

PHYTOCOENOLOGICAL RESEARCH ON ASSOCIATION *LEMETUM MINORIS* IN SANTĂU GROVE (BIHOR COUNTY)

Pantea Stelian*, Pășcuț Călin Gheorghe, Bartha Szilard

* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea;
Romania, e-mail: stelian_pantea@yahoo.com

Abstract

This paper presents a phytocoenological research on the association Lemnetum minoris Oberdorfer ex Th. Müller et Görs 1960 conducted in the Santău grove (Bihor county) in the summer of 2015.

For the phytocoenological research a synthetic table was conceived on the association Lemnetum minoris comprising four surveys, but also information on the floristic composition, life forms and floristic elements. In the case of the association surveyed we carried out the spectra of life forms and floristic elements.

Key words: phytocoenoses, floristic elements, life forms, association.

INTRODUCTION

The territory where the research was conducted is located in the north-west part of Oradea city (Bihor county), near the Romanian - Hungarian border between the settlements of Santăul Mic and Santăul Mare. *Lemna minor* aquatic phytocoenoses identified are included in the Santău grove site no. ROSCI0185.

Phytocoenoses of the association *Lemnetum minoris* are widespread throughout the country, as described in the northwest of the country by Burescu (2003), Karácsonyi (1980), in Moldova (by Oprea, Sirbu, 2009; Chifu et al., 2006), in the western Romania (by Ardelean, 1999), and in the center of the country (by Cristea, 1981; Drăgulescu, 1995; Sămărghișan, 2005).

MATERIAL AND METHODS

In the research of vegetation the vegetable association was adopted as the base taxonomic unit (Géhu, Rivas-Martines, 1981). Quantitative criterion monitored in researching phytocenoses was the abundance and dominance of individuals, according to Braun-Blanquet system developed and completed by Tüxen and Ellenberg (1937).

The technique used for completing surveys, and quantitative and qualitative assessments was selected according to the indications of Borza, Boșcaiu (1965) and Cristea et al. (2004). The name of the association was

selected in accordance with the provisions established by the Code of Phytosociological Nomenclature (Weber et al., 2000).

The phytocoenological table prepared for the association studied contains information on the floristic composition of plant populations composing phytocoenosis, namely: association individual, life forms, floral elements, the serial number of surveys, GPS coordinates (altitude, lat. N, long. E), coverage (%), area (m²).

The values shown in the Associations table by +, 1, 2, 3, 4, 5, which show the abundance - dominance of each species have the following equivalent percentages: + = 0.5%, 1 = 5%, 2 = 17.5% 3 = 37.5%, 4 = 62.5%, 5 = 87.5% (Ivan and Doniță, 1975).

Botanical nomenclature used is the one developed for Romania's flora by Ciocârlan (2009).

RESULTS AND DISCUSSION

The association is widespread in the area, spreading itself in ditches, ponds and streams. It vegetates well in clearings inside the stands of alder, and also at its edge. These phytocenoses show a continuous growth in dead water; however it vegetates in some flowing waters.

Lemnetum minoris association is present in the study area at an altitude of 100 m in four settlements with a vegetation coverage rate of 75-100% (see Table 1 below). The phytocenoses of this association are stratified into three layers.

The supernatant (first) layer is dominated by *Lemna minor*, appearing alongside species characteristic for the *Lemnion minoris* alliance, *Lemnetalia minoris* order, *Lemnetea* class: *Spirodela polyrhiza*, *Lemna trisulca* and for the *Potamogetonetea pectinati* class: *Potamogeton nodosus*.

The submerged (second) layer consists of species belonging to the *Lemnetea* class: *Ceratophyllum demersum*, *Ceratophyllum submersum* and *Potamogetonetea pectinati* class: *Myriophyllum spicatum*.

In the emerged (third) layer there are transgressive species belonging to *Phragmitetea australis* class, such as: *Phragmites australis*, *Glyceria maxima*, *Lycopus europaeus*, *Alisma lanceolatum*, *Berula erecta*, *Typha angustifolia*, *Typha latifolia*, *Oenanthe aquatica*, *Alisma plantago-aquatica*, *Mentha aquatica*, *Carex gracilis*, *Veronica beccabunga*.

