# SCIENTIFIC ARGUMENT CONCERNING THE ESTABLISHMENT OF NATURAL FOREST RESERVE CURCHI

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**Abstract.** The paper presents an overview of Curchi Monastery natural heritage. The Monastery is situated 49 km from Chisinau and 14 km from Orhei, on the right side of the Vatici river, Orhei region. The Curchi monastery complex includes 11 secular oak trees, dominated by the common oak *Quercus robur* and the evergreen oak *Quercus petraea* with ages between 75 and 110 years old, three lakes, three springs and a water spring - all surrounded by forests, forming a picturesque landscape. In the forest surrounding the monastery we can find numerous species with real scientific value, value expressed by their national and international status of protection. Among these: Flower plants - *Cephalanthera longifolia, Cephalanthera grandilora, Platanthera bifolia, Neottia nidus-avis, Tulipa biebersteiniana, Lilium martagon, Anemone nemorosa, Vinca minor*. The forest shelters and offers favourable living conditions for animal species that have the status of nationally and internationally protected species, such as: the wild cat (*Felis silvestris*), the noble deer (*Cervus elaphus*), the fox (*Vulpes vulpes*). The beauty and the value of this landscape are completed by the floral and animal diversity that have been living for centuries in the forest surrounding the monastery. Species with great scientific value expressed by national or international protection status (NEGRU et al., 2002) are Orhidea, Liliacee, ferns, mosses, lichens, mammals, birds, insects, etc., appearing on national Red Lists or Annexes of international environmental conventions.

**Keywords:** Curchi monastery, forest ecosystem, Natural Protected Areas, valuable species.

**Rezumat. Argument ştiinţific privind instituirea Rezervaţiei Naturale Silvice Curchi.** Lucrarea prezintă rezultatele cercetărilor referitoare la patrimoniul natural al Mânăstirii Curchi. Mânăstirea este situată la 49 km de Chişinău şi la 14 km de Orhei, pe malul drept al râului Vatici, regiunea Orhei. Complexul Mânăstirii Curchi include 11 arbori seculari de stejar, dominante fiind stejarul comun *Quercus robur* şi stejarul peren *Quercus petraea* cu vârste cuprinse între 75 şi 110 de ani, trei lacuri, trei izvoare şi o fântână - toate fiind înconjurate de păduri, formând un peisaj pitoresc. În pădurea din jurul mânăstirii, putem găsi numeroase specii cu valoare ştiinţifică reală, valoare exprimată de statutul lor de protecţie naţional şi internaţional. Printre acestea: plante flori - *Cephalanthera longifolia, Cephalanthera grandilora, Platanthera bifolia, Neottia nidus-avis, Tulipa biebersteiniana, Lilium martagon, Anemone nemorosa, Vinca minor*. Locurile de adăpost din pădure oferă condiţii favorabile de trai pentru specii de animale care au statut de specii protejate la nivel naţional şi internaţional, cum ar fi: pisica sălbatică (*Felis silvestris*), cerbul comun (*Cervus elaphus*), vulpea (*Vulpes vulpes*). Frumuseţea şi valoarea acestui peisaj este întregită de speciile de floră şi faună, care şi-au găsit de veacuri habitatul în pădurea limitrofă mânăstirii. Speciile cu o deosebită valoare ştiinţifică, exprimată prin statutul naţional sau internaţional de protecţie (NEGRU et al., 2002) sunt orhidee, liliacee, ferigi, muşchi, licheni, mamifere, păsări, insecte etc., care figurează pe Listele Roşii naţionale sau Anexele Convenţiilor internaţionale de mediu.

**Cuvinte cheie:** Mânăstirea Curchi, ecosistem forestier, Arie Naturală Protejată, specii valoroase.

## INTRODUCTION

Harmonious blending of natural environment with cultural and historic is one of the Republic of Moldova prerogatives for sustainable development and a basic principle of the European Landscape Convention , Florence, 2000. Among cultural - historical objects of the country, a particular value presents the Monastic Complex Curchi, located within the Codri Orhei, 49 km from Chişinău and 14 km from Orhei, on the right side of the Vatici river. Being a cultural formation, Curchi monastery, together with its churches and adjacent buildings, encloses several secular oaks, three lakes, three springs and a well.

Throughout history, Curchi monastery has inherited some forest land. Being an integral part of the local landscape, it is normal that the forest surrounding the monastery to be protected together with all other objects from the monastic complex composition. The beauty and value of this landscape is complemented by species of flora and fauna, which found their habitat in the forest near the monastery since old times.

