XERO-MESOPHILIC GRASSLAND VEGETATION, POTERIO-FESTUCETUM VALESIACEAE ASSOCIATION, J. DANON 1964 FROM MESESULUI MOUNTAINS

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Abstract

Association Poterio-festucetum valesiaceae gathers populations of plants that make up phytocoenosis of some xero-mesophilic meadows established mainly by Festuca valesiaca and Poterion minor (sanguisarba minor)

The association table comprises a number of 54 species in which the following species are dominant both numerically and as percentage in the spectrum of bioforms: hemicriptophytes - 61.8%, biennial therophytes – 12.8%, camephytes – 10.9%. In the spectrum of floristic elements the Eurasian species are dominant – 45.5%, followed by European species i.e. 20% and Central European species i.e. 18.2%.

The diagram of ecological factors in terms of humidity shows the dominant species of xero-mesophiles 69.1%, mesophiles 16.3%, and xerophyles 10.9%.

In terms of temperature the micro-mesothermal species are dominant – 52.7% followed by moderate thermophilic species – 21.8%. The soil chemical reaction favors the development of low acid species neutrophils – 47.3% and euriionic – 29.1%.

Key words: grassland vegetation, phytocenosis, association, bioform, floristic elements, ecological indices

INTRODUCTION

The current study shows the importance of Poterio-Festucetum valesiaceae Association, by presenting its characteristics and its economic importance, in the xero-meshophilic meadows from the Meseş Mountains. The study we conducted shows the structure of Poterio-Festucetum valesiaceae association, the characteristics and its economic importance, within the xero-mesophilic grasslands of Meses Mountains. These grasslands have not been studied on the spot before our survey. Research on other grasslands with different floristic composition were performed by Balazs (1943) whose dynamic and evolution over seven decades we managed to capture in this scientific paper. In neighbouring territories of Meses Mountains, Sălaj County, research works were conducted on grasslands by Buia (1939), Prodan (1956-1957), Karacsonyi (2011). Marshz meadows and peatlands were researched by Pop, member of the Romanian Academy (1960).

MATERIAL AND METHOD

The material represents an area of 50-100 hectares colonized by Festuca valesiaca and Minor Poterio in the settlements of Dealul Turcului (County of Sălaj), Dealul Bodiei (County of Sălaj), Măgura Boznei (County of Sălaj), Vârful Bozna (County of Sălaj), Valea Bozna (County of Sălaj).

Numerous trips were made in the field resulting in the development of seven surveys, which were computed in a summary table of association (Table 1) and analyzed through specific biological forms, the specific of floristic elements and the diagram of ecological indices.

The sample surfaces sizing of 50 m^2 were chosen from the most representative phytocoenosis with a similar floristic composition and a homogeneous physiognomy. Surveying was made in accordance with the recommendations in the works of the authors Boscaiu and Borza (1965), (Christ et al., 2004). Simultaneously with recording plant species in surveys one has been noted dominant abundance according to Braun-Blanquet cover-abundance scale modified and completed by Tuxen and Ellemberg (1937). Histograms were developed representing bioforms and floristic elements spectra, and ecological indices diagram based on which we carried out our analysis and the scientific interpretation of results on xero-mesophilic grasslands with Festuca valesiaca. Setting the bioforms values of floristic elements and ecological indices were made observing the works developed by (Braun-Blanquet, 1951), (Burescu, Toma, 2005), (Cristea et al., 2004), (Ellemberg, 1979-1992), (Meusel and Jager, 1992), (Raunkiaera, 1937), (Sanda et al., 1983-2003). Name of association and cenotaxa was made in accordance with the Code of Phytosociological Nomenclature, (Weber, 2000). Classification of units by sub-alliance, alliance, order, class was made in accordance with ecological and flora systems (Borhidi, 1996-2003), (Borza-Boscaiu, 1965), (Braun Blanquet, 1964), (Burescu, 2000), (Chifu et al., 2014), (Coldea et al., 1997-2012), (Mucina, 1997), (Oberdorfer, 1992), (Pott, 1995), (Rothmaler, 1994-2000), (Sanda et al., 2008), (Soo, 1964-1980), (Tuxen, 1955).

