FORESTS WITH HIGH CONSERVATION VALUE FROM VLĂDEASA MOUNTAINS, REMEȚI FORESTS DISTRICT MU II MOLIVIȘ

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Abstract

We conducted our research in Vlădeasa Mountains Remeți Forest District, Management Unit II Moliviș, Bihor County, comprising an area of 4247 ha occupied by ancient forests of Silver fir stands - spruce stands- beech stands aimed at setting high conservation values (HCVs) and the forest they contain (HCVF).

In the discussion and findings related chapters there are presented high conservation values in the following compartments 1B, 1D, 1F, 2B, 39C, 62B, 67D, 72A, 73A, 84A, 84B, 130C, 131D, 158, 159, 180A, 184B, 187A, 187D and 187E describing phytocenoses within the forests containing rare plant and animal species, and rare vulnerable, endangered and ecosystems.

Key words: High conservation value forest ecosystems**.**

INTRODUCTION

1. STATE OF KNOWLEDGE

No research on high conservation value forests in the Vlădeasa Mountains, Remeţi Forests District was conducted made until the first research made by us, Burescu (2011, 2012, 2013).

In order to compare the findings with those obtained in other geographic regions of Romania and Europe we have consulted scientific work of the following authors: Abrudan et al. (2006, 2009), Biriş (2001, 2004), Biriş et al. (2002, 2005), Ash (2001), Doniţă (2001), Doniţă et Biriş (2001), Giurgiu (2001), Ioraş et Abrudan (2007), Jennings et al. (2003), Nicolescu (2000), Radu et al. (2004), Rameau (1995), Stăncioiu (2008), Stăncioiu et al. (2008, 2010), Veen et al. (2010).

2. WORKING METHOD AND RESEARCH STATUS

In order to define the concept of "high conservation value forests" first formulated by Forest Stewardship Council (FSC) linked to forest certification systems comprising 26 parameters developed by the Pan-European Forest Certification (PEFC) we consulted the "Ghidul practic pentru identificarea pădurilor cu valoare ridicată de conservare" (*Practical guide to identify high conservation value forest*) developed by Stanciu et al. (2004) where there are precisely defined the high conservation value categories and subcategories as follows:

HCV 1 Significant concentrations of biodiversity (of species) encompassing the following subcategories:

HCV 1.1 Significant concentrations of biological diversity in protected areas;

HCV 1.2 Concentrations containing rare, threatened, endangered, endangered species if their habitats are not protected;

HCV 1.3 Concentrations containing endemic species that are found only in certain areas which geographically define such territories;

HCV 3 Rare, threatened or endangered forest ecosystems, encompassing the following subcategories:

HCV 3.1 Rare forest ecosystems, threatened with extinction;

HCV 3.2 Natural forest ecosystems which are now rare and threatened with extinction even if they were once extensive;

HCV 3.3 Forest ecosystems even degraded but where there are rare, threatened, endangered species;

HCV 4 Critical environmental situations related services (i.e. hydrological, erosion control, climate) encompassing the following subcategories:

4.1 Sources of drinking water, water catchments, river basins that provide water supply;

4.2 Territories exposed to erosion;

4.3 Territories with ecosystems endangered by fire.

Forests containing the above mentioned four high conservation values categories and their related subgroups are considered “high conservation value forests” (HCVF) and they were assigned the appropriate indicators contained namely HCVF 1 (HCVF 1.1 respectively, HCVF 1.2 HCVF 1.3), HCVF 3 (HCVF 3.1 HCVF 3.2 HCVF 3.3), HCVF 4 (HCVF 4.1 respectively, HCVF 4.2 HCVF 4.3). Once the high conservation values of the region studied were set, we made the next step namely the identification and delineation of forest containing high conservation values by extracting the forest compartments and the forests encompassing such values (HCVF) from the forest management units.

For a correct identification and delineation high conservation value of forests (HCVF) field descriptions were made on their phytocoenosis and zoocenozis.

The research was conducted in Remeți Forests District, Mu II Moliviș, forest compartments 1B, 39C, 62B, 73A, 84A, 130c, 187a, 187D, 187E.

3. RESEARCH FINDINGS

Following our preliminary assessments and research in the field we designated High Conservation Value Forests (HCVF) that are included in or contain rare, threatened, endangered ecosysistem (HCV1) forest ecosystems complexes, groves of trees on rocky and/ or scree areas (HCV3) and

ecosystems that provide basic ecosystem services of nature in critical situations (HCV4) as follows:

1. HCV 1.2, 1.3 Forests that are habitats for endemic, relict, rare, vulnerable and endangered species (spruce stands) within the compartments 1B, 39C, 62B, 73A, 84A, 130C, 158, 187a, 187D, 187E, (see Tabel 1 below).

