FORESTS VEGETATION, FOREST HABITATS OF COMMUNITY INTEREST IN NORTH-WEST ROMANIA, INCLUDED IN THE PROJECT "PRIORITY HABITATS OF FOREST STEPPE AND HILLY PIEDMONTS", POTENTIAL THREATS AND MONITORING OF CONSERVATION STATUS (II)

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Abstract

The purpose of this paper is to identify and describe the types of natural habitats of community interest in north-western Romania.

We have proposed to reach five working goals prior to reaching the proposed objective.

The working methods we used consist in the acquisition of informative materials, preliminary evaluation of the forests, field research, and a complete evaluation that led to the elucidation of the scientific content of the proposed objectives.

The scientific information obtained regarding the floral composition, the high conservation values, the state of conservation, the potential threats and the management of the forests included in the five natural habitats of community interest in the northwest of Romania are processed and analysed besides the results and discussions thereof.

The phytocenoses of these habitats were studied from the perspective of their belonging to seven rare plant associations, described for the first time. Four conclusions were formulated summarizing the research results and the original contribution of the authors of this work.

Key words: forests, forest habitats, phytocenoses, plant associations.

INTRODUCTION

In order to solve the objectives of this study we reviewed the scientific papers which have been published more recently and contain information on the habitats and sites of community interest included in the "Natura 2000 Ecological Network" of the following authors: Candrea Bozga et al ,2009; Doniță et al., 2005; Drăgulescu et al., 2007; Gafta, Mountford 2008; Lazăr et al., 2007; Stăncioiu et al., 2008, those containing information on high conservation value forests, Biriș et al., 2002, Ioraș, Abrudan, 2007; Jennings et al., 2003; Stanciu et al., 2004; Stăncioiu 2008; Vlad et al., 2013, and also sources providing information on habitat biodiversity and plants included in the Red lists by Angelstam et al. 2004; Boșcaiu et al., 1994, Coldea et al., 2008; Danciu et al., 2007; Dihoru, Negrean, 2009; Oltean et al., 1994; Radu, 2001; Schulze, Mooney,1993.

MATERIAL AND METHOD

We carried out our research in the foothills of Oradea Hills, the Lăzăreni Hills and the Western Plain of Romania on a total area of roughly 180 km^2.

In order to achieve the proposed goals, the research was divided into four successive stages of work as follows:

(i) The acquisition of informative materials (i.e. tree maps, plot descriptions, Red lists for rare and protected plant species, scientific papers on natural habitats and high conservation value forests);

(ii) The preliminary assessment of presumptive forest areas, with high conservation values, included in natural habitats of community interest;

(iii) The field research of selected forests declared as high conservation value forests (HCVFs);

(iv) The complete of the categories of high conservation value forests (HCVFs) which must be protected and managed sustainably based on a management plan.

RESULTS AND DISCUSSIONS

91MO Pannonian Balkan Turkey oak - sessile oak forests.

According to the The Interpretation Manual of European Union Habitats (European Commission 2003), this type of habitat consists of the sub-continental thermo-xerophilous forests of Turkey oak (*Quercus cerris*), sessile oak (*Quercus petraea*) and Hungarian oak (*Quercus frainetto*) spread in the plain and hilly regions of Pannonian Plain, in the north-Balkans, where the spreading of Tartarian maple (*Acer tataricum*) is a constant; however, the sub-Mediterranean species such as the oriental hornbeam (*Carpinus orientalis*) and the butcher's-broom (*Ruscus aculeatus*) are missing.

In Romania this habitat can be found in the continental areas of the south of the country i.e. Muntenia (Wallachia), Oltenia, Dobrogea, Banat and up to the north, in the Crișana region, at altitudes ranging between 250-500 m, where the forests of xero-thermophile oaks grow on brown, deep soils with sub-layer of limestone, andesite, basalt, loëss, clay and/or sand.

The tree layer is dominated by *Quercus petraea, Quercus cerris, Quercus frainetto, Quercus dalechampii, Tilia tomentosa, Carpinus betulus,* alongside the following species develop *Acer campestre, Acer tataricum, Acer platanoides, Sorbus torminalis, Fraxinus excelsior, Tilia cordata, Ulmus minor, Prunus avium, Malus sylvestris* and *Pyrus pyraster*.

