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Traditional land management for perspectives of enviromental protection

The territory of Ukraine is one of the most ploughed up in the world and it causes a big problem for the preservation of biological and landscape diversity. This is because current conception of environmental protection is realized through creation of extensive in size national or regional reservates. However, it is very difficult to keep reserve rules within these territories, because reservates are often surrounded with urbanized areas, used for agriculture or forestry. Today reserves suffer dramatically from judicial instability, frequent changes of their borders, breaking of hunting and forestry rules (Boreyko, 1997, 2000). All these violations have led in Ukraine to formation of public opinion, which says that reserves in fact can be used for everyday needs, as source of wood and meal, for pasture etc. All that required was some illegal compromise with local or higher level authorities. All 70-year historical experience has shown, that people did not believe to authorities and scientists, that reserves are really necessary and they are of crucial importance for future of country. The main reasons lie in instability of state environmental policy, in all regions statements about reserves activity and borders often were cancelled. Environmental policy of the country has never been the subject of public discussion, and peasants are immensely far from these questions. On other hand, the villagers should be the most informed in this respect, since they live in the neighborhood of reserves, and could effectively influence the whole process of biodiversity protection.

Materials and methods

Influence of traditional land management on ecosystems and biodiversity has been studied by us during 1982-2001 years on the territories of reserves “Roztochchya”, Shackyy and Yavorivskyy national parks, over the 20 reserves of national and local impotencies, some of them were created after our scientific substantiations. Besides this, part of the investigations has been performed on newly created network of IBA territories (important bird areas, having national or international protection priority), that are not in all cases protected by law. IBA network is supported by Ukrainian society for bird protection and BirdLife International organizations, interacting actively to conserve the environment and protect rare and vestigial species of birds (Ìikityuk,1999, Heath,Evans,2000). Using these IBAs, modern influence of traditional land management on wild populations of animals could be studied in all details. These territories are used for animal protection and seasonal agricultural management as well. Interrelationships between traditional land management and protection process within natural ecosystems were studied mainly in western region of Ukraine. Marsh and meadow ecosystems were in the focus of our investigations, since they are degrading dramatically and thus are on the edge of extinction in Ukraine. The biggest marsh ecosystems in Ukraine are localized in the basins of rivers Pripyat, Dnister, Zakhidnyy Buh. During the last century these ecosystems have been changed considerably, because extensive hydromelioraitve work has been carried out there. This has led to decreasing of their biodiversity. Peat marshes in the south-western and western regions are the most degraded. They are localized in the basin of two rivers - Dnister and Zakhidniy Buh, which take their origin in Lviv region. These rivers divide the basins of two seas, and valley of Dnister belongs to Black sea basin, valley of Zakhidniy Buh belongs to Baltic sea.

In order to estimate the influence of traditional land management, special bird number counts and ethologic observations were conducted (Bibby et al.,1992) to find out relationships between different natural components of landscape, seasonality, types of land management, adaptations of animals according to rural work carried out or use of domesticated animals in natural ecosystems (Tsaryk,Tsaryk,2002).

To specify the number of breeding birds under field conditions maps with scale 1:25000 were used to mark the results of registrations. On investigated territories cartographic studies were performed during the preparation of regional Atlas of breeding

birds in Western Ukraine (1982-1986) (Gorban,Bokotej,1995) and realization of international program on preparation of Atlas of breeding birds in Europe (1955-1988). Results of this research work was published in EBCC Atlas of birds of Europe. In course of these studies common methodologies to prepare Atlas of birds were used (look for details in recent European releases; Hagemaijer, Blair,1997). Counts of breeding birds in different ecosystems of national parks were carried every season during 1982-2001 years from March 10 to July 10. Early spring counts were used for representatives of *Anseriformes, Falñoniformes, Strigiformes*, *Piciformes,* few species of *Passeriformes*. The highest frequency of counts carried out was from April 10 to June 20 every year.

