

A VEGETATION ISLAND WITH WHITE OAK (*QUERCUS PUBESCENS* WILLD.) IN THE SUB-CARPATHIANS OF BUZĂU

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Abstract: The vegetation of a forest-steppe type from a part of the river Buzău Basin is presented in this paper. After a short presentation of the natural conditions of the forest Crivineni (near the village Valea Lupului, Buzău county), we are making an analysis of the present-day vegetation, as well as the coenotaxons identified by us in that forest.

Key words: forest-steppe vegetation, associations, Crivineni forest, Romania.

Introduction

Natural conditions: the forest Crivineni is situated at the flexion of the Carpathians Mountains (C), sub-region Vrancea (C₂), in the area of durmast and beech forests, as well as the transitions between these (C₂₅₀), in the middle basin of the Buzău river, in the Depression Larga – Pătârlagele. The whole surface of that forest is around 26 ha.

The whole area is partially situated on a sarmatian-pleistocen syncline, replete with marls, sands and gravels (belonging to levantine and inferior pleistocen ages). The lithological substratum is made from low brassy systems (marls, sandy marls, low consolidated sands, gravels, and loams). Erosions of various types take places without difficulty, frequently even on those fields covered by a forestry vegetation, being favoured by the increased energy of the relief.

The geomorfological prevalent unit is the corrugated slope, having predominantly southern and eastern aspects, sunlited. Also, the geomorfological prevalent unit is a shady aspect (38%), being followed by a partially sunlited (37%) and fully sunlited (25%) ones. Altitudinal, the forest Crivineni, is situated between 250 m.s.l. (at the level of Buzău river meadow) and 1.090 m.s.l. (in the summit Plăiaș). The prevalent altitudes are between 400 and 800 m.s.l. The average altitude is 624 m.s.l. The average inclination of the slopes is 28,4°. The geomorfology of the area, through its parameters, exert some influences over the climatic factors and, therefore, over the vegetation.

The main water basins of the rivers in that area penetrated over by various rivers, and close to the Crivineni forest there is the river called “Valea Lupului”, a right side tributary of the Buzău river. The output of this river is formed by a predominantly pluvial supply, changing and varying with the seasons and the yearly precipitations. The flow capacity has a marked torrential feature, being also unsteady. During the freshets, there are registered significant damages downstream, by entrapment of driftwood, gravels, detritus, and boulder from upstream.

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According to the climatic division into districts, the forests from UP V Pătârlagele are part of the hills and plateaux region, with altitudes between 200 and 800 m.s.l. According to Köppen, that area is part of the boreal climate province Df, characterized by cold and humid winters, with average temperature of the coldest month under $-1,8^{\circ}\text{C}$ and average temperature of the warmest month over $+10^{\circ}\text{C}$. As a climatic province, our territory belongs to the sub-province Dfbx, with average temperature of the warmest month over $+12^{\circ}\text{C}$, precipitations all over the year and cold winters. The average yearly temperature in Pătârlagele is $+9,9^{\circ}\text{C}$. The months with the lowest, and irrespectively the highest average temperatures, are: January ($-1,8^{\circ}\text{C}$) and August ($+19,5^{\circ}\text{C}$). The temperatures on the surface of the UP V Pătârlagele varies with the altitude, and frequently are registered thermal inversions. The maximum absolutely temperature is $38,0^{\circ}\text{C}$ in that area; the minimum absolutely temperature is $-23,5^{\circ}\text{C}$. Early frosts happen, as a rule, after the finishing of the vegetation season; on the other hand, the late frosts happen after the beginning of the vegetation season, producing lesser or higher damages over the fruition.

The average yearly precipitations in Pătârlagele are of 635,8 mm, most of them falling in June (112,3 mm), the lesser being registered in October (25,3 mm). The number of days with downpour is between 25 and 30, over 50% of them taking place in June and July. The downpour days, accompanied by flash of lightnings are registered during the warmest months (June and July). The hail is a rare phenomena, happening only in the warm season.

The winds has an average speed of 3,3 m/sec., with a larger intensity from the North (4,9 m/sec.), and the lowest intensity from the west (2,1 m/sec.). The wind frequency is of 30,6% per year, most of them being in January (36,1%), and the lowest frequency being in July (18,4%).

