RARE, ENDANGERED, VULNERABLE, ENDEMIC, RELICT PLANTS AND ANIMALS ENCOMPASSING HIGH CONSERVATION VALUES FOR THE FORESTS OF VLĂDEASA MOUNTAINS - THE NORTHERN APUSENI MOUNTAINS

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Abstract

Research conducted in Vlădeasa Mountains aimed at determining the high conservation value (HCV), 70 species of plants and 38 species of animals being determined as rare, threatened, vulnerable, endangered, endemic, and relict.

Through research conducted we selected the most representative high conservation value forests (HCVF).

Key words: rare plants, animals, forests, high conservation value forests.

INTRODUCTION

The need for biodiversity conservation and protection of forests in Romania has gained practical applicability in their certification proceedings.

In the National guide for identification and management of High Conservation Value Forests (HCVF) there are defined high conservation value (HCV) differentiated by six (6) categories and several subcategories. Forests containing these six categories of high conservation value and subgroups thereof are considered "High Conservation Value Forests (HCVF)" and they were assigned the corresponding indicators to their intrinsic value, namely HCVF 1 (respective HCVF 1.1 - forests with a statute of scientific reserve, natural reserve, special conservation areas, natural monuments, wetlands, *Natura 2000* sites; HCVF 1.2 - forests which are habitats for critically endangered, endangered and threatened plants and animal species; HCVF 1.3 - forests which are habitats for endemic, relict plant and animal species; HCVF 1.4 - forests which provide shelter for species that are found in temporary critical concentration for their existence, such in the case of birds, mammals), HCVF 2, HCVF 3 (i.e. HCVF 3.1, forests included or containing rare, threatened by extinction forest ecosystems, HCVF 3.2 - forests included in once extensive natural ecosystems and which now have become rare, threatened, endangered ones, HCVF 3.3 - degraded forest ecosystems yet containing rare, threatened, endangered species); HCVF 4 (i.e. HCVF 4.1 - forests which are sources of

drinking water, water catchments, river basins providing water supply, HCVF 4.2 - Critical forests for erosion and erosion control, HCVF 4.3 - forest with critical impact on agricultural lands and air quality, endangered by fire).

MATERIAL AND METHODS

We conducted research in the Vlădeasa Mountains, which is a district of bihor Mountains, namely the forests districts: Remeţi management unit (corking circle) Boceasa (4,899 ha), compartments 9D, 17C, 40B, 64B, 65, 69B, 76B, 80B, 80C, 83C, 84E, 95B, 104C, 130e, 140A, 141A, 141B, 141C, 142A, 142B, 149B, II Moliviş management unit (4,247 ha), compartments 1b 1D, 1F, 2B, 39C, 62B, 67D, 72A, 73A, 84A, 84B, 130C, 131D, 158, 159, 180A, 184B, 187a, 187D, 187E, Remeţi III management unit (1,409 ha), compartments 86C, 87N1, 114A, 114D, 115, 107, 114B, 122A, 131, 138A, 139B, 240A, Iadolina IV management unit (3,120 ha), compartments 91, 92A, 93B, 95A, 95B, 96A, 97A, 98A, 100A, 101, 102A, 107A, 108A, 109, 110A, 111A, 112A, 113A, 115A, Valea Iadului V management unit (2,555 ha), compartments 43C, 66A, 66B, 67A, 68A, 70A, 74, 78B, 82A, 90B, 91A, 92B, 105, 106A, 106C, 107A, 108A, 109A, 112C, 113B, 114C, 126A, 128B, 130C, 139D.

In order to select high conservation values forests in terms of endangered, vulnerable, endemic, relict species of plants, animals and rare ecosystems, we carried out research in the field and we reviewed the dedicated literature: Borza (1939), Raţiu (1965, 1966, 1967, 1968), Ratiu, Gergely (1969, 1970, 1976), Raţiu, Sălăgeanu (1971), Raţiu et al. (1982, 1983, 1984), National Guidel, Annex 1B, Annex 2B and the results we had previously obtained, Burescu et al. (2004), Burescu (2011, 2012, 2013, 2014).

