ECOLOGICAL CONSIDERATION ON QUALITATIVE COMPOSITION OF THE BENTHIC FAUNA FROM THE DÂMBOVIȚA RIVER

CONSIDERAȚII ECOLOGICE ASUPRA COMPOZIȚIEI CALITATIVE A FAUNEI BENTALE A RÂULUI DÂMBOVIȚA

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Abstract: *The following paper presents some aspect of qualitative composition of benthic fauna from Dâmbovița River, which was studied during 2004 in seven sites from upstream to downstream on a length of 200 km. A list with main groups and taxa is presented and elements regarding percentual composition in different months of the studied period for the whole basin are done. A comparative analyze of alpha diversity variation upstream and downstream of Nucet for entire period is revealed.*

Rezumat: *Lucrarea prezintă câteva aspecte privind compoziția calitativă a faunei bentale a râului Dâmbovița, care a fost studiată în anul 2004, de-a lungul a şapte stații, din amonte până în aval, pe o lungime de 200 de km. Se prezintă o listă cu principalele grupe şi taxoni prelevați şi elemente privind compoziția procentuală a acestora, în diferitele luni ale perioadei studiate, pentru întregul bazin. În lucrare se face şi o analiză comparativă a variației diversității alpha în stațiile din amonte, şi respectiv, din aval de Nucet, în cele patru sezoane din anul 2004.*

Key words**:** *Dâmbovița River, fresh water, benthic fauna, invertebrates*
Cuvinte cheie: *Râul Dâmbovița, apă dulce, faună bentală, nevertebrate*

INTRODUCTION

Dâmbovița River is the most important affluent of Argeș River both as flow and hydrograph point of view, with a hydrographical basin area of 2830 km². Having a total length of 266 km (ALEXANDRESCU et al., 1975), Dâmbovița is situated in the eastern part of Meridional Carpathians, in Făgăraș Mountains. From its source to the confluence with Argeș, the river crosses through an amazing relief shapes; upstream is characterized by various types of rocks and crystalline schists and cross secular forests of coniferous and deciduous trees. The hill zone and downstream on plane is a mixture of landscapes and natural resources which have done along the centuries that many human villages and towns to be built on its banks.

Dâmbovița constitute one of the main fresh water sources for Bucharest and other towns, too. For this reason, many studies and researches were developed along its course, during decades.

The present study is a part of a larger one, which intended to obtain more recent data of the benthic communities, which are living in different zone along the river, from the source to the flow.

Many fresh water invertebrates have essential roles in ecosystem transfer of substance and energy; some species are well known as water quality bioindicators, other interfere in biogeochemical cycles or in self – adjustment of the system (RÂȘNOVEANU & VĂDINEANU, 2000).

This paper will present main encountered invertebrates species and their proportion in different sites along the river.

MATERIAL AND METHOD

Sampling was performed during 2004, in May (vernal season), July (aestival season), September (serotinal season) and December (hiemal season) from 7 sites along the river, at Podul Dâmboviței, upstrem of Rucăr, downstream of Rucăr, Nucet and in Bucharest at Ciurel (Lacul Morii), Grozăveşti and Hidrologycal point Sere. The quantitative samples were taken from hard substratum with a scarper (natural rocks or concrete support were the river is made – up, from an area of 20 cm²), and from mobile/ sedimentary substratum, using a corer tube with known volume.

The samples have been preserved, in 4 % formaldehyde solution and transported in plastic bags. In laboratory they have been washed and sieved with a series of sieves of 1 mm, 0.315 mm, 0.250 mm, and 0.1 mm mesh diameter. Invertebrate fauna was removed under Nikon stereomicroscope. Taxonomic identification have been done for large phylogenetic groups and counted - for some genera and species was made specific determination (CHIRIAC & UDRESCU, 1985; GODEANU, 2002; BOTOŞĂNEANU, 1963; PAPADOPOL, 1980; CROFT, 1986; BĂCESCU & CODREANU, 1951).

