

PHYTOCOENOLOGICAL RESEARCH CONCERNING THE MEADOWLANDS FROM THE MIDDLE AND INFERIOR BASIN OF CRIȘUL NEGRU RIVER

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Abstract

*The paper presents the hygrophilic association *Juncetum effusi* Soó (1931) 1949 in the meadowlands from the middle and inferior basin of Crișul Negru river, association classified from the coenotaxonomic point of view in the class *Molinio-Arrhenatheretea* R. Tüxen 1937.*

*The *Juncetum effusi* association Soó (1931) 1949 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: hygrophilic 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 confluent. 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 – 560 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).

A part of the middle and inferior basin of the Crișul Negru River, being covered with primary herbaceous vegetation, has been broken up and used for agriculture. The meadows which hasn't been broken up, used by humans as pastures and meadows; as a result of canalizations and drainages these meadows suffered a saline progradation, and secondary halophile vegetation appeared, vegetation which is widely spread in this area.

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 *Juncetum effusi* association Soó (1931) 1949 was classified in the following coenosystem:

MOLINIO-ARRHENATHERETEA R. Tüxen 1937

POTENTILLO-POLYGONETALIA R. Tüxen 1947

Potentillion anserinae R. Tüxen 1937

Juncenion effusi Soó (1931) 1949

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). The taxons identified in the field will be harvested and put away for conservation (herborized) and identified by specialty catalogues (acc. to the volumes "Flora României"/Romania's Flora 1952-1976 and "Flora ilustrată a României"/Romania's Illustrated Flora 2003 by V. Ciocârlan, etc.).

The synthetic table of association contains information on species from the floristic composition, the life forms, the floristic elements, the ecological indices (moisture, temperature, chemical reaction of the soil), the serial number of surveys, altitude (m.s.m.), area (m²) and the coverage of grass layer (%). The quantitative assessment of the participation of each species in the tables of associations was made with the index of abundance-dominance. At the end of tables the constance (K) phytocoenotic synthetic index was calculated and noted, whose classes ranging from I-V expresses the degree of cenotic fidelity of each species to the phytocoenoses environment.

RESULT AND DISCUSSION

The floristic and phytocoenological characterization of *Juncetum effusi* association Soó (1931) 1949 reveals that the composition includes eighteen varied species. The dominant species *Juncus effusus* realizes a covering of vegetation of 75%, while the characteristic species *Agrostis stolonifera*, *Lysimachia nummularia* and *Carex hirta* have a high constancy (IV) in the frame of association.

The hygrophilic touch of the association *Juncetum effusi* Soó (1931) 1949 (Fig. 1) is reflected also in the high percentage of species with high index of humidity (almost 78% of the species).

Among the species characteristic to the suballiance, alliance, order and class we mention: *Agrostis stolonifera*, *Lysimachia nummularia*, *Carex hirta*, *Mentha pulegium*, *Juncus articulatus*, *Ranunculus repens*, *Vicia cracca*.

The phytocenosis of this association were identified in the meadows near Petid village (Bihor county), in the barrage with water retention from Cociuba-Mare village (Bihor county), at the Guricior brook, Cărsău village (Bihor county), another barrage with water retention from Olcea village (Bihor county), meadows near Ciumeghiu village (Bihor county), meadows near Mărțihaz village (Bihor county), respectively.



Fig. 1 – Association *Juncetum effusi* Soó (1931) 1949, meadow near Mărțihaz village, Bihor county.