RESULTS AND DISCUSSION

In the Meses Mountains, the phytocoenosis of this association occupies relatively small areas on the sunny slopes (S, SE, W), with slopes of 4-38º at an altitude of 550-720 m, on skeletal soils with limestone bedrock with rock on the surface. The relevant and dominant species is *Festuca valesiaca* with a broad coverage range of 55%, the maximum constant (K = V), followed by the characteristic species *Sanguisorba minor* with a general coverage of 1.1%, the maximum constant (K = V).

Beside the aforementioned species there are a number of 36 species characteristic to the alliance Festucetum valesiaceae, order ***Festucetalia valesiacae***: *Fragaria viridis, Dichanthium ischaemum, Dorycnium pentaphyllum, Scabiosa ochroleuca, Centaurea spinulosa* etc., class ***Festuco-Brometea***: *Asperula cynanchica, Euphorbia cyparissias, Brachypodium pinnatum, Teucrium chamaedrys, Hypericum perforatum, Agrimonia eupatoria, Teucrium montanum, Plantago media* (see Table 1).

At the edge of the association there are found a total of 16 species, transgressive from classes: ***Molinio-Arrhenatheretea***: *Achillea millefolium, Leucanthemum vulgare, Lotus corniculatus, Plantago lanceolata, Leontodon hispidus*, etc., ***Rhamno-Prunetea***: *Crataegus monogyna, Rosa canina, Prunus spinosa*, etc.

