CONTRIBUTIONS TO THE PHYTOSOCIOLOGICAL STUDY OF SESSILE AND TURKEY OAK FORESTS IN THE ORĂŞTIE AREA (CENTRAL-WESTERN ROMANIA)

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Abstract. In the current paper we present a phytosociological study of the phytocoenoses of the association ***Quercetum petraeae-cerris*** Soó 1963 (Syn.: *Quercetum polycarpae-cerris* G. Popescu 1988) identified in the Orăştie river basin, situated in the central-western part of Romania.

The characterisation of the association under analysis as well as the presentation of the phytosociological table have been done by selecting the most representative relevés performed in the Turkey and Sessile oak forests of the lower and central parts of the Orăştie river basin (Culoarul Orăştiei).

This paper aims at analysing the phytocoenoses of the association ***Quercetum petraeae-cerris*** Soó 1963 in terms of physiognomy and floristic composition, life forms spectrum, floristic elements, and ecological indices.

Keywords: *Quercus cerris*, phytocoenoses, association, alliance, relevé, floristic elements, life forms, ecological indices.

INTRODUCTION

The hydrographic basin of the Orăştie river lies in the central-western part of Romania (Fig. 1). It is located between the hydrographic basins of the rivers Strei (to the South and West) and Cugir (to the East), while to the North the Orăştie river discharges into the Mureş river [33, 35].

Figure 1. Position of Orăştie River Basin in Romania [38]

The association ***Quercetum petraeae-cerris*** Soó 1963, taken into consideration in this paper, was identified in the Orăştiei Corridor, geographically located in the northern sector of the Orăştie river catchment area.

The Orăştiei Corridor, buffering the Mureş river, is a typical valley corridor, showing the distinctive land forms of a typical valley (floodplain and terraces). The terrace system is well developed, the lower and intermediate ones being strongly fragmented by the rivers of Orăştie, Sibişel and Cucuiş. At the level of the higher terraces the geomorphologic complexity becomes apparent as they superimpose on the lower piedmont (at altitudes of 380-520 m a.s.l.), an area of altitudinal storeys which is significantly fragmented into large and elongated interfluves [37].

The soils typical of the area in discussion belong to the categories of Preluvisols (Gray Luvisols) şi Luvisols (Gray Brown Luvisols) [11, 17].

The climate features are influenced by the landforms, the depressions and river corridors displaying yearly average temperatures of 7-10º C and 600-800 mm of rainfall [6, 17]. In the warm season the air circulation is generally eastward and south-eastward, carrying the humid Atlantic cyclones, which generate abundant rainfall. In the cold season the precipitations are much scarce, as they are brought about mainly by anticylones [11].

The Sessile and Turkey oak forests are present in the hills and lower mountains of Romania, in the nemorous zone. The association *Quercetum petraeae-cerris* Soó 1963, was reported by many authors, in territories located mainly in the southern, south-western, and western parts of Romania, of which we dare mention: Plopiş Mountains, Cernei Corridor, Zarandului Mountains, Pădurea Craiului Mountains, Cernei Corridor, Clujului Hills, Certeju de Sus – Hunedoara [7, 12, 13,18, 22, 24, 25, 28].

The phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963 (Fig. 2), occupy important areas in the Orăştiei Corridor (Orăştie river basin). Within this territory we identified other forest associations as well, such as: *Polygonato latifolio-Quercetum roboris* (Hargitai 1940) Borhidi 1966 in Borhidi et Kevey 1996, *Carpino-Quercetum cerris* Klika 1938, *Cytiso nigricantis-Quercetum petraeae* Paucă 1941, *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964.

Figure 2. Association ***Quercetum petraeae-cerris*** Soó 1963 (Cucuişului Valley)

MATERIALS AND METHODS

The botanical studies in the catchment basin of the Orăştie river (central-western Romania) were carried out between the years of 2011 and 2012 targetting all types of sites indicative of the association *Quercetum petraeae-cerris* Soó 1963. The vegetation research deployed the phytocoenologic survey methods drawn up by Braun-Blanquet (1964) [4]. The sampling technique and the annotations (quantitative appraisals) were performed according to the indications given by Borza et Boşcaiu (1965) [1]. The associations were identified using the characteristic species, without neglecting the differential and dominant species [1, 8].

