ROCZNIKI BIESZCZADZKIE 17 (2009), str. 129–136

Stepan Stoyko[1], Ivan Ivanega[2], Vasyl Kopach[2]
[1] Institute of Ecology of the Carpathians NAS of Ukraine
Kozelnicka str. 4, 79026, Lviv, Ukraine
[2] Uzhansky National Nature Park
Nezalezhnosti str. 7, Veliky Berezny, 89000, Ukraine
naukaunpp@rambler.ru

Received: 26.03.2009
Reviewed: 1.07.2009

PROTECTION OF THE MOST VALUABLE NATURE OBJECTS IN THE TERRITORY OF THE UZHANSKY NATIONAL NATURE PARK

Abstract: The most biogeographically and ecologically valuable nature objects in the territory of the Uzhansky National Nature Park and ways of solving problems of their conservation are presented.

Key words: Uzhansky National Nature Park, International Biosphere Reserve "Eastern Carpathians", nature protection, reserve.

Introduction

Uzhansky National Nature Park (39.1 thousands of hectares), which is a part of International Biosphere Reserve "Eastern Carpathians", belongs to original in biogeographical and landscape-ecological aspects protected objects in the Carpathian mountain system. Due to its geological, geomorphological, soil, climatic, and ecological diversity, the territory of the park is known for its huge heterogeneity of natural ecosystems, and biological and phytocenotical diversity (Stojko, Mykhalyk 1991).

The beginnings of nature protection in the present territory of the Uzhansky NNP dates back to the first years of the past century. It was in 1910–1912 that Hungarian foresters took the ancient forests under protection, and on their basis the first forest reserves „Stuzhica" and „Tykha" were created. Lots of valuable work in the field of protection of ancient forests of Zakarpattya was done by outstanding Czech scientists A. Zlatnik and A. Hilitzer, who in 1930s had substantiated the need to preserve the unique beech, beech-fir, and spruce-beech old forests (Zlatnik, Hilitzer 1932). With the aim to preserve virgin forests ecosystems, in 1970s Ukrainian foresters have created Stuzhica Landscape Park. After enlargement of its territory in 1999, the Uzhansky NNP was created. A number of publi-

cations (Hrůby 2002; Stojko, Mykhalyk 1991; Stojko et al. 1996) were dedicated to study its natural ecosystems. Due to rich natural and geographical conditions the park is known for its outstandingly vast species content and heterogeneous flora and fauna. Over 870 species of vascular plants grow in the park's territory, which constitutes 42% of plant genofund in the Ukrainian Carpathians, whose flora enumerates 2040 species (Stojko, Tasenkevych 1997). Among them are 40 species of plants and 26 species of animals included into Red Book of Ukraine, while 67 species of plants entered into the Regional Red List. In the territory of more than 3000 hectares the unique beech, beech-fir, and spruce-beech old forests are preserved, which in 2007 were included into the List of the World Heritage of UNESCO together with the virgin forests ecosystems of Slovakia.

From phyto-historical point of view of a special interest are the relict taxa – *Quercus petraea* and *Syringa josikaea*, which are preserved among the zonal climax beech forests from the middle and late holocen period. In high-mountain landscapes the beech *Fagetum sylvaticae* and alder crooked forests *Alnetum viridis* are preserved (*Alnus viridis* has here its western border of distribution in the Carpathians).

High up in the mountains the populations of rare for Europe animals, such as *Ursus arctos*, *Lynx lynx*, *Felis silvestris*, *Meles meles* and some others are under protection. The ornitofauna of the park amounts to more than 80 species, 6 of which are included in the Red List of Europe.

The park territory is very interesting in wide hydro-geographical sense, because here lies the orographical border between Baltic and Black Sea basins, on Uzhotska Pass have their sources mountain rivers San, the tributary of Vistula, and Uzh, the tributary of Bodrog.

In the territory of the Park their lives a compact ethnical group of Lemky, distinguished for its peculiar ethno-cultural, historical and religious traditions. In Lemky villages and towns the unique sacred monuments of wooden architecture of 17th and 18th centuries are under strict protection, as being of an important historical and cultural significance. In the mountain part of Beskydy during the 1st and 2nd WW the historical events took place, their remains can still be found here as military cemeteries, trenches and defensive objects.

