CONTRIBUTIONS TO THE KNOWLEDGE OF EUROPEAN BEECH STANDS FROM THE SEMENIC MOUNTAINS

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Abstract

The association brings together the beech stands from South-eastern Carpathian Mountains with Festuca drymeja, identified in the Northern part of the Semenic Mountains, the Reşiţa Forest District near the Piatra Alba and in the forest districts Văliug, Caraş-Severin County.

The relief on which the phytocoenoses of the association develop consist of medium slopes (22-36 º), at altitudes ranging between 440-732 m, on shady and humid exposition with different orientations. The lithological substrate consists of crystalline shale, conglomerate, sandstone and eruptive rocks. The soils on which the association is located are districambosol, luvisol, poor-semiskeletal, deep medium, moderately acidic and slightly moist soils.

The flora of beech stands with Festuca drymeja sums up to 111 species, which means a great biodiversity. From the point of view of the bio-species categories, in the phytocoenoses of the association Festuco drymejae-Fagetum the dominant species are hemicryptophites (46.84 %) followed by geophytes (24.10 %), phanerophytes (18.01 %) and therophytes (8.10 %). In the spectrum of phytogeographical elements the dominant species are Eurasian (36.93 %), European (26.12 %), Central European (12.61 %), circumpolar (7.20 %), Cosmopolitan (3.60 %), Carpathian (3.60), and Atlanto-Mediterranean (3.60%). In terms of environmental factors: humidity (H), temperature (T), chemical reaction of soil (R), the dominant species are mesophilic plants (71,12 %), followed by xero-mesophilic species (16,21 %), meso-hygrophila (10.81 %), micro-mesothermal (68.46 %), microthermal (19.81 %), eurythermal (9.00 %), acido-neutrophilic species (33.33 %), and euriionic (20.72 %) species. Cytogenetic analysis reveals the dominant share of polyploid (44.14%) and diploid (41.44%) species. Fagus sylvatica stands with Festuca drymeja have a high ecological value in that they shelter 11 rare, endemic, endangered species.

Key words: beech stands, phytocoenosis, bioforms, floristic elements, karytype

INTRODUCTION

Fagus sylvatica beech stands with *Festuca drymeja* vegetate on poor-semi-skeletal, deep-medium, oligo-basic, moderately acidic, slightly moist with variable-humidity variable soil of districambosol and luvisol type with a deep rock substrate i.e. schist crystals. The relief is fragmented with medium to steep slopes (i.e. ranging from 22 ^{0} - 36 ^{0}) with predominantly Northeast and North-western exposure at an altitude ranging between 440 to 732 m. No research on herbaceous vegetation but especially on *Fagus sylvatica* stands with *Festuca drymeja* in the Northern part of the Semenic Mountains was carried out previously. We may found the first information on the flora and vegetation of the Semenic Mountains in the work of the famous botanist and professor Borza (1946). Other researches carried out in

this area and around the studied territory belong to the next authors: Bănărescu et al. (1978), Borza (1958), Bujorean et Popescu (1966), Coste (1975), Hoborka (1976), Matacă (2005), Peia (1978, 1981, 1982), Schrött (1968, 1972) and Schrött et Purdelea (1993).

MATERIAL AND METHOD

The material subject to our survey consists of the natural ecosystems of *Fagus sylvatica* beech stands and *Festuca drymeja* on the plateau and heights of the northern part of the Semenic Mountains on the upper mountain floor. A number of 17 phytosociological surveys were made in the most representative phytocoenoses. We introduced in the association table all the plant species identified with the abundance and dominance assessment (AD) for each one individually following the Braun-Blanguet and Pavillard scales (1928). The population of *Fagus sylvatica* beech stands with *Festuca drymeja* was reviewed and mapped ecologically, phytocenologically, and cytogenetically, based on the association table and histograms in terms of distribution of bioforms, phytogeographical elements, ecoforms and genetic karytypes. The classification of the species by the types of bioforms was made after the system developed by Raunkiaer in 1937 and improved by Braun-Blanguet in 1964. The analysis of composition in floristic elements and the historical, phytogeographical and ecocenotic significance thereof were made after Meusel and Jäger (1992) two top representatives the Central European Chorology School.

