

THE RAPPORT BETWEEN THE STRUCTURES OF GASTROPODS POPULATIONS AND THE TYPES OF CONTINENTAL AQUATIC ECOSYSTEMS

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INTRODUCTION

One of the decisive factors the distribution and location of Gastropods, as well as other organisms from the continental aquatic ecosystems depend on is the type of ecosystem they populate. Continental waters are grouped in springs, streams, mountain, hill and plain rivers, the Danube and the Danube Delta, lakes, pools, swamps, underground waters.

As compared to other types of ecosystems, we shall identify the Gastropods specific to these ecosystems due to their ecophysiological features (CIOBOIU CODOBAN, 2003).

MATERIAL AND METHOD

In order to observe the features of the ecosystems where Gastropods live and to emphasize the rapport between their structure and the types of aquatic ecosystems there were used two ways: - drawings of benthos qualitative and quantitative samples (CIOBOIU, 2002) from different aquatic ecosystems; - synthesis of the data rendered in the field literature referring to the structure of the populations present within Romania's waters (GROSSU, 1993).

RESULTS AND DEBATES

Within Romania, there has been identified a number of 133 species. These are distributed according to the types and categories of aquatic ecosystems.

Within the torrents and mountain streams (BĂNĂRESCU, ARION 1982), there can be noticed species belonging to a number of 4 families: **MOITESSIERIDAE FAMILY:** *Paladilhia (Paladilhiopsis) transsylvanica*, *Paladilhia (Paladilhiopsis) carpathica*, *Paladilhia (Paladilhiopsis) leruthi*; **BYTHINELLIDAE FAMILY:** *Bythinella molesany*, *Bythinella dacica*, *Bythinella austriaca austriaca*, *Bythinella austriaca melanostoma*; **THIARIDAE FAMILY:** *Amphimelania holandri holandri*, *Amphimelania holandri afra*, *Amphimelania holandri aequata*, *Amphimelania holandri costulata*, *Amphimelania*

parvula; **ANCYLIDAE FAMILY:** *Ancylus fluviatilis*, *Ancylus fluviatilis f. cornu*.

Along the sub-mountainous and hilly sectors of the rivers, characterized by a slow slope and a relatively low speed of the water, the beds of the rivers are more stable, the bottom is soft, oozy or sandy and, sometimes, it has deeper areas. The water is clear and it gets warmer and warmer. The aquatic vegetation also becomes richer and it provides enough food for the fauna (CURTEAN & collab. 1999).

The Gastropods specific to these waters are mainly represented by: **NERITIDAE FAMILY:** *Theodoxus danubialis danubialis*, *Theodoxus prevostianus*; **LITHOGLYPHIDAE FAMILY:** *Lithoglyphus apertus*, *Lithoglyphus pigmaeus*; **LYMNAEIDAE FAMILY:** *Radix ovata f. expansilabris*, *Radix ovata f. ampulla*.

The plain rivers present a very slow speed and they are influenced by the steppe climate characteristic to plains. During summer, the water level in the rivers decreases very much, some of them getting even dry, while, during winter, they freeze (SÂRBU, 2001).

The Gastropods characteristic to these rivers are: **NERITIDAE FAMILY:** *Theodoxus danubialis stangulata*; **HYDROBIIDAE FAMILY:** *Pseudamnicola dobrogica*, *Pseudamnicola bacescui*, *Grossuana codreanui*; **VALVATIDAE FAMILY:** *Valvata (Borysthemia) naticina*.

Within the glacier lakes and alpine marshes there has been accidentally noticed the Gastropod called *Stagnicola palustris f. flavida*.

Within the hilly lakes and pools, there have been the following species of Gastropods: **VALVATIDAE FAMILY:** *Valvata (Tropidina) pulchella*; **LYMNAEIDAE FAMILY:** *Stagnicola palustris f. fusca*, *Stagnicola palustris f. transsylvanica*.

Within the plain lakes and pools (CIOBOIU, BREZEANU, 1999), which are invaded by submergent and free-floating vegetation (sedge, bulrush, reed, Dutch rush, arrow-grass and water lily, Chara), there can be noticed the following species: **NERITIDAE FAMILY:** *Theodoxus fluviatilis*; **LYMNAEIDAE FAMILY:** *Stagnicola palustris f. curta*, *Radix ovata f. piniana*, *Radix ovata f. patula*, *Anisus (Anisus) spirorbis*, *Anisus spirorbis f. dazurii*, *Anisus (Anisus) septemgyratus*, *Anisus (Anisus) rotundatus*, species that sometimes appears within the mountainous area, as well.

Other species can be found **within the stagnant**

waters from the plain, hilly and mountaineous areas. They are: *Radix auricularia*, *Radix auricularia f. contracta*, *Gyraulus* (*Gyraulus*) *acronicus*, *Stagnicola corvus*, *Stagnicola turricula*.

