

THE EFFECTS OF SIRIU DAM ON THE MAYFLY (EPHEMEROPTERA) AND STONEFLY (PLECOPTERA) COMMUNITIES IN BUZĂU RIVER

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INTRODUCTION

The dam constitutes obstacles for longitudinal exchanges along river systems and as such result in the fragmentation (reduced connectivity) of ecosystems. It not only alters the pattern of downstream flow (intensity, timing and frequency) it also change sediment and nutrient regimes and alter water temperature and chemistry. The dam may be viewed as anthropogenic alterations that disrupt dynamic processes and so impact on the ecological integrity of natural systems. The dam disrupts the river continuum and cause upstream and downstream shifts in abiotic and biotic parameters and processes. They have a significant

impact on transport rates and retention within the river system.

Dam modifications had significant effects on both abiotic and biotic variables, and macroinvertebrate assemblages exhibited significant longitudinal differences. Changes in the density and composition of benthic macroinvertebrate communities downstream of major reservoirs are generally attributed to alterations in the flow regime [3], temperature [3] or the chemical composition of the receiving waters [1].

The Siriu dam is located in the upper course of Buzau river and the main purposes are: drinking and industrial water supply, hydroelectricity, flood control and irrigation (fig.1).



Fig. 1. The Buzău River study area, with location of the four sampling reaches

MATERIALS AND METHODS

To examine the downstream effects of Siriu reservoir on mayflies and stoneflies population we take samples from a station fixed upstream from dam (S1) and one downstream from dam (S2), next to the base of the hydraulic dam.

The quantitative benthic samples were sampled with an Surber sampler with a surface of 900 cm². The benthic macroinvertebrates identification was done till the species level.

RESULTS AND DISCUSSIONS

We have found upstream from dam, 17 macroinvertebrates identified species, from which 6 were efemeroptere and 5 plecoptere (table 1), species which are characteristic to abiotic type of the mountain water course. Also, we have found out that these population had big densities, this meaning that there were no hydromorphological or other kind changes. But, we have identified only organisms from oligochete and chironomide group in sample taken

from downstream (S2), because of the increment of the sediment quantity.

We have taken samples at 1 km away from the dam, from the S3 station situated after the junction of Buzau river with its affluent Cașoca, in order to find out where this dam effect is felt. We saw a remarkable reconstruction of the efemeroptere and plecoptere communion, in taken

samples being 4 efemeroptere species and 3 plecoptere species.

When we compare the taxonomic list from station S1 with that from S3, we can see 2 new efemeroptere species *Baetis rhodani* and *Seratella ignita* in S3 station and all other different plecoptere species *Isoperla grammatica*, *Leuctra inermis* and *Brachyptera risi*.

Table 1. The benthic macroinvertebrates communities structure in the sampling sites

S1 (Upstream Siriu)		S2 (Downstream Siriu)		S3		S4 (Cașoca tributary)	
	Density ind/m ²		Density ind/m ²		Density ind/m ²		Density ind/m ²
Ephemeroptera		Diptera		Ephemeroptera		Ephemeroptera	
Epeorus sylvicola	27	Cryptochironomus sp	50	Baetis rhodani	22	Baetis rhodani	33
Rhithrogena semicolorata	47	Oligochetae		Epeorus sylvicola	38	Epeorus sylvicola	20
Baetis alpinus	77	Nais sp.	10	Rhithrogena semicolorata	11	Rhithrogena semicolorata	24
Baetis melanonyx	60			Seratella ignita	22	Ecdyonurus torrentis	
Ephemerella notata	23			Plecoptera		Seratella ignita	
Ephemerella major	17			Isoperla grammatica	11	Plecoptera	
Plecoptera				Leuctra inermis	27	Amphinemura sp.	9
Perla marginata	40			Brachyptera risi	22	Brachyptera risi	22
Dinocras cephalotes	30			Trichoptera		Perla marginata	13
Protonemura nitida	73			Hydropsiche pellucidula	27	Protonemura meyeri	18
Amphinemura sp	37			Diptera		Coleoptera	
Perlodes microcephala	17			Atherix ibis	7	Hydraena gracilis	7
Trichoptera				Cricotopus tremulus	44	Diptera	
Ecnomus tenellus	11			Tipula maxima	11	Atherix ibis	12
Halesus digitatus	7					Eukiefferiella sp.	22
Hydropsiche pellucidula	27					Simulium sp.	16
Rhyacophila fasciata	9						
Diptera							
Blepharicera fasciata	24						
Cricotopus fuscus	22						