In cenotaxonomic terms the association is classified as follows:

- ✓ Class *Lemnetea* O. by Bolós et Masclans 1955
- ✓ Order *Lemnetalia minoris* O. by Bolós et Masclans 1955
- ✓ Alliance *Lemnion minoris* O. by de Bolós et Masclans 1955
- ✓ Association *Lemnetum minoris* Oberdorfer ex Th. Müller et Görs 1960

Table 1

Lemnetum minoris association Oberdorfer ex Th. Müller et Görs 1960

L.f.	F.e.	Number	1	2	3	4	
		GPS	Altitude (m)	100	99	98	100
		coordonates	Lat. N	47.15847	47.16051	47.16024	47.15803
			Long. E	21.82865	21.83150	21.83233	21.83384
		Vegetation coverage (%)	100	75	90	95	
		Area (m ²)	10	15	30	10	
Hh	Cosm	<i>As. Lemna minor</i>	5	4	4	5	
		Lemnion minoris, Lemnetalia minoris, Lemnetea					
Hh	Cosm	<i>Spirodela polyrhiza</i>	+	•	•	•	
Hh	Cosm	<i>Lemna trisulca</i>	•	•	1	+	
Hh	Cosm	<i>Ceratophyllum demersum</i>	1	1	2	+	
Hh	Eua	<i>Ceratophyllum submersum</i>	•	+	+	•	
		Potamogetonetea pectinati					
Hh	Cp	<i>Myriophyllum spicatum</i>	+	•	+	+	
Hh	Cp	<i>Potamogeton nodosus</i>	•	+	•	•	
		Phragmitetea australis					
Hh	Cp	<i>Glyceria maxima</i>	+	•	+	+	
Hh	Eua	<i>Lycopus europaeus</i>	•	•	+	+	
Hh	Eua	<i>Alisma lanceolatum</i>	+	+	•	•	
Hh	Cp	<i>Berula erecta</i>	•	+	•	+	
Hh	Cosm	<i>Typha angustifolia</i>	+	•	+	•	
Hh	Cosm	<i>Typha latifolia</i>	+	+	•	•	
Hh	Cosm	<i>Oenanthe aquatica</i>	•	+	+	•	
Hh	Cosm	<i>Alisma plantago-aquatica</i>	•	+	•	•	
Hh	Eua	<i>Mentha aquatica</i>	•	•	+	•	
Hh	Eua	<i>Carex gracilis</i>	+	•	•	+	
Hh	Cosm	<i>Phragmites australis</i>	•	•	+	•	
Hh	Eua	<i>Veronica beccabunga</i>	•	•	•	+	
		Variae syntaxa					
H	Cosm	<i>Juncus effusus</i>	•	+	•	+	
H	Eua	<i>Juncus inflexus</i>	•	+	•	•	
H	Cp	<i>Epilobium palustre</i>	+	+	•	•	
H	Cp	<i>Scutellaria galericulata</i>	•	•	+	+	
Th	Eua	<i>Polygonum hydropiper</i>	+	•	•	+	
H	Cp	<i>Stachys palustris</i>	•	+	•	+	

Place and date of mapping: 1 - 4 Santău grove (Bihor county) 26.08.2015.

where: L.f. - life forms; Hh - Helohidatophytes; H - Hemicryptophytes; Th - Annual terophytes; F.e. - floristic elements; Cosm - Cosmopolitan; Cp - Circumpolar; Eua - Eurasian.

Particular attention was paid to the analysis of life forms and floristic elements, and to reading them as spectra in graphical charts.

From the life forms spectrum (see Figure 1), it results the dominance of helohidatophytes in the association studied (Hh = 76%), followed by hemicriptophytes (H = 20%) and annual therophytes (Th = 4%).

Dominant floristic elements (see Figure 2) are cosmopolitan species (Cosm = 40%), followed by Eurasian (Eua = 32%) and circumpolar (Cp = 28%).

