

STUDY REGARDING THE AQUATIC VEGETATION IN THE MIDDLE BASIN OF CRIȘUL NEGRU RIVER

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Abstract

The paper presents the hydrophytic association Spirodello-Aldrovandetum Borhidi et Komlódi 1959, association classified from the coenotaxonomic point of view in the class Lemnetea O. de Bolós et Masclans 1955. Of its earlier distribution area covering a substantial part of Europe, only a few native sites in Russia, Ukraine, Belarus, Lithuania, Serbia, Hungary, Poland and Romania remain. In Romania this association was identified by Păun M. and Popescu G. (1969, 1972) in the ponds from Calafat, Nebuna and Jiului fens (Balta cu Dubă) as well. From Snagov these phytocoenosis are reported by Șerbănescu I. (1959).

The Spirodello-Aldrovandetum association Borhidi et Komlódi 1959 is presented from the point of view of the floristic composition and by analyzing the spectrum of the floristic elements, the life forms spectrum, the karyotype spectrum and the ecological factors.

Key words: aquatic vegetation, ecological factors, vegetal association, floristic elements, life forms.

INTRODUCTION

The plain of Crișul Negru is situated in the hydrographic basin of Tisa, the plain being watered by Crișul Negru, which has a general course in the direction east-west, and by its confluents. Crișul Negru springs from the northern flank of Curcubăta peak, from the altitude of 1460 m, near the springs of Arieșul Mic. Regarding the hydrological data of the river Crișul Negru we have: the length of the river in Romania – 144 km; the medium flow – Zerind 31,40 m³/s; the maximum registered flow – Zerind 648 m³/s; minimum registered flow – Zerind 0,47 m³/s.

The soils of the Crișul Negru Plain are characterized by diversity, their genesis being in close connection with the evolution of the Plain of Tisa. The region from the Plain of Crișul Negru is tessellated; the inter-region soils dominate (alluvial, swamp soil, gleic soil and pseudogley, salty soils).

The *Spirodello-Aldrovandetum* association Borhidi et Komlódi 1959 populates the edge of ponds where water does not exceed one meter. *Aldrovanda vesiculosa* L. is a rare aquatic carnivorous plant. It is rootless, free-floating, growing close below the water surface in shallow standing waters. *Spirodela polyrhiza* is a perennial aquatic plant usually growing in

dense colonies, forming a mat on the water surface. Each plant is a smooth, round, flat disc one half to one centimeter wide.

MATERIAL AND METHODS

On taking into consideration several papers in the specialty literature (Sanda V., A. Popescu, N. Barabaş, 1998; Sanda V., K. Öllerer, P. Burescu, 2008), the *Spirodelo-Aldrovandetum* association Borhidi et Komlódi 1959 was classified in the following coenosystem:

LEMNETEA O. de Bolós et Masclans 1955

LEMNO-UTRICULARIETALIA Passarge 1978

Utricularion vulgaris Passarge 1978

Spirodelo-Aldrovandetum Borhidi et Komlódi 1959

In cases of vegetation studies, observations and data gathered during field trips constitute the foundation of all future processing and interpretations, reason of which the methods of preparing and developing them must be complex, thorough, scientific and objective.

The methods of vegetation studying are those elaborated by J. Braun-Blanquet (1964), adapted to the particulars of the vegetation from the surveyed zone.

In what the execution of surveys and notations on the analyzed fitocenoses' structure is concerned, both quantitative and qualitative criteria were considered, according to authors Al. Borza and N. Boşcaiu (1965). The quantitative criteria were abundance and dominance according to the combined system of J. Braun-Blanquet, J. Pavillard (1928), supplemented by R. Tüxen (1955) and H. Ellenberg (1963).

After the field research the list of species is drawn up grouped by classes, order, families and ranges alphabetically, specifying the place and habitat where they vegetate, the locality and an ecological summary (bioforms, geo-elements, ecological clues and economic importance).

RESULT AND DISCUSSION

The plant community of the association *Spirodelo-Aldrovandetum* Borhidi et Komlódi 1959 (Fig. 1) were identified in the water retaining dam of the Guricior brook, near Cărăsău village (Bihar county).

The phytocoenoses of the analyzed association are three-bedded, enlightened by natant, submersed and emersed hydrophytes, which develop in stagnant water of fens and water retaining dams.

The floristic and phytocoenological characterization of this association reveals that the composition includes nine varied species. The

character of the association *Spirodela-Aldrovandetum* Borhidi et Komlódi 1959 is reflected in the high percentage of hydrophytic species (88,88%).

