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CONTRIBUTION TO THE KNOWLEDGE OF THE MEADOWLANDS FROM THE MIDDLE AND INFERIOR BASIN OF CRIŞUL NEGRU RIVER

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Abstract

The meadowlands from the middle and inferior basin of Crisul Negru river form an area with rich flora and vegetation suitable for a complex fitocenological research and an ecologic and bio-economical study of the floor vegetation. This work represents a phytocoenologic, ecological, bioeconomic and ecoprotectiv study on the vegetation of the meadowlands from the middle and inferior basin of Crisul Negru river. Also, based on these area research results, after carrying out the floristic and fitocenological study of the meadowlands, the possibility to revaluate their productive potential will be established.

After conducting a 40 phytocoenologic surveys on the meadowlands near Cociuba Mare, Holod and Miersig villages there have been identified a number of ten vegetal associations from which only one is examined in this work: Agrostio-Festucetum valesiacae Borisavljevič et al. 1955.

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

INTRODUCTION

The middle and inferior basin of Crisul Negru river is located in NW Romania between 46°42' north latitude and between 21°16' east longitude, being enclosed between the basin of Crisul Repede river in the north and the basin of Crisul Alb river to the south.

The plain of Crişul Negru is situated in the hydrographic basin of Tisa, the plain being watered by Crişul Negru, which has a general course in the direction east-west, and by its confluents. Crişul Negru springs from the northern flank of Curcubăta peak, from the altitude of 1460 m, near the springs of Arieşul Mic. Regarding the hydrological data of the river Crişul Negru we have: the length of the river – 560 km; the medium flow – Zerind 31,40 m^3/s; the maximum registered flow – Zerind 648 m^3/s; minimum registered flow – Zerind 0,47 m^3/s.

The soils of the Crişul 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 Crişul Negru is tessellated; the inter-region soils dominate (alluvial, swamp soil, gleic soil and pseudogley, salty soils).

On the Plain of Crişul Negru, the summers are hot and humid, and the winters are cold, sometimes accompanied with blizzards; in the winter, the periods of warming up are rare as the snow bed is thicker and more stable.

A part of the middle and inferior basin of the Crişul 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

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 element, the ecological indices (moisture, temperature, chemical reaction of the soil), the serial number of surveys, altitude (m.s.m.), area (m^2), 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 phytocenosis of this association were identified in the steppes and silvosteppe meadows from Cociuba Mare, Holod, Miersig respectively.

The phytocenosis of association *Agrostio-Festucetum valesiacae* (Fig. 1) have a character clearly xerophile, impressed by the dominant species, *Festuca valesiaca* and by the large frequency of some xerophilic species. Those cenosis are spread on degraded soils, intensively grazed, compact, formed on a crystalline substrate. In the phytocenosis identified on arid and intensely sunlit soils, *Festuca valesiaca* is spread on little hillocks, without moisture. The mezophile forms are spread on the lower forms.

Fig. 1 – Association *Agrostio-Festucetum valesiacae* Borisavljevič et al. 1955, meadowlands - Cociuba Mare village, Bihor county.

The association *Agrostio-Festucetum valesiacae* (Table 1) totals 34 species. The physiognomy of the association is impressed by *Festuca valesiaca* with a coverage of 69,64% ADm and a maximum constancy.

Table 1

Agrostio – Festucetum valesiacae Borisavljevič et al. 1955
(Syn.: Medicagini - Festucetum valesiacae subass. Anthoxanthetosum odorati Chifu et Ştefan 1978;
Agrostio – Festucetum valesiacae Ardelean 1983; Agrosteto – Festucetum sulcatae M. Csűrös – Káptalan 1971),

L.f.	F.e.	U	T	R	2n	No. Land Surveys	1	2	3	4	5	6	7	K	ADm
						Altitude (m.s.m.)	180	160	140	150	160	140	160		
						Area (m²)	100	25	10	10	8	15	16		
						The coverage of grass layer (%)	100	85	100	95	100	85	95		
H	Eua(C)	1,5	4	4	D	As. Festuca valesiaca	4	4	5	4	5	4	4	V	69,64
H	Cp	0	0	0	P	As. Agrostis capillaris	2	1	1	2	+	1	2	V	9,71
						Arrhenatherion, Arrhenatheretalia, Molinio-Arrhenatheretea									
H	Eua	3	0	0	P	Achillea millefolium	1	+	+	1	+	1	1	V	3,07
H	Eua	2,5	0	0	P	Lotus corniculatus	+	+	.	+	+	.	.	III	0,28
H	Ec	3	2,5	3	D	Centaurea phrygia	+	.	.	.	.	+	.	II	0,14
Th-H	Eua(M)	2,5	3	0	D	Daucus carota ssp. carota	+	+	+	+	+	+	+	V	0,5
H	Eua	0	0	0	D-P	Anthoxanthum odoratum	.	+	.	+	+	.	.	III	0,21
H	Eua	3	0	0	D-P	Centaurea jacea	.	+	.	.	+	.	.	II	0,14
Ch	Cosm	3	0	0	P	Cerastium holosteoides	.	+	.	+	.	+	.	III	0,21
H	Eua	3,5	3	0	D	Holcus lanatus	.	+	.	+	+	.	.	III	0,21
H	Eua	3	0	0	D	Trifolium pratense	.	.	.	+	.	+	.	II	0,14
H	E	3	3	3	D	Cynosurus crystatus	+	+	+	.	.	.	.	III	0,21
H	Eua	3,5	0	0	P	Trifolium repens	+	+	.	+	.	.	+	III	0,28
H	Ec	4	3	4	P	Festuca arundinacea	.	+	+	+	+	.	.	III	0,28
H	E(M)	3,5	3	4	D	Trifolium hybridum	.	+	.	.	.	+	.	II	0,14
						Stellarietea									
H	Cosm	2	3	3	P	Rumex acetosella	.	+	+	+	.	.	+	III	0,28
Th	Eua	3,5	3	3	D	Vicia tetrasperma	.	+	.	+	.	+	.	III	0,21
Th	E(M)	2,5	3	0	D-P	Geranium pusillum	.	+	.	.	.	+	.	II	0,14
H-G	Cosm	0	0	0	P	Convolvulus arvensis	.	+	.	.	+	.	+	III	0,21