Results

Species of birds receiving the status of being at the edge of extinction in the Europe were studied the most thoroughly. According to international list we have analyzed the status, quantity and biotopic distribution of mentioned species in Shackyy National Natural Park and many reserves, that are the most important area of natural ecosystem for biodiversity conservation in western region of Ukraine. To carry out this estimation, special counts of breeding birds number and following mapping of their localization in different biotopes has been performed. For detailed investigations 88 bird species were chosen, which are included to one of the four categories of priority SPEC (Tucker,Heath 1994), having international protection status. These species are as follows: *Anseriformes*: *Aythya nyroca, Aythya ferina, Anas strepera, Anas querquedula*; *Ciconiformes*: *Ciconia ciconia, Ciconia nigra, Botaurus stelaris, Ixobrychus minutus*; *Falñoniformes*: *Pernis apivorus, Milvus migrans, Hiraaetus pennatus, Circaetus gallicus, Aquila pomarina, Circus pygargus, Falco tinnunculus*; *Galliformes*: *Tetrao tetrix, Perdix perdix*; *Coturnix coturnix*; *Gruiformes*: *Grus grus, Crex crex, Porzana parva, Porzana porzana*; *Charadriiformes*: *Gallinago media, Tringa totanus, Limosa limosa, Numenius arquata, Columbiiformes*: *Columba palumbus*, *Columba oenas*, *Streptopelia turtur*; *Strigiformes*: *Bubo bubo, Asio flammeus*, *Strix aluco, Athene noctua*; *Caprimulgiiformes: Caprimulgus europaeus; Coraciformes*: *Coracias garrulus, Alcedo atthis; Piciformes*: *Picus viridis, Picus canus, Dendrocopos medius*, *Dendrocopos syriacus, Jynx torquilla; Passeriformes*: *Galerida cristata, Lullula arborea, Alauda arvensis, Riparia riparia, Hirundo rustica, Anthus pratensis, Prunella modularis, Erithacus rubecula, Luscinia luscinia*, *Phoenicurus phoenicurus, Saxicola rubetra, Saxicola torquata, Turdus merula, Turdus philomelos, Turdus viscivorus, Locustella naevia, Locustella fluviatilis, Locustella luscinioides, Acrocepalus paludicola, Acrocepalus schoenobaenus, Acrocepalus palustris, Acrocepalus scirpaceus, Silvia communis, Silvia borin, Silvia atricapila, Silvia nisoria, Hippolais icterina, Phylloscopus sibilatrix, Regulus regulus, Muscicapa striata, Ficedula hypoleuca, Parus cristatus, Parus caeruleus, Certhia brachydactyla, Lanius collurio, Lanius excubitor, Corvus monedula, Fringilla coelebs, Serinus serinus, Carduelis chloris, Carduelis spinus, Carduelis cannabina, Emberiza citrinella, Emberiza hortulana*. All species, having international protection status, we subdivided into 4 groups. First is SPEC 1, breeding populations whose quantity decreased up to 75-50% (3 species). Other 9 species belong to SPEC 2 category – their population decreased twofold. 31 species belongs to SPEC 3 category, their population decreased on more than 25%. 45 species whose population decreased on less than 25% belong to SPEC 4 category. Preparation of National Red Book new edition instigates to carry out modern analysis of rare birds populations, and how they are affected by traditional land management.

Breeding of various species, like *Botaurus stellaris* and *Ixobrychus minutus*, totally depends on reed and cattail thickets, distributed on lakes and fish farms. The highest quantity of *Botaurus stellaris* was revealed in reed *Puragmites australis (CAV.)*, lake Luki, and *Ixobrychus minutes* in cattail *Typha latifolia L.*, *Typha angustipolia L.*, shoal of the lake Lucimer, where burning of marsh flora is not practiced. During the last 20 years the population of both species decreased more than twofold. It could be accounted by short food supply and regular burning of reeds/cattails near the lakes of fish farms. Little fluctuation of *Ñiconia ciconia* and *Ñiconia nigra* populations number was observed due to human activity. For instance, efficiency of *Ñiconia ciconia* breeding depends on scale of traditional land management, especially on haymaking time, pasture. State of *Ñiconia nigra* population depends on forest. In *Ñiconia ciconia* seasonality in food getting is clearly observed, which

coincides with phenology of agricultural work – haymaking, harvesting of cereals, plouging of soils, changes of grazing areas.

