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Problems of the restitution of European bison *Bison bonasus* L. in Russia

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The Prioksko-Terrasny State Nature Biosphere Reserve named after M.A. Zablotsky, Russia

Abstract Summarized is the history of European bison restitution in Russia (formerly Soviet Union) since 1946, and in particular, achievements of Prioksko-Terrasny State Nature Reserve. Described are main assumptions of the program for wisent breeding, proposed by Michael Zablotsky. Listed are recommendations for the future work on securing the survival of the species, and identified are main threats related to its genetic purity.

Key words: *Bison bonasus*, restitution, breeding, Russia, threats, recommendations

Introduction

Shrinking of the *Bison bonasus* natural range began in the early Holocene. Three geographical isolated subspecies: Belovezhian or Lithuanian (*Bison bonasus bonasus* L.), Carpathian (*Bison bonasus hungarorum* Kretzoi) and Caucasian (*Bison bonasus caucasicus* Sat.) were formed in Europe (Flerov, 1979). By the end of first third of XX century all three subspecies vanished from their former habitats; wild European bison ceased to exist, and Carpathian and Caucasian subspecies were not preserved even in captivity.

The number of *Bison bonasus* living in captivity by December 31, 1924 was only 54 individuals all over the world. This was the lowest level of its numbers in the history of this species. At present, zoological species *Bison bonasus* is presented by two forms: European bison of Lowland (Białowieża) subspecies *Bison bonasus bonasus* and European bison of Lowland-Caucasian line *Bison bonasus caucasicus x Bison bonasus bonasus* which have in their gene pool genes of Caucasian subspecies. European bison of the Lowland-Caucasian line – are descendants of a single male of Caucasian subspecies, Pedigree No 100 named Kaukasus, mated in captivity with females of Białowieża subspecies.

Now, the situation with *Bison bonasus L.* had been changed to the better as a result of an intensive international work conducted over many years. By January 1st 2015, total number of European bison reached 5.553 out of which 3.543 were living in wild state over the territories of Russia, Ukraine, Byelorussia, Poland, Lithuania, Slovakia, and Germany (European Bison Pedigree Book 2014). Among the species, which were on the brink of extinction and preserved only in captivity, *Bison bonasus*

is a unique one, which was successfully returned into natural conditions. But the European bison still remains a rare, endangered species until now, and can be considered only as a species that escaped the threat of instant extermination. The question of necessity to ensure the existence of *Bison bonasus* is still urgent.

Description of Russian restitution program for European bison

The work of the restitution of *Bison bonasus* in the USSR, has been started in 1946. The initial stock (5 individuals) was brought from Poland to the Byelorussian part of Belovezhskaya Pushcha.

The main breeding centre of European bison in the Prioksko-Terrasny State Nature Reserve was established by outstanding Russian scientist Michael Zablotsky in 1948.

First 4 European bison (one pair of Białowieża subspecies and another of Lowland-Caucasian line) were brought to the Breeding Centre from Poland. Main goals of the Breeding Centre work are: (1) accelerated reproduction of European bison in conditions close to natural, to restore wild living populations within former range of the species, (2) the preservation of European bison pedigree stock (with pedigree retreated until 1881), (3) the preservation of insurance gene pool of the species *Bison bonasus,* (4) studies on biology, ecology, and ethology of European bison, (5) the elaboration of methods of keeping, breeding, feeding, transportation of European bison, (6) the education of specialists on the problem of the restitution of European bison.

The area of the Main Breeding Centre is of 200 ha. About 25–30 pure blood adult European bison with certified pedigree are living here during whole of their lives. About 20–30 calves are reared up here until the age of 1,5–2 years. Annually, in the Main Breeding Centre are maintained 45–60 individuals.

Up to January 1st 2016, 632 European bison were born in the Main Breeding Centre in Prioksko Terrasny Reserve. As much as 382 of them were sent to other places to establish new Breeding Centers of European bison and wild living groups on the territory of the former USSR and Russian Federation. Three "daughter" Breeding Centers were established in the Oka State Nature Reserve, Russia (1959), in the Game Management "Nauyamestis", Lithuania (1969), and in the Experimental Management "Cherga", Russia (1982). Establishment of wild living groups and later wild living populations of *Bison bonasus* had been started since 1961. European bison born and reared up in the Main Breeding Centre of European bison were brought to 27 places in forests of Russia, Ukraine, Lithuania, Byelorussia, Kirghizia (the last – experimental work) as initial stock for future wild living populations.

The great part of the work on the problem of the restitution of *Bison bonasus L.* in the USSR and in Russia had been made by Michael Zablotsky (between 1946–1996). The Prioksko-Terrasny State Nature Biosphere Reserve was named in honor of M. Zablotsky by March 19, 2015.

The program proposed by M. Zablotsky for the restitution of European bison, later successfully carried out into practice included:

1. An increment of European bison numbers in Breeding Centers according to specially developed scheme of breeding and keeping (von der Groeben, Żabiński, Zablotsky).
2. Resettlement of European bison over the territory of their former area in regions corresponding to biological requirements of this species.
3. The creation of local, geographically disunited populations of European bison, what is necessary condition for the increase of genetic diversity of the restored species, as a result of different genetic-automatic processes in each of separate populations (Dubinin, Glembotsky 1967).
4. The restoration of natural population structure of the species in the process of junction of separate populations, and as a consequence – certain level of panmixia owing to gene flow (Zablotskaya 2004).

Results of long-term work according to this program are as follows:

1. By January 1st 2016, there were 664 wild living *Bison bonasus L.* in 13 sites within Russian Federation.
2. About 129 *Bison bonasus* were living in 3 European bison Breeding Centres by this date: 53 in the Main Breeding Centre, 23 in the Oka reserve Breeding Centre, 53 in the "Cherga" Breeding Centre. Almost all *Bison bonasus* in Russia belong to Lowland-Caucasian line. European bison of Białowieża subspecies *Bison bonasus bonasus* remain only in the Breeding Centre "Cherga" (less than 60 individuals).

