PHYTOCENOLOGICAL RESEARCHES ON THE GRASS LANDS OF OAS MOUNTAINS (NORTH WESTERN ROMANIA)

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Abstract

In this paper we present a phytocoenological study of the phytocoenoses of the association ***Clinopodio-Pteridietum aquilini*** *Dihoru 1975, identified in Magura Tarsoltului and in Bixad. This association includes invasive species especially Pteridium aguilinium, which has a highly developed rhizome and efficient for the propagation on mountain and hills meadows.*

The phytocoenosis of these associations were analyzed in terms of floristic composition, life forms spectrum, floristic elements, and ecological indices.

Key words: association, phytocoenosis, biological forms, floristic elements, ecological factors, Oas Mountains.

INTRODUCTION

The Oas Mountains are located in the north-west of the Oriental Carpathians, between Tisa and the Maramures Depression to the north, Gutai Mountains to the east, the River Tur to the south and the Somes Plain to the west.

The studied region has a temperate continental climate, with mild winters (average temperature ranges from -3° to 3°) and warm summers (average temperature of 15-20°).

The phytocoenoses of the association were found on slopes with exposition south, south-west and south-east, with a drop of 5°- 10°, at altitudes of 350-550 m.

The phytocoenosis edified by *Pteridium aguilinium* occupies relatively large surfaces to the edge of the forest, in clearings of forests and grasslands and is cited for the first time in the Oas Mountains area.

This association is also described in Crişana (Raţiu et al., 1966; Karácsony, 2011) and Banat (Peia, 1978; Arsene et al., 2001).

MATERIALS AND METHODS

The identification, as detailed as possible, of the phytocoenosis of the association *Clinopodio-Pteridietum aquilini* Dihoru 1975 (Fig. 1), from the Oaş Mountains was based on field investigations during the years 2010 - 2012. The nomenclature of taxa was done according to Ciocârlan (2009). In the study of vegetation we used phytocoenological research methods of

Central European school based on the principles and methods elaborated by Braun-Blanquet (1964), Ellenberg (1974) and adapted by Borza et Boşcaiu (1965), at the particularities of the vegetal carpet in our country.

For ordering and grouping the species in the association table (Table 1), to superior cenotaxons, sub-alliance, alliance, order and class were considered the traditional ecological-floristic systems of the authors Braun-Blanquet (1964), Ellemberg (1974), Tüxen (1955), Soó (1980) and also the paper recently appeared belonging to Sanda et al., (2008).

RESULTS AND DISCUSSIONS

In the studied region the phytocoenosis belonging to this association (Fig. 1) were identified on the hill between Măgura Târşolţului and Bârloge, at the foot of Măgura Târşolţului and the Piatra Bixadului Hill.

The physiognomy of the association is given in the upper layer by *Pteridium aguilinium*, dominant species and *Clinopodium vulgare*, in the lower layer (Fig.1). Along with revealing and characteristic species there are many belonging species, the alliance *Trifolion medii,* the order *Origanetalia vulgris* and the class *Trifolio-Geranietea sanguine: Dactylis glomerata, Centaurea jacea, Calamintha menthfolia, Knautia arvensis, Trifolion medium, Agrimonia eupatoria, Campanula persicifolia, Gentiana asclepiadea, Hypericum perforatum* (Table 1).

Also noted is the presence of transgressive species of the class: *Molinio-Arrhenatheretea*: *Achillea milefolium, Campanula patula, Galium mollugo, Holcus lanatus, Leontodon hispidus* (Table 1).

Fig. 1. *Clinopodio-Pteridietum aquilini* Dihoru 1975, Măgura Târşolţului

In the life forms spectrum (Fig. 2), hemicryptophytes are dominant (H =

79.24%), followed by therophytes (T = 5.65%) and chamephytes (Ch = 3.77%).

In the floristic elements spectrum (Fig. 3), Eurasian species are predominate (Eua = 62.26%), followed by European (E = 18.86%) and Circumpolar species (Cp = 9.43).

