Preliminary data concerning zooplankton and zoobenthos communities of the Lower Mureş River from the Lunca Mureşului National Park (Arad County)

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Abstract. The present paper represents an inventory of aquatic fauna from the lower Mureş River, downstream of Arad, in the Lunca Mureşului National Park. Zooplanktonic microcrustaceans and zoobenthonic communities were considered for the study. The samples were taken in the year 2004, using the qualitative sampling equipment not only for zooplankton but also for zoobenthos communities.

Keywords: *taxonomical diversity, lower course, the Mureş River, zooplankton microcrustaceans, zoobenthonic community.*

Introduction

Primary or second consumer communities have great importance in aquatic ecosystem matter and energy flow. The aim of this paper was to identify zooplankton and zoobenthos populations inhabiting the lower Mureş River reach. No previous literature on the subject was available. Due to the fact that the present study represents only a qualitative research, quantitative analyses are required for a more accurate approach.

Material and Methods

The samples used for the present study were collected in October 2004 from the main Mureş River course, but also from three adjacent water pools situated in the Mureş floodplain (see figure 1).

The stations 1 to 8 were located on the main course, on going downstream from Arad to the Hungarian border. Site 9 was located on the dead arm of the Mureş River, site 10 was situated on the Bezdin pool and site 11 on the Moltăreţ pool.

Zooplanktonic microcrustaceans were sampled using a 50 µ mesh size plankton net. The samples were preserved with sucrose solution according to Haney & Hall method (Haney & Hall 1973) and in 4% formaldehyde. Identifications were made to the species level in case of cladocerans (Negrea 1983, Dumont & Negrea 2002) and cyclopoid copepods (Damian-Georgescu 1963; Dussard & Defaye 2001). Benthic samples were collected using an Ekman sampler for muddy and sandy bottom, where water depth exceeded 1m. Where water depth was less than 1m and the substratum consisted of sand or gravel, a 250 µ mesh size qualitative net was used. Zoobenthos samples were preserved in the field with 4% formaldehyde. The samples were sorted in the laboratory and the organisms were identified using a microscope and a stereomicroscope.

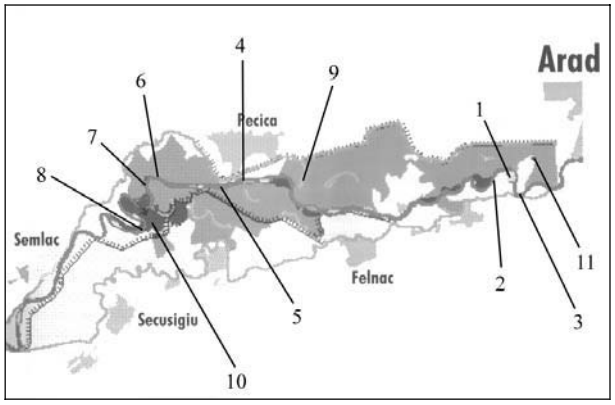

Fig.1 The sampling sites from the lower Mureş River located in the Lunca Mureşului National Park

Results

Physical and chemical parameters were recorded only in the water pools located in the Mureş River floodplain. The values of several parameters (water temperature, conductivity, Total Dissolved Salts- TDS, pH and dissolved oxygen) are depicted in table 1.

Zooplanktonic microcrustacean community from the lower Mureş course included five cladoceran species and two cyclopoid copepod species (table 2).

As concerns the benthic macroinvertebrate communities from the lower Mureş River, seven main groups of organisms were collected in qualitative samples (table 3).

Table No.1 Physical and chemical parameters measured at the three sampling sites located in the adjacent water pools from the Lunca Mureşului National Park

PARAMETERS	SITE 9: MUREŞ MORT	SITE 10: BALTA BEZDIN	SITE 11: BALTA MOLTĂREŢ
Oxygen	0%	25.1%	60.1%
pH	7.67	7.35	8.03
Temperature	13.7°C	13.8°C	15.9°C
Conductivity	1263 µS / cm	712 µS / cm	639 µS / cm
TDS	726 mg/l	322 mg/l	322 mg/l

Table No.2 Zooplanktonic microcrustacean taxa identified in the eleven sampling sites located on the lower Mureş course, in the Lunca Mureşului National Park

TAXA		SAMPLING SITES
CLADOCERA	*Disparalona rostrata*	1; 2, 4, 5, 6, 7, 9
	Ilyocryptus agilis	7
	Ceriodaphnia reticulata	7, 9
	Pleuroxus aduncus	11
	Daphnia sp.;	11
COPEPODA (Cyclopoida)	*Microcyclops varicans*	5, 9
	Mesocyclops crassus	11

Table No. 3 The main zoobenthonic groups and species collected on the Lower Mureş River in the Lunca Mureşului National Park

TAXA		SAMPLING SITES
NEMATODA		1, 6, 8, 9, 11
OLIGOCHAETA	*Dero* sp.	10
	Eiseniella tetraedra	1
	Aulodrilus pluriseta	1, 7
	Brachiura sowerbyi	2,
	Limnodrilus claparedeanus	11
	Limnodrilus hoffmeisteri	7, 9, 10, 11
	Limnodrilus udekemianus	9
	Potamothrix hammoniensis	10
	Tubifex tubifex	7, 9, 10, 11
HIRUDINEA	*Piscicola geometra*	2
GASTROPODA	*Planorbarius* sp.	7, 10
	Viviparus sp.	10
	Planorbarius carenatus	10
OSTRACODA		1, 2, 3, 4, 5, 6, 7, 8, 9, 11
EPHEMEROPTERA	*Caenis macrura*	2
	Caenis horaria	3
	Heptogenia flava	3
TRICHOPTERA	*Hydropsiche* sp.	1, 2, 3, 7
HETEROPTERA		2, 4, 10
DIPTERA	*Chironomus plumosus*	1, 2, 3, 6, 7, 9, 11
	Atherix sp.	9
	other dipters	1, 4
COLLEMBOLA		2, 9
HYDRACHNIDIA		2

