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FESTUCA AMETHYSTINA IN THE SESSILE OAK FORESTS FROM UPPER BASIN OF OLT RIVER

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Abstract: In the upper basin of Olt river were identified populations of *Festuca amethystina* ssp. *amethystina* in geographical, ecological and sociological conditions different from those known for this taxon in Romania. It is about sites on lower altitude, in deciduous forests belt (650-950 m) of Harghita, Bodoc and Nemira Mountains, near villages Biborţeni, Turia, Petriceni, Valea Seacă, Belani and Estelnic (Covasna county). The phytocenoses that preserve these populations of low altitude correspond to sessile oak association *Carici montanae-Quercetum petraeae* Gergely 1962. The abiotic features are flysch or volcanic bedrock, flat tops or gentle to medium steep slopes and moderately acidic soils. Similar cenotical and ecological characteristics for *Festuca amethystina* ssp. *amethystina* exist in other European countries and this fact could be an argument for the relict nature of this type of sessile oak forests and for the connections with some syntaxa from Central Europe. In this paper are presented some morphological and anatomical details, distribution, abiotic conditions and cenology of *Festuca amethystina* populations identified in the oak forests of upper basin of Olt river.

Keywords: *Festuca amethystina*, *Quercus petraea*, distribution, ecology, phytosociology, upper basin of Olt river, Braşov Depression, *Carici montanae-Quercetum petraeae*.

Introduction

Festuca amethystina L. is a species with European (Alps, Sudetes, Carpathians, Balkans) and West-Asiatic (Asia Minor) distribution. In Romania is included in national Red List [11]. The present knowledge about its chorology in our country reveals a distribution at high altitude, especially in the subalpine belt. From ecological point of view it is xeromesophile, mesothermophile, slightly acidophil-neutrophile, calcicole. The phytocenotic preferences are for vegetation of subalpine xeric lawns on limestone (*Festuco saxatilis-Seslerion bielzii* (Pawl. et Walas 1949) Coldea 1984, where belongs also its own association – *Diantho tenuifolii-Festucetum amethystinae* (Domin 1933) Coldea 1984) [5]. Till now was founded, in Romania, only in lawns.

Material and Methods

Identification of the *Festuca* material was made according to morphological traits and anatomical structure of basal leaves of the shoots [4]. The phytosociological and ecological data were collected through floristic relevees (following the methodology of Zürich-Montpellier school). Soil samples of upper horizon (A) from five relevees were taken and analyzed[1] in laboratory.

The study area was the basin of Braşov Depression, the largest part of upper basin of Olt river – between Tuşnad and Racoş, where still exist oak stands.

The nomenclature of the plant taxa follows Ciocârlan [4].

[1] By kindness of Mrs. Livia Boeru from Pedology Laboratory – Faculty of Silviculture.

Results and Discussions

In the basin of Braşov Depression the presence of *Festuca amethystina* was known till now from Bucegi, Ciucaş and Postăvaru Mountains, namely in the south part of this basin, in alpine-subalpine belt. Other new sites were identified in Covasna county, in some forests from nemoral belt of the mountains Nemira (near villages Estelnic, Belani, Valea Seacă), Bodoc (near villages Petriceni, Turia) and Harghita (near village Biborţeni) (Fig. 1).

The morpho-anatomical traits of *Festuca amethystina* L. ssp. *amethystina* L. populations founded here are: non-flowering shoots mostly intravaginal; sheath closed in the lower half; ciliolate ligula; lema without awn; basal leaves of the shoots of 0.5-0.65 mm wide, scabrid, with (5)7 veins and (7)9 sclerenchyma strands (Fig. 2). The species show a good vitality, growing sometimes in large and dense tufts, with cover up to 10-15%.

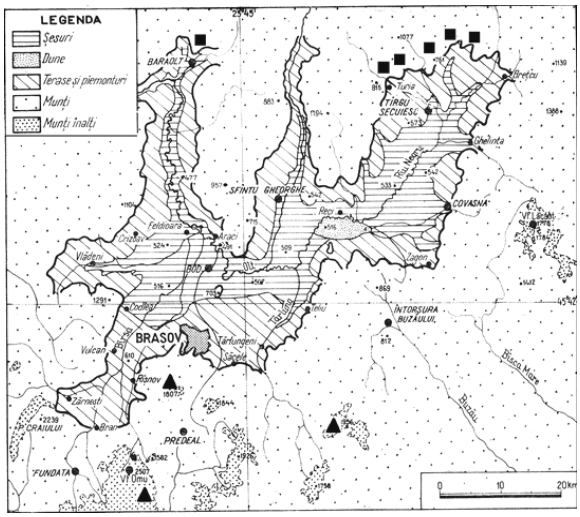

Fig. 1: Distribution of *Festuca amethystina* (■) in the sessile oak forests of Braşov Depression basin. ▲– sites of the species on subalpine belt

