CONTRIBUTIONS TO THE KNOWLEDGE OF HORNBEAM AND BEECH FORESTS, FROM LĂZĂRENI HILLS (NW ROMANIA)

Petru BURESCU[*], Laura Mariana LACATOŞ[**]

[*] *University of Oradea, Faculty of Environmental Protection, Department of Agriculture-Horticulture, Oradea, Romania*
[**] *University of Oradea, Faculty of Sciences, Biology Department, PhD Student, Oradea, Romania*
Corresponding author: Petru Burescu, University of Oradea, Faculty of Environmental Protection, Department of Agriculture-Horticulture, 26 Gen. G. Magheru, 410048 Oradea, Romania, tel.: 0040259412550, fax: 0040259416274, e-mail: pburescu@gmail.com

Abstract. In this paperwork we presented a phytocoenologic, environmental, bioeconomic and ecoprotective study on hornbeam and beech forests mixture spread over Lăzăreni Hills. These forests are subordinated to association *Carpino-Fagetum*, Paucă (1941) [21] whose phytocoenoses are analyzed by us under terms of floristic composition, ecological spectra of life form types, floristic elements (phytogeographic), under terms of ecological factors chart: humidity, temperature and chemical reaction of soil.

The association is presented in a stable equilibrium and consequently none of the dominant species of the tree layer or of the herbaceous layer tend to replace each other inherently in their competition for food and light.

It is necessary to maintain these forests in a natural state, because through the particular nature of the stations they occupy, they join in the group of forests with priority functions of anti-erosion protection, of hydrological balance adjustment and biodiversity conservation.

From the economic point of view, the association is of particular interest through the high quality of timber provided by the dominant species.

Keywords: phytocoenoses, association, phytocoenologic study, life forms, floristic elements, ecological indexes.

INTRODUCTION

The present study entitled "Contribution to the knowledge of Hornbeam and Beech from Lăzăreni Hills" complements other older studies [6, 23, 24], or more recently [10, 11, 12]. This study is justified by the fact that the paperworks mentioned above either covers a smaller area (like small plain of Miersig, Şomleului Hill near Betfia, Hidişel Hills) or a wider area (North-Western Romania).

Lăzăreni Hills (Fig. 1) are located in the western part of Pădurea Craiului Mountains, at south from the Vad-Oradea depression, at east of Miersig Plain, at north of the low plain of the rivers and Holod depression [22].

From administrative view Lăzăreni Hills are located in the central southern Bihar County, between Crişul Repede River at North and Crişul Negru River to the south.

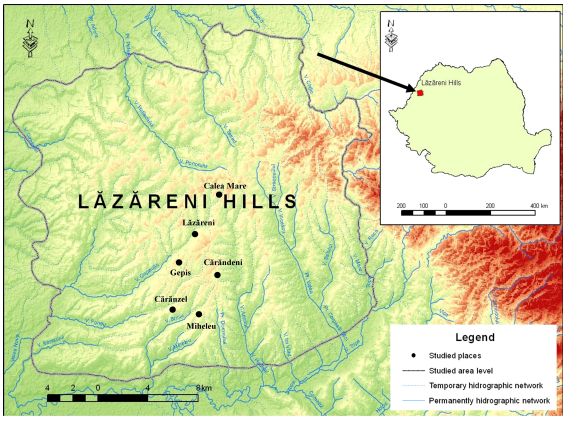

Figure 1. Geographical location of Lăzăreni Hills [22] (modified).

Lăzăreni piedmont takes the form of several terraces and peaks spread over a width of 15-25 km, with height between 220-347 m. Lăzăreni piedmont has the greatest development in Tăşadului Hills characterized through by gentle peaks and vaulted slopes, separated by wide valleys. The highest peak is leveled as a small plateau with a maximum altitude of 339 m. Lăzăreni Hills consist from Marne and sarmatien conglomerates, partly offset by Pleistocene clays. Soils are forest brown and luvic.