In order to thoroughly identify the phytocenoses of the association, we performed a total of 9 phytocoenologic sampling incursions or relevés, of which 5 relevés were included in the phytosociological table of the association (Table 1), the other 4 having been excluded from the table since they displayed similar stational conditions. In order to perform the sampling relevés, areas of 400 square metres were selected, as homogeneous as possible with respect to floristic composition, landforms, geology, slope exposition, while the ecotone areas were avoided [1, 8].

The phytocoenologic worksheets contain information regarding the stational habitat conditions in which the phytocenoses evolve: rock, soil, altitude, exposition, slope, vegetation coverage. At the same time when we took down the taxa that define each relevée, we also gave a quantitative appraisal of the participation of each and every species with respect of abundance and dominance, in accordance with the method proposed by Braun-Blanquet et Pavillard (1928) [3], and we filled in the overall vegetation coverage using the method designed by Tüxen (1955) [34] and Ellenberg (1974) [10].

The phytosociological table of the association was structured according to the methodology designed by Braun-Blanquet (1964) [4] and improved by Ellenberg (1974) [10]. The methodology we used for positioning the association into the superior coeno-taxonomic units, namely suballiance, alliance, order, class, took into consideration the traditional ecological-floristic systems developed by Tüxen (1955) [34], Braun-Blanquet (1964) [4], Borza et Boşcaiu (1965) [1], Soó (1980) [30], as well as the more recent papers by researchers such as Mucina *et al.* (1993) [15], Pott (1995) [20], Borhidi (1996) [2], Weber *et. al.* (2000) [36], Sanda (2002) [26], Sanda *et. al* (2008) [29]. In order to position the association *Quercetum petraeae-cerris* Soó 1963 (analysed by us in this paper) into the superior coeno-taxonomic units we referred to Sanda *et al.* (2008) [29].

The constancy of species (K) whose classes are marked by Roman digits from I to V, stands for the degree of coenotic fidelity of each species towards the ambient of the association phytocoenoses. The values of the synthetic phytocoenologic indices, constancy (K) were calculated using the formulas proposed by Braun-Blanquet et Pavillard (1928) [3], Cristea *et al.* (2004) [8].

The nomenclature of taxa was done according to Ciocârlan (2009) [5], and the vegetal association was analysed using the main ecological indices of the component species, life forms and floristic elements, the data being shown graphically in spectra and diagrams [8, 27].

RESULTS

The phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963 were identified in the following places: Aoşul Sărăcii, Cucuişului Valley, Oraşului Valley.

The Turkey and Sessile oak forests vegetate on very sunny slopes, with a southern (S) and south-eastern orientation (SE), but they also transgress onto the northern (N) and north-western slopes (NV) with average angles of 8°-16° at absolute altitudes of 260-380 m a.s.l. (Table 1). The bedrocks consist of mudrocks, sandstones and andesites, and the soils overlaying them belong to Luvisols and Preluvisols, partly skeletal, clay-silty, mezo-alkaline, hydro-balanced, mezo-trophic.

The physiognomy and the floristic composition. The Turkey and Sessile oak forests discussed here are 60-100 years old [39]. The floristic inventory boasts a number of 96 species, which denotes a rich biodiversity. Of these, 23 species (23.95%) belong to the coenotaxa subordinating the association, while 73 species (76.04%) are transgressive and accompanying other associations.

The arborescent layer is dominated by *Quercus cerris*, *Quercus polycarpa* and *Quercus petraea*, also accompanied by the following species: *Acer campestre*, *Cerasus avium*, *Carpinus betulus*, *Fagus sylvatica* subsp. *sylvatica*, *Fraxinus excelsior*, *Quercus robur*, *Tilia cordata*, *Sorbus torminalis*. The canopy coverage is around 60%-80%. The trunk diameters vary between 26 and 54 cm, while they rise up to 22-25 m tall.

The undergrowth and the offspring cover roughly 15%-20% of the area and consist of the following species: *Acer campestre*, *Acer tataricum*, *Carpinus betulus*, *Cerasus avium, Quercus cerris*, *Quercus petraea*.