Among the species characteristic to the alliance, order and class we mention: *Hydrocharis morsus-ranae* and *Salvinia natans*.



Fig. 1 – Association *Spirodela-Aldrovandetum* Borhidi et Komlódi 1959, water retaining dam on Guricior brook, Bihor county.

The synthetic table of this association (Table 1) contains information on species from the floristic composition, the life forms, the floristic elements, the ecological indices (moisture, temperature, chemical reaction of the soil), number of surveys, altitude (m.s.m.), area (m²) and the coverage of grass layer (%).

Table 1

Spirodela-Aldrovandetum Borhidi et Komlódi 1959

L.f.	F.e.	U	T	S.r.	2n	No. Land Surveys	1	2	3
						Altitude (m.s.m.)	155	155	155
						Area (m ²)	1	2	1
						The coverage of grass layer (%)	95	85	90
Hh	Adv	6	3,5	0	P	As. <i>Aldrovanda vesiculosa</i>	4	4	5
Hh	Cosm	6	3,5	0	P	As. <i>Spirodela polyrhiza</i>	+	1	+
Utricularion, Lemno-Utricularietalia, Lemnetea									
Hh	Eua	6	3,5	3,5	P	<i>Hydrocharis morsus-ranae</i>	+	.	.
Hh	Eua	6	3	3	D	<i>Salvinia natans</i>	.	+	.
Potamogetonetea Pectinati									
Hh	Eua	6	4,5	4,5	P	<i>Najas minor</i>	1	+	+
Hh	Cosm	6	2,5	4	P	<i>Potamogeton natans</i>	+	+	+
Hh	Cosm	6	3	4,5	P	<i>Potamogeton pectinatus</i>	+	+	+
Phragmitetea Australis									
Hh	Cosm	6	0	0	D	<i>Alisma plantago-aquatica</i>	+	+	.
G-Hh	Cosm	5	0	4	P	<i>Eleocharis palustris</i>	.	+	.

Place and date of surveys: 1, 2, 3 – water retaining dam on Guricior brook, near Cărăsău village (Bihor county) 29.07.2010.

The analysis of the association on the aspect of the main ecological factors (Fig. 2) emphasize the dominant hydrophytic character (88,88% $U_6 = 8$ species). Depending to the temperature, the association has a micro-mesotherm character (55,55% $T_{3-3,5} = 5$ species), followed by thermic amphitolerant character (22,22% $T_0 = 2$ species), and depending on the chemical reaction of the soil, it manifests a slightly acid-neutrophile character (44,44% $R_{4-4,5} = 4$ species), followed by chemical amphitolerant character (33,33% $R_0 = 3$ species).

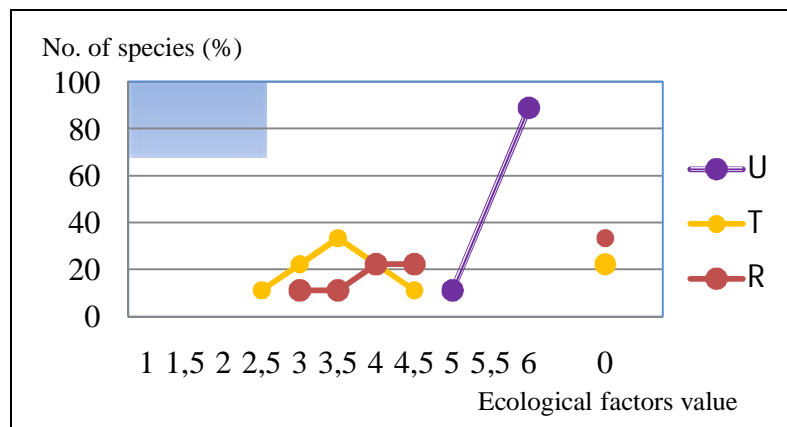


Fig. 2 – Diagram of ecological factors for the association *Spirodelo-Aldrovandetum* Borhidi et Komlódi 1959, where: U – humidity, T – temperature, R – the chemical reaction of the soil.

The life forms spectrum (Fig. 3) is dominated by helohydatophytes (88,88% Hh = 8 species).