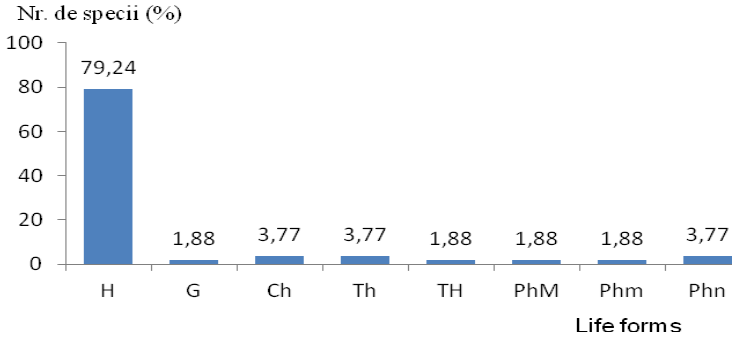

Fig. 2. Life forms spectrum of the association *Clinopodio-Pteridietum aquilini* Dihoru 1975

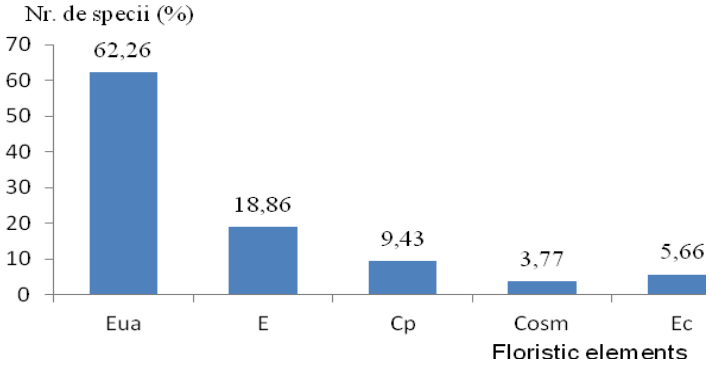

Fig. 3. Floristic elements spectrum of the association *Clinopodio-Pteridietum aquilini* Dihoru 1975

The diagram of the ecological indices (Fig. 3), shows that most species of the association are mesophylous in terms of humidity ($U_{3-3,5}$ = 49.04%), followed by xero-mesophylous ($U_{2-2,5}$ = 35.84%). Depending on the temperature the majority are micro-mesothermophylous ($T_{3-3,5}$ = 54.71%) followed by eurithermophylous (T_0 = 23.91%). species ($T_{2-2,5}$ = 12.11%), and from the chemical reaction of the soil, the dominant species are euri-ionical (R_0 = 41.50%), followed by acid-neutrophylous ($R_{3-3,5}$ = 20.75%) and weak acid-neutrophylous (R_4 = 13.20%).