The analysis of phytocenoses in terms of ecoforms categories i.e. humidity (H), temperature (T) and chemical reaction of the soil (R) was made after the works of the next authors: Csürös et al (1967), Beldie, Chiriţă (1967), Sanda et al. 1983, 2003, which adjusted the values of the ecological indices for plants in Central Europe on the Ellenberg scale (1979) with values ranging from 1 to 9 after the pedoclimatic conditions specific to Romania, using a scale of values ranging between 1 and 6. The classification of the species in the corresponding cenotaxa was made in accordance with the work of the authors Borza, Boşcaiu (1968), Chifu et al. (2014), and Sanda et al. (2007, 2008). The cytogenetic analysis of the species after karytype was done according to the work of the authors Ciocarlan (2009) and Sanda et al. (2003).

RESULTSAND DISCUSSION

The beech stands surveyed by us are secular, stratified and very important ecologically and genetically, with fallen (5-10%) decayed wood.

The floral inventory of *Fagus sylvatica* forests with *Festuca drymeja*, *Festuco drymejae-Faggetum*, sums up to 111 species (see Table 1 below)

which shows us a high biodiversity. A total of 85 species are part of the basic cenotaxa of the association, of which 12 species belong to *Symphyto-Fagenion, Symphhyto cordati-Fagion*, 32 species belong to *Fagetalia sylvaticae*, and 41 species belong to *Querco-Fagetea*. In addition, there are 11 rare, endangered, endemic and relic species included on the red flag lists of Boşcaiu et al. (1994), Dihoru et Dihoru (1994), Dihoru et Negrean (2009), Oltean et al (1994), Sârbu coord. (2007).

The layer of trees is dominated by *Fagus sylvatica* with a 80% overall coverage, with accompanying species such as *Abies alba, Acer pseudoplatanus, Acer platanoides, Fraxinus excelsior, Tilia tomentosa, Ulmus glabra, Carpinus betulus* and *Sorbus torminalis*.

The layer of shrubs with insignificant coverage consists of *Sambucus nigra, Corylus avellana, Salix capraea* and *Evonymus latifolia.*

The herb layer with a 70% overall coverage is dominated by *Festuca drymeja* which is a characteristic and edifying species for the association. The other species are characteristic for the sub-alliance ***Symphyto-Fagenion***, the alliance ***Symphyto cordati-Fagion***, i.e. *Abies alba, Acer pseudoplatanus, Aconitum vulparia ssp. vulparia, Dentaria glandulosa, Helleborus purpurescens, Symphytum cordatum,* Order ***Fagetalia sylvaticae*** *Galium odoratum, Lamium galeobdolon, Mercurialis perennis, Allium ursinum, Rubus hirtus, Carex sylvatica* and the class ***Querco-Fagetea****: Dentaria bulbifera, Dryopteris filix-mas, Carex digitata, Carex pilosa, Geranium robertianum, Anemone nemorosa, Polygonatum odoratum.* (see Table 1).

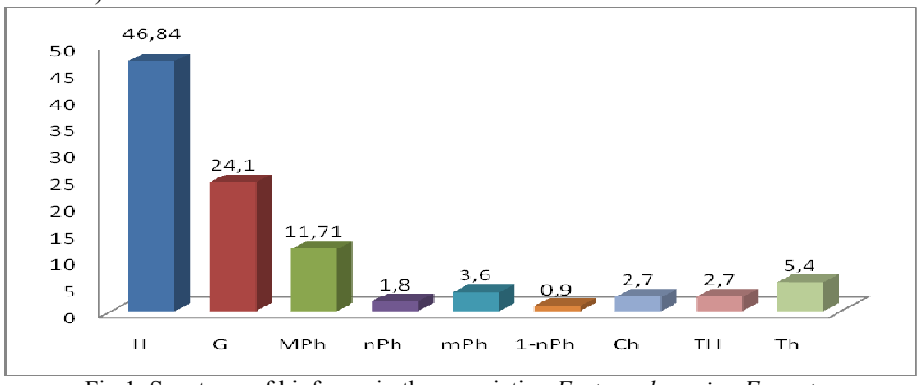

Fig 1 Spectrum of bioforms in the association *Festuco drymejae-Faggetum*

Legend: H=Hemicryptophytes; G=Geophytes; Mph=Megaphanerophytes; nPh = Nanophanerophytes; mPh = Megaphanerophytes; 1-nPH = Liana; Ch = Chamaephytes; TH = Therophytes (biennial); Th = Therophytes (annual).

