FORESTS THAT ARE LOCATED IN / OR CONTAINING RARE, THREATENED, ENDANGERED ECOSYSTEMS FROM VLĂDEASA MOUNTAINS-WESTERN CARPATHIANS

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Abstract.

This paper is a study of forests containing rare, threatened, endangered ecosystems from Vlădeasa Mountains - Western Carpathians. Investigated forests are managed by Remeţi Forestry, Forestry Department of Bihor County. According to forest planning, they are part of production (PU) and improvement units (IU) V PU Iadului Valley, IU 66A, PU IV Iadolina IU 95B, PU I Boceasa - Devil's Mill, IU 141A, IU 141B. Forests have been investigated by us were not covered with forest work, were not disturbed zooanthropically, belonging such by virgin forests, quasi virgin, that respectively containing rare ecosystems from categories of: spruce fir with Leucanthemum waldsteinii, glade of spruce (Picea abies), on rocks and debris, spruce-breed-fir forests (Picea abies, Abies alba, Fagus sylvatica) with Transylvanian lilac bushes (Syringa josikaea) with fescue beech forest (Fagus sylvatica, Festuca drymeia), with Transylvanian bat bushes. These ecosystems fall under high conservation value forests (HCVF) category belonging to the groups of: HCVF 1.2, HCVF 3.1, HCVF 3.3, HCVF 4.

Keywords: rare, endangered, ecosystems, Vlădeasa Mountains

INTRODUCTION

Vlădeasa Massive includes the northern part of Bihor Mountains and takes its name from its most important peak level of 1836 m, and is one of the largest units in the Apuseni Mountains, Crişul Repede from which gathers up its main affluents, Secuelul, Drăgan, Iad (it constitutes thus water castle of Crişul Repede) (Berindei, Pop, 1972)

Vlădeasa massive consists of crystalline schists, sedimentary permezozoic (conglomerate, sandstone, limestone) and eruptive mesozoic (predominantly riolitic, dacite) last dominating formation and giving lithologic character of the mountain. The dominance of rhyolite and eruptive dacites especially in upper cretaceous massif Vlădeasa taken as a whole is distinguished by Bihor Mountains, although geographically belonging to their northern mountain range (Coteţ, 1973)

Remeţi Forestry is part of Oradea Forestry Directorate within the Naţional Forest - Romsilva.

Forest neighborhoods of O.S. Remeţi are at North O.S. Aleşd, O.S. Huedin, at East O.S. Huedin, at South O.S. Beliş, O.S. Sudrigiu and West O.S. Beiuş, O.S. Aleşd.

In the O.S. Remeţi there were three production units: PU I Boceasa, PU IV Iadolina and PU V Iadului Valley, Surface production units range from 1517.2 ha (PU IV Iadolina, PU V Iadului Valley) and 4949.1 ha (PU I

Boceasa).

High Conservation Value Forest (HCVF) are rare, relict, endangered forest ecosystems composed from plants and animal populations ordained in food chains, within which material flow takes place, the two components are inextricably linked to their natural – ancestral habitat.

Researchers such as (Doniță., Chiriță,. Stănescu,, 1990), (Otto, 1998), (Puia, Soran, 1990), (Ramade, 1987), (Rameau, 1995), (Schulze, Mooney, 1993) provide data in their work on the structure, balance, dynamics of natural systems, and imbalances that may occur during exploration and cutting wood forest on large areas.

Through this paper we want to pull a warning to protecting natural forest ecosystems, with high conservation value forests (HCVF) from Vlădeasa Mountains containing rare, endangered, relict, endemic, monuments in their work noticed and from (Rațiu, Sălăgeanu, 1971), (Rațiu., Gergely, , Șuteu,., 1984), listed on the Red List, (Coteț, P., 1973), (Dihoru, G., Dihoru, A., 1994), (Oltean et al., 1994), (Sârbu., 2007).