The shrubbery species, unevenly dispersed in the wooded area, consist of the following: *Chamaecytisus* *hirsutus*, *Cornus mas*, *Cornus sanguinea*, *Corylus avellana*, *Cytisus nigricans*, *Frangula alnus*, *Ligustrum vulgare*, *Prunus spinosa*, *Rosa canina*, *Rubus hirtus*.

The herbaceous layer covers as much as 15%-25%. The species in this synousia come in to the **alliance** and **order *Quercion petraeae* et *Fraxino orni-Cotinetalia*** (*Hypericum montanum*, *Trifolium medium*, *Trifolium alpestre*, *Lathyrus niger*), the **class *Quercetea pubescenti-petraeaeae*** (*Polygonatum odoratum*, *Acer tataricum Brachypodium sylvaticum*, *Campanula persicifolia*, *Genista tinctoria*, *Lithospermum purpurocaeruleum*, *Melittis melissophyllum*). A great many herbaceous species are transgressive from the **class *Querco-Fagetea*** (*Anemone nemorosa*, *Anemone ranunculoides*, *Calamintha vulgare*, *Convallaria majalis*, *Dentaria bulbifera*, *Fragaria vesca*, *Galium odoratum, Galium schultesii*, *Geranium robertianum*, *Geum urbanum*, *Hieracium murorum*, *Luzula luzuloides*, *Mycelis muralis*, *Platanthera bifolia*), **suballiance *Lathyro hallersteinii-Carpinenion*** (*Dactylis polygama*, *Stellaria holostea*, *Vinca minor*) and **class *Molinio-Arrhenatheretea*** (*Agrostis capillaris*, *Dactylis glomerata*, *Poa pratensis*).

The life forms spectrum (Fig. 3) of the association under consideration highlights the numerical prevalence of hemicryptophytes (H = 50%), their abundence being largely influenced by the mild temperate climate, and the natural hazards (trees felled by wind and snow). The hemicryptophytes are closely followed by phanerophytes (Ph = 26.01% of which: MPh = 11.45%, mPh = 10.40%, nPh = 4.165%) as they are the basic constituents of forests. The geophytes (G = 12.50%) share a small percentage and illustrate the presence of a habitat where these species round up their short vegetation cycle in early spring and spring. The therophytes (Th = 5.20%) with a poor percentage, illustrate a low anthropic impact on flora and vegetation. The chamaephytes (Ch = 4.04%), with a very thin presence, appear only occasionally in the phytocoenoses of this association.

The floristic elements spectrum (Fig. 4) reveals the prevalence of the Eurasian species (Eua = 38.53%), followed by those European (E = 28.12%), with their genetic centre in the regions with a mild temperate climate of Europe, and those Central European (Ec = 10.41%), with their genetic centre in the regions with a mild and wet climate of Europe, from where they transgressed to the more continental regions, including the Orăştie river basin. The Circumpolar elements (Cp = 9.37%), and those Alpine-Carpathian-Balkanic (Alp-Carp-B = 1.04%) are present in a small share. The existence of southern elements, Atlantic-Mediterranean (Atl-M = 1.04%), Pontic-Mediterranean (P-M = 2.08%) and Mediterranean (1.04), is due to the frequent warm air incursions through the Mureşului Corridor and the Orăştiei Corridor, originating in the Mediterranean Sea. We notice the presence in this region of Carpathian-Balkanic (C-B = 2.08%) as well as of Pontic-Pannonian-Balkanic elements (Ppn-B = 1.04%), species that are characteristic of the Carpathians and the Balkans, namely the species whose evolution developed in the climate offered by the shores of the former Pontic and Pannonian Pliocene lakes. The species having the largest distribution on Earth, that is Cosmopolitan (Cosm = 5.20%), reached into the Orăştie Valley too.