According to the climatic division into districts of the Romanian territory (Geographic Monography of R. P. R. [7]), the forests from U. P. V Pătârlagele are part of the region, having a hilly climate (200 – 800 mm precipitations/year), within the climatic province Dfbx (Köppen classification), characterized by a boreal climate, favourable to the forest vegetation.

The Dryness Index De Martonne is 32. This index having a value over 30, denote the situation of the Crivineni forest into the forest region of Romania.

From pedologic point of view, the soils from the surveyed region, are the next ones: illuvial clay soils (rendzina, brown illuvial typical and lithic, luvisol albic typical), and cambisoils (brown eu-mesobasic: typical, mollic, rendzinic, pseudo- rendzinic, and lithic). Still, the prevalent soils on the territory of the Crivineni forest, are the next ones: regosoils and regosoils with a salinized sub-type, in U. A. 86, plots: A, B, D & E; 87 plots A & C (25.9 ha).

Material and methods

All the plant species have been collected, identified in the laboratory, accordingly to Ciocârlan, 2000 [2]. The nomenclature follows the paper [5]. The methodology used for the phytosociological research is according to the Central-European Plant Sociology School (i. e. Braun-Blanquet, 1921) [1].

Discussions

Our investigations on the vegetation of the Crivineni forest (Buzău county) have been done during the autumn season (2005), and in the spring season of 2006. In those two period of the field surveys, we analyzed all the vegetation types of that forest.

Surprisingly, we have discovered in that region, definitely a sub-montane one, a strong influence of a warm climate over the vegetation. Thus, the presence of an island having a forest-steppe vegetation, is a result of some factors, like the next ones:

- the dominant aspects of the surveyed area is south or south-east ones;
- the slope gradient vary between 5 and 40 degrees;
- the geologic substratum is made by marls;
- the pedologic stratum is dominated by rendzinas and pseudo-rendzinas soils;
- those termic and humidity gradients vary a lot – on the northern slopes the yearly temperatures are lower and the humidity is higher (being covered by the phytocoenoses with beech (Ass. *Galio schultesii* – *Fagetum* (Burduja et al. 1973) Chifu et Ștefan 1994), while the southern and south-eastern slopes, having yearly temperatures higher and the humidity lower, are covered by the phytocoenoses with white oak (Ass. *Orno* – *Quercetum pubescentis* Horanszky, Jakucs et Zólyomi 1958; Ass. *Seslerio heufflerianae* – *Hippophaëtum rhamnoidis* Ștefan 1995; Ass. *Taraxaco serotini* - *Botriochloëtum ischaemi* (Burduja et al. 1956, Răvăruț et al. 1956) Sârbu, Coldea et Chifu 1999):
- even so, the most pregnant influence over that area is the existence of a strong foehn at the flexion of the Carpathians Mountains; those „warm winds” is the major climate factor which favor the existence of that type of vegetation, as it is also concluded by Ciocârlan, 1968 [2], Mititelu & colab., 1980 [6], as well as by Ștefan, 1995 [4].

All the xero-termophilous plants from the area of the Crivineni forest are installed there after the glaciation age – in Holocen, in the so called „the mixed-oak forest” phase. On that period, a lot of xero-termophilous species, having a Pontic and sub-Mediterranean origins, have invaded the forest-steppe region, as well as parts of the *Quercus petraea* subzone (of the forest zone), from the Buzău river basin. The ways of the penetration of the xero-termophilous elements in the flora of Romania, are the next ones: the „Pontic route” from the eastern part of Europe (for *Asparagus verticillatus*, *Crambe tataria*, *Peucedanum tauricum*, *Salvia nurtans*, *Centaurea orientalis*, and so on); the „Illyrian route” from the south-western part of Europe (for *Quercus pubescens*, *Q. virgiliana*, *Q. dalechampii*, and so on), and the „Moesian route” from the south-eastern part of Europe (for *Quercus pedunculiflora*). The presence of these plant species is depending now on the soil coverage and the climate of the region [2].

The vegetation of the Buzău river basin is made by mixed forests (of beech and spruce, of beech and oaks, of white oaks and ashes, and so on), bushes of sea-buckthorn, hawthorns and so forths, or meadows of various green grasses etc.