The shrub layer consists of *Cornus mas, Crataegus monogyna, Ligustrum vulgare, Staphyllea pinnata, Euonymus europaeus, Fraxinus ornus, Viburnum lantana, Sambucus nigra* and *Prunus spinosa*.
The herbaceous layer consists of *Lithospermum purpurocoeruleum, Ruscus aculeatus, Potentilla micrantha, Tamus communis, Lychnis coronaria, Arum orientalis, Lathyrus niger, Lathyrus venetus, Polygonatum odoratum, Polygonatum latifolium, Convallaria majalis, Melittis melissophyllum, Vincetoxicum hirundinaria, Smyrnium perfoliatum, Cephalanthera damasonium, Platanthera bifolia, Viola hirta, Stellaria holostea, Veronica chamaedrys, Isopyrum thalictroides, Scilla bifolia, Corydalis cava, Melica nutans, Melica uniflora, Festuca heterophylla, Poa nemoralis, Silene nutans* ssp. *Nutans* and *Carex digitata*.
In the northwest part of Romania this type of habitat is represented by four types of forest ecosystems:
R4132 ecosystem. Pannonic & Balkan forests of sessile oak (*Quercus petraea*), Turkey oak (*Quercus cerris*) and European beech (*Fagus sylvatica*) with *Melittis melissophyllum*. PALAEARCTIC HABITATS 41.7696. PALAEARCTIC HABITATS 41.7696. Pre-Carpathian *Quercus cerris – Quercus petraea* forests. It is widespread in the northwest of Romania, Oradea Hills, Lăzăreni Hills, Măgura Șuncuiuș Hill, Bihor County.

Plant association: *Quercetum petraeae ceris, - ruscetosum aculeati* Morar – Burescu 2012.

Ecosystem type: 7724 high and medium productive sessile oak and Turkey oak stands, with mull-moder, growing on brown and brown-reddish, mesobasic soils with *Glechoma hederacea* and *Geum urbanum.*

This ecosystem contains high conservation values classified as: HCVFs 1.1, HCVFs 1.2, HCVFs 3 and HCVFs 4.2 with string plant populations of *Ruscus aculeatus*.

Ecosystem R 4140 Dacian - Balkan forests of sessile oake (*Quercus petraea*), Turkey oak (*Quercus cerris*) and European white lime also known as silver linden (*Tilia tomentosa*) with *Lychnis coronaria*. PALAEARCTIC HABITATS 41.7696, Pre-Carpathian *Quercus cerris – Quercus petraea* s.l. forests. It is spread throughout the Oradea Hills, Șomleu Hill, Băile 1 Mai Oradea, Bihor County.

Plant association: *Tilio argenteae – Qurcetum petraeae – cerris* Soó 1967 – *ruscetosum aculeati* Morar – Burescu 2012.

Type of forest ecosystem: 7114 High and medium productive Turkey oak stands with mull, growing on brown and reddish-brown, typical eubasic and mesobasic soils with *Glechoma hirsuta* and *Geum urbanum*. The forests included in this ecosystem contain high conservation values in

the class HCVFs 1.1 with compact and well-developed plant populations of *Ruscus aculeatus*.

Ecosystem R 4152, Dacian Turkey oak forests (*Quercus cerris*) and European hornbeam (*Carpinus betulus*) with *Digitalis glandiflora*. PALAEARCTIC HABITATS 41.769 Getic and sub-continental thermophyllus oak forests. This type of ecosystem can be found at Măgura Hill, Șuncuiuș, Oradea Hills, Lăzăreni Hills, Bihor County.

Plant association: *Carpino - Quercetum cerris Klika* 1938 (Boșcaiu et al. 1969).

Type of forest ecosystem: 7214 High and medium productive Turkey oak and European hornbeam stands, with mull growing on brown and brown-reddish luvic, eubasic-mesobasic soils with *Arum orientale* and *Brachypodium sylvaticum*.

This ecosystem contains high conservation value forests classified as HCVFs 1.2, HCVFs 1.3 and HCVFs 4.2, and enjoy a very high biodiversity.

Ecosystem R 4154 Danubian and Balkan forests of Hungarian oak (*Quercus frainetto*). PALAEARCTIC HABITATS 41.76814. Balkan and Danube *Festuca heterophylla* forest. This type of ecosystem is widespread in the form of isolated forest stands on the Oradea Hills, Lăzareni Hills, Bihor County.

Plant association: *Quercetum frainetto-dalechampii* (Bârcă 1984), Chifu et al. 2006.

