The ecological condition of the Criş/Körös[1] catchment area on the basis of planktonic fauna

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Abstract

In this paper a summary is given of the results of zooplankton research on the Criş/Körös catchment area in 1994-1995. In this period 103 Rotatoria, and 15 Cladocera taxa were recorded all together. The Copepoda fauna was characterized by occurrence of juvenile forms. Different sections in the watercourses could be separated on the basis of composition of the planktonic fauna. The human effects (damming-up, reservoirs, pollution, technical interventions) change the ecological state, increases the degree of trophity and saprobity, and decreases the diversity. On the basis of the zooplankton community the protection of Criş/Körös catchment area is justified.

Key words: Criş/Körös catchment area, Rotatoria, Cladocera, Copepoda, zooplankton abundance, diversity, ecological condition.

Introduction

A detailed survey of the Körös/Criş catchment area was conducted in July-August 1994-1995. I performed the determination of the zooplankton from the biological examinations, and investigated the groups of Rotatoria, Cladocera and Copepoda from the zooplankton elements in detail. In the course of the investigation of samples I addressed the following main questions:

- What sort of qualitative and quantitative changes characterize the zooplankton of the Criş/Körös catchment area?
- What sort of species describe the rivers in the given period?
- What sort of riparian categories are found along the longitudinal section? Are they separable, and if so, what kinds of reaches are they?
- How can we describe the water quality of the rivers by the composition of the planktonic fauna during the period of examinations?

1 The first name is Romanian, and the second Hungarian.

At the present time very few data are known about planktonic fauna of the Körös/ Criş catchment area. In Romania Rudescu (1960), Damian-Georgescu (1963, 1970), and Negrea (1983) refer to planktonic faunal, taxonomic research which mainly refers to the Danube, to the delta of the Danube, to the sea, to the high mountains, etc. I did not find any Romanian literature referring to the Criş catchment area. In Hungary, Megyeri (1972) examined the zooplankton of Hármas-Körös. Along the whole Hungarian section of the Körös water-system the Rotatoria and Entomostraca fauna were studied by Zsuga, Nagy (1989, 1991). Gulyás at al. published results about planktonic fauna of Körös catchment area (Gulyás, Bancsi, Zsuga 1995). In the Hungarian reaches there were mainly microvegetation investigations. The earliest data were published by Domján (1942) who examined the water fungi, and by Szalai (1942) who writes about the pseudophytoplankton of Körös. Kol (1954) performed studies of algae from the rice-field. Uherkovich (1963, 1964) investigated the potamophytoplankton and saprobiological conditions of the River Körös. Kiss examined the algal vegetation of the alkali waters of this region (1959, 1959/a, 1970). The phytoplankton of Körös backwaters was described by Vasas (1980, 1980/a, 1986). Data were published about limnology of two backwaters by Varga (1931). Grigorszky et al. performed examinations about Dinoflagellates (Grigorszky, Vasas, Mészáros, Sümegi 1993, Grigorszky, Vasas, Borics 1995, Grigorszky, Borics, Fodor 1996). The macrovegetation of this area were investigated by Borbás (1881), Kiss (1968), Koren (1883), and Máthé (1936).

Material and methods

The samples were taken in August of 1994 and 1995. I investigated the zooplankton composition of the catchment area altogether in 29 sampling sites. I performed detailed qualitative and quantitative examinations of the Rotatoria, Cladocera and Copepoda fauna from the zooplankton groups. For the investigations 50-100 liters water was collected with a plankton net made from silk, mesh-sized 45 μm. The filtered samples were conserved on site by using 40 % formaldehide solution to reach 4 % final concentration. The quantity of zooplankton was counted by using a plexi-box sized 80 x 35 x 6 mm and cubby-hole numbered with a graticule of 5 x 5 mm. For the preparation of Rotatoria mastax I used hypochlorid (NaOCl) solution. Animals were determined using the identification keys by Bancsi (1986, 1988), Damian-Georgescu (1963, 1970), Dévai (1977), Donner (1965), Gulyás (1974), Koste (1978), Kutikova (1970), Negrea (1983), Rudescu (1970).

Results

Rotatoria fauna

The Crişul Alb/Fehér-Körös and Crişul Negru/Fekete-Körös are characterized with little abundance (Fig. 1.) and number of species (Fig. 2.) at the riverhead; the diversity (Fig. 3.) is also low. Only those well adapted species which can tolerate the fast water velocity are found. At the further reaches the fauna changes, the number of species rises, and the planktonic, metaphytic as well as benthic organisms are found. At the sections before the confluence of the two rivers the species composition indicates an increase of trophity, some organisms indicate a moderately polluted limnosaprobic state (Cephalodella forficula, Lophocharis salpina, Rotaria spp.). The metaphytic elements are most proportional in the Crişul Alb/Fehér-Körös at Gyulavári, while the percentage of these species is few in the Crişul Negru/Fekete-Körös and the planktonic organisms dominate. An euplanktonic species (Polyarthra dolichoptera) is determinant (66 %). Although the number of species is nearly equal in the two rivers, the diversity and proportions differ from each other.