The coenotaxonomic framing of the vegetation in the Crivineni forest, Buzău county, is like the next ones:

Quercetea pubescenti – *petraeae* (Oberd. 1948) Jakucs 1960

Orno – *Cotinetalia pubescentis* Jakucs 1960

Orno – *Cotinion* Soó 1960

1. *Orno* – *Quercetum pubescentis* Horanszky, Jakucs et Zólyomi 1958

Prunetalia Tx. 1952

- Prunion spinosae* Soó 1950
2. *Sesleria heufflerianae* – *Hippophaëtum rhamnoidis* Ştefan 1995
Quercus-Fagetum Br. – Bl. et Vlieger 1937 em. Soó 1964
Fagetalia sylvaticae (Pawl. 1928) Tx. et Diem. 1936
Lathyro hallersteinii – *Carpinion* Boşcaiu et al. 1982
Galio schultesii – *Carpinenion* Taüber 1992
3. *Galio schultesii* – *Fagetum* (Burduja et al. 1973) Chifu et Ştefan 1994
- Festuco* – *Brometea* Br. – Bl. et Tx. 1943
Festucetalia valesiacae Br. – Bl. et Tx. 1943
Festucion rupicola (*sulcatae*) Soó (1929 n.n.) 1940 corr. Soó 1964
Jurineo – *Euphorbinenion nicaeensis* Dobrescu et al 1971, corr. Sârbu. Coldea et Chifu 1993
4. *Taraxaco serotini* - *Botriochloëtum ischaemi* (Burduja et al. 1956) Sârbu, Coldea et Chifu 1999
5. Phytocoenoses with *Sesleria heufflerana* ssp. *heufflerana*

Description of the associations

1. Ass. *Orno* – *Quercetum pubescentis* Horanszky, Jakucs et Zólyomi 1958

The phytocoenoses of this coenotaxa are situated on the slopes of the Crivineni hill, on Eastern and Southern aspects. The density of stand vary between 0.6 and 0.8. The herbaceous stratum have a coverage varying between 3% and 80% at the time of the recording relevés. The white oak (*Quercus pubescens*) has a natural regeneration, mostly from the stub, due to the forest cuttings in the past, but also from the seeds – only in some very rare cases (**Table no. 1**).

Tab. no. 1 Ass. *Orno* – *Quercetum pubescentis*

Aspect (dominant)	E	S-E	S	S	S	S	N-E
Slope (°)	30	25	25	30	30	35	30
Density of stand	0.6	0.8	0.8	0.7	0.75	0.80	0.90
Tree height (m)	10	12	10	12	12	12	12-14
Tree diameter (cm)	15-25	15-30	15-25	25	5-30	5-25	7-40
Coverage of shrub & juvenile layer (%)	10	5	5	10	30	3	3
Coverage of herbaceous layer (%)	80	60	3	60	15	5	15
Surface of relevé (m ²)	400	400	400	400	400	200	200
Relevé number	1	2	3	4	5	6	7
Charact. ass.							
<i>Quercus pubescens</i>	3	5	3	3	3	4	4
<i>Quercus pubescens</i> juv.	+	+	+	+	1	+	1
<i>Fraxinus ornus</i>	2	+	2	1	2	1	-
<i>Fraxinus ornus</i> juv.	2	+	-	1	1	+	+
Orno – Cotinon et Orno – Cotinetalia pubescentis							
<i>Asparagus tenuifolius</i>	+	-	-	-	-	-	+
<i>Rhamnus saxatilis</i> ssp. <i>tinctorius</i>	-	+	+	-	-	+	-
<i>Tilia tomentosa</i>	-	-	-	-	-	-	+
Quercetea pubescenti – petraeae							
<i>Acer campestre</i>	-	-	+	-	-	-	+

