

RARE, ENDANGERED, VULNERABLE, ENDEMIC PLANTS AND ANIMALS - RELICT NATURAL MONUMENTS ENCOMPASSING HIGH CONSERVATION VALUES FOR THE FORESTS OF PĂDUREA CRAIULUI MOUNTAINS, BIHOR COUNTY

Burescu Laviniu Ioan-Nuțu *

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048, Oradea, Romania, e-mail: laviniuburescu@gmail.com

Abstract

Research conducted in Pădurea Craiului Mountains aimed at determining the high conservation value (HCV), 31 species of plants and 45 species of animals being determined as rare, threatened, endangered, endemic, relict, and natural monuments.

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

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

INTRODUCTION

The impact of the past century, especially of the last few decades on forests through deforestation, drainage, dams, mining, etc., has led to quantitative and qualitative changes in the composition of flora and fauna.

Finding and demarcation of high conservation value forests (HCVF) is strictly correlated with (sub)categories of high conservation value (HCV) contained in: HCV1.1 (HCVF 1.1) - protected areas; HCV 1.2 (HCVF 1.2) HCV 1.3 (HCVF 1.3) - rare, threatened, endangered, and endemic plant and animal species; HCV 1.4 (HCVF 1.4) - Temporary concentrations of birds and mammals; HCV 2 (HCVF 2) - Landscapes with natural indigenous forest species populations; HCV 3 (HCVF 3) - Rare, threatened, endangered ecosystems; HCV 4 (HCVF 4) - Critical services of nature (hydrological, erosion control, climate); HCV 5 (HCVF 5) - Basic needs of Local Communities; HCV 6 (HCVF 6) - Cultural identity of Local Communities.

MATERIAL AND METHODS

The research was conducted in Bihor county, in the north - west of the Apuseni Mountains, Pădurea Craiului Mountains Forest District i.e. Dobrești Forest Unit - Management Unit IV Vida (2,460 ha), compartments (working circles) 26C, 79A, 82E, 83A, Management Unit VI Răcaș (2,357 ha), compartments 1A, 7A, 8A, 9B, 36A, 37N1; Beiuș Forest District – Management Unit II Roșia (2,719 ha), compartments 101A, 101C, Management Unit III Sohodol (2,990 ha), compartments 6A, 8A, 11A, 12A,

38, 40A, Management Unit IV Meziad (798 ha), compartments 35A, 36A, 37B, 43, 69E, 70B, 81A, 81B, 82B, 88B, 95B, 95C, 96B.

In order to highlight the high conservation values at the level of plants and animal species, and ecosystems, we reviewed the current literature and we conducted investigations in the field for the purposes of selecting high conservation value forests.

Regarding the flora of Pădurea Craiului Mountains, the names of rare, endangered, vulnerable, endemic, relict species were extracted mainly from “Flora României” (*Romanian Flora*), volume XIII and from other works i.e. Ciocârlan (2009), Oltean et al. (1994), Dihoru et al. (1994), Boşcaiu et al. (1994), Danciu et al. (2007), Groza (2008).

We carried out our research using the index of vulnerable plant species in the National guide for identification and management of High Conservation Value Forests (HCVF) and based on the field research we had conducted, Burescu, Doniță (2001), Burescu et al. (2002, 2003), Burescu (2009, 2010, 2013, 2014).

We were not able to make a full inventory of the fauna through research on the field; therefore we studied the literature of zoologists Covaciu Marcov et al. (2002, 2003, 2006, 2009) Gal - Korodi (1974), Groza et al. (2008), Kovits (1973), Munteanu (1982), Sas et al. (2006), Sas (2010).

