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## **NEW APPROACHES TO EFFICIENCY ENHANCEMENT OF LIVESTOCK BREEDING IN THE REPUBLIC OF BELARUS**

Olshevskaya A.N., Master's student,

Rylo T.V., senior teacher

*Belarusian state agrarian technical university, Minsk, the Republic of Belarus*

**Summary.** The article is devoted to the problem of optimising innovation processes in livestock breeding. The examples of the most suitable and effective innovations used on Belarusian advanced farms are described.

**Key words:** livestock farming, milk, feed additives, smart farm, technologies, innovations.

**Formulation of the problem.** There are about 3.2 thousand dairy farms in Belarus, of which more than 1.6 thousand use modern technologies (49% of the total number of farms) and keep 67% of the total number of cows in the country. The share of milk production on Belarusian modern farms is 73% of the total volume. The productivity of milking herd for 9 months of the current year amounted to 4851 kg, which is 426 kg higher than the average republican level. Proper application of technologies at these complexes and construction of new machine and tractor complex is a stimulus for further increase of milk production and efficiency.

Owing to modernization of livestock facilities in Belarus, positive dynamics of milk sales has been noted. Thus, in the first half of 2023, the profitability of milk sales amounted to 24.3%, which corresponds to the level of the same period of 2022.

*Basic research materials.* The leading center in Belarus, which is engaged in capacity building in various areas of agriculture, is the National Unitary Enterprise "Scientific and Practical Center of the National Academy of Sciences of Belarus on Animal Husbandry".

In recent years the specialists of the center have created a lot of new feed additives, which allow increasing qualitative and quantitative indicators of the livestock industry.

A great variety of premixes and protein mineral supplements enable providing farm cattle and poultry with full-fledged diets, balanced in nutrients, mineral and biologically active substances, in manufacture of which the best technologies and components are used. In this way, the use of secondary products of oil extraction industry is being actively developed, and good results are achieved by adding valuable natural raw materials – lake sapropels into fodder, which makes it possible to increase animal productivity, reduce the cost of production and save up to 8% of grain in the composition of mixed fodder. Even better results are achieved by including complex protein-mineral and protein-vitamin-mineral supplements prepared from local raw material sources into animal diets. Along with the increase in productivity and reduction of production costs, this allows to reduce imports of feed additives and save money in foreign currency.

As productivity increases, cattle diets are improved with consideration of new indicators that were not taken into account before: degradable and non-degradable protein, neutral and acid-detergent fiber, stable starch, etc., which are essential for obtaining high productivity from livestock.

The research in the field of amino acid nutrition of calves during the dairy breeding period is carried out, which allows to efficiently raise healthy calves. Different mineral feed additives for cattle based on nanoparticles and chelate compounds are constantly introduced into production. The scientists are improving highly effective recipes for premixes, mixed foddors, and feed additives. All this makes it possible to reduce the imports of similar

components. One of the latest developments of the center is a smart farm. All new technological developments of the center were included in the project of construction of an innovative dairy complex for 1000 dairy cows with a closed cycle which is located on the farm "Ustye" in Orsha district. All processes have been intensified there, which makes it possible to significantly increase the efficiency.

In fact, this is a farm with a full closed cycle, where human participation is minimized. For the first time in the post-Soviet period, the system of automated milking on a 40-seat rotary-type milking platform "Carousel" was used in combination with differentiated cow housing by physiological condition and productivity, being typical for large complexes. Smart Farm is a huge computer, which monitors absolutely every stage of animal husbandry: movement of animals, automated individual dispensing of concentrates, automatic system for sorting and breeding animals into groups based on set parameters, a system for recording animal activity, milking process control [1].

The National Research Center for Animal Husbandry of the National Academy of Sciences together with colleagues from other industry departments created a domestic breed of Eushta cattle, the milk potential of which is estimated at 10-12 thousand liters. 80% of milk in Belarus is produced by animals of this breed. Besides, the work on creation of the Belarusian red breed is being actively carried out. Thus, a small population of cows of this breed has been preserved in the republic – about 300 cows. The milk from these cows is characterized by unique qualitative characteristics: fat content of 4.5%, low protein - 3.8% and up to 15 thousand somatic cells. For enhancing of cattle breeding development, the population of red Danish cattle was imported to four farms in Belarus. It is planned to use genetic markers of this breed, and at the same time to preserve the authenticity of the Belarusian red cow. Significant work is also being done to optimize animal reproduction, and the efficiency of the embryo

transplantation method is being improved. In vitro methods for obtaining animals outside the body are being developed and introduced. This makes it possible to use cows that are no longer suitable for milk production but have a high genetic status [2].

**Conclusions.** In recent years, advanced agrarian enterprises of Belarus have been actively introducing innovative technologies into the practice of economic activity, however, the degree of innovation prevalence in agriculture as a whole remains insignificant. A minimum number of farms use innovations, which is associated both with the low or insolvent state of many agricultural enterprises, and with the shortage of qualified personnel who do not possess the appropriate professional education, and are not ready for innovations psychologically.

Developing scientific and practical recommendations to improve the efficiency of functioning of livestock industries of meat and dairy subcomplexes of the agribusiness of Belarus are focused on the further development of animal husbandry, increasing the efficiency of production, which is providing a balanced and innovative development of industries in the context of consistent effective intensification and building competitive advantages on the basis of resource conservation, realization of animal productivity potential, and the growth of productivity and efficiency.

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