Brachypodium sylvaticum	-	-	+	-	+	-	-
Buglossoides purpureoerulea	-	-	-	+	+	+	+
Calamintha clinopodium	+	+	-	+	-	-	-
Calamintha sylvatica	-	+	-	-	-	-	-
Campanula bononiensis	+	+	-	-	-	-	-
Campanula persicifolia	-	+	-	-	-	-	+
Campanula sibirica	-	+	-	-	-	-	-
Campanula trachelium	-	-	-	-	-	+	-
Carex humilis	-	-	-	-	1	-	-
Carpinus betulus	-	-	-	-	-	-	+
Clematis vitalba	-	-	-	-	+	-	-
Cornus mas	-	-	-	-	-	-	+
Corylus avellana	-	+	-	-	1	-	-
Crataegus monogyna	-	+	+	1	-	+	+
Crataegus monogyna juv.	-	+	-	+	-	-	-
Cytisus hirsutus	-	-	+	-	-	+	+
Cytisus nigricans	1	+	-	-	-	-	-
Dactylis glomerata	-	-	-	1	-	-	+
Dictamnus albus ssp. albus	-	-	-	-	-	+	+
Fragaria viridis	-	+	-	+	-	-	-
Lathyrus niger	-	-	+	-	-	-	-
Lathyrus vernus	-	-	-	-	-	-	+
Ligustrum vulgare	-	-	+	-	-	-	-
Lilium martagon	-	-	-	-	-	-	+
Lonicera xylosteum	-	-	-	-	-	-	+
Malus sylvestris	-	-	-	-	-	-	+
Peucedanum oreoselinum	+	-	-	-	-	-	-
Poa nemoralis	-	1	1	-	-	-	-
Polygonatum latifolium	-	-	-	-	-	-	+
Primula veris	-	-	-	+	-	-	+
Quercus-Fagetea							
Quercus × pseudopubeszens	+	+	+	-	-	-	-
Quercus pedunculiflora	-	-	-	-	+	-	-
Rosa canina	-	+	+	+	-	-	-
Sedum telephium ssp. maximum	+	+	-	-	-	+	+
Sorbus domestica	-	-	-	-	-	+	-
Tanacetum corymbosum	-	+	+	-	-	+	+
Teucrium chamaedrys	-	-	-	+	-	-	-
Thalictrum aquilegifolium	-	-	-	-	-	+	-
Tilia platyphyllos	-	-	+	-	-	-	-
Tilia platyphyllos juv.	-	+	-	-	-	-	-
Trifolium alpestre	+	-	-	-	-	-	-
Ulmus minor	+	-	-	+	-	+	-
Ulmus procera	-	+	-	-	+	-	-
Vicia dumetorum	-	-	+	-	-	-	-
Vincetoxicum hirsundinaria ssp. hirsundinaria	-	-	+	+	+	+	-
Festuco-Brometea							
Agrimonia eupatoria ssp. eupatoria	+	-	-	+	-	-	-
Brachypodium pinnatum	-	+	-	1	-	+	-
Carex praecox	2	2	2	-	-	-	-
Coronilla varia	-	-	-	+	-	-	+
Daucus carota	+	-	-	-	-	-	-
Dichanthium ischaemum	-	+	-	-	-	-	-
Dorycnium pentaphyllum ssp. herbaceum	-	+	-	1	-	-	-
Erysimum cuspidatum	-	+	-	-	-	-	-