MATERIALS AND METHODS

It was consulted the scientific literature by (Abrudan, I. 2001), (Doniță, N., et colab, 2005), (Doniță, Borlea, Turcu., 2006), (Enescu, 2002), (Nicolaescu, 2000), (Stanciu et al., 2004), (Steve, et al. 2003), Law 13/1993 - Habitats Directive, Bern 1979 for Romania's accession to the Convention on the conservation of wildlife and natural habitats adopted at Bern in Europe September 19, 1979; Law 5/2000 - Law on the approval of the national planning - Part III - protected areas; Law 426/2001 on the regime of protected areas, natural habitats, flora and fauna (Law 426/2001), Habitats Directive - Council Directive 92/43 EEC (Law 13/1993), on natural habitats and rare, relict, threatened or endangered ecosystems and General Declaration of the Third Ministerial Conference on the protection the Forests in Europe, Lisabona 1999 (General Declaration, Conference Forests in Europe).

I have consulted the forest planning Remeți Forestry (Institutul de Cercetări și Amenajări Silvice București), Bihor county, on which occasion we selected production units (PU) and improvement units (IU) whose forests may contain rare, relict, threatened or endangered ecosystems.

Field verification was made of these forests performing phytocoenological lifting in phytocoenosis located in rare, threatened, endangered ecosystems.

For this paper were chosen four cases of forest containing rare, relict, threatened or endangered ecosystems.

RESULTS

Scientific data on the structure, floristic composition and status of ecosystems

Next I will present the ecosystems which contain HCVF sites for Remeți Forestry established under Practical Guide to identify high conservation value of forests.

Natural ecosystems which contain forests with high conservation value are most representative river basin has been identified in Iadului Valley, Drăgan Valley, Remeți Forestry.

We chose to study Forestry Remeți for HCVF sites because it is located on a mountainous terrain with steep valleys and streams in the basin which meet old forest, virgin forest, endangered and rare ecosystems, which survive in extreme conditions, natural forest ecosystems host a representative number of plants are included on red listed as rare, vulnerable, relict, endemism, natural monuments.

Description of some natural ecosystems situations identified in the studied zone

Next I will present some descriptions of natural forest ecosystems containing high conservation value, forests which survive in extreme conditions of life, forests that hosting rare species, old virgin forests.

O.S. Remeți PU V Iadului Valley

IU 66A Iadolina Waterfall **HCVF 1.1, HCVF 1.2, HCVF 1.3, HCVF 3**

Exposition E, slope 45°, altitude 750-950m, area 8,7 ha, age 120 years.

Rock, massive shale with steep rocky road PU stream and downstream road mobile debris.

Syringa josikaea bushes by 28 copies, located near the debris stands adjacent to the river.

Habitat: Southeastern Carpathian scrub with *Syringa josikaea* Doniță et al. 2005.

Vegetable Association: *Alno incanae - Syringetum josikaeae* (Borza, 1965; Rațiu et al., 1984).

Ecosystem type: Scrub of transylvanian bat *(Syringa josikaea)*. Rare ecosystem, endangered-dependent spruce-beech-fir trees, which develops the shelter.

Relives no1.

Trees, cover layer 60%

Picea abies 2 H=30m, d=40cm

Abies alba 2 H=30m, d=46cm

Fagus sylvatica 3 H=28m, d=58 cm

Acer pseudoplatanus + H=20m, d=60cm

Ulmus glabra + H=18m, d=30cm
Sorbus aucuparia + H=10m, d=12cm

Shrubs layer coveravage 5%
Syringa josikaea 1
Sambucus racemosa +
Salix capraea +
Spiraea chamaedrifolia +-1
Lonicera nigra +
Rosa pendulina +
Atragene alpina +

