

FOREST BIODIVERSITY PRESERVATION IN ROMANIA

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Abstract. The biodiversity conservation strategy should include forest protected areas as important objectives. Important legislative and administrative measures should be taken in order to integrate the forestry better in the sustainable development of the natural capital of Romania. A list of the most valuable virgin and natural forests is included. The definitions given to forest indicators must be revived and adapted to the actual situation.

Key words: forest ecosystem biodiversity, natural capital, strategic conservation objectives, forest protected areas, virgin forests, natural forests

INTRODUCTION

Total forest area in Romania consists of 6.339.000 hectares from which 6.245.000 hectares covered with forest vegetation (27% of total land area of the country). Previously, 70% of the total present-day territory was forest covered (Chiriță, 1986). Forest composition is varied. Conifers make up 31% (23% spruce, 5% fir-tree and other conifers 3%), beech 31%, oaks 18%, other hard broad-leaves 15% and soft broad-leaves 5%.

Romania owns very important forest biodiversity resources: 60 native tree species, 10 groups of natural forest formations and 150 types of forest ecosystems (Doniță et al., 1990). The natural capital of Romania is unique with a high bio-diversity level (Timotin, 2000), due to its geographical setting: 3100 native species of plants, 23 species are natural monuments, 74 species are extinct, 39 species are endangered, 171 species are vulnerable and 1253 are rare species.

More than 4% of plant species are endemic (57 endemic taxa and 171 sub-endemic taxa) ver 33802 animal species, 717 vertebrates (191 fish species, 20 amphibian species, 30 species of reptiles, 364 of nesting and migratory (312) birds and 102 mammals species.

History of protected areas in Romania

The first reference to forest protection was made in the Constitution in 1907. In 1912, “Progresul Silvic Society” proposed to the authorities a project of National Parks as in the USA. In 1928, at the first Congress of naturalists here, Emil Racoviță presented the Nature Monuments Law project in Romania, adopted in 1930 at the same time with the founding of the Nature Monuments Commission.

The legislative system concerning forest conservation also includes the Forest Protection Law (1935). In 1938, Marin Dracea mentioned, “We didn’t alterate the original structure of our vegetation through forest species dislocation and by dramatic changes of the natural mixtures”.

An important step forward for forest preservation was made in 1935 when the first National Park - Retezat (> 11,000 ha) mainly afforested, was authorized by Law.

Between 1930 -1943, 36 natural reserves were constituted (total area 15,000 ha).

After World War II, a new Nature Protection Law was adopted and the number of natural reserves increased up to 130 (75.000 ha total area). Unfortunately, in 1970, the administration rules of nature reserves were modified and the Retezat National Park administration was dissolved. The result was the disturbance of the nature protection activity in the whole country. Projects and studies on the National Parks System management were issued between 1973-1978. Important studies were developed by the Geographical Institute and the Institute of Biological Research Bucharest concerning natural flora and fauna.

The criteria for the zonal function of the forests were published officially in 1957 and have been continuously improved since then. A new Silviculture Code was adopted in 1962 but in 1963 the government directed (by special orders) the silviculture to clear cutting and coniferous extension out of their natural areal. The economic pressure on the forest has increased at macrolevel due to the wood industry development and exports and at microlevel due to the population growth and the large utilization of wood as fuel. Starting with 1976, the specialists succeeded to add to the Law (besides some undesirable measures against sustainability) a long term plan for forest conservation (1976 - 2010), as the main result of both - international organisms, pressure and the conclusion that deforestation played a very important role in the catastrophic floods of 1970 -1975.

The “Management Norms” of 1986 stipulated the term of “special regime of conservation for the natural forests” (intensive treatments, no clear cuttings and maintaining the forest natural type). The multiple functions of the forests were pointed out in the “Management Norms” of 1988.

The “National System of Natural Parks and Reservations” was initiated in 1990 (12 National Parks with more than 80% of natural forest each).

The present-day biodiversity conservation objectives in forest protected areas

There are some strategic objectives with specific actions in the new National Forest Policy and Strategy (2001), related to biodiversity conservation and they apply to all forests irrespective of ownership:

-conservation of the forest ecosystem biodiversity and development of the necessary institutional framework: the development of management structures for protected areas from the forest fund, and the development and implementation of management plans for these protected areas, the inclusion of aspects relating to biodiversity and the management of protected areas in the forest management plans, the inventory and protection of rare, endemic and endangered species from the forest fund, the conservation of virgin and quasi-virgin forests, the active sourcing of funds for projects related to the conservation of biodiversity in forest ecosystems and the management of protected areas, the re-population of those ecosystems with species lost from their natural area, the rehabilitation of damaged/degraded habitats, the reconstruction of dwarf pine areas and their inclusion in the forest fund to assure proper administration and the integration of biodiversity and protected areas management issues within the information and monitoring system of the forestry sector and correlation of this system with the national monitoring system for biodiversity.