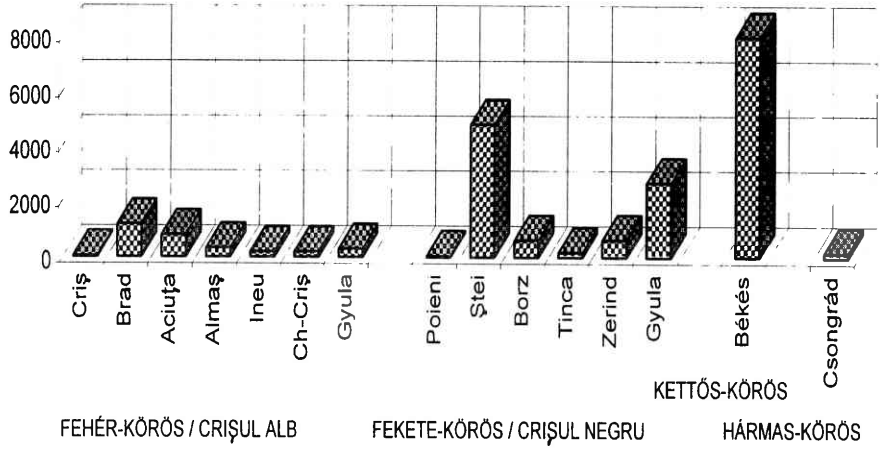

Fig. 1. Rotatoria abundance in the Criş/Körös watercourses (i/100 l)

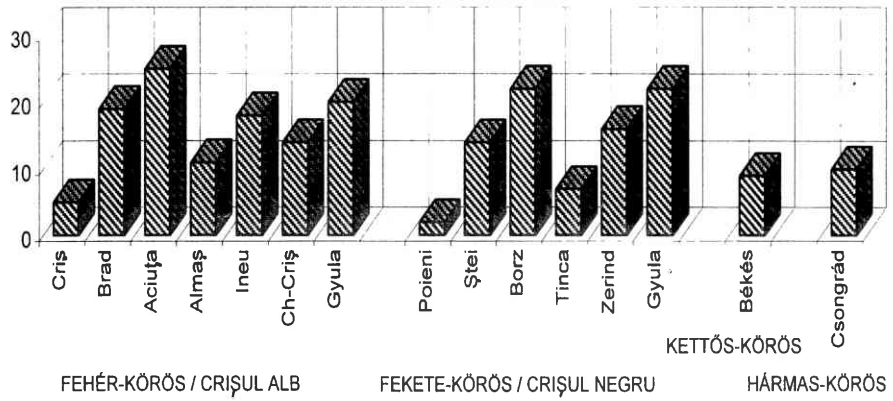

Fig. 2. Number of Rotatoria species in the Criş/Körös watercourses

In the Kettős-Körös a high quantity of Rotatoria plankton is found (Tab. 1.), but the number of species is little (Fig. 2.). The diversity and evenness are low (Fig. 3.), thus indicating an eutrophic state. Two planktonic species are in large number Polyarthra dolichoptera (55,6 %) and Trichocerca pusilla (25 %), while the proportion of the other organisms is lower. The Rotatoria plankton composition of the river is considerably determined by the damming-up of the flow.

In the Hármas-Körös little abundance and small number of species are found (Tab. 1.). Previous examinations also show these results (Zsuga, Nagy 1989, 1991, Gulyás, Bancsi, Zsuga 1995).

In the catchment area of Crişul/Sebes-Körös Repede the Drăgan/Dregán, Iad/Jád, and Barcău/Berettyó were also examined.

In the Stream Drăgan only few Rotatoria organisms were found (Fig. 4.) as a result of the fast water velocity. The abundance and species number (Fig. 5.) are also few in the Stream Iad. In this stream was found a rare Rotatoria organism (Cephalodella theodora), which was described earlier only from a Central-German pond in Europe (Koste 1978). Additional data about its other presence have not yet been compiled. Standing waters are determined as its habitat by Ilies (1978) in the Limnofauna Europea, evidently on the basis of mentioned description. In contrast with this, during examinations it was found not only in the Iad, but in the Crişul Repede/Sebes-Körös, too. Our knowledge about its ecology is deficient, but presumably it can adapt to the fast water velocity and occurs not only in standing waters, but also in running waters, streams and rivers.

