

Development of European bison population “Ozery” from Grodno region

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Abstract: In 1998–2014, numbers of European bison „Ozery” population increased from 18 to 196 individuals. In this period 213 calves were born, the average coefficient of fecundity was 37.5%, and coefficient of births – 16.4%. Eight individuals died of natural causes. Average coefficient of mortality was 0.4%. The present home range of this population is 15–20 thousand ha during summer, and 6–8 thousand ha during winter. E. bison of this population are feeding as well in the forest as and agricultural fields and cultivated meadows.

Key words: European bison, population dynamics, Belarus

Introduction

To save the lowland European bison in Belarus, in the years 1994–2000 was developed and partially implemented population model, oriented for maintaining the European bison in the country in the form of a number of isolated populations. Currently there are 9 such populations, one of them has been formed in 2013. One of the fastest growing populations is “Ozery” from Grodno region.

Location and habitat conditions

European bison population “Ozery” dwells at the territory of Grodno region (western Belarus). The area is characterized by significant anthropogenic transformation and is represented by small fragments of forest, divided by agricultural fields. Inside the forests there are no human settlements. Pine forests, which cover 58.6% of the forest territory, dominate in the structure of forest stands. Among them well represented are mossy pine forests (63%), to a small degree blueberry (13%) and heather (18%) pine forests, other associations account for about 17%. The part of deciduous forests amounts to about 21%, including 12.0% alder and birch – 9.6%. Spruce forests cover up to 7.3%. The area of wetlands is about 8% of the total range. Middle-aged and maturing forests dominate there. Undergrowth is of moderate density, it consists of oak, spruce, birch, and aspen as well as alder buckthorn, rowan, hazel, juniper and other species. Agricultural areas include cultivated meadows (more than 500 ha), as well as cereals and winter rape. The total area used by “Ozery” population is 15–20 thousand ha.

Founding group

The founding group of "Ozery" population were 18 E. bison delivered from the "Belovezhskaya Pushcha" National Park to kolkhoz "„Ozery"" in 1998. Among them there were 4 males: 2 – 1.5 years old, 2 – 3 and 7 years old; and 14 females: 1 in the age of 2.5 years, 2 – 3 years old, 5 – 3.5 years old and 6 – from 4 to 8 years old. For temporary breeding and acclimatisation, a wooden enclosure was built there.

Materials and methods

Main part of data was collected and processed under the supervision of the former head of the laboratory of theriology of the State Research-Production Association "The Scientifically-Practical Centre of the National Academy of Sciences of Belarus for Bio-resources" Piotr Kozlo, who died in 2013.

The estimation of population density was carried out once, in winter (December) as well as the level of reproduction. At the same time sexual and age structure of population was determined. Coefficient of fecundity, birth coefficient and coefficient of mortality were calculated according to the method described in publications of Krasiński *et al.* (1999) and Kozlo and Bunevich (2011). Natural mortality was routinely registered during whole year.

Results and discussion

Development and forming of "Ozery" population was faster compared with other Belarussian E. bison populations. Over 16 years of its existence, the numbers of population increased from 18 to 196 individuals. During this period, 8 individual died (Tabl. 1). Average coefficient of mortality was 0.4% there. Since 2003, the elimination of defective (i.e. injured, severely sick, aggressive) animals takes place. So far there were culled 32 (27 males and 5 female) individuals, 30 (10, 20) E. bison were relocated to create a new population in the north part of Belarus, and one female was transferred to Grodno Zoo. Thus, the overall losses from this population amounted to 63 individuals. Analysis of long term data showed that the minor migrations of males from this population did not seriously affected its reproduction rate. Apparently, the ratio of reproductively active European bison males to females can be maintained at the level of 1 to 3 or 1 to 4.

During this entire period, 213 calves were born in this population. The average coefficient of fecundity was equal to 37.5% (with fluctuations from 23.4% to 77.7%), and was the same as in E. bison population living in Białowieża Forest (Krasiński *et al.* 1999; Kozlo and Bunevich 2011) and was higher comparing to other Belarussian populations. However the birth coefficient was similar there to this value at Osipo-

Table 1. Main demographic characteristics of "Ozery" population of European bison.