Once the buildings within the complex have started to be renovated, there emerged the necessity to look for possibilities to protect the secular trees located within the renovation perimeter as well as in the adjacent forest areas. In addition to the 3 protected oak trees located within the church yard and 5 located within the former monastic estate, there are other protected oak trees (3 trees - parcel 52/4, 1 tree - parcel 26/7) [9], but also valuable trees of *Cerasus avium* (L.) MOENCH, *Fraxinus excelsior* L., *Tilia cordata* MILL. and various species of herbal plants and animals with national, regional and international protection status.

## MATERIAL AND METHODS

The flora and fauna study of the adjacent forest was carried out during 2007 - 2009, seasonally, both in field conditions - by going through diagonally the investigated parcels and sub parcels area and in the laboratory - with microscopes MBS-10, Micmed-5, specialized flora and fauna books (BEGU et al., 2005; IVAN & DONIŢĂ, 1975; GHEIDEMAN, 1975; SIMONOV, 1978; MUNTEANU & LOZAN, 2004; GROSSU, 1986). Floristic diversity was investigated

during the vegetation season based on the routing method. Plant species that could not be determined in the field were herborized. Phytocenotic diversity was investigated according to BRAUN-BLANQUET (1964).

A registry of representative species and vegetation sectors together with their current state was developed. Valuable species have been identified according to the book: Rare plants from spontaneous flora of the Republic of Moldova (NEGRU et al., 2002), the Red Book of Republic of Moldova and annexes of environmental conventions to which Republic of Moldova is party. The "Passport" of the adjacent forest sector proposed for protection was developed in accordance with the model approved by the national central environmental authority (POSTOLACHE et al., 2004). The scheme of the forest sector proposed for protection was drawn by delimiting parcels and indicating the location of registered valuable species.

## RESULTS AND DISCUSSIONS

After evaluation of the environmental status of the forest sector near the monastery Curchi was found that parcels 37, 38, 39, 51, 52, 53 present various flora and fauna species diversity, among which there are many valuable species: rare, i.e. included in the Red Book as well as in the annexes of International Environmental Conventions (Fig. 1). Being part of a common landscape, it is normal that the forest around the monastery to be protected together with all other objects in the composition of the monastic complex.

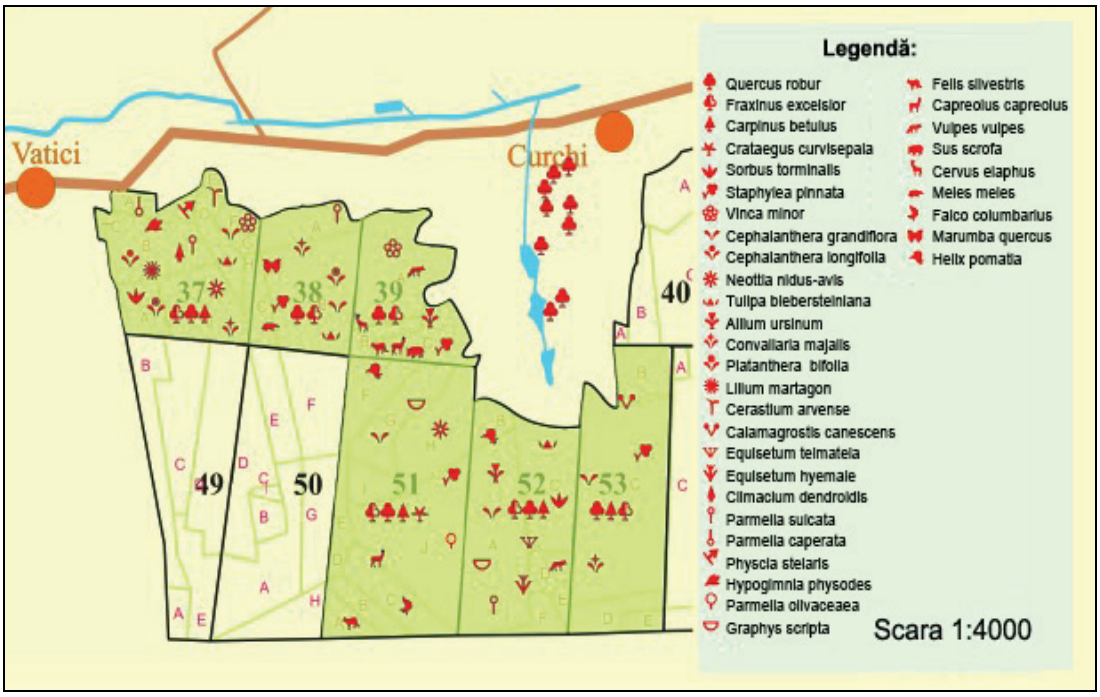


Figure 1. The project - scheme of Natural Forest Reserve Curhi (original).
Figura 1. Proiect-schemă a Rezervației Naturale Silvice Curchi (original).