Table 1

Juncetum effusi Soó (1931) 1949

L.f.	F.e.	U	T	S.r.	2n	No. Land Surveys	1	2	3	4	5	6	7	8	K	Adm
						Altitude (m.s.m.)	170	160	140	160	160	140	150	140		
						Area (m ²)	20	8	9	100	100	20	25	10		
						The coverage of grass layer (%)	95	70	90	90	90	95	100	80		
H	Cosm	4,5	3	3	P	As. Juncus effusus	5	4	5	4	4	5	5	4	V	75
						Juncenion effusi, Potentillion anserinae, Potentillo-Polygonetalia, Molinio-Arrhenatheretea										
H	Cp	4	0	0	P	Agrostis stolonifera	1	+	.	2	2	+	+	1	IV	5,81
Ch	E	4	3	0	P	Lysimachia nummularia	+	.	+	1	1	.	1	1	IV	2,62
G	E(M)	0	3	0	P	Carex hirta	.	+	.	+	+	+	.	+	IV	0,31
H	Eua(M)	4	3	4	P	Mentha pulegium	+	.	.	+	+	.	.	+	III	0,25
H	Cp	5	2	0	P	Juncus articulatus	.	.	.	.	.	.	+	+	II	0,12
H	Eua	4	0	0	P	Ranunculus repens	+	.	.	.	+	.	.	.	II	0,12
H	Eua	3	0	3	D-P	Vicia cracca	.	.	.	.	+	.	.	.	I	0,06
						Phragmitetea australis										
Hh	Eua	5	3	0	D	Lycopus europaeus	+	+	+	.	+	+	.	.	IV	0,31
H	Cp	5	3	0	D-P	Galium palustre	+	+	.	+	+	.	.	.	III	0,25
Hh	Cosm	5	3	0	P	Glyceria fluitans	.	+	.	.	.	1	.	+	II	0,75
H	Eua(M)	4	3	3	P	Epilobium hirsutum	.	+	.	+	.	.	+	.	II	0,18
Hh	Eua	5	3	0	P	Mentha aquatica	.	.	+	.	.	+	+	.	II	0,18
Hh	Cosm	6	0	0	D	Alisma plantago-aquatica	+	.	+	.	.	.	.	.	II	0,12
						Bidentetea tripartiti										
Th	Eua(M)	4,5	3	4	D	Polygonum hidropiper	+	1	.	+	+	+	1	1	V	2,12
Th	Eua	4,5	3	0	P	Bidens tripartita	.	+	.	.	.	.	.	.	I	0,06
						Accompanying										
H	Eua	2,5	0	0	D	Leontodon hispidus	.	.	.	+	.	.	.	.	II	0,12
H	Eua	3	3,5	4,5	P	Senecio erucifolius	+	.	.	.	.	.	.	.	I	0,06

Place and date of surveys: 1 – Meadow, Petid village (Bihor county) 16.07.2010; 2,3 – Barrage with water retention, Cociuba-Mare village (Bihor county) 16.07.2010; 4 – Guricior brook, Cărsău village (Bihor county) 29.07.2010; 5,6 – Barrage with water retention, Olcea village (Bihor county) 29.07.2010; 7 – Meadow, Ciumeghiu village (Bihor county) 25.08.2010; 8 – Meadow, Mărthaz village (Bihor county) 25.08.2010.

The analysis of the association on the aspect of the main ecological factors (Fig. 2) emphasize the dominant meso-hydrophilic character (44,4%, $U_{4-4,5} = 8$ species) and hydrophilic character (27,7%, $U_{5-5,5} = 5$ species). Depending to the temperature, the association has a micro-mesotherm character (66,6%, $T_{3-3,5} = 12$ species), followed by thermic amphitolerant (27,7%, $T_0 = 5$ species), and depending on the chemical reaction of the soil, it manifests a dominant chemical amphitolerant character (66,6%, $R_0 = 12$ species).

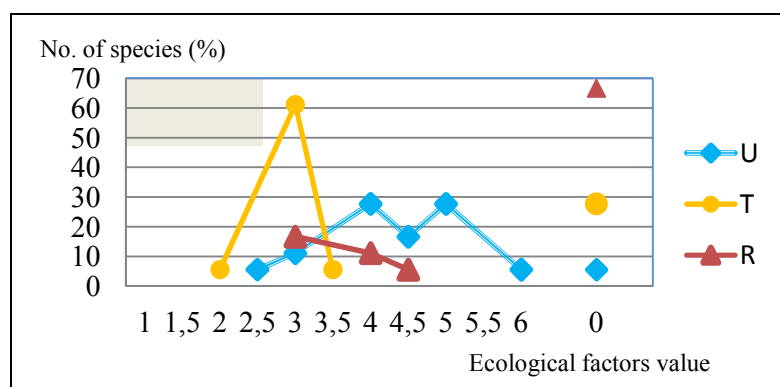


Fig. 2 – Diagram of ecological factors for the association *Juncetum effusi* Soó (1931) 1949, where:
U – humidity, T – temperature, R – the chemical reaction of the soil.

The life forms spectrum (Fig. 3) is dominated hemicryptophytes (55,5%, $H = 10$ species), followed by helohydatophytes (22,2%, $Hh = 4$ species).

