The Oligochaeta and the Chironomid fauna as pollution indicators in the Criş/Körös[1] river system

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Abstract

The Oligochaeta and the Chironomid fauna were investigated in the Körös/Criş river system from the spring area to the inflow in the years of 1994-1995, to cover up the species living there. A zero-state was made. Specimen density of Oligochaetae was high on the polluted river parts, *Limnodrilus hoffmeisteri and Tubifex tubifex* were dominant there. Specimen density increased by moderated, and decreased by hard pollution effects. More than 50% of the Chironomid species were found in one sample only, which shows mosaic-like fauna. The presented species could not be rare, or threatened, because of the lack of the earlier faunistical investigations. *Brilia longifusca*, *Brilia modesta*, *Rheocricotopus effusus*, *Briophaenocladius nitidicollis*, *Chironomus fluviatilis*, *Paralauterborniella nigrohalteralis* and *Thienemanniella lentiginosa* were typical for clean water river parts. The changes in the fauna picture would show the positive, or negative effects in the river system during future investigations.

Keywords: river ecology, invertebrate fauna, Oligochaeta, Chironomid, diversity.

Introduction

Organisms have to have a continuous contact with their own environment, therefore they reflect the environmental changes. Presence or absence of a species in one ecosystem, its settlement or disappearance are the results of this interaction and answer to one environmental quality.

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

A lot of species are well known which are sensitive and are able to reflect the effects of the environmental changes. Thienemann (1954) and his contemporaries have already taken note of the fact that some species live on a certain small part of a river, but others appear on longer parts in that same ecosystem. This quality is known for more and more animal group and species as typical, therefore most of them can be used very well to indicate the different environmental effects. The shells (Lamellibranchia) are already common in the immediate monitoring in the past years (Salánki, 1994).

The negative environmental effects to the animals may be short, like oxygen depletion, or longer, like heavy metal pollution and accumulation in the sediment. The injury of the zoocoenose follows the environmental injury, and a longer time is needed for the animals to resettle.

Chironomids (non-biting midges) living in the sediment are used commonly for monitoring on population-, coenose-, and ecosystem level, as well as for toxicological tests in the laboratory and on the field, too. Chironomids are of essential importance in the saprobiological qualification (Rosenberg, 1991). Their use is the same in the monitoring of the water ecosystems too (Cushman, 1984; Cushman and Goyert, 1984; Frank, 1983; Szító, 1994; Szító and Waijandt, 1989; Warwick, 1988, 1989).

The registration of the ecological condition started in our common rivers with the Maros/Mureş in 1991, followed by the Szamos/Someş river system in 1993; the River Crişul Alb/Fehér-Körös, River Crişul Negru/Fekete-Körös in 1994, and the River Crişul Repede/Sebes-Körös, River Barcău/Berettyó in 1995. The works were organised and supported by Tisza Klub (Szolnok, Hungary) and Liga Pro Europa (Târgu-Mureş, Romania). No similar examinations had been used on these rivers before our fundamental work (Albu, 1966; Cure, 1964, 1985; Pop, 1943, 1950).

The goals were as follows:

- to throw light on the flora and fauna from the head waters to the mouth
- to registrate the changes in the coenoses by the environmental effects
- to answer the questions of the environmental changes
- to submit recommendations to the governmental and non-governmental organizations for the improvement or for the conservation of the condition of the living resource.

There was crude oil pollution in the River Barcău in November and December 1994. More than 60 tons of the oil were collected from the river during three weeks, but the rest spread to the Körös river system and the River Tisza, too. The pollution effect was examined and published in a separated paper to this monograph.

Material and methods

The sampling places were as follows: River Crişul Alb, River Crişul Negru, River Kettős-Körös, Crişul Repede, and River Barcău. The rivers were sampled from the source to the mouth by a hand net with 250 μm pore mesh size in 1994 and in 1995. The sediment was collected near the bank on the right and the left side and in the main current (Fig. 1.).

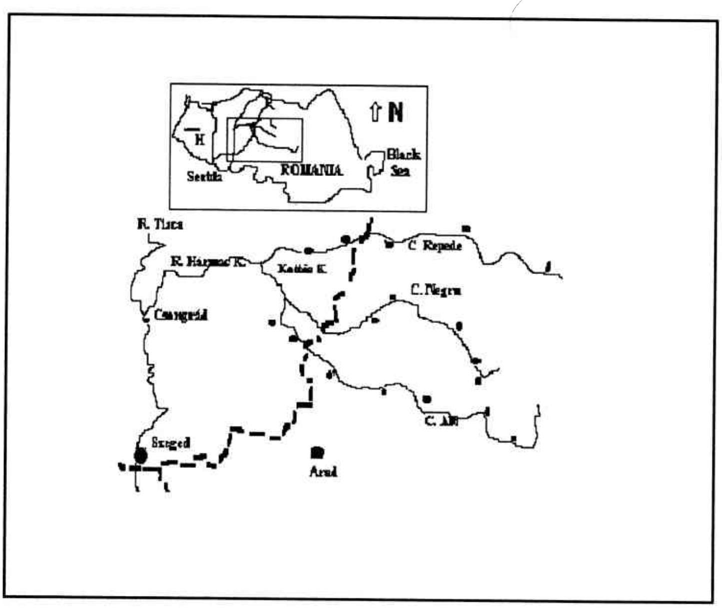

Fig. 1. Sampling places on Criş river system

Qualitative samples were taken from the surface of the stones and gravel pieces by washing into a drifting net in each profiles. Sampling sites were at various distances from the left and the right bank, and when it was possible in the main current as well.

Each sample was washed through a metal screen with a pore mesh size of 250 μm just after collection and preserved in 3-4% formol solution. The retained material was divided into groups of Oligochaetae and Chironomids by a Zeiss stereo microscope in the laboratory, with a four- to sixfold magnification. Animals were preserved in 80% density ethyl alcohol.

For taxonomic identification the following works were used: (Bíró, 1981; Brinkhurst, 1963; Brinkhurst and Jamieson, 1971; Ferencz, 1979, Fittkau, 1962; Fittkau et al. 1983; Hirvenoja, 1973; Pinder et al. 1983; Pop, 1943, 1950; Tshernovskii, 1949).

Results

Oligochaeta fauna

River Crişul Alb/Fehér-Körös

Specimen density was low in the Spring area. Four Nais species were present in the phytotecton on the gravels, covered by a thin layer of filamentous and unicellular algae. The phytophil Pristina rosea was dominant there. Low density of the Nais bretscheri, Nais behningi, and Nais pseudoptusa was detected. The diversity was very low there (Fig. 2).

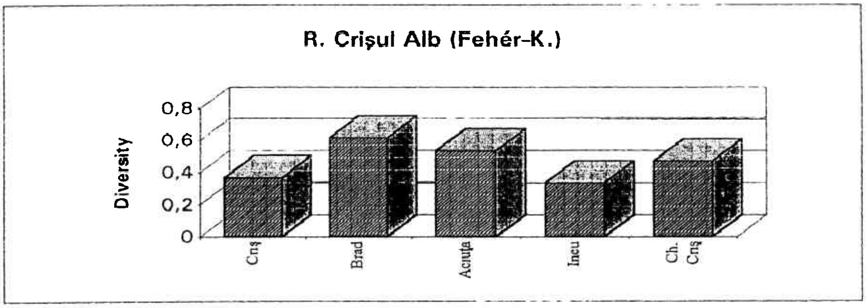

Fig. 2. Diversity of the sediment of the River Crişul Alb by Oligochaeta fauna, as a living resource (Shannon-W. Div. index)

Specimen density increased at Brad. Tubificidae were dominant, especially the Limnodrilus hoffmeisteri, a species that was tolerant to harder pollution as well as the Limnodrilus profundicola and Limnodrilus claparedeianus. Four species of Naididae were present. Pristina bilobata was the most frequent, Nais communis, Nais variabilis and

Uncinais uncinata were not so common. The number of species, specimen density and the diversity were the highest on this river part.