**Dendroflora.** The study of the forest sector under investigation revealed a lush and well-developed spectrum of both arboreal species and herbaceous plants. Dominant tree species are *Quercus petraea* L. ex LIEBL. and *Quercus robur* L., especially in parcel 50 and 53 and sub parcels 38B, 39A, 40A, trees of about 75-110 years old and a coverage ratio of 0.8. Parcels 51, 52, 37 and sub parcel 40C are dominated by *Fraxinus excelsior* L. of about 50, 75 and 100 years old and the coverage ratio is from 0.7 to 0.8 what is characterized by a good vitality; the sub parcels 38A and 41B is dominated by *Carpinus betulus* L., of about 80-110 years old, which occupy 30% of all investigated sectors providing a coverage ratio of 0.7 to 0.9. Among the sub dominant species there have been recorded *Tilia cordata* MILL., which occupies 30% of the parcel 51 and 20% of the sub parcel 40 C. This tree is found in the other parcels as well (38, 40, 41, 50, 52, 53) but with a lower ratio (10%). Among other species there were registered: *Acer platanoides* L., *Cerasus mahaleb* (L.) MILL., *C. avium* (L.) MOENCH, and among bushes: *Cornus mas* L., *Sorbus torminalis* (L.) CRANTZ, *Viburnum lantana* L., *Sambucus nigra* L., *Crataegus curvisepala* LINDM., *Staphylea pinnata* L., *Euonymus verrucosa* SCOP., *E. europaea* L., *Corylus avellana* L., etc. Lianas common to deciduous forest were also registered: within the forest - *Hedera helix* L. and on the out skirt - *Clematis recta* L.

**Carpet grass** is well developed, especially at the base of the slopes, which are rich in *Melampyrum nemorosum* L., *Hieracium pilosella* L., *Viola mirabilis* L., *Isopyrum thalictroides* L., *Veronica chamaedrys* L., *Poa sylvicola* GUSS., etc.

Under the canopy of trees predominant are: *Mercurialis perennis* L., *Dentaria bulbifera* L., *Anemonoides ranunculoides* (L.) HOLUB., *Scilla bifolia* L., *Corydalis solida* (L.) CLAIRV., *Stellaria holostea* L., *Geum urbanum* L.,

*Primula veris* L., *Polygonatum latifolium* MILL., *Arum orientale* BIEB., *Ficaria verna* HUDS., *Asarum europaeum* (L.), *Tulipa biebersteiniana* SCHULT. et SCHULT. fil., *Convallaria majalis* L., *Alliaria petiolata* (BIEB.) CAVARA et GRANDE, *Dentaria bulbifera* L., *Allium ursinum* L., etc.

Around the water spring the following species were registered: *Phragmites australis* (CAV.) TRIN. ex STEUD., *Iris pseudacorus* L, *Ranunculus cassubicus* L., *Alisma plantago-aquatica* L., *Calamagrostis arundinacea* (L.) ROTH, *Lilium martagon* L., *Cephalanthera longifolia* (L.) FRITSCH, *Equisetum telmateia* EHRH., *Equisetum hyemale* L., etc.

Around many predominant and sub predominant trees there is often a layer of mosses, in particular: *Leskea polycarpa* HEWD. and *Amblystegium serpens* WHREAS, the stems of the trees are preferred habitats of many lichens species: *Graphys scripta* (L.) ASH, *Parmelia sulcata* TAYL., *Parmelia caperata* (L.) ASH, *Physcia stelaris* (L.) NYL., *Hypogimnia physodes* (L.) NYL., *Xanthoria parietin*a (L.) TH. FR., etc. These organisms are good bioindicators in assessing the quality of the environment.

**Fauna.** Based on nests near the ponds and traces of marking the territory as well as consultation with forest workers, we can confirm the presence of the following species of animals: *Sus scrofa* (LINNAEUS 1758), *Cervus elaphus* (LINNAEUS 1758), *Capreolus capreolus* (LINNAEUS 1758), *Vulpes vulpes* (LINNAEUS 1758), *Felis silvestris* (SCHREBER 1777), *Meles meles* (LINNAEUS 1758), *Talpa europaea* (LINNAEUS 1758), *Ciconia ciconia* (LINNAEUS 1758), *Falco columbarius* (LINNAEUS 1758), *Accipiter gentilis* (LINNAEUS 1758), *Helix pomatia* (LINNAEUS 1758), *Marumba quercus* DENIS & SCHIFFERMULLER 1775, etc.