2. HCV 3 (B_4) Upper altitudinal limit forest ecosystems, spruce crop ecosystems with *Soldanella*, some of which virgin nature (1136) in the compartments 1B, 2B, 5B, 8B.

3. HCV 3 (A_1) Humid forest ecosystems, spruce crop ecosystems with *Leucanthemum waldsteinii* (1227) in the compartments 39C, 62B, 187a.

4. HCV 3 (A_3) Forest ecosystems complexes, groves of spruce and beech on siliceous rocks or scree, some of virgin nature in the compartments 39C, 73A, 84a, 130C, 187D, 187E.

Table 1 below presents data on high conservation value forests in Remeți Forests District, Management unit (Mu) II Moliviș.

The table shows that for the protected (smaller) area there were proposed as HCVF 3 both ancient forests (1.5j) and forests dedicated to the protection of rare species (1.5i).

In the conservation (larger) area there were put forward HCVFs 3 with seeds reserve function (1.5h) and forests situated on the direct slopes of the Drăganul storage lake (1.1b).

Description of phytocoenoses in the compartments containing high conservation value forests

Remeți Forest District (F.D.), Management unit II Moliviș

Descriptions in situations representative for HCVF3A2 HCVF 1.2 (HCVF 4.2).

Forest ecosystems complexes: Spruce stands with *Luzula sylvatica* forests and glades on siliceous rocks.

Ecosystem type: 1237 Spruce stands with *Luzula sylvatica*

Forest type: 1141 Spruce stands with *Luzula sylvatica*

Forrest site type: 2311 Mountain spruce stands Pi with raw humus spodosols ± lithic soils, under – medium and small edaphic type with *Vaccinium*

R 4208 Habitat South-eastern Carpathian Forest (*Picea abies*) and European fir (*Abies alba*) with

Luzula sylvatica.

Plant Association: *Hieracio rotundati – Piceetum* Pawl et Br.Bl. 1939.

Table 1

Compartments proposed to be established as high preservation value forests (HCVF) from Remeţi forest district. Management unit (Mu) II Moviliş (surface Mu II Moviliş = 4,247 ha)

Management unit (Mu)	Compartment	Surface Ha	Ecosystem type	Belonging to one of the categories of forests with high conservation value – HCVF (by indicating the area - ha -, and functional zoning)				
				HCVF 1-1	HCVF 1-2,1-3	HCVF 3	HCVF 4-1	HCVF 4-2
HCVF 5% protected area (Mu II Moliviş)								
II	1B	11.0	1237		11.0	11.0(1-5j.5i)		11.0
II	1D	7.2	1136			7.2(1-5j.2a)		7.2
II	1F	1.6	1136			1.6(1-5j)		
II	2B	2.8	1136			2.8 (1-3f)		
II	39C	1.6	2318		1.6	1.6(1-2a.1c)		1.6
II	62B	5.1	2318		5.1	5.1(1-1b)	5.1	
II	67D	2.8	2434			2.8(1-5j)		
II	72A	16.0	2336			16.0(1-5j)		
II	73A	4.3	2318		4.3	4.3(1-1b.5i)	4.3	4.3
II	84A	14.4	2316		14.4	14.4(1-1b.5i)	14.4	
II	84B	3.3	2316			3.3	3.3(1-1b)	3.3
II	130C	7.6	2316		7.6 (1-5i)	7.6		7.6
II	131D	8.0	2316			8.0 (1-5h)		
II	158	49.4	1237		49.4	49.4(1-5h)		
II	159	30.7	1237			30.7(1-5h)		
II	180A	8.8	1237			8.8(1-5j)		
II	184B	1.7	2316			1.7		1.7 (1-2a)
II	187A	5.7	2318		5.7	5.7(1-5i.1c)		5.7
II	187D	9.9	2344		9.9	9.9(1-5i.2a)		9.9
II	187E	9.9	2316		9.9 (1-5i)	9.9		9.9
Total = 201.8 ha								