The analysis of the diagram of ecological indices (Fig. 5) reveals a majority of mesophylous species ($U_{3-3.5}$ = 46.87%), followed by xero-mesophylous species ($U_{2-2.5}$ = 42.70%), meso-hygrophylous ($U_{4-4.5}$ = 6.24%), xerophylous ($U_{1-1.5}$ = 1.04) and eurihydrophylous (U_0 = 3.12%). If analysed thermically, one can notice the dominance of micro-mesothermophylous species ($T_{3-3.5}$ = 77.07%), followed by microthermophylous ($T_{2-2.5}$ = 8.32%), moderate-thermophylous ($T_{4-4.5}$ = 3.12%) and eurithermophylous (T_0 = 11.45%). The chemical reaction of soils outlines the prevalence of the species that are weakly acid-neutrophylous (R_4 = 36.45%), closely followed by acid-neutrophylous species (R_3 = 29.16%), acidophylous (R_2 = 8.33%), strongly acidophylous (R_1 = 1.04%), neutral-basiphylous (R_5 = 1.04%) and euri-ionical (R_0 = 23.95%). Upon analysing the diagram below it goes that the phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963 are mesophylous, micro-mesothermophylous, weakly acid-neutrophylous.

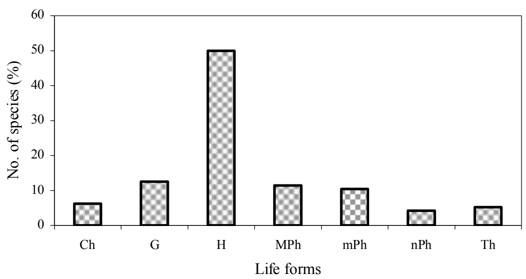

Figure 3. Life forms spectrum of the association ***Quercetum petraeae-cerris*** Soó 1963, where: MPh - Megaphanerophytes; mPh - Mezophanerophytes; nPh - Nanophanerophytes; Ch- Chamaephytes; H - Hemicryptophytes; G - Geophytes; Th - Annual therophytes

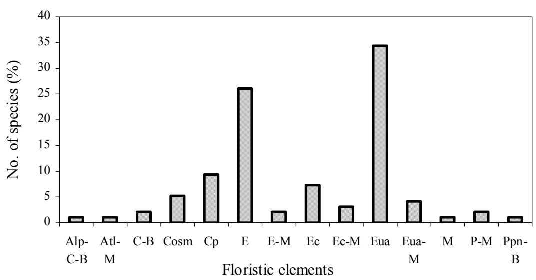

Figure 4. Spectrum of floristic elements for the association ***Quercetum petraeae-cerris*** Soó 1963 , where: Alp-C-B – Alpine-Carpathian-Balkanic; Atl-M - Atlantic-Mediterranean; C-B – Carpathian-Balkanic; Cosm – Cosmopolitan; Cp – Circumpolar; E – European; E-M – European-Mediterranean; Ec – Central European; Ec-M – Central European-Mediterranean; Eua - Eurasian; Eua-M - Eurasian-Mediterranean; M - Mediterranean; P-M – Pontic-Mediterranean; Ppn-B – Pontic-Pannonian-Balkanic

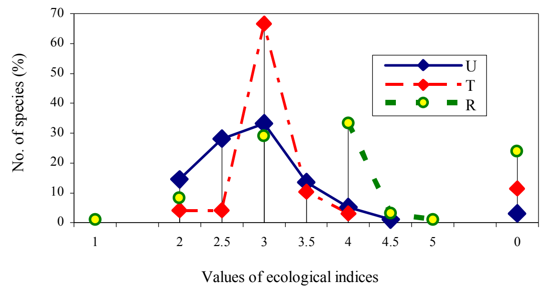

Figure 5. Ecological indices of ***Quercetum petraeae-cerris*** Soó 1963, where: U - humidity, T - temperature, R - chemical reaction of soil

DISCUSSIONS

From our observations the association *Quercetum petraeae-cerris* Soó 1963, herein the very first time analysed in the Orăştie river basin, comprises a large number of layers, hence a great structural complexity, and is dynamically and ecologically well balanced [1].

Within the phytocoenoses of this association there vegetates the orchid *Platanthera bifolia* enlisted as rare (the red lists) among the vascular plants of România [16, 31].

The research we conducted in the Orăştie Corridor (the Orăştie river basin) over the years of 2011 and 2012 underlined the fact that the vegetation of the oak forests is best represented by the association *Quercetum petraeae-cerris* Soó 1963.

Neighbouring the phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963 there are those of hornbeam mixed with oak and beech spread throughout the hills and lower mountains. This fact determined the migration of a considerable number of species from the *Querco-Fagetea* and the *Molinio-Arrhenatheretea* classes into the phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963. The localisation of the phytocoenoses of *Quercetum petraeae-cerris* Soó 1963 in the neighbourhood of pastures, arable land, human settlements, caused some of the weeds and ruderals (*Convolvulus arvensis*, *Cichorium intybus*, *Medicago lupulina*, *Polygonum convolvulus*, *Stellaria media*) to migrate into these phytocoenoses.