Herbaceous layer 50%
Rubus hirtus 3
Calamagrostis arundinacea +-1
Hieracium transsilvanicum + *(Endemic carpathian)*
Campanula persicifolia +
Digitalis grandiflora +
Poa nemoralis +
Luzula luzuloides +
Melica nutans +
Doronicum austriacum +
Leucanthemum waldsteinii + *(Endemic carpathian)*
Pulmonaria rubra + *(Endemic carpathian)*
Athyrium filix – femina +
Dryopteris filix – mas +
Dryopteris cristata + *(glacial relict)*
Plystichum lobatum +-1
Geranium robertianum +-1
Asarum europaeum +
Polypodium vulgare +
Asplenium trichomanes +
Campanula rotundifolia ssp. kladniana + *(rare)*
Aconitum vulparia ssp. lasianthum + *(Endemic carpathian)*
Galium schultesii +
Mercurialis perennis +
Solidago vitgaurea +
Galeopsis tetrahit +

Muscinal layer 5-10%
Dicranum scoparium 2-3

O.S. Remeți PU IV Iadolina

IU 95B Dealu Mare,**HCVF 1.1, HCVF 1.2**, **HCVF 3**

Exposition V, slope 40 °, altitude 840-1000 m, area 13,9 ha, shale rock, acid brown soil, Beech-Fir trees, stand, age 100 - 110 years.

Habitat: Scrub with southeastern Carpathian *Syringa josikaea* (Doniță et al., 2005).

Vegetable Association: *Alno incanae - Syringetum josikaeae* (Borza, 1965; Ratiu et al., 1984).

Type of ecosystem: Transylvanian lilac scrubs *(Syringa josikaea)*. Endangered and rare ecosystem, which grows to shelter of beech with *Festuca drymeia*.

Relives no 2.
Tree layer 80%
Fagus sylvatica 4 H=24 m, d=80-100 cm
Abies alba 1 H=26m, d=60-80cm
Carpinus betulus + H=15m, d=18-20 cm
Acer pseudoplatanus + H=19m, d=90-100cm
Ulmus glabra + H=16m, d=20cm

Shrubs layer 15-20%
Syringa josikaea +-1 H=2-3 m the number of 56 specimens
Corylus avellana +

Herbaceous layer 40-50%

Festuca drymeia 2-3
Galium odoratum 1
Rubus hirtus +
Asarum europaeum 1
Lunaria rediviva +
Senecio germanicus +
Sanicula europaea + *(tertiary relict)*
Doronicum columnae +
Mercurialis perennis +
Epilobium montanum +
Luzula luzuloides +
Polystichum aculeatum +
Athyrium filix – femina +
Dryopteris cristata + *(glacial relict)*
Dryopteris filix – mas +
Mycelis muralis +
Polygonatum odoratum +
Lilium martagon + *(forests relict)*
Silene dioica +
Salvia glutinosa +
Oxalis acetosella +
Lamium galeobdolon +
Gentiana asclepiadea +
Carex brizoides +-1
Hypericum montanum +
Filipendula ulmaria +-1

PU I Boceasa – Moara Dracului (Devil's Mill)
IU 141A, **HCVF 3, HCVF 4.2**,

Area: 20,7 ha, altitude of 1440m, where the left side downstream of the Devil's Mill Cascade.

Exposition north slope of 40-48 °, with clusters on acidic rock shale debris with semi-mobile and fixed slope.

Shallow skeletal soil permanently wet oligo-basic but drained coated muscle, consistency 0,6 Class IV-V production.

Habitat: Southeast Carpathian spruce forests *Picea abies* and fir *(Abies alba)* with *Luzula sylvatica*.

Vegetable Association: *Hieracio rotundati - Piceetum* Pawl. Et Br. -BL. 1939 *(Luzula sylvaticae - Piceetum* Wraber 1953).

Type of ecosystem: Spruce with *Luzula sylvatica*.

Relief: rocky versant strongly inclined to the surface and large clumps of semi-mobil and mobile debris.

Rock: shale silicon boundaries.

Trees:Spruce with *Luzula sylvatica* with an age of 140-160 years.

Secular virgin forests, rare forest ecosystem, endangered the life survives in extreme conditions on rocky slopes strongly inclined and more debris, to limit of the subalpine gap.