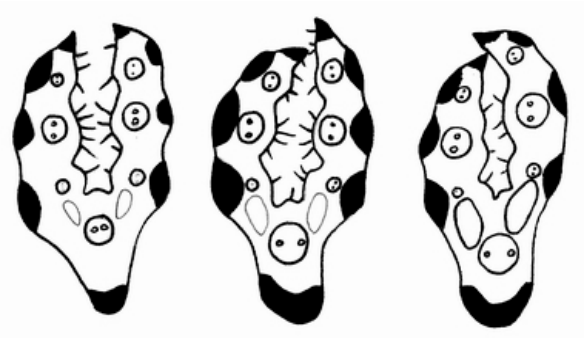

Fig. 2: Cross sections on lower part of basal leaves of the shoots

The site conditions are characterized by flysch or volcanic-deposit bedrock, altitude between 650-950 m (the lowest altitude for this taxon in Romania), flat and large ridges or slopes with inclination of 3-25° and different exposures, soils with acidic reaction (ph = 4.4-4.9). The climate specific of the area, due to the geomorphological peculiarities, comparatively with that of other regions at the same altitude, is colder and dryer and more excessive.

The phytocenotic background, which can be considered a novelty for Romania, is represented by sessile oak (*Quercus petraea*) forests (Fig. 3, table 1). In composition take part different plant category: acidophile, xerophile, of intermittent soil water, mesophile, of wet lawns, etc.

It has to be noted that these are not marginal communities, in contact with lawns or cliffs, but in the middle of the compact forest. At Belani, Estelnic and Petriceni it is specific the invasion of spruce (*Picea abies*) in the sessile oak stands. Planted in the past, near the oak forests, *Picea abies* is extended now naturally and fast, inside them. Some phytocenoses near Belani are next to *Pinus sylvestris* stands with characteristic species of natural pine forests (*Chimaphila umbellata, Daphne cneorum, Pyrola chlorantha* etc.). These floristic clues along with evidences from forestry documentation and local people testimonials lead to the assumption of the naturalness origin of these Scots pine stands. Furthermore, this conclusion can serve to interpret the *Festuca amethystina* presence here and the floristic preservative role of the intermountain depressions. In the same order of facts, the existence of pure sessile oak stands on

high altitude (1000-1100 m) emphasizes the climate and vegetation evolution peculiarity in Braşov Depression area, and was one of the conditions of unique interference, in Romania, of the two species: *Quercus petraea* and *Festuca amethystina*.

Vegetation cover for each layer is: tree layer 60-85%, shrub layer 0-5%, herb layer 20-80%, ground layer 0-3%.

In the overall composition of the 13 relevees prevail, as constancy and cover, the species of *Quercetea pubescenti-petraeae* s.l. and *Quercetalia robori-petraeae*, and also those of *Trifolio-Geranietea*. Some taxa cast a regional or local specific to these sessile oak forests: *Ranunculus oreophilus, Silene nutans ssp. dubia, Pyrola rotundifolia, Rubus saxatilis, Avenulla praeusta ssp. adsurgens, Festuca drymeja, Dryopteris affinis, Iris ruthenica*.

Fig. 3: Sessile oak forest with *Festuca amethystina* near Valea Seacă (Covasna county) – Nemira Mt.

Constant and dominant species are: *Quercus petraea, Festuca amethystina, Luzula luzuloides, Carex montana, Fragaria vesca, Cruciata glabra, Ajuga reptans, Veronica chamaedrys, V. officinalis, Calamagrostis arundinacea, Festuca heterophylla, Trifolium medium, Vaccinium myrtillus*, etc.

Usually, there are phytocenoses with a high floristic diversity, with 40-101 vascular plant species on 400 m^2, and a total of 10 taxa from Romanian Red List [11] (*Festuca amethystina, Silene nutans ssp. dubia, Phyteuma tetramerum, Scorzonera humilis, Hierochloë australis, Platanthera bifolia, Neottia nidus-avis, Cephalanthera longifolia, Listera ovata, Hepatica transsilvanica*).