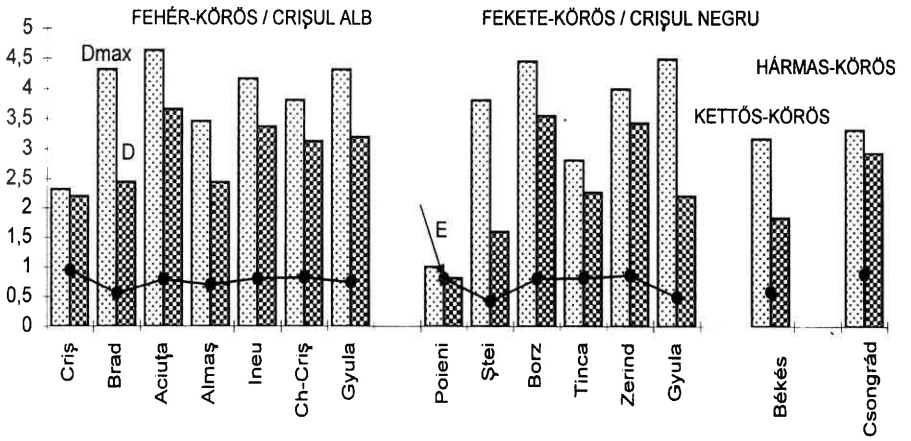

Fig. 3. Diversity and evenness in the Criş/Körös watercourses

A mixed composition characterizes the Rotatoria fauna at the upper reach of Crişul Repede/Sebes-Körös. There are found well adaptable, cosmopolitan organisms. From Şaula to Stana de Vale the abundance, the number of species and diversity decrease (Fig. 4-6.). At sampling sites Aleşd and Fughiu the quantity of Rotatoria is very similar (Tab. 2.), but the species composition totally differs. At Aleşd the high rate of organic detritus feeders, Rotaria spp. (41,2 %), indicates a richness in organic nutrients and polluted water quality. At Fughiu the euplanktonic elements dominate, the Synchaeta pectinata and Polyarthra dolichoptera occurring in the largest proportion (49,4 % and 34,2 % respectively). The decrease of diversity (Fig. 6.) also indicates a qualitative change, which ensues by the effect of Tileagd Reservoir. Considering the whole catchment area the highest abundance and the most number of species were found at Cheresig (Fig. 4-5.). At this sampling site the diversity was also high (Fig 6.). The planktonic elements dominate and more species indicate the rise of trophity (Brachionus angularis, Filinia longiseta, Trichocerca pusilla) and saprobity (Rotaria spp.). The causes of these considerable quantitative and qualitative change are the effects of Tileagd Reservoir, pollution from Oradea, the slowing down of water movement and an increase of water temperature. From Cheresig to Szeghalom the abundance and number of species decrease (Fig. 4-5.). In this section were found two species (Brachionus bidentata, Sinantherina procera), which are more frequent in warmer waters (in tropical, subtropical area) according to the special literature (Bancsi 1988, Koste 1978).

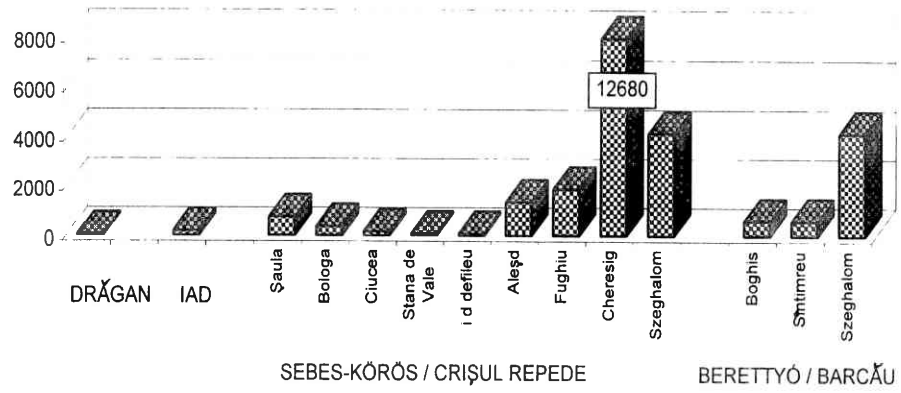

Fig. 4. Rotatoria abundance in the Crişul Repede/Sebes-Körös and its tributaries (i/100 l)

