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Further development of the strategy for European bison population in Belarus

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Abstract: Discussed is the concept for the creation of European bison population in Belarus. Its main point is to connect three already existing large populations by creating three small satellite populations between them, in order to achieve a metapopulation that can be managed at country level. Presented are assumptions for the establishment of such satellite populations.

Keywords: European bison, Belarus, strategy, development, metapopulation.

Introduction

The strategy to manage European bison as metapopulation in Belarus, has been developed for already over 15 years ago (Kozlo 1999). Its basic idea was to create a number of separate European bison herds (subpopulations), able to exist for a long period of time. Currently there are 9 such groups in the country. Total numbers of this species estimated on December 31st 2015, was 1464 individuals. Among them there were 1391 free-living individuals, and 73 animals in captivity. According to the assessment performed in 2014, the optimal population number was estimated for 1500 individuals, which can be reached already in 2016.

Material and methods

For the selection of potential areas for the creation of new subpopulations, the following criteria were used: relatively low density of human population, areas of 30–40 thousand hectares, far from the major often used roads, with a high proportion of grasslands (not less than 40%). Such areas should be surrounded by buffer zones of about 20–25 thousand hectares, with similar environmental conditions. Following the methodology by Korochkina (1973), Dunin and Kozlo (1992) estimated were following factors: the land cover and hydrological conditions (wetlands, network of small and medium size rivers, species and age structure of forests and their area); species composition of undergrowth, and the its density in a zone typical for foraging by European bison; ground flora – its composition and biomass; European

bison inventory including total numbers and size of particular herds, age and sex structure estimated in winter by visual observations and photos; a size of the home range for each herd, estimated for all seasons of the year.

Results and Discussion

The average annual rate of population growth for whole country was estimated for about 8%, with the maximal value of 15%. For particular populations different maximal values were recorded: e.g. for Osipovichskaya (19.4%), and Ozerskaya (10.9%) subpopulations, both characterised by high density of animals, which resulted in migration of some individuals or even groups.

Table 1. Population dynamics of European bison in Belarus.

Year	Population numbers	Annual rate of growth [%]
2006	730	7,4
2007	790	8,2
2008	864	9,4
2009	914	5,8
2010	943	3,2
2011	1084	15,0
2012	1155	6,5
2013	1250	8,2
2014	1363	9,0
2015	1464	7,4

The main aim of the creation of new subpopulations is to connect already existing large populations by creating opportunities for the natural (as well as controlled) migration. In the concept of "metapopulation model" for the management of European bison in Belarus (Kozlo 1999), it was suggested that in order to prevent inbreeding and increase genetic diversity of the population, it is necessary to carry out a so-called "blood refreshment" i.e. the exchange of males between populations at least once in a generation (about 5 years). Currently in Belarus there are three well developed and properly formed local populations (Belovezhskaya, Ozerskaya and Osipovichskaya), which are foreseen to be the "cores" of population clusters. The whole national population can be divided into two clusters. The western cluster, would be based on Belovezhskaya, and Ozerskaya populations supplemented with Nalibokskaya population. Eastern cluster will connect together: Osipovichskaya and Polesskaya populations, with Pripyatskaya group (Ozeranskaya and Naydianskaya subpopulations) (Fig. 1).

Figure1. The European bison distribution on the territory of the Republic of Belarus

Legend:

– existing herds of the European bison

– planned herds of the European bison

I – the Northern Zone due to its landscape, floral and climatic conditions of winter seasons is suboptimal for the European bison reintroduction and the creation of new herds

II – the Central Zone due to its landscape, floral and climatic conditions is close to optimal for the creation of the new herds of European

III – the Southern Zone is favorable regarding its climatic conditions; however its natural food resources are at average level and its landscape and geological conditions are suboptimal due to too high proportion of wetlands (according to P.G. Kozlo - unpublished data)

The newly established subpopulations will have relatively small numbers, usually not exceeding 40 individuals. The following criteria are used during the selection of colonizing sites. The minimal area for the European bison settlement has to be no smaller than 30 000 ha, including forested area – no less than 10 000 ha. The forest ecosystems should have multi-age and multi-species structure; its distribution should be mosaic: broad-leafed, coniferous, and mixed forests older than 40 years, the presence of forest clearings and meadows; the proportion of wetlands and irrigation channels is rather insignificant. The floodplains along watercourses are preferred as optimal sites for creation of new micropopulations.

The minimal quantity of animals needed for the formation of European bison micropopulation – 15 individuals originating from two or three different groups, and allowed for unrestricted crossbreeding.

As founders of these populations foreseen are animals from Belovezhskaya, Osipovichskayay and Ozerskaya subpopulations. New population ranges will be situated at the territory of migratory corridors that exist along the floodplain areas of major rivers of the country, especially the river Neman. Already, as a first step, performed are studies concerning the selection of suitable areas in Masty district to create such first subpopulation. Subsequently, upon receiving satisfactory results, to create the western cluster, it is planned to create another two such subpopulations, at a distance not exceeding 60 kilometres, from already existing large populations.

Conclusions.

The average annual increase of the European bison population in Belarus during the last 10 years was about 8%. That may be an effect of present isolation of largest populations. To create conditions for natural and controlled migrations it is necessary to establish three small "satellite populations." This could help in exchange of genetic material among existing populations and improve overall genetic structure of European bison in Belarus.

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Postęp wdrożenia strategii ochrony żubra w Białorusi

Streszczenie: Omówiono sposób i metodę tworzenia populacji żubra w Białorusi. Głównym zadaniem obecnego etapu jest połączenia trzech istniejących dużych populacji poprzez utworzenie pomiędzy nimi trzech małych satelitarnych stad. W celu zapewnienia ciągłości i uzyskania metapopulacji na poziomie kraju. Przedstawione są wymagania dla tworzenia tych populacji.