Even if the analysed stands record an altitudinal range of 300 m, they show a relatively similar composition, because of other homogenous site factors. Considering one of the latest syntaxonomy of Romanian vegetation [14] these forests can be assigned to *Genisto tinctoriae-Quercetum petraeae* Klika 1932 *caricetosum montanae* Gergely 1962 (syn. *Carici montanae-Quercetum petraeae* Gergely 1962). Due to the frequency and cover values of the elements of *Quercion petraeae* Zólyomi et Jakucs 1957 and other xerophytes, species richness, soil water regime and the lower development of ground layer, these cenoses, like those of Trascău Mountains, seem to be more fitted to *Quercetalia pubescenti-petraeae* than to *Quercetalia robori-petraeae*. Until the syntaxonomical position of this type of forests will be clarified, it will be used further in this paper the name proposed by Gergely [6] – *Carici montanae-Quercetum petraeae*.

Acidic bedrock, lower altitude and forest vegetation seem to be in contrast with the species preferences, but here is the case of compensating action of the ecological factors. According to the observations of Al. Beldie [2] over *Festuca amethystina* populations in Bucegi Mountains – where this taxon take part to different grassland communities, at high altitude (1700-2300 m), the species optimum is on large girdle, slightly inclined, with high amplitude of soil humidity (in the Spring with water excess due to snow melting, and in the Summer with strong water deficit due to overexposure to sun and wind). This alternant water regime is one of the common features with habitats of *Carici montanae-Quercetum petraeae*, and probably the key of preserving a predominantly subalpine taxon in this forest sites. Being meso- and not microthermophilous species, can be presumed that the nowadays subalpine sites are the

retreating places from lower altitude: the calcareous bedrock and heliophilous preferences represent some counterbalancing factors for the lower temperature.

Table 1: The phytosociological table of sessile oak forests with *Festuca amethystina* from Braşov Depression basin – *Carici montanae-Quercetum petraeae* Gergely 1962.

Relevee no.	1	2	3	4	5	6	7	8	9	10	11	12	13	
Altitude (m)	900	870	780	830	680	650	650	950	930	940	790	690	660	
Exposure	NV	V	SV	SV	NV	V	V	S	S	V	NE	E	S	
Slope (°)	10	15	15	25	25	15	10	10	25	20	5	3	10	
Cover (%) – tree layer	85	75	70	70	70	70	80	75	75	60	75	65	70	
– shrub layer	3		1			5	1			3	1	5	1	
– herb layer	80	60	50	20	60	85	85	85	70	70	85	80	60	K
Festuca amethystina ssp. amethystina	+	2	2	1	+	+	+	+	+	+	2	+	+	V
Char. ass.														
Quercus petraea	5	5	4	5	5	4	4	5	5	4	5	4	4	V
Quercus petraea (juv.)	1	+	+	1	1	1	2	+	+	+	2	2	2	V
Carex montana	2	3	1	1	2	3	4	2	2	.	1	3	2	V
Quercion petraeae														
Potentilla alba	1	+	+	.	+	2	2	.	+	+	+	1	1	V
Hypericum montanum	1	+	+	.	+	+	+	.	+	+	+	+	1	V
Lathyrus niger	.	+	+	+	.	+	+	+	+	.	1	+	1	IV
Hierochloë australis	+	.	+	+	+	+	.	+	2	1	2	.	1	IV
Melampyrum cristatum	+	.	+	.	.	.	.	+	+	+	.	.	+	III
Primula veris	.	+	+	.	.	+	.	.	.	.	.	.	.	II
Quercetea pub.-petr. s.l.														
Trifolium medium	1	+	+	+	1	2	2	+	+	.	1	1	1	V
Festuca heterophylla	+	1	1	1	.	+	.	1	+	+	+	+	1	V
Achillea distans	+	+	+	+	+	.	.	1	1	+	1	.	+	IV
Chamaecytisus hirsutus	+	.	+	+	.	+	.	.	+	+	1	+	+	IV
Campanula persicifolia	+	+	+	+	+	.	+	1	+	.	+	+	.	IV
Melittis melissophyllum	1	.	+	.	1	1	+	+	+	.	1	1	1	IV
Brachypodium pinnatum	+	2	+	.	.	.	.	1	2	.	+	1	1	IV
Stachys officinalis	+	+	.	.	+	1	2	.	+	.	.	2	1	IV
Rosa gallica	+	.	.	.	.	+	+	+	.	.	+	+	1	III
Vincetoxicum hirundinaria	.	.	.	.	+	1	+	.	.	.	+	+	1	III
Rosa canina	.	+	+	.	.	+	+	+	+	.	.	.	.	III
Genista tinctoria	+	.	+	+	.	+	.	+	.	.	.	.	+	III
Crataegus monogyna	.	+	+	.	.	+	+	.	.	.	.	+	+	III
Pyrus pyraster (juv.)	.	.	+	.	+	.	+	.	.	.	.	+	+	II
Peucedanum oreoselinum	+	.	.	+	.	+	.	.	.	.	+	.	1	II
Bromus ramosus	+	.	.	.	.	.	+	.	.	.	.	.	+	II
Sedum maximum	.	.	.	+	.	.	.	+	.	.	.	.	+	II
Euphorbia angulata	+	.	.	.	+	+	.	.	.	.	.	+	+	II
Galium pseudaristatum	.	.	.	.	+	+	+	.	.	.	.	+	1	II
Quercetalia rob.-petr.														
Luzula luzuloides	2	1	1	2	+	+	+	1	1	1	2	1	+	V
Veronica officinalis	+	+	+	+	.	+	1	+	+	.	+	+	+	V
Hieracium umbellatum	+	.	+	+	+	1	1	+	+	.	+	1	1	V
Cruciata glabra	2	+	1	1	+	+	1	1	1	1	1	1	1	V
Vicia sepium	+	.	+	.	.	+	.	+	+	.	+	+	1	IV
Luzula pilosa	+	.	.	+	+	1	+	.	+	.	.	1	1	IV

