

PRELIMINARY ASPECTS CONCERNING MACROINVERTEBRATES QUALITATIVE STRUCTURE IN THE DANUBE RIVER

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Abstract

The authors present the qualitative structure of macroinvertebrates recorded in the Danube River sector of Calărași and Brăila (km 375- km 175). On the basis of samples collected in the vegetative season of the 2011, in seven critical points (PC01- area Bala end sandbank Carageorghie, PC02- area Island Epurașu, PC03- upstream and downstream Șeica, PC04- Islands Ceacăru and Fermecatu, PC07- Island Fasolele, PC09- area Varsăturii, PC10- channel Caleia (Ostrovul Lupu) were highlighted seven taxonomic groups namely: Oligochaeta, Gastropods, Bivalves, Ostracods, Amphipoda, Odonata, Diptera.

They were identified in total 16 species of macroinvertebrates. Macroinvertebrates are present in all plants analyzed are represented in most of the gastropods (13.79-82.69%).

Key words: macroinvertebrates, species, qualitative structure

INTRODUCTION

The watershed of the Danube is the second largest river basin in Europe, with a size of about 800,000 km². The basin extends over 17 countries. Total length of the river is 2,857 km [7].

Romanian Danube has a length of 1075 km, which represents 38% of the total length, enters our country in the Bazias town (km 1075) and “loses name and waters” into the Black Sea in the Sulina town (km 0).

The sector is directly influenced by urban waste waters from numerous settlements within the stretch, as well as by the Cernavodă Power Plant.

These organisms inhabit of river, lake, and reservoir bottoms, and their distribution is directly related to food availability and quantity, sediment type (organic, sandy, clay), substrate (rock, wood, aquatic macrophytes), and water quality (temperature, oxygen, and dissolved substances) [2].

This study aims to determination the macroinvertebrate composition in the Danube river (the sector Brăila km 175 and Calărași km 375).

MATERIAL AND METHODS

The present study was performed June 2011 during vegetative season.

Samples of macroinvertebrates were collected in six critical points on the sector from km 375 to km 175 (table 1). Biological sampling was conducted within the project “Monitoring the environmental impact of works to improve the conditions for navigation on the Danube between Calărași and Brăila, km 375 - km 175” (beneficiary AFDJ Galați).

Table 1 Sampling stations

Critical points	Section	Km
PC01	area Bala end sandbank Carageorghie	km 347 - km 343
PC02	area Island Epurașu	km 342+700 - km 341+800
PC03A and PC03B	upstream and downstream Șeica (Mirleanu)	km 329 - km 325
PC04A and PC04B	Islands Ceacăru end Fermecatu	km 324 - km 322
PC07	Island Fasolele	km 291
PC10	channel Caleia (Ostrovul Lupu)	km 197 - km 195

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The manuscript was received: 09.09.2015

Accepted for publication: 15.12.2015

The samples were preserved with 4% formaldehyde. Sorting and identification were carried out using a binocular magnifier (5-50x) and a stereomicroscope (10x10 and 10x40).

The determination of main taxonomic groups was made after Godeanu, 2002 [5], Botnariuc, 1999 [1], Descarpentries, 1973 [4], Chiriac, 1965 [3] and Thierry Demol, 2000 [8].

RESULTS AND DISCUSSION

After sorting of benthos samples and identifying organisms to species level achieved a qualitative general overview of zoobenthos composition of the Danube between Calărași and Brăila (km 375- km 175).

The qualitative processing of samples in 11 to 16 June 2011 of the 6 critical points (PC01, PC02, PC03, PC04, PC07, PC 10), were highlighted seven taxonomic groups namely: Oligocheta, Gastropoda, Bivalvia, Ostracoda, Amphipoda, Odonata, Diptera.

They identified a total of 16 species of macroinvertebrates (table 2). Was found one

species of oligocheta, *Tubifex tubifex*, which was identified in 5 critical points (PC01, PC02, PC04, PC07, PC10). Gastropoda was represented by eight species of which *Lithoglyphus naticoides* (figure 1) was present in all the stations studied. Of the bivalve, *Dreissena polymorpha* (figure 2) has been found in almost all the stations studied, less in PC04. Freshwater mussels may form beds on rocks or snags in the shallow water near the shore [6]. Besides crustacean species (*Gammarus* sp.) were found three species from Insecta class (two species from Odonata - *Libellula depressa*, *Libellula quadrimaculata* and one species from Diptera - *Chironomus plumosus*, figure 3).

Gammaridae were found in samples taken near the shore, these organisms preferring slower water. The presence of oligochaetes and especially chironomidae in the samples indicates the existence of a larger quantity of organic substance.

