European Bison Conservation Newsletter Vol 5 (2012) pp: 87–94

The plan of action for optimization of supplemental feeding and the management of population of the European bison (*Bison bonasus*) "Osipovichskaya"

Piotr Kozlo, Vasili Shakun, G. Yanuta, Pavel Velihurau

The State Research-Production Association "The Scientifically-Practical Centre of the National Academy of Sciences of Belarus for bio-resources", Minsk, Belarus

Abstract

The present state of the population of the European bison *(Bison bonasus)* "Osipovichskaya" (regarded as the reserve of gene pool for this species), natural food supply and the level of supplemental feeding are reviewed. Demonstrated are methods used for the improvement of food supply available for the bison. Numbers of "Osipovichskaya" population of European bison increased from 15 to 186 individuals (by 12.4 times) and exceeded the level considered as optimal (120–130 individuals). Reported are main parameters of "Osipovichskaya" population and indicated are reasons of its fast growth. Explained is the necessity and methods for the extension of the area of feeding plots that provide a significant of spring, summer and autum diet of European bison there.

Key-words: *Bison bonasus*, "Osipovichskaya" population, food resources, artificial feeding

Introduction

A study for the estimation of the extent of favorable ecological conditions to create a population of European bison of reserve gene pool was conducted in Osipovichy forestry in 1995. In 1997, 15 bison were transferred to the adaptive enclosure there from Belowezhsky National Park. Numbers of this population reached 186 individuals, exceeding the ecological capacity estimated for 120–130 animals. This caused a migration of European bison into agricultural areas and damages to crops. Therefore necessary was to work out recommendations for the optimization of support for this population, decreasing losses to agriculture, and creation of the plan for the control of its numbers.

The present state of the population

The "Osipovichskaya" population of European bison increased from 15 to 186 individuals (by 12.4 times) during its 15 years of existence. The dynamics of this population changes during last 6 years are shown at Fig. 1. Its average

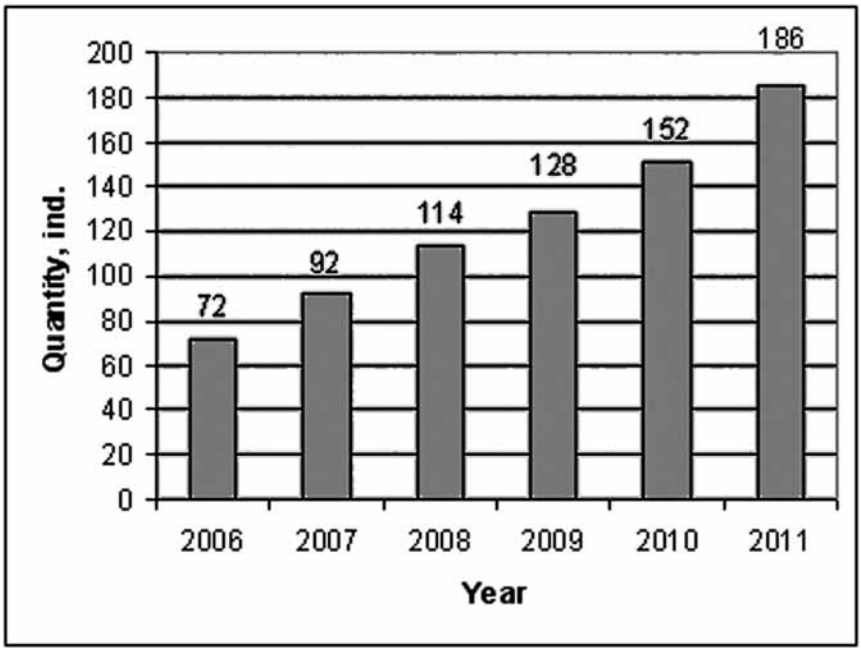

Figure 1. Population dynamics of European bison herd "Osipovichsakaya"

annual increase during that time was 19.6%. Between 1997 to 2011, 182 calves were born there, i.e. 12.1 annually. The highest number of offspring was recorded in 2011 – 34, followed by 2009 – 24, 2008 – 23 and 2007 – 20.

The reproductive rate ranged between 9.2 to 33.3%, 17.8% on average. The average fertility rate since 2006 was estimated for 40.5%, its maximal value was 61.0%. Mortality in the "Osipovichskaya" population of European bison was at minimal level (in comparison with other E. bison populations): 1 yearling was shot by poachers, 1 male had his forelimb hurt by buck-shot (eliminated) and another 6 years old male had his scapula broken (eliminated). There were not recorded cases of infectious diseases (Kozlo & Bunevich 2011).