Iris ruthenica	1	.	1	+	.	.	1	.	.	.	2	1	1	III
Vaccinium myrtillus	1	.	.	2	+	.	.	+	+	3	1	.	.	III
Pteridium aquilinum	+	.	.	.	+	1	1	.	.	.	.	1	+	III
Pyrola rotundifolia	1	.	.	.	.	+	.	.	1	1	+	.	.	II
Vaccinium vitis-idaea	1	.	.	1	.	.	.	.	1	1	1	.	.	II
Melampyrum pratense	.	.	.	.	.	+	+	.	.	.	.	+	+	II
Hieracium lachenalii	+	.	.	+	+	.	.	.	+	.	.	.	+	II
Phyteuma tetramerum	1	.	.	.	+	+	+	.	.	.	.	.	+	II
Molinia arundinacea	+	+	.	.	.	.	.	.	+	.	.	.	1	II
Fagetalia s.l.														
Carpinus betulus (juv.)	+	+	+	+	+	+	.	+	+	+	+	+	+	V
Ajuga reptans	+	.	+	.	+	1	1	+	1	+	1	1	+	V
Symphytum tuberosum	2	.	+	.	1	1	+	.	+	.	+	.	+	IV
Dryopteris filix-mas	.	+	+	+	2	.	+	.	.	.	+	+	+	IV
Maianthemum bifolium	1	.	.	.	1	.	.	.	+	+	+	.	+	III
Sanicula europaea	.	.	.	.	2	2	2	.	+	.	.	2	1	III
Festuca gigantea	.	.	+	.	+	+	1	.	.	.	.	+	+	III
Dactylis polygama	.	.	.	.	.	1	+	.	.	.	.	.	1	II
Carex pilosa	.	.	.	1	.	.	.	.	.	+	1	.	.	II
Galium schultesii	.	.	+	.	.	.	.	+	1	.	1	.	.	II
Viburnum opulus	+	.	.	.	.	.	+	.	.	.	.	.	+	II
Fagus sylvatica (juv.)	.	.	.	+	.	+	+	.	.	.	.	+	+	II
Athyrium filix-femina	.	.	+	.	2	+	.	+	.	.	.	.	+	II
Rubus idaeus	.	.	.	.	+	+	.	.	.	.	.	+	.	II
Astrantia major	.	.	.	.	1	2	.	.	.	.	.	+	.	II
Querco-Fagetea s.l.														
Fragaria vesca	2	1	2	+	1	1	2	1	1	1	1	2	1	V
Mycelis muralis	+	+	+	+	1	+	1	1	+	.	.	+	+	V
Viola reichenbachiana	+	+	+	+	2	.	+	1	1	1	1	+	1	V
Ranunculus auricomus	1	1	+	.	+	+	+	+	1	.	+	.	+	IV
Hieracium murorum	+	.	+	1	+	.	.	1	+	+	1	.	1	IV
Platanthera bifolia	+	.	.	+	+	.	+	.	+	+	.	+	+	IV
Populus tremula (juv.)	1	.	+	.	.	.	.	+	+	1	1	+	+	IV
Poa nemoralis	1	1	+	+	.	.	+	+	.	.	.	+	.	III
Frangula alnus	.	.	.	.	1	.	+	.	+	.	+	1	1	III
Geum urbanum	.	+	.	.	1	+	.	+	.	.	.	+	.	II
Neottia nidus-avis	+	.	.	+	.	.	.	+	+	.	+	.	.	II
Lathyrus vernus	+	.	.	.	.	.	.	.	1	.	+	+	+	II
Brachypodium sylvaticum	.	.	.	.	2	+	+	.	.	.	.	.	1	II
Campanula rapunculoides	.	.	+	.	.	.	+	+	.	.	1	.	.	II
Juniperus communis	.	.	.	.	+	.	.	+	+	.	+	.	+	II
Convallaria majalis	.	.	+	.	1	+	+	.	.	.	+	.	.	II
Pulmonaria officinalis	.	.	.	.	.	.	1	.	.	.	.	1	1	II
Corylus avellana	+	.	+	.	.	.	.	.	.	.	.	.	+	II
Anemone nemorosa	+	+	1	.	.	.	.	.	.	.	.	.	.	II
Trifolio-Geranietea														
Veronica chamaedrys	1	1	+	1	+	1	+	1	1	1	2	+	1	V
Clinopodium vulgare	.	.	.	+	.	+	+	+	1	.	+	+	+	IV
Trifolium alpestre	+	.	+	+	.	.	.	+	+	.	.	.	+	III
Pulmonaria mollis	+	.	.	.	1	2	+	.	.	.	1	+	2	III
Campanula glomerata	.	.	.	.	.	.	.	.	+	.	.	+	+	II