Type of forest ecosystem: 7535 Medium productive Hungarian oak forests with moder growing on luvic vertisoils and brown luvic, oligomesobasic soils with *Genista ovata* and *Festuca heterophylla*. This ecosystem comprises high conservation value forests classified as HCVFs 1.1 and HCVFs 1.2 in which isolated plant populations of *Ruscus aculeatus* and *Convallaria majalis* grown.

Conservation status and potential threats: conservation of the forests in this habitat is endangered by the lack of a Natura 2000 specific Management Plan, changes in plant living conditions (through deforestation, clear cutting) leading to inadequate conditions for the development of rare, endangered, vulnerable, relic, endemic species, such as *Ruscus aculeatus, Cephalanthera damasonium, Convallaria majalis* and *Potentilla micrantha*, and smaller forests surfaces populated with Hungarian oak and reproductive isolation.

91 Yo Dacian oak-hornbeam forests

In the Annex of the Treaty of Accession of Romania (and Bulgaria) to the European Community (January 2005), this type of habitat was included in the list of habitats described as forests consisting of various plant species of *Quercus robur, Quercus petraea, Quercus dalechampii, Quercus cerris, Quercus frainetto* in mixture with European hornbeam

(*Carpinus betulus*) spread on the sizes and foothills of the eastern and southern Carpathians, in the Moesiac area of the plant alliance *Quercion frainetto*, in the eastern part of the Pannonian area, in the western part of the Danubian-Pontic forest steppe area, and in the pre-Pontic area of southeast Europe.

Dacian hornbeam-Turkey oak forests are widespread in Romania, and they can be found in the peri- and intra-Carpathian hills in the west, center and north parts of the country, the Transylvanian Plateau, the sub-Carpathians of Moldova and Curvature Carpathians, the Dobrogea Plateau and in the Danube Plain, growing on low to moderate steppe slopes, ridges, wide ridges, plateaus, wide valleys, high plains at altitudes ranging from 200 to 800 m, with average annual temperatures of 7.5-10°C, and average annual rainfall between 500 and 800 mm.

The sub-layers on which they develop are generally marl, calcareous sandstone, clay deposits, loëss, conglomerates, limestone and even crystalline shale with soils classified as luvisoils and cambisoils. The forest vegetation consists of mixtures of non-European, Balkan and Caucasian European plant species.

The phytocenoses of the oak trees stands have the tree layer composed of sessile oak (*Quercus petraea*), Dalechampii oak (*Quercus dalechampii*), European hornbeam (*Carpinus betulus*), exclusively or mixed with European beech (*Fagus sylvatica*), pedunculate oak (*Quercus robur*), Turkey oak (*Quercus cerris*), Hungarian oak (*Quercus frainetto*), small-leaved lime tree (*Tilia cordata*), European white lime (*Tilia tomentosa*), broad-leaved lime tree (*Tilia platyphyllos*), European sweet cherry (*Prunus avium*), Norway maple (*Acer platanoides*), sycamore (*Acer pseudoplatanus*), European ash tree (*Fraxinus excelsior*, *Fraxinus angustifolia*), flowering ash (*Fraxinus ornus*), smooth-leaved and wych elm (*Ulmus minor, Ulmus glabra*), field maple (*Acer campestre*), mounatin ash (*Sorbus torminalis*), Tartarian maple (*Acer tataricum*), European wild apple tree (*Malus sylvestris*), and European wild pear (*Pyrus pyraster*).

The shrubs layer consists of cornel-tree (*Cornus mas*), femal corenl-tree (*Cornus sanguinea*), European haze-tree (*Corylus avellana*), common hawthorn (*Crataegus monogyna*), common privet (*Ligustrum vulgare*), European spindle (*Euonymus europaeus*), way faring tree deciduous shrub (*Euonymus verrucosus*) (*Viburnum lantana*), elder (*Sambucus nigra*), common buckthorn (*Rhamnus catharticus*).

