The Oligochaete and the Chironomid fauna of the Upper Tisa Region and its tributaries

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Introduction

River Tisa and its tributaries serve as a possibility for organisms living in water to migrate as in a corridor. The drifting of different animals is well known, which is a passive way of travelling. Fishes often swim against the stream.

Scientific data showed that other animals, too, were able to migrate against water stream. Invertebrates, such the snail species of *Theodoxus fluviatilis* (Soós, 1965), a fresh water mussel (*Dreisena polimorpha*: Mollusca, Bivalvia) or a worm species (*Hypania invalida*: Annelida, Polychaeta) showed the praxis of this form of migration in recent years. *Hypania invalida* was first detected in 1969 near Szeged (Ferencz, 1969), and its specimens have become common in River Tisa near Tokaj by present time (Szitó, 1996).

Different river sections serve as refuges for the species. Following an ecological injury, a species-poor river section will be recolonised by their active and passive migration.

There have been no literature sources about the oligochaete and chironomid fauna of the Upper Tisa Region (Pop, 1943, 1950; Albu, 1966), therefore our present data collection will the basis, showing the current situation.

The main goals were as follows: to make a data collection which shows the present situation of the species, identifies them, and presents the species-richness of different parts of the river system; to find the character species on different river courses, and to try to qualify the river profiles by indicating the presence or absence of indicator species in the river courses. This work is part of the data collection and evaluation analysing the state of ecological health in River Tisa and its tributaries, and serves as a standard for the assessment of ecological changes in the future (Szitó, 1995).

Keywords: *Oligochaeta*, *Chironomidae*, Upper Tisa

Materials and Methods

Sediment samples were taken from the source area of the rivers Bila and Chorna Tisa, and from their mouth to the Hungarian reach down to Tiszaszalka in 17 cross sections (Figure1.).