The bioforms of *Festuco drymejae-Fagetum* (Fig 1) are dominated by Hemicryptophytes (46.84 %) followed by Geophytes (24.1 %), Phanerophytes (18.01 %) and Chamaephytes (2.7 %).

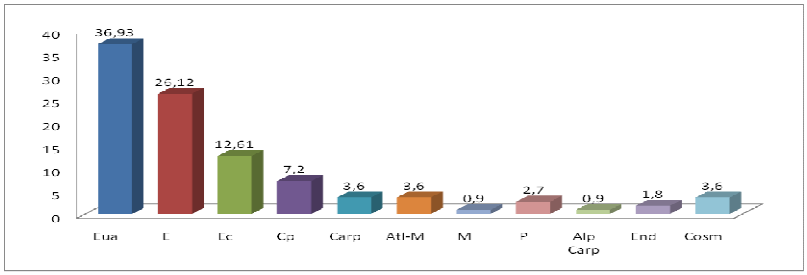

Fig. 2 Spectrum of floral elements in the association *Festuco drymejae-Faggetum*
Legend: Eua = Eurasian; E = European; Ec = Central European; Cp = Circumpolar; Carp = Carpathian; Atl-M = Atlanto-Mediterranean; M = Mediterranean; P = Pontic, Alp Carp = Alpine-Carpathian; End = Endemic; Cosm = Cosmopolitan.

In terms of geographical area and the current distribution of the species (Fig 2), phytocoenoses of the association *Festuco drymejae-Fagetum* are dominated by Eurasian (36.93 %), European (26.12 %), Central European (12.61 %), circumpolar (7.20 %), Balkan and Carpathian (3.60 %), Atlanto-Mediterranean (3.60%), and Cosmopolitan (3.60%) species. In smaller shares, there are also present Pontic (2.70%), endemic (1.80%), and Alpino-Carpathian (0.90%) species.

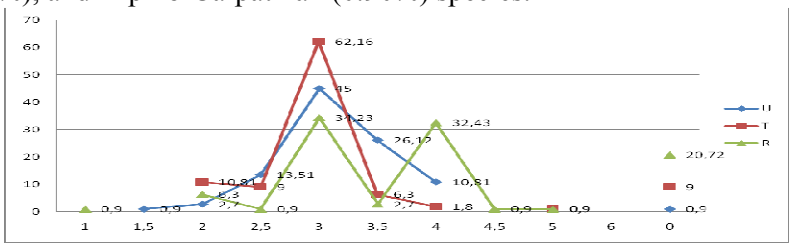

Fig 3. Diagram of ecological indices for the association *Festuco drymejae-Fagetum*

Analysis of the ecoforms (Fig 3) shows that in terms of soil humidity (moisture) the mesophilic species prevails (71.12 %), followed by xero-mesophilic (16.21 %), and meso-hygrophilic (10.81 %) species.

Depending on temperature, micro-mesothermal (68.46%), micro-thermal (19.81 %) and eurythermal (9.00 %) species are dominant. With regard to the soil chemical reaction, acid-neutrophilic (36.93 %), weak acid neutrophilic (33.33 %) and euriionic (20.72 %) species are mentioned.

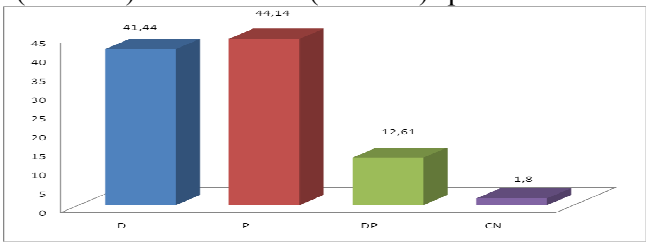

Fig 4 Cariological spectrum of the association *Festuco drymejae-Fagetum*
Legend: D = Diploid; P = Polyploid; DP = Diplo-polyploid; UK = Unknown karytype.

From the cariological point of view (Fig 4) in the case of association *Festuco drymejae-Fagetum* the polyploid species (44.14%) are dominant since they are better adapted to pedoclimatic conditions; they are followed by diploid species (41.44%) which make the genetic reserve for evolution and by diplo-polyploid ones (12.61%) and by plants with an unknown karytype (1.80%).

