



## DISTRIBUTION OF MACROZOOBENTOS IN THE TRIBUTARIES OF RIVER IBAR IN THE NORTHERN PART OF KOSOVO AND METOHIJA

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### Key words:

distribution,  
diversity,  
macrozoobenthos,  
river Ibar

### Ključne reci:

distribucija,  
diverzitet,  
makrozoobentos,  
reka Ibar

### SYNOPSIS

During 2006/2007 the research of the bottom macro fauna in tributary rivers of Ibar river was conducted. The diversity of invertebrate fauna was presented with 19 groups and 61 taxa. The highest diversity of the taxa came from the group of Diptera-19, then Trichoptera-11, Ephemeroptera-10, Odonata and Coleoptera 5, gastropoda -4, Crustacea-3, Plecoptera-2 and Hirudinea with 2 taxa. The biggest number of the taxa was found in Josanicka river -43, then in Socanicka river 26 and Leposavska river with 19 taxa. On the researched sites of river Ibar before and after the mouth 10 taxa were found. The group of Crustacea was dominant with the abundance in all sampling sites with 60-80% with *Gammarus balcanicus* species, as well as group of Ephemeroptera with *Ephemera danica* and *Ecdyonurus venosus* species.

### DISTRIBUCIJA MAKROZOOBENTOSA U PRITOKAMA REKE IBAR U SEVERNOM DELU KOSOVA I METOHIJE

### SINOPSIS

U period 2006/2007 godine izvedena su istraživanja distribucije makrofaune dna u pritokama reke Ibar. Diverzitet makrofaune invertebrate je bio predstavljen sa 9 grupa i 61 taksonom. Najveći diverzitet taksona je imala grupa Diptera- 19, slede Trichoptera- 11, Ephemeroptera-10, Odonata i Coleoptera po 5, Gastropoda -4, Crustacea -3, Plecoptera -2 i Hirudinea -2. Najveći broj taksona je utvrđen u Josanickoj reci 43, sledi Socanska reka sa 26 i Leposavska sa 19 taksona. Na lokalitetima reke Ibar pre i posle uliva je utvrđeno prisustvo 10 taksona. Na svim ispitivanim lokalitetima abundantnoscu je dominantna grupa Crustacea od 60-80 % sa vrstom *Gammarus balcanicus* kao i grupa Ephemeroptera sa vrstama *Ephemera danica* i *Ecdyonurus venosus*.

## INTRODUCTION

The region of Kosovo and Metohija is characterized by a rich hydrographic network of diverse aquatic ecosystems. The biological research of these ecosystems began in early 1930s (Karaman 1931). In the later period there were numerous published papers by various authors, presenting the results of analyses of aquatic ecosystems of this region from the faunistic, floristic, biocenological and biogeographical, saprobiological aspect (Šapkar ev (1975), Filipovi ć (1975), Karaman, M.(1967), Šukriu (1976): Dauti (1977), Marinkovi ć – Gospodneti ć, M. (1979), Maloseja, Ž., Gecaj, A. (1983) ).

Some of the particularly significant papers are those by Urošević, (1994), Živić (1997,2007), and Randjelović (1997), presenting the results of hydrobiological studies of high-mountain aquatic ecosystems of Kosovo and Metohija.

All these studies indicated that these are specific aquatic ecosystems, and their hydrobiological analysis represents a significant contribution to knowledge of regional limnology.

At the northern part of Kosovo in Ibar Gorge, the right-hand tributaries of River Ibar are Sočanska and Leposavska Rivers coming from the slopes of Mt. Kopaonik, while the left tributary, Jošanička River, comes from the slopes of Mt. Rogozna. The goal of the studies on these mountain rivers was to contribute to protection and conservation of biodiversity of aquatic fauna of flowing waters by studying the distribution and diversity of benthos community of macroinvertebrates.

## MATERIJAL AND METHODS

Studies of zoobenthos were performed at three mountain-type tributaries of River Ibar: Sočanska River (30km) – sites 1, 2 and 3; Leposavska River (20km)– sites 4 and 5; Jošanička River (18km)– sites 6, 7 and 8; as well as at two sites at River Ibar (sites 9 and 10), before and after the confluence of the tributaries (Fig. 1). The studies had included 4 seasonal aspects, starting with the summer of 2006 and finishing in spring of 2007. The representative localities were chosen on the rivers in all parts from the springs to the confluences. Number of processed samples was 40.



Fig. 1a. Area investigated river, Sočanska - I, Leposavska - II and Jošanička III.



Fig. 1b. Area investigated river, Sočanska - I, Leposavska – II and Jošanička III.

