PHYTOCOENOLOGICAL RESEARCHES ON THE ROCKY ASSOCIATION *ASPLENIO RUTAE - MURARIAE – MELICETUM CILIATAE* IN ŞOMLEU HILL

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Abstract.

This paper constitutes a basic tool in the eco-protective management of the Betfia 2000 Site. It provides valuable information on the number of species, live form, floristic elements, ecological factors and karyotype. As a result of the field research, we identified a total of 29 species, from the *Asplenio rutae - murariae – Melicetum ciliatae* association, which enhance the specialized scientific heritage.

Keywords: phytocoenological research, live forms, floristic elements, ecological factors, association, constancy.

INTRODUCTION

This phytocoenological research was conducted on a virgin field from Şomleu Hill, Betfia territorial administrative unit. Şomleu Hill is part of Lăzăreni Hills, which are also a division of Western Hills.

The present phytocoenoses has been described in other regions of the country, and this work complements other older studies from Transylvania: Feneş Basin (Hodişan, 1968); Crişana: Plopiş Mountains (Coldea, 1972), Ordâncuşii Gorges (Bihor mountains) (Pop et Hodişan, 1964).

The association identified at the Betfia 2000 site is an open coenosis which vegetates on limestone rocks, rough blocks of stone and skeletal soils (Fig. 1).

Figure 1. *Asplenio rutae - murariae - Melicetum ciliatae* Soo 1962, at Betfia (original)

MATERIALS AND METHODS

To describe the association, we used the traditional phytosociological research method of the Central European School based on the principles and methodology developed by Braun-Blanquet (1964) and adapted by Borza (1934) and Borza et Boşcaiu (1965) to the features of the vegetation cover in our country.

In order to realise this research we performed 2 field trips. Out of the 7 phytocoenses stands described in the field, we chose a total of five representative relevées to form a phytocoenological table. The table contains information about the species that are part of the association's floristic composition, live form, floristic element, ecological factors, karyotype, numerical order for the relevées, altitude (m.s.m.), exposition, slope, herbaceous layer cover (%), surface (m²). The sample areas oscillate from 2 to 4 square meters. The quantitative assessment of each species which participates in the association table was made using the index of abundance-dominance, and the constancy (K) was calculated and noted according to the evaluation system of Braun-Blanquet and Pavillard (1928). The locality and the date of the relevées were entered at the bottom of the table.

The data obtained from the phytocoenological and ecological research of the coenosis *Asplenio rutae - murariae – Melicetum ciliatae* were represented graphically as a spectrum of live forms, florlistic elements, ecological factors and karyotypes.

The identification of every taxon dicovered in the field was based on the determination volumes "Flora României" (1952-1976), "Flora ilustrată a României" by Ciocârlan (1990) and on the International Code of Botanical Nomenclature (Code of Tokyo, 1995) etc.

For the ordering and the grouping of the species in the association table, in what concerns superior cenotaxons, suballiance, alliance, order and class, the follwing works were consulted: Sanda et al. (2008), Pott (1995), Borhidi, (1996), Mucina et al. (1993) etc.

RESULTS AND DISCUSSIONS

The structure of the *Asplenio rutae - murariae – Melicetum ciliatae* phytocoenoses comprises a total of 29 species (Table 1), of which the following plants are characteristic and revealing species for the association: *Asplenium ruta-muraria* has a general coverage of 29.5% ADm, maximum constancy (K = V) and *Melica ciliata* ssp. *flavescens* has a general coverage of 5.7% ADm and high constancy (K = V).

16 other plants also participate as subordinate to the alliance ***Seslerio - Festucion pallentis,***, ***Stipio pulcherrimae - Festucetalia pallentis*** order***:*** *Potentilla cinerea, Thymus comosus, Poa compresa* and ***Festuco -***

Brometea class: *Bothriochloa ischaemum, Sedum acre, Achillea nobilis, Asperula cynanchica* etc.