Solidago virgaurea	+	.	.	.	.	+	+	.	.	.	+	.	1	II
Hieracium sabaudum	.	.	.	.	.	.	+	.	.	.	+	+	+	II
Molinietalia														
Serratula tinctoria	+	.	+	.	+	1	1	+	+	.	+	2	1	IV
Potentilla erecta	+	.	+	.	+	+	+	+	+	+	.	1	1	IV
Deschampsia cespitosa	.	+	+	.	.	+	+	.	.	.	.	1	+	III
Carex pallescens	+	.	.	.	.	+	+	.	+	.	.	1	+	III
Laserpitium prutenicum	.	.	.	.	.	+	.	.	.	.	.	1	+	II
Scorzonera humilis	.	.	.	.	.	+	+	.	.	.	.	+	+	II
Dianthus superbus	+	.	.	.	.	.	.	.	+	.	.	.	+	II
Succisa pratensis	.	.	.	.	.	1	.	.	.	.	.	+	1	II
Varia														
Calamagrostis arundinacea	2	1	2	1	.	+	+	3	2	2	1	.	2	V
Avenulla adsurgens	1	+	+	.	.	+	+	.	+	+	1	+	+	IV
Poa angustifolia	.	.	+	+	.	.	1	.	+	.	2	+	1	III
Epilobium montanum	+	.	.	.	+	+	.	.	+	.	.	.	+	II
Picea abies (juv.)	+	.	+	+	.	.	.	.	.	+	+	.	.	II
Orthilia secunda	+	.	.	.	.	.	.	+	+	1	.	.	1	II
Sorbus aucuparia	+	.	.	.	.	.	.	.	.	+	.	.	+	II
Hieracium caespitosum	.	.	.	.	.	+	+	.	.	.	.	.	+	II
Agrostis capillaris	.	.	.	.	.	.	+	+	+	.	.	1	+	II
Lotus corniculatus	.	+	+	.	.	.	.	.	.	.	.	+	.	II
Campanula patula	+	+	+	.	.	.	.	.	.	.	.	.	.	II
Festuca rupicola	+	.	+	.	.	.	+	.	.	.	.	.	.	II
Peucedanum carvifolium	.	.	.	.	.	.	+	.	.	.	.	+	+	II
Carex umbrosa	.	.	.	.	.	1	1	.	+	.	.	1	+	II
Urtica dioica	.	+	.	.	+	.	.	+	.	.	.	.	.	II