RESULTS AND DISCUSSION

Rare, endangered, vulnerable, endemic, relict plant species - natural monuments of Pădurea Craiului Mountains

Based on research conducted we have identified as endangered, vulnerable, rare, endemic, the following species:

1. *Ceterach officinarum* DC ssp. *bivalens* D. E. Meyer, rare, HCV 1.2.
2. *Pulsatilla montana* (Hoppe) Rchb. ssp. *Dacian* Rummel.: rare, HCV 1.2.
3. *Quercus pubescens* Wild, rare in the region, HCV 1.2.
4. *Quercus virgiliana* (Ten.) Ten., rare in the region.
5. *Silene nutans* L. subsp. *Dubia* (Herbich) Zapal: rare and subendemic plant, HCV1.2.
6. *Sedum L. caepaea*: rare, HCV 1.2.
7. *Spiraea crenata* L.: rare, HCV 1.2.
8. *Seseli elatum* L. ssp. *Osseum* (Cr.) P. W. Ball: rare, HCV 1.2.
9. *Alyssum montanum* L. ssp. *Montanum*: rare, HCV 1.2.
10. *Rorippa islandica* (Oed.) Borb.: rare, HCV 1.2.
11. *Salix aurita* L.: rare, HCV 1.2.
12. *Thymus comosus* Heuff.: endemic plant, HCV 1.3.
13. *Teucrium montanum* Heuff.: rare, HCV 1.2.

14. *Campanula rotundifolia* L. ssp. 14. *Polymorpha* Witasek: Carpathian endemic plant, rare, HCV 1.3.
15. *Edraianthus graminifolius* (L.) A.D.C.: endemic in Romania, HCV 1.3.
16. *Phyteuma tetramerum* Schur: Carpathian endemic plant, rare, HCV 1.3.
17. *Erythronium dens - canis* L. ssp. *Niveum* (Baumg.) Buia et Păun: rare, HCV 1.2.
18. *Fritillaria orientalis* Adams (*F. montana* Hoppe), vulnerable, HCV 1.2.
19. *Iris aphylla* L.: rare, HCV 1.2.
20. *Iris sibirica* L., rare, HCV 1.2.
21. *Anacamptis pyramidalis* (L.) R.C. Rich: vulnerable and rare, HCV 1.2.
22. *Cephalanthera damasonium* (Mill.) Druce: rare, HCV 1.2.
23. *Cephalanthera longifolia* (Huds.) Fritsch: rare HCV 1.2.
24. *Cephalanthera rubra* (L.) R.C.: rare, HCV 1.2.
25. *Epipactis helleborine* (L.) Crantz: rare, HCV 1.2.
26. *Gymnadenia conopsea* (L.) R. Br.: rare, HCV 1.2.
27. *Listeria ovata* (L.) R. Br.: rare, HCV 1.2.
28. *Neottia nidus - avis* (L.) L.C. Rich.: rare, HCV 1.2.
29. *Platanthera bifolia* (L.) L.C. Rich.: rare, HCV 1.2.
30. *Cleistogenes serotonin* (L.) Keng: rare in the region, HCV 1.2.
31. *Sesleria heuffleriana* Schur: Carpathian endemic plant, HCV 1.3.

Endemic, relict, endangered, vulnerable and rare animal species in Pădurea Craiului 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 (*Guidelines for identifying 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, endangered in Europe.
2. *Triturus alpestris* (Laurentus), 1768 (Syn.: *Ichthyosaura* (*Mesotriton*) *alpestris* (Laurentus)), 1768 – the Alpine newt, HCV 1.2, vulnerable in Romania and jeopardized in Europe.
3. *Triturus cristatus* (Laurentus), 1768 – the Great crested newt, HCV 1.2, vulnerable in Romania and jeopardized in Europe.

4. *Triturus vulgaris* (Linnaeus), 1758 (Syn.: *Lissotriton vulgaris* (Linnaeus)) 1758, the Common newt, HCV 1.2.
5. *Bombina variegata* (Linnaeus), 1758 – the Yellow-bellied toad (the European fire-bellied toad) with yellow belly, HCV 1.2, almost strictly threatened and endangered Romania in Europe.
6. *Bufo bufo* (Linnaeus), in 1758 - the Common toad, HCV 1.2, almost threatened in Romania and endangered in Europe.
7. *Pseudepidalea (Bufo) viridis* (Laurentus), 1768 - the Common European green toad, HCV 1.2.
8. *Hyla arborea* (Linnaeus), 1758 - the European tree frog, HCV 1.2 vulnerable in Romania, strictly protected in Europe.
9. *Rana dalmatina* (Bonaparte) in 1839 – the Agile frog, 1.2 HCV, vulnerable in Romania, strictly protected in Europe.