The saltish and brackish lacustrine

ecosystems are populated by species adapted to this environment and they are Sarmatic relicts, such as *Lithoglyphus naticoides*, *Neritina sp.*, *Viviparus sp.*, or species that have recently come from the sea (Table 1):

Table 1. Gastropods from the brackish lacustrine ecosystems

Species	Brackish waters	Brackish-fresh waters
NERITIDAE FAMILY		
<i>Theodoxus euxinicus</i>	+	-
<i>Theodoxus pallasi</i>	-	+
<i>Theodoxus fluviatilis</i>	-	+
HYDROBIIDAE FAMILY		
<i>Pseudamnicola razelmiana</i>	+	-
<i>Pseudamnicola leontina</i>	+	-
<i>Hydrobia ventrosa</i>	-	+
MICROMELANIIDAE FAMILY		
<i>Micromelania (Turricaspia) lincta</i>	+	-
<i>Micromelania (Turricaspia) dimidiata</i>	+	-
<i>Clessiniola variabilis</i>	+	-
<i>Micromelania ismailensis</i>	-	+
LITTORIDINIDAE FAMILY		
<i>Potamopyrgus jenkinsi</i>	+	-
CERITHIIDAE FAMILY		
<i>Cerithium vulgatum</i>	+	-
RETUSIDAE FAMILY		
<i>Retusa (Coleophysis) truncatula</i>	+	-
<i>Retusa (Coleophysis) truncatula f. opima</i>	+	-
<i>Retusa (Coleophysis) striatula</i>	+	-
<i>Cylichnina strigela</i>	+	-
<i>Cylichnina robogliana = Retusa ovoidea</i>	+	-
ELLOBIIDAE FAMILY		
<i>Ovatella (Myosotella) myosotis</i>	+	-

Gastropods along the Romanian sector of the Danube and within the easily flooded area

There has been identified (BOTNARIUC & collab., 1963, 1964; CIOBOIU, BREZEANU, 2000; CIOBOIU, 2002; NEGREA, 1992) a number of 54 species along the Danube, within its easily flooded area, within the Danube Delta and the shore lakes of the Black Sea (Table 2):

Table 2. The taxonomic composition of the Gastropods from the Romanian sector of the Danube (after Alexandrina Negrea, 1992)

Species	The Danube	Its Easily flooded area	The Danube Delta
<i>Theodoxus transversalis</i>	+	+	
<i>Theodoxus danubialis</i>	+	+	+
<i>Theodoxus fluviatilis</i>	+	+	+
<i>Theodoxus euxinicus</i>	+		+
<i>Theodoxus pallasi</i>	+		+
<i>Viviparus acerosus</i>		+	+
<i>Viviparus contextus</i>	+		
<i>Valvata cristata</i>	+	+	+
<i>Valvata pulchella</i>	+		
<i>Valvata piscinalis</i>	+	+	+
<i>Valvata naticina</i>	+	+	
<i>Pseudamnicola penchinati</i>	+		+
<i>Pseudamnicola razelmiana</i>			+
<i>Pseudamnicola dobrogica</i>	+		
<i>Pseudamnicola leontina</i>			+
<i>Potamopyrgus jenkinsi</i>			+
<i>Lithoglyphus naticoides</i>	+	+	+
<i>Lithoglyphus apertus</i>	+	+	
<i>Lithoglyphus pygmaeus</i>	+		
<i>Bithynia tentaculata</i>	+	+	+
<i>Bithynia leachi</i>	+	+	+
<i>Micromelania lincta</i>	+		+

<i>Micromelania ostroumovi</i>			+
<i>Micromelania ismailensis</i>	+		
<i>Esperiana acicularis</i>	+	+	+
<i>Esperiana esperi</i>	+	+	+
<i>Physa fontinalis</i>	+	+	+
<i>Physa acuta</i>	+	+	+
<i>Lymnaea stagnalis</i>	+	+	+
<i>Stagnicola palustris</i>	+	+	+
<i>Stagnicola corvus</i>	+		+
<i>Stagnicola turricula</i>	+		
<i>Radix auricularia</i>		+	+
<i>Radix ovata</i>	+	+	+
<i>Radix peregra</i>	+	+	+
<i>Galba truncatula</i>	+		
<i>Ancylus fluviatilis</i>	+	+	+
<i>Ferrissia wautieri</i>	+	+	
<i>Acroloxus lacustris</i>	+	+	+
<i>Planorbis planorbis</i>	+	+	+
<i>Planorbis carinatus</i>	+		+
<i>Anisus septemgyratus</i>	+		+
<i>Anisus spirorbis</i>	+	+	+
<i>Anisus rotundatus</i>	+		+
<i>Anisus vortex</i>	+	+	+
<i>Anisus vorticulus</i>	+	+	+
<i>Bathymphalus contortus</i>		+	
<i>Gyraulus albus</i>	+	+	+
<i>Gyraulus acronicus</i>	+		
<i>Gyraulus laevis</i>	+	+	+
<i>Armiger crista</i>	+		+
<i>Segmentina nitida</i>	+		+
<i>Hippeutis complanatus</i>	+		+
<i>Planorbarius corneus</i>	+	+	+

In the underground waters, there can be noticed the following species: *Paladilhia* (*Paladilhiopsis*) *transsylvanica*, *P. leruthi*, *P. carpathica*, *Heleobia dobrogica* (NEGREA & collab., 2004).