L.f.	F.e.	U	T	R	2n	No. Land Surveys	1	2	3	4	5	6	7	K	ADm
						Festuco-Brometea									
Th	E	3	3	0	D	Trifolium campestre	+	+	.	+	.	.	.	III	0,21
Ch	P-Pan	2	4	0	P	Thymus glabrescens	+	1	.	.	.	.	+	III	0,85
H	P-Pan	5	4	2	D-P	Eryngium campestre	+	+	+	.	.	.	.	III	0,21
H	Eua	2	4	2	D	Potentilla argentea	.	+	.	+	+	+	.	III	0,28
H	Eua	3	0	3	D	Galium glaucum	.	+	.	.	.	.	+	II	0,14
						Trifolio-Geranietea									
H	Eua	2,5	3	4	P	Agrimonia eupatoria	+	+	.	.	+	.	+	III	0,28
H	Ec	2,5	3,5	5	D	Dorycnium herbaceum	.	+	.	.	+	.	.	II	0,14
						Artemisietea									
TH	E	2	3	0	D	Carduus acanthoides	+	+	+	.	.	1	.	III	0,92
						Nardo-Callunetea									
H	E(M)	2,5	0	0	D-P	Hieracium pilosella	.	+	.	+	.	.	.	II	0,14
						Koelerio-Corynephoretea									
Th	Eua(M)	1	3,5	2	P	Vulpia myuros	.	.	.	.	.	.	1	II	1,42
						Accompanying									
H	Eua(C)	2,5	3	3	D	Ranunculus polyanthemos	.	.	.	+	+	+	.	III	0,21
Th	Eua	4	0	4	P	Stenactis annua	.	+	+	.	.	+	.	III	0,21
H	Eua	2,5	0	0	D	Leontodon hyspidus	.	.	+	.	+	.	.	II	0,14
Ch	Eua	2	2	2	D-P	Veronica officinalis	.	.	.	+	+	+	.	III	0,21
TH-H	Eua	2	3	4	P	Verbascum nigrum	.	.	+	.	+	+	.	III	0,21

Place and date of surveys: 1 – Meadowlands - Cociuba Mare village, Bihor county, 26.06.2009; 2, 3, 4 – Meadowlands - Holod village, Bihor county, 29.07.2010; 5, 6, 7 – Meadowlands - Miersig village, Bihor county, 15.08.2010.

The analysis of the association on the aspect of the main ecological factors (Fig. 2) emphasize the dominant xero-mezophile character (44%, $U_{2-2,5}$ = 15 species), followed by the mezophile (32,2%, $U_{3-3,5}$ = 15 species). Depending to the temperature, the association has a micro-mezotherm character (44%, $T_{3-3,5}$ = 15 species), followed by thermic amphitolerant (38,2%, T_0 = 13 species), and depending on the chemical reaction of the soil, it manifests a euriionic character (50%, R_0 = 17 species).

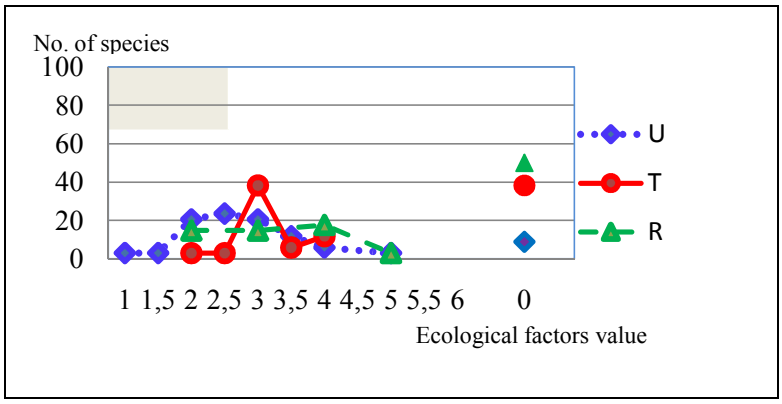

Fig. 2 – Diagram of ecological factors for the association *Agrostio-Festucetum valesiacae* Borisavljevič et al. 1955, where: U – humidity, T – temperature, R – the chemical reaction of the soil.