Benthos was sampled by using Surber net with catchment surface of 1200 cm<sup>2</sup>. The macroinvertebrates were additionally collected from the rocks by hand (hand-sorting). After the sampling, the organisms were conserved in 4% formaldehyde with several drops of glycerin. The abundance of individuals was represented as number of individuals per square meter.

## RESULTS AND DISCUSION

Benthos fauna of the studied ecosystems is composed of various groups with pronounced space and time dynamics in abundance and number of species. According to the analysis of biocenotic composition, the studied tributaries of River Ibar may from the limnological standpoint be classified as rithron, which includes many similar watercourses of this region as well (Marković, (1995, Miljanović (2001): ). The area of the studied part of Ibar catchment is 536 km<sup>2</sup>. There is a relatively rich

fauna of benthic macroinvertebrates in this small area. Diversity of this fauna was represented with 61 taxa (Tab. 1 ).

**Table 1. Qualitative composition of macrozoobenthos and the average abundance of taxa in samples from studied localities**

River	Sočanska			Leposavska		Jošanička			Ibar	
	1	2	3	4	5	6	7	8	9	10
Taxa	ind/m <sup>2</sup>									
<b>Gastropoda</b>										
<i>Ancylus fluviatilis</i> (O.F. Müller )					4		6	6		2
<i>Radix peregra</i> (O.F. Müller )								8		
<i>Planorbis planorbis</i> (Linnaeus )	2	4					2	2		
<i>Planorbis</i> sp.	16									
<b>Hirudinea</b>										
<i>Erpobdella octoculata</i> (Linnaeus )									2	2
<i>Dina lineata</i> (O.F. Müller )		4		6	6	4	2			
<b>Crustacea</b>										
<i>Gammarus balcanicus</i> Schaferna	54	304	404	302	189	254	164	279	112	133
<i>Gammarus fossarum</i> C.L.Koch	62,5					12	14			
<i>Asellus aquaticus</i> (Linnaeus )						2				
<b>Ephemeroptera</b>										
<i>Ephemera danica</i> Müller	36	33	41	6	16	29	4	12	12	29
<i>Ephemera vulgata</i> Linnaeus				2		2	2			
<i>Baetis scambus</i> Eaton	2					2				
<i>Baetis rhodani</i> (Pictet)	4			4		2				
<i>Baetis fuscatus</i> (Linnaeus)				2					2	
<i>Baetis melanonyx</i> (Pictet)							2		2	
<i>Ecdyonurus venosus</i> (Fabricius)	4	8	3		8	12	8	2		4
<i>Electrogena macedonica</i> (Ikonmov)	8									
<i>Rhithrogena semicolorata</i> (Curtis )							2			

<i>Rhithrogena carpatoalpina</i> Klonowska, Olechowska, Sartori & Weichselbaumer						2			2	
<b>Coleoptera</b>										
<i>Elmis aenea</i> (Müller )	2									
<i>Limnius volckmari</i> (Panzer )	6	6	5			2		2	4	
<i>Stenelmis</i> sp.	2									
<i>Elmis</i> sp.	2	14	22	2				6	7	5
<i>Platambus maculatus</i> (Linnaeus)						2				
<i>Esolus angustatus</i> (Müller)					2					
<b>Diptera</b>										
<i>Hexatoma</i> sp.							2			
<i>Erioptera</i> sp.								2		
<i>Helius</i> sp.								2		
<i>Tabanus</i> sp.					2					
<i>Atherix ibis</i> (Fabricus)					2					
<i>Psychoda</i> sp.			2							
<i>Dicranota</i> sp.	6									
<i>Liponeura</i> sp.				2						
Chironomidae	56	22	56	66	33	16	23	12	4	14
Cylindrostomatidae	2									
Ceratopogonidae								2		
Empididae								2		2
Culicoides sp.							4			
Beria sp.						2				
Syrphidae			2							
Limonidae	2		2			2	6	2		
Limnophila sp.								2		
Limonia sp.							2			
<b>Odonata</b>										
<i>Cordulegaster boltonii</i> (Donovan)			2					4		
<i>Ophiogomphus cecilia</i> (Fourcroy )								2		