Lăzăreni piedmont climate is influenced by the Tisza Plain and also by Pădurea Craiului Mountains. Thus the studied region have a moderate continental climate with mild winters (temperature average in January is 1.9°C) and with warm temperate summers (temperature average in July being 20.6°C). The annual temperature average varies between 10ºC and 9ºC, somewhat high in Tisza Plain neighborhood and lower near Pădurea Craiului Mountains. Annual precipitation average varies between 680-700 mm, and the contact area with the Pădurea Craiului Mountains reach 800-900 mm [32].

Lăzăreni Hills are little more than half forested (54%) and almost half (46%) deforested and cultivated.

From the present forests are highlighted: *Quercetum petraeae-cerris* Soó 1963, *Quercetum frainetto-dalechampii* Bârcă 1984, *Quercetum robori-petraeae* Borza (1928) 1959, *Querco petraeae-Carpinetum* Soó et Pócs 1957, *Carpino-Quercetum cerris* Klika 1938 and *Carpino-Fagetum* Paucă 1941.

Cereal cultures alternating with mesophilous grasslands illustrated, by *Agrostis capillaris* L. (grass field) and *Anthoxanthum odoratum* L. (sweet vernal grass) (*Anthoxantho-Agrostietum capillaris* Sillinger 1933), mesohygrophylous with *Festuca pratensis* Hudson (meadow fescue) and *Cirsium canum* L. (Queen Anne's Thistle) *(Cirsio cani-Festucetum pratensis* Májovsky et Ruzicková 1975) dominate cleared land.

On arid and sunny soils xero-mesophilous glasslands with *Festuca valesiaca* Schleicher ex Gaudin (Volga fescue) and *Medicago minima* L., (little bur-clover) *(Medicagini-Festucetum valesiacae* Wagner 1940*),* with *Festuca rupicola* Heuffel (Furrowed fescue) and *Festuca valesiaca* Schleicher ex

Gaudin (Volga fescue), settle which transform by degradation into yellow bluestem grassland (*Botriochloetum ischaemi* Kristiansen 1937).

MATERIAL AND METHODS

In the study of hornbeam-beech forests of Lăzăreni Hills, we used the phytosociological research method of Central European School based on the principles and methodology developed by Braun-Blanquet (1964) [7] and adapted by Borza and Boşcaiu (1965) [4, 5] to the features of vegetation cover in our country. Phytocoenologic heaves including floristic and physiognomic homogeneous sample surfaces were chosen in the characteristic fragments of phytocoenoses stands of beech and hornbeam brushes, their size being 400 m^2.

In this sense we conducted a total of 14 field trips during 2009, resulting in a total of 60 recorded stations in variations concerning the edaphic layer, altitude, exposition, slope inclination, situated on the slopes of the streams depths of Lăzăreni Hills.

From the 60 relevées a number of 10 were selected, which were grouped in a table of association.

The synthetic table contains information on species which enter in the floristic composition of the association, biological form, floral element (phytogeographic), ecological indices (moisture, temperature, chemical reaction of the soil), point serial number, altitude (m.s.m), exposure, slope, tree height (m), canopy (%), herbaceous layer cover (%), area (m^2).

Quantitative assessment of each species participation in the association table was made with the index of abundance-dominance according to evaluation system of Braun-Blanquet & Pavillard (1928) [8]. Synthetic phytocoenologic indicex of constancy (K) whose classes are included between I-V values, that expresses the degree of coenotic fidelity compared to phytocoenoses environment of the association has been entered and calculate don the right of the table.

Figure 2. Association *Carpino-Fagetum*, in Lăzăreni Hills, Bihor County (NW Romania).

For the ordering and classification of species in the table of association, for hierarchically superior coenotaxons, sub-alliance, alliance, order and class, the traditional ecological-floristic systems belonging to the authors: [16, 29, 31] as well as the works recently published belonging to signatories of the authors [3, 20, 30] were considered.