The presence of some species with certain temperature requirements (*Acer tataricum*, *Viola odorata*, *Cornus mas*), in the Oraşului Valley (relevés 4 and 5) and the absence of the same species in the Cucuişului Valley (relevé 3) and Aoşul Sărăcii (relevés 1 and 2), is caused by the existence of certain spots of higher thermal conditions in the Oraşului Valley, which is located in the proximity of the Mureş river. For the same conclusion also pleads the existence of some microthermophylous species (*Festuca drymeja*, *Luzula luzuloides*, *Rubus hirtus*, *Vicia sylvatica*) in the Cucuişului Valley and Aoşul Sărăcii, while they are absent in the Oraşului Valley.

Should one compare the Sessile and Turkey oak forests we researched in the Orăştie area to those located in Certejul de Sus – Pârâul Piscului Hill (nearby the township of Deva), described by Sanda et al. (1972) [24], one can see a great many similarities and few differences.

The phytocoenoses of the *Quercetum petraeae-cerris* Soó 1963 association of the two contrasted territories display a comparable biodiversity (96 species in the Orăştie area, of which 23 species (23.95%) are part of the coenotaxa subordinating the association; 88 species at Certejul de Sus, of which 15 species (17.04%) are part of the coenotaxa subordinating the association. We reckon that this fact is due to the presence of similar pedological and climatic conditions in the two geographical territories discussed herein.

The life forms spectrum reveals the prominence of hemicryptophytes in both territories (H = 50%, in the Orăştie area; H = 61.6%, at Certejul de Sus). The lush of hemicryptophytes in the two territories suggests a climate that is temperate, which favours the grassy species. The phytocoenoses of the association *Quercetum petraeae-cerris* Soó 1963, being situated at the lower limits of the wooded areas, have come into contact with the herbaceous vegetation of the grassy areas, which caused the migration and integration of many hemicryptophytes from the grassy areas into forests.

The floristic elements spectrum of the association *Quercetum petraeae-cerris* Soó 1963 reveals a high percentage of Eurasian species in the two geographical areas under discussion (Eua = 38.53%, Orăştie area; Eua = 32.8%, Certejul de Sus), followed by the European (E = 28.12%, Orăştie area; E = 24.16%, Certejul de Sus) and Central-European ones (Ec = 10.41, Orăştie area; Ec = 8.2%, Certejul de Sus).

The high coverage of Eurasian and European species in the two adjoining territories of Hunedoara county, namely the Orăştie river basin and Certejul de Sus, owes a great deal to their positioning in the same biogeographical regions (Holarctic Region, Eurosiberian Subregion, Central-European Domain, Dacian Province) [1, 8], where biogenetically originated a great many woody and/or grassy species pertaining to the phytocoenoses of *Quercetum petraeae-cerris* Soó 1963 association.

The presence of some heat-sensitive species at Certejul de Sus (*Dorycnium pentaphyllum*, *Festuca hetrophylla*, *Faraxinus ornus*, *Rubus canescens*, *Teucrium chamaedrys*) and their absence from the Orăştie area could be linked with the existence of warmer climatic conditions at Certejul de Sus. Likewise, we can as well explain the presence of certain Circumpolar species (*Carex divulsa*, *Deschampsia flexuosa*, *Polypodium vulgare*, *Solidago virgaurea*) in the Orăştie area, while they are absent from the hills nearby the Deva township (Certejul de Sus).