Pristina bilobata was dominant near Ineu, and Nais behningi subdominant. They were typical litorheophile species. Sediment accumulation provides suitable conditions for the increase of specimen density of the Tubificidae (lower water speed, rich phytotecton, sediment accumulation). Both the species richness and the biodiversity decreased, but specimen density increased.

The regulation of the river bed was disadvantageous in ~~the~~ Chişineu-Criş area. Both the species number and the specimen density decreased there. The Nais behningi was found again, which indicated the upgrade of the water quality.

The total species number of the Oligochaetae was 11 in the River Crişul Alb. Limnodrilus claparedeianus and Pristina bilobata had the highest specimen density in the mentioned river (Table 1.).

River Crişul Negru/Fekete-Körös

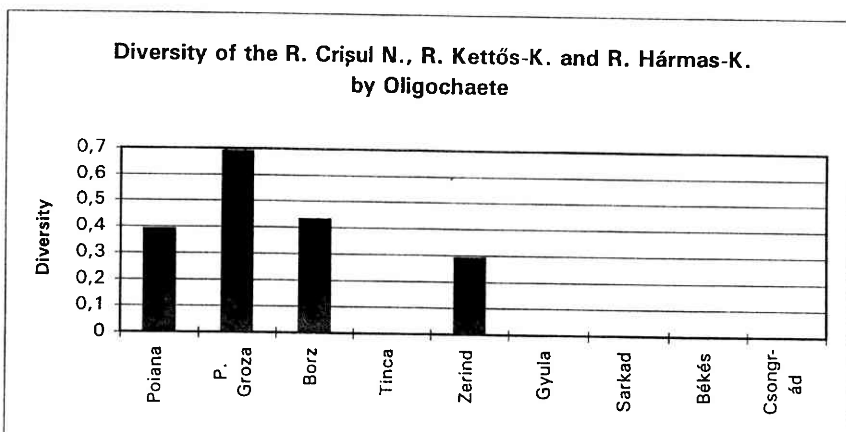

Fig. 3. The diversity of the sediment as a living resource in the River Crişul Negru by the Oligochaeta fauna

16 Oligochaeta species were found here. The Limnodrilus hoffmeisteri and the Nais bretscheri were the most frequent. Oligochaeta species were not present at sampling sites near Gyula and Sarkad (Hungary). Limnodrilus hoffmeisteri was the only Oligochaeta species which was persent near Petru Groza, but in low density. Tubifex nevaensis

appeared by Borz, which is a characteristic species of clean water, and of water and sediment containing low organic and inorganic materials. Both the above mentioned species were absent at Tinca, but the Branciura sowerbyi, which is characteristic an eutroph environment, appeared. This species was present in the River Kettős-Körös by Békés too. Limnodrilus hoffmeisteri was found in the Mouth of the River Hármas-Körös by Csongrád (Table 2.).

No correlation was found between the species richness, specimen density and the phosphorus and heavy metal content of the sediment (Table 2., and 4.). The diversity changed between 0.0 and 0.7 (Fig. 3.).

River Crişul Repede/Sebes-Körös

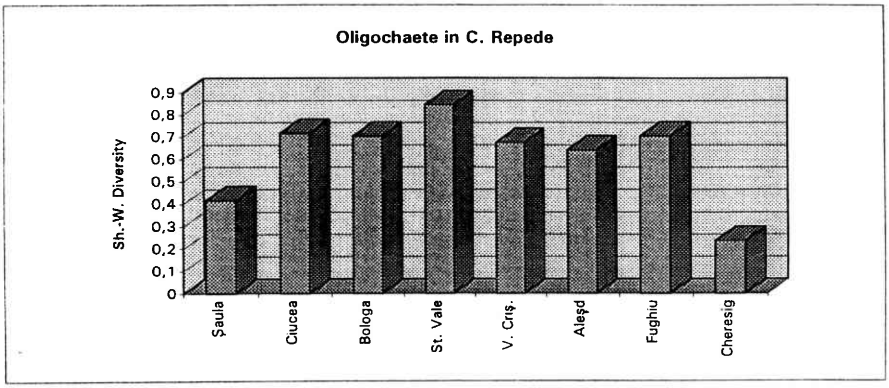

Fig. 4. The quality of the sediment in the River Crişul Repede by the Oligochaeta fauna

Four species of Oligochaetae were present at the source. Tubifex tubifex was dominant, and Limnodrilus hoffmeisteri the subdominant species. The high density of the L. hoffmeisteri showed a similar eutrophic level. 12 species were present by Ciucea.

25 species of the Oligochaetae were present in the sampling time from the Spring to the Mouth area. Species richness varied between 4-12 at the different sampling sites, it was the lowest near Cheresig, and the maximum near Vadul Crişului (Table 3.). The diversity changed between 0.2 and 0.85 (Fig. 4.).

Chironomid fauna

Species richness and specimen density

River Crişul Alb/Fehér-Körös

45 species were found from the Spring to the Mouth. Species richness varied between 5-12 in the different sampling sites. Thienemanniella lentiginosa was not present near Chişineu-Criş and Gyula, but Thienemanniella flavescens was found at the Spring area only. The other species were tolerant to the environmental factors (Table 5).

Crişul Negru/Fekete-Körös

49 species represented the Chironomid fauna. Species richness changed between 1-14 on the different sampling sites. Thienemannimyia lentiginosa and Thienemanniella clavicornis were found at the Spring area and the others were euryoec too and sporadic (Table 6.).

River Crişul Repede/Sebes-Körös

64 species represented the Chironomid fauna. Species richness varied between 0-23. Species living in the phytotecton were characteristic at the Spring area and near Aleşd, but species living in the sediment were dominant by Bologa and Ciucea. Polypedilum scalaenum was the dominant there, the other species were found mostly only once (Table 7.).

Only 2 species were present in the River Kettős-Körös by Sarkad, the maximum, 11 species, were detected by Békés. Two species were present at the Mouth of the River Hármas-Körös near Csongrád. Procladius choreus was dominant in the River Kettős-Körös and R. Hármas-Körös, too. Macropelopia notata was dominant and Procladius choerus the subdominant, where the sediment was rich in organic materials. The only species which is typical of rivers was Rheotanytarsus curtistylus, the others were euryoec and characteristic of still waters (Table 8.).

Some tributaries of the Crişul Repede

At the Mouth of the tributaries of the Crişul Repede there were 2-12 species, 31 species altogether. 16 species were present in Drăgan/Dregán Stream, 21 species in Iad/Jád Stream, and 2 species in the Zerna Stream. Orthocladius thienemanni was dominant, living in the phytotecton, Micropsectra praecox was subdominant, living in the sediment. Most Chironomid species were present only at one sampling site, in low density (Table 9.).

Dominance and abundance

Regarding the dominance situation, Psectrocladius barbimanus was dominant and Thienemannimyia lentiginosa subdominant in the River Crişul Alb. The slow water current was indicated by the presence of Chironomus plumosus and Chironomus fluviatilis there.

Total specimen of more than 50% of the Chironomid were lower than 1% in the R. Crişul Alb, while the rate of total specimen of 14 species varied between 1-6% (Table 10.). Regarding the abundance, Syndiamesa branickii and Eukiefferiella coerulescens were present in 67% of the samples and they were followed by Rheocricotopus effusus, with 56%. Only one sampling site was found with 23 species, in high density, which provided 50% of the species found. The presented Chironomid species were common both in the standing- and in the running waters, but they were very rare in this river (Table 10.).

Polypedilum scalaenum (32%) was dominant and Cryptotendipes anomalus (19%) was subdominant in the River Crişul Negru. The other species, living in the phytotecton and in the sediment, served as tinctorial elements, because of their low densities and rates, generally under 1% (Table 11.).

