ABSTRACT

of dissertation work of Gulzhan Kalenovna Musaeva "Increasing productive longevity of Holstein cows bred in the zone of Northern Kazakhstan" submitted for the degree of Doctor of Philosophy (PhD) on specialty 6D080200 - Production technology of livestock products

General description of the work.

Dissertation work was carried out in accordance with the provisions of the bioethics committee. Extract from the protocol № 6 of the meeting of the local ethics committee of RSE "National Center for Biotechnology" of the Ministry of Education and Science of the Republic of Kazakhstan, Astana, September 25, 2017 the work was carried out under the grant funding project of the Ministry of Education and Science of the Republic of Kazakhstan for 2018-2020 "Development and implementation of a comprehensive program to improve the duration of productivity of highly productive domestic cows. The state registration number №0118RK00398 and the study was conducted on the dairy farm of "Beck+" LLP in the village of Lesnoye, Fedorovsky district, Kostanai region. The obtained data will significantly expand and deepen the application in practice, playing a major scientifically important role in the selection of dairy cattle, in particular Holstein breed, bred in the conditions of continental climate of the northern region of the country, and the study of the technology of keeping depending on this region.

Relevance of the topic.

Livestock in Kazakhstan occupies about 43% of all gross agricultural output, is the main source of employment, nutrition and income of rural population, in connection with that its development is one of the main strategic objectives of the republic. The leading branch of the agro-industrial complex of the Republic, which accounts for about 20% of the volume of food produced in Kazakhstan has always been and remains the dairy industry.

In conditions of intensive technology, implementation of innovative and information technologies in dairy cattle breeding it is necessary to breed high-yielding cattle breeds characterized by productive longevity.

The Holstein breed takes the leading place in dairy cattle breeding in the developed countries of the world. Animals of this specialized dairy breed are distinguished by desirable type of build and high milk productivity. In favorable conditions, microclimate, with loose housing system and balanced feeding the yields of Holstein cows in breeding herds reach 8000-10000 kg, mass fraction of fat in milk is on the average 3.5-3.6%.

Duration of productive use of dairy cattle - a category not only biological but also economic, because the effectiveness of the dairy cattle industry depends not only on the level of milk yield, but also the terms of productive use of cows.

Productive longevity of dairy cattle is considered one of the most important traits that ensure its high lifetime dairy productivity. Therefore, an important assessment of an animal is the amount of production received for the period of its use. In cattle breeding the whole lifecycle of an animal from economic and biological point of view can be divided into two main stages: preparation and use. The task of the first stage is growing a full-fledged animal and preparing it for productive ¬ actions, the second stage is getting the maximum production. When growing livestock, only its potential productivity is created. The genotype of the animal predetermines and environmental conditions determine the future productivity of the cow.

In dairy farming, the productive longevity of cows is characterized by such attributes as total longevity and number of calvings during life, as well as lifetime productivity (lifetime milk yield). Lifetime milk yield is the total milk yield for all lactations during an animal's life. The genetic potential for productive longevity of cows is quite high and amounts to 12-15 years or 10-12 lactations or more. To study the effect of lineage on milk production as well as on lifetime productive longevity, we studied a large digital material for 2014-2020 inclusive. It is known that the main structural unit with which breeding work is carried out is the line. Each line has its own distinctive characteristics and features. As is known, animals of different lines, families, originating from different ancestors differ from each other. Therefore, the study of origin allows not only to predict productivity, but also to understand in detail the features of the herd as a whole.

Numerous data are given in the literature, where genetic factors are more than 20% responsible for the level of animal productivity. Therefore, the selection of bulls-producers is of great importance in the improvement of breeding qualities of dairy cows, as well as other directions of productivity. The analysis of existing data shows that the average duration of bulls' descendants use in a herd is 10-12 years. At the same time for the first 6 years the number of descendants of a highly productive bull in the herd was rather high, which conditioned good productive indices in the herd as a whole.

In developed countries for milk production when developing breeding programs the main attention is paid to increasing the number of indicators included in the aggregate index of breeding value of dairy cattle, while recently the main focus is on animal health, reproductive qualities, period of productive longevity, exterior.

Redistribution of emphasis on individual traits in breeding indices is due to the fact that long-term, intensive and unidirectional breeding to increase milk productivity has led to a significant decrease in resistance of animals to various diseases, reproductive qualities, reduction of productive longevity, which had a negative impact on the economic indicators of milk production.

