Zooplankton investigations in the Upper Tisa Region

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Introduction

A detailed examination of the upper course of River Tisa was conducted in August 1995. I performed the determination of the zooplankton from the biological examinations. I performed the detailed investigation of the groups of the *Rotatoria*, *Cladocera* and *Copepoda* from zooplankton elements.

Keywords: zooplankton, Upper Tisa

Material and Methods

Time and location of the examination:

A zooplankton examination from the Upper-Tisa was performed between 6th - 20th August 1995. The samples were taken from the river section extending from the source of the rivers Bila- and Chorna Tisa to Szalka in 12 segments, and from 2 streams which flow into the Tisa.

Collecting method:

100 or 200 litres of water was filtered through a 45 um mesh size plankton net made of silk bolting cloth. The filtrate was conserved on-site by using 40 % formaldehyde solution to achieve a final concentration of 4 %.

Processing method:

During the course of microscopic examinations I performed all quantitative and qualitative processing. I used an Ergaval microscope, and the quantitative samples were counted using a box sized 80 by 35 by 6 mm and a cubby-hole numbered with a graticule of 5 by 5 mm. For the preparation of the mastax of *Rotatoria* I used hypochlorid solution. Quantitative data were given in 100 i/litre unit of measure. For the taxonomic determination of the animals identification keys by Bancsi (1986, 1988), Boruckij (1992), Carlin (1943), Damian-Georgeşcu (1970, 1983), Dévai (1977), Donner (1965), Dussart (1967), Flößner (1972) Gulyás (1974), Kutikova (1970), Negrea (1983) were used.

Sampling sites were the followings:

1. Chorna Tisa: near source
2. Yasina
3. Bila Tisa: near source
4. Breboja
5. Roztoki
6. Tisa: Troznik (at the confluence of the Chorna and Bila Tisa)
7. near Rahiv
8. Dilove
9. above Tereblia Stream
10. Vinogradiv
11. Tivadar
12. Szalka
13. Teresva Stream: before mouth
14. Tereblia Stream: before mouth

Results

The upper stretch of River Tisa has high flow velocities, abundance is therefore low and the species composition of the zooplankton community is poor.

Analysis of the plankton samples revealed the occurrence of altogether 49 *Rotatoria*, 1 *Cladocera* and 1 Copepoda taxa from the examined stretch (see Table 1.).

Rotatoria fauna

The fewest species number characterized the Bila Tisa where only 2-3 species were found (Figure 1.).

In the Chorna Tisa this value was a thought more than in Bila Tisa. In the period of examination the highest number of taxa were identified at Trosnik where the Chorna- and Bila Tisa unite. The number of Rotatoria species at Rahiv and Szalka was high too. In the streams (Teresva and Tereblia) the number of taxa was also rather small.

Organisms characteristic of various kinds of biotops could be found among the species. As a consequence of low water level and high flow velocities, real plankton communities do not develop.

The number of euplanktonic species was small and organisms found represented only a small fraction of them. On the shingly, stony bottom only few benthic organisms live. At the highest proportion mostly psammon species were found.

Most of the Rotatoria species found were euryoc and cosmopolitan organisms, although some rare rotifers were also recorded (Cephalodella remanei, Cephalodella theodora, Lecane chankensis, Proales theodora, Proales theodora calcarata).