CONCLUSIONS

The distribution of the Gastropods according to the types of continental aquatic ecosystems is more or less relevant; in other words, some species, such as *Viviparus acerosus*, *Valvata piscinalis*, *Lithoglyphus naticoides*, *Lymnaea stagnalis*, *Stagnicola corvus*, *Radix auricularia*, *Ancylus fluviatilis* and others can be accidentally found within other types of ecosystems than the characteristic ones.

According their distribution, it can be stated that the Gastropods have the necessary ability to adapt to the environmental conditions, proving thus their ecophysiological adaptability.

REZUMAT

În apele continentale ale României au fost identificate un număr de 133 specii. În funcție de tipul de ecosistem, distribuția gastropodelor este următoarea: 14 specii în torenți și pâraie de munte; 28 specii în apele colinare și de șes; 18 specii în ecosistemele lacustre; 54 specii în Dunăre, zona inundabilă și Delta Dunării.

Din analiza distribuției gastropodelor în funcție de tipurile de ecosisteme acvatice continentale rezultă că acestea au capacitatea de a răspunde unor variații ale condițiilor de mediu demonstrând plasticitatea lor ecofizologică.

REFERENCES

1. BĂNĂRESCU P., ARION-PRUNESCU ELENA, 1982 - Zoocenoza de moluște prosobranhiate din râul Caraș și necesitatea protejării ei. Conservarea naturii pe baze ecologice: lucrări științifice la cea de-a 7-a Conf. Națională de Ocrotirea naturii, Drobeta-Turnu-Severin: 155-159
2. BOTNARIUC N., NEGREA ALEXANDRINA, NEGREA ȘT., 1963 - Observații asupra biologiei speciei *Fagotia esperi* (Fer.) din complexul de bălți Crapina-Jijila, Societatea de științe Naturale și Geografice din R.S.R., Comunicări de zoologie, vol. II: 10-19
3. BOTNARIUC N., NEGREA ALEXANDRINA, TUDORANCEA CI., 1964 - Rolul moluștelor în economia complexului de bălți Crapina-Jijila, Hidrobiologia vol.5 București: 95-104
4. CIOBOIU OLIVIA, BREZEANU GH., 1999 - Structure of the Gastropod populations from small dam lakes in Oltenia Plain. Proceedings of the Institute of Biology Annual Scientific Session vol. II, Bucharest: 99-109
5. CIOBOIU OLIVIA, BREZEANU GH., 2000 - The Gastropoda Diversity in the Romanian Area of Danube pools, in Relation with Habitat Types. 33 Konferenț der Internationalen Arbeitsgemeinschaft Donau forschung, Osijek, Kroatien: 15-19
6. CIOBOIU OLIVIA, 2001 - Distribuția populațiilor de gastropode în raport cu structurile faciesului benthal. Argessis, Studii și comunicări - Științele naturii, Pitești: 52-59
7. CIOBOIU OLIVIA, 2002 - Gastropoda Diversity within the Danube Alluvial Plain (700-800km). Limnological Reports, volume 34, Proceedings of the 34th Conference, Tulcea, România. Edit. Academiei Române, Bucharest: 269-275
8. CIOBOIU OLIVIA, 2002 - Hydrobiological Peculiaritiis of Some Small Eutrophic Reservoirs within the Hydrographical Basin of the Jiu. Limnological Reports, volume 34, Proceedings of the 34th Conference, Tulcea, România. Edit. Academiei Române, Bucharest: 275-287
9. CIOBOIU CODOBAN OLIVIA, 2003 - Gastropodele din apele continentale ale României și zona litorală a Mării Negre, Ed. Sitech, Craiova: 1 - 95
10. CURTEAN ANGELA și colab., 1999 - Data concerning the benthic communities of the Cibin River (Olt River Basin). Transylv. Rev. Syst. Ecol. Res., 1, Ed. Univ. Lucian Blaga, Sibiu: 99 - 110
11. GROSSU AL. V., 1993 - The catalogue of the molluscs from Romania. Trav. Museum d'Histoire Naturelle Grigore Antipa, vol. XXXIII, București: 291 - 366
12. NEGREA ALEXANDRINA, 1992 - Gastropode din sectorul românesc al Dunării găsite până în prezent, Hidrobiologia, vol. XX, București: 75 - 110
13. SÂRBU I., 2001 - Moluștele acvatice din râul Ier, lacul termal de la Băile Episcopoești și Răbăgani (Bazinul Crișurilor). Acta oecologica, vol. VIII, nr. 1 - 2, Ed. Univ. Lucian Blaga, Sibiu: 107 - 120.

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