<i>Euphorbia cyparissias</i>	+	+	-	-	-	-	-
<i>Festuca valesiaca</i>	3	1	-	-	-	-	-
<i>Galium verum</i>	-	+	-	-	-	-	-
<i>Hieracium pilosella</i> ssp. <i>pilosella</i>	-	+	-	-	-	-	-
<i>Hypericum perforatum</i>	+	-	-	-	-	-	-
<i>Inula ensifolia</i>	-	+	-	-	-	-	-
<i>Inula hirta</i>	-	+	-	-	-	-	-
<i>Phleum phleoides</i>	-	+	-	-	-	-	-
<i>Pimpinella saxifraga</i>	-	+	-	-	-	-	-
<i>Poa angustifolia</i>	-	1	-	1	+	-	-
<i>Salvia nemorosa</i>	-	+	-	-	-	-	-
<i>Salvia verticillata</i>	-	-	-	+	-	+	-
<i>Scabiosa ochroleuca</i>	+	-	-	-	-	-	-
<i>Seseli annuum</i>	+	+	-	-	-	-	-
<i>Thymus pannonicus</i>	+	-	-	-	-	-	-
<i>Trifolium montanum</i>	-	-	-	-	-	+	-
<i>Veronica austriaca</i> ssp. <i>austriaca</i>	+	-	-	-	-	-	-
<i>Viola hirta</i>	+	-	-	-	-	+	-
Aliae							
<i>Anthericum ramosum</i>	+	-	-	-	-	-	-
<i>Calamagrostis arundinacea</i>	1	+	-	-	-	-	-
<i>Campanula rapunculoides</i>	-	-	-	-	-	+	-
<i>Carex tomentosa</i>	-	-	-	+	-	-	-
<i>Cnidium silaifolium</i>	+	+	+	+	+	+	-
<i>Cruciata glabra</i>	+	+	+	+	-	-	+
<i>Digitalis grandiflora</i>	+	-	-	-	-	-	-
<i>Echinops sphaerocephalus</i>	-	-	-	+	-	-	-
<i>Euphorbia villosa</i> ssp. <i>villosa</i>	-	-	-	+	-	-	-
<i>Ferulago sylvatica</i>	-	+	-	-	-	-	-
<i>Filipendula vulgaris</i>	+	+	-	+	-	-	-
<i>Galium album</i>	-	+	-	-	-	+	-
<i>Inula salicina</i>	+	-	-	-	-	-	-
<i>Laserpitium latifolium</i>	-	-	-	-	-	-	+
<i>Leucanthemum vulgare</i>	+	-	-	-	-	-	-
<i>Sesleria heuflerana</i> ssp. <i>heuflerana</i>	-	-	-	-	-	+	2
<i>Silene nutans</i> ssp. <i>nutans</i>	+	+	+	-	-	-	-
<i>Silene vulgaris</i>	+	+	-	-	-	-	-
<i>Stachys officinalis</i>	+	-	-	-	-	-	-
<i>Verbascum nigrum</i>	-	+	-	-	-	-	-

Date and place of the relevées: Forest Crivineni, Buzău county; 1–3 at 16.09.2005; 4–7 at 16.05.2006

The xero-termophilous features of this association is emphasized by the presence of some of termophilous plant species in the relevées, for instance: *Quercus pubescens*, *Fraxinus ornus*, *Cotinus coggygia*, *Tilia tomentosa*, *Cornus mas*, *Quercus pedunculiflora*, *Sesleria heuflerana* ssp. *heuflerana*, *Asparagus tenuifolius*, and so on; also, there are other plant species having some xero-termophilous preferences, for instance: *Veronica austriaca* ssp. *austriaca*, *Echinops sphaerocephalus*, *Thymus pannonicus*, *Dichanthium ischaemum*, *Vincetoxicum hirundinaria* ssp. *hirundinaria*, *Sorbus domestica*, *Dictamnus albus* ssp. *albus*, *Rhamnus saxatilis* ssp. *tinctorius*, and so on. The same type of vegetation is also met in other neighbouring areas, i. e. the Slănic river basin (Buzău county) [2].

2. Ass. *Seslerio heufleranae* – *Hippophaëtum rhamnoidis* Ștefan 1995

The sea-buckthorn (*Hippophaë rhamnoides* ssp. *rhamnoides*) occupies relative small areas in the Crivineni forest, being installed as a pioneer vegetation on degraded

grounds as result of the landslides and soil erosion. This association has been described by Ștefan, 1995 [6], from the Milcov river basin (Vrancea county). Like there, in the Buzău river Basin (namely, the Crivineni forest), all the phytocoenoses of this association are installed on southern slopes, on pseudorendzines, having average to strong erosional features. Those two characteristic plant species of the association (*Hippophaë rhamnoidis* ssp. *rhamnoidis* and *Sesleria heuflerana* ssp. *heuflerana*) are, also, dominants in those two layers (shrub and herbaceous layers). The vegetation coverage of the soils vary between 90 and 95% (**Table no. 2**).