-integration of representative forest ecosystems in the national network of protected areas: identification of forest ecosystems and habitats with high biodiversity value, the inclusion of all representatives types of forest ecosystems in the national system of

protected areas, the identification and delineation of connection corridors to prevent the fragmentation of habitats and their inclusion in the forest management plans.

These objectives require a very difficult and long term implementation in practice and the problem is that the end of the restitution process should have ended in the year 2002, according to the government plan.

Forest protection areas in Romania

Some explanations are necessary concerning the terms used in the present paper. The General Coordinating Committee of the Helsinki Process prepared a provisional list of descriptive forest indicators. The following definitions were given:

-virgin forest: untouched forest; an area that has never been disturbed by human intervention, with natural structure and dynamics. The soil, climate, entire flora, fauna and life process have not been disturbed or changed by logging, grazing and direct or indirect anthropogenic influences.

In Romania, the term “**quasi - virgin forest**” is also used in order to delimit former virgin forests in which sporadic extraction was practised, but the typical uneven - aged structure was not affected.

-natural forest: a forest which has evolved as a sequence of natural succession but still showing anthropogenetic influences; a forest which has developed from unmanaged pasture or from fallow land.

A present-day estimation of virgin and natural forest area in Romania can be made using:

- the “accessibility” in the forest (or the “isolation degree” of the stands);
- “the actual state of forest types”: natural, derived, artificial or indefinite (almost 70% of the Romanian forests still maintain their natural appearance);
- the age of the stands (the existence of a normal proportion of trees with the age over 120 years. According to the last forest inventory (1985) the area of forests without accessibility (distance from the road > 5 km) was 126,860 ha (representing 2 % of total forest area) and 824,000 ha (13 % of total forest area) were forests with relatively bad accessibility (distance from the road between 2.1 - 5 km). The present - day official list of protected areas in Romania must be reviewed (it includes a number of 15 virgin and quasi-virgin forests protected as forest reserves, with a total area of 3,866 ha). A tree seed sources catalogue (*in situ* conservation) was drawn up (Enescu, 1986) and reviewed in 1997, with 2,313 seed stands (total area 70,176 ha) excepted from cuttings, an important part of which can be included in the natural forest categories.

A short description (composition, structure, value, location) of 67 of the most valuable virgin and natural forests is listed below.