Among undesirable events recorded were: late (January-February 2003) birth of two calves, 4 autumnal calves in 2010, 1 female was blind on right eye; 1 eliminated male had only one testicle, and his horns missed the level for a gold medal by just 1 CIC point. In total, 18 European bison were eliminated from this population between 2002 – 2010 (Kozlo & Bunevich 2011).

Natural food supply in the reserve

There were identified 159 species of herbs and dwarf-shrubs, eaten by European bison, in Osipovichy forestry within boundaries of planned home range of this population. These species belong to 41 families of plants:

Table 1. A composition of supplemental feeding of European bison in autum-winter period

Type of a forage	Age of animals	Daily quota [kg]	No of days of supplemental feeding	Average amount of food per autumn-winter season [kg]
Hay	adult 2–3 years yearling average	10–12 8–10 7–8 10	120	1200
Succulent food (potato, mangels)	adult 2–3 years yearling average	5 4 2 4	120	480
Grains	adult 2–3 years yearling average	3 2 1 2	120	240
Mixed forages	average	2	120	240
Acorns	average	2	120	240

Notice: hay is usually provided *at libitum*.

Asteraceae (22 species), Poaceae (21 species), Cyperaceae (11 species), Fabaceae and Lamiaceae (10 species each), Rosaceae (9 species). Other families are represented by 1 to 6 plant species. The distribution of species among food categories defined by L.N. Korochkina (1969), was as follows: 46 species (28.9%) belong to primary group of forages, 51 species (32.1%) – supplemental, 27 species (17.0%) – are of secondary meaning and 35 species (22.0%) – are eaten only randomly. European bison prefer herbal species from families Poaceae and Fabaceae (Kozlo, Stavrovskaya, Emelyanova, Deryabina, Kuchmel, data were not published).

According to the study on woody vegetation the majority of tree bark forages is in cleared spaces, meadows, desolated fields, deciduous understory, parvifoliate forests and wet meadows. The total reserve of biomass at the area of 26 848 ha is 253.8 thousand tons. It is enough to supply with forage a large population of European bison as well as other ruminant species.

In 2011 we established sampling plots 4x25 m each to estimate qualitatively and quantitatively autumn-winter tree bark forages in basic forest types of Osipovichy forestry. All trees and shrubs within plots were counted and their height recorded (below 1 m, between 1–2 m, higher than 2 m) and estimated was a degree of their damage by ruminant species.

Rowan *(Sorbus aucuparia)* (22.4–38.0%), buckthorn *(Frangula alnus)* (20.4–38.0%), birch *(Betula spp.)* (29.0–31.3%) and pine *(Pinus silvestris)* (8.2–22.4%) often occur in pine forests. Spruce *(Picea abies)* (12.9–24.5%) and

aspen *(Populus tremula)* (44.9%) takes a lower part in these forests. Spruce (34.9–88.5%) dominates in fir-woods, birch (11.6–42.3%) and aspen (53.5%) occur often. Evonymus *(Evonymus spp.)*, aspen and hazel *(Corylus avellana)* are widespread in broad leaved forests, oak *(Quercus robus)*, maple *(Acer platanoides)*, spruce, hornbeam *(Carpinus betulus)* and linden *(Tilia cordata)* are not rare. There are the following species in parvifoliate forests: aspen (39.1–43.4%), birch (28.0–34.6%) and willows *(Salix spp.)*; pine (2.6–16.0%), spruce (8.8–20.3%), black alder *(Alnus glutinosa)*, hazel (8.0–14.1%), rowan (10.3–12.4%) and buckthorn (13.8–18.8%) also grow there. In general in the forests of Osipovichy forestry dense understory occurs, consisting of shrubs and young trees. A majority of these species are a potential food for European bison. The overall damage of plants is not high there. The reserve of tree bark forages is 253.8 thousand tons.

Additional food provided by man

As it was stated earlier (Sushchenia & Kozlo 1992) European bison is the species that in ecological conditions of Belarus must be supplied with additional food. This problem may be solved by two ways: (1) by providing supplemental food in autumn-winter season, or (2) by growing cultivated plants at feeding plots for game.