Releveé no3
Tree_cover_layer 60%
Picea abies 3-4 H=30 m, d=60 cm
Abies alba 1 H=25m, d=80cm
Fagus sylvatica + H=20m, d=80cm
Acer pseudoplatanus + H=18m, d=90cm
Sorbus aucuparia + H=8m, d=14cm

Schrubs layer covervage 5%
Sambucus racemosa +
Lonicera nigra +
Rosa pendulina +
Rubus idaeus +
Rubus hirtus +

Herbaceous layer 70%
Luzula sylvatica 3-4
Calamagrostis villosa 1-2
Athyrium filix – femina +
Dryopteris dilatata +
Polystichum aculeatum +-*1*
Polygonatum verticillatum +
Oxalis acetosella +-*1*
Gentiana asclepiadea +
Homogyne alpina +
Hieracium transsilvanicum + *(Endemic carpathian)*
Asplenium viride + *(rare)*
Valeriana tripteris +
Valeriana sambucifolia +
Stellaria nemorum +
Vaccinium myrtillus +
Deschampsia flexuosa +
Gymnocarpium dryopteris +
Lamium galeobdolon +
Prenanthes purpurea +
Dryopteris carthusiana +
Cicerbita alpina +
Ranunculus platanifolius + *(rare)*
Aconitum firmum ssp. firmum +*(Endemic carpathian)*
Saxifraga rotundifolia ssp. heucherifolia + *(rare)*
Senecio germanicus +
Senecio ovatus +

Muscinal layer 40-50%
Dicranum scoparium 1
Polytrichum juniperinum 2-3
Hylocomium splendens 1-2
Rhytidiadelphus triqueter +

PU I Boceasa – Moara Dracului (Devil's Mill)

IU 141B, **HCVF 3, HCFV 4.2,**

Area: 9,7 ha altitude of 1500 m, Devil's Mill Cascade place.

Exposition north, slope of 45-50°, acid shale rock, heavy rock with 90° tilt of 50-60m high, ranch and large blocks of fallen stone on the slope.

Habitat: Southeast Carpathian spruce *(Picea abies)* Forests with *Leucanthemum waldsteinii*.

Vegetable Association: *Leucanthemo waldsteinii - Piceetum* Krajna 1933.

Type of ecosystem: Spruce with *Leucanthemum waldsteinii*.

Relief: Versant strongly inclined to the rocky mass of 60-80 m high, 90° tilt with ranch and large blocks of stone fallen on the entire surface.

Rock: shale silicon boundaries.

Soil: skeletal, shallow, acidic, wet with moderate humus mull-moder.

Trees: spruce with *Leucanthemum waldsteiniii*, age 120-135 years. Secular virgin forests, rare forest ecosystem, endangered the life survives in extreme conditions on steep rocky slopes strongly inclined and detritus are concentrated a large number of rare species, endemism, relict, endangered *(Heracleum palmatum, Laserpitium krapfii* ssp. *alpinum*, *Adenostyles alliariae* ssp. *kerneri, Aconitum moldavicum)*. 0.5 Consistency production class V-VI.

Releveé no4
Tree_cover_layer 50%
Picea abies 3 H=18-25m d=30-38cm
Sorbus aucuparia + H=12, d=22cm

Shrubs layer coverage 5%
Salix silesiaca+-1
Salix caprea+
Lonicera nigra +-1
Spiraea chamaedrifolia+
Rosa pendulina +
Rubus idaeus +

Herbaceous layer 60%

Calamagrostis villosa 3
Luzula sylvatica 1-2
Deschampsia flexuosa +
Vaccinium myrtillus 1
Homogyne alpina +-1
Oxalis acetosella +-1
Huperzia selago +-1
Gentiana asclepiadea +-1
Dryopteris dilatata +
Dryopteris cristata + (glacial

relict)
Polystichum aculeatum +-1
Senecio germanicus +-1
Aconitum moldavicum + (Endemic carpathian)
Aconitum firmum ssp. firmum + (Endemic carpathian)
Ranunculus platanifolius + (rare)
Leucanthemum waldsteinii + (Endemic carpathian)
Myosotis sylvatica +
Solidago virgaurea +
Doronicum austriacum +
Doronicum columnae +
Adenostyles alliariae ssp. kerneri + (rare)
Laserpitium krapfii ssp. alpinum + (rare)
Heracleum palmatum + (Endemic carpathian)
Petasites albus +
Hypericum maculatum +
Veratrum album +