In order to know the composition and evaluation of benthic communities from the studied zones of the river, a systematic qualitative and quantitative evaluation has been done, making also original fauna photos and determination for some ecological indices like density, frequency, and rank (MOHAN & ARDELEAN, 1993, GOMOIU & SKOLKA, 2001, GODEANU & PARASCHIV, 2005).

RESULTS AND DISCUSSION

After samples analyzing, there were counted invertebrates species belonging to 14 major groups (Table 1). The qualitative spectrum has a great diversity, many invertebrates groups being encountered in all studied sites (as Nematoda, Oligochaeta, or Chironomida), or only in mountain sector (Insecta larvae of Ephemeroptera and Plecoptera) and a third category taken only from downstream sector (as Heteroptera, Simuliidae and some species of Gasteropoda and Bivalvia).

In aquatic benthic biocoenosis one of the most conclusive components of ecological diversity is represented by species number or richness of that particular ecosystem. A comparative analyze of α – diversity in stations situated upstream and downstream of Nucet (fig.1 and 2) shows that the number of taxa if high in mountain zone, suffer an unexpected decrease at Nucet, and after that records a small increase at Ciurel and Grozăveşti; in the last site the number of species is less again. The values recorded at Nucet reveal that benthic biocoenosis was profound affected by local environmental conditions influenced by a bridge construction site in this location, during all period of the study.

Qualitative composition presents seasonal variations, too.

In May (fig. 3) most encountered species were Diptera larvae (58 %), particularly in downstream zone of the river; Oligochaeta have a significant value of 28 %, Nematoda records 5 % and the other groups are very low represented.

For July the proportion between main taxa is very similar (fig.4), with difference that Plecoptera (9 %) and Ephemeroptera (8 %) larvae record an increasing percent.

Table

Main invertebrates benthic taxa founded in Dâmbovița River samples

Taxonomic groups	Taxa/ Genera/ Species
1. Cnidaria	*Hydra sp.*
2. Nematoda	Nematoda
3. Turbellaria	*Dugesia gonocephala*
	Dugesia tigrina
4. Oligochaeta	Oligochaeta varia
	Stylaria lacustris
5. Gasteropoda	*Ancylus sp.*
	Lymnaea stagnalis
	Planorbis sp.
	Radix peregra
	Radix ovata
6. Bivalvia	*Dreissena polymorpha*
7. Hydracarina	Hydracarina varia
8. Copepoda	Harpacticoida
9. Amphipoda	*Rivulogammarus sp.*
10. Ephemeroptera	*Baëtis sp.*
	Ecdyonurus sp.
	Epeorus sp.
	Ephemera sp.
	Ephemerella sp.
	Heptagenia sp.
	Rhithrogena sp.
	Siphlonurus sp.
11. Plecoptera	*Isoperla sp.*
	Isopeteryx
	Leuctra sp.
	Protonemura sp.
	Perlodes sp.
	Siphonoperla sp.
12.Trichoptera	*Anabolia sp.*
	Ecnomus sp.
	Hydropsyche angustipennis
	Limnephilus centralis
	Neuronia sp.
	Phryganopsyche sp.
	Polycentropus sp.
	Rhyacophila sp.
	Sericostoma sp.
13. Heteroptera	Naucoridae
14.Diptera	Simuliidae
	Chironomidae
	Corynoneurinae
	Culicidae