Haliaeetus albicilla in studied region was vestigial species in the past. Now he is restoring his breeding and winter camping areas using for these purposes territories near fish farms, where a lot of fish remains after water has been pumped out of pond.

Close relationship exists between *Galinago media* population number and summer haymaking on peat marshes. The number of the population has been decreased abruptly in Europe after meliorations of their natural biotopes from the end of 1960s to the middle 1990s. Localization of *Limosa l³mosa* breeding colonies on all studied territories depends on land management, in first turn on summer haymaking and grazing seasonality. During the last 10 years *Limosa l³mosa* population has decreased fourfold and modern colonies do not exceed the groups of 10-14 pairs. Satisfactory quantity of moisture favours the growth of *Limosa l³mosa* population number, but choice and the level of population constantly depends on traditional land management. Areas of Shackyy national park, which were not used for haymaking and pasture, lost their the most valuable biodiversity, because were occupied by thickets. In years poor in rains the population number of *Tringa totatnus* varied considerably, especially at the lakes where grazing was prohibited. These territories (suitable for *Tringa totatnus* breeding) have been occupied by thickets, and the birds left them.

In forest ecosystems big birds of prey and hollow breeding birds (for example, *Columba îenas*, living in old hollow trees) depend on forestry (Gorban,1985). Human intervention in reservates results in withdrawal of old trees, and this has led to fivefold decreasing of *Columba îenas* population number during last 20 years. Due to decreasing of old oak forests area in Volyn Polissya, even in Shack national park, the number of *Dendrocopos medius* breeding pairs has decreased.

Periodic fluctuations in population number are common for *Lullula arborea*, *Lanius excubitor*, *Ember³za hortulana*, (Gorban,Bokotej,1995) whose biology is related to traditional land management. Bad conditions of haymaking favored the increase of breeding pairs number and enhancing of breeding area of *Saxicola torquata.* Probably, the same factors influenced negatively on breeding of *Saxicola rubetra,* because former wetlands have been left by these birds after melioration and occupation by thickets.

Table 1 Status of rare and vestigial birds in Shack national natural park, whose population number depends on traditional land management

Species	1982-1987	1997-2001	European status	Dependence on human activity
Botaurus stellaris	60-70	15-27	Â	1,5
Ixobrychus minutus	80-120	20-30	Â	1
Ñiconia ciconia	60-65	51-53	Â	2,3
Ciconia nigra	3-4	4-5	Â, R	4
Anas strepera	3-4	10-12	P	3,5
Anas querquedula	15-20	6-8	-	3,5
Aythya ferina	50-60	100-150	-	3,5
Aythya nyroca	1-5	5-7	R	3,5
Pernis apivorus	1-2	0	Â, P	4
Milvus migrans	2-3	0	Â, P	4
Circus pygargus	2-3	4-5	Â, P	1,2,3
Circaetus gallicus	3	1	Â, R	1,2
Hieraaetus pennatus	0	1	Â, R	1,2
Aquila pomarina	2-3	2-3	Â, R	1,2,3
Haliaeetus albicilla	?	1?	Â, R	4,5,6
Falco tinnunculus	0	1-2	Â	1,2,3
Tetrao tetrix	15-20	4-5	P	4,5
Perdix perdix	40-50	20-25	-	1,2,3,5,7
Crex crex	3-4	15-20	Â, P	1,2,3
Tringa totanus	38-42	25-30	-	1,2,3,

Gallinago media	5-7	3-7	Â, P	1,2
Numenius arquata	3-4	2-3	R	1,2,5
Limosa limosa	60-70	10-15	-	1,2,3
Lulula arborea	30-35	15-20	-	1,3,4
Alauda arvensis	110-130	80-90	-	1,2,3,7
Anthus pratensis	130-150	75-90	-	1,2,3
Lanius collurio	50-60	40-45	Â	1,2,3
Lanius excubitor	17-19	12-13	Â, R	1,2,3
Saxicola rubetra	200-250	60-70	Â	1,2,3
Carduelis cannabina	5000-6000	2000-2500	Â	1,2,3
Emberiza citrinella	3700-4500	1800-2000	Â	1,2,3
Emberiza hortulana	10-15	2-3	P	1,3