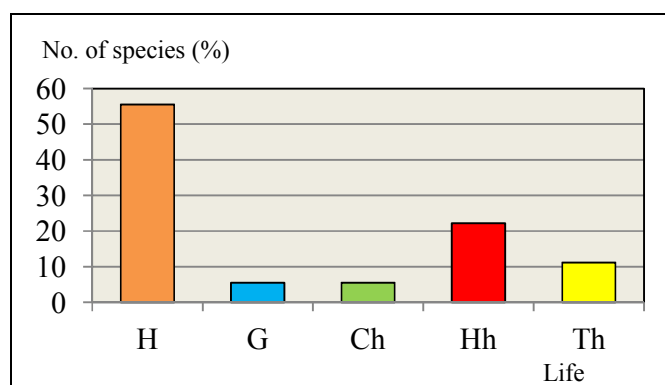


Fig. 3 – The life forms spectrum of association *Juncetum effusi* Soó (1931) 1949, where: H – hemicryptophyte, G – geophytes, Ch – chamaephyte, Hh – helohydatophyte, Th – annual therophyte.

The spectrum of the floristic elements (Fig. 4) is dominated by the Eurasian species (Eua = 38,8%), followed by the Cosmopolitan, Circumpolar and Eurasian including mediterranean species (E = 18,1%) and Central-European species all with three species, representing, each 16,6%.

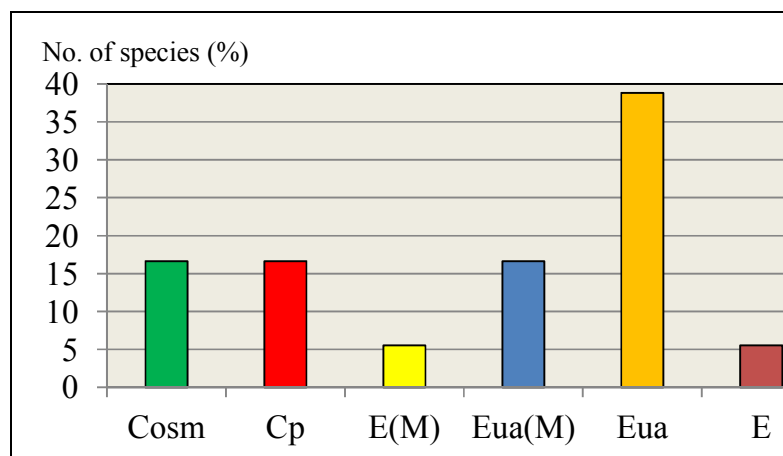


Fig. 4 – Spectrum of floristic elements of the association *Juncetum effusi* Soó (1931) 1949, where: Cosm – Cosmopolitan; Cp – Circumpolar; E – European; M – Mediterranean; Eua – Eurasian.

The polyploid species are dominant in the karyotype spectrum (Fig. 5) with a percentage of 66,6%, and 12 species, followed by the diploid species (22,2%, D = 4 species) and the diplo-polyploid species (11,1%, D-P = 2 species).

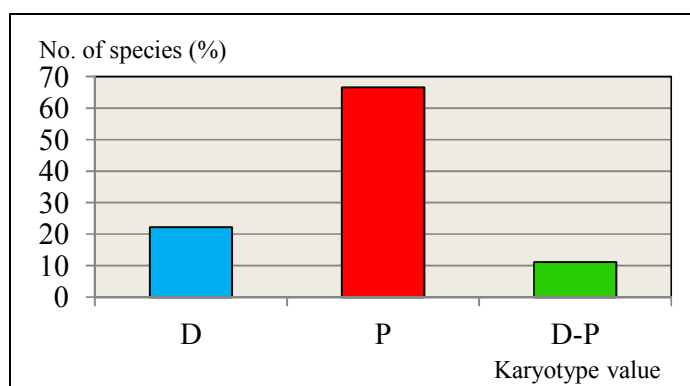


Fig. 5 – The karyotype spectrum of association *Juncetum effusi* Soó (1931) 1949, where: D - diploidy; P – polyploidy; D-P – diplo-polyploidy.

CONCLUSIONS

The analysis results of the eight surveys realised for the association *Juncetum effusi* Soó (1931) 1949, in that concerning the bioforms, floristic elements and ecological indices, shows that our results are according with specialty literature and the floristic and phytocoenological composition of this association is rich and varied.

The installation and development of this kind of hygrophilic phytocoenose is favoured by the stational conditions on plane surfaces, with a surplus of soil humidity almost throughout the year (alluvial soils, gleic and pseudogleic).

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