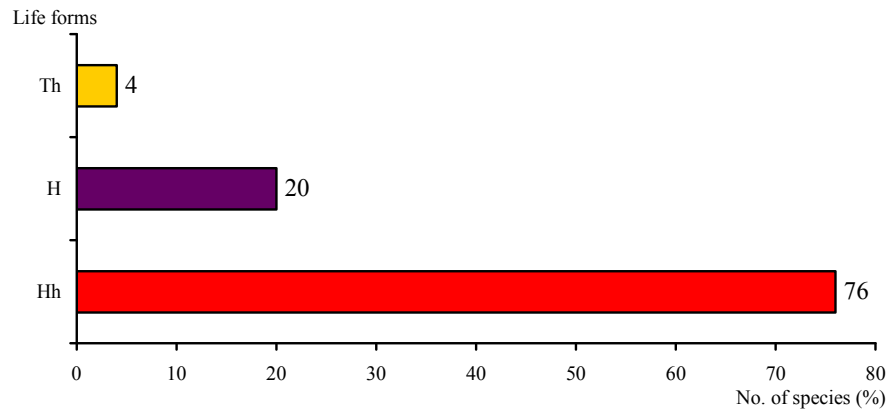


Fig. 1 The life forms spectrum of the *Lemnetum minoris* association

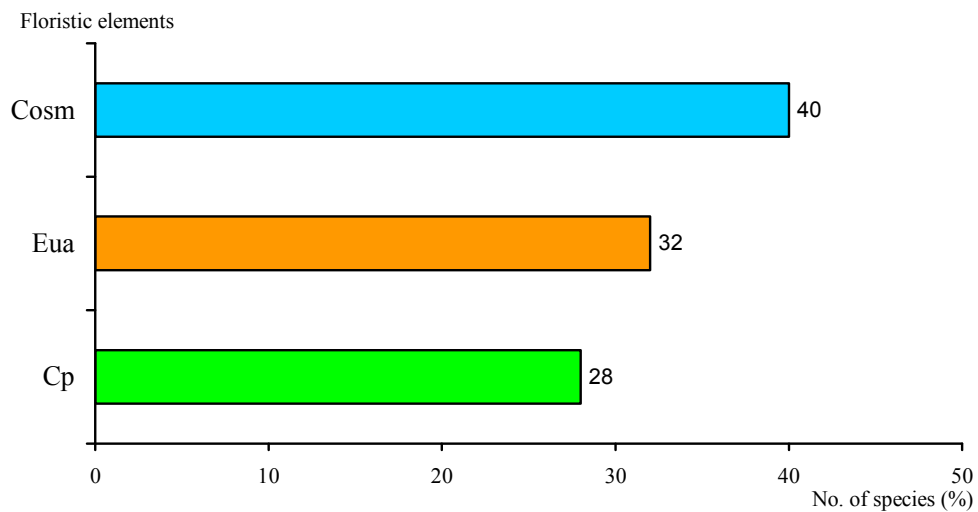


Fig. 2 Spectrum of floristic elements of the *Lemnetum minoris* association

CONCLUSIONS

These supernatant small cenoses, which are not set by substrate presents a relatively small number of species (i.e. 25 species in the case of association studied) and due to the homogeneity of the flora it is quite difficult to separate them, the only criterion being that of dominance.

Phytocoenoses of the association are characterized by a triple layered structure depleted in supernatant species (i.e. 4 species) and submerged species (i.e. 3 species) and somehow richer in emerged species (i.e. 18 species).

The existence of these *Lemna minor* phytocenoses seems to be subject to a lower amount of mineral salts and the lower development of the *Lemna trisulca* species is explained due to lack of an organogenous substrate.

REFERENCES

1. Ardelean A., 1999, Flora și vegetația din Valea Crișului Alb. Editura Vasile Goldiș University Press, Arad.
2. Borza A., Boșcaiu N., 1965, Introducere în studiul covorului vegetal. Editura Academiei R.P.Române, București.
3. Burescu P., 2003, Flora și vegetația zonelor umede din nord-vestul României. Editura Academiei Române, București.
4. Ciocârlan V., 2009, Flora ilustrată a României. *Pteridophyta et Spermatophyta*. Editura Ceres, București.
5. Chifu T., Mânzu C., Zamfirescu O., 2006, Flora și vegetația Moldovei (România). II Vegetația. Editura Universității „Alexandru Ioan Cuza”, Iași.
6. Cristea V., 1981, Flora și vegetația Podișului Secașelor. Rezumatul tezei de doctorat, Cluj-Napoca.
7. Cristea V., Gafta D., Pedrotti F., 2004, Fitosociologie. Editura Presa Universitară Clujeană, Cluj-Napoca.
8. Drăgulescu C., 1995, Flora și vegetația din bazinul văii Sadului. Editura Constant, Sibiu.
9. Géhu J., M., Rivas Martinez S., 1981, Notions fondamentales de phytosociologie, in vol. „Syntaxonomie”. Editura J. Cramer, Vaduz: 5-38.
10. Ivan D., Doniță N., 1975, Metode practice pentru studiul ecologic și geografic al vegetației. Editura Universității București.
11. Oprea A., Sîrbu C., Munții Stănișoarei (Carpații Orientali). Studiu fitosociologic. Editura Universității „Alexandru Ioan Cuza”, Iași.
12. Karácsonyi C., 1980, Cercetări asupra florei și vegetației terenurilor mlăștinoase din Câmpia Nirului. Studii și Comunic. Muz., Satu Mare, IV, 415-434.
13. Sămărghișan M., 2005, Flora și vegetația Văii Gurghiului. Editura University Press, Târgu-Mureș.

14. Tüxen R., Ellenberg H., 1937, Der systematische und ökologische Gruppenwert. Ein Beitrag zur Begriffsbildung und Methodik der Pflanzensoziologie. Mitt. Flor-Soz. Arbeitsgem. 3: 171–184.
15. Weber H., E., Moravec J., Theurillat J., P., 2000, International Code of Phytosociological Nomenclature, 3rd edition, Journal of Vegetation Science II, Opulus Press Uppsala: 739-768.