Table 1- continuation

Management unit (Mu)	Compartment	Surface Ha	Ecosystem type	Belonging to one of the categories of forests with high conservation value – HCVF (by indicating the area - ha -, and functional zoning)				
				HCVF 1-1	HCVF 1-2,1-3	HCVF 3	HCVF 4-1	HCVF 4-2
HCVF 5% preservation (conservation) area (Mu II Moliviş)								
II	5B	3.5	1237					3.5(1-2a)
II	8B	9.8	1237			9.8		9.8(1-2a)
II	14A	27.0	2344			27.0(1-5h)		
II	14B	3.3	1237			3.3 (1-2i)		
II	49A	8.9	2344			8.9(1-5h)		
II	49B	20.8	2344			20.8(1-5h)		
II	54B	25.2	2344			25.2(1-5h)		
II	57B	17.1	2344			17.1	17.1(1-1b)	
II	58A	11.6	2344			11.6	11.6(1-1b)	
II	58B	6.7	2344				6.7(1-1b)	
II	61A	16.4	2344				16.4(1-1b)	
II	81C	14.4	2316					14.4(1-2a)
II	81E	1.7	2316			1.7	1.7(1-1b)	
II	82B	4.2	2316				4.2(1-1b)	
II	84C	2.5	2316				2.5(1-1b)	
II	89C	4.3	2316				4.3(1-1b)	4.3
II	106	4.3	2316			4.3	4.3(1-1b)	4.3
II	107	7.7	2316			7.7	7.7(1-1b. 2d)	7.7
II	108A	13.8	2316			13.8	13.8(1-1b)	
II	108B	4.8	2316			4.8	4.8(1-1b)	
II	109B	1.7	2316			1.7	1.7(1-1b)	
II	131A	2.4	2316			2.4(1-5h)		
II	132E	1.0	2216			1.0		1.0(1-2a)
II	188A	1.0	2316			1.0	1.0(1-1b. 2d)	1.0
Total = 214.1 ha								

Forest District Remeți, Management unit (Mu) II Moliviș, compartment 1B

HCVF3 (HCVF1.2, HCVF 1.3, HCVF 4.1, HCVF 4.2), (B_4/A_3). Forests with upper altitudinal limits of forest ecosystems: spruce stands with *Soldanella*; ecosystems complexes of spruce forests and glades of spruce on siliceous rocks.

The forests studied are summarized in the functional cathegories 1-2a, 1-2c, 1-3f, 1-5j, 1-5i, forest vegetation with critical environmental, climate, erosion-control, hydrological services for the protection of rare species of fauna, compartment 1B, surface of 11.0 ha, aged 120, relatively uneven-aged spruce stands. Location: Slope with virgin spruce forest below Bohodei peak (1,654m). Forrest site altitude: 1420 - 1550 m, Eastern slope heavily inclined (25°) with rocks, scree, hard rock surface at a rate of 40%.

Very high conservation value, old aged forests and diverse layers with rare species of plants and animals.

Phytocoenosis description indicating endemic, relict, rare and endangered species.

Tree layer, covering 60%.

Picea abies 3-4, h=22m, h=18m, d=36cm, d=26cm, Sorbus aucuparia +

Shrub layer, covering 1%

Salix silesiaca +, Sambucus racemosa +, Daphne mezereum +

Herbaceous layer, covering 40%.

Vaccinium myrtillus 1-2, Oxalis acetosella +-1, Campanula abietina +, Hieracium maculatum +, Luzula sylvatica 2-3, Luzula luzuloides +, Calamagrostis villosa 1-2, Deschampsia flexuosa +, Poa nemoralis +, Melampyrum sylvaticum +, Euphorbia carniolica +, Leucanthemum waldsteinii + (end.carp.), Aconitum degenii (A.paniculatum) + (end.carp.), Hypericum maculatum +, Streptopus amplexifolius + (rare), Senecio germanicus +, Gentiana asclepiadea +, Polygonatum verticillatum +, Homogyne alpina +, Soldanella montana +(rare) , Hieracium transsilvanicum +, Lycopodium annotinum +, Huperzia selago +, Blechnum spicant + (third relict), Prenanthes purpurea +, Carex sylvatica +, Rubus hirtus +, Phegopteris connectilis +, Polystichum aculeatum +

Moss layer, covering 100%

Polytrichum juniperinum 3-4, Hylocomium splendens 2-3, Polytrichum commune +, Dicranum scoparium +, Sphagnum gingersohnii +-1.

Among the fauna of this forest one noticed the presence of some rare, threatened, endangered species: *Zootoca vivipara* (Common lizard), *Vipera berus* (Common European adder), *Falco peregrinus* (Peregrine falcon), *Circaetus gallicus* (Snake short-toed eagle), Glaucidium passerinum (Eurasian pygmy owl), *Aegolius funereus* (Boreal owl), *Dryocopus martius* (Black woodpecker), *Picoides trydactylus* (Black-backed Woodpecker), *Bonasa bonasia* (Hazel Grouse), *Lynx lynx* (Eurasioan lynx).