IMPORTANCE

The beech stands with *Festuca drymeja* are valuable in terms of production and quality of wood, being ranked in the 2nd site Class with trees of appreciable diameters (i.e. 40-80 cm) and very appreciable heights (i.e. 30-34 m).

Type of ecosystem: Southeast Carpathian beech stand with *Festuca drymeja*, code: 4136 (Doniţă et al., 2005).

There are high conservation value habitats included in a natural habitat of Community interest H.9110, code 4105, whose conservation requires their declaration as special conservation areas according to Doniţă et al (2005), Gafta et Mountford (2008), because they shelter 11 rare, endangered, endemic and relic species (i.e. *Plantanthera chlorantha, Sanicula europaea, Aconitum vulparia, Epipactis helleborine, Chephalantera longifolia, Plathantera bifolia, Listera ovata, Ceterach oficinarum, Lilium martagon, Dentaria glandulosa, Symphytum cordatum*). Through their rich branch litter and deeper soils on which forests develop, they play an important role in mitigating water leakage on the slopes and regulating the flows of streams and valleys. *Festuca drymeja* and *Rubus hirtus* remain green over the winter, being valuable fodder sources for deer (cervidae). From an economic point of view, the stands of this association are valuable due to the superior quality of wood and the production of wood as raw material to the industry. The wood of these species is also used in the furniture, dyes, tanning, cellulose and construction industries.

From an ecological point of view, the forest surveyed provides basic environmental services in critical situations, such as erosion control and river basin protection.

Due to their biodiversity and specificity of geographical landscape, the beech stands with *Festuca drymeja* in the northern part of the Semenic Mountains increase the degree of attractiveness for tourists.

