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## THE WISENT *BISON BONASUS* (MAMMALIA, ARTIODACTYLA) RESTORATION IN UKRAINE: RESULTS AND PERSPECTIVES

V. M. Smagol, G. G. Gavris

Schmalhausen Institute of Zoology, NAS of Ukraine,  
vul. B. Khmelnytskogo, 15, Kyiv, 01030 Ukraine  
E-mail: v.smagol@gmail.com

**The Wisent *Bison bonasus* (Mammalia, Artiodactyla) Restoration in Ukraine: Results and Perspectives.** Smagol, V. M., Gavris, G. G. — At given time, wisent's metpopulation in Ukraine is in the state of resumption of biological characteristics of this species, which determines the need to control for the animals origin. Such studies assess the condition of each subpopulation, as well as to carry out the selection measures for conservation of the overall genetic variability of species. In modern conditions the success of wisent restoration depends on implementation of the national and international programs, the help of maecenas, the scale agitation among the peoples as well as the interest of users of hunting grounds and conservation areas.

Key words: wisent, Ukraine, subpopulation.

### Introduction

Wisent farming in Ukraine began in 1965 by the Programme for this species restoration in former USSR (Zablotski, 1949). Thus in the Chernivtsi, Ivano-Frankivsk, Lviv, Volyn, Rivne, Vinnytsia, Kyiv, Chernihiv and Sumy regions were formed ten wisent subpopulations only seven of whom are survived to this day (Gerus, Kryzhanivski, 2005). In the near past Ukraine has been the leader in the wisent's livestock increasing, but over the years of sovereignty all positive potential was practically lost.

National Action Plan for the Conservation of the Wisent (*Bison bonasus* L.) has been developed in 2006 (Kryzhanivski, 2006). In this project the creation of new subpopulations, particularly in the Chernobyl Exclusion Zone, Shatsky National Nature Park (Volyn Region), Desnyansko-Starogutsky National Nature Park (Sumy Region), Regional Landscape Park "Kinburnska Kosa" (Mykolaiv Region) was proposed (Akimov et al., 1999; Arhipov et al., 1999; Kryzhanovskii, 1999; Mizin, 2004). In addition, the ways of wisent optimization in human economic activities have been developed, the creation of the national breeding center was justified, and the question about advisability of this species rearing in the "clean" inbred low-lying line was raised. Unfortunately, this project has not received the official status as a national program and financing. Therefore, the salvation of Lopatynska subpopulation due to enriching of its genebank was the only result of the project.

Also, there are problems now. In particular, due to a lack of financing, the national program "Subpopulations passportization and the plan development of wisent's settling in Ukraine, based on assessment of current status, food supplies and optimal numbers of subpopulations; development and implementation of measures concerning its conservation, including information and awareness-raising measures", that was executed in the I. I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine commissioned by the Ministry of Ecology and Natural Resources of Ukraine (2009–2011).

The situation at the regional level is a little better. "Wisent reintroduction programme in Skolivski Beskydy (Ukrainian Carpathians) for the period up to 2015" has been partially implemented by specialists of the Institute of Ecology of the Carpathians of National Academy of Sciences of Ukraine. This project is being implemented with the assistance of European Bison Friends Society (Stowarzzenie Miłośników Żubrow, Polska). Separately, the Lviv Regional Administration of Forestry and Hunting was developed a "Program of conservation, protection and restoration of wisent in the territory of Lviv Region", which is supportive of the Lopatynska subpopulation recovery.

Today, the salvation of wisent in Ukraine is often possible with the assistance of foreign patrons and international funds only. Environmental Private Enterprise "Kyiv Zoological Center" with the support of Frankfurt Zoological Society has developed and partially implemented the regional program "Conservation and restoration of wisent (*Bison bonasus* L.) in Volyn Region".

However, the popularization of information about wisent has an important activity in the field of conservation of this species. In particular, 2009 was proclaimed as the “Year of the Wisent in Ukraine”. In 2010, the campaign “We cut them out of our lives” was held with the support of the OSCE. As part of this action, was carried out several thematic seminars and presentations on the conservation of rare fauna of Ukraine, including bison. In 2011 “Kyiv Zoological Center” issued a leaflet “Wisent in Ukraine: Present and Future”.

### Materials and methods

Results of personal field researches (2009–2015), the available scientific literature, electronic information sources, as well as statistical reporting data of regional Departments of Forestry and Hunting in Ukraine have been analyzed. In addition we studied the regulatory framework and archival materials of the state organization (SO) “Residence “Zalissia” (Kyiv Region), state enterprise (SE) “Hunting farm “Zverivske” (Volyn Region), SE “Konotop forestry” (Sumy Region), SE “Khmelnitsky forestry” (Khmelnitsky Region), SE “Beregometske forestry” (Chernivtsi Region), SE “Storozhynets forest-hunting farm (Chernivtsi Region), SE “Hunting farm “Styr” (Lviv Region), National Nature Park (NNP) “Skolivski Beskydy” (Lviv Region).

### Results

At the beginning of work on this species restoration the European Bison Pedigree Book was created. In this book were recorded data about sex, age and location of each animal. In Ukraine, the beginning of wisent certification was done in 1960–1970 in parallel with the creation of each subpopulation. Identification of the main breeders is not a problem in the initial stages of reintroduction, when the number of animals was not great and its dislocation limited by the enclosure. But, after the release of wisents for wildlife and increase their numbers, the animals began to breed haphazardly by the principle of the any coupling and a broad selection of partners. Also under conditions of herds increasing, the main breeders are often changed every year or even several times a season.

