STUDY REGARDING THE HALOPHILOUS VEGETATION OF THE CRIȘURILOR PLAIN (NORTH WESTERN ROMANIA)

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Abstract

This work represents a phytocoenological study of the halophilic association Plantaginetum maritimae Rapaics 1927, which is classified from the coenotaxonomic point of view in the class Puccinellio-Salicornietea Ţopa 1939.

On the halomorphic soils of the meadows surrounding Salonta locality, Mărţihaz and Mădăras village, all located in Crişurilor Plain, Bihor county, Romania, have been identified a number of ten halophilic associations from which one is examined in this work.

Plantaginetum maritimae association, Rapaics 1927, was analyzed in terms of floristic composition, life forms spectrum, floristic elements, ecological indices and karyotype spectrum.

Key words: phytocoenoses, halophilous vegetation, ecological indices, floristic elements, life forms.

INTRODUCTION

This association was mentioned and studied in our country by many authors, including: in Muntenia (Popescu et al., 1984; Şerbănescu, 1965; Sanda et al., 1978), in Dobrogea, including the Danube Delta (Popescu et Sanda, 1973, 1976), in Transilvania (Morariu et Ularu, 1968).

The territory chosen for research, had not been studied thoroughly by those who had floristic and phytocoenological concerns and were not made many scientific communications and publications about this area. Studies were found in the author paperwork's (Pop, 1959, 1968), (Popescu, 1963), (Ardelean, 1999), (Burescu, 2003). In their work the cited author were related to a larger area. The complex study of flora and vegetation is absolutely necessary especially in regions with less or no researches.

Type of habitat: Natural Habitat of Community interest whose conservation requires the designation of Special Areas of Conservation (ASC), Natura 2000: 1530* Pannonic salt-steppes and salt-marshes.

Code R1522 Ponto-Sarmatian Communities of *Plantago maritima* and *Limonium gmelini* (Doniţă et al., 2006, Gafta et al., 2008).

MATERIAL AND METHODS

Crișurilor Plain is located in the middle of the Banato-Crişene Plain, between Barcău river and the northern edge of the alluvial cone of Mureș river. It has an area equal to Someș Plain, about 3600 km^2, its altitude varying between 90-180 m. It has the most branches eastwards, deep into the hills, especially on Barcău, Crişul Negru and Crișul Alb rivers.

On taking into consideration several papers in the specialty literature (Sanda et al., 1998; Sanda et al., 2008), the *Plantaginetum maritimae* association Rapaics 1927 was classified in the following coenosystem:

Class: ***Puccinellio-Salicornietea*** Țopa 1939

Order: ***Puccinellietalia limosae*** (Soó 1968) Géhu et Rivas-Martinez 1982

Alliance: ***Puccinellion limosae*** (Klika 1937) Wendelberger 1943

The study of *Plantaginetum maritimae* association was made taking into consideration the phytosociological research method of the European Central School, based on the principles and methods elaborated by Braun-Blanquet (1964) and adapted by Borza et Boşcaiu (1965) to the particularities of the vegetation carpet from our country.

The taxa identified in the field have been recognized by specialty catalogues ”Romania’s Illustrated Flora” (Ciocârlan, 2009), in conjunction with the information provided by the ”International Code of Botanical Nomenclature” (Code de Tokyo, 1993).

The association synthetic table was structured after the methodology proposed by Braun-Blanquet J. (1964) and developed by Ellenberg H. (1974); therefore, in the column header of the table for the association analyzed the following have been entered: the serial number of land surveys, altitude (m.s.m.), area (m^2), coverage (%).

Participation of each species to the association table was made with the help of the abundance–dominance index (ADm), according to the system developed by Braun-Blanquet (1964) and completed by Tüxen and Ellenberg (1937).

To the end of the table was registered and calculated the constancy (K), the phytocenotical index whose class is between I-V and expresses the coenetic fidelity degree of each species to the ambiance of the association's phytocoenoses (Braun-Blanquet et Pavillard, 1928).

Establishment of ecological index values, life forms, floral elements, and karyotype, were made after the work of synthesis developed by (Raunkiær, 1937), (Meusel et Jäger, 1992), (Ellenberg, 1974), (Májovsky et Murin, 1987), (Sanda et al. 1983), (Ciocârlan, 2009).

