

# AQUATIC ASSOCIATIONS

## FROM THE BISTRIȚA INFERIOR RIVER BASIN

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**Key words:** Aquatic associations, Bistrița, Bacău, Romania.

### Introduction

The studied area is situated on the lower course of Bistrița river between Piatra Neamț and Bacău (Romania – Moldova region). The associations were encountered in several locations along the Bistrița river in pools and in the Lilieci lake (Bacău county) and in the Cracău river (tributary to Bistrița from Neamț county).

### Materials and method

For studying the vegetation was used the method of the phytocoenological school of Zürich – Montpellier perfected by J. Braun-Blanquet and J. Pavillard (Ștefan N., 2005). For synonyms I followed Ciocârlan (2000) and for the classification of the vegetation was used the monography “*Flora și vegetația Moldovei (România)*” by T. Chifu et al. (2006).

### Abbreviations:

**H** – hemicryptophytes  
**HH** – helohidatophytes  
**G-HH** – geophytes – helohidatophytes  
**Eua.** – eurasiatic  
**Eur.** – european  
**Circ.** – circumpolar  
**Cosm.** – cosmopolitan  
**Med.** – mediterranean  
**Adv.** – advent  
**U** – humidity  
**T** – temperature  
**R** – soil pH

### Results and discussions

The associations presented and described in the current paper are classified as follows:

Class **POTAMETEA PECTINATI** Klika in Klika et Novák 1941

Order Potametalia Koch 1926

Alliance Parvopotamo – *Zanichellietum tenuis* Koch 1926

1. *Parvopotamo* – *Zanichellietum tenuis* Koch 1926

2. *Elodeetum canadensis* Egger 1933

Alliance Ceratophyllion demersi Soó 1927

3. *Potamo* – *Ceratophylletum submersi* I. Pop 1962

#### 1. As. *Parvopotamo* – *Zanichellietum tenuis* Koch 1926

The aquatic association *Parvopotamo* – *Zanichellietum tenuis* is presented for the first time in the region. It was identified in the pools close to the Bistrița river ahead Lilieci lake

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(Bacău county) and in the Cracău's river arms close to the Doina village (Neamț county) in 2007. The association is formed mainly by *Zanichellia palustris* and other species like *Myriophyllum spicatum*, *Lemna minor*, *Potamogeton gramineus*, *Potamogeton crispus* (Table 1).

Table 1. – As. *Parvopotamo – Zanichellietum tenuis* Koch 1926

No.	1	2	3	4	5	K
Atitude (m.s.m)	200	200	200	350	350	
Coverage (%)	100	80	80	80	60	
Surface (m <sup>2</sup> )	6	8	6	7	4	
<b>Ass. caract.</b>						
<i>Zanichellia palustris</i>	5	4	4	3	3	V
<b>Potamion</b>						
<i>Ceratophyllum submersum</i>	+	+	1	+	+	V
<i>Potamogeton pectinatus</i>	1	1	+	1	1	V
<i>Potamogeton trichoides</i>	+	-	+	-	+	III
<b>Potametalia et Potametea pectinati</b>						
<i>Myriophyllum spicatum</i>	+	+	-	+	-	III
<i>Potamogeton crispus</i>	+	+	+	+	+	V
<i>Potamogeton gramineus</i>	-	-	+	+	+	III
<b>Lemnetea minoris</b>						
<i>Lemna minor</i>	+	+	-	+	+	IV
<i>Utricularia vulgaris</i>	+	+	-	+	-	III
<b>Phragmiti – Magnocaricetea</b>						
<i>Alisma plantago-aquatica</i>	+	+	+	+	+	V
<i>Butomus umbellatus</i>	-	-	+	+	+	III
<i>Cardamine amara</i>	+	+	+	-	-	III
<i>Eleocharis uniglumis</i>	+	+	-	+	-	III

Place and data: 1 – Bistrița river (pools), (Bacău couty), 7 iuly 2007; 2, 3 – Lilieci lake (Bacău couty), 7 iuly 2007; 4, 5 – Cracău river (Neamț county), 10 june 2007.

The analysis of the bioforms shows the high presence of the helohidatophytes (84%) followed by the hemicryptophytes and geophytes – helohidatophytes with 8% each (Fig. 1). The floristic elements are dominated by the cosmopolitan species and the circumpolar species with 31% each, followed by the euroasiatic and european species (Fig. 2). The ecological indexes show the absolute dominance of the ultrahydophyte species with 84,61%. The thermic index shows that the dominant species are the mezothermal and the amphytolerant ones. The pH preferences shows the dominance of the weak acid-neutral species and the amphytolerant ones (Fig. 3).