Festuco drymejae-Fagetum Morariu et al. 1968 *Table 1*

Bio.	E.f.	H.	T.	R.	C																		K
						Survey no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
						Altitude (m.s.m.)	538	693	698	678	714	732	600	720	670	620	565	365	525	710	650	440	730	
						Exposition	N	NV	NV	NV	E	E	NE	NE	N	E	E	NE	E	N	N	NV	NE	
						Consistency	80	90	90	90	80	90	80	90	90	90	60	90	80	90	70	80	90	
						Tree height (m)	34	26	28	36	32	30	36	38	34	28	32	28	32	36	32	30	32	
						Tree diameter (cm)	36	48	48	72	48	40	60	100	52	42	62	44	60	70	60	60	60	
						Herb layer coverage (%)	40	50	60	80	50	80	70	40	50	60	70	40	40	60	100	80	80	
						Slope (G°)	34	24	28	30	32	22	30	28	28	35	34	30	30	36	32	36	32	
						Surface (m²)	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1000	1200	1200	1200	1200	1200	1200	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
G	Carp	4	2	3	D	As. *Festuca drymeja*	3	4	5	3	5	5	4	2	3	3	5	3	4	3	4	5	3	V
MPh	E	3	3	0	D	As. *Fagus sylvatica*	5	5	4	5	5	5	5	4	4	4	4	5	5	4	4	5	5	V
						Symphyto-Fagenion, Symphyto cordati-Fagion																		
G	End Carp	4	2.5	4	P	*Dentaria glandulosa*	-	+	+	-	+	-	+	+	+	-	+	+	-	+	+	--	+	IV
MPh	Ec	3.5	3	3	P	*Acer pseudoplatanus*	-	-	+	-	+	-	+	-	+	+	+	-	+	+	+	-	+	IV
MPh	Ec	4	3	0	D	*Abies alba*	-	+	+	2	+	+	+	3	3	+	-	+	-	2	2	-	+	IV
H	*End(Carp)*	*3*	*2*	*3*	*D*	*Sympytum cordatum*	+	-	-	-	+	--	+	+	-	+	-	-	-	-	-	+	-	III
H	Alp-Carp-B	3	4	4	D	*Euphorbia cornicola*	-	+	+	-	-	-	-	-	-	-	-	+	+	-	+	-	-	III
H	*Atl-M-Ec*	*3*	*3*	*3*	*P*	*Atropa belladona*	-	-	+	--	-	-	-	+	-	-	+	-	+	-	-	-	+	III
H	*Ec*	*3*	*2.5*	*4*	*DP*	*Veronica urticifolia*	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	+	II
G	Eua	3	2.5	2.5	D	*Polygonatum verticillatum*	-	-	-	+	-	-	-	-	+	-	-	-	-	+	-	-	-	II
G	*Eua*	*3.5*	*3*	*3*	*CN*	*Planthantera chloranttha*	-	-	-	-	-	+	-	-		-	-	-		+	-	-	-	II
TH	*Carp-B*	*3.5*	*2*	*0*	*D*	*Silene heuffelii*	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	+	-	II
H	Carp	2.5	3	4	P	*Helleborus purpurascens*	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-	II
H	Ec	4	2.5	4	D	*Aconitum vulparia* ssp. *vulparia*	-	-	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	II
						Fagetalia sylvaticae																		
G	Eua	3	3	3	P	*Galium odoratum*	+	-	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	V
nPh	E	3	2.5	3	P	*Rubus hirtus*	5	+	+	1	+	+	+	+	+	+	-	-	+	+	3	-	+	V
H	Eua	3.5	3	4	DP	*Asarum europaeum*	+	-	+	-	+	+	+	+	-	-	-	+	-	+	+	+	+	IV
H	Ec	3	0	4	D	*Lamium galeobdolon*	-	-	+	-	+	+	-	+	+	-	+	+	+	-	+	+	+	IV
H	E	3.5	3.5	3.5	P	*Polystichum aculeatum*	-	+	+	-	+	+	+	+	+	+	-	+	+	-	-	+	-	IV
G	E	3.5	3.5	4	D	*Allium ursinum*	-	-	+	+	+	-	+	-	+	+	-	-	+	-	-	-	-	III
H	E	3.5	3	4	P	*Mercurialis perennis*	-	-	1	+	+	-	-	+	-	+	-	-	-	+	+	+	-	III
H	Eua	3	0	3.5	P	*Epilobium montanum*	+	--	-	-	-	-	-	-	+	-	-	+	+	-	-	-	+	III
H	Cosm	4	2.5	0	P	*Athyrium filix-femina*	-	-	-	2	-	-	-	+	+	+	+	-	-	-	-	-	+	III
H	Eua	3.5	3	4	D	*Salvia glutinosa*	-	-	-	-	-	-	+	+	-	-	+	+	+	-	+	+	-	III
H	E	3.5	3	4	P	*Carex sylvatica*	+	-	-	+	-	-	-	-	-	-	-	+	-	+	+	+	-	III
H	E	3.5	3	3	D	*Pulmonaria officinalis*	-	-	-	-	-	-	+	+	-	+	--	-	-	+	+	+	-	III
H	Eua	3.5	3	0	P	*Scrophularia nodosa*	-	-	-	-	+	-	+	+	+	-	+	+	-	-	+	-	+	III
H	Eua	3	3	3	D	*Lathyrus vernus*	-	-	-	-	+	-	-	+	+	-	--	-	+	-	+	-	+	III
G	Eua	3.5	3	4	D	*Circaea lutetiana*	-	-	+	-	-	-	-	+	+	+	-	-	+	-	-	-	-	III
H	Atl-M	3.5	3	4	D	*Sanicula europaea*	-	-	+	-	-	+	+	+	+	-	-	+	-	-	+	+	-	III
G	Eua	3	0	4	D	*Lilium martagon*	-	+	+	-	-	-	-	-	-	-	+	-	-	-	-	+	+	II

Table 1 – (continuation)