Table 2 List of macroinvertebrate species identified on the Danube between Calărași and Brăila (km 375- km 175)

Taxons	PC 01				PC 02			PC 03		PC 04		PC 07		PC 10		
	01-1	01-2	01-3	01-4	02-3	02-4	02-5	03 A	03 B	04 A	04 B	07-1	07-2	10-1	10-2	10-3
Phylum ANELIDA																
Subphylum Chaetopode																
Class Oligocheta																
<i>Tubifex tubifex</i>	+	-	-	-	-	+	-	-	-	+	+	-	+	+	-	+
Phylum MOLUSCA																
Class Gasteropoda																
Order Branchiata																
Family Bithynidae																
<i>Bithynia tentaculata</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Family Valvatidae																
<i>Valvata piscinalis</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-
Family Viviparidae																
<i>Viviparus acerosus</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Subclass Prosobranchia																
Family Lithoglyphidae																
<i>Lithoglyphus naticoides</i>	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	-
Family Neritidae																
<i>Theodoxus fluviatilis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Theodoxus danubialis</i>	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Theodoxus transversalis</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Family Thiaridae																
<i>Esperiana acicularis</i>	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Esperiana esperi</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Class Bivalvia																
Subclass Eulamelibranhiata																
Family Dreissenidae																
<i>Dreissena polymorpha</i>	+	+	+	+	-	+	+	+	+	-	-	-	+	-	-	+
Family Cyrenidae																
<i>Corbicula</i> sp.	-	+	+	-	-	-	-	+	-	-	-	-	+	-	-	-

Phylum ARTHROPODA																
Class Crustacea																
Order Ostracoda																
<i>Ostracode</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+
Order Amphipoda																
<i>Gammarus sp.</i>	-	-	+	-	-	+	-	-	-	+	+	-	+	-	-	-
Class Insecta																
Order Odonata																
<i>Libellula depressa</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>Libellula quadrimaculata</i>	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Order Diptera																
<i>Chironomus plumosus</i>	+	+	-	-	-	-	-	-	-	+	+	-	+	-	+	-

Legend:

+ = present form

- = absent form



Fig. 1 *Lithoglyphus naticoides* (original photo)



Fig. 2 *Dreissena polymorpha* (original photo)



Fig. 3 *Chironomus plumosus* (original photo)

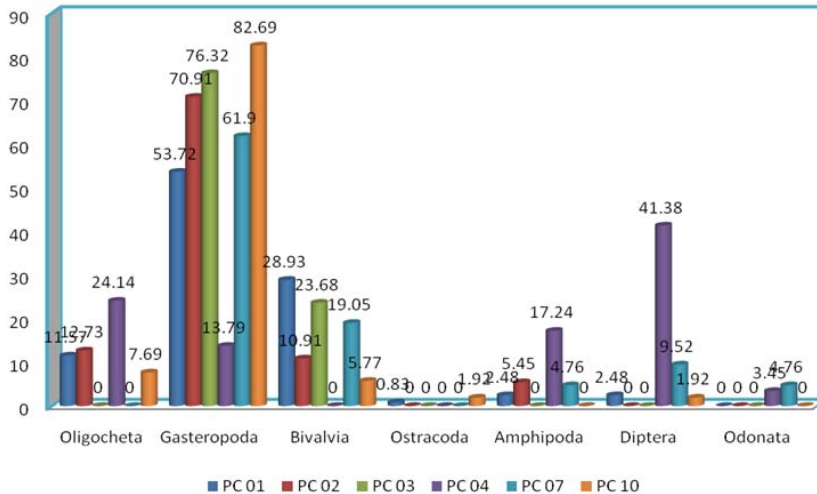


Fig. 4 Taxonomic distribution (%) in the critical studied points

The dominant group was represented by Gasteropoda (13.79-82.69%), followed by Diptera (0-41.38%) (figure 4).

CONCLUSIONS

They revealed seven taxonomic groups of macroinvertebrates namely: Oligocheta, Gastropoda, Bivalvia, Ostracoda, Amphipoda, Odonata, Diptera.

Macroinvertebrates are represented by a total of 16 species in biological samples taken on the Danube between Calărași and Brăila (km 375- km 175).

We observed the macroinvertebrate fauna typical of large lowland rivers, with domination of molluscs.

Clasa Gasteropoda was best represented as a number of species, followed by Clasa Insecta.

From the species of macroinvertebrates found after analyzing qualitative structure it was found that the stable benthic species are: *Lithoglyphus naticoides* and *Dreissena polymorpha* (being filter-species, helps to clarifying the water).

REFERENCES

[1] Botnariuc N., Cure Victoria, 1999: Identification manual of Chironomidae larvae (Diptera) fauna of Romania, Ed. Romanian Academy, Bucharest

[2] Callisto M., 2000: Macroinvertebrados bentónicos. In: R.L. Bozelli, F.A. Esteves & F. Roland (ed.), Impacto e recuperação de um ecossistema amazônico, Ed. UFRJ, Rio de Janeiro, pp. 141-151

[3] Chiriac E., Udrescu M., 1965: The naturalist guide in the freshwater world, Ed. Scientific Bucharest

[4] Descarpentries A., Villiers A., 1973: Petits animaux des eaux douces, Ed. Politikens Forlag, Copenhaga

[5] Godeanu S. P., 2002: The diversity of the living world – Illustrated identification manual of flora and fauna Romania, vol. II – Continental waters – Part one, Ed. Bucura Momd, Bucharest

[6] Mekong River Commission, 2006: Identification of Freshwater Invertebrates of the Mekong River and its Tributaries, Chapter 10 Freshwater Mollusca, Publisher, Mekong River Commission

[7] Paunović M., Simić V., Dunja Jakovčević-Todorović and Bojana Stojanović, 2005: Results of investigating the macroinvertebrate community of the Danube river on the sector upstream from the iron gate (km 1083-1071), Arch. Biol. Sci., Belgrade, 57 (1), 57-63

[8] Thierry Demol, 1999-2000: Identification des moules non marines de Belgique, Document utilisé dans le cadre du Life-Nature B8590 «Conservation des habitats de la moule perlière en Belgique »