VIRGIN AND NATURAL FORESTS IN ROMANIA

A. Virgin and natural forests complexes in National Parks

National Park Retezat (Hunedoara) 11,466 ha	Virgin and natural beech, mixed beech-fir-spruce and spruce forests, particularly in the scientific reserve (1840). Extensive areas with <i>Pinus mugo</i> and the largest occurrence of <i>Pinus cembra</i> in Romania. Include also alpine and subalpine shrubs and meadows, peaks, glacial lakes of unique landscape value. 1200 species of plants and a high mountain rare fauna (chamois, bear, deer, lynx). Genetic centre for <i>Hieracium</i> and
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	<i>Ragenus</i> . Biosphere reserve (1979), declared as NP since 1935.
National Park Rodna (Maramures) 13,500 ha	Remnants of virgin and natural spruce forest with <i>Pinus cembra</i> and <i>Pinus mugo</i> . Include alpine and subalpine pastures. Biosphere reserve (1979).
National Park Domogled -Valea Cernei Caras-Severin, (Mehedinti, Gorj) 13,310 ha	Virgin beech forests in Valea Cemei and natural <i>Pinus mugo var banatica</i> in Domogled Mt Submediterranean species on limestones in Domogled Mt (<i>Quercus pubescens</i> , <i>Q. cerris</i> , <i>Q. frainetto</i> , <i>Carpinus orientalis</i> , <i>Corylus colurna</i> , <i>Juglans regia</i> , <i>Fraxinus ornus</i> , <i>Prunus mahaleb</i>). Karst phenomena.
National Park Cheile Nerei -Beusnita (Caras-Severin) 6,619 ha	Beech virgin forests in Nera forest district (Cheile Nerei, Nergana, Nerganita). Xerophite vegetation (<i>Carpinus orientalis</i> , <i>Corylus colurna</i> , <i>Fraxinus ornus</i> and <i>Syringa vulgare</i>) in Beusnita. Karst phenomena.
National Park Apuseni(Bihor, Alba, Cluj) 9,526 ha	Remnants of virgin and natural spruce and beech forests in Padis and Somesul cold watersheds, as well as on the plateau Lumea Pierduta. All these forests are situated in karst area, plenty of unique geological phenomena (caves, underground gladders, lakes, waterfalls).
National Park Bucegi (Prahova, Brasov, Dambovita, Arges) 9,000 ha	Virgin and natural beech and pure silver fir forests (at 900-1200 m alt.) between Sinaia and Poiana Tapului. Natural larch and larch-cembra pine stands in Piatra Arsa (1600-1800 m alt.).
National Park Semenic-Cheile Carasului (Caras-Severin) 8,522 ha	Virgin and natural beech forests. Karst phenomena and gorge submediterranean vegetation (<i>Carpinus orientalis</i> , <i>Fraxinus ornus</i> , <i>Syringa vulgaris</i> , <i>Cotinus coggygria</i>).
National Park Ceahlau (Neamt) 5,424 ha	Natural forest of beech, fir and spruce and many endemic species. Natural occurrence of <i>Larix decidua var. carpatica</i> . Rare mugo pine and <i>Alnus viridis</i> .
National Park Cozia (Valcea) 6,747 ha	Natural and virgin forests of beech, sessile oak, spruce and fir. Occurrence of <i>Quercus robur</i> at high altitude (1800 m). Many endemic species. Include subalpine meadows.
National Park Calimani (Suceava) 8,241 ha	Remnants of virgin and natural spruce and spruce-cembra forests. Occurrence of <i>Taxus baccata</i> , <i>Rhododendron myrtillus</i> , <i>Leontopodium alpinum</i> and other rare, protected species.
National Park Piatra Craiului (Brasov, Arges), 4,024 ha	Quasi-virgin and natural mixed (beech, fir, spruce) forests on Jurassic limestone's. Specific <i>Acerato-Ulmetum</i> in gorges. Frequent occurrence of <i>Pinus mugo</i> , <i>Taxus baccata</i> and other endemic species.
National Park Cheile Bicazului-Hasmas (Harghita, Neamt) 5,326 ha	Virgin and natural spruce-fir-beech forests with <i>Pinus sylvestris</i> and <i>Juniperus sabina</i> as relicts, in a limestone's area with frequent karst phenomena (gorges).

B. Virgin and natural forests in forest reserves and protected areas

Gradistea de Munte-Cioclovina (Hunedoara) 1,000 ha	Natural and seminatural beech (and spruce) forests in an area with a complex of archeological vestiges of ancient Dacian state. System of fortresses and the spiritual capital of Dacia (Gradistea Muncelului).
Portile de Fier (Mehedinti) 423 ha	Semi-natural limestone vegetation, loaded along the Danube, with beech (<i>Fagus sylvatica</i> , <i>F. taurica</i> , <i>F. orientalis</i>), <i>Acer monspessulanum</i> , <i>Corylus colurna</i> , <i>Carpinus orientalis</i> , <i>Fraxinus ornus</i> and oak species (<i>Q. cerris</i> , <i>Q. pubescens</i> , <i>Q. virginiana</i> , <i>Q. polycarpa</i> , <i>Q. dalechampii</i>). <i>Syringa</i>