RESULT AND DISCUSSION

Phytocoenosis analyzed were identified on salty wet soils, dry during the summer season, which forms a crust of salt on the surface, in the grasslands near Salonta, Mărțihaz and Mădăras localities.

The floristic and phytocoenological characterization of *Plantaginetum maritimae* association Rapaics 1927 (*Fig. 1*) reveals that the composition includes eighteen varied species (*Table1*).

Table 1

Plantaginetum maritimae Rapaics 1927

L.f.	**F.e.**	**W**	**T**	**S.r.**	**2n**	**No. Land Surveys**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**K**	**ADm**
						Altitude (m.s.m.)	94	94	94	95	95	95	95	95		
						Area (m²)	10	8	8	15	20	20	10	8		
						The coverage of grass layer (%)	95	70	90	90	90	95	100	80		
H	Eua(M)	4	0	5	D	As. *Plantago maritima*	5	4	5	4	4	5	5	4	V	75
						Puccinellion limosae, Puccinellietalia limosae, Puccinellio-Salicornietea										
H	Pn	3,5	0	5	P	*Puccinellia limosa*	+	1	.	+	+	+	1	1	V	2,12
H	Eua(C)	3	3	0	P	*Achillea setacea*	1	+	.	2	2	+	+	1	V	5,81
TH-H	Eua(M)	3	3	0	P	*Inula britannica*	+	.	+	1	1	.	1	1	IV	2,62
H(TH)	Eua	2,5	3,5	4,5	D	*Cichorium intybus*	.	+	.	+	+	+	.	+	IV	0,31
Ch(H)	Eua(C)	2,5	4	0	D	*Artemisia maritima*	+	+	+	.	+	+	.	.	IV	0,31
Th	Cosm	2,5	0	3	P	*Polygonum aviculare*	+	.	.	+	+	.	.	+	III	0,25
G	Cp-Bo	4,5	3	5	P	*Juncus gerardii*	+	+	.	+	+	.	.	.	III	0,25
H(TH)	Mp	2	4	4,5	D	*Scorzonera cana*	.	.	.	.	.	.	+	+	II	0,12
Th-TH	Eua	2	3,5	0	P	*Lepidium ruderale*	+	.	.	.	+	.	.	.	II	0,12
Th	Eua(C)	2	3	2	D	*Gypsophila muralis*	.	+	.	.	.	1	.	+	II	0,75
H	Eua(C)	2	4	4	D,P	*Festuca pseudovina*	.	+	.	+	.	.	+	.	II	0,18
Th	B-Cauc	0	4	4,5	D	*Trifolium angulatum*	.	.	.	.	+	.	.	.	I	0,06
						Molinio-Arrhenatheretea										
H	Eua	0	0	0	D	*Plantago lanceolata*	.	.	+	.	.	+	+	.	II	0,18
H	Eua(C)	4	3	4	P	*Juncus atratus*	+	.	+	.	.	.	.	.	II	0,12
H	Eua(M)	4	3	4	P	*Mentha pulegium*	.	+	.	.	.	.	.	.	I	0,06
H	Cp-Bo	3	3	0	P	*Prunella vulgaris*	.	.	.	+	.	.	.	.	I	0,06
H	Eua(M)	2,5	4	4,5	D	*Lolium perenne*	+	.	.	.	.	.	.	.	I	0,06

Place and date of surveys: 1 – 3 Salonta locality (Bihor county) 29.06.2013; 4 – 6 Mărțihaz village (Bihor county) 11.07.2013; 7 – 8 Mădăras village (Bihor county) 11.07.2013.

Plantago maritima is the dominant species, with 75% ADm coverage, and a high constancy (V), along with the developing alliance characteristic species ***Puccinellion limosae***, order ***Puccinellietalia limosae*** and class ***Puccinellio-Salicornietea***: *Puccinellia limosa*, *Achillea setacea*, *Inula britannica*, *Cichorium intybus*, *Artemisia maritima*, *Polygonum aviculare*, *Juncus gerardii*, *Lepidium ruderale*, etc.

The *Plantaginetum maritimae* association table notifies the presence of transgressive species from ***Molinio-Arrhenatheretea*** class: *Plantago lanceolata*, *Juncus atratus*, *Mentha pulegium*, *Prunella vulgaris*, etc.