Reptiles

10. *Podarcis muralis* (Laurentus, 1768) - the Common wall lizard, 1.2 HCV vulnerable in Romania.
11. *Lacerta viridis* (Laurentus 1768) - the European green lizard, HCV 1.2, almost threatened in Romania, strictly protected in Europe.
12. *Anguis fragilis* (Linnaeus), 1758 – the Slow worm, Slow-worm or Slowworm HCV 1.2, vulnerable in Romania, endangered in Europe.
13. *Austrian Coronella* (Laurentus), 1768 – the Smooth snake, HCV 1.2, vulnerable in Romania, strictly protected in Europe.
14. *Elaphe longissima (Zamensis longissimus)* (Laurentus, 1768) – the Aesculapian snake, HCV 1.2, vulnerable in Romania, strictly protected in Europe.
15. *Natrix tessellata* (Laurenti) 1768 - the dice snake, HCV 1.2.

Birds

Rare, vulnerable bird species or dependent on the type of forest, declared as such under the Law on protected areas, Berne and Bonn international conventions, Birds Directive and suggestions of international institutions (IUCN, BirdLife International), GEO no. 57/2007 (Annex 4A 4B), Guide on forest protection (Annex 1C).

16. *Chrysaetos eagle*, the Golden eagle, HCV 1.2, critically endangered.
17. *Falco peregrinus* - the Peregrine falcon, HCV 1.2, vulnerable.
18. *Milvus milvus* - the Red Kite, HCV 1.2, bird species of passage, critically endangered.

19. *Aquila pomarina* - the Lesser Spotted Eagle, HCV 1.2, summer visitor, vulnerable.
20. *Bubo Bubo* - the Eurasian eagle-owl, HCV 1.2, sedentary, vulnerable species.
21. *Buteo buteo* - the Common buzzard, HCV 1.2, vulnerable.
22. *Ciconia nigra* – the Black Stork, HCV 1.2, vulnerable, rare species, summer visitor.
23. *Streptopelia turtur* – the Turtle Dove, HCV 1.2, vulnerable, summer visitor.
24. *Pernis apivorus* – the European honey-buzzard, HCV 1.2, vulnerable. Summer visitor.
25. *Upupa epops* – the Hoopoe, HCV 1.2, vulnerable.
26. *Corvus corax* – the Common raven, HCV 1.2, sedentary, threatened species.
27. *Lullula arborea* – the Woodlark, HCV 1.2, summer visitor, species protected under the Berne Convention.
28. *Phoenicurus ochruros* - the Black redstart, HCV 1.2, summer visitor.
29. *Picus viridis* – the European Green Woodpecker, HCV 1.2, sedentary, protected under the Berne Convention.
30. *Picus canus* – the Grey-faced Woodpecker, HCV 1.2, sedentary, protected under the Berne Convention.
31. *Dryocopus martins* – the Black woodpecker, HCV 1.2, sedentary protected under the Berne Convention.
32. *Dendrocopos leucotos* – the White-backed Woodpecker, HCV 1.2, sedentary, protected under the Berne Convention.
33. *Emberiza cia* – the Rock Bunting, HCV 1.2, sedentary, protected under the Berne Convention.
34. *Falco tinnunculus* – the Eurasian kestrel, HCV 1.2, partially migratory species, protected under the Berne Convention.
35. *Lanius excubitor* – the Great grey shrikes, HCV 1.2, partially migratory species, winter visitor, protected under the Berne Convention.
36. *Ficedula parva* – the Red-breasted Flycatcher, HCV 1.2, summer visitor, protected under the Berne Convention.
37. *Strix uralensis* – the Ural owl, HCV 1.2, sedentary, protected under the Berne Convention.

Mammals

Threatened, endangered and vulnerable species

The selection of these species was based on the Law no. 57/2006 on protected areas (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 conducted by us in the field.