	<i>vulgaris</i> , <i>Taxus baccata</i> and <i>Sorbus aria</i> in undergrowth.
Ravna (Fersig) (Maramures) 26 ha	Virgin oak (<i>Q. robur</i>) forest.
Ronisoara (Maramures) 29 ha	Quasi-virgin sessile oak forest.
Giupalau-Valea Putnei (Suceava) 844 ha	Virgin spruce forest, under the peak Giupalau.
Gosmanu-Tarcau (Neamt) 172 ha	Virgin spruce-fir-beech forest.
Dumbrava-Vanatorii Neamtului (Neamt) 866 ha	Old oak (<i>Q. robur</i>) natural forest.
Humosu (Iasi) 73 ha	Quasi-virgin beech forest.
Slatioara (Suceava) 854 ha	Virgin (spruce, fir beech) forest at 800-1320 m alt., protected since 1904 (1921).
Milea-Viforita (Buzau) 149 ha	Virgin fir (in mixture with beech and spruce) forest in Mt. Penteleu. An fir windthrown in 1953 was 56 height and 465 years old.
Tisa (Penteleu) (Buzau) 34 ha	Virgin spruce forest destroyed by windfalls (1953-1961), now in regeneration phase. In the proximity, in Hategului forest was recorded in 1945 the highest spruce in Romania: 62 m with 2.2 m diameter.
Glodeasa (Prahova) 453 ha	Mixed quasi-virgin forest (beech and fir).
Zanoaga (Dambovita) 250 ha	Virgin spruce-cembra pine forest.
Tampu (Hunedoara) 157 ha	Quasi-virgin beech spruce forest
Batrana (Hunedoara) 117 ha	Quasi-virgin beech forest.
Gornovita (Ieroni) (Gorj) 55 ha	Virgin beech forest.
Runcu-Grosi (Arad) 932 ha	Quasi-virgin and natural forest.
Arghisel (Arad) 145 ha	Quasi-virgin and old natural beech forest.
Poiana Stampei (Suceava) 677 ha	Natural <i>Pinus sylvestris</i> f. <i>turbosa</i> occurrence on <i>Sphagnum</i> Swamp.
Bila-Lala (Suceava) 234 ha	Botanic alpine reserve with <i>Pinus cembra</i> , <i>Taxus baccata</i> , <i>Rhododendron myrtillus</i> and <i>Cypripedium calceolus</i> .
Tudora (Botosani) 126 ha	Remnants of old natural beech-hombean-sessile oak forest preserving scattered <i>Taxus baccata</i> .
Uricani (Iasi) 68 ha	Natural oak (<i>Q. robur</i> , <i>Q. petraea</i>) forest.
Harboanca- Brahasoia (Vaslui) 70 ha	Natural oaks forest (<i>Q. pedunculiflora</i> , <i>Q. pubescens</i> , <i>Q. dalechampii</i> , <i>Q. virgiliana</i>) with occurrence of their natural hybrids population in sylvo-steppe.
Calinesti (Vaslui) 365 ha	Natural sessile oak-beech forest.
Mociar (Mures) 50 ha	Remnants of old natural oak forest on heavy, moist soils.
Mestecanisul Reci (Covasna) 34 ha	Complex of eutrophic swamps with glacial relict <i>Belula nana</i> . <i>Pinus sylvestris</i> on former mobile sand dunes.
Cenaru (Vrancea)	Natural beech-fir forest with frequent natural occurrence of <i>Taxus baccata</i>