Doniţă *et al.* (2005) outline that the Pontic-Balkanic Sessile oak forests (*Quercus petraea*) with Turkey oak (*Quercus cerris*) and *Melittis melissophyllum* (Cod Natura 2000: 91 Mo), harbour the phytocoenoses of *Quercetum petraeae-cerris* Soó 1963 association,

Table 1. Association ***Quercetum petraeae-cerris*** Soó 1963 (Syn.: *Quercetum polycarpae-cerris* G. Popescu 1988) in Orăştie River Basin

L.f.	F.e.	U.	T.	R.	No. of relevé	1	2	3	4	5	K
					Altitude (a.s.l.)	340	360	375	380	260	
					Exposition	SE	SE	S	NV	N	
					Slope (degree) (º)	16	12	12	8	12	
					Hight of the trees (m)	24	25	24	20	22	
					Trunk diam. (cm)	26	54	38	40	36	
					Consistencey of tree layer (%)	60	80	80	70	80	
					Shrubbery layer (%)	2	2	4	2	2	
					Herbaceous layer cover (%)	25	15	20	25	20	
					Surface (m^2)	400	400	400	400	400	
0	1	2	3	4	5	6	7	8	9	10	11
					Car. ass.						
MPh-mPh	C-B	2.5	3.5	0	*Quercus polycarpa*	3	3	2	1	1	V
Mph-mPh	M	2	3.5	3	*Quercus cerris*	2	3	4	4	4	V
					Quercion petraeae* et *Fraxino orni-Cotinetalia						
nPh	Ec	2.5	3.5	2	*Cytisus nigricans*	+	+	+	.	.	V
H	E	3	3	4	*Hypericum montanum*	+	.	+	+	.	III
H	Eua	3	3	0	*Trifolium medium* subsp. *medium*	.	.	+	+	+	III
H	E	2.5	3	4	*Trifolium alpestre*	.	.	+	+	.	II
H	Eua	2	4	3	*Fragaria viridis*	+	.	.	+	.	II
H	Ec	2.5	3	3	*Lathyrus niger*	.	+	+	.	.	II
					Quercetea pubescenti-petraeae						
G	Eua	2	3	4	*Polygonatum odoratum*	+	+	+	.	.	III
MPh-mPh	E	2.5	3	0	*Quercus petraea*	+	+	.	.	+	III
mPh-MPh	Eua	2.5	3.5	4	*Acer tataricum*	.	.	.	+	+	II
H	Eua	3	3	4	*Brachypodium sylvaticum*	.	.	.	1	1	II
H	Eua	3	3	0	*Campanula persicifolia*	.	.	+	+	.	II
mPh	P-M	2	3.5	4	*Cornus mas*	.	.	.	+	+	II
mPh	Ec	3	3	4	*Cornus sanguinea*	.	+	+	.	.	II
Ch	E	2.5	3	3	*Genista ovata*	.	+	+	.	.	II
Ch-nPh	E	2.5	3	2	*Genista tinctoria*	.	+	+	.	.	II
H-G	Ec-M	2.5	4	4.5	*Lithospermum purpurocaeruleum*	.	+	.	+	.	II
H	Ec-M	2.5	3	5	*Melittis melissophyllum*	+	.	.	+	.	II
MPh	E-M	2,5	3	4	*Sorbus torminalis*	.	+	+	.	.	II
H	Alp-C-B	2.5	3	4	*Achillea distans* subsp. *distans*	.	+	.	.	.	I
H-G	Eua	2	3	4.5	*Carex humilis*	.	.	.	+	.	I
nPh	Ec	2	3.5	4	*Chamaecytisus hirsutus*	.	.	+	.	.	I
					Querco-Fagetea						
MPh-mPh	E	2.5	3	3	*Acer campestre*	+	+	+	+	+	V
H	Eua	3	2	2	*Cruciata glabra*	.	+	+	+	+	IV
H	Cp	3	3	0	*Poa nemoralis*	+	+	+	+	.	IV
G	Ppn-B	3	3.5	4	*Polygonatum latifolium*	+	.	+	+	1	IV
G	Cp	3.5	3	0	*Anemone nemorosa*	.	+	.	+	+	III
G	E	3.5	3	4	*Anemone ranunculoides*	.	.	+	+	+	III
G	Ec	3	3	4	*Dentaria bulbifera*	.	+	+	+	.	III
H	Eua	3	3	4	*Geum urbanum*	.	.	+	+	+	III
H	E	2.5	2.5	2	*Luzula luzuloides*	2	1	+	.	.	III
H	E	3	3	0	*Mycelis muralis*	+	.	.	+	+	III
mPh-MPh	E	2	3	4	*Pyrus pyraster*	+	.	+	.	+	III
MPh	E	3.5	3	0	*Quercus robur*	.	.	+	+	1	III
H-G	Eua	3.5	3	3	*Ranunculus ficaria*	.	+	+	+	.	III
H	Eua	3	3	4	*Astragalus glycyphyllos*	.	.	+	+	.	II
H	Cosm	4	2.5	0	*Athyrium filix-femina*	.	+	.	.	+	II
mPh	Eua	2.5	3	3	*Crataegus monogyna*	.	+	.	.	+	II
H-G	Eua	2.5	3	2	*Calamagrostis arundinacea*	.	+	.	.	+	II
G	E	2.5	3	3	*Convallaria majalis*	.	+	+	.	.	II
Ch	E-M	3	3.5	4	*Euphorbia amygdaloides*	.	+	.	.	+	II
H	Eua	3	2.5	0	*Fragaria vesca*	+	.	.	+	.	II
Mph	E	3	3	4	*Fraxinus excelsior*	.	+	.	.	+	II
G	Eua	3	3	3	*Galium odoratum*	.	.	+	.	+	II
G	Ec	2.5	3	3	*Galium schultesii*	.	+	.	.	+	II
Th-TH	Cosm	3.5	3	3	*Geranium robertianum*	+	.	.	.	+	II
H	E	3	0	3	*Hieracium murorum*	+	+	.	.	.	II
mPh	Eua-M	2.5	3	3	*Ligustrum vulgare*	.	+	+	.	.	II
H	Eua-M	3.5	0	3	*Platanthera bifolia*	.	+	+	.	.	II
nPh	E	2	3	3	*Rosa canina*	.	.	+	+	.	II
nPh	Eua	3	2.5	2	*Rubus hirtus*	+	.	+	.	.	II