The species from one relevée, the locality and the date of relevée were noted at the bottom of the table. For the phytocoenologic and ecologic study of the association *Carpino-Fagetum*, we represented graphically in the form of spectra the distribution of life forms, of floristic elements and ecologic indices in the phytocoenoses analyzed. The image of this association of *Carpino-Fagetum* Paucă 1941 will be presented in figure 2 below.

RESULTS

Hornbeam and beech mixed forests belonging association *Carpino-Fagetum*, covers relatively large surfaces in the north-eastern of Bihor County located in Crişeni piedmonts, at altitudes between 300-500 m, and subordinated geographicaly to Craiului Forest Mountains.

In north-eastern piedmont Lăzăreni, on the summit and northern and shady slopes with the north, north-east exposure of the localities Şerghiş, Surduc, Copacel, Poiana Tăşad, Bucuroaia, Calea-Mare hornbeam-beech forests going down to altitudes of 260-380 m but occupying restricted areas. In the distribution of hornbeam-beech forests, we found that they lower to an altitude under 200 m in North and in the central part of Lăzăreni piedmont in Cărandului Valley (Cărănzel), Biţişagului Valley (Gepiş) Lăzăreni Valley, Topile-Miheleu Valley, Căzaşului-Calea Mare Valley, they appear as an intrazonal type of vegetation within cvercinee forests. It is a particular case where hornbeam-beech forests inhabits the depths of streams and narrow valleys, and oak groves with hornbeam *(Querco petraeae-Carpinetum)*, are found above them on the plateau, on the slopes there are cerris geosigmetum with hornbeam *(Carpino-Quercetum cerris)*, evergreen oak *(Quercetum petraeae-cerris)*.

Thus, we find that in the distribution of woody vegetation across Lăzăreni Hills there is a thermal inversion phenomenon caused by edafo-climatic factors, abundant rainfall, high and constant humidity of air, favorable temperatures, deep moist-wet soils to moist soils rich of humus and minerals, defining the bottom of streams stations and valleys we refer to. Phytocoenoses of association *Carpino-Fagetum* are developed on the sloped and steep ravines exposed to the north, northeast, northwest with a slope between 6º and18° from streams depth and narrow ravines, on brown soils.

In such stations with deep soils, intensely rich in humus, wet-moist to moist-wet with sufficient humidity of air, beech and hornbeam find conditions conducive to life, stations where they immigrated (hornbeam was first occupied, beech appeared much later) and associated three millennia ago.

Flora of carpino-fagetum we studied in this area is rich, totalizing a number of 60 species (Tab.1) grouped in phytocoenologic table, in illustrating and characteristic species for the association, for the recognition or differentiation of sub-alliance, alliance, order and class.

Trees layer is well united with a crowning of 0.8, where the physiognomy of the association is given by *Fagus sylvatica* L., with has a height of 28 m, a diameter of 50-60 cm, an average coverage of 30.6%, a maximum constancy (K = V) and by *Carpinus betulus* L., with a height of 20-22 m, a diameter of 30-40 cm, with an average coverage of 18.5% and a maximum constancy (K = V).

Tree layer also includes other woody species among which: *Quercus petraea* (Mattuschka) Liebl. (oak), *Quercus polycarpa* Schur (Transylvanian oak), *Quercus cerris* L. (Cerris), *Prunus avium* Miller (bird cherry).

Shrubs layer is represented by young specimens like *Sambucus nigra* L., *Staphylea pinnata* L., *Cornus sanguinea* L., *Evonymus latifolius* L., *Rubus hirtus* Waldst. et Kit.