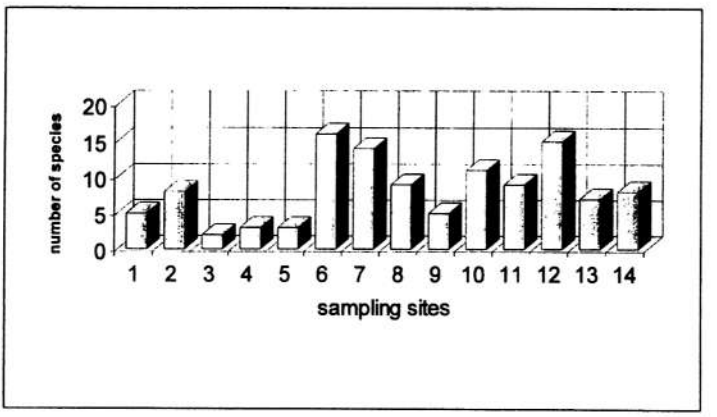

Figure 1. Number of Rotatoria species

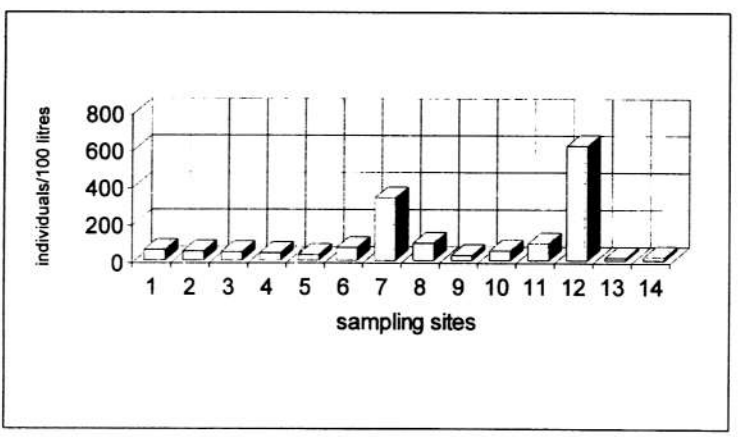

Figure 2. Number of Rotatoria individuals per unit volume

Quantitative examinations showed that the hydrological properties resulted in low abundance values. A relatively high number of individuals per unit volume were found only at the Hungarian reach, at Szalka (Figure 2.).

The composition and abundance of the zooplankton community at Szalka showed marked differences from other sampling sites. Here the character and structure of river bottom changed in comparison with the upper reach. Instead of shingly bottom, small, fine-grained sediment was found. The other reason for the discovered changes in the species community and abundance is River Szamos. This river brings high zooplankton biomass into River Tisa, and the water quality often becomes more unfavourable than in the upper reach.

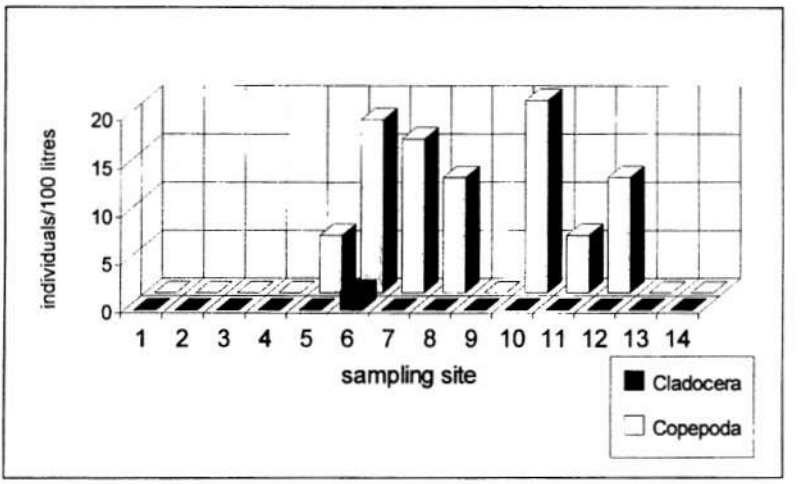

Figure 3. Number of Crustacea individuals per unit volume

Crustacea fauna

The Crustacea fauna was extremely poor from the point of view of both abundance and species composition (Figure 3.).

During the examined period altogether 1 Cladocera species was found. Bosmina longirostris is an euryoc, cosmopolitan organism.

The number of Copepoda was also very small. From adult organisms only one Bryocamptus species was found, otherwise nauplii and copepodit forms were characteristic in the samples.