Eukiefferiella similis and Paracladopelma camptolabis were present in 40% of the samples in the R. Crişul Negru. 34 species were present only once in the sediment samples (their abundance was 11%), which was 69% of the Chironomid larvae collected here. Chironomid species in low abundance were common in the standing water and lowland rivers, and they were known as tolerant to the environmental factors (Table 11.).

Polypedilum scalaenum was dominant with 32%, and Cladotanytarsus mancus subdominant with 16% of the collected Chironomid larvae in the R. Crişul Repede. 16 species of the 64 found in this river represented 1-6% of the Chironomid abundance, and 47 species were detected, which abundance was lower than one per cent. The rate of this species was 73% of the species found in this ecosystem.

No species would reach 50% abundance in this river. Both Thienemannimyia lentiginosa and Corynoneura celeripes were present with 42% in the samples. The abundance of most species was very low, reached 3% only (Table 12.).

Orthocladius thienemanni was found in the tributaries R. Crişul Repede making up 25% of the total number of the Chironomid larvae collected by the inlets. Micropsectra praecox was subdominant with 15%. 60% of the collected larvae from the R. Crişul Repede represented the total specimen of 29 species (Table 13.).

The diversity of the investigated ecosystems

The minimum-maximum values by the Chironomid fauna were as follows: the River Crişul Alb: 0.37-0.66; the River Crişul Negru: 0.29-0.56; the River Kettős-Körös:

0.21-0.30; the River Hármas-Körös, sampled at the Mouth only: 0.09-0.21, and the River Crişul Repede; 0.15-0.73.

The affluents of the River Crişul Repede at the Mouth: Drăgan Stream: 0.21-0.49; Iad Stream: 0.39-0.70, and Zerna Stream: 0.17 (Table 12.).

Discussion

Oligochaetae

The lack of Oligochaetae was evident at the source area of the River Crişul Alb. Both the quality of the substrate and the narrow food circumstances might be the reason why bloodworms were not able to settle down here. The main cause of high specimen density was probably the organic material content and the quantity of the inorganic phosphorus by Brad, which determined the biomass of the primary production, the main food source of the worms.

Some Oligochet species should be present at the sampling site at Almaş. Their absence signals unfavorable environmental conditions, which affected the river part some time earlier too, but the time was not enough yet for the regeneration (Table 1). Despite signals of the pollution by different Oligochaetae species were detected, the condition of the River Crişul Alb was good. The water was cleaner and contained lower food source near Aciuţa than earlier, thanks to selfpurification. Tubificidae were dominant, mainly Limnodrilus hoffmeisteri, Limnodrilus claparedeianus and Limnodrilus profundicola.

The Oligochaeta fauna of the River Crişul Negru was poor too. The presence of the 3 species detected was periodic. Their lack can still be regarded natural at the source area. Limnodrilus hoffmeisteri, being the only species present, and especially the lack of Tubifex nevaensis migh indicate a medium degree inorganic and organic pollution.

The Oligochet fauna of the River Crişul Repede can be classified into four families. The families of the Tubificidae and Naididae were the biggest both in species and specimen too. The importance of the Oligochaetae, concerning water (ecosystem) qualification, lies in the fact that the species and specimen richness showed a close correlation with the organic and inorganic material content of the water and sediment. Increasing specimen density showed organic water pollution. The water quality was not determined by the total specimen density correctly, because the ecological demand of the species in different families differed widly. The substrate quality determined the spreading of the species besides the organic matter content of the water and sediment (Szító et al., 1989, 1993). Naididae preferred the stony and sandy substrate, when the water speed provided sufficient oxygen supply. They were found in high density in the biotecton and among the plants near the banks. Tubificidae preferred the sediment with rich organic material content (detritus and fitotecton on the sediment surface). This species, living in such environment, were not sensitive for the low oxygen concentrations.

High specimen density of the Oligochaetae was detected both at the Spring area and near Oradea. The main cause was the sedimentation of the communal pollutants. The communal sewage water of Oradea was the main pollution source. Low density of the worms indicated acceptable situations for them at the other sampling sites (Table 3). Naididae were present everywhere with the exception of two, hard polluted sampling sites. They representeded high densities by Stâna de Vale and Aleşd, because of the rich phytotecton on the stones. Rapid water current resulted in a thin sedimentation near Aleşd, which was the reason for the low density of the worms.

By comparing the relative abundance of the Tubificidae with the saprobity zones (S), and the values of the saprobity index, water quality can be estimated at the different sampling sites. It follows that the water quality was β mesosaprob between Ciucea and Oradea/Nagyvárad (Fig. 5.).

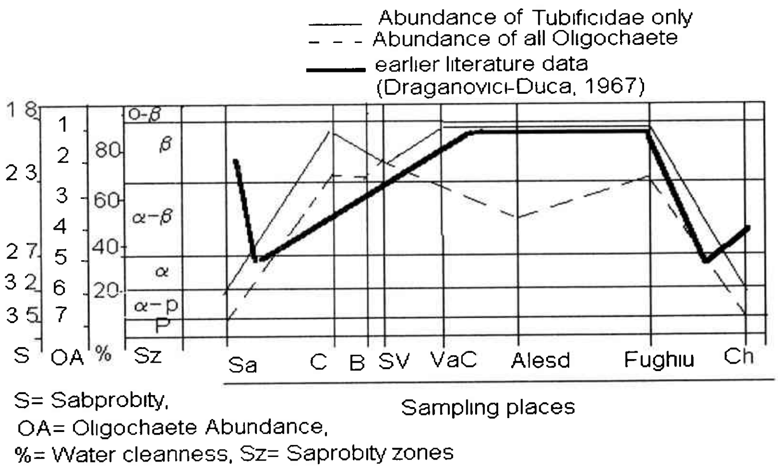

Fig. 5. The quality of the sampling places in the River Crişul Repede by the Tubuficids, by the ind. density of the Oligochaete, and by the earlier literature data

Regarding the abundance of the Tubificidae and other Oligochaeta species, we get a saprobity index for all sampling places, presented by the broken line (Fig. 5), which gives us nearly the same abundance of the Tubificidae, but represents a more correct picture. Therefore, Aleşd was in an α–β mesosaprobe zone (Fig. 5). Comparing the course of the two lines with the data by Draganovici-Duca (1967), the conclusion was that the water quality did not change considerably (Fig. 5).

Chironomid fauna

A common feature of the River Crişul Alb, the R. Crişul Negru and the R. Crişul Repede is that their water output varies. The flood wave comes down rapidly after rainy days and thaw. Stones and gravels cover the river beds on the upper parts under the shallow water. Because of high transparency the stones, gravels and the sediment surface is covered by phytotecton, which is an advantage for the Chironomid larvae as they live in phytotecton. The flood wave duly wash the Chironomid larvae downstream. Some individuals can find refuge, where they can survive the flood wave and from where they fly up the the river after their larvae have developed into imagos. Females are able to fly several kilometers in search of a suitable site to lay their eggs at. Chironomid species of estuaries (streams) reach the different part of the rivers by the drifting and the flood wave, spreading on this ecological floor continuously.

On the ground of the above presented, we expect that the rivers have a lot of common species mainly on their source and upper stream areas, but we found some such species only on the source area. Pentapedilum sordens is the only species present in the investigated rivers.The Polipedilum scalaenum was absent in the R. Crişul Negru, as well as the Polipedilum minutum and Prodiamesa olivacea on the source areas of the R. Crişul Alb (Table 5-7).

Thienemannimyia lentiginosa was the only common species on the lower river part, which was present in three rivers, but not on all sampling sites. The lower water current near the banks is advantageous for it and lives in the phytotecton. We found it in the main current sometimes too, because of the drifting and washing away (Table 5-7).

The upper parts of the rivers were characterized by the absence of the sediment. Chironomid larvae were typical, living in the phytotecton (Orthocladius, Cricotopus, Eukiefferiella). The other species were present where some sediment was found near the banks in still bays (Cryptochironomus, Polipedilum and Tanytarsus species).