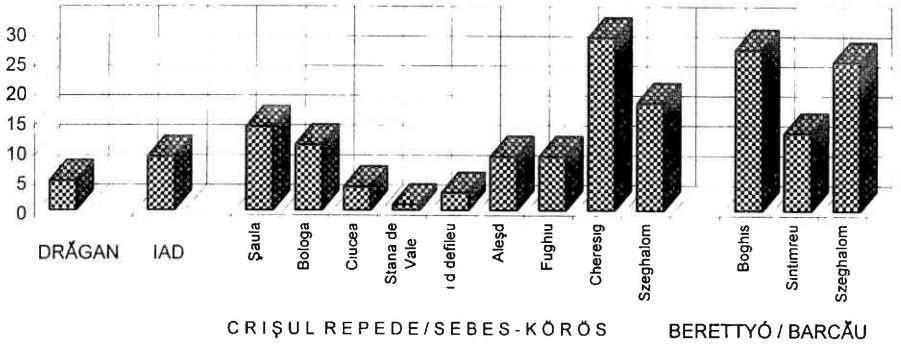

Fig. 5. Number of Rotatoria species in the Crişul Repede/Sebes-Körös and its tributaries

The Rotatoria fauna of Barcău/Berettyó was exanimated at three sampling sites. At the upper reach (Boghiş) the abundance is little (Fig. 4.), but the species composition is the most diverse (Fig. 6.). In the region of Sîntimreu the abundance is similar to the upper reach (Tab. 2.), but the number of species and diversity is lower (Fig. 5 and 6.) and the planktonic elements become dominant (Brachionus angularis). Before the mouth, at Szeghalom an eutrophic state is characteristic with high abundance and very diverse (planktonic, metaphytic, benthic species) composition of fauna.

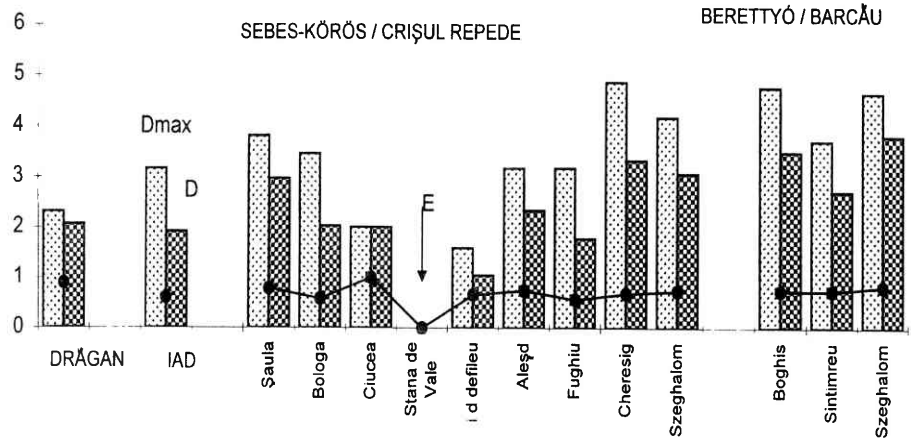

Fig. 6. Diversity and evenness in the Crişul Repede/Sebes-Körös and its tributaries

Crustacea fauna

The abundance and number of species of Cladocera were few in the entire catchment area (Fig. 7-8.). The abundance was relatively larger only in the Kettős-Körös, in the Crişul Repede/Sebes-Körös at Fughiu, and in the Barcău/Berettyó at Szeghalom. The larger number of the found species are well adaptable, cosmopolitan organisms (Bosmina longirostris, Chydorus sphaericus), and the metaphytic elements (Alona spp., Graptoleberis testudinaria Pleuroxus aduncus, Simocephalus vetulus) indicate eutrophic water quality.

The Copepoda abundance usually was larger than Cladocera, and dominated the juvenile nauplius and copepodit forms. There is special attention to the very high Copepoda abundance in the Kettős-Körös (Fig. 7.). As an effect of damming-up (at Békés) the quantity of nauplii rises considerably.

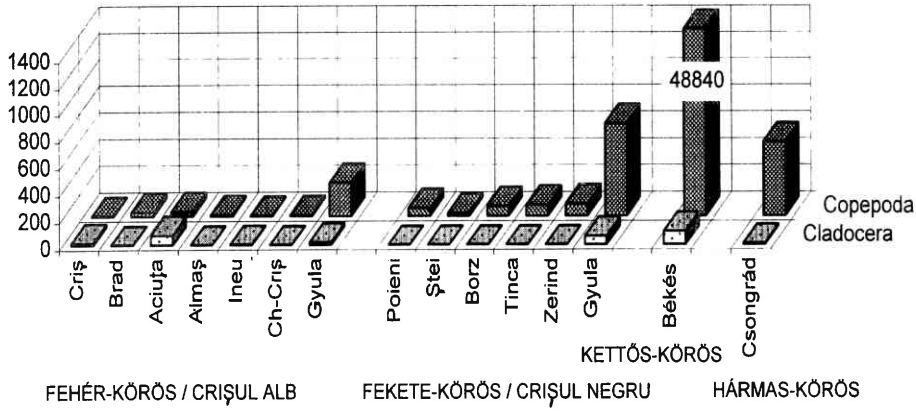

Fig. 7. Crustacea abundance in the Criş/Körös watercourses (i/100 l)