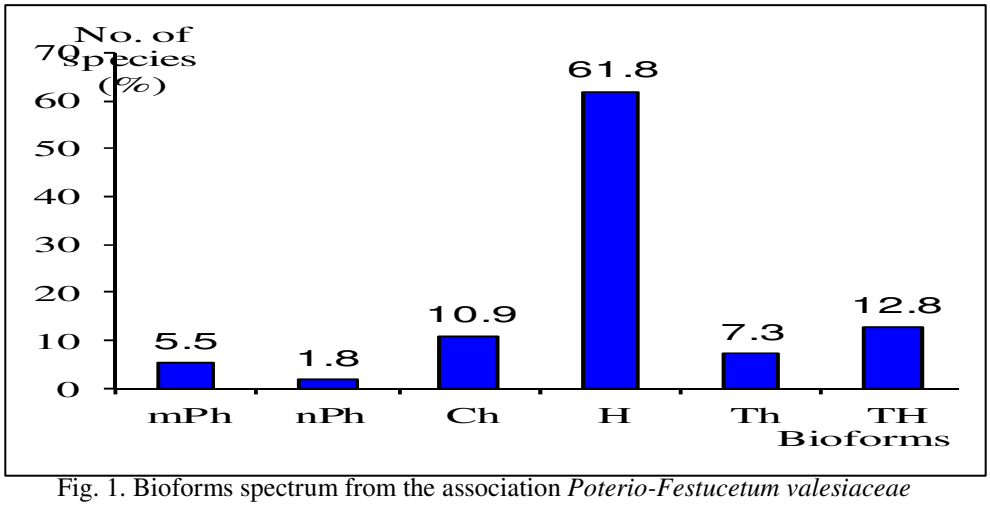

Fig. 1. Bioforms spectrum from the association *Poterio-Festucetum valesiaceae*

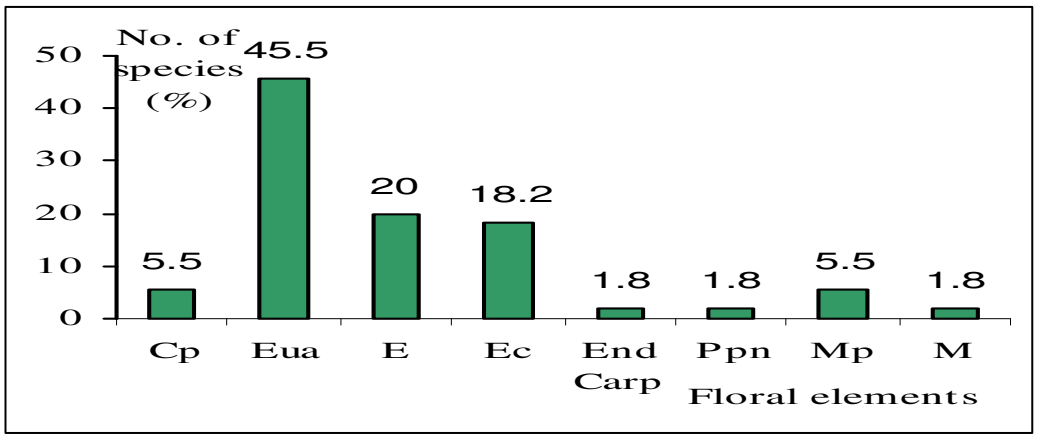

Fig. 2. Spectrum of floristic elements from
the association *Poterio-Festucetum valesiaceae*

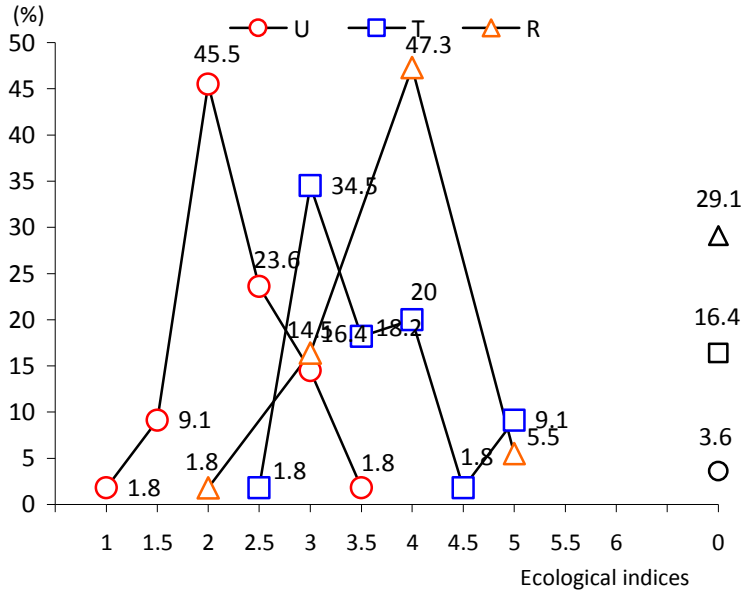

Fig. 3. Diagram of ecological indices for the association *Poterio-Festucetum valesiaceae*

The bioforms (see Chart 1) which highlight the phytocoenosis of this association are dominated by hemicriptophytes (61.8%), followed by biennial therophytes (12.8%), and camephytes (10.9%).

The floristic elements spectrum (see Chart 2) shows the preponderance of Eurasian species (45.5%), accompanied by European (20%), Central European (18.2%) and Southern European (7.3%) species.

The diagram of ecological indices (see Chart 3) indicates that the majority of the association species are Xero-mesophilic (69.1%), followed by mesophilic (16.3%) and xerophilic (10.9%) species. In terms of thermal, micro-mesothermal are the dominant species (52.7%), followed by moderate-thermophyles (21.8%) and eurythermal species (16.4%). Compared to the chemical reaction of soil most species are weak acid-neutrophils (47.3%) and euriionic (29.1%).

The economic importance

The steppe grass meadows (*Festuca valesiaca*) with cebărea (*Sanguisorba minor*), have a low pastoral value, being used at most to pasture during summer. In their floristic composition there are many meliferous herbs that can be sold locally.