Species in one or two relevees: *Polygonatum odoratum* 7: +, 11: +; *Tanacetum corymbosum* 1: +, 13: +; *Valeriana wallrothii* 6: +, 7: +; *Hieracium cymosum* 9: +, 12: 1; *Melampyrum bihariense* 5: 1, 11: 2; *Laserpitium latifolium* 11: +, 13: +; *Carex michelii* 3: +, 13: 1; *Cytisus nigricans* 3: +, 4: +; *Moehringia trinervia* 8: +, 12: +; *Prunella vulgaris* 3: +, 9: +; *Cephalanthera longifolia* 6: +, 13: +; *Cornus sanguinea* 3: +, 11: +; *Dryopteris carthusiana* 2: +, 12: 1; *Circaea lutetiana* 5: 1, 6: +; *Fraxinus excelsior* (juv.) 5: +, 12: +; *Lonicera xylosteum* 1: +, 13: +; *Lilium martagon* 1: +, 5: +; *Lychnis viscaria* 3: +, 4: +; *Myosotis scorpioides* 1: +, 13: +; *Crepis praemorsa* 9: +, 13: +; *Gentiana asclepiadea* 1: +, 5: +; *Prunus avium* (juv.) 7: +, 13: +; *Festuca rubra* 1: +, 9: +; *Populus tremula* 1: +, 10: +; *Carpinus betulus* 8: +, 9: +; *Dryopteris affinis* 6: +, 12: +; *Trifolium aureum* 8: +, 9: +; *Taraxacum officinale* 2: +, 9: +; *Geranium sanguineum* 1: +, 13: +; *Polypodium vulgare* 4: +, 5: +; *Ranunculus oreophilus* 3: +, 9: +; *Hieracium bauhinii* 1: +, 3: +; *Tilia cordata* (juv.) 1: +, 3: +; *Anthoxanthum odoratum* 1: +, 3: +; *Lonicera xylosteum* 6: +; *Lysimachia nummularia* 13: +; *Lapsana communis* 5: +; *Acer campestre* (juv.) 3: +; *Scrophularia nodosa* 13: +; *Stellaria holostea* 2: +; *Rubus hirtus* 9: +; *Geranium robertianum* 5: +; *Carex tomentosa* 13: +; *Galium glaucum* 6: +; *Carex digitata* 5: +; *Veronica urticifolia* 1: +; *Digitalis grandiflora* 6: +; *Galium odoratum* 5: 1; *Aegopodium podagraria* 4: +; *Melica nutans* 9: +; *Hepatica transsilvanica* 6: +; *Coronilla varia* 8: +; *Viola canina* 12: +; *Lysimachia punctata* 12: +; *Malus sylvestris* (juv.) 1: +; *Thesium linophyllon* 8: +; *Euphorbia cyparissias* 13: +; *Carex caryophyllea* 3: +; *Silene dubia* 4: +; *Viola odorata* 1: +; *Hieracium racemosum* 10: +; *Pyrus pyraster* 12: +; *Astragalus glycyphyllos* 3: +; *Carex polyphylla* 2: +; *Leucanthemum vulgare* 9: +; *Aconitum variegatum* 6: +; *Lysimachia vulgaris* 7: +; *Galium aparine* 1: +; *Hieracium aurantiacum* 1: +; *Salix caprea* (juv.) 13: +; *Listera ovata* 1: +; *Fagus sylvatica* 10: +; *Betula pendula* 9: +; *Festuca drymeja* 12: +; *Daphne mezereum* 11: +; *Thalictrum aquilegiifolium* 13: +; *Galium mollugo* 9: +; *Lathyrus pratensis* 13: +; *Dactylis glomerata* 12: 1; *Agrimonia eupatoria* 12: +; *Prunus padus* (juv.) 6: +; *Rubus nessensis* 6: +; *Angelica sylvestris* 6: +; *Rubus fruticosus* 1: 1; *Carex praecox* 12: +; *Trifolium pannonicum* 1: +; *Rosa tomentosa* 1: +; *Centaurea indurata* 7: +; *Trifolium repens* 3: +; *Briza media* 9: +; *Rubus saxatilis* 11: +; *Filipendula vulgaris* 12: +;

Relevees data: 1 – Belani, 6.07.2006; 2,3 – Valea Seacă, 6-7.07.2006; 4 – Estelnic, 26.08.2006; 5, 6, 7 – Biborțeni, 29.08.2006, 1-2.09.2006; 8, 9, 10, 11 – Petriceni, 15-17.09.2006; 12, 13 – Biborțeni, 28.09.2006.

