvédelmi Körzet vízi és szárazföldi puhatestűinek összehasonlító faunisztikai és ökológiai vizsgálata

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Kivonat

A szerző 1959—81 között 21 gyűjtőhelyen gyűjtött.

A szárazföldi gyűjtőhelyek fajszegénységét (7 élő faj) két tényező indokolja. Az alacsonyan fekvő ártér miatt az évente 2—3-szor jelentkező áradások átmosó hatása (a diverzitás egyenletesség alacsony értékei ezt jól mutatják), valamint az erdészeti, mezőgazdasági háborítás.

Az őshonos erdőállományok csiga együtteseik összetételüket tekintve megfelelnek a Tisza völgyében másutt talált viszonyoknak (BÁBA 1980b).

A megvilágítás erőssége, az erdőállományok záródása befolyásolja a faj és egyedszám alakulását. (2. táblázat, 2. 3. ábra)

A körtvélyesi holtág állapotának felmérését az egymás után következő növényzeti successiós állapotok csigaegyütteseinek mozaikszerű összeállítása és összehasonlítása képezte. A vízi biotópok puhatestű faunája hasonló más holtágak, kubikok faunájához. A kubikokat Körtvélyesen erdőtelepítéssel kiszárították. A holtág a természetes feltöltődés egy állapotát mutatja. Kultúrhatások kimutathatók az aljzat faunáján (kagylópusztulás). A vegetáció háborítottságát egyes fajok egyedszámának növekedés és más fajok kiesése mutatja.

Uporedni faunistički i ekološki prikaz vodenih i kopnenih mekušaca za tićenog okruga Körtvélyes

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Abstrakt

Autor je u periodu 1959—1981. godine prikupljao materijal sa 21 lakaliteta. Siromaštvo suvozemnih lokaliteta u vrstama (7 vrsta) odredjuju dva faktora:

— na dvo- i trokratno godišnje ispiranje sa niskih plavnih područja jasno ukazuju niska vrednosti diverziteta, i

— antropogeni uticaj šumarstva i poljoprivrede.

Sastav zajednice puževa u autohtonim šumskim zejednicama odgovara nalazima sa drugih područja duž doline reke Tise (BÁBA 1980b). Na broj vrsta i jedinki utiče intenzitet insolacije i sklop šumske zajednice.

Uporedna naliza mozaičnog rasporeda zajednice puževa na mrtvajama Körtvélyes vršena je na osnovu sukcesija biljnog pokrivača. Fauna mekušaca vodenih biotopa je slična fauni drugih msrtvaha i kubika. Kubici Körtvélyes-a su šumskim plantažama isušeni. Mrtvaja pokazuje stanje prirodnog zasipavanje. Antropogeni uticaj je očigledan na fauni korita (uginuće školjki). Promena vegetacije popraćena je povećavanjem brojnosti pojedinih, odnosno isčezavanjem drugih vrsta.

СРАВНИТЕЛЬНЫЕ ФАУНИСТИЧЕСКИЕ И ЭКОЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ ВОДНЫХ И НАЗЕМНЫХ МЯГКОТЕЛЫХ КЁРВЕЙЕШСКОЙ ЗАПОВЕДНОЙ ЗОНЫ

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Резюме

Автор проводил исследования с 1959 по 1981 год, в 21 точке. Бедность наземных видов в исследоваемых местах (7 живых видов) обуславливается вдумя причинами. От низкорасположенной заливной территории — влияния промыва, 2—3 в год проходящих наводнений (равномерность низких показателей этого ясно показывает табл. 3), а также из-за лесных и сельськохозяйственных работ. В аборигенных лесных массивах состояние моллюсков соответствует маллюскам обнаруженным в других местах долины реки Тисы (Баба 1980 б).

Сила освещения и сомкнусть древостоя лесов в значительной мере влияют на развитие видов и отдельных популяций.

Определение состояния старицы Кёртвейеш следует искать в очередно следуемых следуемых растительных сукцесионных отношениях и мозаичной структуре мягкотелых. Мягкотелая фауна водных биотопов сходна здесь с фауной других стариц и ям. Однако, при лесоустройственных мероприятиях отдельные ямы у Кёртвейеша были высушены. Старицы однако показывает на свое естественное происхождение. Гибель данной фауны (беззубки) происходит, в основном, от влияния человека. Колебание вегетационного состояния происходит от гибели илиот или от вазвитияотдельных видов растений.