Depending on the specificity of its habitat, the herbaceous layer is differentiated into three categories of floristic compositions as follows:

(i) On weak-acid to neutral soils, saturated at the base, the species of mull flora are present: *Arum orientale, Asarum europaeum, Galium odoratum, Polygonatum latifolium, Geum urbanum, Lathyrus*

vernus, Lathyrus niger, Lathyrus hallersteinii, Stellaria holostea, Brachypodium sylvaticum, Lamium galeobdolon, etc.;

(ii) On moderately acid, mesobasic soils, herbaceous flora is predominantly composed of poaceae: *Poa nemoralis, Festuca drymeja, Melica uniflora, Calamagrostis arundinacea*, besides which one can meet *Carex sylvatica, Carex pilosa, Luzula luzuloides, Galium schultesii, Veronica officinalis, Glechoma hirsuta, Hieracium transsylvanicum* and *Lithospermum purpureocaeruleum*;

(iii) On acid, skeletal, oligotrophic soils on sunny, strongly inclined slopes the predominant sub-shrub species are: *Cytisus nigricans, Cytisus hirsutus, Cytisus austriacus* ssp. *heuffelii, Genista tinctoria* ssp. *tinctoria, Calluna vulgaris, Bruckentharia spiculifolia, Vaccinium myrtillus, Vaccinium vitis-idaea,*, besides which one can encounter *Luzula luzuloides, Poa nemoralis, Veronica officinalis, Fragaria viridis, Scutellaria alltissima and Lithospermum purpureocaeruleum*.

In the northwest of Romania this type of habitat is represented by two types of forest ecosystems, as follows:

R4124 Ecosystem. Dacian forests of sessile oak (*Quercus petraea*), European beech (*Fagus sylvatica*) and European hornbeam (*Carpinus betulus*) with *Lathyrus hallersteinii*. PALAEARCTIC HABITATS 41. 2C12. Dacian Lathyrus hallersteinii oak - hornbeam forests. It is spread in the northwest of Romania on the Oradea Hills.

Ecosystem type: 5216 High and medium productive sessile oak with European hornbeam, with mull growing on typical brown, luvic, eubasic and mesobasic soils with *Asperula odorata - Asarum europaeum - Stellaria holostea*.

Plant association: *Carpino-Quercetum petraeae* Borza 1941.

The physiognomy of the association is instilled by the two characteristic and uplifting species: *Quercus petraea* with an overall coverage of 62.5% and *Carpinus betulus* with an overall coverage of 13.34% alongside which also are present: *Prunus avium, Tilia tomentosa, Acer campestre, Quercus dalechampii, Acer platanoides, Fraxinus excelsior, Fagus sylvatica, Tilia cordata, Ulmus glabra, Ulmus minor* and *Quercus robur*.

The shrub layer consists of Cornus mas, Crataegus monogyna, Ligustrum vulgare, Euonymus europaeus, Staphylea pinnata, Sambucus nigra.

The herbaceous layer encompasses a number of 66 characteristic and recognizable cormophyte species specific for the sub-alliance *Lathyro hallersteinii* – the alliance *Symphyto cordati – Fagion: Ruscus aculeatus,*

Glechoma hirsuta, Festuca drymeja, Stellaria holostea, Lathyrus vernus, Dactylis polygama, Viola odorata, Polygonatum multiflorum, the order *Fagetalia sylvaticae: Lamium galeobdolon, Euphorbia amygdaloides, Allium ursinum, Alliaria peţiolata, Rubus hirtus, Carex pilosa, Mercurialis perennis, Stachys sylvatica, Galium odoratum, Scrophularia nodosa, Sanicula europaea, Circaea lutetiana,* the class *Querco-Fagetea: Dentaria bulbifera, Malica nutans, Melica uniflora, Anemone nemorosa, Hedera helix, Mycelis muralis, Geum urbanum, Viola reichenbachiana, Brachypodium sylvaticum, Symphytum tuberosum, Polygonatum latifolium, Athyrium filix-femina.* Some species migrated from the class *Querctea pubescenti-petraeae* are included in this plant association: *Quercus cerris, Quercus polycarpa, Sorbus torminalis, Acer tataricum, Polygonatum odoratum, Viola hirta, Melittis melissophyllum* (see Table 1).

High conservation values: In this habitat there are located high conservation values forests classified as HCVFs 1.2 and HCVFs 1.3, populated with rare species, relict plant species considered as monuments of nature: *Ruscus aculeatus, Sanicula europaea* and *Convallaria majalis*.

Conservation status and potential threats: Conservation of these forests is endangered by the lack of a Natura 2000 specific Management Plan, wood extractions performed improperly both in terms of the wood exploitation works application technique and the selection of tree specimens and species from a scientific, economic point of view, afforestation with wood species other than those characteristic for that habitat, inter-specific plant competition favoured by human factor, by which species such as hornbeam, field maple, linden trees totally or partially supress oak and sessile oak species, invasion of allochthonous species such as acacia, soil sodding that hinders the regeneration from advance grow, and the damage caused by entomofauna and phytopathogenic agents.