In the table 1 are shown the status and changes in population number of rare birds included to the Red Book of Ukraine - (R), or such species, which we suggest to include in new edition of Red Book – (P), listed in Bern convention (animals, whose dwelling area in Europe becomes worse; Convention of 1998) – (B). Digitals 1-7 mark types of human activities, that have major impact on natural populations: 1 – grass burning, 2 – haymaking, 3 – pasture 4 – forestry 5 – hunting, 6 – fishing, 7 – ploughing.
Among traditional land management we considered grazing , haymaking, grass burning, hunting and fishing. In most cases these activities have positive effect on preservation of biodiversity. Positive influence is clearly determined in case of traditional grazing, haymaking, grass burning (in several cases). Especially positive effect on local improving of biodiversity have the different grazing schemes (Finck, Reicken, et al.,2002).

Discussion

With respect to agricultural use of resources and landscapes Ukraine is one of the advanced European countries. Under such conditions the biodiversity conservation problems are complicated and require the national strategy of the nature protected aareas development. The principles of such a strategy are actively discussed (Stecenko, etc. 1994) and many contradictory items still remain, when concerning the hierarchy and use of reserve categories (Klestov, 1994, Movchan, Sheliag-Sosonko, 1999). Ukraine belongs to countries with the biggest agricultural areas. That is why preservation of it's natural environment and biodiversity will depend on development of fine ecological network, where optimal interaction between protected territories and territories used by agricultural industry will be the major player. Traditional land management is important for conservation of natural environment and improvement of economic situation of country as well, that finally is key factor for sustainable development and protection of ecosystems (Kampf, 2002). We should take into account, that in majority of EU countries considerable decreasing of birds population number is observed, even for those species, that were considered as common or highly populated. This is because of landscape changes resulted from human activity. To protect these biotopes, directed nature-protecting programs and measures have been developed (Robson, 1997, Tucker, 1997).

During the last century natural ecosystems of Ukraine have been changed considerably. Even mountain forest ecosystems underwent changes, and in several regions of Carpathian mountains they are not capable of executing their nature-protective functions (this is confirmed by floods during the last years) (Leonenko,2000). Bad environmental conditions reflect our political past, when country had the monopoly in all areas, and extensive manner of development was dominant. This has led to exhaustion of natural resources and their non-rational use. After preliminary analysis of reserve funds of Ukraine it is suggested, that normal development of natural ecosystems is not possible, if we would like to draw the line between natural and transformed ecosystems (Babko, Khimko et al, 1994). Taking the investigation of fauna-protecting reserves network as an example, conclusions can be drawn, that this network was formed spontaneously, without any scientific approaches (Klestov, 1994), and this complicate further work on creation of ecological network of Ukrainian reserves.

The processes that analyzed in this paper are interrelated , but continuously implementation of non-market economy in transitional countries have been resulted as in economy as in natural resources state (Gardashuk,1997). Although traditional land

management is extensive by it's nature under conditions of low density of village population it is well-balanced and has non-exhaustive character with respect to restoration of natural resources. An advantage of traditional land management is it's harmony with natural landscape. In first turn we mean open landscapes, peat ecosystems, meadows, fields. Mixture of landscapes and high number of ecotones favors the enrichment of biotopes with new species. But traditional land management cannot withstand current economic realities, and is in deep crisis. That is why the role of traditional land management is not yet estimated perfectly. Traditional land management is still detrimental, time- and labor consuming, requiring constant external support (economic and social subsidies for small farmers, especially when saying about haymaking from forest and peat marshes, cutting the thickets, private grazing). On other hand traditional land management could potentially be profitable and funding would come from ecological tourism, which is still not developed. Money obtained from it would be spent to improve the nature protection and life of local communities. For development of tourism several rules should be established (e.g., how much tourists could accept given territory with minimal influence on environment).