Herbaceous layer is well emphasized having an average coverage of 50% and being composed of sciophiles plants (ombrophile): *Oxalis acetosella* L., *Asarum europaeum* L., *Allium ursinum* L., *Aposeris foetida* L., *Galium odoratum* L., *Dentaria glandulosa* Waldst. et Kit., *Dryopteris filix-mas* (L.) Schott *Athyrium filix-femina* (L.) Roth, sciaphyle - helsciaphyle (shadow-semishadow), *Festuca drymeja* Mert. et Koch, *Carex sylvatica* Hudson, *Sanicula europaea* L., *Viola reichenbachiana* Jordan ex Boreau, *Symphytum tuberosum* L., *Stellaria holostea* L., *Scilla bifolia* L., *Euphorbia amygdaloides* L., *Pulmonaria officinalis* L., *Mycelis muralis* (L.) Dumort., which are also associated with species indicating humus soil, mull type: *Aegopodium podagraria* L., *Anemone nemorosa* L., *Asarum europaeum* L., *Allium ursinum, Circaea lutetiana* L., *Dentaria bulbifera* L., *Geranium robertianum* L., *Lamium galeobdolon* L., *Lathyrus vernus* (L.) Bernh., *Carex digitata* L., *Hedera helix, Melica uniflora* Retz., *Polygonatum odoratum* (Miller) Druce.

In the composition of herbaceous layer, species indicating pH were also observed of which a higher proportion is held by those indicating an acid neutrophil chemical reaction (pH=5.8-6.5), *Dactylis polygama* Horvátovszky, *Ranunculus auricomus* L., *Galium schultesii* Vest, *Rubus hirtus, Platanthera bifolia* (L.) L.C.M.Richard, *Lapsana communis* L., *Viola reichenbachiana*, followed by those indicating weak acid neutrophil chemical reaction (pH 6.5-7.0), *Dentaria bulbifera, Dentaria glandulosa, Circaea lutetiana, Carex sylvatica, Sanicula europaea, Lamium galeobdolon, Euphorbia amygdaloides, Allium ursinum, Asarum europaeum, Geum urbanum* L., *Glechoma hirsuta* Waldst. et Kit., *Melica nutans* L., *Melica uniflora*.

If we also analyze the phytocoenoses of the association from phytocoenologic point of view, it results that the characteristic and illustrating species for the association are *Fagus sylvatica* and *Carpinus betulus* which are in codominance relation.

Between recognized species for sub-alliance *Lathyro hallersteinii-Carpinenion* Boşcaiu et al. 1982, we remind: *Aposeris foetida, Stellaria holostea, Dactylis polygama, Dentaria glandulosa, Ranunculus auricomus.*

Among the species for the recognition of alliance *Symphyto cordati-Fagion* Vida (1959) 1963 we mention: *Pulmonaria officinalis, Carex sylvatica, Galium odoratum, Festuca drymeja, Circaea lutetiana, Stachys sylvatica* L., *Galium schultesii, Viola reichenbachiana,* etc.

Recognition species for order *Fagetalia sylvaticae* Pawlowski in Pawlowski et al. 1928 are: *Lamium galeobdolon, Lathyrus vernus, Oxalis acetosella, Sanicula europaea, Symphytum tuberosum, Rubus hirtus, Asarum europaeum*, and from those of the class *Querco - Fagetea* Br.-Bl. et Vlieger in Vlieger em. Borhidi 1996 we enumerate the following: *Quercus petraea* (Mattuschka) Liebl., *Cruciata glabra* L., *Athyrium filix-femina, Carex digitata, Dentaria bulbifera, Mycelis muralis, Quercus polycarpa* Schur, *Hedera helix, Melica uniflora, Anemone nemorosa, Aegopodium podagraria.*

The association includes a number of 5 transgressive species of the class *Quercetea pubescenti-petraeae* Jakucs 1960.

Analyzing the composition of hornbeam-beech forests according to the main ecologic factors (Fig. 3.), it result that they join the group of thermo mesophilous and xero-mesophilous deciduous forests.

In the composition of phytocoenoses, mesophilous represent most species of 65% (U3 = 40%, U3.5 = 25%), followed by xero-mesophytes, which are less: 20% (U2 = 5%, U2.5 = 15 %).

From thermal point of view, moderately thermophilous species also named micro-mesothermal, represent most plants 65% (T3 = 60%, T3.5 = 5%), followed by micro-thermal species 20%.

As regards soil chemical reaction, approximately 31.66 % of the species of the association are moderately acidic also named acidic-neutrophilous (R3 = 31.66), followed by amphitolerant species (R0=28.33).