R4143 Ecosystem. Dacian forests of pedunculate oak (*Quecus robur*) with *Melampyrum bihariense*. PALAEARCTIC HABITATS 41.2C11 Dacian *Melampyrum bihariense* oak-hornbeam forests. This type of habitat is widespread in the northwest of Romania, across the Oradea Hills and the Lăzăreni Hills.

Ecosystem type: 6216 Medium productive oak-hornbeam forests, with mull growing on typical brown, luvic, eubasic and mesobasic soils with *Asperula odorata - Asarum europaeum - Stellaria holostea*.

Plant association: *Querco robori - Carpinetum* Borza 1937

The physiognomy of this plant association is instilled by the two characteristic and dominant species i.e. *Quercus robur* with a general coverage of 21.5% and *Carpinus betulus* with a general coverage of 29.5% alongside which plant species such as vegetează *Prunus avium, Acer campestre, Fagus sylvatica, Tilia tomentosa, Tilia cordata, Quercus*

petraea, Fraxinus excelsior, Ulmus minor, Malus sylvestris and *Pyrus pyraster* also develop.

The shrub layer consists of *Cornus mas, Crataegus monogyna, Ligustrum vulgare, Euonymus europaeus, Euonymus latifolium, Acer tataricum* and *Sambucus nigra*.

The herbaceous layer comprises a number of 64 characteristic and differential cormophyte species for the sub-alliance *Lathyro hallersteinii - Carpinenion*, the alliance *Symphyto cordati-Fagion: Glechoma hirsuta, Ruscus aculeatus, Stellaria holostea, Tamus communis, Arum maculatum, Melampyrum bihariense, Isopyrum thalictroides, Viola odorata, Melica picta, Potentilla micrantha*, the order *Fagetalia sylvaticae: Galium odoratum, Lamium galeobdolon, Allium ursinum, Veronica hederifolia, Rubus hirtus, Alliaria petiolata, Corydalis cava, Stellaria nemorum, Carex pilosa, Carex sylvatica, Euphorbia amygdaloides, Mercurialis perennis, Pulmonaria officinalis, Sanicula europaea,* the class *Querco-Fagetea: Polygonatum latifolium, Ranunculus ficaria, Anemone nemorosa, Melica nutans, Cruciata glabra, Viola reichenbachiana, Dentaria bulbifera, Carex digitata, Corydalis solida, Brachypodium sylvaticum, Geum urbanum, Campanula rapunculoides, Lathyrus niger, Symphytum tuberosum, Galium schultesii*.

In the association migrated species from the class *Quercetea pubescenti-petraeae* do appear: *Qurcus cerris, Quercus polycarpa, Sorbus torminalis, Acer tataricum, Polygonatum odoratum, Melittis melissophyllum* and *Pulmonaria mollis* (see Table 1).

High conservation values: this habitat contains high conservation value forests classified as HCVFs 1.2 and HCVFs 1.3, where rare and relict species, considered as monuments of nature, found shelter i.e. *Ruscus aculeatus, Arum maculatum, Melampyrum bihariense, Potentilla micrantha, Sanicula europaea* and *Convallaria majalis*.

Conservation status and potential threats: lack of a specific Natura 2000 Management Plan, inadequate management, improper timber extractions, afforestation with species other than those specific to this habitat, unfair interspecific competition by which the hornbeam, linden, field maple supress oak and sessile oak species, soil sodding the soil that hinders the regeneration from advanced grow, grazing and transit of the animals through the habitat.

Table 1

Forest habitat of community interest in north-western Romania and the categories of high conservation value forests (HCVFs) they contain