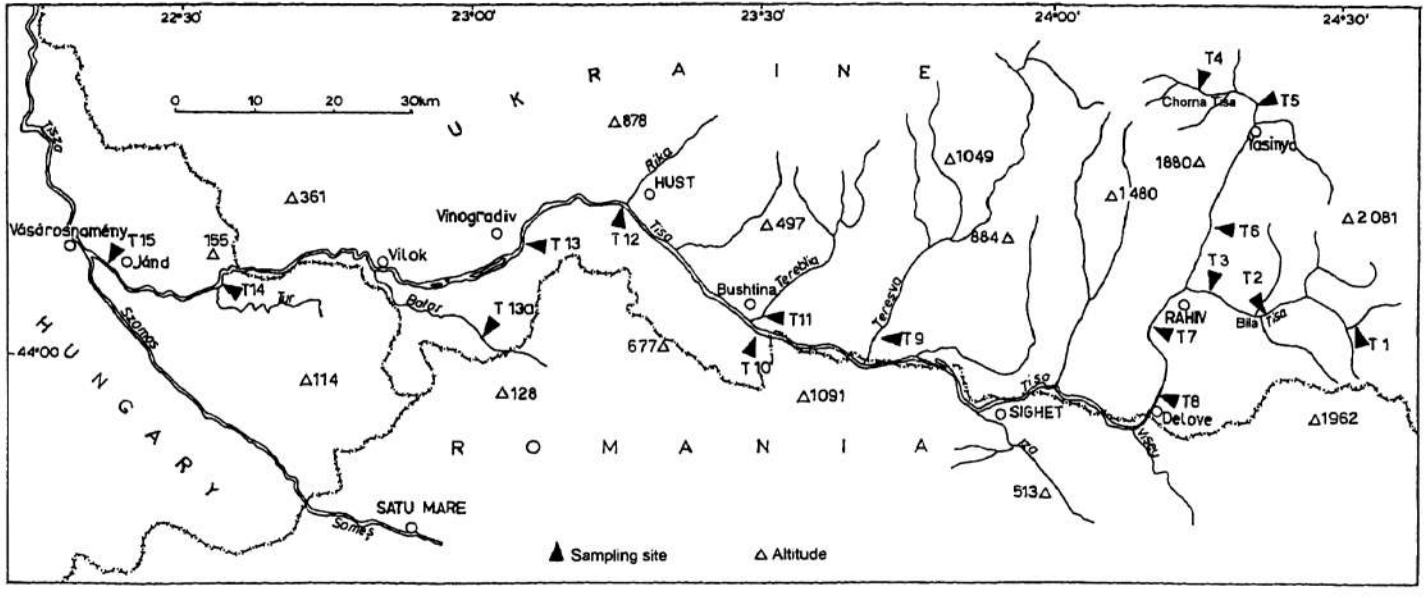

Figure 1. Sampling places

Sampling sites	Bila Tisa						Chorna Tisa				Tisa																											
	Head-waters	Breboya			junction		Head-waters		Control station		Yasinya		Rahiv		Dilove			Teresva		Tereblia		Bustina			Viskove		Hust		Vinogradiv			Trosnik			V. namény		Tisza-szalka	
Species: Oligochaetae	near the bank	near the bank	gravels	stagnant water	near the bank	biotecton	near the bank	biotecton	sandy sediment	biotecton	near the bank	biotecton	near the bank	biotecton	near the bank	stagnant water	filamentous algae	near the bank	biotecton	near the bank	biotecton	near the bank	sandy sediment	biotecton	near the bank	biotecton	near the bank	biotecton	near the bank	biotecton (slow current)	biotecton (rapid water)	near the bank	biotecton	interst. water	near the bank	main current	near the bank	Frequency (%)
Aulodrilus limnobius																												67	37									5
Eiseniella tetraedra	100						100						33				100																					11
Limnodrilus hoffmeisteri															35													33	32			100					58	14
Limnodrilus udekemianus																																					8	3
Ophidonais serpentina																														100								3
Paranais litoralis																											25											3
Peloscolex ferox																										100												3
Potamothrix vejdovskyi																100																						3
Pristina longiseta														100																								3
Tubifex ignotus											63		33		13														32								17	14
Tubifex nevaensis											38		33		52												75										17	14
Total ind. (%)	100	0	0	0	0	0	100	0	0	0	100	0	100	100	100	100	100	0	0	0	0	0	0	0	0	100	100	100	100	100	0	100	0	0	0	0	100	
Chironomidae																																						
Ablabesmyia monilis														6																		4	38				63	11
Acricotopus lucens	25	25	33			11						50	15	19				13													4							24
Anatopynia plumipes																													16									3
Arctopelopia sp.																												40			7							5
Chironomus riparius																7							14		3	25			63					44				16
Chironomus thummi																																27						3
Cladotanytarsus mancus																															4		13					5
Cricotopus algarum													8	63				22			7			21				20			4		50					22
Cricotopus bicinctus														13																								3
Cryptochironomus defectus																						33															25	5
Cryptochironomus redekei																7																						3
Cryptotendipes anomalus																																8						3
Eukiefferiella bavarica																								50														3
Eukiefferiella longicalcar																				50																		3
Eukiefferiella quadridentata	25				25	43		100		67																		20			18							19
Harnischia albimanus					25																										4							5
Heleniella thienemanni						1																																3

Table 1. The percentage rate of oligochete and chironomid species in the source area and in the upper section of River Tisa

Sampling sites	Bila Tisa						Chorna Tisa						Tisa																									
	Head-waters	Breboya			Junction		Head-waters		Control station		Yaszinya		Rahiv		Dilove		Teresva			Tereblia		Bustina			Viskove		Hust		Vinogradiv			Trosnik			V. namény		Tisza-szalka	.
Species: Chironomids	near the bank	near the bank	gravels	stagnant water	near the bank	biotecton	near the bank	biotecton	sandy sediment	biotecton	near the bank	biotecton	near the bank	biotecton	near the bank	stagnant water	filamentous algae	near the bank	biotecton	near the bank	biotecton	near the bank	sandy sediment	biotecton	near the bank	biotecton	near the bank	biotecton	near the bank	biotecton (slow current)	biotecton (rapid water)	near the bank	biotecton	Interst water	near the bank	main current	near the bank	Frequency (%)
Krenopelopia binotata									10			8																			4							8
Macropelopia nebulosa									50						60	21					7																	11
Macropelopia notata											25																							11				5
Microcricotopus bicolor		50																																				3
Micropsectra praecox												8																										3
Microtendipes chloris												8				4																		11				8
Nanocladius bicolor						1	2																															5
Odontomesa fulva																									3													3
Orthocladius saxicola	38		33			29				33			4					13		50	7								2		29							27
Orthocladius thienemanni			33										4																									5
Paracladopelma camptolabis											25		4			4													2	10								14
Paralauterborniella nigrohalteralis																																8						3
Paratanytarsus lauterborni																					13					25		20										8
Pentapedilum sordens		25			25												100	7			47			29		50					11							22
Polypedilum convictum													4																									3
Polypedilum scalaenum		25											15			7						50	86		90				2			50		11				24
Procladius choreus																11													5					11				8
Prodiamesa olivacea	13				25				40		50		4		40	29																						19
Psectrocladius barbimanus												8																										3
Psectrocladius dilatatus						16												11													4						13	11
Psectrocladius psilopterus												8						2													7							8
Rheocricotopus effusus																					13																	3
Rheocricotopus gouini							98																															3
Smittia terrestris													8					2			7										4							11
Tanypus punctipennis													31			11						17			3				11	20		4						19
Tanytarsus curticornis																		20																11				5
Tanytarsus gregarius												8	4					2																				8
Tanytarsus lobatifrons																		9																				3
Thienemannimyia lentiginosa																														70	4							5
Total ind. (%)	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	0	0	100	
Species number	4	4	3		4	5	3	1	4	1	6	6	13	3	9	8	2	10	0	2	7	3	3	3	4	4	2	6	10	4	13	7	3	6			7	