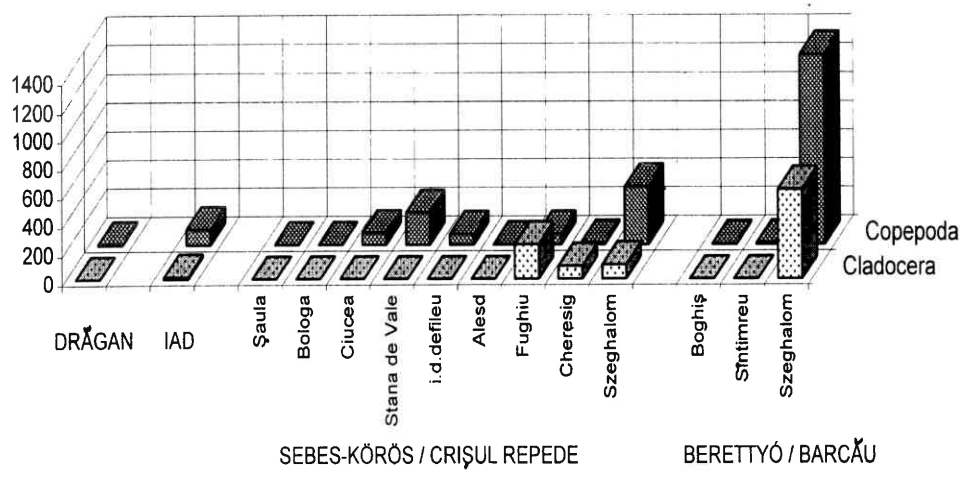

Fig. 8. Crustacea abundance in the Crişul Repede/Sebes-Körös and its tributaries (i/100 l)

Conclusions and Proposals

On the basis of the quantitative and qualitative composition of zooplankton the following sections in the watercourses of catchment area could be separated.

- Quantitatively poor fauna, well adaptable, and wide range of tolerance organisms, fast velocity: Drăgan, Iad, upper stretch of Crişul Alb/Fehér-Körös (Criş), Crişul Negru/Fekete-Körös (Poieni), Crişul Repede/Sebes-Körös (from Şaula to i.d. defileu).
- Little abundance, little number of species, medium diversity, slow-flowing: Crişul Alb/Fehér-Körös (Almaş), Crişul Negru/Fekete-Körös (Zerind), Hármas-Körös (Csongrád).
- Quantitatively rich zooplankton, slow-flowing, eutrophic state: Crişul Negru/Fekete-Körös (Gyula), Kettős-Körös (Békés), Crişul Repede/Sebes-Körös (Cheresig, Szeghalom), Barcău/Berettyó (Szeghalom).
- Qualitative rich fauna, medium abundance, high diversity, favourable water quality: Crişul Alb/Fehér-Körös (Aciuţa, Ineu, Ch-Criş, Gyula), Crişul Negru/Fekete-Körös (Borz, Zerind), Barcău/Berettyó (Boghiş).
- Moderately, from time to time heavily polluted, rich in organic nutrients water quality: Crişul Alb/Fehér-Körös (Brad), Crişul Negru/Fekete-Körös (Ştei), Crişul Repede/Sebes-Körös (Aleşd, Cheresig).

In the course of examinations more species were found in the watercourses which are rare in the planktonic fauna of Europe (Ilies 1978). Their occurrence can be appreciated as new data considering their habitat and ecological claim is collected. Their abundance is usually small, but they are not threatened with extinction.

Rare species

Brachionus bidentata (Crişul Repede/Sebes-Körös – Cheresig, Szeghalom), Brachionus bidentata crassispineus (Crişul Repede/Sebes-Körös – Cheresig, Szeghalom), Brachionus diversicornis homoceros (Crişul Alb – Aciuţa), Cephalodella limosa (Crişul Alb – Aciuţa, Ch-Criş), Cephalodella fluviatilis (Crişul Alb – Aciuţa), Cephalodella theodora (Iad, Crişul Negru – Stei, Crişul Repede – Bologa, i.d. defileu, Aleşd), Encentrum fluviatilis (Barcău – Boghiş), Encentrum wiszniewski (Barcău – Boghiş), Eosphora thoa (Barcău – Boghiş), Hexarthra fennica (Crişul Alb – Aciuţa), Lecane stichaea (Iad), Pseudoharringia similis (Crişul Repede – Şaula, Bologa), Sinantherina procera (Sebes-Körös – Szeghalom), Taphrocampa selenura (Crişul Alb – Aciuţa, Inau, Ch-Criş, Crişul Negru – Borz, Zerind), Trichocerca insignis (Crişul Alb – Brad)

On the basis of the occurrence of rare organisms, the protection of Criş/Körös catchment area is justified. The elimination of pollution is needed, as is the reduction of technical interventions which change the water quality, transform, and make unofficial the various, diverse biocenosis.