The remaining 7 species have migrated from neighboring coenosis and belong to the classes ***Stellarietea mediae:*** *Anthemis austriaca, Bromus squarrosus, Xanthium spinosum* and ***Molinio – Arrhenatheretea:*** *Hypochaeris radicata, Leontodon hispidus, Plantago lanceolata, Cerastium fontanum.*

The analysis of the spectrum of live forms (Fig. 2) shows the dominance in association of the hemicryptophyte species (51.7%), followed by therophytes (34.5%) and chamaephytes (13.8%).

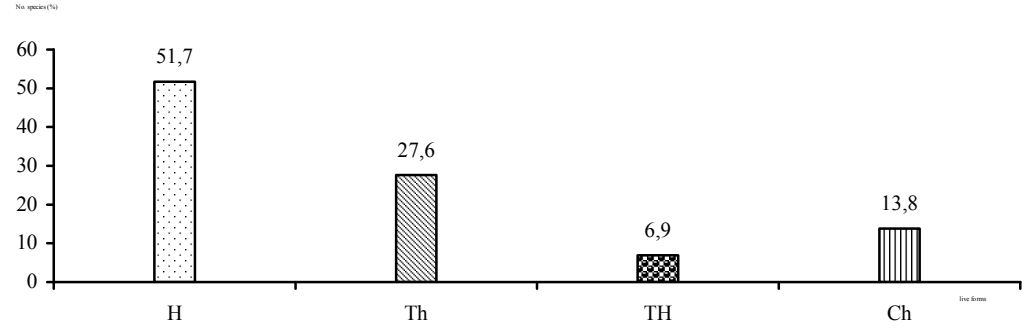

Figure 2. The spectrum of live forms from the association *Asplenio rutae - murariae - Melicetum ciliatae* (original), where: H = hemicryptophytes; Th, TH = terophytes; Ch= Chamaephytes;

The spectrum of the floristic elements (Fig. 3) is dominated by the Eurasian species (41.4%), followed by the European ones (20.7%) and the Pontic-mediterranean ones (13.8%).

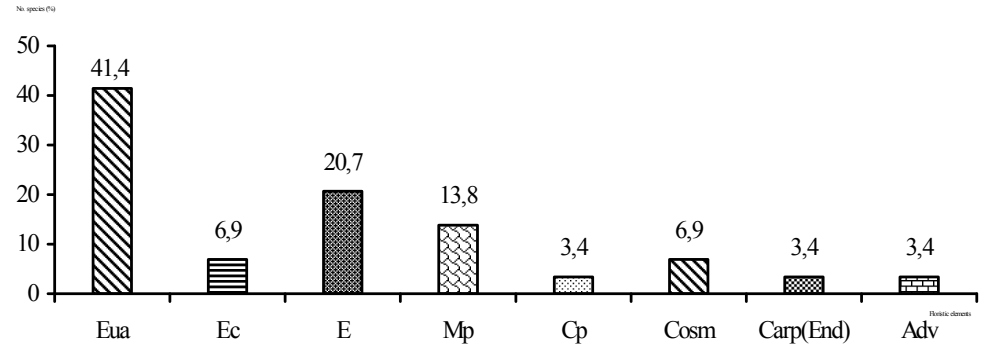

Figure 3. Spectrum of the floristic elements of the association *Asplenio rutae - murariae - Melicetum ciliatae* (original), where: Eua- Eurasian; Ec-Central European; E-European; Mp- Pontic-mediterranean; Cp- Circumpolar; Cosm-Cosmopolitan; Carp (End) - Carpathian endemism; Adv-Adventive;

The diagram of the ecological factors (Fig. 4) reveals the xero-mesophilic (58.6%), xerophilic (24.1%), micro-mesothermal (58.6%), moderately thermophilic (24.1%), eurythermic (13.8%), weak acid

neutrophil (44.8%), euriionic (24.1%) and acid-neutrophil (17.2%) character of the phytocoenoses from this association.