RESULTS AND DISCUSSION

Rare, endangered, vulnerable, endemic, relict plant species in Vlădeasa Mountains

Based on the research conducted, we identified as high conservation value forests Mountains Vlădeasa the following plant species:

1. *Aconitum firmum* Reichenb. (A. skerisorae Gayer) Carpathian endemic plant, HCV 1.3.
2. *Aconitum callibotrion* Reichenb., Carpathian endemic plant, HCV 1.3.
3. *Aconitum moldavicum* Hacq. (A *Hosteanum* Schur) Carpathian endemic plant, HCV 1.3.

4. *Toxicum Aconitum* Reichenb, Carpathian rare endemic plant, HCV 1.2.
5. *Aconitum vulparia* Reichenb. (*A. lasianthum* Reichenb.) Ciocârlan, Romanian Carpathian endemic plant, HCV 1.3.
6. *Adenostyles alliariae* (Gouan) A. Kerner var. Kerner (Simonkai) G. Beck, rare in the region, HCV 1.2.
7. *Andromeda polifolia* L., rare glacial relict, HCV 1.3.
8. *Angelica archangelica* L. vulnerable, HCV 1.2.
9. *Arnica montana*, natural monument, vulnerable HCV 1.2.
10. *Anthemis macrantha* Heuffel, endemic, rare HCV 1.3.
11. *Athyrium distentifolium* Tausch ex Opiz (*A.alpestre* (Hoppe) Milde), rare, HCV 1.2.
12. *Blechnum spicata* (L.) Roth, tertiary relic, rare HCV 1.3.
13. *Bruckenthalia spiculifolia* (Salisb.) Reichenb., rare in the region, HCV 1.2.
14. *Campanula rotundifolia* L. ssp 14. *Kladniana* (Schur) Tacik, subendemic, rare, HCV 1.2.
15. *Campanula serrata* (Kit.) Hendrich (*C. napuligera* Schur), Carpathian endemic, rare HCV1.2, HCV 1.3.
16. *Dentaria glandulosa* Waldst. et Kit., Carpathian endemic, HCV 1.3, HCV 3.
17. *Cardaminopsis halleri* (L.) Hayek ssp. *Ovirensis* (Wulfen) Hegi et E. Schmid f. *Dacian* Heuff., rare, HCV 1.2.
18. *Carex limosa* L., glacial relict, HCV 1.3.
19. *Carex pauciflora*, Lightf, glacial relict, HCV 1.3.
20. *Cephalanthera damasonium* (Miller) Druce, rare, not threatened, HCV 1.2.
21. *Cephalanthera rubra* (L.) L.C.M. Richard, rare, HCV 1.2.
22. *Coeloglossum viride* (L.) Hartman, rare, HCV 1.2.
23. *Comarum palustre* L, rare, HCV 1.2.
24. *Corallorhiza Trifid* Châtel., rare, HCV 1.2.
25. *Dactylorhyza cordigera* (Fries) Soó, rare, HCV 1.2.
26. *Dactylorhiza maculata* (L.) Soó, rare, HCV 1.2.
27. *Drosera rotundifolia* L., glacial relict, rare HCV 1.3.
28. *Dryopteris cristata* (L.) A. Gray, glacial relict, rare HCV 1.2.
29. *Dryopteris dilated* (Hoffm.) Gray, rare in the region, HCV 1.2.
30. *Edraianthus graminifolius* (L.) A. DC. ssp. *kitaibelii* (Waldst. et Kit) A.DC., Carpathian endemic, rare, HCV 1.3.
31. *Empetrum nigrum* L., glacial relict, rare, HCV 1.3.
32. *Epilobium alsinifolium* Vill., rare, HCV 1.2.
33. *Epilobium nutans* F.W. Schmidt, rare, HCV 1.2.