<i>Gomphus vulgatissimus</i> (Linnaeus)								2		
<i>Onychogomphus forcipatus</i> (Linnaeus)								2	2	2
<i>Libellula quadrimaculata</i> Linnaeus			2							
<b>Trichoptera</b>										
<i>Helesus radiatus</i> (Curtis)		2		4		2	4		4	2
<i>Helesus</i> sp.				2	10	2			4	
<i>Potamophylax latipennis</i> (Curtis )						8	4	6		
<i>Rhyacophila nubila</i> Zetterstedt							2			
<i>Hydropsyche instabilis</i> (Curtis)				2	2	4	4			
<i>Hydropsyche pellucidula</i> (Curtis)				2					2	
<i>Hydropsyche angustipennis</i> (Curtis )							24			
<i>Sericostoma personatum</i> (Kirby & Spence )	4			2		2		4		
<i>Plectrocnemia conspersa</i> (Curtis )							2			
<i>Athripsodes bilineatus</i> (Linnaeus )		2								
<i>Silo pallipes</i> (Fabricius)								2		
<b>Plecoptera</b>										
<i>Nemoura cinerea</i> (Retzius )	2									
<i>Isoperla grammatica</i> (Poda)							2			

Most taxa belong to the group Insecta (82.25 %), which is a common characteristic of fast-flowing mountain rivulets with sandy-stony bottom (Š u k r i u, 1976 ). Species *Ephemera danica* Müller and *Gammarus balcanicus* Schaferna, with frequency of occurrence of 100% in all samples, represent the euconstant species for the studied watercourses.

The diversity of taxa of macrozoobenthos was the greatest at Jošanička River, followed by Sočanska and Leposavska River, respectively (Fig. 2).

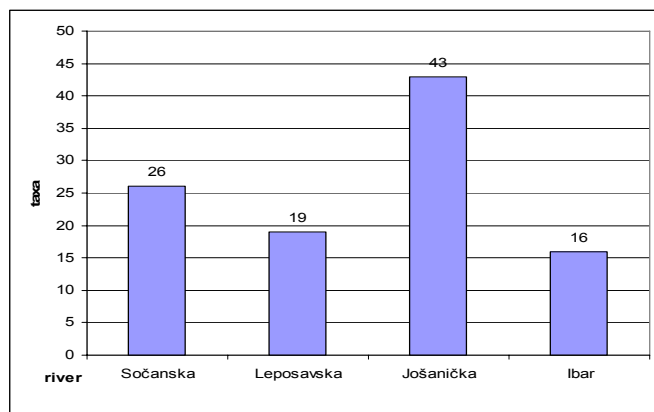


Fig.2. Diversity of species of macrozoobenthos of studied rivers

As the ecological conditions influence the succession of cenotic composition in a watercourse (Griffiths, 1991), the dynamics of changes in composition of macrozoobenthos were also recorded in the studied tributaries of River Ibar. In most of the upstream localities of the studied ecosystems (site 1) the diversity of taxa was greater than at the downstream sites, while at Jošanička River there was no recorded significant seasonal dynamic in species composition along the watercourse (Fig. 3).

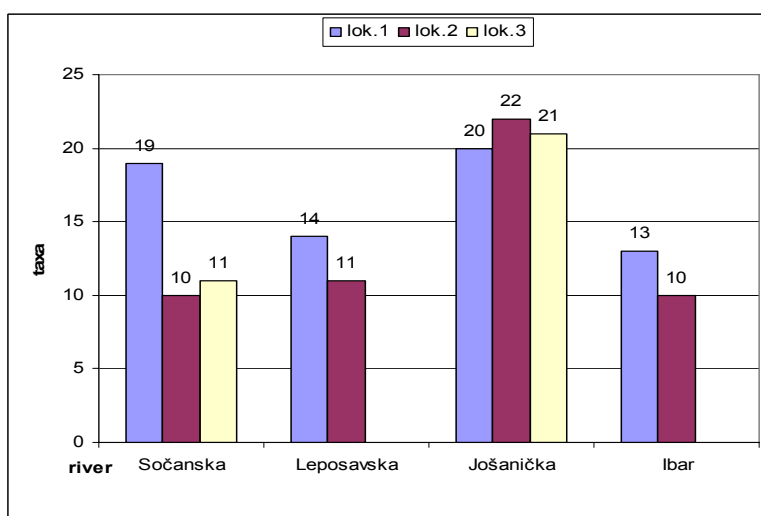


Fig.3. Spatial dynamics of diversity of macrozoobenthos taxa.

The diversity of taxa of recorded groups was variable among the studied rivers. At Sočanska River the greatest diversity was recorded in groups Diptera, Ephemeroptera and Coleoptera. At Leposavska River the greatest diversity was present in groups Ephemeroptera, Diptera and Trichoptera, while at Jošanička River the most diverse were Diptera, Trichoptera and Ephemeroptera (Fig. 4).