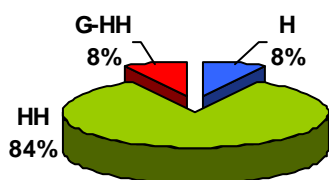


Fig. 1. Bioforms.

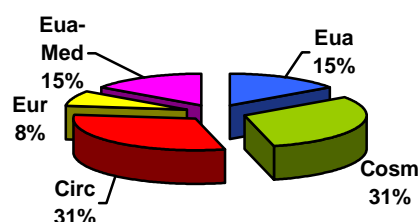


Fig. 2. Floristic elements.

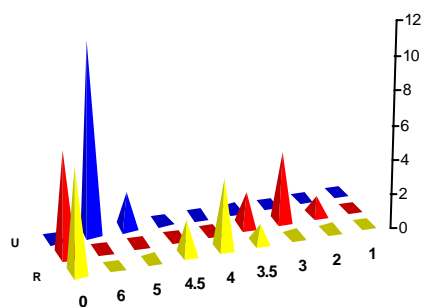


Fig. 3. Ecological indexes.

## 2. As. *Elodeetum canadensis* Egglar 1933

The aquatic association *Elodeetum canadensis* is presented for the first time in the region. It was identified in Bacău county at Șurina between the Bistrița river's arms vis-a-vis Gura Văii village, in the pools close to the Bistrița river ahead Lilieci lake, in the Lilieci lake and next to Bacău town also in pools close to the Bistrița river ahead the dam. The association was described before in a few locations from the southern part of Moldova. Nevertheless, it can be noticed that the association is starting to spread up north because we identified it in the northern part of Bacău county in many places along the Bistrița river. It is formed mainly by *Elodea canadensis* because not to many species can live in the dense layer created by the dominant species (Table 2).

Table 2. – As. *Elodeetum canadensis* Egglar 1933.

No.	1	2	3	4	5	6	7	
Atitude (m.s.m)	200	200	250	250	200	200	200	
Coverage (%)	100	100	100	100	100	100	100	K
Surface (m <sup>2</sup> )	10	5	6	10	5	5	6	
<b>Ass. caract.</b>								
Elodea canadensis	5	5	4	5	4	4	5	V
<b>Parvopotamion</b>								
Ceratophyllum demersum	+	+	-	-	-	-	-	II
Ceratophyllum submersum	-	-	-	+	+	+	-	III
Potamogeton pectinatus	-	-	-	-	+	1	-	II
<b>Potametalia et Potametea pectinati</b>								
Myriophyllum spicatum	+	+	-	+	-	-	-	III
Potamogeton crispus	+	+	-	+	-	-	-	III
Potamogeton perfoliatus	-	-	-	-	-	-	+	I
Ranunculus trichophyllus	-	+	-	-	-	-	-	I
<b>Phragmiti – Magnocaricetea</b>								
Alisma plantago-aquatica	+	+	+	+	+	-	+	V
Bolboschoenus maritimus	+	+	+	-	-	-	+	III
Butomus umbellatus	+	-	+	-	+	-	+	III
<b>Lemnetea minoris</b>								
Lemna minor	+	+	-	-	-	-	+	III
Utricularia vulgaris	-	-	-	-	1	+	-	II

Place and data: 1, 2 – Șurina (Bacău county), 2 august 2006; 3 – between Bistrița river's arms vis-a-vis Gura Văii village (Bacău county), 5 iuly 2007; 4 – pools close to Bistrița ahead Lilieci lake (Bacău county), 7 iuly 2007; 5, 6 – pools from the Lilieci lake tale (Bacău county), 7 iuly 2007; 7 – Bacău town in pools close to the Bistrița river ahead the dam (Bacău county), 2 august 2006.

The analysis of the bioforms shows the high presence of the helohidatophytes (84%) followed by the hemicryptophytes and geophytes – helohidatophytes with 8% each (Fig. 4). The floristic elements are dominated by the cosmopolitan species with 38% followed by the circumpolar species with 31% (Fig. 5). The ecological indexes show the absolute dominance of the ultrahydophyte species with 92% (HH, G-HH). The thermic index shows that the dominant species are the mezothermal and the amphytolerant ones. The pH preferences shows the dominance of the weak acid-neutral species and the amphytolerant ones (Fig. 6).

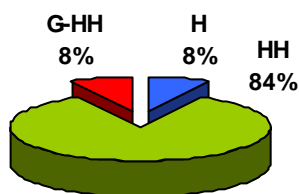


Fig. 4. Bioforms.