The primary task of the National Park is the preservation of biological, phytocenotical, ecosystem and landscape biodiversity as the natural basis for providing the sustainable development and sustaining the ecological balance. A very reliable method to preserve this natural heritage is the creation of the net of nature reserves, restricted areas and sanctuaries.

Ecological characteristic of forest and botanical reserves

Beech and beech-fir ancient forests reserve „Stuzhica"

This is the oldest reserve in the Ukrainian Carpathians, which was created by Austrian-Hungarian foresters in 1910 in order to preserve and study beech and beech-fir forests in Carpathians. The reserve is situated in the zone of beech and beech-fir forests as high as 500–1200 m a.s.l., and includes natural forests on the slopes of Jasan and Kremenets mountains, and in the upper watersheds of Kamyanysty and Bystry streams. Here grow typical for Eastern Beskyds indigeneous beech and beech-fir forests with an addition of *Acer pseudoplatanus*, *Fraxinus excelsior*, *Ulmus montana*. In 1950s a part of the forests was cut out, but under optimal for beech and fir soil and climatic conditions these tree species have successfully recovered in natural way. Step by step 50 year-old beech forests with the addition of *Abies alba*, *Acer pseudoplatanus*, *Acer platanoides* have formed here. They are of interest for comparative researches of cenotic and age structure of these spontaneously recovered beech forests.

Beech, beech-fir and fir-beech old forests of Stuzhica massif are sort of natural models for studying of forest-creating process, age and cenotical of natural ecosystems, their capabilities to self-recovery, self-regulation and self-protection from biological pests (Stojko et al. 1998).

Scientific researches of ancient forests ecosystems started in 1934 by Czekh geobotanist-forester professor Zlatnik, and were continued by Hruby (2002). He found out that during 60 years cenotical and age structure of virgin forests ecosystems and their supply did not change. So virgin forests as ecologically stable ecosystems may restore themselves, and practically do not grow old. They may serve as ecological models to study the dynamic changes in plants cover under the influence of the global warming.

Old beech forest reserve „Yavirnyk" (project)

It is situated in montane zone of beech forests at levels of 700–810 m a.s.l., in a cool, wet zone, where on flysh substratum (clay slaters and fine-grained sandstones) very rich forest brown soils appeared, which supports a very good productiveness of the forests. The anthropogenic influence was during the past century practically absent here, so the natural condition of the beech forests has well preserved. In 1936 professor Zlatnik has set up three probe areas here.

The reserve plays a great role in continuing of the researches of age and cenotic structure of old beech forests.

Forest reserve „Ulichanka"

It was created more than a century ago, by Hungarian foresters with an experimental purpose. In fresh beech forests – *Dentario-Fagetum* association – the cul-

tures of *Pinus strobus* were created, and as a result a highly productive beech-pine tree phytocenosis was formed. Average height of Weymouth pine here reaches 40 metres, average diameter – 40 centimetres. *Pinus strobus* growing here is characterized by high trunk quality. The reserve is of a very big experimental significance, as well serving as a good forest seminal area. Taking into account the fact that in national park it is necessary to protect natural genofund, the cultivation of this species on the park territory is considered inadvisable.

Forest reserve „Holanya"

This reserve was created to protect the remains of natural beech, beech-fir and beech-sycomore forests. As a result they are represented here by associations: *Dentario-Fagetum,* and *Athyrio-Abieto-Fagetum*. At Mt Holanya foot there appeared in a natural way a *Fraxinetum excelsioris* forest, in which a big deal (up to 20%) is created by self-introduced wild cherry *Cerasus avium*. On rocky slopes the population of a valuable medicinal plant *Scopolia carniolica* can be found, and this species is included into the Red Book of Ukraine. On the top of the mountain there grow rare drought-resistant plants – *Ribes lucidum*, *Asplenium trichomanes*, *Cystopteris fragilis*, Carpathian endemic species *Sedum carpaticum*.