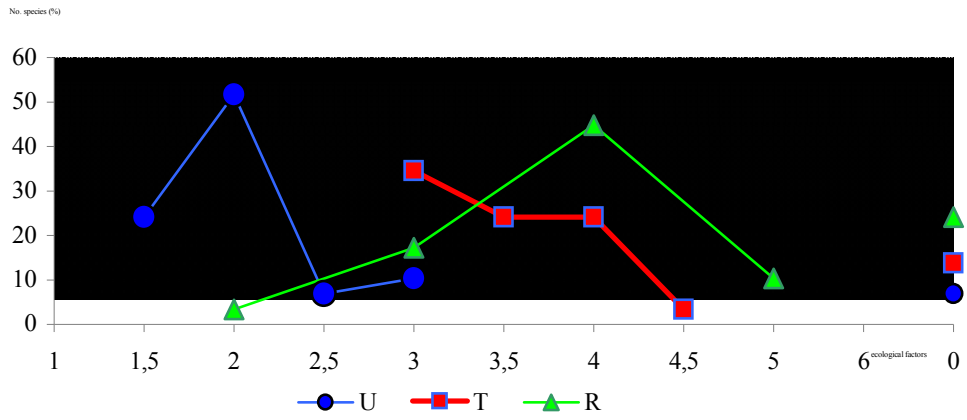

Figure 4. Diagram of the ecological factors for the the phytocoenoses from the association *Asplenio rutae - murariae - Melicetum ciliatae* (original), where: U – humidity, T – temperature, R – the chemical reaction of the soil

The karyologic spectrum (Fig. 5) shows that polyploid species prevail (48.3%), followed by diploids (41.4%) and diplo-polyploids (10.3%). The diploids index has a value of 0.85.

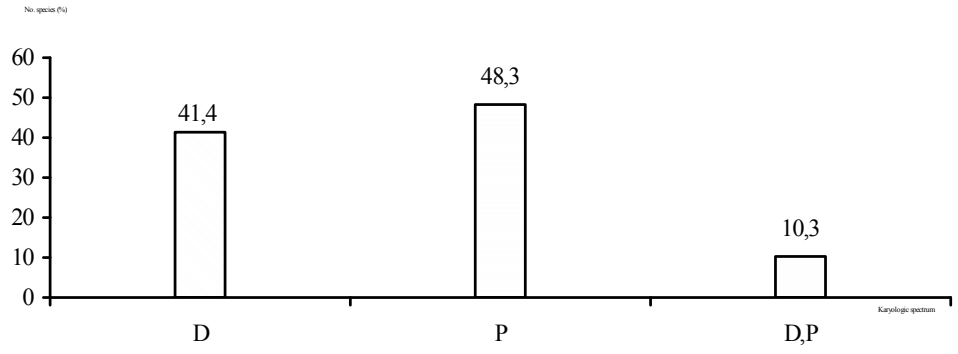

Figure 5. Karyologic spectrum of the association *Asplenio rutae - murariae - Melicetum ciliatae* (original), where:D=dyploid; P=polyploid; D.P=Dyplo-polyploid;

The phytocoenoses of *Asplenio rutae - murariae – Melicetum ciliatae* is one of the seven associations (*Sedo sexangulari - Syntrichietum calcicolae, Cleistogeno - Festucetum rupicolae, Bromo squarrosi - Xeranthemetum annui, Corno-Quercetum pubescentis, Ventenato dubiae-Xeranthemetum cylindraceum, Nymphaeetum thermalis),* which are part of the Natura 2000 – Betfia Site, and respectevly one of the 16 rare associations present in the Lăzăreni Hilles. It is a rare and vulnerable

association, registered on the red list (Dihoru et Negrean, 2009, Oprea, 2005, Oltean et al. 1994, Boşcaiu et al. 1994 etc).

So far there have been modest attempts regarding their protection. Among these we can mention the introduction of one part of the Betfia Hill in the Natura 2000 Site (ROSCI0008 Betfia) and the establishment of the nature reserve Peța Lake in the Băile 1 Mai resort. The association analyzed in the Natura 2000 site has a scientific importance because it is rare, vulnerable and calls for protection. It has a total of 29 species, which is a relatively rich biodiversity. Among them there is a Carpathian endemism (*Thymus comosus*).

This is why a constant monitoring of rare, endangered and vulnerable species (*Nymphaea lotus* var. *thermalis, Dianthus spiculifolius, Koeleria cristata, Saxifraga bulbifera, Dactylorhiza incarnata, Quercus pubescens* etc.) is recommended in order for the decision makers to apply a proper forest management that ensures their perenniality inside the phytocoenoses of forest ecosystems, aquatic ecosystems and meadows. This is possible through the accountability and involvement of local authorities, including communities that are part of this area, in various actions ment to protect the flora and the vegetation of this area.