Among all the communities with *Festuca amethystina* from Romania, our phytocenoses have the highest floristic and ecological similarities with those described from Ciuc Mountains (into an area located also in upper basin of Olt river) [1]. Here, communities of *Festuca amethystina* are developed on mountain belt, at altitude between 950 and 1450 m, having in composition some taxa present also in the sessile oak forests, like *Carex montana* with 82% constancy (!), *Luzula luzuloides, Avenulla adsurgens, Ranunculus oreophilus, Trifolium alpestre, Genista tinctoria, Cruciata glabra, Potentilla erecta, Brachypodium pinnatum, Vaccinium myrtillus, V. vitis-idaea,* etc.

These biotic and abiotic backgrounds for *Festuca amethystina* are not so surprising if we analyze the whole area of the species. In Central Europe it is not an exclusive plant of alpine-high mountain level. Was quoted from Switzerland in hilly regions [9] and from Germany – below 500 m altitude, in xerophile pine forests [10], being here one of *Erico-Pinetea* characteristic taxa [12]. In Czech Republic grows also at low altitude, down to 170 m, in dry-mesic forests with pedunculate oak and/or sessile oak: *Carici fritschii-Quercetum roboris* Chytrý et Horak 1997 and respectively *Potentillo albae-Quercetum petraeae* Libbert 1933 [3], [7]. It can be observed that similar conditions of habitat and vegetation for *Festuca amethystina* remain also in upper basin of Olt river.

Considering all the data available till now for the *Festuca amethystina* ecology and cenology in Romania, the presence of this species on lower altitude, in sessile oak forests, can be seen as relict. In the same way is deemed species in the case of Czech Republic [13]. On the other hand, the sessile oak forests on high altitude or those with *Carex montana* in Romania have a relict feature. The last one forest type has connections with syntaxons from Central Europe, as was previously remarked by I. Gergely [6]

Conclusions

Our phytosociological researches in upper basin of Olt river lead out to the identification of new chorological, ecological and cenotical traits of *Festuca amethystina* in Romania: sites on the lower altitude, on noncalcareous bedrock, in nemoral belt, on forest communities with *Quercus petraea*, similar conditions with those recorded in other regions of Central Europe. This new data can be used both on *Festuca amethystina* ecology and sessile oak sintaxonomy.

The relict origin of *Festuca amethystina* in sessile oak forests in this region can be related to climate peculiarities that lead to a later and incomplete extinction of the boreal-age elements, like *Pinus sylvestris* woods (small patches of natural xerophilous pine woods or the peat-bog pine from) or high altitude oak forests.

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FESTUCA AMETHYSTINA ÎN GORUNETELE DIN BAZINUL SUPERIOR AL OLTULUI

(Rezumat)

În bazinul superior al Oltului au fost identificate populaţii de *Festuca amethystina* ssp. *amethystina* în condiţii ecologice şi cenotice diferite faţă de cele cunoscute pentru acest taxon în România. Este vorba despre staţiuni la altitudini mai mici, în etajul nemoral (650-950 m) al munţilor Harghita, Bodoc şi Nemira, în raza localităţilor Biborţeni, Turia, Petriceni, Valea Seacă, Belani şi Estelnic (judeţul Covasna). Fitocenozele în care s-au conservat aceste populaţii de la altitudini joase corespund asociaţiei de gorunete *Carici montanae-Quercetum petraeae* Gergely 1962, iar condiţiile de biotop specifice sunt: substrat de fliş sau depozite vulcanogene, culmi sau versanţi slab-moderat înclinaţi şi soluri cu reacţie moderat acidă. Caracteristici cenotice şi ecologice similare pentru *Festuca amethystina* ssp. *amethystina* se regăsesc şi în alte regiuni europene ale arealului său, ceea ce poate constitui un argument în susţinerea ipotezei caracterului relictar al acestui tip de gorunete şi a conexiunilor cu sintaxoni similari din Europa Centrală. În lucrare sunt prezentate detalii morfo-anatomice, corologia, biotopul şi cenologia populaţiilor de *Festuca amethystina* identificate în gorunetele din bazinul superior al Oltului.

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