34. *Epipactis helleborine* (L.) Crantz, rare, HCV 1.2.
35. *Eriophorum gracile* Koch ex Roth, rare, HCV 1.2.
36. *Gentiana punctata* L., rare, HCV 1.2.
37. *Gymnadenia conopsea* (L.) R. Br. ssp. *densiflora* (Wahlb.) R.Richter, *rare*, HCV 1.2.
38. *Helictotrichon decorum* (Janka) Henrard, Romanian Carpathian endemic, HCV 1.3.
39. *Heracleum palmatum* Baumg., Carpathian endemic, HCV 1.3.
40. *Huperzia selago* (L.) Bernh. ex Schrank et C.F.P. Mart, rare, HCV 1-2.
41. *Leucanthemum waldsteinii* (Schultz Bip.) Pouazar, Carpathian endemic, rare, HCV 1.3.
42. *Leucojum vernum* L., rare, HCV 1.2, vulnerable.
43. *Lilium martagon* L., sylvatic relict, HCV 1.3.
44. *Lister cordata* (L.) R. Br., rare, HCV 1.2.
45. *Lycopodium inundatum* L., glacial relict, HCV 1.3.
46. *Menyanthes trifoliata* L., rare, HCV 1.2.
47. *Orchis laxiflora* Lam. ssp. *elegans* (Heuffel) Soó, rare, HCV 1.2.
48. *Oxycoccus palustris* Pers. (*Vaccinium oxycoccos* L.), rare, glacial relict, HCV 1.3.
49. *Pedicularis limnogena* A. Kerner, subendemic, vulnerable, rare, HCV 1.2.
50. *Phyteuma tetramerum* Schur, Romanian Carpathian endemic, rare, HCV 1.3.
51. *Platanthera bifolia* (L.) L.C.M. Richard, rare, HCV 1.2.
52. *Pleurospermum austriacum* (L.) Hoffm., rare, HCV 1.2.
53. *Potentilla chrysantha* Trev. Romanian Carpathian endemic, rare HCV 1.3.
54. *Pulmonaria rubra* 54. Schott, Carpathian endemic, HCV 1.3.
55. *Rhynchospora alba* (L.) Vahl., glacial relict, rare, HCV 1.3.
56. *Saxifraga rotundifolia* L. ssp. *Heucherifolia* (Griseb. Et Schenk) Ciocârlan, rare, HCV 1.2.
57. *Scheuchzeria palustris* L., glacial relict, vulnerable, rare, HCV 1.3.
58. *Sempervirum marmoreum* Griseb., rare, HCV 1.2.
59. *Senecio subalpinus* Koch, rare, HCV 1.2.
60. *Seselj libanotis* (L.) Koch, rare, HCV 1.2.
61. *Sesleria rigida* Heuffel subsp. *Haynaldiana* (Schur) Beldie, endemic, HCV 1.3.
62. *Silene nutans* L. subsp. Dubia (Herbich) Zapala., Carpathian endemic, rare, HCV 1.3.
63. *Soldanella hungarica* Simonkai subsp.. *Major* (Neilr.) S. Pawl., rare, HCV1.2.

64. *Soldanella montana* Willd., rare, HCV 1.2.
65. *Symphytum cordatum* Walsat. et Kit., Carpathian endemic, HCV 1.3.
66. *Syringa josikaea* Jacq., Tertiary relic, Romanian endemic, vulnerable, rare, HCV 1.1 HCV 1.3.
67. *Thymus comosus* Heuffel ex Griseb. Romanian Carpathian endemic, HCV 1.3.
68. *Thymus dacicus* Borbas (T. *pannonicus* All. x *T. pulegioides* L.), Romanian Carpathian endemic, rare, HCV 1.3.
69. *Trollius europaeus* L. ssp. *Transsilvanicus* (Schur) Domin, Romanian Carpathian endemic, vulnerable, HCV 1.3.
70. *Viola dacica*, borbas Romanian Carpathian endemic, rare HCV.