1.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
H	Ec	3	3	3	D,P	*Symphytum tuberosum*	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	--	-	II
Th	Eua	3	2	0	D	*Galeopsis speciosa*	-	-	-	+	-	-	-	+	-	-	+	-	-	-	+	-	-	II
H	E	3.5	3	3	D	*Myosotis sylvatica*	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	II
H	Eua	3.5	0	4	P	*Paris quadrifolia*	-	-	-	--	-	-	-	-	+	+	-	-	-	--	-	-	-	II
nPh	Cp	3	3	3	D,P	*Rubus idaeus*	-	-	-	-	-	+	-	-	+	-	+	-	-	-	+	-	-	II
MPh	Eua	4	3	3	P	*Ulmus glabra*	-	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	II
G	Ec	3.5	3.5	4	P	*Arum maculatum*	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	+	II
G	Eua	3	3	3	P	*Epipactis helleborine*	+	-	+	-	-	-	-	+	--	-	--	-	-	-	-	-	-	II
H	*Eua*	*3.5*	*3*	*3*	*D*	*Actaea spicata*	-	-	+	-	-	-	-	+	-	+	-	-	-	-	-	+	-	II
Ch	E	3	3.5	4	D	*Euphorbia amygdaloides*	-	-	-	-	-	-	-	-	+	+	-	-	-	+	--	-	+	II
H	Cp	4	3	3	D	*Oxalis acetosella*	-	-	+	-	-	-	-	+	+	-	-	--	-	-	-	-	-	II
H	Eua	3.5	0	0	P	*Stachys sylvatica*	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	+	II
G	E	3.5	3	4	P	*Anemone ranunculoides*	-	-	-	-	1	-	-	-	-	-	-	-	-	-	+	-	-	II
G	E	3	3	0	D,P	*Corydalis solida*	-	-	-	-	+	-	-	-	-	--	-	-	-	-	-	-	-	I
G	Ec	4	3	3	D	*Leucojum vernum*	-	-	-	--	-	-	-	+	-	-	-	-	-	-	-	--	-	I
						Querco-Fagetea																		
G	Ec	3	3	4	P	*Dentaria bulbifera*	+	1	+	2	+	+	-	+	+	-	+	-	-	1	+	-	+	IV
H	E	2.5	2.5	2	D	*Luzula luzuloides*	+	-	+	+	-	-	+	-	+	+	+	-	-	-	-	+	+	IV
G	E	3.5	4	0	P	*Anemone nemorosa*	+	+	+	-	-	-	-	+	+	-	-	-	-	+	-	-	-	III
H	Cosm	4	3	0	P	*Dryopteris filix-mas*	-	-	-	+	+	+	+	+	-	-	-	-	-	-	+	-	+	III
H	E	3	3	3	P	*Carex digitata*	-	+	-	-	--	-	-	--	-	-	-	+	-	-	+	+	+	III
MPh	E	3	3	3	P	*Carpinus betulus*	+	+	-	-	-	+	-	-	-	1	-	-	-	-	+	-	-	III
G	Eua	2	3	4	D	*Polygonatum odoratum*	-	+	-	+	+	+	-	+	-	-	-	-	-	-	-	+	1	III
MPh	Eua	3	3	3	D,P	*Acer platanoides*	-	+	+	+	-	+	-	-	+	-	+	-	-	-	-	+	+	III
MPh	E	3	3	4	D	*Fraxinus excelsior*	-	+	2	+	+	-	-	+	-	-	+	-	+	-	-	+	2	III
Th	*Eua*	*2.5*	*3*	*3*	*D*	*Lapsana communis ssp. communis*	+	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	II
H	E	3	3	0	D	*Mycelis muralis*	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	+	-	II
H	Eua	2.5	3	3	P	*Carex pilosa*	+	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	II
G	E	3.5	3	4	D,P	*Scilla bifolia*	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	II
H	*Eua*	*3*	*0*	*4*	*D*	*Melica nutans*	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	-	II
H	*Ec*	*3*	*2.5*	*0*	*D*	*Prenanthes purpurea*	-	-	-	-	-	+	-	-	-	+	-	-	-	-	+	-	+	II
MPh	Eua	3	2	2	P	*Betula pendula*	-	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	II
G	*Eua*	*3*	*3*	*0*	*P*	*Maianthemum bifolium*	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	II
H	*Eua*	*3*	*2*	*2*	*DP*	*Cruciata glabra*	-	+	-	-	-	-	+	-	-	-	+	-	-	+	-	-	-	II
H	*Cp*	*3*	*3*	*4*	*P*	*Geum urbanum*	-	-	-	-	-	-	-	+	-	-	+	-	-	-	--	-	--	II
H	Eua	3	2.5	0	D	*Fragaria vesca*	-	-	+	+	-	-	-	-	-	-	-	-	--	-	-	-	-	II
MPh	M	2.5	3	0	D	*Quercus petraea*	+	-	-	--	-	-	-	-	-	-	+	+	+	-	-	-	-	II
H	*Cp*	*2*	*3*	*3*	*P*	*Clinopodium vulgare*	+	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	II
G	*E*	*2.5*	*3*	*4*	*P*	*Chephalanthtera longifolia*	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	+	II
MPh	*E*	*2.5*	*3*	*3*	*D*	*Acer campestre*	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	II
H	Eua	3	3	3.5	P	*Viola reichenbachiana*	-	-	-	-	+	-	+	-	-	+	-	+	-	-	-	-	-	II
l-nPh	Atl-M	3	3	3	P	*Hedera helix*	-	-	-	-	+	+	-	-	-	-	+	-	-	-	-	+	-	II
Th	*Eua*	*4*	*3*	*4*	*DP*	*Impatiens noli-tangere*	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	II
G	Eua	3.5	0	3	P	*Platanthera bifolia*	-	-	-	-	-	-	+	-	-	+	-	+	-	-	-	-	+	II
G	Ec	2.5	3	3	P	*Galium schultesii*	+	-	-	--	+	-	-	-	-	-	+	-	-	-	-	+	-	II