The middle-course sections of the rivers were shown by Chironomus, Cladopelma, Dicrotendipes, Tanytarsus, Cladotanytarsus species, living in sediment in both standing- and running waters. These species were mostly phytophageous (algae, bacteria and detritus) and had a large adaptability to extreme environmental factors.

Dominance and abundance

Water soluble organic and inorganic materials were determining factors in the growing of phytotecton (phosphorus and nitrogen). The rivers were oligotrophic at the upper parts and at the source area. Their enrichment by the effect of food materials (sawdust and other plant residues) resulted the increase of the trophic level in the rivers. Slowly mineralizing organic materials were continuous food material source for bacteria and algae. Their formation was intensified by the communal-, agricultural- and industrial waste waters which were not, or partly sedimented. The phytotecton serves as rich food source for Chironomid larvae. The shallow water level for some weeks in summer was advantageous for us to study the regenerated Chironomid fauna, and to signalize their specimen density and the species richness after a flood wave.

The presence of the species was definitely mosaic-like in the River Crişul Alb. The low specimen density and the sporadic presence of the tolerant species showed that the river often got pollution effects when the larvae died, and after which the fauna had to start to settle in. The probability of the periodical pollution effects showed the decrease of the specimen density, such the Thienemannimyia lentiginosa and other species living in the phytotecton and characteristic of clean water, whereas the increasing of the density of Psectrocladius barbimanus was detected (Table 5).

Both the nutrient content and the pollution of the River Crişul Negru were higher than in the Crişul Alb, which was indicated by decreasing of the species richness by Petru Groza, Zerind, Osorhei and Cheresig. The River Crişul Negru was characterized as a very diverse ecosystem by the mosaic-like presence of the tolerant species. The sporadic presence of the species signalized mostly that these species survived the negative environmental effects in refuge (Table 6).

Of the total 64 species we found only 19 (29%) which were present only once. That same rate was 60% in the River Crişul Alb, and in the River Crişul Negru 79%. The "average" diversity index (minimum and maximum values in brackets) were as follows: the River Crişul Alb: 0.52 (0.37-0.65); the River Crişul Negru: 0.40 (0.0-0.64), and the River Crişul Repede: 0.43 (0.19-0.73). The River Crişul Alb showed the highest diversity followed by the River Crişul Repede and the R. Crişul Negru (Table 12).

The collected data showed that the most tolerant species were able to survive the negative environmental effects in the River Crişul Alb and Crişul Negru, by contrast in the River Crişul Repede strong water current is the dominant factor, and that was the reason why both the species richness and the specimen density were low in both R. C. Alb and R. C. Negru. The character species for the clean water and low nutrient content were as follows: Brilia longifusca, Brilia modesta, Rheocricotopus effusus, Briophaenocladius nitidicollis, Chironomus fluviatilis, Paralauterborniella nigrohalteralis, Thienemannimyia lentiginosa (Table 5-7).

Paratendipes intermedius and Paratendipes connectens were absent from the River Crişul Alb and Crişul Negru, while they were present in the River Crişul Repede in sandy sediment on the lowland river part (Table 7). The lack of the above mentioned Paratendipes species from the hard polluted Rivers Kettős-Körös and the Hármas-Körös showed the same situation in the Crişul Alb and Crişul Negru too. A significant correlation might be demonstrated between Cadmium (Cd) concentrations and the labium deformities of Paratendipes species in the River Tisza (Szító and Waijandt, 1989), when the larvae of the species could survive the negative effect by concentrations of 20-30 mg/kg of the investigated sediment. The maximum Cd concentration was 7.4 mg/kg of the sediment in the River Crişul Alb, only 25% of the concentration measured in the River Tisza; therefore the absence of the Paratendipes species caused by other environmental factors, which have not been identified yet.

Conclusions and proposals

1. The fauna lists present a zero-state, which is not known yet.

2. The specimen density of the Oligochaetae was high on the polluted river parts, Limnodrilus hoffmeisteri and Tubifex tubifex were characteristic for these river parts.

3. Both the specimen density and species richness increased by the moderated pollution effects (R. Crişul Alb near Brad, R. Crişul Negru near Zerind and R. Crişul Repede by Aleşd). The species richness and the specimen density decreased by hard pollution (River Crişul Repede by Şaula and Cheresig).

4. The River Crişul Alb and R. Crişul Negru had more common Chironomid species, but their abundance was very different. Cryptochironomus anomalus was found tree times in both rivers, whereas it was only a tinctorial element in the R. Crişul Alb, the rate of its individuals came to 80% of the Chironomid larvae in the R. Crişul Negru by Tinca. Thienemannimyia lentiginosa was abundant in the R. Crişul Alb and its rate was only twice under 30%, generally fluctuated between 30-50%. It was found in the River Crişul Negru twice only (Poiana and Petru Groza). Polypedilum convictum showed a similar picture too.

The standing water and low water current with rich nutrient was optimal for Cladotanytarsus mancus. The River Crişul Negru showed a characteristic pollution from Zerind.

The larvae of the Cryptochironomus redekei were in low specimen density, while the species was subdominant in River Crişul Negru.

5. Prodiamesa olivacea and Orthocladius saxicola species were present on the Spring area, but Cladotanytarsus mancus was characteristic for the middle and the lowland parts of the River Crişul Repede. Polypedilum scalaenum was present from the Spring to the Mouth on the different sampling places.

6. Orthocladius thienemanni, Thienemannimyia lentiginosa and Paratendipes intermedius were known as characteristic species for the clean river ecosystems. The presence of the Polypedilum sp. was characteristic for the ecosystems, which were rich in nutrients.

7. Despite more than half of the Chironomid species were detected in one sample only, the presented species cannot be classified as rare or threatened, because of lack of earlier faunistical investigations.

Table 1. Quantitative data of the Oligochaete in the River Fehér-Körös (Crişul Alb)

No.	Species	Sampling places				
		Criş	Brad	Aciuţa	Ineu	Ch. Criş
		ind./m2				
1	*Limnodrilus claparedeianus*		171	302	3006	40
2	*Limnodrilus hoffmeisteri*		2313	845	306	
3	*Limnodrilus profundicola*		428	181	982	30
4	*Nais behningi*	33		20		30
5	*Nais bretscheri*	33				
6	*Nais communis*		386			
7	*Nais pseudoptusa*	16				
8	*Nais variabilis*		214			
9	*Pristina bilobata*		686	241		
10	*Pristina rosea*	230				
11	*Uncinais uncinata*		86			
	Total ind./m2	312	4284	1589	4294	100
	Species number	4	7	5	3	3

Table 2 . Species and quantitative data of the Oligochaete in the R. Fekete Körös (Crisul Negru), R. Kettos K. and R. Hármas K. (August 10-17, 1994)

		Sampling places								
No.	Species	Poiana	Petru Groza	Borz	Tinca	Zerind	Gyula	Sarkad	River Kettos Körös Békés	R. Hármas Körös Csongrád
		ind./m2								
1	*Branchiura sowerbyi*				59				59	
2	*Eiseniella tetraedra*	200		51						
3	*Limnodrilus claparedeianus*		401							
4	*Limnodrilus hoffmeisteri*		987	89		182				44
5	*Nais barbata*		219							
6	*Nais behningi*	111				557				
7	*Nais bretscheri*		619	666		10				
8	*Nais communis*	22								
9	*Nais pseudoptusa*	1671								
10	*Pristina aequiseta*					10				
11	*Pristina bilobata*			1516						
12	*Pristina rosea*	355								
13	*Tubifex nevaensis*			44						
14	*Tubifex tubifex*		474							
15	*Uncinais uncinata*		109							
16	*Vejdovskiella comata*			333						
	Total (ind./m2)	2359	2809	2699	59	759	0	0	59	44
	Species number	5	6	6	1	4	0	0	1	1