The reserve is very valuable for the preservation of populations of wild cherry, *Scopolia carniolica*, *Telekia speciosa* and some other rare species. Its old forests phytocenoses are very important as natural models for reconstruction of derivative forests of low value.

Reserve of old beech-fir forests „Adamiv lis"

It is situated at the sources of mountain stream „Tykhyj", where climatic, soil and orographic conditions promote the formation of beech-fir forests, which cover now an area of 2350 hectares in the park territory. Archival forestry data show that in the past this area was much bigger but then due to the cutting down of the indigenous trees it significantly decreased, and now pure fir forests grow instead. The reserve was created in 1912, its name tells us about the natural roots of the indigenous forests. After war a part of the reserve was cut down, but we have discovered here a well-preserved area of a typical old beech-fir forest aged 150–200 years. An average fir height is 35 metres (maximum 42), diameter up to 60 cm, average height of beech trees is 30 metres, average diameter 50 cm. The ancient forest has a very reliable natural renewal (6000 ind./hectar of fir and 2000 ind./hectar of beech). Natural phytocenoses of this reserve are of great importance as a model for the formation of beech-fir forests in the Beskydy.

Forest reserve „Dubova"(project)

Under extreme ecological conditions on the south slope as high as 650 m a.s.l., with steepness of 45°, on stony acid brown soils, there has preserved a re-

lic from the Middle Holocene, a forest of sessile oak *Quercus petraea*. Its age is 140–150 years, average height 16 metres, diameter 28 cm. Some species, like *Luzula nemorosa*, *Sedum maximum*, *Poa nemoralis*, *Polypodium vulgare*, *Asplenium trichomones* tell us about oligotrophic edaphic conditions of this island.

Sessile oak bears fruits every 5–6 years, which provides its natural renewal and protection of the local mountain population. On this basis the creation of genetic reserve has been planned in order to obtain the planting material to create the sessile oak cultures as high as at 600–700 m a.s.l.

The successful natural recreation of sessile oak tells about the phynocenotic stability of these forests. The relic locality of sessile oak is also of a great interest when studying the history of forest phytocenoses during Holocen in the Carpathians.

Ukrainian-Slovakian botanical reserve „Stinka" (project)

Due to presence of carbonate flysh rocks and stony steep slopes, this mountain chain is characteristic because of its special flora and vegetation. The reserve is of some interest in phytogeographical aspect, because it is a part of western boundary of East-Carpathian plant species (Zemanek 1991). To preserve rare species and phytocenoses, in Slovak side of border a botanical reserve was created, with some conjoint territory from the Ukranian side. That's why it is advisable to create here a bilateral reserve on the area of 200 hectares.

In the Ukrainian part of Stinka chain there grow more than 150 species of vascular plants, among them such rare species like *Aconithum anthora*, *A. paniculatum*, *Coeloglossum viride*, *Jovibarba preissiana*, *Ranunculus carpaticus*, *Silene dubia*, *Veronica austriaca* ssp. *dentata*, and some other.

In mountain meadows there grows association of *Achilleo strictae-Calamagrostietum arundinaceae*. On south steep stony slope there are preserved beech *Carici pilosae-Fagetum* and beech-sycamore *Lunario-Aceretum pseudoplatani* phytocenoses of virgin forest character. The reserve is interesting for its large quantity of rare moss species, here for the first time in the Eastern Carpathians 19 species were reported (Mierzeńska, Lesjo 2004). On the south slope of the chain there is a cave where different species of bats live, and the cave is under strict protection as being a very good place for preserving these populations.

Flora reserve of *Arnica montana* L. (project)

Arnica montana represents a Central Europe montane-subalpine element, and is included into the Red Book of the Ukraine. In the Carpathians it grows in natural and half-natural mesotrophical and eutrophical meadows between 400 and 1850 m a.s.l. It is very important as a medicinal and decorative plant. In the Park territory local population of *Arnica montana* is preserved near headwaters of the river Uzh as high as 1000 m a.s.l., in man-made meadow in mountain massif

of Kinchyk Hnylskyj. Its population is presented by juvenile, virginal, immature and senile age groups, and is well recovered through seeds.