Table 1 –(continuation)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	29	20	21	22	23	24	25
Th	Cosm	3.5	3	3	P	*Geranium robertianum*	-	-	-	--	-	-	-	-	+	+	-	-	-	+	-	-	-	II
mPh	E	3	3	4	-	*Evonymus latifolius*	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	II
Th	Eua	3	3	4	P	*Alliaria petiolata*	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	II
H	Mp	2.5	3	4	P	*Glechoma hirsuta*	-	-	-	-	-	-	-	-	-	+	-	+	--	-	-	-	+	II
G	Eua	3.5	0	4	D	*Listera ovata*	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	II
H	E	2.5	3	4	D	*Melica uniflora*	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	+	II
H	Eua	3	3	0	D	*Stellaria holostea*	-	-	-	+	-	-	-	-	-	+	-	-	+	-	+	-	-	II
G	Ec	3	3	0	D	*Corydalis cava*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
MPh	Eua	3	2	2	D,P	*Populus tremula*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
G	Ppn	3	3.5	4	P	*Polygonatum latifolium*	-	-	-	-	-	-	-	-	-	-	-	+	--	-	-	-	-	I
H	E	3.5	3	3	D	*Stellaria nemorum*	-	-	-	+	-	-	-	-	-	-	-	-	-	--	-	-	-	I
H	*Eua*	*3*	*3*	*4*	*DP*	*Brahypodium sylvaticum*	-	-	-	-	-	-	+	--	-	-	-	-	-	-	-	-	-	I
						Rhamno-Prunetea																		
mPh	E	3	3	3	P	*Sambucus nigra*	-	-	+	-	-	-	+	-	-	+	+	+	+	+	+	+	+	IV
mPh	E	3	3	3	D	*Corylus avellana*	-	+	-	-	+	+	-	+	-	+	+	-	+	+	+	-	+	IV
mPh	Eua	3	3	3	D,P	*Salix capraea*	-	-	-	+	-	-	-	-	-	-	-	-	-	+	+	-	-	II
MPh	E	2.5	3	4	D	*Sorbus torminalis*	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	+	II
						Variae syntaxa																		
MPh	B-Pn	2.5	3.5	3	D	*Tilia tomentosa*	+	+	2	+	2	+	-	+	-	1	+	+	+	-	+	+	+	V
H	*Cp*	*2.5*	*3*	*3*	*D*	*Solidago virgaurea*	-	-	+	+	-	-	+	-	+	-	-	+	-	-	-	+	-	III
H	*Eua*	*4*	*3*	*0*	*D*	*Eupatorium cannabinum*	+	-	-	-	-	-	+	--	-	+	+	-	+	-	-	-	-	III
Ch	*Eua*	*2*	*2*	*2*	*DP*	*Veronica officinalis*	-	-	-	-	-	-	-	-	-	+	-	+	+	-	+	+	+	III
H	*Eua*	*2.5*	*3*	*2*	*P*	*Calamagrostis arundinaceae*	-	+	-	-	+	-	+	-	-	+	-	-	-	+	-	-	+	III
H	*Eua*	*3*	*3*	*0*	*P*	*Hypericum perforatum*	-	-	+	-	-	-	-	+	-	-	+	-	+	-	+	-	-	III
H	Eua	3	3	0	P	*Poa nemoralis*	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	+	+	II
H	Ec	4	2	4	P	*Gentiana asclepiadea*	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	II
G	Cosm	3	3	0	P	*Pteridium aquilinum*	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	II
G	Cp	3.5	3	5	D	*Phyllitis scolopendrium*	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	+	-	II
H	*Atl-Med*	*1.5*	*5*	*4.5*	*P*	*Ceterach oficinarum*	-	+	-	-	-	+	--	-	--	-	-	-	-	-	-	-	-	II
H	*Eua*	*3*	*0*	*3*	*D*	*Campanula glomerata*	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	II
Ch	*Cp*	*0*	*2*	*1*	*D*	*Vaccinum myrtillus*	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	II
H	*E(Mont)*	*3.5*	*2*	*0*	*D*	*Cicerbita alpina*	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-		-	II
H	*Cp*	*3*	*3*	*3*	*P*	*Gnaphalium sylvaticum*	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	--	II
H	*Ec*	*3*	*3*	*3*	*P*	*Digitalis grandiflora*	--	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	II
Th	*E*	*2.5*	*3.5*	*4*	*P*	*Verbascum phlomoides*	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	II
TH	*E*	*3*	*2.5*	*3*	*DP*	*Campanula patula*	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	II
G	*Eua*	*3.5*	*0*	*0*	*P*	*Petasites albus*	-	-	-	-	-	+	-	-	-	-		+	-	+	-	-	-	II
TH	Carp-B	3.5	2	2	P	*Campanula abietina*	-	-	-	-	-	+	-	+	-	-	--	+	-	-	-	-	+	II