Table1

Ass. *Asplenio rutae - murariae – Melicetum ciliatae* Soó 1962 (original)

L.f.	F.e.	U.	T.	Cr.	2n	Nr. Land Surveys	**1**	**2**	**3**	**4**	**5**	**K**
						Altitude (m.s.m.)	340	320	300	330	310	
						Exposition	E	SE	NV	SE	E	
						Slope (°)	70	70	80	90	80	
						Herbaceous cover layer%	60	55	50	75	55	
						Surface (m²)	2	2	4	4	4	
H	Cp	1,5	3	5	P	*Asplenium ruta-muraria*	3	2	3	3	2	V
H	Ec	1,5	4	4	D	*Melica ciliata* ssp. *flavescens*	+	1	+	1	2	V
						Seslerio – Festucion pallentis; Stipio pulcherrimae – Festucetalia pallentis						
H	E(c)	2	3,5	4	D,P	*Potentilla cinerea*	1	+	+	.	+	IV
Th	Carp(End)	2	3,5	4	P	*Thymus comosus*	.	+	+	+	+	IV
H	E	1,5	3	0	P	*Poa compressa*	+	+	.	+	.	III
						Festuco - Brometea						
H	Eua(M)	1,5	5	3	P	*Bothriochloa ischaemum*	+	1	+	1	+	V
Ch	Eua	0	3	3	P	*Sedum acre*	1	2	1	2	1	V
H	Eua(c)	2	3,5	4	P	*Achillea nobilis*	+	+	.	+	+	IV
H	Mp	2	3,5	4	D,P	*Asperula cynanchica*	+	+	.	+	+	IV
TH	Eua	2	3	4	P	*Echium vulgare*	+	+	+	.	+	IV
H	Eua(c)	1,5	4	4	D	*Festuca valesiaca*	+	+	.	+	+	IV
H	Eua(M)	2	3	5	D,P	*Medicago falcata*	+	.	+	+	+	IV
Th	Mp	1,5	4	3	D	*Xeranthemum cylindraceum*	+	+	+	.	+	IV
H	Eua(c)	2	3	5	D	*Achillea setacea*	+	+	.	+	.	III
						Syntrichia ruralis var. *calcicola*	+	+	.	.	+	III
Ch	Eua(c)	1,5	3,5	4	P	*Thymus pannonicus*	+	.	+	.	+	III
Th	Mp	2	4	3	D	*Xeranthemum annuum*	+	.	+	+	.	III
Ch	Ec	2	3	0	P	*Sedum sexangulare*	+	+	.	.	.	II
						Stellarietea mediae						
Th	E(c)	2	4	4	D	*Anthemis austriaca*	+	+	.	+	.	III
Th	Eua	1,5	4	4	D	*Bromus squarrosus*	+	+	.	+	.	III
Th	Adv	2,5	4	3	P	*Xanthium spinosum*	+	+	+	.	.	III
						Molinio – Arrhenatheretea						
H	E	3	3	2	D	*Hypochaeris radicata*	+	+	+	+	+	V
H	Eua	2,5	0	0	D	*Leontodon hispidus*	+	+	+	.	+	IV
H	Eua	0	0	0	D	*Plantago lanceolata*	+	.	+	+	1	IV
H	Cosm	3	0	0	P	*Cerastium fontanum*	+	+	.	+	.	III
						Însoțitoare						
Th	E(M)	2	3	0	P	*Cerastium pumilum*	+	+	+	+	.	IV
Ch	Mp	2	3,5	4	P	*Teucrium chamaedrys*	+	+	.	+	+	IV
H	Cosm	3	0	4	D	*Asplenium trichomanes* ssp. *quadrivalens*	+	+	+	.	.	III
TH	E (M)	2	3	0	D	*Carduus acanthoides*	+	.	+	+	.	III
Th	Eua(M)	2	3	0	P	*Filago germanica*	+	.	.	+	+	III

Locality: 1 - 5. Şomleu Hill - Betfia Site 2000, 5.07.20011;

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