Table 1. continue

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

Each sample was washed through a metal screen with a mesh pore size of 250 μm and was preserved in 3-4 % formol solution. The retained material was separated in the laboratorium into groups of oligochaetes, chironomids and 'other' using a Zeiss stereo microscope with 4 to 6 times magnification. The animals were preserved in 80 % ethylic alcohol.

For taxonomic identification the following works were used: Bíró, 1981; Brinkhurst and Jamieson, 1971; Cranston et al. 1983; Ferencz, 1979, Fittkau, 1962; Fittkau et al. 1983; Pinder et al. 1983; Pop, 1943, 1950.

Results

The qualitative rate of oligochaetes and chironomid species at different sampling places is presented in Table 1.

During the expedition, 11 species of oligochaetes and 46 species of chironomids were found in the examined river sections.

Species richness was low both in Bila and in Chorna Tisa. The very same oligochaete species, *Eiseniellla tetraedra* was the only one present in these rivers. The big boulders, the gravel and the rapid water current were inappropriate for other oligochaete species to live here.

Oligochaete specimens were often present in samples collected near the river bank. The number of the species changed between 0-3, with 4 species being the maximum (at only one sampling place: by Tiszaszalka). Some specimens of oligochaetes were found below the mouths of rivers Bila Tisa and Chorna Tisa. These species, except for *Limnodrilus hoffmeisteri*, were characteristic for clean streams (Table 1).

Only 11 chironomid species were found in Bila Tisa and 15 species were present in Chorna Tisa. The species richness changed between 3-5 in samples from Bila Tisa and between 1-6 in Chorna Tisa. The common species were as follows:

Specimens of *Prodiamesa olivacea* were found in the sediment only, while the rest of the listed species were present both in the sediment and in the biotecton (Table 1). Species found commonly in both rivers showed that the environment and the ecosystem were similar in the rivers Bila and Chorna Tisa. The presence of *Prodiamesa olivacea* indicated a low pollution level and clean water here.

13 chironomid species were found below the mouths of rivers Bila and Chorna Tisa. 10 species were present in the Teresva tributary. They were found in the biotecton only. No chironomid species were found in the sediment consisting of gravels. In the Tereblia estuary 8 chironomid species were determined from the sediment and 7 species from the biotecton.

The species richness of chironomids changed between 2-6 in the river section Bustina - Viskove - Hust, 10-13 species were present at Vinogradiv, and their number decreased to 3-7 species by Troznik (Table 1.).

32 % of the chironomid species were characteristic for living in the sediment. They were as follows: *Chironomus riparius, Chironomus thummi, Cladotanytarsus mancus, Cryptochironomus defectus, Cryptochironomus redekei, Harnischia albimanus, Krenopelopia binotata, Macropelopia sp., Paracladopelma camptolabis, Paralauterborniella nigrohalteralis, Pentapedilum sordens, Procladius choreus, Tanypus punctipennis* and *Tanytarsus curticornis*.

The remainder 68 % of chironomid species were characteristic for the biotecton: algae growing on the surface of boulders and gravel served for them as food as well as a living environment.

Summary

A very important data collection was made during the international expedition, to cover up the oligochaete and chironomid fauna on the Upper Tisa Region and the tributaries of River Tisa. The information presented here serves as basic ecological information, because there had been no similar data and information from this area previously.

The river beds were covered by boulders and gravel, sediment was found only rarerly and it was not characteristic for this region. This was the reason why the macrozoobenthos was poor in species as well as in individuals. Its species- and specimen richness was bigger than those of the benthos.

Pollutants could not concentrate because of the lack of sediment, but these materials were transported downstream and were diluted. Anthropogenic pollution effects were not detected during the expedition, although the chironomid species *Prodiamesa olivacea* was not present in River Tisa below Delove. The absence of this species showed as an indicator that some kind of pollution effect may exist in this river region periodically.

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