Thus the passportizations of wisent’s livestock in Ukraine were stopped since the subpopulations formation that complicates the definition of genealogical relationship and representation of the genetic pool of individual breeders in herds. Now we have the data only about imported animals that are the founders of the subpopulations (Smagol, Gavris, 2013). This once again raises the problem of conservation of the genetic variation of species.

It must be recalled that recent wisent’s livestock went through two the so-called “bottleneck”. Geneticists mean by this process, reducing the population gene pool to critical minimum (Kaidanov, 1996). The first “bottleneck” was formed in 1924 when seventeen animals of this species were selected for restitution. In 1946 due to the reduction of livestock during the Second World War, only 67 wisents participated in breeding (second “bottleneck”). Thus, genetic catastrophes resulted in impoverishment of the general heterogeneous level of the world wisent’s livestock. However, in Ukrainian reality, since the 1990’s the all national subpopulations autonomously crossed (or currently) that barrier for a third time.

The investigation of origin Ukrainian wisent’s herds proves that after forming, they can be divided of *polyphyletic* (origin from different breeding centers) and *monophyletic* (origin from only one breeding center) (Smagol, Sharapa, 2010) (fig. 1).

The first group is made:

- Bukovynska subpopulation (Chernivtsi Region), 29 individuals, this animals origin from Belovezhskaya Pushcha (Belarus), Berezinski Nature Reserve (Belarus), Oksky Nature Reserve (Russian Federation), Prioksko-Terrasny Nature Reserve (Russian Federation);

- Lopatinska subpopulation (Lviv Region), 36 individuals, was formed into wisent’s livestock from specialized breeding center “Naujamestis” (Lithuania) and the new group of animals from Uladvivska subpopulation (Vinnytsa Region) origin from Belovezhskaya Pushcha (Belarus).

- Skolivska subpopulation (Lviv Region), 20 individuals, was importing mainly from Germany, though from different breeding centers.

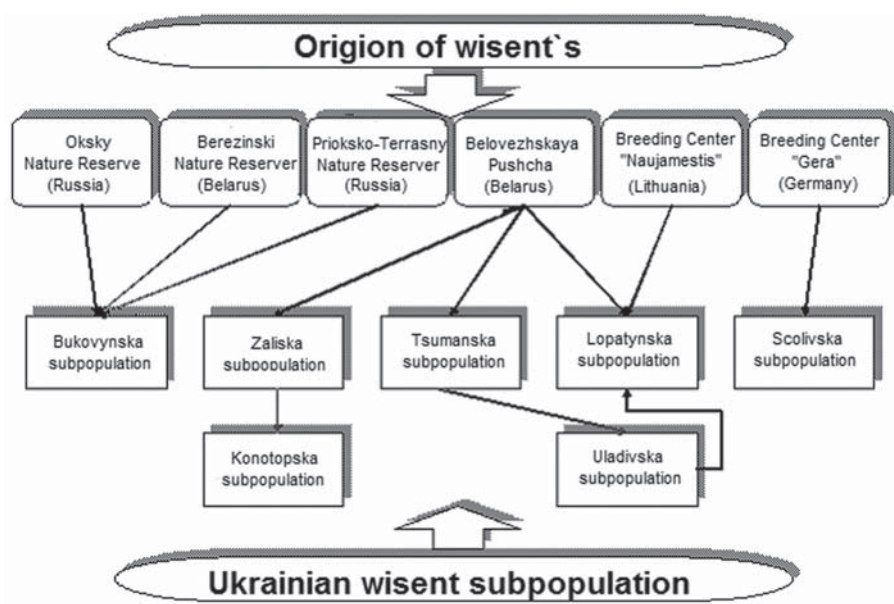


Fig. 1. Etymology of wisent subpopulations in Ukraine.

Heterogeneous of named two herds is beyond any doubt, what cause predetermines their optimization only due accumulation general quantity of livestock. The animals-founder of Skolivsky subpopulation characterized by high degree of inbreeding initially, but the perspectives of participation of a few males in reproductive process creates the prerequisites to improve heterogeneous background of herd.

The second group is made:

- Tcumanska subpopulation (Volyn Region), 14 individuals
- Uladivska subpopulation (Vinnytsia Region), 101 individuals
- Zaliska subpopulation (Kiev Region), 25 individuals
- Konotopska subpopulation (Sumy Region), 43 individuals.

All said herd’s origin from Belarus state nature conservation enterprise “National Park “Belovezhskaya Pushcha”. And Uladivska subpopulation is “daughter” (i. e. closely breeding) of Tcumanska herd.

Konotopska subpopulation has a similar origin in relation to Zaliska herd. At the same time, to the Kyiv and Volyn Regions wisents also came from Belovezhskaya Pushcha, and in the short period (1965 and 1967). In that way we can suppose proximity of blood all four herds, and consequently the exchange of animals between subpopulations will bring unimportant results of influence in the increase of general heterogeneous level.

Prevention of inbreeding depression can be achieved by the exchange of animals (i. e. by the genetic material) between “Belovezhskaya” and “German” pools. In particular, it is advisable to transfer the part of the wisent herd of NNP “Skolivski Beskydy” to the SE “Hunting farm “Zverivske” or GO “Residence “Zalissia” — where there are fenced areas, and the possibility of qualitative monitoring accordingly.

The delivery animals from Uladivska subpopulation look more attractive for NNP “Skolivski Beskydy”. Considering the cumulative numbers of more than a hundred individuals, now this group is the only one “donor” for other herds in Ukraine.

Thus, there is the necessity of the development of the separate “Programme of optimization of the common heterogeneous background of Ukrainian wisent metapopulation”, which will coordinate the isolated activities of the above-mentioned regional projects.

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