Conclusions and recommendations

At present, the work on the European bison restitution has reached the stage III. Some urgent problems should be solved to ensure further survival of *Bison bonasus:*

1. At least 1500–2000 individuals of *Bison bonasus* should live in wild state in forests of Russia, Byelorussia, and Ukraine (Zablotsky 1975; Red Data Book of RSFSR 1985; Zablotskaya 1990).
2. At least two large self-regulating meta-populations with an effective number Ne (the breeding part of the population) of 500 individuals should be established (Zablotskaya 1990; Zablotsky *et al.* 1999; Zablotskaya 2004). According to the criteria of the International Union of Nature Conservation, based on the population genetics, only fulfillment of requirements 1 and 2 may effectively preserve the species *Bison bonasus L.* from extinction.
3. The separate breeding of European bison of Białowieża subspecies *Bison bonasus bonasus* and of Lowland-Caucasian line should be continued. The separate breeding of these two forms belonging to the species *Bison bonasus* had been provided since first steps of work by the International Society for Protection of European

Bison (1923). All countries have been adhered to this principle until 1996, when it has been violated in Russia.

4. *Bison bonasus bonasus*, a single preserved subspecies among three subspecies which existed in the beginning of historical period, should preserve its genetic purity. The number of European bison belonging to Białowieża line, must be increased within Russia. The restitution of pedigree stock of *Bison bonasus bonasus* should be among the most important priorities of nature conservation in this country. It should be kept as a principle, that Białowieża subspecies of European bison is the nominal subspecies and its loss would be inadmissible.
5. The Main Breeding Centre of European bison in the Prioksko-Terrasny State Nature Biosphere Reserve must restore the separate keeping and breeding of both existing forms of *Bison bonasus* as it had been done until 1990s of XX century. Initial pedigree group of Białowieża line European bison should be brought from Breeding Centers in Poland or Lithuania.
6. Herds of interspecific hybrids *Bison bison x Bison bonasus* should be eliminated on the territory of the North West Caucasus (from the Kavkasky State Nature Biosphere Reserve). Instead, *Bison bonasus* of Lowland-Caucasian line must be introduced to these territories, most suitable for this form (Zablotskaya *et al.* 2004). The territory of North West Caucasus is ecologically most optimal for European bison. It is among some few ranges preserved at present, where sufficiently large self-regulating population of this species may exist. Elimination of interspecific hybrids in Kavkasky State Biosphere Reserve is necessary not only for the protection of European bison, but also for the conservation of unique biocenoses of the reserve. The influence of hybrids on biocenoses may be very harmful because they are as their ancestor *Bison bison* gregarious animals which tend to concentrate during grazing in great numbers within small area causing the transformation of forest ecosystem and disappearance of some herbaceous plant species (Dyrenkov, Durov, Pridnya pers. comms).
7. It is absolutely necessary totally put an end to unscientific statements that interspecific hybrids *Bison bison x Bison bonasus* which are living now at the territory of Kavkasky State Biosphere reserve became a new species: "mountain European bison" during 40 years (since 1940 till 1980) (acc. late Alexander Nemtzov) or that they have transformed into new "mountain" subspecies of European bison (acc. Taras Sipko). Taras Sipko had been making also oral statements that all pureblood European bison will die out because of inbreeding, if they will not be mated with animals called by him "mountain European bison" (really interspecific hybrids *Bison bison x Bison bonasus).* The harm from statements of such type to the restitution of European bison could be compared only with the harm which had been done to soviet genetic by Trophim Lysenko.
8. It is necessary to provide the artificial gene flow (separately for European bison of the Lowland subspecies and for European bison of Lowland-Cauca-

sian line) between local populations by means of repeated bringing of European bison from Breeding Centres and by exchange of males between wild living herds.

9. Existing local populations of European bison must became nuclei of self-regulated populations. Besides them, populations of European bison regulated by men should be established in the ecologically sufficient territories with limited areas about 50–70 thousand hectares, situated within hunting grounds (Zablotsky and Zablotskaya 1986)
10. Breeding of *Bison bonasus* in Breeding Centres should be continued to preserve insured pedigree stock (at least 15% from total number of European bison in the country) and gene pool of the species.
11. Appropriate administrative and legal measures to improve the protection of the species, and conditions in European bison habitats should be undertaken.
12. The economic losses caused by wild living European bison to private agricultural property should be compensated by the State.
13. The restitution of European bison in Russian Federation must be among priorities of governmental policy of natural conservation. Broad circle of scientists from State Nature Reserves, Academy of Sciences, Universities and other scientific institutions should be involved in the decision of this problem. Priority among them should be done to specialists on the problems of the European bison restitution, specialists on ungulates and other zoologists of vertebrates. Without systematic coordinated work on the problem of the restitution of European bison, carried out in conditions of extensive publicity, the destiny of *Bison bonasus* as zoological species is endangered.

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Problemy restytucji żubra *Bison bonasus L.* w Rosji

Streszczenie: Podsumowano historię restytucji żubra od 1946 w Rosji (dawny Związek Radziecki), a szczególnie osiągnięcia ośrodka hodowli w rezerwacie natury Prioksko-Terrasnyj. Opisano główne założenia zaproponowanego przez Michaiła Zabłockiego programu hodowli żubrów. Wymienione są rekomendacje dla przyszłej pracy nad tym gatunkiem zapewniającej przetrwanie i właściwą ochronę oraz określono najważniejsze zagrożenia związane z gwarantowaniem czystości gatunkowej.