

THE TROPHICAL SPECTRUM AND ROLE OF THE MAYFLIES (EPHEMEROPTERA) AND STONEFLIES (PLECOPTERA) IN TROPHICAL STRUCTURE OF MACROINVERTEBRATES COMMUNITIES OF BUZĂU RIVER

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Key word: feeding functional groupe, mayflies, stoneflies, trophical spectrum

INTRODUCTION

Macroinvertebrates play an important role in material and energy transfer in aquatic ecosystem, being dominant in trophic structure of water flow. Food sources, especially in lotic ecosystem, are distributed not uniform so as their location for feeding determined a series of morphological and behaviour adaptation. The approach of the macroinvertebrate feeding behaviour from a functional perspective permitted the understanding of the energetic flow dynamic from the aquatic ecosystem (Vannote *et al.*, 1980). Macroinvertebrates give to the aquatic ecosystem many services as nutrients cycle and sediments aeration in this process of energy transfer maintaining.

It was made a macroinvertebrates classification in accordance with the feeding mechanism and functional and morphological adaptation in four feeding functional groups (Cummins and Klug, 1979): shredder, scraper, collector and predator. Shredders eat especially the periphyton fixed on the bottom, scraper eat vegetal and wooden parts (diameter >1 mm), collector eat fine organic particles, having specialized anatomic structures, predators can consume the whole prey or just their body containing.

Mayflies and stoneflies have an important role in trophic structure of the macroinvertebrates community. From the trophic level point of view, both groups have detritivores- herbivores species and stoneflies have also carnivorous.

MATERIALS AND METHODS

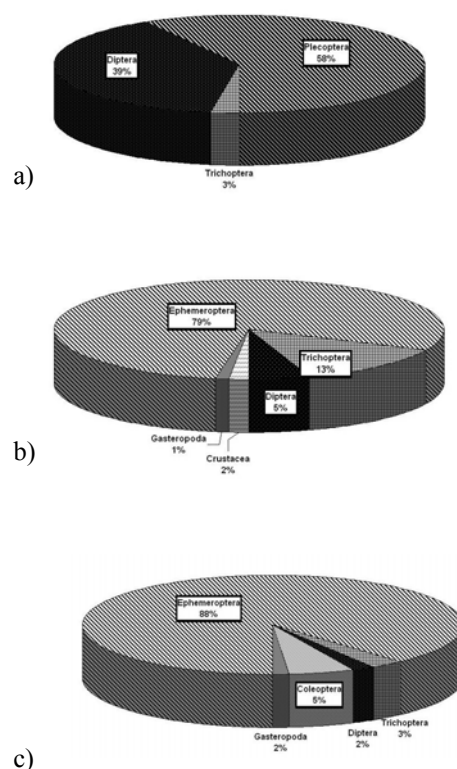
The trophical spectrum and role of the mayflies (Ephemeroptera) and stoneflies (Plecoptera) in trophical structure of macroinvertebrates communities of Buzău river was established through seasonal samples in 2006 from six monitoring site: Vama Buzăului, Nehoiu, Măgura, Amonte Municipiu Buzău, Banița and Racovița.

The quantitative benthic samples were sampled with an Surber sampler with a surface of

900cm². The benthic macroinvertebrates identification was done till the species level. The functional feeding group was analyzed and was established the percentage composition of each group. Also the intestines of 6 species were dissected and the food items found were separated.

RESULTS AND DISCUSSIONS

It can be observed that, in macroinvertebrates samples taken from Buzău river, mayflies are dominant in collectors and shredders group and stoneflies are dominant in predators and scrapers group. (fig.1)



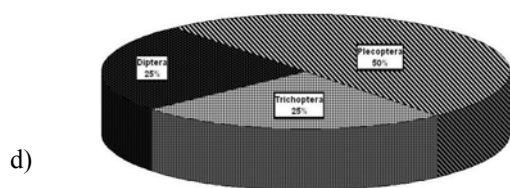


Fig.1. The procentual abundance of:
a) shredders; b) collectors; c) scrapers; d) predator

Species from Baetidae family have an important role in collectors group of mayflies, because they have the biggest density, being present in all the sampling points. Species from Baetidae family have registered a density of 76 % from the total number of the collectors, Ephemerellidae species 12 %, Caenidae species 10%, Oligoneuriidae and Leptophlebiidae species 2 % (fig. 2).