Botanical reserve of *Syringa Josikaea* Jacg. „Borsuchyna"(project)

Small populations of Eastern Carpathian-Balkan endemic *Syringa josikaea* (Tertiary relic) were found in the Ukrainian Carpathians only in some places. This species grows here probably from the middle Holocene, that is why its remainings are interesting from phytohistorical and phytogeographical point of view. *Syringa josikaea* occurs in wet biotopes, it gives fruits every year and propagates well in generative and vegetative ways which is a good sign of high vitality of its population and reliability of its preservation.

In the territory of the Uzhansky NNP in Borsuchyny reserve, a small biogroup of 100 sq. m of this species grows among beech forests on peat swamp inside *Caltho-Syringeto-Salicetum auritae* group. In herb layer there prevail mosses and wet-loving herbs, such as *Caltha palustris*, *Chrysosplenium alternifolium, Impatiens noli-tangere, Solanun dulcamara* and others. The population is in a satisfactory condition, it regenerates well in vegetative way. To protect it, an artificial propagation of the species with rooted branches in area with identical conditions has been conducted.

Botanical reserves „Irtashi" and „Pasiky" of *Colchicum autumnale* L.

They are situated on the right bank of the river Uzh, and were created to preserve the population of a rare Red Book species *Colchicum autumnale,* distributed in the Central Europe, Baltic area, European part of Turkey. In Ukraine this species can rather rarely be met in the Carpathians and in Western wooded steppe. In the Transcarpathian region in wet meadows some 20 small local areas of this species still exist.

Botanical-landscape reserve „Chorni Mlaky" (project)

It is advisable to create this reserve in order to preserve the unique mountain peat swamp that was created as a result of falling of a big meteorite in 1866. Pieces of this celestial body can now be found in 120 countries of the world, the biggest of them weighing 279 kg is in the Natural History Museum in Vienna.

In area „Chorni Mlaky" on the area of approximately 1 hectare most of the territory is occupied by *Salix aurita* and *Deschampsia ceaspitosa* groups. A smaller territory is taken by *Polytrichetum* and *Sphagnetum* swamps, and also a small area is occupied by *Caricetum nigrae* association. Rare herbaceous plants as *Streptopus amplexifolius*, *Trientalis europea, Veratrum album* and *Dactylis slovenica* are found there. Around the swamp a kind of beech forest *(Athyrio distentifoliae-Fagetum)* has formed, and it should also be taken under care in order to provide stable hydrological conditions of the swamp.

Natural-historical memorial reserve „Cheremkha" (project)

It is proposed to create this reserve on the mountain chain of Cheremkha (1130 m a.s.l.) with the aim to protect upper forest line, the remainings of natural meadows and the military cemetery dating back to World War I. In upper forest line the remains of beech and beech-sycamore maple old forests exist, which are of model meaning for mountain forestry of the Beskydy. In shadow forests here grow rare plants as *Platanthera bifolia, Lilium martagon, Cephalanthera longifolia, Arum maculatum* and others. Higher than the natural line of beech forests there can be found subalpine meadows with *Nardetum strictae, Deschampsietum caespitosae, Festucetum rubrae* growing on them, the access of cattle to these places was stopped, and that is why we can see the process of spontaneous succession.

During the Brusilov offensive in 1915 on Cheremkha heavy fights among Russian and Austrian-Hungarian troops took place, the proof for them is the military cemetery on the top of the mountain. It's planned to create a memorial complex and to open some tourist routes here.

Fauna of the park

The Park fauna enumerates 213 species, of which 28 are entered into the Red Book of Ukraine. Rare species, such as *Salamandra salamandra*, *Triturus alpestris*, *T. montandoni*, *Elaphe longissima*, *Vipera berus*, *Coronella austriaca*, *Rana dalmatina*, and some others can be met here. Among birds we can distinguish *Ciconia nigra*, *Aquila chrysaetos*, *A. pomarina*, *Strix uralensis*. Among mammals of the biggest interest are *Sorex alpinus*, *Rhinolophus hipposideros*, *Myotis nattereri*, marten *Martes martes*, otter *Lutra lutra*.