Endemic, relict, endangered, vulnerable and rare animal species in Vlădeasa Mountains

Amphibians

The selection of these species was based on Government Emergency Ordinance (GEO) no. 57/2006 (Annex. 4B), Council Directive 92/43 EEC on the conservation of natural habitats and wild fauna and flora, Ghid practic pentru identificarea pădurilor (*Practical guide for identification of forests*) Annex 1A, Annex 1C, Stanciu et al. (2004) and the research carried out by us.

1. *Salamandra salamander* (Linnaeus), 1758 - Salamander, HCV 1.2, vulnerable in Romania and in the territory studied, endangered in Europe.
2. *Ichtyosaura (Mesotriton) alpestris* (Laurentus, 1768) - The alpine newt, vulnerable in Romania, rare in the studied territory, jeopardized in Europe.
3. *Triturus cristatus* (Laurentus), 1768 - the Great crested newt, HCV 1.2, vulnerable in Romania.
4. *Triturus vulgaris* (Linnaeus), 1758 (Syn.: *Lissotriton vulgaris* (Linnaeus)) 1758, the Common newt, almost threatened in Romania, HCV 1.2.
5. *Bombina variegata* (Linnaeus), 1758 - the Yellow-bellied toad (the European fire-bellied toad) with yellow belly, almost threatened in Romania and endangered in Europe, HCV 1.2.
6. *Bufo bufo* (Linnaeus), in 1758 - the Common toad, almost threatened in Romania, well spread in the territory studied, and endangered in Europe, HCV 1.2.

7. *Pseudepidalea* (*Bufo*) *viridis* (Laurentus), 1768 - the Common European green toad, almost threatened in Romania, sporadic in territory studied, HCV 1.2.
8. *Hyla arborea* (Linnaeus), 1758 - the European tree frog, HCV 1.2 vulnerable in Romania, sporadic in territory studied, strictly protected in Europe, HCV 1.2.
9. *Rana dalmatina* (Bonaparte) in 1839 - the agile frog, 1.2 HCV, vulnerable in Romania, well spread in the territory studied, protected in Europe, HCV 1.2.
10. *Rana temporaria* (Linnaeus, 1758), the European common frog, still not threatened but with diminished number of samples in Romania, protected in Europe, HCV 1.2.
11. *Podarcis muralis* (Laurentus, 1768), the Common wall lizard, vulnerable in Romania, strictly protected in Europe, HCV 1.2.
12. *Zootoca vivipara* (Jacquin, 1787), The viviparous lizard or common lizard. Almost threatened in Romania, protected in Europe, glacial relict species, HCV 1.2.
13. *Anguis fragilis* (Linnaeus), 1758 - the Slow worm, Slow-worm or Slowworm HCV 1.2, vulnerable in Romania, endangered in Europe, HCV 1.2.
14. *Austrian Coronella* (Laurentus), 1768 - the Smooth snake, vulnerable in Romania, sporadic in the territory studied, strictly protected in Europe, HCV 1.2.
15. *Zamenis (Elaphe) longissimus* (Laurentus, 1768) - the Aesculapian snake, vulnerable in Romania, sporadic in the territory studies, strictly protected in Europe, HCV 1.2.
16. *Vipera berus (*Linnaeus 1758*)* - the common European adder, endangered in Romania, rare in the territory studied, HCV 1.2.

Birds

Rare, vulnerable or forest dependent birds species.

On the basis of selection of these birds there are the Law on protected areas, Berne and Bonn international conventions, Birds Directive and suggestions of international institutions (IUCN, BirdLife International), GEO no. 57/2007 (Annexes 4A and 4B), Practical guide on forest protection (Annex 1C). Stanciu E. et al. (2004) and the research conducted by us in the field.

17. *Chrysaetos eagle*, the Golden eagle, critically jeopardized, HCV 1.2. endangered in Romania. Sporadic presence in Vlădeasa Mountains.
18. *Falco peregrinus* - the Peregrine falcon, sedentary, winter visitor, vulnerable species, HCV 1.2.