Table 1

Association *Clinopodio-Pteridietum aquilini* Dihoru 1975

Biof.	E. f.	U	T	R	Nr. releveului	1	2	3	4	5	K
					Expoziția	S	SV	S	SV	SE	
					Altitudinea	350	400	400	450	550	
					Înclinarea	10	5	5	10	5	
					Acoperire vegetație (%)	60	85	75	55	100	
					Suprafață (m^2)	50	50	100	100	100	
					Char. Ass.						
H	Cp	2	3	3	*Clinopodium vulgare*	+	+	+	+	+	V
G	Cosm	3	3	0	*Pteridium aguilinium*	5	5	5	5	5	V
					Trifolion medii						
H	Eua	3	0	4	*Dactylis glomerata*	.	+	.	+	.	II
H	Eua	3	0	0	*Centaurea jacea*	.	.	+	+	.	II
H	Ec	2,5	3,5	5	*Calamintha menthfolia*	+	.	+	.	+	III
Ch-H	Eua	3,5	3	0	*Glechoma hederacea*	+	.	+	.	.	II
H	E	2,5	3	0	*Knautia arvensis*	.	+	.	+	.	II
H	Eua	3	3	0	*Trifolion medium*	+	.	+	.	+	III
H-Ch	Eua	3	0	0	*Veronica chamaedrys*	+	+	.	+	+	IV
H	Eua	3	0	3	*Vicia craca*	+	+	.	.	+	III
					Origanetalia vulgris, Trifolio-Geranietea sanguinei						
H	Eua	2,5	3	4	*Agrimonia eupatoria*	.	.	+	.	+	II
H	Eua	3	3	0	*Campanula persicifolia*	.	.	+	.	+	II
H	Eua	0	3	0	*Carex spicata*	.	.	.	+	.	I
H	Ec	4	2	4	*Gentiana asclepiadea*	.	+	.	+	+	III
H	Eua	3	3	0	*Hypericum perforatum*	+	.	.	.	+	II
H	Eua	2,5	3	3	*Origanum vulgare*	.	+	.	.	.	I
H	Ec	2,5	3	0	*Peucedanum oreoselium*	+	+	.	+	+	IV
H	Eua	2	2	4	*Silene nutans*	.	.	+	.	+	II
TH-H	Eua	2	3	4	*Verbascum nigrum*	.	.	+	.	+	II
					Molinio-Arrhenatheretea						
H	Eua	3	0	0	*Achillea milefolium*	+	+	+	+	.	IV
H	Cp(bor)	0	0	0	*Agrostis capillaris*	.	+	+	+	+	IV
TH	E	3	2,5	3	*Campanula patula*	.	.	+	.	+	II
H	Cp(bor)	3	0	0	*Festuca rubra*	.	.	+	+	.	II
H	Eua	3	0	3	*Galium mollugo*	+	+	.	.	+	III
H	Eua	3,5	3	0	*Holcus lanatus*	.	.	.	+	.	I
H	Eua	2,5	0	0	*Leontodon hispidus*	+	+	+	+	+	V
H	Eua	3	0	0	*Leucanthemum vulgare*	.	.	+	+	.	II
H	Eua	0	0	0	*Plantago lanceolata*	+	+	.	.	.	II
H	Cp(bor)	3	3	0	*Prunella vulgaris*	.	.	.	+	.	I
H	Cp	3	0	0	*Poa pratensis*	.	.	+	+	+	III
H	Eua	2,5	3	3	*Ranunculus polyanthemos*	.	.	+	+	+	III
					Festuco-Brometea						
H	Eua	2,5	4	4	*Brachypodium pinnatum*	+	.	+	.	+	III
H	E	2	5	5	*Dianthus carthusianorum*	.	+	.	+	+	III
H	Eua	2	3	4	*Euphorbia cyparissias*	+	+	.	.	.	II
H	Eua	2,5	2,5	0	*Galium verum*	.	+	.	+	+	III
					Nardo-Callunetea						
H	E	0	3	2	*Danthonia decumbens*	.	+	+	.	.	II
H	Eua	4	3	2	*Hypericum maculatum*	+	+	.	.	+	III
H	Eua	2,5	0	0	*Hieracium pilosella*	+	.	.	+	+	III
H	Eua	0	0	0	*Potentilla erecta*	.	.	+	+	+	III
H	Eua	2,5	3	2	*Viola canina*	+	.	+	.	+	III
					Querco-Fagetea						
PhM	Eua	3	3	3	*Betula pendula*	.	+	.	.	+	II
H	Eua	3	2	2	*Cruciata glabra*	+	+	+	+	+	V
Th	Cosm	3,5	3	3	*Geranium robertianum*	+	.	+	+	.	III
H	E	3,5	3	3	*Pulmonaria officinalis*	+	+	+	+	.	IV
Phn	E	3	2,5	3	*Rubus hirtus*	+	+	.	.	+	III
H	Eua	3	3	4	*Viola reichenbachiana*	+	.	+	.	+	III

					Variae syntaxa						
H	Eua	2,5	3	2	*Calamagrostis arundinacea*	+	.	.	+	+	III
Phn	E	2,5	3	3	*Crataegus monogyna*	+	.	+	.	+	III
Phm	E	3	3	3	*Corylus avellana*	.	+	.	+	.	II
H	Eua	3	2,5	0	*Fragaria vesca*	+	+	+	.	+	IV
Th	Eua	3	2	0	*Galeopsis speciosa*	.	.	.	+	+	II
Ch	E	4	3	0	*Lysimachia nummularia*	.	.	+	+	.	II
Phn	E	2	3	3	*Rosa canina*	+	.	+	.	.	II
Place and date of mapping: Măgura Târşolţ, 03.07.2010 (rel.1-3), Piatra Bixadului 03.07.2010 (rel.4-5)											

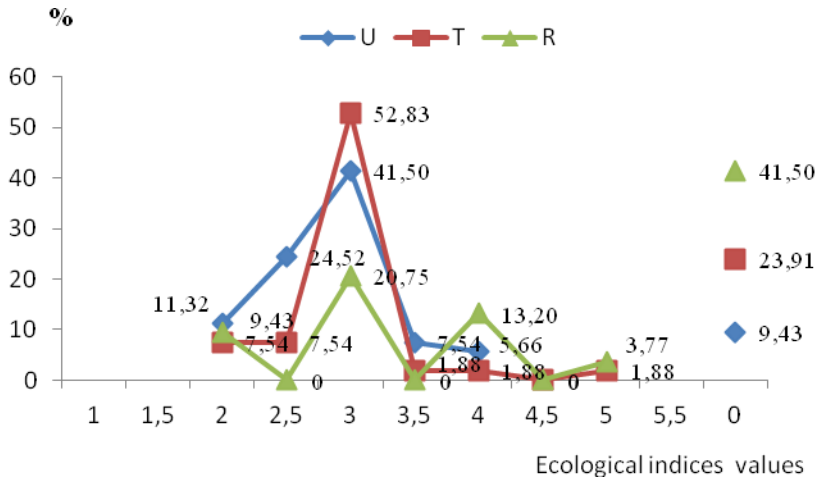

Fig. 4. Diagram of ecological indices for the association *Clinopodio-Pteridietum aquilini* Dihoru 1975

CONCLUSIONS

In the association *Clinopodio-Pteridietum aquilini* Dihoru 1975, it is noted the presence of numerous transgressive species of the classes *Molinio-Arrhenatheretea, Festuco-Brometea, Querco-Fagetea* (Table 1).