Table 3. Oligochaete and their quantity in Crişul Repede (Sebes-Körös)

No.	Species	Sampling places							
		Şaula	Ciucea	Bologa	Stâna de Vale	Vadul Crişului	Aleşd	Fughiu	Cheresig
		ind./m²							
1	Aulodrilus pigueti							7	
2	Aulodrilus pluriseta		2			13			
3	Branchiura sowerby							3	
4	Eiseniella tetraedra				15		13		
5	Limnodrilus claparedeianus	328				6			266
6	Limnodrilus hoffmeisteri	3443	56	561			12	17	5665
7	Limnodrilus profundicola	11							
8	Limnodrilus udekemianus	439		27					54
9	Nais barbata		4	617	325	7	73		
10	Nais behningi				104	16	119		
11	Nais bretscheri		138	802	207	312	1295		
12	Nais communis		274	3995	380	86	123	20	
13	Nais elinguis		8	1644	147	23	53		
14	Nais pardalis			80	484	19	377	3	
15	Nais pseudoptusa		30		573	73	103		
16	Nais variabilis						3		
17	Ophiodonais serpentina			107	70	7		51	
18	Pristina aequiseta		14	27			10		
19	Pristina bilobata		8			6	17	7	
20	Pristina rosea		16	3013			3		
21	Rhyncheimis sp.				35				
22	Stylaria lacustris						12	88	
23	Stylodrilus heringeanus	14							
24	Tubifex tubifex	859	6	53		13	46	3	742
25	Veidowskyella comata							3	
	Total ind./m²	5094	64	641	50	32	71	27	6727

Table 4. Sediment chemical data of R. Crişul Alb (Fehér-K.) and R. Crişul Negru (Fekete-K.)

Components (total)	Unit (dry mat.)	Sampling places													
		Crişul Alb							Crişul Negru					R. Kettős-K.	R. Hármas-K.
		Criş	Brad	Talagiu	Almaş	Ineu	Ch. Criş	Gyula	Source	P. Groza	Tinca	Borz	near border	Békés	Inflow
Fe	g/kg	23,53	36,37	27,29	9,69	19,61	8,44	17,02	12,65	9,60	24,65	8,94	18,92	24,74	19,20
Mn	mg/kg	439,05	1995,40	1768,50	224,60	678,20	337,10	675,30	411,40	285,20	519,10	236,20	616,10	802,80	617,10
Kjeldahl -N	g/kg	2,72	2,85	2,69	0,13	3,55	0,29	0,54	1,70	0,71	0,63	0,21	1,25	1,57	0,99
P	g/kg	0,48	1,05	0,72	0,30	0,60	0,19	0,36	0,36	0,21	0,39	0,30	0,48	0,65	0,63
Cd	mg/kg	0,00	7,40	2,40	0,00	4,80	0,70	0,70	0,50	0,40	1,60	0,00	0,50	0,90	0,50
Ni	mg/kg	44,90	52,80	28,80	10,30	24,90	8,40	20,50	15,20	10,60	29,60	10,40	19,30	30,00	24,80
Zn	mg/kg	89,30	1139,20	307,00	42,40	328,10	59,50	107,20	69,80	37,80	242,60	23,40	75,80	137,00	116,40
Pb	mg/kg	25,30	79,90	63,00	13,50	116,10	28,00	35,60	35,00	21,00	58,70	8,80	98,20	43,00	29,80
Cr	mg/kg	17,30	38,20	22,90	4,50	13,50	7,20	12,70	11,50	6,90	16,80	5,50	13,70	24,50	23,50
Cu	mg/kg	41,10	377,90	126,20	6,00	117,20	23,40	26,00	27,00	12,50	50,30	5,30	24,60	50,90	27,90

Table5 Chironomid fauna of the R. Crişul Alb (Fehér-Körös)

Species	Spring area	Brad				Ch. Criş	Aciuţa	Ineu	Gyula
	main current	near the bank	fresh alder leaves in water	navvy holes	river bed				
	ind./m2								
1 Brillia longifusca K		8	19						
2 Chironomus fluviatilis Lenz					11				
3 Chironomus plumosus Linnaeus				8	4				
4 Cladopelma laccophila K				19					11
5 Cladotanytarsus mancus Walk.	4					4			
6 Conchapelopia pallidula Mg				4	15				
7 Cricotopus sylvestris Fabr									8
8 Cryptochironomus defectus K				49					
9 Cryptochironomus redekei Krus	4			38			23	15	
10 Cryptotendipes anomalus K				57				4	4
11 Dicrotendipes nervosus Staeg									19
12 Dicrotendipes pulsus Walk.									8
13 Dicrotendipes tritomus K.								4	
14 Einfeldia insolita K				4					
15 Einfeldia pectoralis K	4			4					
16. Endochironomus intextus Walk.			11						
17 Eukiefferiella coerulescens K						4			
18 Krenopelopia binotata Wied.								4	
19 Limnophies prolongatus K		15							
20 Macropelopia nebulosa Mg	4								42
21 Micropsectra praecox Mg.	110	8						8	
22 Micropsectra trivialis K									8
23 Microtendipes chloris Mg							4	4	
24 Orthocladius olivaceus K	11								
25 Orthocladius saxicola K.			4			8		19	
26 Parachironomus arcuatus Goetgh.				23					
27 Parachironomus monochromus v d. Wulp									11
28 Parakiefferiella bathophila K.							19		
29 Paralauterborniella nigrohalteralis Mall							4		
30 Paratanytarsus lauterborni K	4	4			4		8		
31 Pentapedilum sordens v d Wulp	4	8	34		30				
32 Polypedilum minutum Krug			15	0	34	11	23		
33 Polypedilum nubeculosum Mg		4	4	23					11
34 Polypedilum nubifer Skuse				8					
35 Polypedilum scalaenum Schr	11	15			64			4	4
36. Procladius choreus Mg.		4		15					
37. Psectrocladius barbimanus Edw					446		4		
38. Rheocricotopus effusus Walk.		8							
39 Robackia demeijerei Krus						8			
40 Syndiamesa branickii Now		4							
41 Tanypus punctipennis Mg				19					
42 Tanytarsus curticornis K	8			8	11		4	4	11
43 Tanytarsus gregarius K.							4		
44 Thienemanniella flavescens Edw		4							
45. Thienemannimyia lentiginosa Fries	79	38		132	4		87	42	
Total ind./m2	242	117	144	408	646	34	178	106	136
Species richness	11	12	6	15	10	5	10	10	11

Table 6. Chironomid fauna in the R. Crişul Negru (Fekete-Körös)