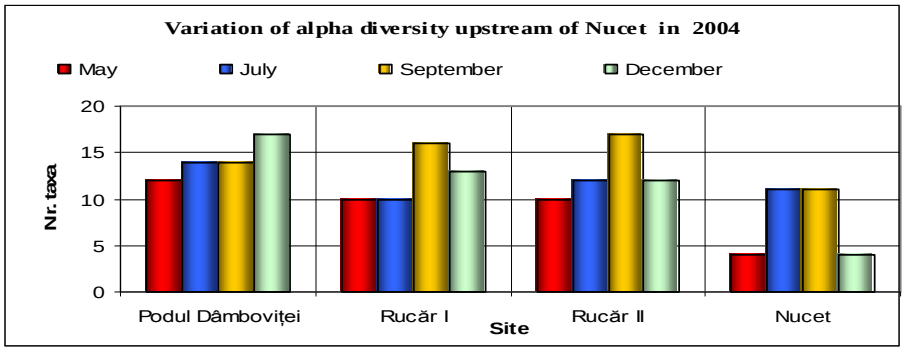

Figure 1. Variation of alpha diversity upstream of Nucet

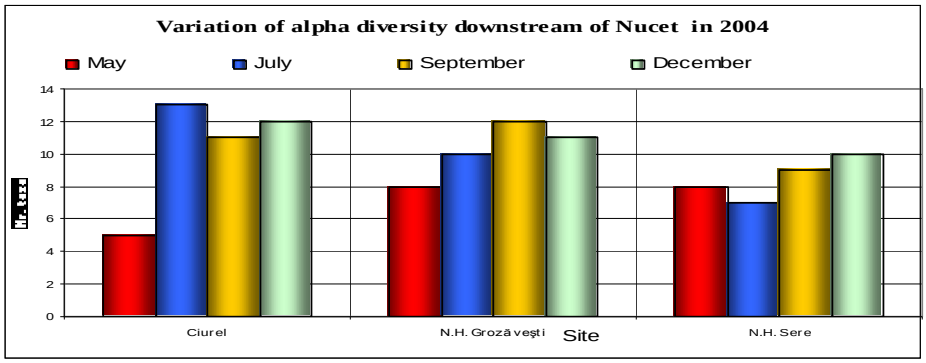

Figure 2. Variation of alpha diversity downstream of Nucet

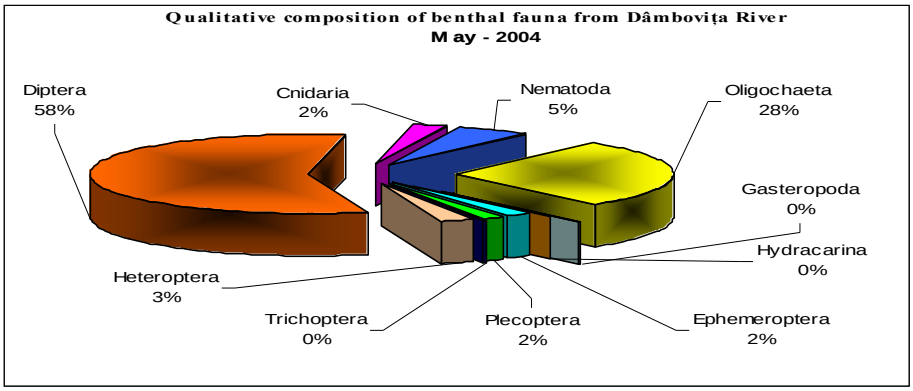

Figure 3. Qualitative composition of benthic fauna from Dâmbovița River in May 2004

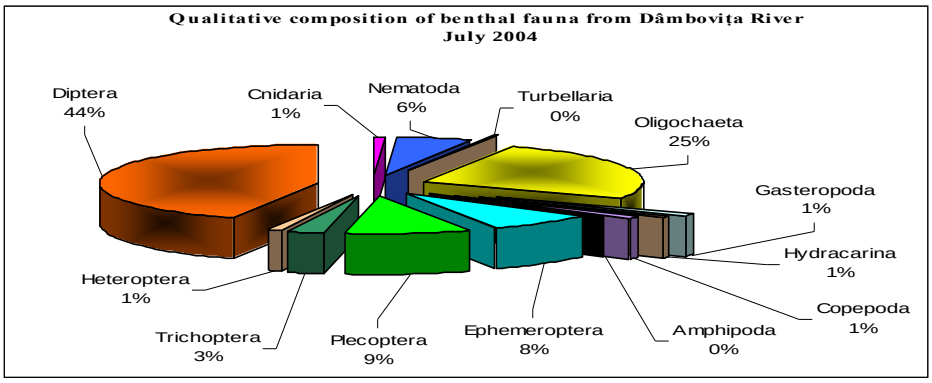

Figure 4. Qualitative composition of benthic fauna from Dâmbovița River in July 2004