Tab. no. 2 As. *Sesleria heufleranae* – *Hippophaëtum rhamnoidis*

Aspect (dominant)	S	S-E
Slope (°)	5	5
Coverage of vegetation (%)	95	90
Surface of relevé (m ²)	25	25
Relevé number	1	2
Charact. ass.		
<i>Hippophaë rhamnoidis</i> ssp. <i>rhamnoidis</i>	5	5
<i>Sesleria heuflerana</i> ssp. <i>heuflerana</i>	1	1
<i>Teucrium chamaedrys</i>		
Prunion spinosae		
<i>Rosa canina</i>	+	+
Prunetalia et Quercetea pubescenti – petraeae		
<i>Brachypodium pinnatum</i>	+	+
<i>Carex humilis</i>	+	+
<i>Salvia nemorosa</i>	+	+
<i>Veronica chamaedrys</i>	+	+
<i>Viola hirta</i>	+	+

Date and place of the relevés: Forest Crivineni, Buzău county; 1–2 at 16.05.2006

This kind of vegetation, made predominantly by the bushes of sea-buckthorn (*Hippophaë rhamnoidis* ssp. *rhamnoidis*) is also described from the Râmnicu Sărat - Higher and Middle river basin, Ștefan, 1995 [6]. Due to the fact that bushes of sea-buckthorn cover the soil between 90% and 95%, and the soil erosion is pretty higher, there are other few plant species, accompanying the characteristic species, i. e.: *Teucrium chamaedrys*, *Rosa canina*, *Viola hirta*, and so on.

3. Ass. *Galio schultesii* – *Fagetum* (Burduja et al. 1973) Chifu et Ștefan 1994

The phytocoenoses of this association are situated only on the northern slopes of the same Crivineni hill. The density of the stand vary between 0.7 and 0.9. The herbaceous stratum had a coverage between 10% and 40% at the time of the recording relevés. The regeneration is also present, existing there some juvenile individuals of the beech trees (i.e. *Fagus sylvatica* ssp. *sylvatica* and *Fagus taurica*) (**Table no. 3**).

Tab. no. 3 As. *Galio schultesii* – *Fagetum*

Aspect (dominant)	N	N	N-E
Slope (°)	35	35	25
Density of stand	0.7	0.9	0.85
Tree height (m)	15	18-20	18-20
Tree diameter (cm)	20-25	25-30	25
Coverage of shrub & juvenile layer (%)	25	10	5
Coverage of herbaceous layer (%)	40	10	5
Surface of relevé (m ²)	400	400	400

Relevé number	1	2	3
Charact. ass.			
<i>Fagus sylvatica</i>	4	4	4
<i>Fagus sylvatica</i> juv.	+	+	+
<i>Fagus taurica</i>	+	+	+
<i>Galium schultesii</i>	-	1	-
Fagetalia sylvaticae et Querco-Fagetea			
<i>Quercus dalechampii</i>	-	1	-
<i>Populus tremula</i>	+	-	-
<i>Tilia cordata</i>	-	+	-
<i>Cerasus avium</i>	-	-	+
<i>Corylus avellana</i>	+	+	-
<i>Cornus sanguinea</i>	+	-	-
<i>Euonymus europaeus</i>	-	+	-
<i>Rosa canina</i>	-	+	-
<i>Rubus caesius</i>	+	-	-
<i>Salvia glutinosa</i>	-	-	+
<i>Teucrium chamaedrys</i>	+	-	-
<i>Veronica urticifolia</i>	-	+	-
<i>Luzula luzuloides</i>	-	+	-
<i>Euphorbia amygdaloides</i>	-	+	-
Quercetea pubescenti – petraeae			
<i>Fraxinus ornus</i>	-	1	-
<i>Fraxinus ornus</i> juv.	+	+	+
<i>Tilia tomentosa</i>	-	+	-
<i>Crataegus monogyna</i>	+	+	+
<i>Cytisus hirsutus</i>	+	-	-
<i>Cytisus nigricans</i>	-	-	+
<i>Campanula trachelium</i>	-	-	+
<i>Poa nemoralis</i>	2	1	-
<i>Brachypodium sylvaticum</i>	-	+	-
<i>Lathyrus vernus</i>	-	+	-
<i>Melittis melissophyllum</i> ssp. <i>melissophyllum</i>	-	+	-
Aliae			
<i>Hieracium lachenalii</i>	-	-	+
<i>Cruciata glabra</i>	-	-	+
<i>Euphorbia cyparissias</i>	+	-	-
<i>Sesleria heuflerana</i> ssp. <i>heuflerana</i>	+	-	+
<i>Medicago falcata</i>	+	-	-
<i>Hieracium umbellatum</i>	+	+	-
<i>Inula ensifolia</i>	+	-	-
<i>Tanacetum corymbosum</i>	+	+	-
<i>Peucedanum alsaticum</i>	+	-	-
<i>Calamagrostis arundinacea</i>	-	+	-
<i>Digitalis grandiflora</i>	-	+	-
<i>Solidago virgaurea</i> ssp. <i>virgaurea</i>	-	+	-