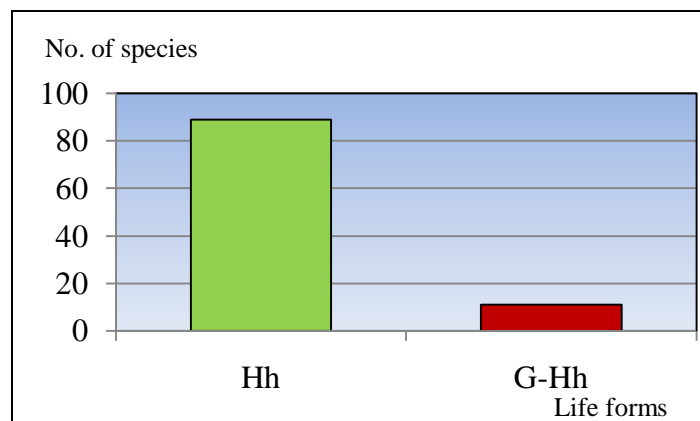


Fig. 3 – The life forms spectrum of association *Spirodelo-Aldrovandetum* Borhidi et Komlódi 1959, where: Hh – helohydatophyte, G – geophytes.

The spectrum of the floristic elements (Fig. 4) is dominated by the Cosmopolitan species in a percentage of 55,55%, followed by the Eurasian species (33,33%), and Adventive species

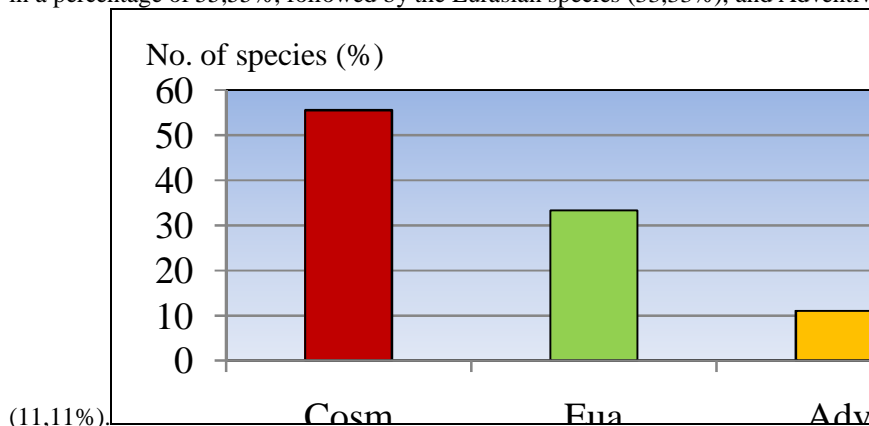


Fig. 4 – Spectrum of floristic elements of the association *Spirodelo-Aldrovandetum* Borhidi et Komlódi 1959, where: Cosm – Cosmopolitan; Eua – Eurasian, Adv – Adventive.

The polyploid species are dominant in the karyotype spectrum (Fig. 5) with a percentage of 77,77% (P = 7 species), followed by the diploid species with 22,2% (D = 2 species).

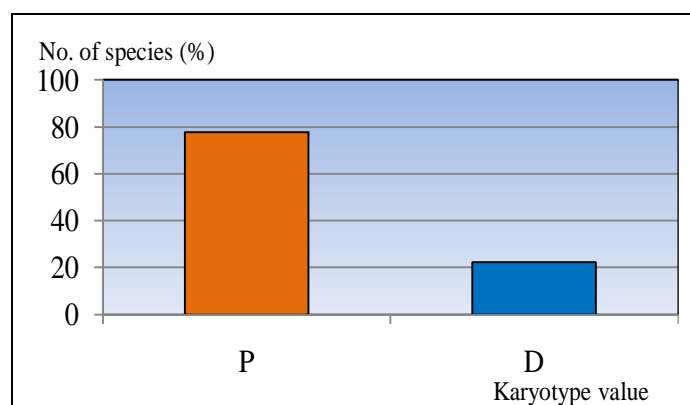


Fig. 5 – The karyotype spectrum of association *Spirodelo-Aldrovandetum* Borhidi et Komlódi 1959, where: P – polyploidy, D - diploidy.

CONCLUSIONS

Aldrovanda vesiculosa, a critically endangered aquatic carnivorous plant, is a species rapidly vanishing from Europe. The maintenance and protection are based on the introduction of *A. vesiculosa* to new potential sites as fens, swamps, peaty lakes and pools, shallow reed belts, etc.

The analysis results of the surveys realised for the association, in that concerning the bioforms, floristic elements and ecological indices, shows that our results are according with specialty literature.

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