It is difficult to achieve the succes in environmental protection, since new conception of conservation and rational use of natural resources is largely unknown among local population and authorities of different levels. Conservation of natural resources is thought to be non-rational and unpractical with respect to local village communities. Such form of very advanced nature protective unit as national park has not been applied to the territory of the former USSR long time due to several political and theoretical reasons. That is why now our society accepts very slowly this category, and often difference between reserve and national park is not clear. This difference has the biggest practical importance to continue traditional land management, enhancing of recreation potential and development of regional infrastructure. In several reserves where grazing and haymaking was prohibited irreversible succession of flora occurred. This led to decreasing of population number or disappearance of animals, that were under protection. That is why the creation of a number of small reserves without clear management plans was very irrational. We are convinced with numerous zoological and ecological investigations, that traditional land management is very favorable with respect to the conservation of natural resources, landscape and biological diversity.

Traditional grazing at the edges lead to formation of low thicket, a biotope suitable for breeding of *Sylvia communis* and *Sylvia curruca*, whose populations now are decreased in many countries of Europe. The pasture of village cattle in East of Bescides is propitious for wide introduction of rare *Crex crex*, *Perdix perdix*, *Coturnix coturnix*. In many district of Polissya successful nesting of *Ciconia ciconia*, *Sturnus vulgaris* and *Motacilla flava* is binding with traditional systems of pasture. During stable and free pasture of cattle (at first horses and cows) these species of bird gains feed more effective and much sooner what is very important for feeding of nestling. From other side pasture is very important for migrate birds (at first trushes and some snipes), which gains feed in excrements of domestic cattle during late autumn when temperature is low. Such adaptation is very distributed. The pasture is also positive factor for population keeping of many species of amphibia and such very rare as Bufo viridis and Bufo calamita (are present in the Red Book of Ukraine).

To restore breeding populations of globally sensitive species (SPEC1) - *Crex crex*, *Aythya nyroca* it is necessary to develop management plan to combine traditional land management with protection strategy for each species (Heredia òà ³í.,1996,Mikituk,2000). Such management plans are major premise for interaction of various reserves and development of traditional land management on their territory, which is vital for protection of landscape and biological diversity (Schaffer,òà ³í.,2001). Good examples are haymaking on meadows , grazing without using of dogs. In the basins of several rivers in Rivnenska region pasture and haymaking is practicing widely to preserve the breeding of some species, whereas late haymaking is used to preserve the breeding of another species. People encircle with wood palisade the wettest territories in the river basin, this favours the preservation of very rare bird populations, such as *Crex crex* which is globally sensitive. By conserving the mosaic meadow structure people limit their occupation with thickets, and protect them from cows, that is very important for breeding of *Crex crex*. In fact this is the example of spontaneous management plan, developed by local village community.

Until this time small preserves outnumbers among all natural reserve found of Ukraine. Such small preserves are practically main bases for development big reservation in future. For example, reservation "Roztochchya" was founded on the base of small forest preserve "Stradch's forest" and National Natural Park in Shack was founded on the base of many hydrological small reserves in Shac'k district of Volyn' region. Youngest in our country

Rivnens'kyy natural reservation was founded on the base of three swamp small preserves in Rocytni, Volodymyrec', Dubrovec'and Sarnec'districts of Rivne region. On the territory of some small preserves was not special protection and even after pasture or haymaking we observed quick negative changes in all natural complex. Many valuable territories lost its floristic and faunistic complexes, valuable rare species of plant are disappeared, important species of bird stopped nesting because of quick overgrowing with bushes. So we need special plan of preserves development under conditions of long anthropogenic influence on the environment.

Today local village communities involvement in the process of protected territories development is still overlooked and interest is very low but it is not excluded that by way of new conception of nature protected areas development we will have higher activity of NGOs and rural communities.

In ukraine it is the best way to create simple system of natural reservation rejecting big state reservations and small sized reserves conception, but developing the network of national and regional landscape parks where some areas of full protection, areas with limited economy activity and zones with different recommended economic activity should be indicated. Such approaches would help to change negative attitude of many ethnic groups and local community to the problems of protection of biological diversity and in the same time would be propitious for stable development in country. From one side national and regional landscape park are propitious for development of ecological tourism and from other side by this way it is possible to do network of preserves, which now are without good management and degrades. Joined in national and landscape park preserves would keep enough status for keeping administration, increasing of financial support for protection of biological and landscape diversity. We think that development of new systems of reserve network should be argued on the base of analysis of traditional land-tenure in different regions of ukraine with consideration of available scientific information and experience in the field of biological diversity protection.

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