In the studied association, the majority of the species are Eurasian, hemicryptophytes, their abundance is influenced by moderate temperate climate zone. The high percentage of mesophytes expresses the humidity and the micromesothermal abundance is the consequence of relatively high temperature on the slopes.

The areas occupied by *Pteridium aguilinium* in the studied area are beginning to increasingly expand, due to decreases in the number of farmers, who have begun to go abroad in search of better paid jobs.

REFERENCES

1. Ardelean, A., 1999, Flora şi vegetaţia din Valea Crişului Alb – de la izvoare până la ieşirea din ţară, Ed. "Vasile Goldiş" University Press, Arad, 311 p.

2. Arsene, G., G., Coste, I., Chelu, A., I., 2001, Contribuţii la studiul ecologic şi fitocenologic al fitocenozelor cu *Pteridium aquilinum (L.)* Kuhn din sud-vestul României (Banat), În „Omul şi mediul", Editura Politehnică, Timişoara: 158-167.
3. Borza, Al., Boşcaiu, N., 1965, Introducere in studiul covorului vegetal. Academiei Romane Publishing House, Bucharest, 342 p.
4. Braun-Blanquet, J., 1964, Pflanzensoziologie. Springer- Verlag, Wien-New York, 3, Aufl, pp. 12-24.
5. Ciocarlan, V., 2009, Flora ilustrată a Romaniei. Pteridophyta et Spermatophyta. Ceres Publishing House, Bucharest, 141 p.
6. Ellenberg, H., 1974, Zeigerwerte der Gefässpflanzen Mitteleuropas - Scripta Geobotanica. Göttingen, 9: 1-97.
7. Karácsonyi, C., Negrean G., 1986-1987, Contribuţii la flora Munţilor Oaş-Gutâi (jud. Satu Mare), Satu – Mare, St. Com., VII- VIII, 373-377.
8. Karácsonyi, C.**,** 2011, Flora şi vegetaţia Dealurilor Tăşnadului şi a colinelor marginale, „Vasile Goldis" University Press, Arad, p. 368.
9. Moldovan I., 1970, Flora şi vegetaţia Muntelui Gutâi. Universitatea „Babeş-Bolyai", Teza de doctorat, Cluj Napoca.
10. Peia, P., 1978, Aspecte de vegetaţie din Cheile Minişului, Contrib. Bot. Cluj-Napoca: 235-250.
11. Raţiu, O., 1966, Associations des plantes nouvelles du basin de Sâna de Vale, Studia Univ. Babeş-Bolyai, seria Biol., Cluj-Napoca, 2: 15-21.
12. Raţiu, O., Gergely I., Moldovan, I., 1977, Consideraţii fitocenologice asupra pădurilor depresionare din "Ţara Oaşului", Contrib. Bot., Cluj Napoca, 9-18.
13. Raţiu, O., Gergely I., 1978, Analiza complexă a florei „Ţării Oaşului", Contrib. Bot.,, Cluj-Napoca, 217-226.
14. Raţiu, O., Gergely I., 1979, Caracterizarea sinecologică a principalelor fitocenoze lemnoase din „ Ţara Oaşului" (jud. Satu Mare), Contrib. Bot. Cluj-Napoca, 85-118.
15. Sanda, V., Răduţoiu, D., Burescu, P., Blaj-Irimia, I., 2007, Breviar fitocenologic. Partea a IV-a. Sitech Publishing House, Craiova, pp. 92-93.
16. Sanda, V., Kinga, O., Burescu, P., 2008, Fitocenozele din Romania, sintaxonomie, structură, dinamică şi evoluţie. Ars Docendi Publishing House, Bucharest, 570. p.
17. Soó, R., 1980, A magyar flora és vegetacio rendszertani, növényföldrajzi kézikönyve, Akadémiai Kiadó, Budapest, pp. 1-6.
18. Tüxen, R., 1955, Das System der nordwestdeutschen Pflanzengesellschaften, Mitt Floristic-Sociologie Arbeitsgen, n. Folge, 5: 155-176.