Summary

On the basis of examinations it can be ascertained that the abundance and species number are little at the upper reach of streams and rivers. In the next sections there is characteristic a mixed zooplankton community, the planktonic, metaphytic as well those living on the surface of sediment organisms are found. Approaching the plain the euplanktonic elements become dominant. The effects of damming-up, reservoirs and pollution changes the water quality, increases the degree of trophity and saprobity, and some species indicate the rise of the inorganic nutrient and organic matter content of water and sediment.

On the catchment area of Criş/Körös were found 103 Rotatoria taxon, from these were 14 rare species. The Cladocera community was quantitatively and qualitatively poor, only 15 Cladocera taxon occurred. The Copepoda fauna was characterized by occurrence of juvenile forms (nauplii and copepodits) in the course of examinations.

Table 1.

	sampling sites													KETTŐS KÖRÖS	HÁRMAS KÖRÖS
	CRIŞUL ALB / FEHÉR-KÖRÖS							CRIŞUL NEGRU / FEKETE-KÖRÖS							
TAXA	Criş	Brad	Aciuţa	Almaş	Ineu	Ch-Criş	Gyula	Poieni	Ştei	Borz	Tinca	Zerind	Gyula	Békés	Csongrád
ROTATORIA															
Asplanchna brightwelli (Gosse)													32		10
Brachionus angularis Gosse	4	4	16										16		
Brachionus bennini (Leissling)							8								
Brachionus calyciflorus (Pallas)		16					4								
Brach. calyc. amphiceros Ehrb.													16		
Br. diversicornis homoceros Wierz.			16												
Brachionus rubens Ehrenberg		304													
Brachionus urceolaris O F Müller		16	8												
Cephalodella biungulata Wulfert		4	48	30	12	4	24		80	104	8	30	32		
Cephalodella catellina O F Müller					4					8					
Cephalodella exigua (Gosse)		8													
Cephalodella fluviatilis Zawadowsky			8												
Cephalodella forficula (Ehrb.)		4	8				16			8	8				10
Cephalodella gibba (Ehrb.)			64			12			10	8					
Cephalodella giganthea Remane				10											
Cephalodella limosa (Wulfert)			40			4									
Cephalodella sterea (Gosse)										16					
Cephalodella theodora Koch-Althaus									40						
Cephalodella ventripes (Dixon-Nuttal)			8									10			
Cephalodella sp.			8												
Colurella adriatica Ehrenberg		16							320			20			
Colurella colurus Ehrenberg						4			80	8					
Colurella uncinata O F Müller							4			64		10	16	80	
Dicranophorus caudatus Ehrenberg				10	4	24				8					
Dicranophorus grandis Ehrenberg		4			12	4									
Dicranophorus uncinatus (Milne)		4													
Euchlanis dilatata Ehrenberg		4	8	10				30	560	24		20	64		20
Filinia longiseta (Ehrenberg)	12	4			4								128	800	
Filinia opoliensis Zacharias											8				
Hexarthra intermedia Wiszniewski														480	
Hexarthra fennica (Levander)			8												
Itura aurita Ehrenberg			8												
Itura sp.										8					
Keratella cochlearis (Gosse)	4		24												

	sampling sites													KETTŐS KÖRÖS	HÁRMAS KÖRÖS
	CRIŞUL ALB / FEHÉR-KÖRÖS							CRIŞUL NEGRU / FEKETE-KÖRÖS							
TAXA	Criş	Brad	Aciuţa	Almaş	Ineu	Ch-Criş	Gyula	Poieni	Ştei	Borz	Tinca	Zerind	Gyula	Békés	Csongrád
Keratella cochl tecta (Gosse)					4										20
Keratella quadrata (O F Müller)	8		8												
Lecane bulla Gosse		16		10	20		128		10	8	80	110	192	80	20
Lecane closteroceca (Schmarda)		80	16	10	4	12	8	10	40	56	24	60	32		
Lecane hamata Stokes		16				12	8			8			80		
Lecane luna (O.F.Müller)					4		24			16		150	16		30
Lecane lunaris (Ehrenberg)			8		4		4		40	8		10	16		10
Lecane quadridentata (Ehrenberg)							8								
Lecane stenroosi (Meissner)						4									
Lepadella patella (O F Müller)		96	32	10	4	8	8		80	16		40			
Lepadella patella oblonga Ehrb												20			
Lophocharis oxsternon (Gosse)				10			2								
Lophocharis salpina (Ehrenberg)			8												
Monommata grandis Tessin										8					
Mytilina crassipes (Lucks)		4													
Myt. ventralis macracantha Gosse							8						32		
Platyias patulus (O F Müller)							2								
Platyias quadricornis (Ehrenberg)									40						
Pleurotrocha petromyzon Ehrb										8					
Polyarthra dolichoptera (Idelson)													1808	4800	
Pompholyx sulcata Hudson			8												
Rotaria rotatoria (Pallas)		16													
Rotaria sp.	8	544	288	170	16	48	8		3480	168	24	60	64		30
Scaridium longicaudum (O.F Müller)							8			8		20	16		
Squatinella rostrum (Schmarda)							4								
Synchaeta oblonga Ehrenberg														80	10
Synchaeta pectinata Ehrenberg														80	
Taphrocampa selenura Gosse			8		8	4				32		10			
Testudinella patina (Hermann)				10	4	4				16		10			
Trichocerca birostris Minkiewicz													48		
Trichocerca elongata (Gosse)					4		8						16		
Trichocerca iernis (Gosse)					8										
Trichocerca insignis (Herrick)		16													
Trichocerca pusilla (Lauterborn)													48	2160	10
Trichocerca rattus (O.F.Müller)					68	48	8				16	40			