Supplemental feeding in autumn-winter season

"Osipovichskaya" population receives following supplemental food: corn silage, grain wastes and mangels. In winter 2010/11 European bison were supplied with following forages: hay 10 tons, crushed grain 60 tons, corn silage 83 tons, mangels 45 tons, grain forage 7 tons. The amount of additional feeding is insufficient: it is estimated that it is necessary to have hay 1 200 kg, crushed grain 240 kg, rich fodders (potato, mangels) 480 kg, mixed fodders and acorns 240 kg each per one individual for a period of additional feeding. Because of this E. bison use crop remains from agricultural fields.

Cultivated feeding plots

According to our estimate, the area of feeding plots is insufficient – 40 ha out of the home range of this population (about 26 848 ha). There are three such plots: first with oats (4.5 ha), second with corn (10.5 ha), at third, with total area of 25 ha, 3 ha were of wheat, 4 ha – barley, and 10 ha – mangels (in total 17 ha). Except European bison there are red deer *(Cervus elaphus)*, roe deer *(Capreolus capreolus)*, moose *(Alces alces)* and wild boar *(Sus scrofa)*. The total numbers of their populations are 2 000–2 500 individuals. These animals also feed at feeding plots so plants cultivated there are severely damaged. Since the number of E. bison in the "Osipovichskaya" population is 186 animals, there

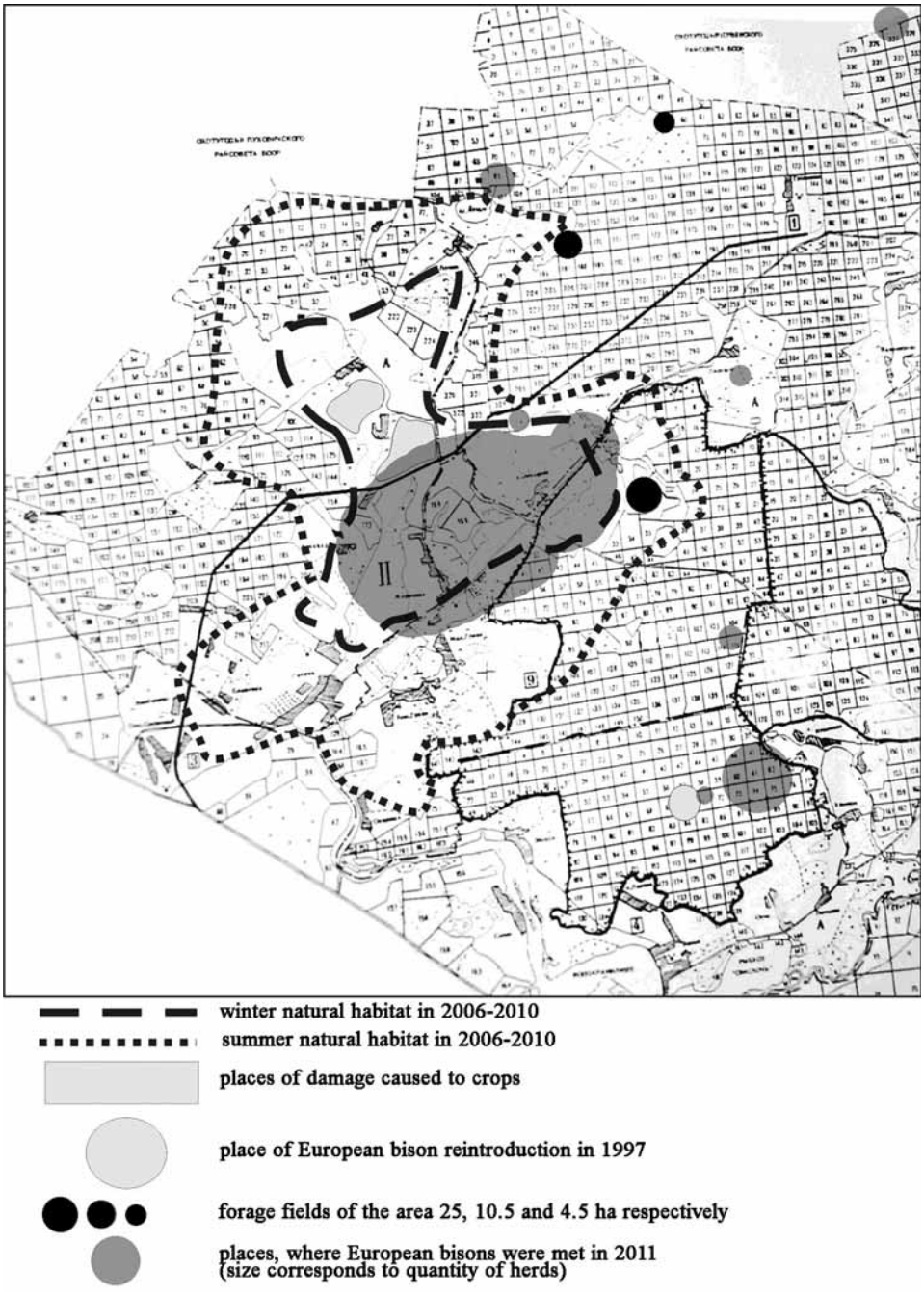

Figure 2. Characteristics of natural habitat for European bison herd in Osipovichy forestry.