Year	Numbers on December 31, 2014	Increase or decrease rate [%]	Births	Coefficient of birth [%]	Natural Mortality (Coefficient of mortality) [%]	Culling (M, F)
1998	18		7	38.8	–	–
1999	25	+38.8	10	40.0	–	–
2000	35	+40.0	4	11.4	–	–
2001	39	+11.4	7	17.9	–	–
2002	46	+17.9	7	15.2	–	
2003	52	+13.0	9	17.3		1 (1, 0)
2004	60	+15.4	11	18.3	–	5 (3, 2)
2005	69	+15.0	12	17.4		2 (2, 0)
2006	79	+14.5	10	12.6	2 (2,0)	2 (2, 0)
2007	93	+17.7	12	12.9	1 (1,0)	5 (5, 0)
2008	110	+18.2	13	11.8	–	1 (1, 0)
2009	124	+12.7	14	11.3	1 (0,1)	2 (1, 1)
2010	139	+12.1	15	10.8	–	2 (2, 0)
2011	164	+18.0	20	12.2	–	9 (8, 1)
2012	185	+12.8	19	10.3	–	1 (0, 1)
2013	209	+13.0	18	8.6		2 (2, 0)
2014	196	–6.2	25	12.8	4 (2,2)	–
Total	–	–	213	–	8 (5,3)	31 (26, 5)
Average	–	+16.5	9.3	16.4		–

vichskaya population –16.4%. Undoubtedly, the high rate of the reproduction level in "Ozery" population is the result of very favourable habitat conditions during whole year, as well as effective protection and conservation measures.

Analysis of the reintroduction results showed that population "Ozery" is living in the most favourable habitat conditions, as compared to other Belarussian populations. This is largely due to organic type of farming applied in local agricultural fields, that are mainly used as cultural hayfields. Fields planted with perennial grasses (trefoil, alfalfa), peas, corn and other crops are essentially the best pasture for European bison and other wild ungulates. E. bison there mostly grazed at mowed hay meadows that provide abundant green fodder from early spring to late autumn. However, according to our observations, despite the abundance of food in agroecosystems, European bison feed also upon several species of plants that grow in various types of forest ecosystems. The damage to undergrowth within the European bison winter habitat is quite high.

European bison population "Ozery" has remained stable within originally designated area. A powerful factor stimulating movements of European bison from bordering forests and uncultivated land, is the presence of cultural hay fields. With an abundance of diverse, high-caloric and high-quality forage, the area actually occupied by European bison remains small. According to results of monitoring in the spring and summer, the home range of this population is about 12 thousand ha. In autumn, it is 8–9 thousand ha, and in winter it drops to 6–7 thousand ha.

Conclusions

The current population of European bison population "Ozery" counts 196 individuals (on 31st December 2014). Average long-term coefficient of fecundity is 37.5%, coefficient of birth 16.4%, and growth rate is 16.5%. The main negative factor preventing from the further development of European bison population "Ozery", is high density of its population, reaching 12.5 individuals per 1000 ha of forest.

The successful experience of reintroduction and the creation of well-formed European bison population „Ozery” allows to suggest, that some areas consisting of forests-agrocenoses, where crops are cultivated towards obtaining green mass for cattle breeding are very perspective for reintroduction of European bison, allowing for its range extension and increase of population numbers not only in Belarus, but also in other countries with similar ecological conditions.

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Rozwój populacji żubra "Ozery" z rejonu Grodna

Streszczenie: Między 1998 a 2014 rokiem populacja "Ozery" zwiększyła swoją liczebność od 18 do 196 osobników. W tym okresie urodziło się 213 cieląt, przeciętny współczynnik płodności wynosił 37,5%, a współczynnik urodzeń 16,4%. Osiem osobników padło z przyczyn naturalnych. Przeciętny współczynnik śmiertelności wynosił 0,4%. Aktualny areal zajmowany przez populację wynosi 15–20 tysięcy hektarów w sezonie wegetacyjnym oraz 6–8 tysięcy hektarów zimą. Żubry z tej populacji są dokarmiane zarówno na terenie lasu jak na obszarze użytkowanych rolniczo pól jak i uprawianych łąk.