Remeți Forest District (F.D.), Management unit II Moliviș
Descriptions in situations representative for specific regional of Silver fir - spruce - beech stands with mull flora.
Ecosystem type: 2316 Silver fir - spruce - beech with *Oxalis - Dentaria - Asperula* (lower production)
Forest type: mixture of fir, spruce and beech on crystalline rocks (i)
Forrest site type: 3321 Mountain districambosols Pi ± lytic mixtures (including prespodic soils) and eutricambosoils ± lithic soils, small edaphic type *Asperula - Dentaria* ± acidophilous.
Habitat: 4101 Southeast Carpathian spruce Forests (*Picea abies*), beech (*Fagus sylvatica*) and fir (*Abies alba*) with *Pulmonaria rubra*.
Plant Association: *Pulmonario rubrae - Fagetum* (Soó 1964) Tauber 1987.

Forest District Remeți, Management unit (Mu) II Moliviș, compartment 84A

HCVF 3 (HCVF 1.2, HCVF 1.3, HCVF 4.1, HCVF 4.2), (A_3). Ecosystems complexes of spruce forests and glades of spruce, fir, and beech on siliceous rocks.

The forests studied are classified in the functional cathegory 1-1b, 1-5i forest vegetation with critical environmental, climate, erosion-control, hydrological services for the protection of rare species of fauna, compartment 84A, area 14.4 ha, aged 120, relatively uneven-aged spruce, fir and beech stands. Location: Drăganului Valley, direct slope of the storage lake. Forrest site: altitude 920 - 1120 m, north-eastern slope heavily inclined (26°), lithic under layer, surface deposits from marl flysch sandstone, limestone polygenic conglomerates, debris mixed with crystalline rocks and limestone.

Very high conservation value, old aged forests on direct slopes of the storag lake containing rare species of plants and animals.

Phytocoenosis description indicating endemic, relict, rare and endangered species.

Tree layer, covering 70%.

Abies alba 3-4, h=31m, h=26m, d=56cm, d=35cm, Picea abies 2, h=31m, h=24m, d=52cm, d=28cm, Fagus sylvatica 1, h=28m, h=22m, d=56 cm, d=28cm

Shrub layer, covering 0.8%

Sambucus racemosa+, Salix capraea +, Daphne mezereum +, Rubus idaeus +Herbaceous layer, covering 40%

Pulmonaria rubra + (end. carp.), Galium odoratum +-1, Oxalis acetosella 1-2, Dentaria glandulosa + (end.carp.), Symphytum cordatum + (end.carp.), Lamium galeobdolon +, Anemone nemorosa +, Anemone ranunculoides +, Mercurialis perennis +, Asarum europaeum +, Luzula sylvatica +-1, Luzula luzuloides +, Calamagrostis arundinacea +-1, Stellaria holostea +, Carex sylvatica +, Rubus hirtus 1-2, Gentiana asclepiadea +, Veronica montana +, Epilobium montanum +, Paris quadrifolia +, Lilium martagon + (forst relict), Sanicula europaea + (third relict), Festuca drymeja +, Galeopsis speciosa +,

Polygonatum verticillatum +, Aconitum callibotrion + (end.carp.), Moehringia trinervia +, Euphorbia carniolica +, Stachys sylvatica +, Solidago virgaurea +, Doronicum austriacum +, Veratrum album +, Gnaphalium sylvaticum +, Athyrium filix – femina +, Dryopteris dilatata + (rare), Cystopteris fragilis +, Lycopodium annotinum +, Huperzia selago +, Hieracium maculatum +, Pulmonaria molissima+(rare.)

Image 1: Common spruce stands – fir stands, common spruce stands – beech stands – fir stands situated on the direct slopes of the Drăganului Valley storage lake, functional category 1-2d, bordering on hydro-technical constructions, HCVF 4.1, HCVF 3.

Moss layer, covering 5%

Polytrichum juniperinum +-1, Polytrichum commune +, Dicranum scoparium +, Sphagnum acutifolium +-1

Among the fauna of this forest one noticed the presence of: *Triturus cristatus* (Warty newt), *Bufo bufo* (European toad), *Rana temporaria* (European common frog), *Zootoca vivipara* (Common lizard), *Zamenis longissimus* (Aesculapian snake), *Circaetus gallicus* (Snake short-toed eagle), *Picus canus* (The grey-headed woodpecker), *Drycopus martius* (The black woodpecker), *Ficedula parva* (The red-breasted flycatcher), *Plecotus auritus* (The brown long-eared bat), *Martes martes* (The European pine marten).

Forest District Remeți, Management unit (Mu) II Moliviș, compartment 130C.