Date and place of the relevées: Forest Crivineni, Buzău county; 1–2 at 16.09.2005; 3 at 16.05.2006

Though this vegetation type is situated only on northern slopes of the Crivineni Hill, where the air & soil humidity is pretty higher, there are some plants of xero-thermophilous nuances, like the next one: *Fagus taurica*, *Quercus dalechampii*, *Fraxinus ornus*, *Tilia tomentosa*, *Sesleria heuflerana* ssp. *heuflerana*, and so on. The presence of these species in our relevées emphasize, one more time, the thermophilous influence of the climate conditions over the entire area of the Crivineni Hill.

4. Ass. *Taraxaco serotini* - *Botriochloëtum ischaemi* (Burduja et al. 1956) Sârbu, Coldea et Chifu 1999

The phytocoenoses of this association are installed in the forest clearings, as well as in the surroundings of the Crivineni forest, on the slopes of the same hill (**Table no. 4**).

Tab. no. 4 As. *Taraxaco serotini* - *Botriochloëtum ischaemi*

Aspect (dominant)	S	E
Slope (°)	40	5
Coverage of vegetation (%)	70	90
Surface of relevé (m ²)	100	100
Relevé number	1	2
Charact. ass.		
<i>Botriochloa</i> (<i>Dichanthium</i>) <i>ischaemum</i>	4	5
<i>Taraxacum serotinum</i>	+	+
Festucetalia valesiacae		
<i>Astragalus onobrychis</i>	+	1
<i>Carlina biebersteinii</i> ssp. <i>brevibracteata</i>	-	+
<i>Centaurea biebersteinii</i> ssp. <i>biebersteinii</i>	+	-
<i>Chrysopogon gryllus</i>	-	+
<i>Dianthus rehmanni</i>	-	+
<i>Dorycnium pentaphyllum</i> ssp. <i>herbaceum</i>	+	-
<i>Onobrychis viciifolia</i>	1	1
<i>Stachys recta</i>	-	+
Festuco-Brometea		
<i>Anthericum ramosum</i>	+	+
<i>Calamintha clinopodium</i>	+	+
<i>Campanula bononiensis</i>	+	+
<i>Carex praecox</i>	+	-
<i>Euphorbia cyparissias</i>	+	-
<i>Muscari neglectum</i>	-	+
<i>Phleum phleoides</i>	-	+
<i>Plantago media</i>	+	-
<i>Salvia nemorosa</i>	+	-
<i>Scabiosa ochroleuca</i>	-	+
<i>Seseli annuum</i>	+	-
<i>Tanacetum corymbosum</i>	+	-
<i>Teucrium chamaedrys</i>	+	+
<i>Trifolium arvense</i>	-	+
Aliae		
<i>Arabis hirsuta</i>	-	+
<i>Calamagrostis arundinacea</i>	-	+
<i>Campanula persicifolia</i>	-	+
<i>Cytisus nigricans</i>	+	+
<i>Dactylis glomerata</i>	-	+
<i>Daucus carota</i>	-	+
<i>Trifolium alpestre</i>	-	+
<i>Verbascum phlomoides</i>	+	-

Date and place of the relevés: Forest Crivineni, Buzău county; 1–2 at 16.09.2005

This association is definitely a xero-termophilous one, being a remnants of a more termophilous climate from the past (see the chapter „Introduction”). In fact, the phytocoenoses of this association are localized predominantly on southern and eastern slopes, on fields affected by a medium to a strong erosion of the soil stratum. Also, in the floristic composition of the phytocoenoses, there are some xero-termophilous plant species, as the next ones: *Chrysopogon gryllus*, *Centaurea biebersteinii* ssp. *biebersteinii*, *Carlina*

biebersteinii ssp. *brevibracteata*. Thus, is emphasized the termophilous nature of the herbaceous vegetation on Crivineni Hill.