The life forms spectrum (Fig. 3) is dominated by hemicryptophytes (64,7%, H = 22 species). From the point of view of the floristic elements (Fig. 4), most of them are euroasiatic species (44,1%, Eua = 15 species).

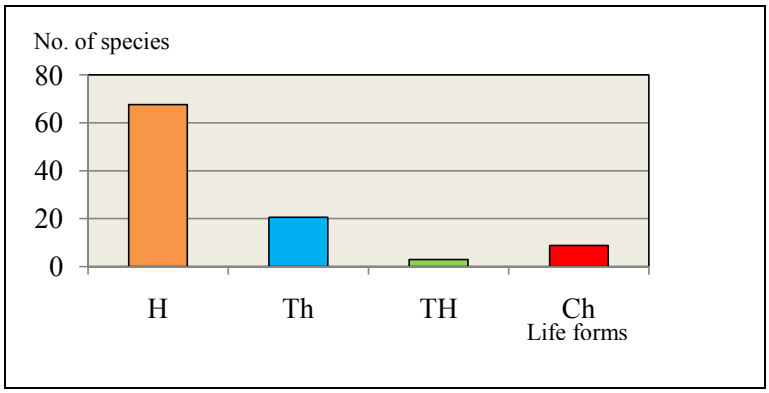

Fig. 3 – The life forms spectrum of association *Agrostio-Festucetum valesiacae* Borisavljevič et al. 1955, where: H – Hemicryptophytes; Th - Euterophytes; TH – Hemiterophytes; Ch – Chamaephytes.

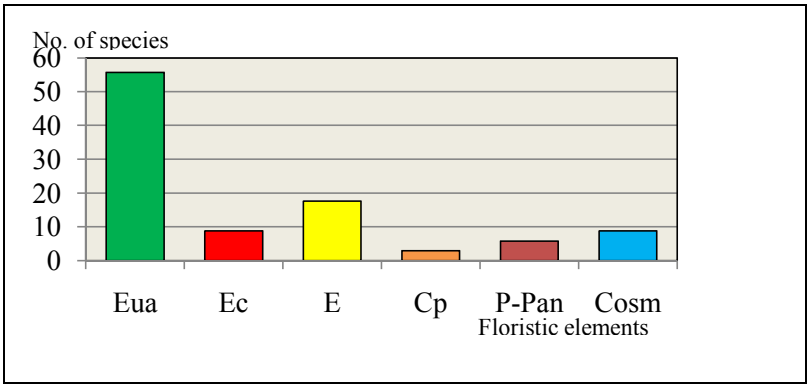

Fig. 4 – Spectrum of floristic elements of the association *Agrostio-Festucetum valesiacae* Borisavljevič et al. 1955, where: Eua - Eurasian; Ec - Central European; E - European; Cp - Circumpolar; P-Pan – Ponto-Pannonian; Cosm – Cosmopolitan.

The diploid (44,1%, D = 15 species), the polyploid species (38,2%, P = 13 species) and the diplo-polyploid (17,6%, D = 6 species) partake in the karyotype spectrum (Fig. 5).

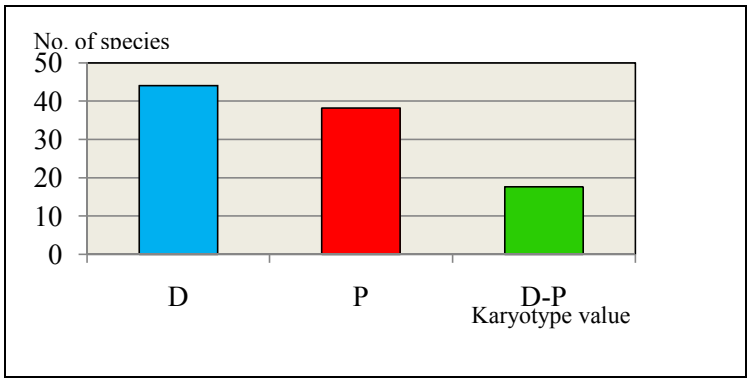

Fig. 5 – The karyotype spectrum of association *Agrostio-Festucetum valesiacae* Borisavljevič et al. 1955, where: D - diploidy; P – polyploidy; D-P – diplo-polyploidy.

CONCLUSIONS

After the fitocenological, ecological and bio-economical study of the floor vegetation from the searched area, a summary of the vegetal associations will be made specifying the characteristics of cenotaxons and the dynamics and succession of the vegetal formations from the meadowlands of the middle and inferior basin of Crisul Negru river.

After completion of floristic and fitocenological study of the lawns, their productive potential development possibilities will be established,

together with the specification of the species, fitocenoses and rare ecosystems protection measures.

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