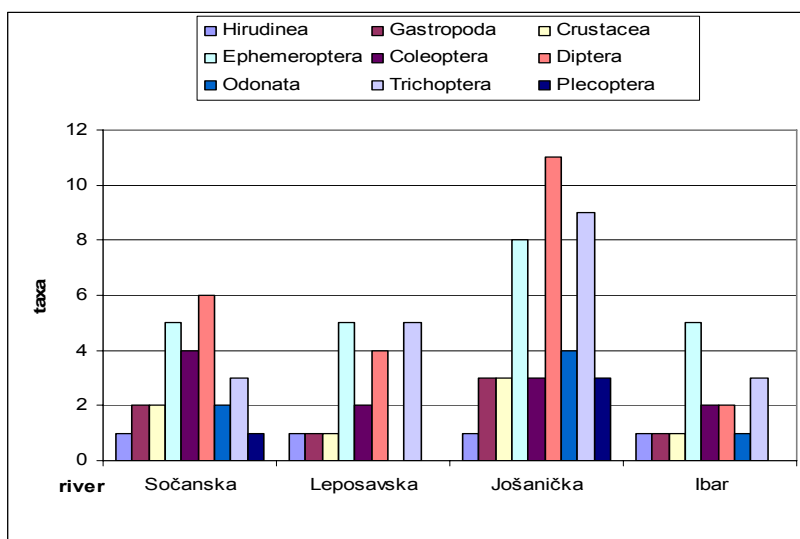


Fig. 4. Diversity of groups of macrozoobenthos.

On average, the greatest number of taxa is present in samples from Jošanička River during the spring period (Fig. 5).

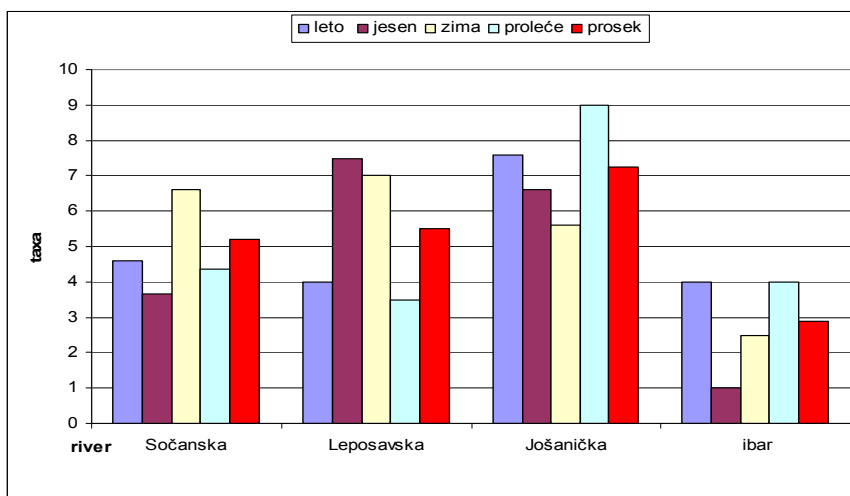


Fig. 5. Seasonal dynamics and the average number of taxa in the studied rivers.

The main carriers of abundance of macrozoobenthos of studied ecosystems were the populations of species *Gammarus balcanicus*, *Ephemera danica* and fam. Chironomidae, comprising 70-80 % of all individuals in the samples from these study sites. The dominance of these taxa is characteristic for watercourses with an abundance of water vegetation (F i l i p o v i ć ,1967).

An increase in abundance of macrozoobenthos species was recorded at the lower (downstream) parts of studied watercourses (Fig. 6).

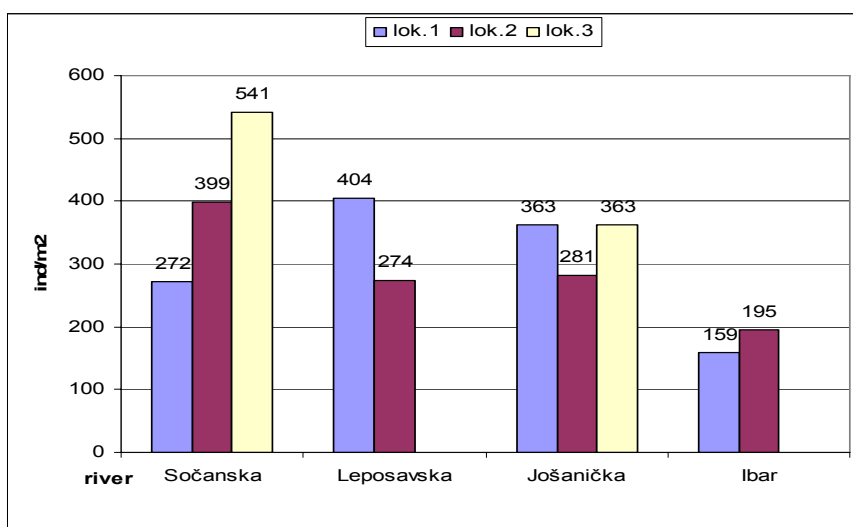


Fig 6. Average abundance of macrozoobenthos in samples from the studied localities.