38. *Plecotus auritus* (Linnaeus, 1758) - the Brown long-eared bat, HCV 1.2, vulnerable in Romania, endangered in Europe.
39. *Nyctalus leisleri* (Kuhl, 1818) - the Leisler's bat HCV 1.2, endangered in Romania and in Europe.
40. *Martes martes* (Linnaeus, 1758) - the European pine marten, HCV 1.2, vulnerable in Romania and endangered in Europe.
41. *Lynx lynx* (Linnaeus, 1758) – the Eurasian lynx, HCV1.2, vulnerable in Romania and endangered in Europe.
42. *Cervus elaphus* (Linnaeus, 1758) - the Red deer (Carpathian deer), HCV 1.2, vulnerable.
43. *Capreolus capreolus* (Linnaeus, 1758) - the European roe deer, HCV 1.2, vulnerable.
44. *Ursus arctos* (Linnaeus, 1758) – the Brown bear, HCV 1.2, rare but non-threatened in Romania, vulnerable in Europe.
45. *Canis lupus* (Linnaeus, 1758) – the Grey wolf, HCV 1.2, strictly vulnerable in Romania and strictly protected in Europe.

CONCLUSIONS

1. Through an extensive documentation work we set high conservation value (HCV) for the forests of Pădurea Craiului Mountains.
2. In the case of the Pădurea Craiului Mountains forest these values are as follows:
 - 31 rare, threatened, endangered, endemic, relict plant species (HCV 1.2, HCV 1.3);
 - 45 rare, threatened, endangered, endemic, relict animal species (HCV 1.2, HCV 1.3).
3. As a result of the research we had conducted we selected the most representative high conservation value forests (HCVF), namely:
 - 563.24 ha in protected areas excluded from forestry interventions;
 - 478.84 ha managed in particular to maintain or increase biodiversity in forest areas chosen for preservation.

REFERENCES

1. Boşcaiu N., Coldea G., Horeanu C., 1994, *Lista roşie a plantelor vasculare, dispărute, periclitare, vulnerabile şi rare din România*, Ocrot. Nt. Med. Înconj., Bucureşti, 38 (1): 45-56

2. Burescu L., 2009, *Phytocoenological and ecological study of beech forests from Pădurea Craiului mountains (north - western Romania, Bihor county)*, Analele Universității Oradea
3. Burescu L., 2010, *The phytocoenology and ecology of european beech stands with Phyllitis scolopendrium from Pădurea Craiului Mountains (North - western Romania)*, Studia Universitatis Vasile Goldiș, Arad, pp. 65-70
4. Burescu L., 2013, *Research on high conservation value forests of Piatra Craiului Mountains to establish protection measures*, International Symposia „Risk Factors for Environment and Food Safety”, November 8-9, Oradea, Section 4 Forestry
5. Burescu L., 2014, *Forests with High Conservation Value from Pădurea Craiului Mountains, Beiuș Forest District, PU III Sohodol*, International Symposia „Risk Factors for Environment and Food Safety” & „Natural Resources and Sustainable Development”, November 7-8, 2014, Oradea
6. Burescu P., Doniță N., 2001, *Contribuții la cunoașterea diversității floristice a pădurilor din Munții Pădurea Craiului*, Anal. Univ. Oradea, fascic. Silvic., vol. VI, pp. 157-164
7. Burescu P., Doniță N., Burescu L., 2002, *Făgetele din Munții Pădurea Craiului*, Analele Univ. din Oradea, fascic. Silvic. Vol. VII, pp. 49-56
8. Burescu P., Doniță N., Burescu L., 2003, *Contributions to the study of beech forests in the Pădurea Craiului Mountains, Bihor County*, Natural resources and sustainable development, International scientific session, Debrecen, pp. 33-35
9. Ciocârlan V., 2009, *Flora ilustrată a României: Pteridophyta et Spermatophyta*, Editura Ceres, București, 1141 p.
10. Covaciu-Marcov S.D., Cupșa D., Telcean I., Cicort A., 2002, *Spectrul trofic al unei populații de Triturus cristatus (Amphibia, Urodele) din zona Șerghiș, Munții Pădurea Craiului*, Studii și Comunicări, Științele Naturii, Craiova, 18:188-194
11. Covaciu-Marcov S.D., Sas I., Cupșa D., Meleg G., Bud B., 2003, *Studii herpetologice în regiunea Munților Pădurea Craiului și Plopișului (județul Bihor)*, Analele Univ. din Oradea, fasc. Biol., Oradea, tom X, pp. 81-95
12. Covaciu-Marcov S.D., Bogdan H.V., Ferentz S., 2006, *Notes regarding the presence of some Podarcis muralis (Laurenti 1768) populations on the railroads of Western Romania*, North-Western Journal of Zoology, Oradea, 2(2):126-139
13. Covaciu-Marcov S.D., Groza M., David A., Ferentz S., 2009, *High amount of Bombina bombina characters in Bombina variegata populations from North-Western Romania, ecological or zoogeographical consequence?*, Herpetologica Romanica, Cluj-Napoca, vol.3, pp. 9-17
14. Danciu M., Gurean D., Indreica A., 2007, *Plante vasculare periclitare, vulnerabile și rare din pădurile României*, Editura Tehnică Silvică, București
15. Dihoru G., Dihoru A., 1994, *Plante rare periclitare și endemice în flora României – Lista roșie*, Acta Horti. Bot. Buc., București, pp. 173-197
16. Gal-Korodi I., 1974, *Observații asupra păsărilor din Munții Apuseni, Beobachtungen über die Vogelfauna der Westkarpaten (Munții Apuseni)*, Nymphaea, Muzeul Țării Crișurilor, Oradea, pp. 71-108
17. Groza G., 2008, *Flora și vegetația Munților Pădurea Craiului*, Editura Risoprint, Cluj- Napoca, 303 p.
18. Groza M.I., Suciu I.C., Ancău M., Pali I.N., Letai V., 2008, *Comparison between males and females feeding habits from three of Bombina variegata from Vadu Crișului, Pădurea Craiului Mountains, Romania*, Bihorean Biologists, Oradea, vol.2, pp. 50-57