Weak acid neutrophil species present in proportion of 25% (R4=25%), prefer eutrophic base-saturation soils, intensely rich in humus.

In the spectrum of life forms (Fig. 4), phanerophytes representing the tree layer are quantitatively dominated, while in the herbaceous layer, hemicriptophytes hold numerically the highest percentage (H = 53.3%). Geophytes are well represented and have a 20% share and a short growing cycle.

The floristic elements spectrum (Fig. 5) highlights numerical predominance of Eurasian species (Eua = 41.66%), followed by the European species (E = 28.3%) and Central European species (Ec= 8.3%). European species together with Central European species amount to a percentage of 36.6%, which explains the wet and moderately thermophilous nature of the stations where hornbeam and beech brushes develop.

Thermophilic elements of southern origin (Mediterranean, Pontic-mediterranean, Atlantic, Balkanic) have a share of 13.2% is the expression of a habitat with a mild climate without extremes.

The association is presented in a stable equilibrium and consequently none of the dominant species of the

tree layer or of the herbaceous layer tend to replace each other inherently in their competition for food and light.

It is necessary to maintain these forests in a natural state, because through the particular nature of the stations they occupy, they join in the group of forests with priority functions of anti-erosion protection, of hydrological balance adjustment and biodiversity conservation.

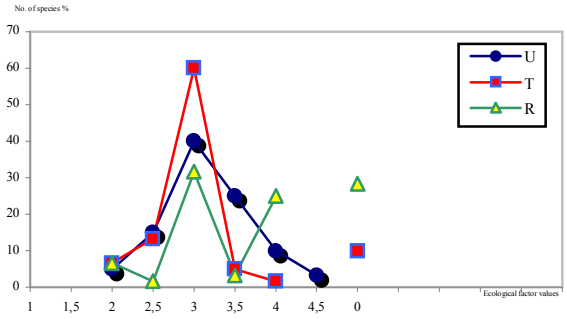

Figure 3. Diagram of ecological factors for the *Carpino-Fagetum* (Hornbeam and Beech forests), in Lăzăreni Hills- Bihor County, where: U – humidity,T – temperature, R – the chemical reaction of the soil.

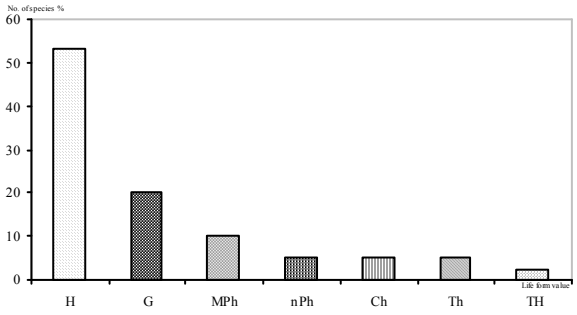

Figure 4. The life forms spectrum of *Carpino-Fagetum,* in Lăzăreni Hills- Bihor County, where: H-Hemicryptophytes; G-Geophytes; MPh-Megaphanerophytes; nPh-Nanophanerophytes;Ch-Chamaephytes; Th-Euterophytes; TH-Hemiterophytes.

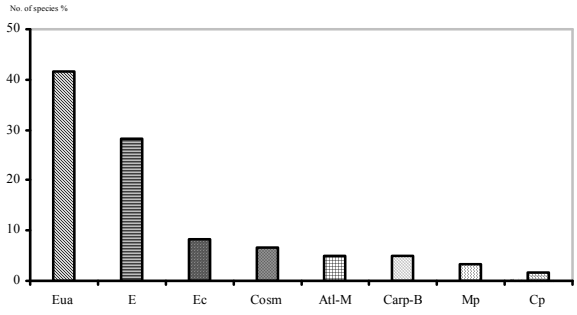

Figure 5. The spectrum of floristic elements of association *Carpino-Fagetum*, in Lăzăreni Hills- Bihor County, where: Eua-Eurasian; E-European; Ec-Central European; Cosm-Cosmopolitan; Atl-M- Atlantic-Mediterranean; Carp-B-Carpathian-Balkanic; Mp-Pontic-mediteranian; Cp-Circumpolar.