Species	Poiana		Petru Groza		Borz	Tinca	Zerind		Sarkad
	bank	gravels	sandy sediment	gravels	gravels	sediment	sediment	phytotecton	clay sediment
1. Arctopelopia sp.	4								
2. Brillia longifusca K.		8							
3. Brillia modesta Mg.	4								
4. Briophaenocladius nitidicollis Goetgh.		4							
5. Chironomus fluviatilis Lenz					15				
6. Chironomus riparius Mg.					8				
7. Cladotanytarsus mancus Walk.							11	19	
8. Conchapelopia pallidula Mg.					15				
9. Cricotopus bicinctus Mg.					4				
10. Cricotopus trifascia Edw.				4					
11. Cryptochironomus redekei Krus.					4		4		
12. Cryptotendipes anomalus K.					4	249			
13. Demicryptochironomus vulneratus Zett.		19							
14. Dicrotendipes nervosus Staeg.					4				
15. Eukiefferiella longicalcar K.				8					
16. Eukiefferiella similis Goetgh.				8					
17. Eukiefferiella tshernovskii Pankr.				106					
18. Limnophies pusillus Eaton		4							
19. Macropelopia nebulosa Mg.	4								4
20. Metriocnemus hygropetricus K.		8							
21. Micropsectra praecox Mg.		4							
22. Micropsectra trivialis K.	23								
23. Microtendipes chloris Mg.						4			
24. Microtendipes pedellus de Geer						15			
25. Orthocladius olivaceus K.				23					
26. Orthocladius saxicola K.				15					
27. Paracladopelma camptolabis K.						4			4
28. Parakiefferiella bathophila K.			4						
29. Paralauterborniella nigrohalteralis Mall.				4	8	4		8	
30. Paratanytarsus lauterborni K.				8					
31. Pentapedilum sordens v. d. Wulp	34	11		4					
32. Polypedilum minutum Krug	113	42			34			12	
33. Polypedilum nubeculosum Mg.	634	8							
34. Polypedilum scalaenum Schr.					53				
35. Potthastia longimana K.	4								
36. Procladius choreus Mg.	23				4	8			
37. Prodiamesa olivacea Mg.	87					4			
38. Propsilocerus danubialis Botnariuc et Albu				11					
39. Protanypus morio Zett.		8							
40. Psectrocladius barbimanus Edw.				19					
41. Synorthocladius semivirens K.		8							
42. Tanypus punctipennis Mg.					4	11			
43. Tanytarsus arduensis Goetgh.						4			
44. Tanytarsus curticornis K.	4			4	4				
45. Tanytarsus gracillentus Holmgr.						15			
46. Tanytarsus gregarius K.		8			4				
47. Thienemanniella clavicornis K.	4								
48. Thienemannimyia lentiginosa Fries	102	110							
49. Trissopelopia longimana Staeg.	4								
Total ind./m2	1042	238	4	211	162	317	15	38	8
Species richness	14	13	1	12	14	10	2	3	2

Table 7 Chironomid fauna of the R. Crisul Repede (R. Sebes-Körös) - 1995

Sampling places	Spring area		Alesd				Bologa			Ciucea below					Osorhei before					Fugiu		Cheresig				Szeghalom
	bank	main current	bank	2 ms from the bank	bank	26 ms from the bank	bank	2 ms from the bank	main current	right bank	main current	left bank	2 ms from the bank	bank side	bank side	szélétől 6 m	main current	6 ms from the bank	2 ms from the bank	bank side	main current	bank side	2 ms from the bank	main current	main current	2 ms from the bank
Species	Ind./m2																									
1 Apsectrotanypus trifascipennis Zett.																			15							
2 Camptochironomus tentans Fabr																4										
3 Cardiocladius fuscus K																			0		15					
4 Chironomus fluviatilis Lenz																23			140	8				4		
5 Chironomus riparius Mg												4							8	15						
6 Cladopelma laccophila K																										4
7 Cladotanytarsus mancus Walk			155		465	41				4		4		8	4	4		4	26						34	
8 Clinotanypus nervosus Mg.																	4									
9 Corynoneura celeripes Win	8																									
10 Corynoneura lemnae Frauenfeld																				4						
11 Cricotopus albiforceps K.																			4							
12 Cricotopus algarum K		4	8	4															4			8				
13 Cricotopus annulator Goetgh.		8																								
14 Cricotopus bicinctus Mg														11												
15 Cricotopus fuscus K																			8							
16 Cricotopus sylvestris Fabr																			4							
17 Cricotopus tremulus Linnaeus		8																								
18 Cricotopus trifasciatus Edw	15	15		8							4								26							
19 Cryptochironomus redekei Krus.			38		72	15					4	4				8	11		15	4			45	23	49	
20 Cryptotendipes anomalus K															4									4		
21 Demicryptochironomus vulneratus Zett									11																	
22. Dicrotendipes nervosus Staeg.																			11		11			8	72	
23 Dicrotendipes tritomus K.															8	11			125				4	4		
24 Einfeldia pectoralis K												4														
25 Eukiefferiella brevicalcar K														8												
26 Eukiefferiella quadridentata Tshern	19																									
27 Eukiefferiella tshernovskii Pankr	8																									
28. Glyptotendipes cauliginellus			4																							
29 Kiefferulus tendipediformis Goetgh																			4							
30 Lenzia flavipes Mg.																4										
31 Limnophies prolongatus K									15																	
32 Limnophies pusillus Eaton		8																								
33 Macropelopia nebulosa Mg.																		4	30	15						
34 Metriocnemus hygropetricus K			4																							
35 Micropsectra praecox Mg				4					8				4			11				19	4	4		4	4	
36 Microtendipes chloris Mg												8		4						11						
37 Nanocladius bicolor Zett																	4		4		4					
38 Orthocladius saxicola K.	11	90		11						4			4	11	8		4		11		19				19	
39 Orthocladius thienemanni K.	23	4	11	38		8							11			4			15	8				11		
40 Parachironomus arcuatus Goetgh.																				4						
41 Paracladius conversus Walk																					83					
42 Paracladopelma camptolabis K			8		11											4			4					8		
43 Paracladopelma rolli Kirp																										8
44 Parakiefferiella bathophila K				5																						
45 Paratendipes intermedius Tsh												4			4	4				19						
46 Patatendipes connenctens Lipina												4														
47 Pentapedilum sordens v d Wulp	4		11	8							15		11	19						30	8					
48 Polypedilum minutum Krug											4		4	4		4		4	4	4						
49 Polypedilum nubeculosum Mg.			4		8										4				15	4				4	8	4
50 Polypedilum scalaenum Schr	26	4				4				4	4	196	15	11	8	64	8		45	98		83	242	128	491	30
51 Potthastia gaedi Mg.																					26					
52 Procladius choreus Mg.			11		26										8					4						
53 Procladius conversus Walk																			4							
54 Prodiamesa olivacea Mg	4																			79						
55 Psectrocladius barbimanus Edw								4																		
56 Psectrocladius dilatatus v d Wulp	125			4																4	4			8		
57 Symposiocladius lignicola K.																					15					
58. Tanypus punctipennis Mg.					4																					
59 Tanytarsus curticornis K															4									8	4	
60 Tanytarsus gracillentus Holmgr	19																									
61 Tanytarsus gregarius K.								4					4	42		4			15		19					
62 Thienemanniella vittata Edw															4											
63 Thienemannimyia lentiginosa Fries								4	4		11			8	4			4		4		4		4		
64 Trissocladius fluviatilis Goetgh.									38																	
Total ind /m2	261	139	253	81	585	68	0	11	76	11	42	227	53	125	57	147	30	15	536	332	208	98	291	215	680	45
Species richness	11	8	10	8	6	4	0	3	5	3	6	8	7	10	11	13	5	4	22	17	11	4	3	13	8	4

Table 8. Individual density and species richness of the Chironomids in the Körös River System

Rivers	R. Kettős-Körös			R. Hármas-Körös	
sampling places	Sarkad	Békés		Csongrád	
Species	bank	bank	qualitative	bank	main current
1. Cladotanytarsus mancus Walk.			11		
2. Cryptochironomus redekei Krus.		8			
3. Cryptotendipes anomalus K.			8		
4. Dicrotendipes nervosus Staeg.		4			
5. Dicrotendipes pulsus Walk.				4	
6. Dicrotendipes tritomus K.			4		
7. Einfeldia carbonaria Mg.			4		
8. Macropelopia nebulosa	4				
9. Macropelopia notata Mg.			72		
10. Micropsectra praecox Mg.			11		
11. Paracladopelma camptolabis	4				
12. Polypedilum nubeculosum Mg.		4			
13. Procladius choreus Mg.			19	4	
14. Rheotanytarsus curtistylus Goetgh.			15		
Total ind./m2	8	15	144	8	0
Species richness	2	3	8	2	0

Table 9. Tributaries of the R. Crişul Repede, Chironomid fauna (ind/m2)- 1995.