5. Phytocoenoses with *Sesleria heuflerana* ssp. *heuflerana*

The phytocoenoses having *Sesleria heuflerana* ssp. *heuflerana* as a dominant species is spreaded in clearings of the forest, in more or less shady places, on eroded soils, even on the rock substratum.

Normally, this type of vegetation could be placed under the association *Seslerio heufleranae* – *Caricetum sempervirentis* Coldea 1984; this association is spreaded from the hillock zone to the mountane and sub-alpine belts of vegetation in Romania. But, in the lower regions (like here, in the Crivineni forest), the above mentioned association (Ass. *Seslerio heufleranae* – *Caricetum sempervirentis*) is totally devoided by *Carex sempervirens*, but in change is present the other species – *Sesleria heuflerana* ssp. *heuflerana*, as a differential species for these phytocoenoses (**Table no. 5**).

Tab. no. 5 Phytocoenoses with *Sesleria heuflerana* ssp. *heuflerana*

Aspect (dominant)	E	E
Slope (°)	25	25
Coverage of vegetation (%)	60	80
Surface of relevé (m ²)	4	4
Relevé number	1	2
<i>Sesleria heuflerana</i> ssp. <i>heuflerana</i>	4	4
<i>Agrimonia eupatoria</i>	+	-
<i>Asperula tenella</i>	+	
<i>Brachypodium pinnatum</i>	-	+
<i>Crataegus nigra</i> juv.	+	+
<i>Cytinus nigricans</i>	+	-
<i>Dichanthium ischaemum</i>	-	+
<i>Filipendula vulgaris</i>	+	
<i>Inula hirta</i>	+	-
<i>Lithospermum officinale</i>	+	-
<i>Melilotus officinalis</i>	+	+
<i>Onobrychis viciifolia</i>	+	+
<i>Peucedanum alsaticum</i>	+	-
<i>Phleum phleoides</i>	+	+
<i>Quercus pubescens</i> juv.	+	-
<i>Rhamnus saxatilis</i>	+	+
<i>Rosa canina</i> juv.	-	+
<i>Salvia verticillata</i>	+	+
<i>Teucrium chamaedrys</i>	+	+
<i>Tragopogon pratensis</i> ssp. <i>orientalis</i>	1	-
<i>Verbascum nigrum</i>	+	-

Date and place of the relevées: Forest Crivineni, Buzău county; 1–2 at 16.09.2005

The characteristic species, *Sesleria heuflerana* ssp. *heuflerana*, is a dominant plant in those phytocoenoses, having coverage indices varying between 60% and 80%. Thus, the other species has only a minimal presence in our relevées. Among the accompanying species only the juveniles of *Quercus pubescens* has a termophilous feature.

Conclusions

1. The Crivineni forest (Buzău county) represent an island, having a xero-termophilous vegetation, situated right at the flexion of the Carpathians Mountains (C), sub-region Vrancea (C₂), at the higher limit of this type of vegetation, from the Forestry Ward Cislău;
2. The determinative factors for the existence of that vegetation of the xero-termophilous type, in the area of the Forestry Ward Cislău, are the next ones: the dominant aspect of the Crivineni Hill, the dominant slope declivity, the geological factors (substratum of marls), pedological factors (rendzinas and pseudorendzinas soils), and, especially, a very strong influence of the foehn ("warm winds") over the whole region;
3. The dominant vegetation is edified by forests of white oak and ash (Ass. *Orno – Quercetum pubescentis*) and almost pure beech stands (Ass. *Galio schultesii – Fagetum*) or bushes of the sea-buckthorn (Ass. *Seslerio heufleranae – Hippophaëtum rhamnoidis*), which are hosting most of the xero-termophilous species;
4. A secondary vegetation is represented in that area by meadows of *Dichanthium ischaemum* (Ass. *Taraxaco serotini - Botriochloëtum ischaemi*) and phytocoenoses with *Sesleria heuflerana* ssp. *heuflerana*, which are hosting other pontic and sub-Mediterranean plant species.

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