Discussions

Physical and chemical parameters were recorded at three samples located in the adjacent water pools from the Mureş floodplain. As shown in table 1, water temperature recorded normal values for autumn. pH recorded neuter values, ranging from 7 to 8. At site 9 (the dead arm of the river Mureş), dissolved oxygen recorded 0%, indicating conditions of anoxia. At this particular site conductivity and total dissolved salts (TDS) recorded also higher values compared to the other two stations. These particular conditions can be withstood only by tolerant species, with broad ecological limits.

The lower reaches of a river course shelter population with preferences for lentic but also lotic ecosystems (Allan 1995). Planktonic communities are well defined, and their importance in river economy is far greater compared to upper and middle reaches of the river. Benthic communities include mostly collector and filtrating species.

In all aquatic ecosystems, zooplanktonic organisms represent the main consumers of animal and vegetal detritus, transforming the dead organic matter for the

superior trophic level, leading to shorter food chains and fastening the matter flow in ecosystems (Pricope 1999).

Five species of cladocerans and two species of cyclopoid copepods (table 2) were identified in the sampling sites located on the lower Mureş River. Two cladoceran species prefer the regions located near the muddy bottom of the water basin: *Disparalona rostrata* (fig. 2) and *Ilyocryptus agilis. Ceriodaphnia reticulata* represents a true plankton species, and *Pleuroxus aduncus* is usually found in water pools located in the lower reaches of river floodplains. Ephippial eggs were also found in all sampling sites.

The two cyclopoid species of copepods - *Mesocyclops crassus* and *Microcyclops varicans* (fig. 3)- were identified not only on the main river course, but also in the adjacent water pools from the river floodplain (see table 2). Harpacticoid copepods, as well as nauplii and copepodites (larval and juvenile stages) were also found in the samples collected from the eleven sites.

Three Rotifera genera were also identified in the considered samples (*Keratella, Asplanchna* and *Polyarthra*).

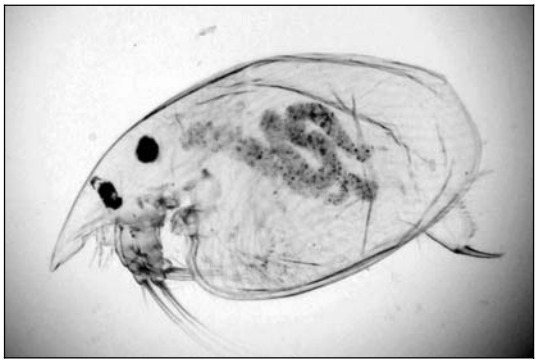

Fig. 2 The cladoceran *Disparalona rostrata* (parthenogenetic female) identified on the lower Mureş course

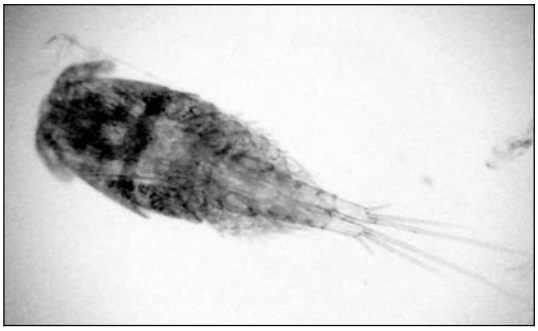

Fig. 3 The cyclopoid copepod *Microcyclops varicans* (male)

Benthic macroinvertebrates were collected at all sampling sites, no matter the nature of the substratum or the hydrological regime (see table 3). A total number of 7 taxonomical groups were identified: dipters, nematodes, oligochaetes, gastropods, may flies, caddis flies and leaches. Oligochaetes were represented by 9 species, 7 of them belonging to Family Tubificidae. Three species of May flies (Ephemeroptera) (fig. 4) and one of caddis flies (Trichoptera) were also identified. At stations 4 and 6 only dipter species (fig. 5) were found.

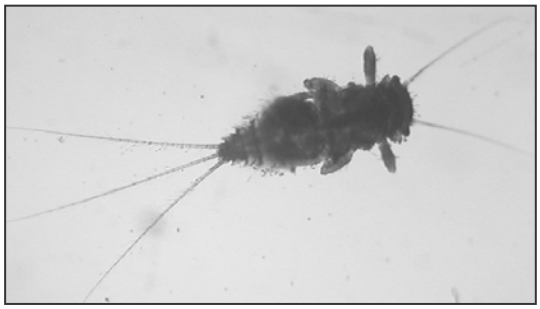

Fig. 4 May fly larva (Ephemeroptera) found at site 3 located on the main Mureş River course

Fig. 4 Dipter larva collected from the qualitative benthos samples of the lower Mureş River

As expected, zooplanktonic communities were poorly represented on the main river course, but their taxonomical diversity increased in lotic ecosystems located in the river floodplain. The diversity of benthic communities from the main Mureş course and from the adjacent water pools is low, but characteristic to a lower river course.

Further quantitative studies should be carried out in the study area to get a more complete and accurate picture of zooplankton and zoobenthos communities inhabiting the lower Mureş river reach.

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