19. Kövits L., 1973, *Observații avifaunistice-ecologice în Defileul Crișului Repede la Vad (Ornithological-Ecological observations in the Crișul Repede defile at Vad)*, Nymphaea, Muzeul Țării Crișurilor, Oradea, pp. 137-160
20. Munteanu D., 1982, *Contribuții la cunoașterea avifaunei din Munții Bihorului*, Nymphaea Folia Naturae Bihariae, Oradea, pp. 283-296
21. Oltean M., Negrean G., Popescu A., Roman N., Dihoru G., Sanda V., Mihăilescu S., 1994, *Lista roșie a plantelor superioare din România, Studii, sinteze, documentații de ecologie I*, Acad. Română, Institut. de Biol., București, 1:1-52
22. Sas I., Cupșa D., Széplaki E., Ilie R.D., Tötös M., 2006, *Seasonal variations in the feeding niche of a Bombina variegata population from Pădurea Craiului Mountains (Romania)*, Brukenthal, Acta Musei, Sibiu, I, 3:167-173
23. Sos T., 2010, *Evaluating the accuracy of morfological traits used in Anguis (sub) species differentiation*, Herpetologica Romanica, Cluj-Napoca, vol.4, pp. 29-44
24. Stanciu E., Mihul M., Dinicu G., Iorgu O., Abrudan I.V., Biriș I., Drăgoi M., Dragoș M., Doniță N., Filip L., Ferko J., Tamás P., Comănescu-Paucă M., Sandor A., Tănăsie L., Tatole V., 2004, *Ghid practic pentru identificarea pădurilor cu valoare ridicată de conservare* (Cooperare între WWF și IKEA pentru proiecte în domeniul forestier, un parteneriat pentru promovarea unei silviculturi responsabile), București
25. ***, 1976, *Flora R.S. România*, Editura Academiei R.S.Române, București, vol.XIII, pp. 97-117
26. ***, 1992, *Directiva Habitat – Directiva Consiliului Europei 92/43 EEC, referitoare la conservarea habitatelor naturale și a florei și faunei sălbatice*, 21 mai 1992.
27. ***, 2007, *Ordonanța de Urgență a Guvernului României nr. 57 din 20 iunie 2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei și faunei sălbatice*, Monitorul Oficial nr. 442, pp. 1-32: Anexa nr. 2: Tipuri de habitate naturale a căror conservare necesită declararea ariilor speciale de conservare, Anexa nr 4A, Specii de interes comunitar, specii de animale și de plante care necesită o protecție strictă, Anexa nr 4B, Specii de interes național, specii de animale și de plante care necesită o protecție strictă