is 0.21 ha of feeding plots per one individual. Russian specialists on European bison advise to designate 2–3 ha of feeding plots per one animal. So, for present numbers of E. bison (186) it would be necessary to establish 370–560 ha of feeding plots which is unrealistic. Results of our studies show however, that it is enough to designate on average 1.0–1.5 ha of feeding plots per 1 European bison.

The plan for an improvement of nutritional situation

Supplemental feeding in autumn-winter period

It will be necessary to establish at least two additional feeding points within winter home ranges of European bison herds. In those feeding points the following infrastructure should be installed: watching towers, trough for grain, grain wastes, acorns and other forages, salt containers and facilities allowing for the separation of calves. Additional feeding should follow quotas given in Tab. 1, that were approved in the Program for Conservation, Distribution and Using of European bison in Belarus (Kozlo 1999).

In the last 8–10 years there were some changes in the composition of supplemental feeding: instead of hay corn silage was offered, and it was willingly consumed by all ungulates including the European bison. If the population of E. bison will be cropped, it should be possible to limit the amount of provided food to 4.5–5 feed units per 1 individual daily.

Forage of agricultural origin

There is no way to prevent damage at the agricultural fields. In Osipovichy forestry in autumn, early spring and winters with a little of snow, large E. bison herds remain at not ploughed fields with mangels and corn. Especially they prefer fields with winter rape and rye. The optimal variant to solve this problem is to rent 200–250 ha of fields from agricultural organizations.

The plan of conservation and reasonable management of "Osipovichskaya" population

The plan of conservation and regulation of "Osipovichskaya" population of E. bison requires the maintenance of its numbers between 2012–2020, within the range of 120–130 individuals. An income from commercial hunts, would be then used to cover costs of all agricultural operations feeding plots and rented fields. Such arrangement with renting some fields would be favorable for both: forest economy, that does not have suitable machines for cultivation of plants, and agricultural organizations because of compensation for the loss of their profits. An improvement

of nutritional conditions for "Osipovichskaya" population of European bison will be possible if its numbers will remain within the range of 120–130 individuals, with planned harvest of 10 individuals in 2012, 10 in 2013, 10–15 in 2014, and up to 75% of annual growth after 2014.

References

Korochkina L.N. 1969. Woody vegetation in diet of European bison in Bielowiazhskaya pushcha. Bielowiazhskaya pushcha. Researches. I. 3: 120–126. [in Russian].

Kozlo P.G. 1999. The program for conservation, distribution and use of European bison in Belarus. Minsk, 48 pp. [in Russian].

Kozlo P.G., Bunevich A.N. 2011. European bison in Belarus. Minsk, 366 pp. [in Russian].

Sushchenia L.M., Kozlo P.G. 1994. Main objectives and conceptions of the program of European bison conservation in Belarus. Contemporary problems of European bison conservation: 24–30 [in Russian].

Plan optymalizacji działań wspierania i zarządzania populacją żubra (*Bison bonasus*) „Osipovichskaya"

Streszczenie: Przedstawiona jest aktualna sytuacja populacji żubra (*Bison bonasus*) „Osipovichskaya". Omówiona tez jest wielkość naturalnych zasobów pokarmowych oraz zakres dokarmiania. Przedstawione są cechy charakterystyczne populacji „Osipovichskaya" i przyczyny wysokiego tempa wzrostu jej liczebności. Opisane są metody poprawy warunków bytowania tej populacji. Wielkość populacji „Osipovichskaya" wzrosła z 15 do 186 zwierząt (czyli 12,4 razy) i przekroczyła zakładany poziom (120–130 osobników). Potwierdzono konieczność i wskazano metody rozszerzenia zasięgu poprzez zakładanie poletek i łąk które dostarczą znaczącą ilość pokarmu żubrom w sezonie wegetacyjnym.