309 ha	undergrowth.
Dalhauti (Vrancea) 188 ha	Remnants of old sessile oak-beech forest.
Cristian (Brasov) 372 ha	Natural sessile oak-fir mixed forest (as azonal relict) at 900-930 m alt.
Prejmer (Brasov) 252 ha	Natural oak-swamp ecotype forest, with other rare and endemic species.
Dumbrava Vadului (Brasov) 395 ha	Natural thinned forest of oak, sheltering an abundance occurrence of <i>Narcissus stellaris</i> .
Spataru (Buzau) 174 ha	Natural and seminatural ash (<i>Fraxinus pallisae</i> , <i>F. angustifolia</i>) with oak forest, on primary saline soils.
Frasinu (Buzau) 156 ha	Natural ash (<i>F. pallisae</i> , <i>F. angustifolia</i> , <i>F. excelsior</i>) forest, on primary saline soils.
Garboavele (Galati) 450 ha	Remnant of natural oak (<i>Q. pubescens</i> , <i>Q. pedunculiflora</i>) forest, surrounded by black locust plantation of <i>Quercus</i> , <i>Pyrus</i> and <i>Ulmus</i> natural hybrids.
Viisoara (Braila) 1.694 ha	Remnants of old natural <i>Quercus pedunculiflora</i> forest, replaced by black locust plantations.
Erenciuc (Tulcea) 48 ha	Pure <i>Alnus glutinosa</i> natural forest with disperse <i>Salix cinerea</i> , in Danube-Delta.
Caraoman (Tulcea) 841 ha	Semi-natural ash (<i>F. excelsior</i> , <i>F. angustifolia</i> , <i>F. pallisae</i>), oak (<i>Q. robur</i> , <i>Q. pedunculiflora</i>) and poplars (<i>Populus alba</i> , <i>P. nigra</i>) forest on river-main sand dunes, in Danube-Delta.
Letea (Tulcea) 2.746 ha	Natural and semi-natural oaks-ash and <i>Alnus glutinosa</i> forests, on river marine sand dunes in Danube-Delta, with climbing liana (<i>Vitis vinifera</i> , <i>Periploca graeca</i>) on trees.
Valea Fagilor (Luncavita) (Tulcea) 154 ha	Relict island of natural beech (<i>Fagus sylvatica</i> , <i>F. taurica</i>), hombean and other species forest, located in a valley in Macin Mt. (Dobrogea).
Hagieni (Constanta) 207 ha	Natural oak (<i>Q. pedunculiflora</i> , <i>Q. pubescens</i>) forest with <i>Carpinus orientalis</i> .
Ciornuleasa (Calarasi) 254 ha	Natural and seminatural mixed oak (<i>Q. robur</i> , <i>Q. pedunculiflora</i>), <i>Tilia tomentosa</i> - <i>Fraxinus pallisae</i> , <i>F. ornus</i> - <i>Prunus mahaleb</i> forest.
Caiafele si Moroiu (Calarasi) 479 ha	Old natural stands of <i>Salix alba</i> , <i>Populus alba</i> , <i>P. nigra</i> located in the Danube flood-plain, with <i>Vitis vinifera</i> ssp. <i>sylvestris</i> and <i>Periploca graeca</i> liana on trees.
Comana (Giurgiu) 439 ha	Complex of natural oak forest (<i>Q. robur</i> , <i>Q. pedunculiflora</i> , <i>Q. pubescens</i> , <i>Q. cerris</i> , <i>Q. frainetto</i>) which include reserve fir rare and threatened species (<i>Convallaria majalis</i> , <i>Paeonia peregrina</i> , <i>Ruscus aculeatus</i>).
Manafu-Ghimpati (Giurgiu) 83 ha	Natural mixed oak species (<i>Q. cerris</i> , <i>Q. frainetto</i> , <i>Q. pedunculiflora</i>) forest and black locust plantations.
Snagov (Ilfov) 1.151 ha	Remnants of ancient natural <i>Querceto-Carpineum</i> which covered this area as far to the Danube. Sporadic occurrence of relict beech (<i>F. sylvatica</i> , <i>F. orientalis</i> , <i>F. taurica</i>) and <i>Quercus petraea</i> .
Caldarusani (Ilfov) 468 ha	Old natural <i>Quercus robur</i> forest with white poplar and willow.
Seaca-Optasanu (Olt) 434 ha	Old remnants of ancient <i>Quercus frainetto</i> pure massif (2,000 ha).
Topana (Olt) 473 ha	Remnant of mixed <i>Quercus cerris</i> - <i>Q. frainetto</i> forest and of pure <i>Q. frainetto</i> natural stands.
Plopeni (Prahova) 254 ha	Old remnant of natural <i>Quercus robur</i> forest and other endemic species.

Latorita (Valcea) 71 ha	Old natural <i>Larix decidua</i> var. <i>carpatica</i> forests.
Chitu-Bratcu (Gorj) 1.319 ha	Natural beech forest.
Tismana-Pocruia (Gorj) 220 ha	Remnants groups of natural <i>Castanea sativa</i> dispersed in natural oak (<i>Quercus petraea</i> , <i>Q. cerris</i> , <i>Q. frainetto</i>) or beech stands.
Fagetul Gradistea Muncelului (Hunedoara) 35 ha	Natural old beech forest on the territory of the ancient Dacia capital Sarmisegetuza.
Bejan (Hunedoara) 235 ha	Natural occurrence of 8 native oak species (except <i>Q. pedunculiflora</i>) and genetic centre for hybrids among all these species.

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REZUMAT

CONSERVAREA BIODIVERSITĂȚII PĂDURILOR DIN ROMÂNIA

Strategia de conservare a biodiversității în arealele pădurilor protejate constituie în prezent și în viitor un important obiectiv pe plan european (Natura - 2000). Acest obiectiv presupune măsuri legislative și administrative, atât pe plan local, național cât și european. Implementarea unor proiecte cu finanțare europeană ar facilita conservarea biodiversității din pădurile parcurilor naționale și a celor din arealele protejate din România. În lucrare sunt prezentate 67 de păduri din România cuprinse în zone protejate și Parcuri Naționale, cu speciile dominante, codominante și a celor cu acoperire mai redusă.