HCVF 1.2 (HCVF 3, HCVF 1.3, HCVF 4.1, HCVF 4.2)(A_3). Forest ecosystems complexes of spruce forests and glades of spruce, fir on siliceous rocks. Similar ecosystems were found in compartments 132e and 188A.

The forests studied are classified in the functional cathegory 1-2a, 1-5i forest vegetation with critical environmental, climate, erosion-control, hydrological services compartment 130C area 7.6 ha, aged 120, relatively uneven-aged spruce and fir stands. Location: Sebisel Valley which collect its waters from the mountains Dragan - Iadului Valley interfluve and which flows directly into the storage lake Drăganu. Forrest site: altitude 980 - 1100

m, northern slope heavily inclined (36°) with rock covered with vegetation, siliceous rocks and debris to the surface at a rate of 60%.

Very high conservation value, it contains rare species of animals.

Phytocoenosis description indicating endemic, relict, rare and endangered species.

Tree layer, covering 60%.

Picea abies 3-4, h=27m, h=22m, h=8m, d=44cm, d=30cm, d=12cm, Abies alba 1-2, h=26m, d=42cm, Fagus sylvatica +-1, h=26m, d=40cm

Shrub layer, covering 1%

Sambucus racemosa +, Ribes uva – crispa +, Daphne mezereum +Rubus idaeus+Herbaceous layer, covering 40%

Pulmonaria rubra + (end.carp.), Oxalis acetosella +-1, Dentaria glandulosa + (end.carp.), Galium odoratum 1, Symphytum cordatum + (end.carp.), Lamium galeobdolon +, Festuca drymeja +, Luzula luzuloides +, Galeopsis speciosa +, Gentiana asclepiadea +, Mycelis muralis +, Mercurialis perennis +, Asarum europaeum +, Polygonatum verticillatum +, Luzula sylvatica +, Calamagrostis arundinacea 1-2, Stellaria holostea +, Solidago virgaurea +, Doronicum austriacum +, Dryopteris filix-mas +, Athyrium filix – femina +, Dryopteris cristata + (glaciar relict), Cystopteris fragilis +, Huperzia selago +, Lycopodium annotinum +, Hieracium maculatum +, Pulmonaria molissima + rare, *Mochringia trinervia +*

Moss layer, covering 10%

Polytrichum juniperinum 1-2, Polytrichum commune +, Dicranum scoparium +

Among rare, endangered species of the fauna one we mention: *Podarcis muralis* (The common wall lizard), *Zootoca vivipara* (The viviparous or common lizard), *Zamenis longissimus* (The Aesculapian snake), *Falco peregrinus* (The peregrine falcon), *Circaetus gallicus* (The short-toed snake eagle), *Bubo bubo* (The Eurasian eagle-owl), *Dendrocopos leucotos* (The white-backed woodpecker), *Plecotus auritus* (The brown long-eared bat).

Remeți Forest District (F.D.), Management unit II Moliviș

Descriptions in situations representative for specific regional forests of spruce – beech - fir stands with *Calamagrostis – Luzula*.

Ecosystem type: 2344 S spruce – beech - fir stands with *Calamagrostis – Luzula*.

Forest type: 1342 mixture of fir, spruce and beech on crystalline rocks.

Forrest site type: 3120 Mountainous with Pi mixtures rocky and excessive erosion, litho soils in complexes with lithic soils (less rendzinas).

Habitat: R4102 Southeast Carpathian spruce forests (*Picea abies*), beech (*Fagus sylvatica*) and fir (*Abies alba* with *Hieracium rotrundatum*).

Plant Association: *Hieracio rotundatae – Fagetum* (Soó 1962) Täuber 1987.

Forest District Remeți, Management unit (Mu) II Moliviș, compartment 187D.

HCVF 3 (HCVF 1.3, HCVF 4.2)(A_3). Forest ecosystems complexes of spruce forests and glades of spruce and beech on siliceous rocks.

The forests studied are classified in the functional categories 1-2a, 1c, 5i forest vegetation with critical environmental, climate, erosion-control, hydrological services for the protection of some rare fauna species in the compartments 187D, area 9.9 ha, aged 130, relatively uneven-aged spruce, beech and fir stands. Location: Sebisel Valley the largest tributary water flow from the left side of Drăganului valley, its basin covering about 80km^2, with the main spring located under the Măgura Roșianului peak (1489 m). Forrest site: altitude 1080 - 1150 m, South slope heavily inclined (37-40°) on igneous and metamorphic rocks with rock covered with vegetation, to the surface at a rate of 30%.