The species with a national and/or international protection status present a specific scientific value. Thus, the parcels 37, 38, 39 and 51, 52, 53 are quite rich in valuable species. For instance, the following species with national and international status of protection have been recorded in parcel 37: *Cephalanthera longifolia* (L.) FRITSCH and *C. grandiflora* MILL. which are rare species, category III of rare species, included in RBRM, protected species by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington 1973); *Platanthera bifolia* (L.) RICH. and *Neottia nidus-avis* (L.) RICH. rare species in Moldova, namely categories II and VIII of rarity. These species have also international protection status and are included in the Red Book of Ukraine, the Romanian Red List and the Annex of Washington Convention (1973). Species as well rare with Class IV and VIII are *Tulipa biebersteiniana* SCHULT. et SCHULT. fil., respectively *Lilium martagon* L., the first being included in the RBU and the second one even in the European Red List. Curchi forest serves as a good habitat for the conservation of such species as *Cerastium arvense* L., which is indicated as a mesoxerophilous species, encountered rarely and reported only in the northern part of the country (Briceni, Soroca). Within the parcel 51 among all the listed species additionally we mention *Staphylea pinnata* L.- a rare species both within our country as well as in Ukraine, thus included in the Red Book of Ukraine, and within parcel 39 - *Anemonoides nemorosa* (L.) HOLUB.: a vulnerable species, with category III of rarity and *Vinca minor* L.: a rare species, with endangered species status. *Platanthera bifolia* (L.) RICH. found a favourable habitat with parcel 38. This species is protected by state, category II, with rare and endangered species status. The value of this species is also acknowledged by its international status of protection – and its inclusion in the RBU, the RLR and in the Annex of Washington Convention (1973). Among the rare species of the studied forest sector there were registered the following plants: *Pulmonaria officinalis* L. (parcel 52); *Calamagrostis canescens* (WEB.) ROTH and *Convallaria majalis* L. (parcel 53), etc. Within parcels 52 and 39 there was registered *Allium ursinum* L., a rare species within the borders of our country as well included in the RBU. Here, the plant forms a dense covering within the mentioned parcels.

In the forest sector, along with valuable plant species there were registered animals with national and international protection status, such as *Felis silvestris* (SCHREBER 1777), a species with category III of rarity, included in the RBRM as an endangered species, protected as well by the Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, 1973); *Cervus elaphus,* with class VIII of rarity, protected nationally but also by internationally, i.e. Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979) and the Washington Convention; *Vulpes vulpes*, with class VIII of rarity and protected as well by the Washington Convention. Common for the investigated forest is *Capreolus capreolus*, included on the European Red List and *Helix pomatia* (LINNAEUS 1758), protected by Bern Convention, which was registered in all the investigated parcels of the forest.

Secular trees and bushes species, herbaceous plants and valuable animal species is the scientific rationale behind the foundation of a state protected area around the monastery. Presented scientific arguments build the grounds for conferring the forest sector near Monastery Curchi (parcels 37, 38, 39, 51, 52, 53, total area 330 ha) a Natural Forest Reserve status.

## CONCLUSIONS

The forest sector near Monastery Curchi (parcels 37, 38, 39, 51, 52, 53) represents an important habitat for many species of flora and fauna of national, regional and international protection status including: 11 secular oak trees, dominated by the common oak *Quercus robur* and the evergreen oak *Q. petraea* with ages between 75 and 110 years old, *Staphylea pinnata, Cephalanthera longifolia, Cephalanthera grandiflora, Platanthera bifolia, Neottia nidus-avis, Tulipa biebersteiniana, Lilium martagon, Anemone nemorosa, Allium ursinum, Felis silvestris, Cervus elaphus, Vulpes vulpes, Meles meles, Helix pomatia, Marumba quercus* and others.

The water in the studied lakes is of quality class III and IV in the surface waters classification with a moderate hardness and polluted with organic substances. The spring water is transparent, non-coloured and without odour, but with a high hardness.

The establishment of a protected area under the category Natural Forest Reserve will contribute to the conservation of trees, shrubs, herbaceous plants and rare animals, which together with the Monastery Complex buildings will create a valuable landscape as an area for recreation but it will also be important for the environmental and cultural-historical education.

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