

SECTION 10 AGRICULTURAL SCIENCES AND FOOD

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**EMBRYO CRYOBANKS AS AN IMPORTANT COMPONENT
ENDANGERED LIVESTOCK BREEDS OF UKRAINE**

The development of industrial animal husbandry on a global scale shows a tendency towards an unceasing increase in the productive and technological qualities of animals, in particular dairy cattle, but with a simultaneous direction towards the absorption of non-competitive breeding material. In practice, this is done through an intensive selection process, hybridization and the disappearance of local and aboriginal breeds of cattle (cattle).

In Ukraine, experts currently count 5 endangered breeds of cattle of domestic selection: brown Carpathian, Lebedin, red steppe, white-headed Ukrainian and gray Ukrainian [1, 2]. To preserve them, a Program was developed and implemented, which includes numerous scientific research, methodological, biotechnological and organizational measures [1, 2, 6]. Since 2009, Ukraine has been a member of the European Regional Center for Animal Genetic Resources, namely: the Program “Conservation of the Animal Gene Pool”, in the European Regional Center for Animal Genetic Resources, at the FAO. But despite the long-term comprehensive work of numerous state institutions on genetic and population monitoring in gene pool herds, with the regulation and optimization of their numbers on the basis of the European Regional Focal Point for Animal Genetic Resources (ERFP) for the combination of biotechnological, genetic selection and cryotechnologies, the number of animals is steadily decreasing, and as a result of the military aggression of the Russian Federation against Ukraine, this process has become critical [5]. Thus, in recent years, replenishment of the bank of animal genetic resources of the IRGT of the National Academy of Sciences did not meet biotechnological requirements, which is especially noticeable for aboriginal breeds of cattle [5]. The urgent task of creating virtual cryopreserved gene pool herds remains in the state of declaration.

The Association of Ukrainian agro-entrepreneurs and scientific staff of IRGT NAAS, ODAU, DDAEU based on the analysis of literary sources and data from the practical activities of the certified Embryo Transplantation Laboratory “Poltavaplemservice” reviewed the data on the availability of genetic resources of local breeds of the Russian Federation and the possibility of transferring innovative reproductive technologies, in particular, embryo donation, embryo transfer and cryopreservation of gametes and embryos of cattle.

CRYOBANK

Endangered species:

Specialized, commercial, hybrid breeds

Breed	Gray Ukrainian	White-headed Ukrainian	Red steppe	Lebedynska	Bura Carpathian
The number of brooders	12	8	2	6	13
The number of sperm doses	9358	4692	950	1920	3489
Number of cows	7	5	?	0	0
Number of embryos	30	30	?	0	0

Fig. 1. Availability of cryopreserved sperm products and embryos of local and endangered domestic livestock breeds of Ukraine. Source: [2].

As can be seen from the data in Figure 1, today the availability of genetic resources in the bank of IRGT named after M.V. Zubtsia of the National Academy of Sciences, which has the status of national property (order of the Cabinet of Ministers of Ukraine dated 19.09.20202 No. 472-r [1]) does not meet the needs of the biotechnologies of reproduction of cattle both by in situ and for the creation of VRGS, and this primarily concerns a small number or the complete absence of embryos, that is, samples of female genotypes. In 2012, the Embryo Transplantation Laboratory “Poltavaplemservice” took an active part in replenishing the institute's embryo cryobank. Frozen embryos of cows of the red steppe breed were also provided from her, but there are no data on their storage in the literature. The potential of using the practical experience of the Laboratory in the conditions of real Ukrainian dairy farms was considered in our previous publications [3, 4, 5, 6]. Currently, animals of the unique domestic gray Ukrainian breed are preserved in various private farms (Fig. 2-4). The lack of well-established selection control over these groups of animals, uncontrolled crossbreeding lead to the absorption of a unique genotype that is no longer found anywhere on the planet [5].

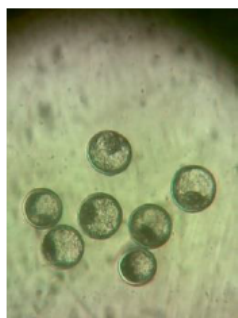


Fig. 2. Photomicrograph of high-quality transferable cow embryos before the start of cryopreservation and placement in the embryo cryobank.



Fig. 3. Repair bulls of the gray Ukrainian breed in the conditions of state breeding of the Askania-Nova Institute, 2018.



Fig. 4. Cattle of the gray Ukrainian population in the herd of the Veles farm, Chernihiv Region, 2023 [7].

Source: photo archive of the author from the materials of the Laboratory of Embryo Transplantation “Poltavaplemservice” and OSAU

Therefore, taking into account the importance of preserving the gene pool of domestic aboriginal breeds as carriers of unique gene complexes that cannot be reproduced in the future, the program of organizing the accumulation of frozen embryos in a cryobank is critically relevant and requires the attention of the world scientific community.

References

1. Башенко М.І., Гладій М.В., Полупан Ю.П., Ковтун С.І., Бородай І.С. Теоретико-методологічні та науково-організаційні засади становлення банку генетичних ресурсів сільськогосподарських тварин Інституту розведення і генетики тварин імені М.В. Зубця НААН. Розведення і генетика. 2017. Вип. 53. С. 7-14.

2. Вишневецький Л.В., Порхун М.Г., Сидоренко О.В., Джус П.П. Банк генетичних ресурсів тварин ІРГТ ім. М.В. Зубця НААН у системі збереження біорізноманіття тваринництва України. Розведення і генетика. 2017. Вип. 53. С. 21-28.

3. Сідашова, С.О., Ковтун С.І., Щербак О.В. Генетичні ресурси племінних молочних стад: селекційний потенціал кращих корів та ефективність їх відтворення. Розведення і генетика тварин: між від. темат. наук.зб. /НААН ІРГТ. К.: Аграрна наука, 2018. Вип.55. С.209-219.

4. Сідашова, С.О., Щербак, О.В., Ковтун, С.І., Троцький, П.А., Стаховський, В.Ф. Спосіб отримання і збереження ооцитів корів в умовах мобільної лабораторії. 2022. Патент України. UA 150 193, подано серпень 12.08.2021, опубліковано січень 12.01.2022.

5. Zhukov Yu.I., Roman L.G., Sidashova S.O., Kirovich N.O. Gray ukrainian cattle - an important component biodiversity of the fau gray ukrainian cattle -an important component biodiversity of the fauna of europe. Abstract II International scientific and practical conference “Modern Approaches to Problem Solving in Science and Technology” (November 15-17, 2023) Warsaw, Poland, International Science Unity. 2023, P. 68-72.

6. Sidashova S., Sherbak O., Kovtun S., Stahovskyy V., Stryzhak T. Formation of a cryobank of high producing cows embryos in the conditions of the industrial dairy complex. CRYO2021. Virtual meeting. The 58th annual meeting of the society for cryobiology. Abstracts. July 20-23, 2021. P.116.

7. Проєкт М. Травецького “Велесова ферма”. [Електронний ресурс]. Режим доступу: <https://www.youtube.com/@user-velesmot/videos>