19. *Circaetus gallicus* - the Short-toed snake eagle, summer visitor, vulnerable species, HCV 1.2.
20. *Pernis apivorus* - the European honey-buzzard, vulnerable, summer visitor, HCV 1.2.
21. *Bubo Bubo* - the Eurasian eagle-owl, HCV 1.2, sedentary, vulnerable species HCV 1.2.
22. *Glaucidium passerinum* - The Eurasian pygmy owl, sedentary, vulnerable species, HCV 1.2.
23. *Aegolius funereus* - the Boreal owl, sedentary, vulnerable species, HCV 1.2.
24. *Bonasa bonasia (Tetrastes bonasia)*- the Hazel Grouse, sedentary, vulnerable species, HCV 1.2.
25. *Tetrao urogallus* - The western capercaillie, sedentary, HCV 1.2.
26. *Picus canus* - the Grey-faced Woodpecker, sedentary, vulnerable, HCV 1.2, protected under the Berne Convention.
27. *Dryocopus martins* - the Black woodpecker, sedentary, vulnerable, HCV 1.2, protected under the Berne Convention.
28. *Dendrocopos leucotos* - the White-backed Woodpecker, sedentary, vulnerable, HCV 1.2, protected under the Berne Convention.
29. *Lanius excubitor* - the Eurasian Three-toed Woodpecker, sedentary, vulnerable, HCV 1.2, protected under the Berne Convention.
30. *Ficedula parva* - the Red-breasted Flycatcher, HCV 1.2, summer visitor, vulnerable, protected under the Berne Convention.

Mammals

Threatened, endangered and vulnerable species

The selection of these species was based on the Law no. 462/2001 on protected areas, Law no. 90/2000 on protection of bat in Europe, the Law no. 13/1993 on preservation of wildlife, Council Directive 92/43 EEC on the conservation of natural habitats and wild fauna and flora, GEO no. 57/2007 (Ammex 4B). Ghid practic pentru identificarea pădurilor (*Practical guide for identification of forests*) Annex 1A, Stanciu et al. (2004) and the research carried out by us in the field.

31. *Plecotus auritus* (Linnaeus, 1758) - the Brown long-eared bat, HCV 1.2, vulnerable in Romania, sporadic in the territory studied, endangered in Europe, HCV 1.2.
32. *Nyctalus leisleri* (Kuhl, 1818) - the Leisler's bat HCV 1.2, endangered in Romania, sporadic in the territory studied, endangered in Europe, HCV 1.2.

33. *Martes martes* (Linnaeus, 1758) - the European pine marten, vulnerable in Romania, well spread in the territory studied, and endangered in Europe, HCV 1.2.
34. *Lynx lynx* (Linnaeus, 1758) - the Eurasian lynx, HCV1.2, vulnerable in Romania, well spread in the territory studied, and endangered in Europe, HCV 1.3.
35. *Cervus elaphus* (Linnaeus, 1758) - the Red deer (Carpathian deer), vulnerable in Romania, well spread in the territory studied, HCV 1.2.
36. *Capreolus capreolus* (Linnaeus, 1758) - the European roe deer, vulnerable in Romania, sporadic in the territory studied, HCV 1.2.
37. *Ursus arctos* (Linnaeus, 1758) - the Brown bear, HCV 1.2, non-threatened in Romania, sporadic in the territory studied, endangered in Europe, HCV 1.2.
38. *Canis lupus* (Linnaeus, 1758) - the Grey wolf, vulnerable to some extent in Romania and jeopardized in Europe, HCV 1.2.

CONCLUSIONS

1. Following the research we conducted we set high conservation value (HCV) for the forests of Vlădeasa Mountains.
2. These values consist in 70 rare, threatened, endangered, endemic, relict plant species (HCV 1.2. and HCV 1.3.), 38 rare, threatened, endangered, endemic, relict animal species (HCV 1.2. and HCV 1.3.), 124 protected areas (HCV 1.1.).
3. As a result of the research we had conducted we selected the most representative high conservation value forests (HCVF), namely:
   - 1,143.8 ha in protected areas excluded from forestry interventions and 786.3 ha managed in particular to maintain or increase biodiversity in forest areas chosen for preservation.

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