o.	Habitats			Plant associations	Type of forest ecosystem	High conservation values forest categories	Location
	Habitats codes according to Directive 92/43/EEC	Romanian equivalent code	PALAEARCTIC code				
1	2	3	4	5	6	7	8
1	9110. *Luzulo-Fagetum* beech forest	R4110. Southeast South-east Carpathian beech forests (*Fagus sylvatica*) with *Festuca drymeja*	41.1 D54 South Carpathian *Festuca drymeja* beech forest	*Festuco drymejae – Fagetum* Morariu et al. 1968	4136	HCVF 1.2, 1.3	Oradea Hills, Măgura Vadu Crișului Hill
2	9130. *Asperulo – Fagetum* beech forests	R4118. Dacian beech forests (*Fagus sylvatica*) and European hornbeam (*Carpinus betulus*) with*Dentaria bulbifera*	41.1D224 Dacian *Dentaria bulbifera* beech forests	*Carpino-Fagetum* Păucă 1941	4216	HCVF 1.2, 1.3	Oradea Hills, Măgura Vadu Crișului Hill, Lăzăreni Hills
3	91 HO* Pannonian woods with *Quercus pubescens*	R4160. Dacian pubescent oak forests – open wood (*Quercus pubescens*) with*Lithospermum purpurocoeruleum*	41.7373 Intra-Carpathian insular *Quercus virgliana* forests	*Corno – Quercetum pubescentis* Jakucs et Máthé et Kóvacs 1962	8771	Șeica Mică, Mirăslău Transylvanian Plateau, Crișul Repede Defile, Băile 1 Mai, HCVF 1.1, 3., 4.1, 4.2.	Măgura – Șuncuiuș Hill, Valea Toplița-Lunca Sprie Valley, Șomleu Hill – Băile 1 Mai Oradea
4	9110* Euro-Siberian forest steppeswith *Quercus sp.*	R.4138. Dacian Sessile oak forests (*Quercus petraea*) and pubescent oak(*Quercus robur*) with*Acer tatricum*. R. 4418. Psamophile Pannonic forests of pedunculate oak (*Quercus robur*) cu *Convallaria majalis*	41.7A225 Sarmatian*Acer tataricum – Quercus robur – Quercus petraea* forest steppe 41.7A213 Pannonic sand steppe oak woods	*Aceri tatarico – Quercetum roboris* Zólyomi 1957 facies with*Ruscus aculeatus, Polygonato latifolio-Quercetum roboris* (Hargitai 1940, Borhidi 1966) (Syn.: *Convallario-Quercetum roboris* Soó 1957)	6716 - -	HCVF 1.1, 1.2 HCVF 1.2, 1.3, 4.2	Oradea Hills Lăzăreni Hills, Nort-west Romania sandy areas, Șimian, Valea lui Mihai, Oradea Hills
5	91LO. Illyrian oak - hornbeam forest (*Erythronio - Carpinion*)	R4127. Mixed Dacian sessile oak (*Quercus petraea*), beech (*Fagus sylvatica*) and silve limetree (*Tilia tomentosa*) with*Erythronium dens-canis*.	41.2A12. Illyrian neutrocline sessile oak hornbeam forests.	*Tilio tomentosae - Quercetum dalechampii,* Sârbu 1979, *ruscetosum aculeati* subas. nova. *Fago-Quercetum petraeae* R.Tüxen 1955	5416 4516	HCVF 1.1, 1.2, 3, 4.2	Oradea Hills Vadu Crișului

o.	Habitats			Plant associations	Type of forest ecosystem	High conservation values forest categories	Location
	Habitats codes according to Directive 92/43/EEC	Romanian equivalent code	PALAEARCTIC code				
1	2	3	4	5	6	7	8
6	91 Mo. Pannonian - Balkan Turkey oak - sessile oak forest	R4132. Pannonic and Balkan sessile oak (*Quercus petraea*), Turkey oak (*Quercus cerris*) and beech (*Fagus sylvatica*) forests with *Melittis melissophyllum*.	41.7696. Pre-Carpathian *Quercus cerris* - *Quercus petraea* forests.	*Quercetum petraeae - ceris* (Soó 1957)1969 - *ruscetosumaculeati* Morar - Burescu 2012	7724	HCVF 1.1, 1.2, 3, 4.2	Oradea Hills Măgura – Șuncuiuș Hill, Lăzăreni Hills
		R4140. Dacian – Balkan Sessile oak (*Quercus petraea*)forests, Turkey oak (*Quercus cerris*) and silver lime tree (*Tilia tomentosa*) forests with *Lychnis coronaria*.	41.7696. Pre-Carpathian *Quercus cerris* - *Quercus petraea* s.l. forests.	*Tilio argenteae - Quercetum petraeae cerris* Soó 1967 - *ruscetosum aculeati* Morar - Burescu 2012	7114	HCVF 1.1	Oradea Hills, Șomleu Hill, Băile 1 Mai Oradea
		R. 4152. Dacian Turkey oak (*Quercus cerris*) andEuropean hornbeam (*Carpinus betulus*) forests with *Digitalis grandiflora*	41.769. Getic sub-continental thermophilous oak forests	*Carpino-Quercetum cerris* Klika 1938 (Boșcaiu et al. 1969)	7214	HCVF 1.2, 1.3, 4.2	Oradea Hills, Lăzăreni Hills, Măgura Șuncuiuș Hill
		R.4154. Pannonic and Balkan of Hungarian oak (*Quercus frainetto*)	41.76814. Danubian - Balkan *Festuca heterophylla* forests	*Quercetum frainetto – dalechampii* (Bârcă 1984) Chifu et al. 2006	7535	HCVF 1.2, 1.3	Oradea Hills, Lăzăreni Hills
7	91YO. Dacian oak – hornbeam forests	R 4124. Dacian sessile oak (*Quercus petraea*), beech (*Fagus sylvatica*) and European hornbeam (*Carpinus betulus*) forests with *Lathyrus hallersteinii*	41.2C12. Dacian *Lathyrus hallersteinii* oak – hornbeam forests	*Carpino – Quercetum petraeae* Borza 1941	5216	HCVF 1.2, 1.3	Oradea Hills
		R 4143. Dacian pedunculated oak (*Quercus robur*) forests with*Melampyrum biharіense*	41.2C11. *Dacian Melampyrum biharіense* oak – hornbeam forest	*Querco robori – Carpinetum* Borza 1937	6216	HCVF 1.2, 1.3	Oradea Hills, Lăzăreni Hills