Summary

Due to the hydrological properties in the Upper Tisa Region (low water depth, high flow velocities, shingly, stony bottom) neither species composition nor abundance had high values.

During the investigation 49 Rotatoria, 1 Cladocera and 1 Copepoda taxa were recorded.

The species composition of the zooplankton community indicated good water quality at the upper stretch of River Tisa. At Szalka the zooplankton fauna showed marked differences from other samples, partly as a reason of the influence of River Szamos, partly due to changes of the hydrological characteristics of the river.

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Table 1. Data on zooplanton taxa found at various sampling sites

TAXA	Sampling sites													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROTATORIA														
Brachionus angularis Gosse						2	8							
Brachionus calyciflorus calyc.Pallas		3										36		
Brach. quadridentatus brevispinus Ehr.												36		
Brach.quadr. cluniorbicularis Skorikov												204		
Brachionus quad. rhenanus Lauterborn												84		
Brachionus urceolaris O.F.Müller							16							
Brachionus sp.										2				
Cephalodella biungulata Wulfert				16		2				2				
Cephalodella catellina O.F. Müller												36		
Cephalodella crassipes Lord	4													
Cephalodella gibba Ehrb.						2	8	4						
Cephalodella forficula Ehrb.								4		4	6			
Cephalodella remanei Wiszniewski								4						
Cephalodella sterea Gosse							8							
Cephalodella theodora Koch-Althaus	24	6			6		8		6				1,5	4
Cephalodella ventripes Dixon-Nuttal	4							4						
Cephalodella sp.		3					8				6			
Colurella adriatica Ehrb.						2		4				12	3	2
Colurella colurus Ehrb.		12											1,5	2
Colurella uncinata O. F. Müller		3									18			
Dicranophorus caudatus Ehrb.						2								
Dicranophorus uncinatus Milne						2	8	4		2	12			
Encentrum plicatum Eyfert											6			
Encentrum wiszniewski Wulfert							8		3	2	6			
Epiphanes macrourus Barrois et Daday												6		
Euchlanis dilatata Ehrb.						4	8							
Filinia longiseta Ehrb.							32							
Keratella cochlearis Gosse						4								
Keratella cochlearis tecta Gosse						18		4		8	18	12		
Lecane bulla Gosse						4					12	84	1,5	2
Lecane chankensis Bogoslovsky							136		6					
Lecane closterocerca Schmarda	4			8	6							12		
Lecane hamata Stokes												12		

Table 1. continue

TAXA	Sampling sites													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lecane luna O.F. Müller												12		
Lecane ungulata Gosse							8							
Lepadella patella O.F. Müller			5			4		4		2			4,5	2
Mytilina crassipes Lucks							8							
Notholca squamula O.F. Müller		3												
Pleurotrocha petromyzon Ehrb.									3					
Polyarthra dolichoptera Idelson						6				2				2
Proales theodora Gosse										2			1,5	
Proales theodora calcarata Wulfert														2
Rotaria sp.	20	15	40	16	18	8	72	60	9	24		36	1,5	2
Synchaeta oblonga Ehrb.		3								2				
Testudinella patina Hermann												12		
Trichocerca brachyura Gosse						2								
Trichocerca insignis Herrick						2								
Trichocerca sp.						4					6			
Wolga spinifera Western												24		
Total Rotatoria	**56**	**48**	**45**	**40**	**30**	**68**	**336**	**92**	**27**	**52**	**90**	**618**	**15**	**18**
CLADOCERA														
Bosmina longirostris O.F. Müller						2								
Total Cladocera	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
COPEPODA														
Bryocamptus sp.					6		8				6			
nauplius						18	8	12		20		6		
copepodit												6		
Total Copepoda	**0**	**0**	**0**	**0**	**6**	**18**	**16**	**12**	**0**	**20**	**6**	**12**	**0**	**0**