Moderate conservation value, it contains rare species of animals.

Phytocoenosis description indicating endemic and relict species.

Tree layer, covering 70%.

Picea abies 4, h=28m, h=25m, d=44cm, d=32cm, Abies alba + young specimens scattered, Fagus sylvatica +-1, h=24m, h=15m, d=42cm, d=18cm Shrub layer, covering 0.8%

Sambucus racemosa +, Salix silesiaca +, Rubus idaeus +Herbaceous layer, covering 50%

Hieracium transsilvanicum +, Calamagrostis arundinacea 2-3, Luzula sylvatica +-1, Luzula luzuloides +, Deschampsia flexuosa +-1, Vaccinium myrtillus +-1, Oxalis acetosella 2-3, Homogyne alpina +, Lycopodium annotinum +, Huperzia selago +, Polypodium vulgare +, Phegopteris connectilis +, Gymnocarpium dryopteris +, Athyrium filix – femina +, Dryopteris filix – mas +, Dryopteris cristata + (glaciar relict), Cystopteris fragilis +, Carex brizoides +-1, Carex digitata +, Rubus hirtus +, Solidago virgaurea +, Hypericum maculatum +,Doronicum austriacum +, Gentiana asclepiadea +, Asarum europaeum +, Lamium galeobdolon +

Moss layer, covering 35 – 40%

Polytrichum juniperinum 2-3, Polytrichum commune +, Dicranum scoparium 1-2

Among the rare, endangered and vulnerable fauna species we mention: *Zootoca vivipara* (The viviparous or common lizard), *Circaetus gallicus* (The short-toed snake eagle), *Bubo bubo* (The Eurasian eagle-owl), *Dryocopus martius* (The Black woodpecker), *Picus canus* (The grey-headed woodpecker), *Ficedula parva* (The Red-breasted flycatcher), *Plecotus* auritus (The brown long-eared bat or common long-eared bat).

Remeți Forest District (F.D.), Management unit II Moliviș

Descriptions in situations representative for specific regional forests of spruce – beech - fir stands with *Leucanthemum waldsteinii.*

Ecosystem type: 2318 Spruce – beech - fir stands with *Myosotis.*

Forest type: 1313 Mixture of fir and beech on gley soils (s).

Forrest site type: 3621 Mountainous with Ps(m) imperfectly drained soils (proxy, epi, meso soils) hipostagnic or mezostagnic soils, medium and small edaphic types.
Habitat: R4103 South-eastern Carpathian spruce forests (*Picea abies*), beech (*Fagus sylvatica*) and fir (*Abies alba*) with *Leucanthemum waldsteinii*.
Plant Association: *Leucanthemo waldsteinii – Fagetum* (Soó 1964) Tauber 1987.

Forest District Remeți, Management unit (Mu) II Moliviș, compartment 39C

HCVF 3 (HCVF 1.2, HCVF 1.3, HCVF 4.2)(A_3). Forest ecosystems complexes of spruce forests and glades of spruce and beech on siliceous rocks.

The forests studied are classified in the functional categories 1-2a, 1c, forest vegetation with critical environmental, climate, erosion-control, hydrological services in the compartments 30C, area 1.6 ha, aged 110, relatively even-aged spruce, beech and fir stands. Location: Chenţu brook, Drăganului valley basin. Forrest site: altitude 1050 - 1150 m, North slope heavily inclined (30°) with rock covered with vegetation and rocks to the surface at a rate of 40%.

Very high conservation value, regional specific forest ecosystem with rare plant species.

Phytocoenosis description indicating endemic, rare and relict species.

Tree layer, covering 70%.

Fagus sylvatica 4, h=21m, d=36cm, Abies alba +, h=22m, d=40cm, Picea abies +, h=20m, d=38cm, Acer pseudoplatanus +

Shrub layer, covering 1%

Sambucus racemosa +, Lonicera nigra +, Sorbus aucuparia + some underdeveloped specimens, Rubus idaeus +

Herbaceous layer, covering 45%

Leucanthemum waldsteinii 2 (end.carp.), Myosotis sylvatica +, Aconitum vulparia (A. lasianthum) + (end.carp.), Athyrium filix-femina +, Phegopteris connectilis +, Carex brizoides +, Actaea spicata +, Symphytum cordatum 1-2 (end.carp.), Polygonatum verticillatum +, Petasites albus +, Doronicum austriacum +, Majanthemum bifolium +-1, Soldanella montana + (rare), Lycopodium annotinum +, Homogyne alpina +, Hieracium transsilvanicum +, Prenanthes purpurea +, Anemone nemorosa +, Stellaria nemorum +, Paris quadrifolia +, Glechoma hirsuta +, Veratrum album +, Pulmonaria officinalis +, Pulmonaria rubra + (end.carp.), Euphorbia amygdaloides +, Geranium robertianum +, Asarum europaeum +, Rubus hirtus +-1, Festuca drymeja 1, Galium odoratum 1-2, Dentaria bulbifera +, Carex sylvatica +, Euphorbia carniolica +, Mercurialis perennis +, Campanula abietina +, Vaccinium myrtilus +-1, Cystopteris fragilis +, Dryopteris dilatata + (rare), Luzula luzuloides +, Gentiana asclepiadea +.