The data obtained on the basis of the study for 2014-2020 allowed to confirm the dependence of the level of dairy productivity on health,

reproductive properties of breeding stock on the duration of productivity and on lineage. Intensive development of dairy cattle breeding industry and its transfer to an industrial basis have changed the requirements for animals, the level and nature of their productivity. In this connection, the importance of breeding work on qualitative improvement of breeds and obtaining highly productive animals by using bulls-producers of the world gene pool has increased.

Scientific novelty.

For the first time, a comparative assessment of milk productivity, reproductive qualities and productive longevity of Holstein cows depending on their lineage, as well as on individual bulls-producers, has been given. The optimal age of insemination has been established taking into account live weight and duration of economic use of Holstein cows in the conditions of "BEK+" LLP.

The economic efficiency of increasing milk productivity, reproductive qualities and productive longevity depending on the lineage of breeding stock has been determined.

Theoretical significance of the work.

The data obtained significantly expand and deepen knowledge in the field of dairy cattle breeding, in particular, black and white Holstein cattle bred in the continental climate of northern Kazakhstan.

Experimental data have allowed to confirm expediency of research of dependence of milk productivity level and on health strength, reproductive qualities and productive longevity of cows from lineage of Holstein cows.

The aim of the work is to study the duration of productivity of Holstein cows in the conditions of the northern region of the country and to identify the genotypic and phenotypic factors contributing to increase the period of their economic use.

To achieve this goal, the following tasks were envisaged:

- study of breeding and genetic parameters of the herd of animals "Bek+";
- determination of milk productivity of cows depending on their origin;
- evaluation of influence of genotypic factors on milk productivity and duration of cows' productivity: analysis of genetic structure by lines, polymorphism;
- Determination of the influence of phenotypic factors on milk productivity and duration of productivity: age of the first insemination, age of the first calving, live weight at the first calving, service period, reason of retirement from the herd, etc;
- to study the effect of complex application of premix and vitamin-mineral additives in the diet on milk productivity;
- to determine the economic efficiency of cattle breeding taking into account genotype and phenotype.

The main provisions of the thesis:

- Determination of the level of milk productivity of Holstein cows;
- study of the duration of productivity of Holstein cows depending on the genetic line;

Approbation of the work.

General biological methods were used in the work, the results of the study were processed on a personal computer using "Microsoft Excel". Reliability of the indicators was assessed by Student's test.

The main results of the dissertation work were presented at international and national conferences, were positively evaluated and published in international journals that meet the requirements of the Ministry of Science and Education of the Republic of Kazakhstan, KCSON:

The results of the study and the basic principles of research work materials of the international scientific-practical conference "Modern problems of zootechnics", dedicated to the memory of Professor Bakytzhan Muslimovich Muslimov, held annually in the walls of the Kostanay Regional University named after Baitursynov, 2 articles (Kostanay 2018, 2019) and 1 article "Bulletin of Science" (Togliatti, 2019), as well as 1 article - XIV International Scientific and Practical Conference, International Published at the scientific and practical conference" Trends in Science and Technology (Poland), 1 Article 1 article-Streszczenia wystapien "(Poland, 2019).

In the multidisciplinary scientific journal "3i-intelligence, idea, innovation" - 2 articles (Kostanay. 2018-#3, 2019-#4) and 1 article published in the scientific and practical journal of the West Kazakhstan Agrarian and Technical University named after Zhangir Khan "Science and Education", № 4-1 (61) (Uralsk, 2020).

Article in the Journal Ecology Environment & Cons. V. 26 (4) - P. Published in Papers 447-451 (India, 2020), (Scopus at 15 percentile), 1 article - Journal of Elementology (Scopus at 35 percentile), (Poland, 2021) and 1 article - Pakistan Journal of Zoology (Scopus at 40 percentile), (Pakistan, 2023).

In addition, the results obtained during the practice are represented by 1 certificate of authorship and 2 patents for a useful model, received a positive result.

The main provisions put forward for the defense of the thesis:

- Identification of the level of milk productivity of Holstein cows;
- productive longevity of Holstein cows depending on lineage;
- reproductive qualities and fertility index of cows of different lines;
- identification of optimal milk productivity of Holstein cows taking into account line affiliation contributing to the economic efficiency of milk production.

The volume and structure of the dissertation.

The thesis is set out on 134 pages of computer typing and consists of an introduction, a literature review, materials and methods of research, the results of own research, a conclusion, proposals for production, a list of references and appendices. It contains 28 tables and 2 figures. The list of references includes 164 sources, including 45 in foreign languages.