Muscinal layer 50%
Polytrichum juniperinum 3
Sphagnum girgensohnii 1-2
Mnium undulatum +-1
Dicranum scoparium +-1
Hylocomium splendens +-1
Rhytidiadelphus triqueter+

DISCUSSIONS

The forest is a complex and vital component of Earth's ecosystems and through a variety of ecological processes, wildlife habitats ensures stability, watershed protection, water and air quality protection, conservation funds a variety of genes for flora and fauna.

Where these values are considered to be of exceptional importance or critical, the forest can be defined as a "forest with high conservation values" (HCVF). The concept of high conservation value forests (HCVF) was developed by the Forest Stewardship Council (FSC).

According to the principles of FSC and criteria from February 2000 (Principles and Criteria Doc.) defined six types of high conservation value forests (HCVF) applicable in forest management.

HCVF 1. Forest areas containing globally, regionally or nationally signifiant concentrations of biodiversity values (e.g. endemism, endangerered species, refugia).

HCVF 2. Forest areas containing globally, regionally or nationaly significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

HCVF 3. Forest areas that are in or contain rare, threatened or

endangered ecosystems.

HCVF 4. Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control).

HCVF 5. Forest areas fundamental too meeting basic needs of local communities (e.g. subsistence, health).

HCVF 6. Forest areas critical to local communities traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Making comparison between the results obtained by other researchers (Stanciu, E. et colab., 2004), (Steve, J. et colab., 2003), the forests with high conservation value and those obtained by me in the investigated area (table 1) shows that 6 types from the total of 7 subtypes HCVF types, I have identified 3 types with 5 subtypes as follows:

HCVF 1 with HCVF 1.1, HCVF 1.2, HCVF 1.3; HCVF 3; HCVF 4 with HCVF 4.1, HCVF 4.2, HCVF 4.3.

Table 1.

Working checklist for identifying HCVFs within a forest

HCVF (or HCVF element)	Present or Absent	Vlădeasa mountains, Western Carpathians
HCVF 1 Globally, regionally or nationally significant concentrations of biodiversity values		
HCVF 1.1 Protected Areas	Present	IU 66A, IU 95B
HCVF 1.2 Threatened and endangered species	Present	IU 66A, IU 95B
HCVF 1.3 Endemic species	Present	IU 141B, IU 66A
HCVF 1.4 Critical temporal use	Absent	
HCVF 2 Globally, regionally or nationally significant large landscape level forests	Absent	
HCVF 3 Forest areas that are in or contain rare, threatened or endangered ecosystems	Present	IU 141A, IU 141B
HCVF 4 Forest areas that provide basic services of nature in critical situations	Present	
HCVF 4.1 Forests critical to water catchment	Absent	
HCVF 4.2 Forests critical to erosion control	Present	IU 141A, IU 141B
HCVF 4.3 Forests providing barriers to destructive fire	Absent	
HCVF 5 Forest areas fundamental to meeting basic needs of local communities	Absent	
HCVF 6 Forest areas critical to local communities traditional cultural identity	Absent	

As regard to high conservation value ecosystems investigated results:

- the forest IU 66A Iadolina Waterfall HCVF 3, HCVF 1.1, HCVF 1.3, include a total of 40 plant species including 3 Endemic carpathian species, a glacial relict species, a rare species (shows no 1);

- the forest IU 95B Dealul Mare HCVF3 space , HCVF 1.1, HCVF 1.2, HCVF 1.3, includes a total of 26 species of plants from which 2 relict species (releves no2);

- the forest IU 141A Moara Dracului HCVF 3, HCVF 4.2, include 20

species of whom 2 are rare species and one Endemic carpathian species (releves no3);

- the forest IU 141B Moara Dracului HCVF 3, HCVF 4.2, brings together 39 species among which 4 are Endemic carpathian species, 3 rare species, one glacial relict species (releves no4).