0	1	2	3	4	5	6	7	8	9	10	11
H	Atl-M	2.5	3.5	4	*Viola odorata*	.	.	.	+	+	II
H	Cp	2.5	3	0	*Carex divulsa*	.	.	.	.	+	I
G	Eua-M	3.5	3	4	*Circaea lutetiana*	.	.	.	.	+	I
mPh	E	3	3	3	*Corylus avellana*	.	.	+	.	.	I
H	Eua	4	3	0	*Dryopteris filix-mas*	.	+	.	.	.	I
MPh-mPh	E	3	3	0	*Fagus sylvatica* subsp. *sylvatica*	.	+	.	.	.	I
G-H	C-B	4	2	3	*Festuca drymeja*	+	.	.	.	.	I
mPh	Eua	4	3	3	*Frangula alnus*	+	.	.	.	.	I
H-Ch	P-M	2.5	3	4	*Glechoma hirsuta*	.	.	.	+	.	I
Ch	E	4	3	0	*Lysimachia nummularia*	.	.	.	+	.	I
G	Eua	3	3	0	*Maianthemum bifolium*	.	+	.	.	.	I
G	Cp	3.5	3	4	*Polypodium vulgare*	.	+	.	.	.	I
H	E	2	3	4	*Sedum maximum*	.	.	+	.	.	I
H	Eua	3.5	0	0	*Stachys sylvatica*	.	.	.	+	.	I
H	E	3.5	3	3	*Stellaria nemorum*	.	+	.	.	.	I
H	Eua	3.5	2	0	*Vicia sylvatica*	.	.	+	.	.	I
					Lathyro hallersteinii -Carpinenion						
MPh	E	3	3	3	*Carpinus betulus*	+	+	+	+	1	V
MPh-mPh	E	3	3	3	*Cerasus avium*	+	+	+	+	+	V
Th	Eua	0	0	2	*Melampyrum pratense*	+	+	1	.	.	III
H	Ec	2.5	3	3	*Dactylis polygama*	.	.	+	.	+	II
mPh	E	3.5	3	4	*Malus sylvestris*	+	.	+	.	.	II
H	Eua	3	3	0	*Stellaria holostea*	.	+	+	.	.	II
Ch	Ec-M	3	3	3	*Vinca minor*	.	.	.	+	+	II
Mph	E	3	3	3	*Tilia cordata*	.	.	+	.	.	I
					Molinio-Arrhenatheretea						
H-G	Cp	0	0	0	*Agrostis capillaris*	+	.	.	+	.	II
H	Eua	3	0	4	*Dactylis glomerata*	.	+	.	+	.	II
H	Cp	3	0	0	*Poa pratensis*	.	.	.	+	+	II
					Variae syntaxa						
H	Cp	2	0	1	*Deschampsia flexuosa*	+	+	.	+	.	III
H-TH	Eua	2.5	3.5	4.5	*Cichorium intybus*	.	.	.	+	+	II
H	Cp	2	3	3	*Clinopodium vulgare*	.	.	.	+	+	II
H-G	Eua	2	3	4	*Euphorbia cyparissias*	.	+	+	.	.	II
Th	Eua	2.5	3	3	*Polygonum convolvulus*	.	.	.	+	+	II
H-nPh	E	4.5	3	4	*Rubus caesus*	.	.	.	+	+	II
H	Eua	3.5	0	4	*Silene dioica*	.	.	+	.	+	II
H	Cp	2.5	3	3	*Solidago virgaurea*	.	+	.	.	+	II
H	Eua	3	3	0	*Tanacetum vulgare*	.	.	+	.	+	II
H-G	Cosm	3	3	4	*Urtica dioica*	.	.	.	+	+	II
Ch	Eua	2	2	2	*Veronica officinalis*	.	.	+	.	+	II
H	Eua-M	3	3	4	*Anthriscus sylvestris*	.	.	.	+	.	I
H	Cosm	0	0	0	*Convolvulus arvensis*	.	.	.	+	.	I
H	Eua	1.5	4	4	*Festuca valesiaca*	.	.	.	+	.	I
Th-TH	Eua	2.5	3	4	*Medicago lupulina*	.	.	.	+	.	I
mPh	Eua	2	3	3	*Prunus spinosa*	.	.	.	+	.	I
Th-TH	Cosm	3	0	0	*Stellaria media*	.	.	.	.	+	I