Table 1

Poterio-Festucetum valesiaceae, J. Danon, 1964

Bio.	E.f.	U.	T.	R.	Survey no	1	2	3	4	5	6	7	K
					Altitude (m.s.m.)	600	680	690	550	700	720	550	
					Vegetation coverage (%)	80	80	90	90	90	95	90	
					Exposition	S	S	SE	S	S	S	V	
					Slope (°)	12	38	15	18	14	4	20	
					Surface (m²)	50	50	50	50	50	50	50	
H	Eua	2	3.5	4	As. *Sanguisorba minor*	+	1	+	+	+	+	+	V
H	Eua	1.5	4	4	As. *Festuca valesiaca*	4	3	5	4	4	4	4	V
					Festucion valesiacae. Festucetalia valesiacae								
H	E	2	4	3	*Fragaria viridis*	+	+	+	+	1	1	+	V
H	Eua	1.5	5	3	*Dichanthium ischaemum*	+	+	·	+	·	+	1	V
Ch	Ec	2	5	4	*Dorycnium pentaphyllum*	·	·	·	+	+	1	+	IV
TH	Ec	2	3.5	4.5	*Centaurea spinulosa*	+	+	·	·	+	·	·	III
H	Eua	2	4	4	*Scabiosa ochroleuca*	·	·	·	·	+	+	+	III
H	E	2	3.5	4.5	*Potentilla arenaria*	·	·	+	+	·	·	·	II
TH	E	3	3	3	*Centaurea biebersteinii*	+	·	·	·	·	·	·	I
Th	Mp	2	4	3	*Xeranthemum annuum*	·	+	·	·	·	·	·	I
					Festuco-Brometea								
H	Mp	2	3.5	4.5	*Asperula cynanchica*	·	+	+	+	+	+	+	V
H	Eua	2	3	4	*Euphorbia cyparissias*	+	·	+	+	·	+	+	V
H	Eua	2.5	4	4	*Brachypodium pinnatum*	+	·	+	+	+	+	+	V
Ch	Ec	2	3.5	4	*Teucrium chamaedrys*	+	·	+	·	1	·	1	IV
H	Eua	3	3	0	*Hypericum perforatum*	·	+	·	·	+	+	+	IV
H	Eua	2.5	3	4	*Agrimonia eupatoria*	·	·	·	+	+	+	+	IV
H	Eua	2.5	0	4.5	*Plantago media*	·	·	+	+	+	+	+	IV
Ch	Ec	1	4	5	*Teucrium montanum*	·	+	·	+	+	1	1	IV
Th	E	2.5	3	0	*Geranium pusillum*	·	·	+	·	·	+	+	III
H	Eua	2.5	2.5	0	*Galium verum*	·	·	·	·	+	+	·	II
H	Eua	2	4	2	*Potentilla argentea*	+	·	+	·	·	·	·	II
H	Mp	2	4	4	*Stachys germanica*	·	·	·	·	+	+	·	II
Ch	Ppn	2	4	0	*Thymus glabrescens*	·	·	+	+	·	·	·	II
TH	Eua	2.5	3.5	0	*Carlina vulgaris*	·	+	·	·	·	+	·	II
H	Ec	2	3	4	*Coronilla varia*	·	·	·	+	·	·	+	II
H	Eua	1.5	4	4	*Festuca rupicola*	·	·	·	+	+	·	·	II
Ch	End Carp	2	3.5	4.5	*Thymus comosus*	+	·	·	·	·	·	·	I
Ch	Ec	2	3	0	*Sedum acre*	·	·	·	·	·	+	·	I
Th	M	2	4.5	4.5	*Arabis auriculata*	·	·	·	·	+	·	·	I
TH	Ep-Bo	1.5	3	4	*Arabis hirsuta*	·	·	·	·	·	+	·	I
H	Ec	2.5	3.5	3	*Prunella laciniata*	·	·	·	+	·	·	·	I
H	Ec	2	3.5	4	*Seseli peucedanoides*	·	+	·	·	·	·	·	I
H	Ec	1.5	4	4.5	*Veronica spicata*	+	·	·	·	·	·	·	I
					Molinio-Arrhenatheretea								
H	Eua	3	0	0	*Achillea millefolium*	·	+	·	+	+	+	·	IV
H	Eua	3	0	0	*Leucanthemum vulgare*	·	·	·	+	·	+	+	III
H	Eua	2.5	0	0	*Lotus corniculatus*	·	+	·	+	·	·	·	II
H	Eua	0	0	0	*Plantago lanceolata*	·	·	+	·	·	·	·	I