Spesies	H. St. Vale	Drăgan Stream				Iad Stream				Zarna Stream
	near the bank	near the bank	gravels	near the bank	main current		2 ms from the bank	main current	near the bank	near the bank
1. Ablabesmyia monilis Linnaeus								8		
2. Cladotanytarsus mancus Walk.						4	1			
3. Clinotanypus nervosus Mg.		4								
4. Cricotopus fuscus K.								4		
5. Eukiefferiella brevicalcar K.								49		
6. Eukiefferiella clypeata K.									15	
7. Eukiefferiella tshernovskii Pankr.							8			
8. Krenopelopia binotata Wied.								8		
9. Lenzia flavipes Mg.					4					
10. Limnophies hydrophilus Goetgh.	4									
11. Limnophies pusillus Eaton								8		
12. Macropelopia nebulosa Mg.						4		4	8	
13. Micropsectra praecox Mg.	94					8	8		4	
14. Microtendipes chloris Mg.				4						
15. Nanocladius bicolor Zett.	11									
16. Orthocladius saxicola K.	19		4			15	11	8	11	
17. Orthocladius thienemanni K.	30						113	26	23	
18. Paracladopelma camptolabis K.	4									
19. Paratendipes intermedius Tsh.					4					
20. Pentapedilum sordens v. d. Wulp	15	4			4				11	4
21. Polypedilum minutum Krug.									4	
22. Polypedilum nubeculosum Mg.					4				4	
23. Polypedilum scalaenum Schr.				4	4					
24. Prodiamesa olivacea Mg.				11	15				11	11
25. Psectrocladius barbimanus Edw.		4	4							
26. Psectrocladius dilatatus v. d. Wulp							23		15	
27. Psectrocladius simulans Joh.								19		
28. Tanytarsus curticornis K.									4	
29. Tanytarsus gregarius K.	4					4				
30. Thienemannimyia lentiginosa Fries	11						15		8	
31. Trissopelopia longimana Staeg.								4		
Total ind. /m2	193	12	8	19	34	34	179	136	117	15
Species richness	9	3	2	3	6	5	7	10	12	2

Table10. Chironomid species abundance
and dominance in the R. Crişul Alb (Fehér-Körös)

Species	Dominance	Abundance
	%	%
Psectrocladius barbimanus Edw.	22,370499	22,222222
Thienemannimyia lentiginosa Fries	18,986726	11,111111
Micropsectra praecox Mg.	6,2035839	22,222222
Polypedilum scalaenum Schr.	4,8876721	22,222222
Polypedilum minutum Krug.	4,1342293	22,222222
Cryptochironomus redekei Krus.	3,9477352	22,222222
Pentapedilum sordens v. d. Wulp	3,7597478	11,111111
Cryptotendipes anomalus K.	3,1957856	11,111111
Cryptochironomus defectus K.	2,4438361	44,444444
Tanytarsus curticornis K.	2,2558487	33,333333
Macropelopia nebulosa Mg.	2,2558487	22,222222
Polypedilum nubeculosum Mg.	2,0678613	11,111111
Cladopelma laccophila K.	1,5038991	11,111111
Orthocladius saxicola K.	1,5029036	11,111111
Brillia longifusca K.	1,32	22,222222
Parachironomus arcuatus Goetgh.	1,1279243	11,111111
Conchapelopia pallidula Mg.	0,939937	11,111111
Dicrotendipes nervosus Staeg.	0,939937	11,111111
Parakiefferiella bathophila K.	0,939937	11,111111
Paratanytarsus lauterborni K.	0,939937	22,222222
Procladius choreus Mg.	0,939937	33,333333
Tanypus punctipennis Mg.	0,939937	11,111111
Limnophies prolongatus K.	0,7519496	22,222222
Chironomus fluviatilis Lenz	0,5639622	11,111111
Endochironomus intextus Walk.	0,5639622	33,333333
Orthocladius olivaceus K.	0,5639622	11,111111
Parachironomus monochromus v.d. Wulp	0,5639622	11,111111
Chironomus plumosus Linnaeus	0,5639622	11,111111
Cricotopus sylvestris Fabr.	0,3759748	11,111111
Dicrotendipes pulsus Walk.	0,3759748	44,444444
Einfeldia pectoralis K.	0,3759748	44,444444
Micropsectra trivialis K.	0,3759748	44,444444
Microtendipes chloris Mg.	0,3759748	44,444444
Polypedilum nubifer Skuse	0,3759748	11,111111
Rheocricotopus effusus Walk.	0,3759748	55,555556
Cladotanytarsus mancus Walk.	0,375477	22,222222
Robackia demeijerei Krus.	0,3749793	22,222222
Dicrotendipes tritomus K.	0,1879874	11,111111
Einfeldia insolita K.	0,1879874	11,111111
Krenopelopia binotata Wied.	0,1879874	11,111111
Paralauterborniella nigrohalteralis Mall.	0,1879874	11,111111
Syndiamesa branickii Now.	0,1879874	66,666667
Tanytarsus gregarius K.	0,1879874	11,111111
Thienemanniella flavescens Edw.	0,1879874	11,111111
Eukiefferiella coerulescens K.	0,1874896	66,666667
	100,00481	100

Table 11. Chironomid species abundance
and dominance in the R Crişul Negru (Fekete-Körös)

Species	Dominance %	Abundance %
Polypedilum nubeculosum Mg	31,53	11,11
Cryptotendipes anomalus K	12,43	11,11
Thienemannimyia lentiginosa Fries	10,39	11,11
Polypedilum minutum Krug.	9,86	11,11
Eukiefferiella tshernovskii Pankr.	5,19	11,11
Prodiamesa olivacea Mg.	4,45	11,11
Polypedilum scalaenum Schr	2,60	22,22
Pentapedilum sordens v. d. Wulp	2,41	11,11
Procladius choreus Mg	1,67	11,11
Cladotanytarsus mancus Walk.	1,48	11,11
Micropsectra trivialis K.	1,11	22,22
Orthocladius olivaceus K.	1,11	22,22
Paralauterborniella nigrohalteralis Mall.	1,11	11,11
Demicryptochironomus vulneratus Zett.	0,93	11,11
Psectrocladius barbimanus Edw.	0,93	11,11
Chironomus fluviatilis Lenz	0,74	11,11
Conchapelopia pallidula Mg	0,74	11,11
Microtendipes pedellus de Geer	0,74	11,11
Orthocladius saxicola K.	0,74	22,22
Tanypus punctipennis Mg.	0,74	11,11
Tanytarsus gracillentus Holmgr.	0,74	11,11
Propsilocerus danubialis Botnariuc et Albu	0,56	11,11
Tanytarsus curticornis K.	0,56	11,11
Tanytarsus gregarius K.	0,56	11,11
Brillia longifusca K	0,37	11,11
Chironomus riparius Mg.	0,37	11,11
Cryptochironomus redekei Krus.	0,37	22,22
Eukiefferiella longicalcar K	0,37	11,11
Eukiefferiella similis Goetgh.	0,37	44,44
Macropelopia nebulosa Mg	0,37	11,11
Metriocnemus hygropetricus K	0,37	33,33
Paracladopelma camptolabis K	0,37	44,44
Paratanytarsus lauterborni K	0,37	22,22
Protanypus morio Zett.	0,37	11,11
Synorthocladius semivirens K.	0,37	11,11
Trissopelopia longimana Staeg.	0,19	33,33
Arctopelopia sp.	0,19	22,22
Brillia modesta Mg.	0,19	11,11
Briophaenocladius nitidicollis Goetgh.	0,19	11,11
Cricotopus bicinctus Mg	0,19	11,11
Cricotopus trifascia Edw	0,19	11,11
Dicrotendipes nervosus Staeg.	0,19	22,22
Limnophies pusillus Eaton	0,19	11,11
Micropsectra praecox Mg.	0,19	33,33
Microtendipes chloris Mg	0,19	11,11
Parakiefferiella bathophila K	0,19	22,22
Potthastia longimana K.	0,19	11,11
Tanytarsus arduensis Goetgh.	0,19	22,22
Thienemanniella clavicornis K	0,19	11,11

Table 12. Abundance and dominance of the Chironomid species in the R. Crişul Repede/Sebes-Körös - 1995.