Special attention in the general program of biodiversity protection is paid to the system of big predators protection. In the Park territory in mountaineous places there found their shelter such animals as bear *Ursus arctos*, wolf *Canis lupus*, wildcat *Felix silvestris*, lynx *Lynx lynx*. Stable population of 4–5 brown bear is noted on the boundary territories with Slovakia and Poland. These areas are characterised by a large type and age diversity of the forests and man-made meadows. *Fageto-Acereto-Abietum* forests of virgin types are characteristic for this territory which is also known for absence of anthropogenic influence and disturbing the animals.

The territory of the Uzhansky NNP due to its ecological and landscape peculiarities is favourable for inhabiting here big predators, namely wolves, but many human settlements, respectively high level of urbanization and low level of potential preys causes the absence of stable populations of wolf in the Park territory. Wolves appear on the Park areas mainly during winter (December to February), and only some of them can be located during spring and summer. The wolves'

prey constitutes of 3 to 4 individuals of *Cervus elaphus*, and 6 to 7 individuals of *Capreolus capreolus*; now more often the dogs fall the preys of wolves.

The system of protection measures for conservation of fauna species diversity is organised in the Park through organisation of monitoring the ecological condition of biotopes and populations of rare species.

References

Hrůby Z. 2002. Dynamika vyvoje přirozenych lesnich geobiocenoz ve Vychodnich Karpatech. Autoref. dokt. dis., Brno, 42 pp.

Mierzeńska M., Lesjo I. 2004. Nowe stanowiska wątrobowców *Hepaticae* w Użańskim Parku Narodowym. Roczniki Bieszczadzkie 12: 67–72.

Stojko S., Mykhalyk S. 1991. Mizhnarodnyj biosfernyj zapovidnyk u Beskydakh (proekt) ta joho znachennja dlja pryrodookhoronnoho spivrobitnysttva. W: Zapovidni ekosystemy Karpat. L'viv, p. 197–205.

Stojko S. M., Krychevs'ka D. A., Brusak V. P. 1996. Problemy ta perspektyvy formuvannja ukrajins'koji chastyny Mizhnarodnoho biosfernoho rezervatu „Skhidni Karpaty". W: Razvitije sistemy mezhhosudarstvennykh osobookhranjajemykh prirorodnykh territorij. Kijev, p. 103–106.

Stojko S. M., Tasjenkevych L. O. 1997. Systematychnyj spysok sudynnykh roslyn rehional'noho landshaftnoho parku „Stuzhytsja" W: Bioriznomanittja Karpats'koho zapovidnyka. Kyjiv, p. 368–373.

Stojko S., Shushnjak V., Krychevs'ka D. 1998. Rehional'nyj landshaftnyj park „Stuzhytsja" – chastyna pol's'ko-slovats'ko-ukrajins'koho biosfernoho rezervatu „Skhidni Karpaty" ta joho znachennja dlja zberezhennja pryrody ta kul'turnoji spadshchyny. W: Pratsi naukovoho tovarystva im. T. Shevchenka. T. II. Ekolohija. L'viv, p. 432–447.

Zemanek B. 1991. The phytogeographical boundary between the East and West Carpathians. Past and present. Thaiszia, p. 59–67.

Zlatnik A., Hilitzer A. 1932. Přehled přirodnych rezervaci a jejich navrhů na Podkarpatske Rusi. Praha, 84 pp.

Streszczenie

Artykuł omawia rezerwaty leśne i florystyczne na terenie Użańskiego Parku Narodowego oraz występujące w nich rzadkie gatunki zwierząt, i roślin, a także cenne zbiorowiska roślinne. Obszary te odgrywają znaczącą rolę w ochronie różnorodności biologicznej nie tylko dla Użańskiego Parku Narodowego lecz również całych Karpat Wschodnich. Dyrekcja Parku Narodowego przygotowuje obecnie ekologiczną dokumentację dla władz Zakarpacia, dotyczącą ich oficjalnego włączenia do sieci rezerwatów przyrody.

Uwzględniając naukowe, przyrodnicze i praktyczne znaczenie lasu w obrębie rezerwatów leśnych oraz florystycznych – również projektowanych – wszystkie te tereny zostały włączone do strefy wewnętrznej Parku.