The seasonal dynamics of macrozoobenthos abundance was recorded at all the watercourses as a consequence of a change in ecological conditions. On average, most individuals were recorded in the samples collected at sites of Jošanička River. There was a pronounced high abundance recorded at the sites of Leposavska River (Fig. 7).

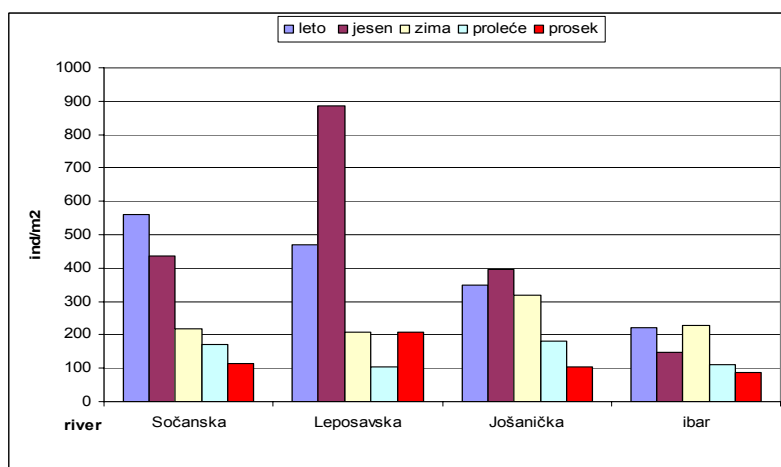


Fig. 7 . Average values of seasonal dynamics of abundance of macrozoobenthos of the studied rivers.

Due to presence of species *G. balcanicus* all the samples of studied rivers were dominated by the group Crustacea. It dominated the total abundance values with 65-75%. The participation of other groups was very small (Fig. 8).

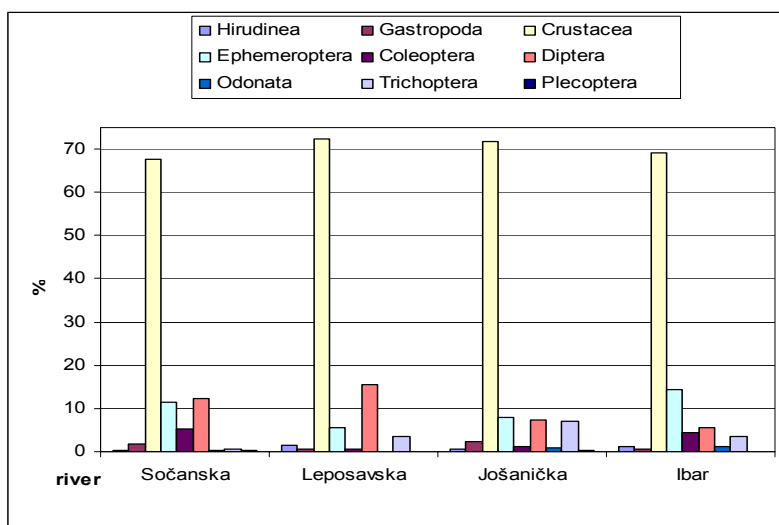


Fig. 8. Participation of various groups in the total abundance of macrozoobenthos.

## CONCLUSION

The studied faunas of benthic macroinvertebrates in the mountain rivers, tributaries of River Ibar, showed a relatively rich diversity represented with 61 taxa. Most species belonged to the group of Insecta – 82.25 %. At Jošanička River the diversity was represented by 43, at Sočanska River by 28 and at Leposavska River by 19 taxa.

The diversity of macrozoobenthos showed a tendency to decrease toward the lower parts of studied rivers. The greatest species diversity was recorded within the groups Diptera, Ephemeroptera, Trichoptera and Coleoptera. The benthic fauna of macroinvertebrates within the watercourse of Leposavska River had the greatest abundance of all the samples, and particularly in the autumn season. In spite of the decrease in number of taxa, the lower parts of watercourses showed an increase in number of individuals of macrozoobenthos. In all the studied samples the greatest abundance was present in species *Gammarus balcanicus* 60-75%, *Ephemera danica* 7-9% and f. *Chironomidae* 11%.

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