Place and date of surveys: 1 – Forest District Reşiţa, Management Unit - UP V, compartment - u.a. 35 A, 04.05.216; 2- Forest District Reşiţa, UP V, u.a. 13, 05.05.2016 – ; 3- Faţa Cozia, Forest District Reşiţa, UP V, u.a. 13, 05.05.2016 ; 4 – Faţa Cozia, Forest District Reşiţa, UP V, u.a. 14, 05.05.2016 ; 5-Slope beneath Piatra Albă, Forest District Reşiţa, UP V, u.a. 32B, 04.05.2016; 6 - Forest District Reşiţa, UP V, u.a. 25. 04.05.2016 ;7- Milestone 93, Forest District Vălig, UP VII, u.a 69, 22.05.2018 ; 8- Forest District Văliug, UP VII, u.a. 72 B, 22.05.2018; 9- Forest District Văliug, UP VII, u.a.75 A, 22.05.2018; 10- Forest District Văliug, VII, u.a.60 A, 22.05.2018;11- Forest District Reşiţa, UP IV , u.a., 32 , 24.05.2018; 12- Forest District Reşiţa, UP IV, u.a., 33A , 24.05.2018; 13- Forest District Reşiţa, UP IV D, u.a., 33 D, 24.05.2018; 14- Forest District Văliug, UP VII, u.a., 53 A, 24.05.2018;15- Forest District Văliug, UP.VII, u.a. 52 A, 27.07.2018; 16- Forest District Văliug, UP VIII, u.a., 35, 24.05.2018; 17- Forest District Văliug, UP VII, u.a., 36 B, 24.05.2018;

CONCLUSIONS

1. Through our research, we identified 111 species of which 11 endemic endangered, endemic, relic species.
2. In the phytocoenoses of the association *Festuco drymejae-Fagetum*, the dominant species both in absolute value and ratio are hemi-cryptophytes (46.84 %) as a consequence of the belonging of the territory surveyed to the temperate-continental climate region.
3. In terms of geographical area and the genetic centre of origin, the core of phytogeographical elements are dominated by Eurasian (36.93 %) followed by European (26.12 %) and European-Central (12.61 %) species.
4. With reference to the action of ecological factors i.e. humidity, temperature, chemical reaction of the soil, the species of the association *Festuco drymejae-Fagetum* are mesophilic (71.12 %), micro-mesothermal (68.46 %) and acido-neutrophilic (36.93 %).
5. The genetic structure of *Festuco drymejae-Fagetum* phytocenoses shows us the dominance of the polyploid (44.14 %) favouring the colonization of the space and adaptation to the environmental conditions, followed by the diploid (41.44 %) that preserve the genetic stock needed for the species evolution.

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