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## **Progress in breeding and scientific research in the central European bison nursery of M.A. Zablotsky Prioksky-Terrasny State Biosphere Reserve of the Ministry of Natural Resources of the Russian Federation – 2017**

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**Abstract.** The article tells the story of the creation of a nursery for breeding an European bison in the Prioksko-Terrasny state biosphere reserve. Data about the breeding of European bison during the last three years are given. Numerical data on the export of European bison to other reserves of the Russian Federation are presented. The article describes the scientific collaboration of the Prioksko-Terrasny reserve with other scientific institutions in Russia and in Europe for the research on European bison. References are given to scientific work on the study of the European bison in recent years, performed with the participation of the employees of the nursery for breeding the European bison.

**Key words:** *Bison bonasus*, animal breeding, microbiology, bacteriophages

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### **Introduction**

The “ M.A. Zablotsky Oka-Terraced State Biosphere Reserve” is located in the south of Moscow region (54.53 °, northern latitude and 37.36° east longitude). The area of the reserve is 4 960 ha. The area of the European bison nursery is 200 ha. The reserve is located in the zone of coniferous-broad-leaved (mixed) forests of the European part of the Russian Federation. In 1948, the Central Bison Nursery was established there, which now is the center of scientific work on the problems of restoring the population of European bison. Studies conducted there concern the morphology, systematics, genetic, evolution, ecology and etiology of European bison. This report presents the results of the work of the nursery on breeding European bison for the last 3 years.



## **The history of the reserve and the central European bison nursery**

Prioksko-Terrasny Reserve was established on June 19, 1945 as one of the five sections of the Moscow Reserve. In 1948, along with other sites of the Moscow Reserve, it was granted with the status of an independent reserve, and after the abolition of the other four reserves in 1951, it remained the only state reserve in the Moscow Region, representing the nature of not only this region, but the center of the Russian Plain. This is its special value and uniqueness. In 1948, to preserve and restore a rare species – the European bison in the northwestern part of the reserve, the Central European Bison Nursery was established by M.A.Zablotsky. The first four European bison in the Central European Bison Nursery were brought in 1948 from Poland (Zablotsky 1975; Zablotsky and Zablotskaya 1986). In the early 1950s, the Nature Museum of the Reserve was built on the Central Manor of the Reserve, the exposition of which was created by V.F. Arsenyev. Most of this exposition is represented in the museum to the present day. Immediately after the organization of the nursery, it became an attractive place for animal painters from Moscow. The first was the academician of the Academy of Arts, V.A. Vatagin, who visited the reserve many times and worked until his death on picturesque, graphic and sculptural images of E. bison living in Central European Bison Nursery. Other numerous Russian animal painters also worked in the reserve many times. In the 1980s the reserve took part in the international project “National Parks and Reserves of the World”, which was filmed by the “BBC” TV company, and the author of the films was the British writer-naturalist Gerald Darrell. The separate film within this project was dedicated to Prioksko-Terrasny Reserve and the restitution of European bison. On March 19, 2016, the reserve was named after M.A.Zablotsky.

## **The main goals and tasks of the nursery**

The main goals of the nursery are: to increase reproduction rate of the European bison, preservation of its gene pool and the resettlement of European bison into various protected areas of the Russian Federation. The tasks of the nursery are: the extension of the gene pool of European bison living in the Russian Federation, the preservation of the bison genetic diversity, the study of bison biology, the development of methods for keeping, feeding, transporting and resettlement of European bison into natural habitats (Zablotskaya 1990; 2016; Zablotsky 1975; Zablotsky and Zablotskaya 1986). Since 1952, 407 animals from the nursery were introduced into natural biotopes of Russian Federation. Among other tasks of the European bison nursery are: compilation of animal passports with photo-documentation for the breeding stock of European bison, keeping the books of the Central European Bison Nursery (CEBN), sanitation of paddocks, restoration of the soil layer in the nursery.

## **The main results of the nursery activities in recent years**

December 31, 2014, in the nursery were maintained 53 pure breed European bison (4 separate family groups of European bison) including 22 mature females and 4 males.

December 31, 2015, in the nursery were maintained 49 pure breed European bison (4 separate family groups of European bison) inhabiting the nursery, including 15 mature females and 4 males

December 31, 2016, in the nursery were maintained 58 pure breed European bison (6 separate family groups of European bison), including 16 mature females and 6 males.

All animals in the nursery belong to Lowland-Caucasian line.