	sampling sites													KETTŐS KÖRÖS	HÁRMAS KÖRÖS
	CRIŞUL ALB / FEHÉR-KÖRÖS							CRIŞUL NEGRU / FEKETE-KÖRÖS							
TAXA	Criş	Brad	Acıuţa	Almaş	Ineu	Ch-Criş	Gyula	Poieni	Ştei	Borz	Tinca	Zerind	Gyula	Békés	Csongrád
Trichocerca similis (Wierzejski)									10				4		
Trichocerca tenuior (Gosse)															
Trichocerca sp.					4								32	80	
Trichotria curta (Skorikov)			144	40											
Trichotria tetractis paupera (Ehrb)									40						
Total Rotatoria (i/100 l)	**36**	**1176**	**792**	**320**	**188**	**192**	**292**	**40**	**4830**	**608**	**168**	**620**	**2708**	**8640**	**170**
CLADOCERA															
Alona costata Sars							4								
Alona elegans Kurz													16		
Alona rectangula Sars														20	
Bosmina longirostris (O F Müller)	16		72		4									30	
Chydorus sphaericus (O F.Müller)							4								
Diaphanosoma mongolianum													32	20	
Graptoleberis testudinaria (Fischer)															10
Moina micrura Kurz													16	20	
Pleuroxus aduncus (Jurine)														20	
Scapholeberis kingi Sars							4								
juv Cladocera							8								
Total Cladocera (i/100 l)	**16**	**0**	**72**	**0**	**4**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**64**	**110**	**10**
COPEPODA															
nauplius		12	24	10	4	8	168	40	10	40	64	90	608	48320	400
copepodit		16	8				88	20	10	32	16		80	520	150
Total Copepoda (i/100 l)	**0**	**28**	**32**	**10**	**4**	**8**	**256**	**60**	**20**	**72**	**80**	**90**	**688**	**48840**	**550**
Total zooplankton (i/100 l)	**52**	**1204**	**896**	**330**	**204**	**200**	**568**	**100**	**4850**	**680**	**248**	**710**	**3460**	**57580**	**730**

Table 2.

	DRĂGAN	IAD	BARCĂU / BERETTYÓ			CRIŞUL REPEDE / SEBES-KÖRÖS								
			sampling sites											
TAXA			Boghis	Sfntimreu	Szeg-halom	Şaula	Bologa	Ciucea	Stana de Vale	i d defileu	Aleşd	Fughiu	Cheresig	Szeg-halom
ROTATORIA														
Anuraeopsis fissa (Gosse)					40	12							20	
Asplanchna priodonta (Gosse)												24	80	
Brachionus angularis Gosse			8	176	160								2080	800
Brachionus bientata Anderson					200								160	240
Br bidentata crassispineus Hauer													240	
Brachionus budapestinensis Daday				16									20	80
Brachionus calyciflorus (Pallas)				16	1080									
Brach calyc amphiceros Ehrb													80	
Brach calyc anureiformis (Brehm)				32	200								320	80
Br quadridentatus rhenanus Lauterb					40									
Br quadr brevispinus (Ehrb)					80									400
Br quadr cluniorbicularis (Skorikov)					120								80	
Brachionus urceolaris O F Müller					40									20
Cephalodella biungulata Wulfert		8	40	16	40	36	8				80		20	
Cephalodella forficula (Ehrb)			16			12							80	
Cephalodella gibba (Ehrb)			32	16	40	12		40		6	80			
Ceph megalocephala (Glascott)			8								80			
Cephalodella sterea (Gosse)			16				8							
Cephalodella theodora Koch-Althaus		56					16			12	80			
Cephalodella ventripes (Dixon-Nuttal)			8			12		40						
Cephalodella sp			8											
Colurella adriatica Ehrenberg	2	4	16			156					160		80	
Colurella colurus Ehrenberg						36								
Colurella uncinata O.F Müller		4						40						
Dicranophorus caudatus Ehrenberg			24										10	
Dicranophorus grandis Ehrenberg			4										10	
Dicranophorus uncinatus (Milne)			16				8							
Encentrum felis (O.F Müller)			16											
Encentrum fluviatilis Wulfert			24											
Encentrum saundersiae (Hudson)			4											