Species	Dominance %	Abundance %
Polypedilum scalaenum Schr.	31,87	3,85
Cladotanytarsus mancus Walk.	16,30	3,85
Cryptochironomus redekei Krus.	6,26	7,69
Orthocladius saxicola K.	4,19	15,38
Chironomus fluviatilis Lenz	3,79	11,54
Dicrotendipes tritomus K.	3,29	3,85
Psectrocladius dilatatus v. d. Wulp	3,13	42,31
Orthocladius thienemanni K.	2,88	3,85
Pentapedilum sordens v. d. Wulp	2,32	3,85
Dicrotendipes nervosus Staeg.	2,22	3,85
Tanytarsus gregarius K.	1,89	3,85
Prodiamesa olivacea Mg.	1,81	19,23
Paracladius conversus Walk.	1,81	3,85
Cricotopus trifasciatus Edw	1,48	3,85
Micropsectra praecox Mg.	1,32	3,85
Macropelopia nebulosa Mg.	1,07	3,85
Polypedilum nubeculosum Mg.	1,07	3,85
Procladius choreus Mg.	1,07	19,23
Thienemannimyia lentiginosa Fries	0,99	46,15
Trissocladius fluviatilis Goetgh.	0,82	7,69
Paracladopelma camptolabis K.	0,74	3,85
Paratendipes intermedius Tsh.	0,66	15,38
Polypedilum minutum Krug.	0,58	19,23
Potthastia gaedi Mg.	0,58	3,85
Chironomus riparius Mg.	0,58	3,85
Cricotopus algarum K	0,58	3,85
Microtendipes chloris Mg.	0,49	3,85
Eukiefferiella quadridentata Tshern.	0,41	3,85
Tanytarsus gracillentus Holmgr.	0,41	3,85
Apsectrotanypus trifascipennis Zett.	0,33	3,85
Cardiocladius fuscus K.	0,33	3,85
Symposiocladius lignicola K.	0,33	11,54

Species	Dominance %	Abundance %
Cricotopus bicinctus Mg.	0,25	34,62
Demicryptochironomus vulneratus Zett.	0,25	11,54
Nanocladius bicolor Zett.	0,25	11,54
Corynoneura celeripes Win.	0,16	42,31
Cricotopus fuscus K.	0,16	38,46
Cryptotendipes anomalus K.	0,16	3,85
Eukiefferiella brevicalcar K.	0,16	3,85
Eukiefferiella tshernovskii Pankr	0,16	19,23
Paracladopelma rolli Kirp.	0,16	3,85
Cricotopus annulator Goetgh.	0,16	3,85
Cricotopus tremulus Linnaeus	0,16	15,38
Limnophies pusillus Eaton	0,16	3,85
Parakiefferiella bathophila K.	0,11	30,77
Camptochironomus tentans Fabr.	0,08	26,92
Cladopelma laccophila K.	0,08	30,77
Clinotanypus nervosus Mg.	0,08	69,23
Corynoneura lemnae Frauenfeld	0,08	3,85
Cricotopus albiforceps K.	0,08	15,38
Cricotopus sylvestris Fabr	0,08	3,85
Einfeldia pectoralis K.	0,08	3,85
Glyptotendipes cauliginellus	0,08	3,85
Kiefferulus tendipediformis Goetgh.	0,08	19,23
Lenzia flavipes Mg.	0,08	3,85
Metriocnemus hygropetricus K.	0,08	3,85
Parachironomus arcuatus Goetgh.	0,08	11,54
Patatendipes connenctens Lipina	0,08	3,85
Procladius conversus Walk.	0,08	23,08
Psectrocladius barbimanus Edw	0,08	3,85
Tanypus punctipennis Mg.	0,08	34,62
Thienemanniella vittata Edw	0,08	3,85
Thienemanniella vittata Edw.	0,08	3,85

Table 13. Chironomid species dominance and abundance in the tributaries of the R. Crişul Repede - 1995.

	Dominance	Abundance
Species	%	
Orthocladius thienemanni K.	25,82	10,00
Micropsectra praecox Mg.	15,18	20,00
Orthocladius saxicola K.	9,14	10,00
Eukiefferiella brevicalcar K.	6,58	10,00
Prodiamesa olivacea Mg.	6,54	10,00
Pentapedilum sordens v. d. Wulp	5,12	10,00
Psectrocladius dilatatus v. d. Wulp	5,06	10,00
Thienemannimyia lentiginosa Fries	4,56	10,00
Psectrocladius simulans Joh.	2,53	10,00
Eukiefferiella clypeata K.	2,03	10,00
Macropelopia nebulosa Mg.	2,02	10,00
Nanocladius bicolor Zett.	1,52	20,00
Psectrocladius barbimanus Edw.	1,07	40,00
Ablabesmyia monilis Linnaeus	1,01	10,00
Eukiefferiella tshernovskii Pankr.	1,01	10,00
Krenopelopia binotata Wied.	1,01	60,00
Limnophies pusillus Eaton	1,01	40,00
Polypedilum nubeculosum Mg.	1,01	40,00
Polypedilum scalaenum Schr.	1,01	40,00
Tanytarsus gregarius K.	1,01	50,00
Cladotanytarsus mancus Walk.	0,64	10,00
Clinotanypus nervosus Mg.	0,54	20,00
Cricotopus fuscus K.	0,51	20,00
Lenzia flavipes Mg.	0,51	40,00
Limnophies hydrophilus Goetgh.	0,51	20,00
Microtendipes chloris Mg.	0,51	20,00
Paracladopelma camptolabis K.	0,51	10,00
Paratendipes intermedius Tsh.	0,51	10,00
Polypedilum minutum Krug.	0,51	20,00
Tanytarsus curticornis K.	0,51	30,00
Trissopelopia longimana Staeg.	0,51	10,00
	100,00	100,00

Table 14. Diversity of the the examined rivers by the chironomid fauna

R. Crişul Alb (Fehér-K.)-1994		
Source area	main current	0,45
	near the bank	0,65
	fresh alder leaves in water	0,48
Brad	navvy holes	0,66
	main current	0,37
Ch. Criş	main current	0,46
R. C. Negru - Fekete-K. (1994.)		
Source area	near the bank	0,42
	gravels	0,56
P. Groza	sandy sediment	0,00
	gravels	0,54
Borz	clay and gravels	0,64
Tinca	phytotecton	0,29
Zerind	main current	0,1694
	near the left bank	0,3675
Almaş	near the rigt bank	0,50
Ineu	near the bank	0,56
River Kettős-K.		
Gyula	clay	0,65
Sarkad	clay	0,21
Békés	left bank	0,31
R. Hármas-K.		
Csongrád	left bank	0,09
	main current	0,21

River C. Repede (S.-Körös) - July, 1995.		
Source area	near the bank	0,61
	main current	0,41
Aleşd	near the bank	0,42
	2 ms from the bank	0,53
	near the bank	0,22
	26 ms from the bank	0,31
Bologa	near the bank	0,00
	2 ms from the bank	0,33
	main current	0,40
H. St. Vale	near the bank	0,49
Ciucea	right side bank	0,42
	main current	0,48
	left bank	0,19
	2 ms from the left bank	0,53
	near the bank	0,61
Osorhei	near the bank	0,70
	6 ms from the bank	0,59
	main current	0,45
	near the bank	0,50
	2ms from the bank	0,73
Fugiu	main current	0,67
	main current	0,59
Cheresig	near the bank	0,18
	2ms from the bank	0,15
	main current	0,48
	qualitative	0,31
Drăgan Stream	near the bank	0,33
	gravels	0,21
	near the bank	0,29
	main current	0,48
Iad Stream	near the bank	0,43
	2 m from the side	0,39
	main current	0,57
	near the bank	0,70
Zarna Stream	near the bank	0,17
Szeghalom	near the bank	0,30

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