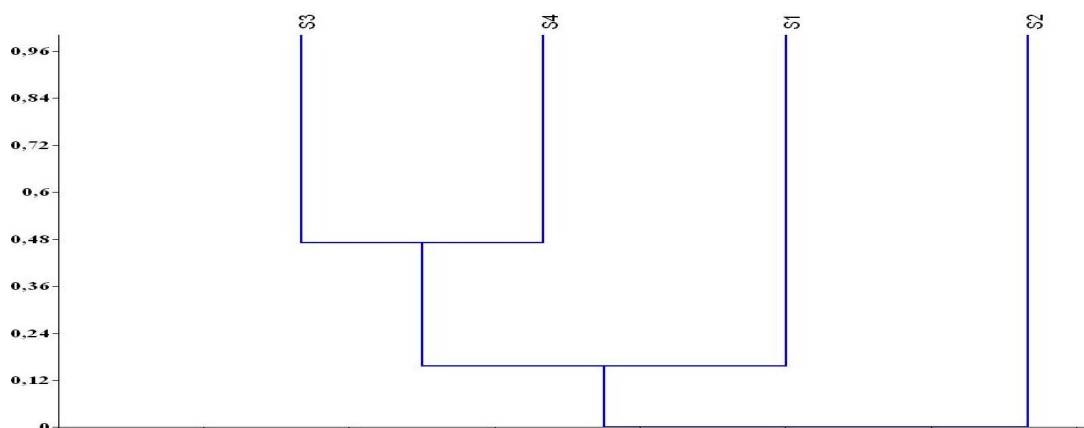


Fig. 2. Dendrogram realised on basis of Jaccard index

The appearance of some new species in sample taken from S3 station is due to the influence of the left affluent of Buzau river, Cașoca, which is situated at 800 m away from Siriu dam. We have taken some samples from Cașoca, at S4 station, upstream from the junction with Buzau river, in order to demonstrate our theory.

The taxonomic list from table 1 confirms the fact that efemeroptera and plecoptera population from S3 station comes from Cașoca communion and it appear in Buzau river because of the drift.

Relationships between that 4 station from which the samples were taken, was analysed with dendrograma on the basis of Jaccard index. The dendrograma was made using the softer PAST-PAleological STatistics, ver. 1.62.

The results are showed in figure 2 where we can see the separation of one group made from S3 and S4 stations at which S1 joins.

Also from this dendrograma made on the basis of equality between the population of those 4 stations, we can see the impact that Siriu dam has on the macroinvertebrates communion and implicitly on the efemeroptera and plecoptera population in S2 station situated immediately after dam.

CONCLUSIONS

Tributaries are expected as a major source of recovery in river system but that is still ambiguous [2].

Therefore, macroinvertebrate assemblages at four sites (upstream of dam, downstream of the dam, downstream of the confluence with Cașoca river, and Cașoca tributary) were sampled to confirm the impact of long-term impoundment and the role of a major tributary (Cașoca River) in mayfly and stonefly community.

ABSTRACT

It has been studied the impact of Siriu reservoir on mayfly (Ephemeroptera) and stonefly (Plecoptera) populations. Siriu reservoir is located on upper course of Buzău River and the four sampling sites are situated upstream and downstream this reservoir. There were some important changes generally for macroinvertebrates population structure and specially for mayfly and stonefly populations due to transverse dam on water course. When studying the macroinvertebrates located at 1 km distance from the dam, it has been noted that mayfly and stonefly populations have been restored, due to Cașoca left tributary of Buzau river.

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