Fig. 1 – Association *Plantaginetum maritimae* Rapaics 1927,
Mădăras village, Bihor county.

The life forms spectrum (*Fig. 2*) is dominated by hemicryptophytes (61,11%), followed by annual therophytes (22,22%).

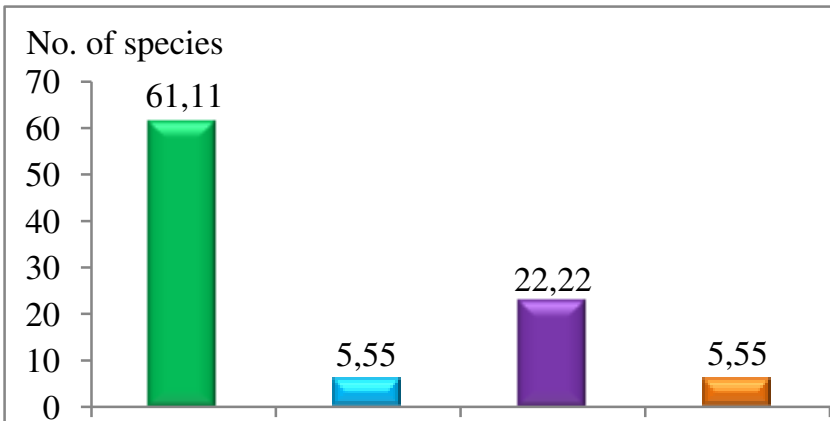

Fig. 2 – The life forms spectrum of ***Plantaginetum maritimae*** association, where:
H – hemicryptophytes, G – geophytes, Th – annual therophytes,
TH – biannual therophytes, Ch – chamaephytes.

Diagram of ecological indices (*Fig. 3*) indicate that, depending on the humidity factor, the dominant species are xero-mesophile (49,99%), followed by meso-hygrophilous (22,21%). Depending on the temperature prevailing micro-mesothermal species (49,99%), followed by the moderately thermophilic species (27,77%). The chemical reaction of the soil favors the development of slightly acid-neutrophile species (38,88%), followed by amphitolerant species (27,77%) and neutro-basophile species (22,22%).

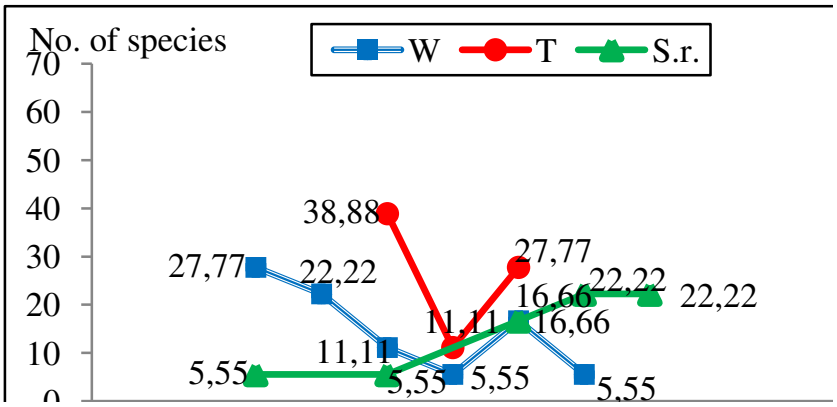

Fig. 3 – Diagram of ecological indices for the ***Plantaginetum maritimae*** association, where: W – soil wet, T – temperature, S.r. – chemical reaction of the soil.

The spectrum of the floristic elements (*Fig. 4*) is dominated by the Eurasian species (Eua = 66,66%), followed by circumpolar species (Cp = 11,11%).