H	Eua	2.5	0	0	*Leontodon hispidus*	·	·	·	+	·	·	·	I
H	Eua	3	0	3	*Galium mollugo*	·	·	·	·	·	+	·	I
Th	E	3	0	0	*Rhinanthus minor*	·	·	·	·	·	+	·	I
H	Cp-Bc	0	0	0	*Agrostis capillaris*	·	·	·	+	·	·	·	I
H	Eua	2.5	3.5	4.5	*Cichorium intybus*	+	·	·	·	·	·	·	I
H	Cp	3	0	0	*Poa pratensis*	·	·	·	+	·	·	·	I
H	E	3.5	3	4	*Trifolium hybridum*	·	·	·	+	·	·	·	I
					Rhamno-Prunetea								
mPh	E	2.5	3	3	*Crataegus monogyna*	·	1	+	+	·	+	·	IV
nPh	E	2	3	3	*Rosa canina*	·	+	+	1	·	+	·	IV
mPh	Eua	2	3	3	*Prunus spinosa*	·	·	·	·	·	+	·	I
mPh	Ec	3	3	4	*Cornus sanguinea*	·	·	·	·	·	+	·	I
TH	Eua	2	3	4	*Verbascum nigrum*	+	·	·	·	·	·	·	I
					Variae Syntaxa								
TH	E	2	3	0	*Carduus acanthoides*	·	·	·	·	+	+	·	II

Place and date of surveys: 1 – Dealul Tircului 01.07.2013; 2-3 – Dealul Bodiei 02.07.2013; 4-5 – Măgura Boznei 17.07.2013; 6 – Vârful Bozna 17.07.2013; 7 – Valea Bozna 17.07.2013 (County of Sălaj).

CONCLUSIONS

1. Plant communities subordinated to the association Poterio-Festucetum valesiaceae show a high biodiversity, while the floristic composition of the phytocoenosis gathers a total of 54 species, some of which have a high conservation value, being rare, endangered, relict, endemic species.

2. Association phytocoenosis are dominated numerically by bioforms belonging to hemicriptophytes - 61.8%, and biennial therophytes – 12.8%. Dominant floristic elements are Eurasian 45.5% and European 20% species. Referring to the prevailing ecological indices xero-mesophilic species are dominant - 69.1%, followed by micro-mesothermal species - 52.7% and weak acid neutrophils - 47.3%.

3. The steppe grass meadows with *Festuca valesiaca* are used by locals as pastures. By their medicinal dyeing, and meliferous qualities the plants in these grasslands can be marketed locally.

REFERENCES

1. Balazs, F., 1943, Nahy Karoly es Erdod Korny e Kenek erdoi, Acta Geobot. Hung, 5(2) :353-398.
2. Borhidi, A., 1996, Critical revision of the Hungarian plant communities. Janus Pannonius University, Pécs.
3. Borhidi, A., 2003, Magyarország növénytársulásai, Akadémiai Kiadó, Budapest.
4. Borza, A., Boscaiu,N.,1965, Introducere în studiul covorului vegetal, Ed. Acad. R.P. Române, Bucureşti, 340 p.
5. Braun-Blanquet, J., 1964, Pfanzensoziologie, III Aufl. Springer- Verlag, Wien - New York.