From the economic point of view, the association is of particular interest through the high quality of timber provided by the dominant species.

DISCUSSIONS

In the country, this association of *Carpino-Fagetum* with a relatively similar floristic composition was also described in: northwestern Romania [1, 2, 6, 10, 12, 19], in Transylvania [15, 25, 26], in Banat [9, 18, 28], from Moldova [13], from the Carpathians [14, 27].

If one compare the hornbeam-beech forests investigated by us and the Lăzăreni Hills investigated by Groza (2008) [17] in Pădurea Craiului Mountains we found that differences:

- in terms of behavior under life factors, both phytocoenoses from Lăzăreni Hills and those from Pădurea Craiului Mountains have a predominant mesophyll character (71.6% in Pădurea Craiului Mountains, 75% in Lăzăreni Hills), micromesotherm (76.5% in Pădurea Craiului Mountains, 70% in Lăzăreni Hills) and acid neutrophil (41.5 % in Pădurea Craiului Mountains, 31.66 % in Lăzăreni Hills).
- the spectrum of life forms shows the dominance of hemicryptophytes in Pădurea Craiului Mountains 33% and in Lăzăreni Hills 53.3%.
- the floristic elements spectrum indicates, the dominance of Eurasian species in Pădurea Craiului Mountains 29% and in Lăzăreni Hills 41.66%.

In the floristic composition of phytocenoses of Carpino-Fagetum Association, 81 species are described in Pădurea Craiului Mountains and 60 species in Lăzăreni Hills and among these 20 species are specific for the deciduous forests from the mountain level.

Phytocenoses of carpino-fagetum from Lăzăreni Hills represent an intrazonal type of vegetation with a very small share within oak forests (oak groves, cerreto-oak groves, oaks) which mainly inhabit this territory.

Through the special character of the stations where they develop, strongly inclined slopes (15-40°) from the bottom of streams and ravines, the phytocoenoses investigated by us join in the group of forests with priority functions of anti-erosion protection and hydrological balance adjustment.

Although they occupy a surface less than 5% of forest fund, Carpino-Fagetum colonizing the ravines, shaded and moist streams from Lăzăreni Hills shelter a large number of jeopardized, vulnerable, relic species, etc reason for which they must be effectively protected together with the natural environment and protected from any exploitation.

Deciduous forests in general in Piedmont Lăzăreni suffered in recent years (1990-2008) because of the economic degradation that caused serious damage to the exploitation of timber.

Table 1. Association *Carpino-Fagetum* Paucă 1941, in Lăzăreni Hills-Bihor County.