## **Reproduction of European bison**

13 calves of European bison (6 males and 7 females) were born in 2014; 13 calves of European bison (7 males and 6 females) were born in 2015; 14 calves of European bison (7 males and 6 females) were born in 2016.

## **Activities of the nursery in last 3 years**

### ***1. Transfers of animals***

In the year 2014 there were no transfers of animals; in 2015–14 European bison were exported, in 2016–15 animals were exported. Out this number 12 animals were placed in reserves: 6 in “Bryansk Forest” and 6 in “Kaluga Zaseki”. Three animals were sent to zoos.

### ***2. Veterinary care***

Veterinary service carries out clinical examination of animals every week. Animals are systematically dewormed and subsequently their condition is monitored through fecal analyses. Additionally animals are provided with vitamins in order to improve their condition.

### ***3. Feeding***

The composition of the diet was prescribed separately for winter and summer seasons. After a 16 year break, reestablished was the storage of vegetables which allowed for including between October and April in E. bison diet juicy components in the form of root crops i.e. beets and carrots. In summer, provided are apples, pumpkin, carrots. A premise for storage of mixed fodder, agricultural machinery, and seasonal equipment has been built.

#### **4. Identification of animals and pedigree documentation**

An observation tower with viewing platforms allowing for convenient photography of animals was built. Maintenance of individual records allowing for identification of animals and their ancestry together with photo documentation for the breeding stock of European bison was suspended for 47 years (from 1948 to 1968). Such certification was restored and now individual pedigree passports are issued for all newborn European bison. The photo-documentation is updated every three years. Revision of pedigree documentation for the period from 1999 to 2013 was performed by M.M. Zablotskaya. In 2014, a complete reconciliation of the books of recording content and breeding of animals in the Central European Bison nursery and materials on the European bison published in the "Annals of Nature of Prioksky-Terrasny Reserve" was done. A compiled list of all amendments to the pedigree documentation on the European bison is in the Scientific Foundation of the Reserve. The second copy is in the Ministry of Nature of RF. The selection of animals for the proper composition of the breeding stock has been done.

#### **Scientific work in the nursery.**

The reserve conducts intensive research on E. bison. Particular attention is paid to the breeding of this species in Russia, the development of plans for its resettlement, and the study on the biology and etiology of these animals in free living conditions. So far published were more than 800 scientific papers in Russian and about 100 in English. Up to now, research at the nursery is being carried out jointly with the K.I. Skryabin All-Russian Research Institute of Fundamental and Applied Parasitology of Animals and Plants, A.A. Borisyak Paleontological Institute of Russian Academy of Science, Moscow State University of Food Production on the topic "Helminthoses of European bison and American bison in the M.A. Zablotsky Oka-Terraced State Biosphere Reserve". In addition to a comprehensive study on animals, a comparative analysis of the data obtained for Pleistocene and modern species is carried out. On the basis of CEBN together with the Institute of Biochemistry and Physiology of Microorganisms, Faculty of Biology of Vyatka State University, Pushchino Natural Science Institute and Aberdeen University conducted was study: "Structural-molecular characterization of the biodiversity of coliphages and bacteriophages of the pseudomonas of the European bison (*Bison bonasus* L. 1758) and American bison (*Bison bison* L. 1758) of the Priokski-Terrasny State Reserve" (Zimin et al. 2016; 2017c). The relevance of this study is very important for the treatment of ungulate animals. Recently a ban on the use of subtherapeutic levels of antibiotics in livestock in the European Union and Russia has been issued. Bacteriophage therapy is one of the alternatives to antibiotics, as antimicrobial drugs for veterinary medicine and medicine. The main focus of the study was on coliphages (i.e. bacteriophages of

*Escherichia coli*, a causative agent of diarrhea in wild and farm animals). The study concerns the ecology of phages in the digestive tract of European bison and the creation of new antibacterial drugs (Zimin et al. 2017a; 2017b).

## Conclusions

In conclusion, it worth to note that in the Breeding Center on the European bison constant research is conducted to maintain and expand the welfare of the animal. The nursery constantly delivers new animals to the most diverse regions of Russia, including the Kaluga Region, the Orlov Region, the Krasnodar Territory and the Vologda Region. The nursery is actively engaged in scientific work, which now includes the most diverse areas of scientific activity. In recent years, a genetic study of European bison, as well as microbiological and virological studies of the gastrointestinal tract of these animals have been started in the nursery in collaboration with academic research institutes and universities. A comprehensive scientific approach to animal breeding allows to hope for a successful work in the field of restoring European Bison population in Russia.

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