sampling sites

TAXA	DRĂGAN	IAD	BARCĂU / BERETTYÓ			CRIŞUL REPEDE / SEBES-KÖRÖS								
			Boghis	Sîntimreu	Szeg-halom	Şaula	Bologa	Ciucea	Stana de Vale	i d defileu	Aleşd	Fughiu	Cheresig	Szeg-halom
Encentrum wiszniewski (Wulfert)			16											
Eosphora thoa Harring et Myers			8											
Euchlanis dilatata Ehrenberg		4	8		240	12	40				160	24	20	400
Filinia longiseta (Ehrenberg)				80								24	880	480
Filinia terminalis Plate													80	
Keratella cochlearis (Gosse)			8									144	480	
Keratella cochl. tecta (Gosse)				16									160	
Lecane bulla osse					200								20	320
Lecane closteroceca (Schmarda)	4		16		320	12	16				80		80	160
Lecane flexilis (Gosse)											80			
Lecane hamata Stokes			8		200								320	
Lecane luna (O F Müller)					20									80
Lecane luna presumpta Ahlstrom							8							
Lecane lunaris (Ehrenberg)	2		8		20									
Lecane stichaea Harring		4												
Lecane ohioensis (Herrick)					80									
Lecane stenroosi (Meissner)					40									
Lepadella patella (O F.Müller)		4	16		160	12								80
Mytilina compressa (Gosse)													80	
Myt. ventralis macracantha Gosse														20
Philodina sp	2													
Platyias quadricornis (Ehrenberg)				8										
Polyarthra dolichoptera (Idelson)				32								648	1280	
Polyarthra vulgaris Carlin													480	
Proales sigmoidea Skorikov						12								
Proales sp												24		
Pseudoharringia similis Fadeew						6	32							
Rotaria sp	8	100	240	160	480	36	216	40	60	54	560	48	4000	720
Scaridium longicaudum (O F Müller)					20									
Sinantherina procera (Thorpe)														40
Synchaeta oblonga Ehrenberg		4	8		160		8							80

sampling sites

TAXA	DRĂGAN	IAD	BARCĂU / BERETTYÓ			CRIŞUL REPEDE / SEBES-KÖRÖS								
			Boghis	Sîntimreu	Szeg-halom	Şaula	Bologa	Ciucea	Stana de Vale	i d defileu	Aleşd	Fughiu	Cheresig	Szeg-halom
Synchaeta pectinata Ehrenberg				16								936	480	
Testudinella patina (Hermann)			8			6								
Trichocerca birostris Minkiewicz												24	320	20
Trichocerca pusilla (Lauterborn)				16	160								720	160
Trichocerca tenuior (Gosse)			8											
Trichocerca sp					40		8							
Total Rotatoria (i/100 l)	**18**	**188**	**592**	**600**	**4180**	**372**	**368**	**160**	**60**	**72**	**1360**	**1896**	**12680**	**4180**
CLADOCERA														
Alona costata Sars					40									
Alona rectangula Sars					80									
Bosmina longirostris (O.F.Müller)		16			40							48	80	
Ceriodaphnia pulchella Sars													10	
Ceriodaphnia quadrangula O.F Müller												168		
Chydorus sphaericus (O F Müller)					400									
Graptoleberis testudinaria (Fischer)					40									
Simocephalus serrulatus (Koch)														20
Simocephalus vetulus (O.F.Müller)					20									80
juv Cladocera												24		
Total Cladocera (i/100 l)	**0**	**16**	**0**	**0**	**620**	**0**	**0**	**0**	**0**	**0**	**0**	**240**	**90**	**100**
COPEPODA														
nauplius	2	100	4	8	600					66		24	50	80
copepodit	2	8			720			80	220	6		48		320
Total Copepoda (i/100 l)	**4**	**108**	**4**	**8**	**1320**	**0**	**0**	**80**	**220**	**72**	**0**	**72**	**50**	**400**
Total zooplankton (i/100 l)	**4**	**312**	**596**	**608**	**6120**	**372**	**368**	**240**	**280**	**144**	**1360**	**2208**	**12820**	**4680**

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