L.f.	F.e.	U.	T.	Cr.	No. Land Surveys	1	2	3	4	5	6	7	8	9	10	K
					Altitude (m.s.m)	280	310	360	190	200	180	230	210	250	310	
					Exposition	NV	N	N	NE	NE	S	S	NV	NV	E	
					Slope	10	11	8	10	11	18	15	9	12	6	
					Trees high (m^2)	22	23	28	22	23	23	24	26	26	24	
					Trunk diam. (cm)	45	40	50	45	55	50	60	40	45	55	
					Consistency (of tree layer)	0.85	0.85	0.7	0.75	0.7	0.85	0.8	0.8	0.7	0.8	
					Herbaceous cover layer%	95	40	90	40	45	35	45	40	30	35	
					Surface (m^2)	400	400	400	400	400	400	400	400	400	400	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MPh	E	3	3	0	*Fagus sylvatica*	2	4	4	2	4	2	1	3	4	1	V
MPh	E	3	3	3	*Carpinus betulus*	4	2	1	3	1	4	4	3	2	4	V
					Lathyro hallersteinii – Carpinenion											
H	Ec	3	2.5	3.5	*Aposeris foetida*	+	+	.	+	+	+	+	+	+	.	IV
H	Eua	3	3	0	*Stellaria holostea*	.	+	.	1	1	+	+	+	.	.	III
H	Ec	2.5	3	3	*Dactylis polygama*	.	.	.	.	.	.	+	+	.	+	II
G	Carp-B	4	2.5	4	*Dentaria glandulosa*	.	.	.	.	.	.	+	.	+	.	I
H	Eua	3.5	3	3	*Ranunculus auricomus*	.	.	.	.	+	.	.	.	.	.	I
					Symphyto cordati – Fagion											
H	E	3.5	3	3	*Pulmonaria officinalis*	+	+	.	.	+	1	.	+	+	+	IV
H	E	3.5	3	4	*Carex sylvatica*	+	1	+	.	.	2	.	1	+	2	IV
G	Eua	3	3	3	*Galium odoratum*	+	+	+	.	+	+	+	+	+	.	IV
G	Carp-B	4	2	3	*Festuca drymeja*	5	2	5	.	.	.	.	1	2	1	III
H	Eua	3	3	3.5	*Viola reichenbachiana*	+	.	.	.	+	+	.	.	.	.	II
H	Cosm	4	3	0	*Dryopteris filix – mas*	.	.	.	.	+	.	.	+	+	.	II
G	Eua	3.5	3	4	*Circaea lutetiana*	+	.	.	.	.	+	.	.	+	.	II
Th	Cosm	3.5	3	3	*Geranium robertianum*	.	.	.	.	.	.	.	+	.	.	I
H	E	2.5	2.5	2	*Luzula albida*	.	.	.	+	.	.	.	.	.	.	I
Ch	Eua	2	2	2	*Veronica officinalis*	.	.	.	.	.	.	.	.	.	+	I
H	Eua	3.5	0	0	*Stachys sylvatica*	.	.	.	.	.	.	.	+	.	.	I
Th	Cosm	3	0	0	*Stellaria media*	.	.	.	.	.	.	+	.	.	.	I
					Fagetalia sylvaticae											
H	Ec	3	0	4	*Lamium galeobdolon*	+	1	+	1	.	+	+	+	+	+	V
H	Eua	3	3	3	*Lathyrus vernus*	.	+	.	+	+	+	.	+	.	.	III
H	Cp	4	3	3	*Oxalis acetosella*	+	+	+	.	.	+	.	.	+	.	III
H	Eua	3.5	3	4	*Asarum europaeum*	.	+	.	.	.	+	.	+	+	.	II
nPh	E	3	2.5	3	*Rubus hirtus*	.	+	.	.	.	.	.	+	+	.	II
H	Atl-M	3.5	3	4	*Sanicula europaea*	+	.	.	.	.	+	.	+	+	.	II
Ch	E	3	3.5	4	*Euphorbia amygdaloides*	.	+	.	.	.	+	.	.	.	.	I
Ch	Eua	4	3	0	*Lysimachia nummularia*	.	.	.	.	.	.	.	.	+	+	I
G	E	3.5	3.5	4	*Allium ursinum*	.	.	.	.	3	.	.	.	.	.	I
H	Eua	3	2	0	*Campanula rapunculoides*	.	+	.	.	.	.	.	.	.	.	I
H	Eua	3.5	3	0	*Scrophularia nodosa*	.	.	.	.	.	.	.	+	.	+	I
H	Eua	3	3	0	*Symphytum tuberosum*	.	.	.	.	.	.	.	+	.	.	I
H	Eua	4	3	2.5	*Festuca gigantea*	+	.	.	.	.	+	.	.	.	.	I