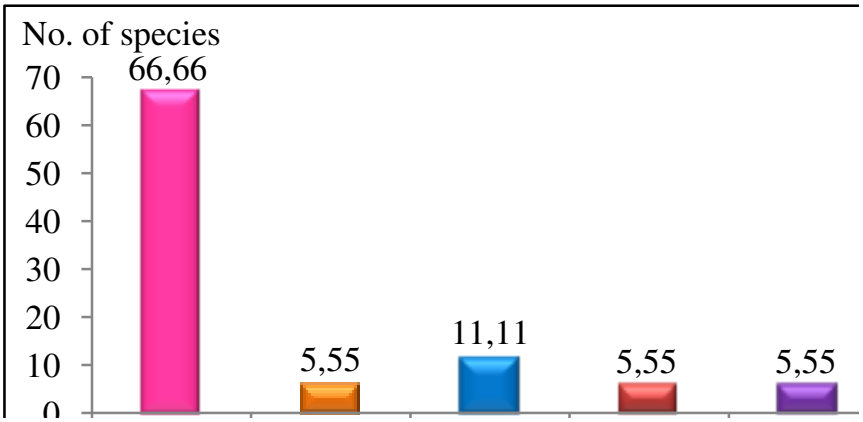

Fig. 4 – Floristic elements spectrum of the ***Plantaginetum maritimae*** association, where:
Eua – Eurasian, Cosm – Cosmopolitan, Cp – Circumpolar, Pn – Pannonian,
B – Balkan, Mp – Mediterranian-pontic.

The diploid species are dominant in the karyotype spectrum (*Fig. 5*) with a percentage of 55,55%, closely followed by the polyploid species with a percentage of 44,44% and the diplo-polyploid species with 5,55%.

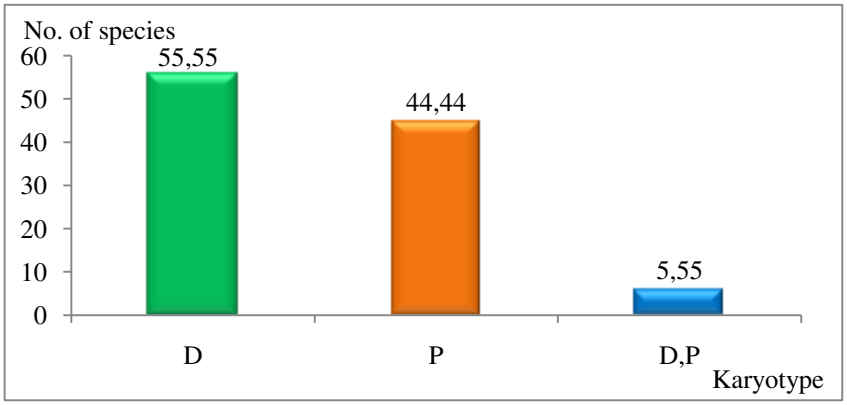

Fig. 5 – The karyotype spectrum of ***Plantaginetum maritimae*** association, where: D – diploidy, P – polyploidy, D,P – diplo-polyploidy.

CONCLUSIONS

The results obtained from the life forms analysis reveal the high percentage of hemicryptophytes (61,11%), which are main components of the meadows grass layer, the high percentage indicates that the researched area belongs to the temperate climate regions; annual therophytes have a substantial participation (22,22%), their spread is correlated with the zoo-anthropic factor influences.

In terms of requirements for humidity, the dominant species are xero-mesophile (49,99%) which signifies the presence of habitats with arid microclimate in the studied area; in relation to the temperature factor, species that are reflected in the general appearance of the flora are micro-mesothermal (49,99%), microclimate which characterizes the low and high plain of the studied territory; regarding the chemical reaction of the soil it reveals the slightly acid-neutrophile character (38,88%), followed by amphitolerant character (27,77%) and neutro-basophile character (22,22%), which reflects the existence of certain soil conditions that favor the floristic diversity in the studied area.

The floristic elements stock is dominated by Eurasian species (66,66%), with the genesis in ancient times, over which interfered in

different phyto-historical periods the circumpolar elements (11,11%), cosmopolitan elements (5,55%), etc.

Analyzing the karyotype spectrum, diploid species are dominant (55,55%), those which provide favorable genetic potential for the future phyto-evolution, alongside with diplo-polyploid species; the polyploid species (44,44%), which are easily adaptable, indicates the zoo-anthropic pressure in the last decades.

Phytocoenoses of halophilous grasslands dominated by *Plantaginetum maritimae* plant association, Rapaics 1927, is a rare natural habitat of community interest whose conservation requires the designation within the Special Areas of Conservation (ASC), Natura 2000: 1530* Pannonic salt-steppes and salt-marshes; code R1522 Ponto-Sarmatian Communities of *Plantago maritima* and *Limonium gmelini*.

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