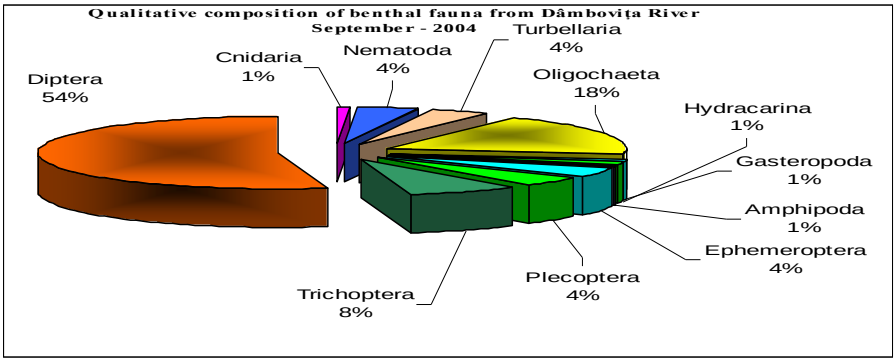

Figure 5. Qualitative composition of benthic fauna from Dâmbovița River in September 2004

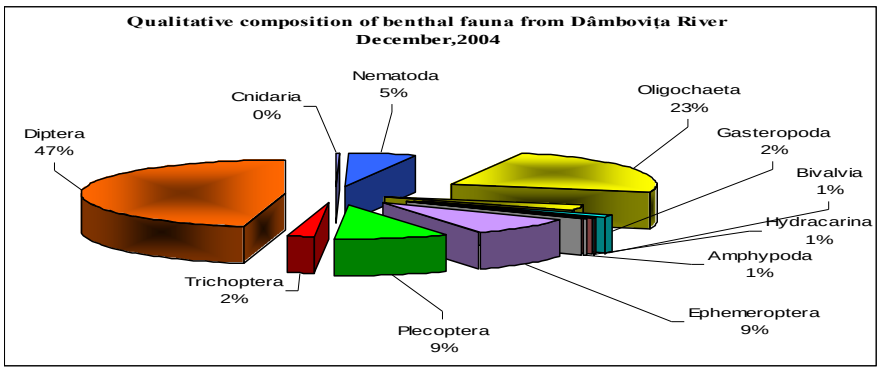

Figure 6. Qualitative composition of benthic fauna from Dâmbovița River in December 2004

In autumn and winter the share between benthic invertebrates along Dâmbovița River maintains the same image as whole, Diptera as eudominant group being almost (fig. 6) or more (fig. 5) than a half. It can be considered that Nematoda have a certain constancy in different seasons in all studied zone, as one of the main meiofauna component of the river. In September it is recorded a significant increasing of Trichoptera larvae percent (fig. 5) and in December of Plecoptera larvae (fig. 6), because of developing of new individuals of these species during the summer time. It is evident a percent increase in autumn and winter for Turbellaria, Copepoda, Amphipoda and Hydracarina, too.

CONCLUSIONS

A general view of qualitative composition of benthic fauna from Dâmbovița River points out that:

- Specific diversity records significant seasonal variations, both in upstream and in downstream of the river;
- Insecta larvae dominate along the river followed by Oligochaeta and Nematoda;
- Some other taxonomic groups are representing, but their percent values are very low;
- Ephemeroptera, Trichoptera and Plecoptera orders populates by their larvae stages especially benthic biocoenosis from mountain sector were the oxygen amount and food resources are suitable for their developing;
- Benthic communities are varying along the river depending on substrata and on local environmental conditions.

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