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Querco – Fagetea											
MPh	E	2.5	3	0	*Quercus petraea*	1	1	+	2	+	1	1	+	.	1	V
H	Eua	3	2	2	*Cruciata glabra*	+	+	.	.	.	+	+	+	+	+	IV
H	Cosm	4	2.5	0	*Athyrium filix – femina*	+	+	+	.	.	.	.	+	+	.	III
H	E	3	3	0	*Mycelis muralis*	+	+	+	.	.	+	+	.	.	+	III
H	E	3	3	3	*Carex digitata*	.	.	.	2	+	.	+	2	+	+	III
G	Ec	3	3	4	*Dentaria bulbifera*	.	.	.	.	+	+	+	+	+	+	III
nPh	Atl-M	3	3	3	*Hedera helix*	.	+	+	.	.	.	.	+	.	+	II
H	Eua	3	0	4	*Melica nutans*	.	.	.	.	.	.	3	+	+	+	II
H	Eua	3	2.5	0	*Fragaria vesca*	.	.	.	.	.	.	+	+	+	+	II
H	E	2.5	3	4	*Melica uniflora*	+	.	+	.	.	+	.	+	.	.	II
H	Eua	3.5	3	3	*Aegopodium podagraria*	.	+	.	.	+	+	.	.	.	.	II
G	E	3.5	4	0	*Anemone nemorosa*	.	.	.	1	+	.	+	.	.	.	II
MPh	Carp-B	2.5	2.5	0	*Quercus polycarpa*	.	.	.	.	.	.	1	.	+	1	II
H	Eua	3	3	4	*Geum urbanum*	.	.	.	.	.	.	.	.	+	.	I
H	Mp	2.5	3	4	*Glechoma hirsuta*	.	.	.	.	.	.	.	+	.	.	I
G	Eua	3.5	0	3	*Platanthera bifolia*	.	.	.	.	.	.	.	+	.	.	I
H	Eua	3	3	0	*Poa nemoralis*	.	.	.	.	.	.	.	+	.	.	I
G	E	3.5	3	4	*Scilla bifolia*	.	.	.	+	+	.	.	.	.	.	I
MPh	E	3	3	3	*Prunus avium*	.	.	+	.	.	.	.	.	.	.	I
TH	E	3	2.5	3	*Campanula patula*	.	.	.	.	.	.	.	.	.	+	I
Th	Eua	2.5	3	3	*Lapsana communis*	.	+	.	.	.	.	.	.	.	.	I
					Quercetea pubescenti –petraeae											
MPh	Mp	2	3.5	3	*Quercus cerris*	+	+	+	+	.	.	.	.	.	.	II
G	Eua	2	3	4	*Polygonatum odoratum*	.	+	.	.	.	.	+	.	.	.	I
G	Atl-M	2.5	4	2	*Ruscus aculeatus*	.	.	.	.	.	.	.	.	.	+	I
					Accompanying											
H	E	3.5	0	0	*Ajuga reptans*	.	+	.	+	.	.	.	.	.	+	II
H	Eua	3.5	3	0	*Holcus lanatus*	.	.	.	.	.	.	.	.	.	+	I
nPh	Eua	4.5	3	4	*Rubus caesius*	.	.	.	.	.	.	.	.	+	.	I

Note: In a disclosure it has been identified: *Carex remota, Festuca sylvatica, Carex leporina, Galeopsis tetrahit, Cardamine pratensis, Luzula campestris, Hypericum perforatum, Agrostis stolonifera,* where: H-Hemicryptophytes; G-Geophytes; MPh-Megaphanerophytes; nPh-Nanophanerophytes; Ch-Chamaephytes; Th-Euterophytes; TH-Hemiterophytes. Eua- Eurasian; E-European; Ec-Central European; Cosm-Cosmopolitan; Atl-M- Atlantic-Mediterranean; Carp-B- Carpathian-Balkanic; Mp-Pontic-Mediteranean; Cp-Circumpolar.

Studied places: 1-2, Gepişului Valley-Gepiş village, 22.08.2009; 3, Mădăraşul Valley-North village of Gepiş, 26.07.2009; 4, Cărandului Valley at the N from Cărănzel village, 11.04.2009; 5-6, Bițișagului Valley-Gepiş village, 26.07.2009; 7, Lăzăreni Valley-Lăzăreni village, 31.05.2009; 8, S of Topile Valley-Miheleu village, 31.05.2009; 9, Căzaşului Valley - Calea Mare village 29.05.2009; 10, Mireş Valley-Calea Mare village 29.05.2009.

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