where: L.f. - life forms; MPh - Megaphanerophytes; mPh - Mezophanerophytes; nPh - Nanophanerophytes; Ch - Chamaephytes; H - Hemicryptophytes; G - Geophytes; Th - Annual therophytes.

F.e. - floristic elements: Alp-C-B – Alpine-Carpathian-Balkanic; Atl-M - Atlantic-Mediterranean; C-B – Carpathian-Balkanic; Cosm - Cosmopolitan; Cp - Circumpolar; E – European; E-M – European-Mediterranean; Ec - Central European; Ec-M - Central European- Mediterranean; Eua - Eurasian; Eua-M – Eurasian- Mediterranean; M – Mediterranean; P-M – Pontic-Mediterranean; Ppn-B – Pontic-Pannonian-Balkanic.

Ecological indices: U - humidity, T - temperature, R - the chemical reaction of the soil; the range of values between 1 and 6 [27]. Synthetic phytosociological indices: K – constancy.

Place and date of mapping: 1-2, Aoşul Sărăcii, 20.07.2011; 3, Cucuişului Valley, 10.07.2012; 4-5, Oraşului Valley, 18.07.2011.

covering about 180,000 hectares in România and displaying a moderate conservation value [9].

It is here in Hunedoara county that the Turkey oak (*Quercus cerris*) protrudes most inwardly to the heart of Transylvania, towards the boundary with Alba county. It is absent in the Transylvanian Tableland [32]. In the Orăştie area it constitutes heterogeneous forests in association with the Sessile oak (*Quercus polycarpa*, *Quercus petraea*), the so-called ″şleauri″ [32].

Popescu *et al*. (2004) asserts: ″the forest is the most potent defence shield of soils against erosion″ [32]. The forests described here lie on medium inclined slopes, thus aiding the fight against erosion. Some of these forests borderline the crops (Aoşul Sărăcii), thus boosting the harvest by generating a better microclimate. The Sessile oak wood is largely utilised by local communities here, having much resilience and durability in air, soil and water environments. The prolonged drought, the rise of mean temperatures, the extreme temperature readings are just few of the climatic changes emphasizing the forest role in the protection of local communities [14, 21, 23].

We reckon that our study illustrates thoroughly the phytocoenoses of *Quercetum petraeae-cerris* Soó 1963 association, vegetating in the Orăştie area, and in the future one may as well assess the effects of certain interventions on the part of the local authorities and forestal administration. This study may also become a significant reference for future research work in similar territories.

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