Moss layer, covering 20%
Polytrichum juniperinum 1, Polytrichum commune +, Dicranum scoparium +, Sphagnum acutifolium+-1.

Table 1 shows - besides the compartments where descriptions were made - other specific regional forest ecosystem types i.e. 1136 (pre-under-alpine spruce stands with *Oxalis Soldanella*), 1237 (spruce stands with *Luzula sylvatica*), 2216 (spruce and fir stands with *Oxalis - Dentaria - Asperula*), 2316 (spruce, beech and fir stands with *Oxalis - Dentaria - Asperula*), 2318 (spruce, beech and fir stands with *Myosotis*), 2344 (spruce, beech and fir stands with *Calamagrostis - Luzula*), containing forest very old forests and dioversified structures in terms o of soil and water protection.

The topic submitted for research is very newsworthy and aims at highlighting the high conservation values (HCV), in our case by selecting 44 compartments containing such values and defined as high conservation value forests (HCVF) that must be reserved in forests certification process for conservation and biodiversity enhancement purposes.

In order to achieve our goal, an extensive technical and scientific documentation work was deployed in the forests investigated and which are located within the Forest District Remeți, Management unit (Mu) II Moliviș; such documentation work shows the ecosystem types where there are included the following data: the state of conservation at the time of research, and the high conservation values contained to be totally protected and are managed conservatively following certification process and in order to preserve their flora and fauna biodiversity.

By sampling a total of 20 phytocenologic items both in spruce forests and the mixed forests i.e. spruce, fir and beech stands as high conservation values carriers we succeeded to collect scientific data based on which there were established natural forest ecosystems containing high conservation values and which – through the natural ecological balance - can ensure the future preservation of such values.

Table drawn up contains compartments proposed to form high conservation value forests (HCVF) which were divided, during certification, as follows:

- 5% HCVF protected area encompassing 1.2, 1.3, HCVF, primeval forests (1.5j) and forests for the protection of rare species (1.5i);
- 5% HCVF conservation area encompassing HCVF 3 seed reserves, forests situated on the direct slopes of a storage lake (1.1b).

CONCLUSIONS

1. Through both the consultation of forest compartments and research conducted in the field there were selected the most representative forests of spruce, fir and beech with high conservation value in a 10% share totaling 416 ha of the total 4247 ha of Management unit (Mu) II Moliviș, of which 5% (201.8 ha) is a HCVF protected area designed to be totally protected, 5% (214.1 ha) belong to a HCVF conservation area where such forest management should be applied in order to provide special management measures
2. Following research conducted there were identified four rare ecosystems, threatened, endangered or containing both plant and animal species and concentration of critical species in terms of survival classified as follows:
- Forests that are habitats for endemic, relict, rare, vulnerable and endangered species i.e. HCV 1.2 HCV 1.3 in 10 compartments;
- Upper altitudinal limit forest ecosystems – spruce stands ecosystems with *Soldanella,* some of of virgin nature i.e. HCV 3 (B^4) in 4 compartments;
- Humid forest ecosystems, spruce stands ecosystems with *Leucanthemum waldsteinii* HCV 3 (A_1) in 3 units landscape planners;
- Complex of forest ecosystems, groves of spruce and beech on siliceous rocks or scree, some of which of virgin nature in 6 compartments.
3. The research method and scientific findings can be used both in forest certification process and by other forest districts managing spruce forests or mixed spruce, fir and beech forests.