Comparisons of results obtained by myself and other authors (Stanciu, E. et colab., 2004), (Steve, J. et colab., 2003), the study of rare ecosystems, relict, threatened, endangered and high conservation value forests which they contain (Table 2).

Table 2

Rare, relict, threatened and endangered forest ecosystems

Ecoszstem tzpe	HCVF element	Present or Absent	Vlădeasa Mountains Western Carpathians
A_1. Complexes of forest ecosystems specific at regional level	HCVF3, HCVF 1.1, HCVF 1.2, HCVF 1.3.	Present	Iu66A, iu95B, iu 141B
A_2. Complexes of forest ecosystems glade of trees and peat swamp	----------	Absent	----------
A_3. Complexes of forest ecosystems, glade of trees and rocks or debris	HCVF3, HCVF 4.2	Present	IU 66A, IU 95B, IU 141A, IU 141B
A_4. Complexes of glade and bushes from subalpine floor	----------	Absent	----------
B_1. Rare forest ecosystems	HCVF 1.1, HCVF 1.2, HCVF 1.3, HCVF 3	Present	IU 66A, IU 95B
B_2. Relict forest ecosystems	----------	Absent	----------
B_3. Anthropogenically endangered forest ecosystems	----------	Absent	----------
B_4. Superior altitudinal limit of forest ecosystems	HCVF 4.2	Present	IU 141A, IU 141B
C_1. Frequent forest ecosystems with very high biodiversity	----------	Absent	----------

Making analysis of the results from table 2 shows that from the total of 9 types of ecosystems that are located in high conservation value forests (HCVF) I have identified 4 types of rare, endangered species as follows:

A_1, HCVF3, HCVF 1.1, HCVF 1.1, HCVF 1.2, HCVF 1.3, present in forest areas IU 66A, IU 95B, IU 141B, Vlădeasa Mountains, Western Carpathians.

A_3, HCVF3, HCVF 4.2, present in forest areas IU 66A, IU 95B, IU 141A, IU 141B, Vlădeasa Mountains, Western Carphatians.

B_1, HCVF 1.1, HCVF 1.2, HCVF 1.3, HCVF 3, present in forest areas IU 66A, IU 95B, Vlădeasa Mountains, Western Carpathians.

B_4, HCVF 4.2, present in forest areas of Vlădeasa Mountains, Western Carpathians.

Analyzing the research, results that Vlădeasa Mountains - Western Carpathians are found as high conservation value forests HCVF 1.1, HCVF 1.2, HCVF 1.3, HCVF 3, HCVF 4.2, which are located or contain rare,

threatened, endangered ecosystems.

According to Natural Habitats Directive in Europe, Practical Guide to identify high conservation value forests and Annex 4 of this, we investigated forests contain rare forest ecosystems category: Spruce trees with *Leucanthemum waldsteinii*, glades of spruce *(Picea abies)* on rocks and debris with spruce-beech-fir *(Picea abies, Fagus sylvatica, Abies alba)* with Transylvanian lilac bushes *(Syringa josikaea)* with fescue beech forest *(Fagus sylvatica, Festuca drymeia)*, with Transylvanian lilac bushes *(Syringa josikaea)*.

Virgin forest and the quasi virgin ecosystems have been identified in upper altitudinal limit categories: spruce trees with *Luzula sylvatica*, spruce trees with *Leucanthemum waldsteinii*.

In the high conservation value forests (HCVF) from Vlădeasa Mountains, Western Carpathians I have identified 4 types of rare, relict, endangered forest ecosystems specific complex at regional level HCVF A1: Spruce – fir - trees - beech with Transylvanian lilac bushes (*Syringa josikaea*).

Complexes of forest ecosystems of fir spruce and glade spruce on siliceous rocks HCVF A_3.

Rare forest ecosystems. Transylvanian lilac shrubs (*Syringa josikaea*), HCVF B_1.

Superior altitudinal limit of forest ecosystems: fir spruce with *Soldanella montana* HCVF B_4.

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