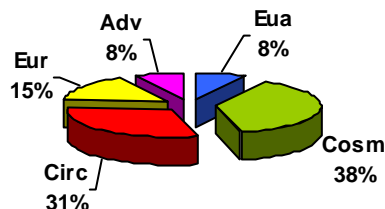


Fig. 5. Floristic elements.

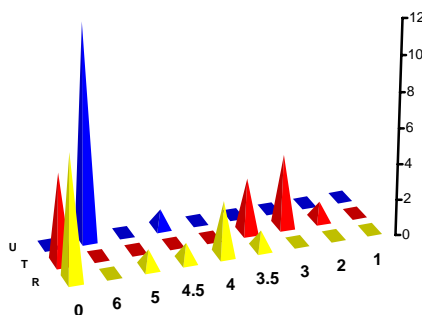


Fig. 6. Ecological indexes.

### 3. As. *Potamo – Ceratophylletum submersi* I. Pop 1962

The aquatic association *Potamo – Ceratophylletum submersi* is presented for the first time in the region. It was identified in Bacău county in some pools close to the Bistrița river ahead the Lilieci lake. The association is formed mainly by *Ceratophyllum submersum* with a 65 – 90% coverage and other species like *Potamogeton trichoides*, *Myriophyllum verticillatum* and *Zanichellia palustris* (Table 3).

Table 3. – As. *Potamo – Ceratophylletum submersi* I. Pop 1962.

No.	1	2	3	4
Atitude (m.s.m)	200	200	200	200
Coverage (%)	100	90	90	100
Surface (m <sup>2</sup> )	6	5	10	7
<b>Ass. caract.</b>				
<i>Ceratophyllum submersum</i>	5	5	4	5
<b>Potamion</b>				
<i>Potamogeton trichoides</i>	+	+	+	+
<b>Potametalia et Potametea pectinati</b>				
<i>Myriophyllum verticillatum</i>	+	-	+	+
<i>Potamogeton crispus</i>	-	+	+	+
<i>Potamogeton pectinatus</i>	+	+	+	+
<i>Zanichellia palustris</i>	+	+	2	+

<b>Lemnetea minoris</b>				
Lemna minor	+	-	+	+
<b>Phragmiti – Magnocaricetea</b>				
Alisma plantago-aquatica	+	+	+	+
Bolboschoenus maritimus	+	-	+	+
Butomus umbellatus	-	+	+	+

Place and date: 1, 2, 3, 4 – pools close to Bistrița river ahead Lilieci lake (Bacău county), 7 iuly 2007.

The analysis of the bioforms shows the presence of two categories: helohidatophytes (90%) followed by the geophytes – helohidatophytes with 10% (Fig. 7). The floristic elements are dominated by the cosmopolitan species with 50% followed by the circumpolar species with 20% and the european, eurasiatic and eurasiatic - mediterranean with 10% each (Fig. 8). The ecological indexes show the absolute dominance of the ultrahydophyte species with 90% (HH). The thermic index shows that the dominant species are the mesothermal ones. The pH preferences shows the dominance of the weak acid-neutral species followed by the amphytolerant ones (Fig. 9).

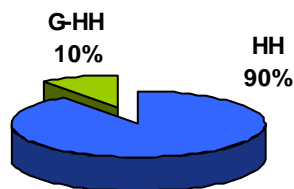


Fig. 7. Bioforms.

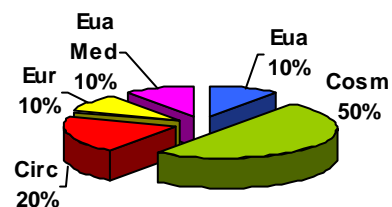


Fig. 8. Floristic elements.

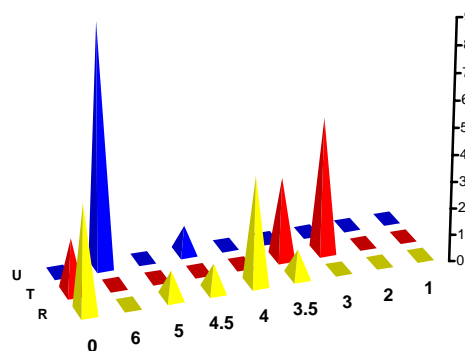


Fig. 9. Ecological indexes.

## Conclusions

The paper presents three aquatic associations from the Bistrița river inferior basin from Neamț and Băcau counties that were not presented before in the area by other researchers. Analyzing the ecological indexes, the floristic elements and the bioforms, it is clearly visible that the characteristics of the vegetation class are well represented by the associations and are in conformity with the locations.

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