REFERENCES

1. Abrudan, I.V., Stanciu, E., Ignea, G., Rogozea, L., 2006: Forest management and conservation in Retezat National Park, In: Transylvanian Review of Systematical and Ecological Research, Vol. 3 – Retezat Mountains Biodiversity, pp. 147-156, Sibiu.
2. Abrudan, I.V., Mihăilă, E., Costăchescu, D., Gurean, D., 2009: Forest vegetation management in Romania, In: Forest vegetation management in Europe: current practice and future requirements, Editors: Willoughby, I., Ballandier, Ph., Bentsen, N.S., McCarthy, N., Claridge, J., Cost Office, pp. 109-116, Brussels.
3. Biriş, I.A., 2001: Criterii de selecţie In: Pădurile virgine din România, Editura ASBL Forêt Wallone, Louvain la Neuve, Belgique, pp. 113-114.
4. Biriş, I.A., 2004: Contributions of the foresters to biodiversity conservation in Romania. In: Bioplatform – Romanian National Platform for Biodiversity, Editura Vergiliu, 130 p., Bucuresti.
5. Biris, I.A., and P.Veen (ed), 2005 : Virgin Forests In Romania: Inventory and Strategy for sustainable management and protection of virgin forests in Romania. Project report. Bucharest. 50p.
6. Biriş, I.A., Doniţă, N., Radu, S., Cenuşă, R., 2002: Ghid pentru selectarea şi evaluarea ecologică a pădurilor virgine din România, 55p, Bucureşti.

7. Cenuşă, R., 2001: Păduri virgine şi cvasivirgine din Munţii Călimani. In: Pădurile virgine din România. Editura ASBL Forêt Wallone, pp.177-182, Louvain la Neuve, Belgique.
8. Doniţă, N., 2001: Conceptul de „pădure virgină". In: Pădurile virgine din România, Editura ASBL Forêt Wallone, pp. 43-49, Louvain la Neuve, Belgique.
9. Doniţă, N., Biriş, I.A., 2001: Caracteristicile pădurilor virgine. In: Pădurile virgine din România, Editura ASBL Forêt Wallone, pp. 51-58, Louvain la Neuve, Belgique.
10. Giurgiu, V., 2001: Gospodărirea pădurilor virgine. In: Pădurile virgine din România, Editura ASBL Forêt Wallone, pp. 93-110, Louvain la Neuve, Belgique.
11. Ioraş, F., Abrudan, I.V., 2007: High Conservation Value Forest Identification and Management in Romania. In: Forest and sustainable development, Editura Universităţii Transilvania din Braşov, pp. 649-658.
12. Jennings, S., Nussbaum, R., Judd, N., Evans, T., 2003: The high conservation value forest toolkit, Edition I, ProForest, Oxford OX 12 HZ, UK, 3:1-62.
13. Nicolescu, N., 2000: Certificarea pădurilor din România, între FSC şi PEF, Revista pădurilor, 6: 41-45, Bucureşti.
14. Radu S., Bândiu, C., Coandă, C., Doniţă, N., Biriş, I.A., Teodorescu M.E., 2004: Conservarea pădurilor virgine, Edit. Geea, 51-57, Bucureşti.
15. Rameau, J.C., 1995: Gestion forestiere et conservation de la nature, quelle strategie patrimoniale pour les forest francaises, Annales de Genbloux, vol. 101, pp. 1-20.
16. Stanciu, E., Mihul, M., Dinicu, G., Iorgu, O., Abrudan, I. V., Biriş, I., Drăgoi, M., Dragoş, M., Doniţă, N., Filip, L., Ferko, J., Tamàs P., Comănescu - Paucă, M., Sandor, A., Tănăsie, L,., Tatole, V., 2004: Ghid practic pentru identificarea pădurilor cu valoare ridicată de conservare, (Cooperare între WWF şi IKEA pentru proiecte în domeniul forestier, un parteneriat pentru promovarea unei silviculturi responsabile), Bucureşti.
17. Stăncioiu, P.T., 2008: Silvicultura şi două concepte noi referitoare la conservarea biodiversităţii: „Păduri cu valoare ridicată de conservare" şi „Reţeaua Ecologică Natura 2000", 90 p.
18. Stăncioiu, P.T., Lazăr, G., Tuddoran, G.M., Bogdan, Ş., Predoiu, G., Şofletea, N., 2008, Habitate forestiere de interes comunitar în proiectul LIFE 05 NAT/RO/000176. „Habitate prioritare alpine, subalpine şi forestiere din România" – Măsuri de gospodărire. Editura Universităţii Transilvania din Braşov, 184 p.
19. Stăncioiu, P.T., Abrudan, I.V., Dutca, I., 2010: The Natura 2000 ecological network and forests in Romania: implication on management and administration. In: The International Forestry Review, vol 12, pp. 106-113.
20. Veen, P., Fanta, J., Raev, I., Biris, I.-A., de Smidt, J., Maes, B., 2010, Virgin forests in Romania and Bulgaria: results of two national inventory projects and their implications for protection. In Biodiversity and Conservation. vol 19, no. 6, pp. 1805-1819.