Notes: The classification by forest ecosystems types (4136, 4216, 4516, 5216, 5416, 6216, 6716, 7114, 7214, 7535, 7724, 8771) was done according to the Romanian typological system elaborated by Doniță, Chiriță, Stănescu (coord.) 1990, Doniță, Gafta (1992):

High conservation value forests (HCVFs) were grouped into six distinct categories after processing, with comments to the practical guidelines by Stanciu, Mihul, Dinicu (2005), Vlad, Bucur, Turtică (2013) as follows :

HCVF 1.1. Forest areas from natural areas protected with role in the conservation of natural habitats and biodiversity, including forests of scientific interest in subgroups 1.5.a, 1.5.d, 1.5.f (taken after the Ministry of Forestry 1986, with comments and notes from Stăncioiu et al. 2008)

HCVF 1.2. Forests that contain rare, threatened or endangered species;

HCVF 1.3. Forests formed in natural habitats for endemic flora species and relict species;

HCVF 3. Forests that contain rare, threatened, endangered ecosystems or species included in rare plant associations;

HCVF 4.1. Forests with special role for the protection of drinking water sources and the prevention of floods with excessive alluvium transport;

HCVF 4.2. Forests with an important role in controlling soil erosion.

The classification of habitats by types was made according to European Directive 92/43/EEC which is legal framework for the implementation of the Natura 2000 Ecological Network, (9110, 9130, 91HO, 91IO *, 91LO, 91MO, 91YO) and according to the Romanian typology (R4110, R4118, R4160, R4138, R4148, R4127, R4132, R4140, R4152, R4154, R4124, R4143) adapted to the specific conditions of our country by Doniță et al. (2005).

The management mode and the measures necessary to maintain a favourable conservation status

According to the functional classification of forests in Romania, these habitats are generally classified into Group 1 - Forest vegetation with special protection functions, included in the functional Type II.

These forests will be managed under conservation regime in which the exploitation of main wood products by the classic regeneration cuts shall not be allowed anymore. Their management will be done through special conservation works that shall ensure the continuity of the forest and maintain a favourable conservation status for the fulfilment of the assigned protection functions.

The care and management of the tree stands shall be adopted and executed in relation to the assigned protection function, with a lower intensity yet with a higher periodicity.

In case of disturbance due to natural or anthropic causes in the studied tree stands, the restoration of the favourable conservation status will be done by natural regeneration from advance grow or from the neighbouring trees or, if not possible, from the trees with similar genetic ecotypes, but coming from the same geographical area.

CONCLUSIONS

We identified two types of forest habitats of community interest in European version and other four types of equivalent habitats on the Romanian territory.

The phytocenoses of forests included in these habitats are subordinated to six rare plant associations, described for the first time for that territory.

The floristic inventory was carried out for each plant association, classifying the species to the corresponding cenotaxa.

The habitats surveyed contain high conservation value forests classified as HCVF 1.1, 1.2, 1.3, 3, and 4.2.

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