6. Braun-Blanchet, J., 1951, Pflanzensoziologie, Grunzuge der Vegetationskunde, 2, edition, Springer Verlag,Wien.
7. Buia, A.,1939, Materiale pentru studiul păşunilor si fânețelor din regiunea Satu Mare - Sălaj, Bul. Acad. Agron. Cluj, 8:347-361.
8. Burescu, Toma, 2005, Manual de lucrări practice de botanică, Ed. Universităţii din Oradea, 590 p.
9. Burescu, P., 2000, Cenotaxonomia şi caracterizarea grupărilor vegetale acvatice şi palustre din nord-vestul Romaniei, Simpozion Ştiinţific, Fac. de Horticultură Cluj-Napoca, Ed. Academic. Press, Cluj-Napoca, pp. 332-342.
10. Chifu, T., (edit.), Irimia, I., Zamfirescu, O., 2014, Diversitatea fitosociologică a vegetației României, Vol. I, II, Ed. Institutul European , Iași, 1112 p.
11. Coldea,G., (edit.), Oprea, A., Sarbu, I., Sarbu, C. ,Stefan, N., 2012, Les associations végétales de Roumanie,Tome 2. Les associations anthropogenes, Presa Universitara Clujeană, 482p.
12. Coldea, G., (edit.) Sanda, V., Popescu, A., Ştefan, N., 1997, Les associations végétales de Roumanie. Tome 1. Les associations herbaces naturalle. Presses Universitaires de Cluj, Cluj-Napoca.
13. Cristea, V., Gafta, D., Pedrotti, F., 2004, Fitosociologie, Ed. Presa Universitară Clujeană, Cluj-Napoca, 233 p.
14. Ellenberg, H., 1979, Zeiger Werte der Gefasspflanzen Mitteleuropas, II edition - Scripta Geobotanica, Gottingen , 9:1-122.
15. Karacsonyi, C., 2011, Flora și vegetația Dealurilor Tășnadului și a colinelor marginale, Ed. Vasile Goldiș, University Press Arad, 368 p.
16. Mucina, L., 1997, Conspectus of Classes of European Vegetation, Folia Geobot. Phytotax, Praha, 32:117-172.
17. Oberdorfer, E., 1992, Suddeutsche Pflanzengesellschaften,Teil, IV: Walder und Gebusche 2, Stark berabeilete Auflage Texband, Grustav Fischer Verlag ,Wien, New York.
18. Pott, R., 1995, Die Pflanzengesellschaften Deutschlands, 2 Aufl., Ulmer Verlug, Stuttgart.
19. Pop, E., 1960, Mlaştinile de turbă din Republica Populară Română, Ed. Acad. R.P. Române, București, 511 p.
20. Prodan, I., 1956, Aspecte din Vegetația zonei de vest a României. Terenuri nisipoase de loess, mocirloase, alkaline și păduri sub aspect floristic ecologic și agricol, Ed. Acad. R. P. Române.
21. Raunkiaer, C., 1937, Life-Form, genus area, and number of species. Botaniske Studier, 5. Haeste (Ed. C. Raunkiaer), pp. 343-356. J. H. Schultz Foorlad, Cobenhavn.
22. Rothmaler, W., 2000, Exkursionsflora von Deutschland, Band 3. Gefäβpfanzen: Atlasband. Spektrum Akademischer Verlag Heidelberg-Berlin.
23. Rothmaler, W., 1994, Exkursionsflora von Deutschland-Band 48 Anflage, Gustav Fischer Verlag Jena-Stuttgart.
24. Sanda, V., Popescu, A., Doltu, I., Doniță, N., 1983, Caracterizarea ecologică şi fitocenologică a speciilor din flora României, Stud. și Com., Muz. Brukenthal, Sibiu, supliment, 25:1-126.
25. Soó, R., 1964-1980, A magyar flora és vegetácio rendszertani, növényföldrajzi kézikönyve, Akad. Kiadó, Budapest: 1-6.
26. Tuxen, R., 1955, Das System der Nordwestdeutschen Pflanzengesellschaften, Mitt. Flor-Soz. Arbeit., N. Folge, 5: 155-176.

27. Tuxen, R., Ellemberg H., 1937, Der Systematische und okologische Gruppen Wert. Ein Beitrag zur Begriffsbildung und Methodk der Pflanzensoziologie, Mitt. Flor-Soz. Arbeitsgem. 3: 171-184.
28. Weber, H. E., Moravec, J., Theurillat, J. P., 2000, Codul internațional al Phytosocilogical Nomenclatură, ediția a 3-a, Journal of Vegetație Știință II, opulus Press Uppsala: pp. 739-768.