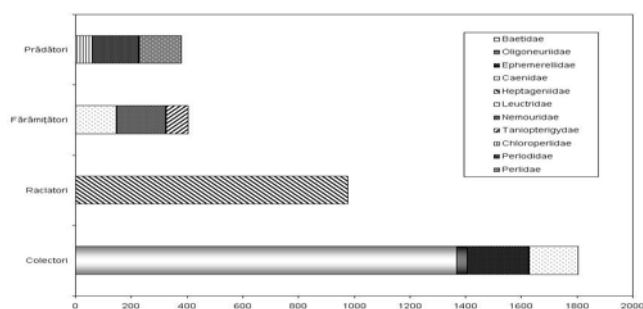


Fig.2. The percentage composition of each family of mayflies and stoneflies

Shredders mayflies are represented by Heptageniidae family, dominant being *Rhithrogena semicolorata* and *Ecdyonurus torrensii* species. Scrapers stoneflies group is dominant by the Leuctridae species 36% and Nemouridae species 44% and predators are represented by 3 family (Perlidae species with a abundance of 40 %, chloroperlidae species with a abundance of 44% and chloroperlidae species 16%).

The diet of mayflies and stoneflies varies in accordance with available food, so that, in speciality literature there are very different opinion concerning with a strict framing of one species in any of those four trophic functional groups only after the morphology of the bucal pieces. So, they can change the feed mode in accordance with different stage of their life cycle or with available food (Mihuc, 1997).

That's why, in order to establish the trophic group of the organisms from the samples, it is very important to analyses the intestinal containing of the larvae. The intestinal containing of six species was analysed: 3 mayflies species (*Baetis rhodani*, *Baetis alpinus*, *Rhithrogena semicolorata*) and 3 stoneflies species (*Perla marginata*, *Leuctra inermis*, *Isoperla*

obscura). It was analysed the intestinal containing of 30 individuals for each species.

The intestinal containing was analysed qualitatively, writing the presence of detritus, algae and animal parts (Azzouz & Sanchez- Ortega, 2000).

Baetis vernus – the intestinal containing was dominated by detritus with organic particles but also with mineral particles represented by sand. It was seen that there was diatoms from *Navicula* and *Gomphonema* genus in a low quantity in the intestinal containing of seven individuals.

Baetis alpinus – the analyses of the intestinal containing showed the increasing of ingested algae quantity. There were identified diatoms from *Achnantes*, *Ceratoneis* and *Navicula* genus, although a high percent of detritus is maintained. These algae have been eaten by taking them from the bottom (these being dead) or through consuming the periphyton which is present in high quantity in mountain area, characteristic to this mayfly species.

Rhithrogena semicolorata – the intestinal containing confirms its trophic group, the shredders one. Diatoms algae present in periphyton are dominant: *Gomphonema olivaceum*, *Synedra acus*, *Navicula* sp., *Didymosphenia geminata*, *Coconeis* sp, *Cymbella affinis*. A very interesting fact is the presence in the intestinal containing of *Didymosphenia geminata* species which is an invasive one.

Perla marginata – animal parts were dominant in 80% in intestinal containing of these carnivore stoneflies. Chitinous parts from some chironomide species body, head of some species of *Hydropsyche* and mayflies could be identified.

Isoperla obscura – animal parts from chironomide group and other diptera species were dominant in the intestinal containing.

Leuctra inermis – organic particles represent 75 % from the intestinal containing and a high quality of sand which it seems that has a role in digesting of the organic material.

It was observed that the analysis of the intestinal containing confirmed the framing of those six species in trophic functional group. However, in the case of *Baetis alpinus*, it can be said that the diet with detritus was complicated with algae from periphyton.

CONCLUSIONS

Mayflies are dominant in collectors and shredders group and stoneflies are dominant in predators and scrapers group. The detritus, algae and animal parts were main items in the diet of mayflies and stoneflies from Buzău river.

REZUMAT

The trophical spectrum and role of the mayflies (Ephemeroptera) and stoneflies (Plecoptera) in trophical structure of macroinvertebrates

communities of Buzău river was established through seasonal samples in 2006 from six monitoring site: Vama Buzăului, Nehoiu, Măgura, Amonte Municipiu Buzău, Banița and Racovița. The benthic macroinvertebrates identification was done till the species level. The functional feeding group was analyzed and was established the percentage composition of each group. Also the intestinals of 6 species were dissected and the food items found were separated.

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Tabel 1. The benthic macroinvertebrates communities structure in the samping sites

S1(Upstream Siriu)		S2(Downstream Siriu)		S3		S4(Caşoca tributary)	
	Density ind/m2		Density ind/m2		Density ind/m2		Density ind/m2
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					Eukiefferiela sp.	22
Hydropsiche pellucidula	27					Simulium sp.	16
Rhyacophila fasciata	9						
Diptera							
Blepharicera fasciata	24						
Cricotopus fuscus	22						

