ABSTRACT

of the dissertation work of Vitaly Anatolevich Raketsky on the topic: «Improving the efficiency of the herd reproduction system by introducing innovative technologies into dairy farming in Kostanay region» submitted for the degree of Doctor of Philosophy (PhD) in the specialty 6D120100 – «Veterinary medicine»

Relevance of the research topic. Animal reproduction is the fundamental activity of a veterinarian. The emergence of a new life is the foundation, both in medicine and in veterinary medicine. Therefore, there is no doubt that any scientific research aimed at improving the processes of reproduction of humans and animals is relevant to our society. Unfortunately, today in our country, not everything in the animal reproduction system is developing successfully and this is well known to the scientific community, although the state is taking some measures for this. Solving the problems of the shortage of qualified specialists, the introduction of scientifically based innovative technologies into the herd reproduction system as a whole will have a positive impact on the development of cattle breeding in the country.

The successful development of agricultural enterprises engaged in the breeding and maintenance of dairy cattle in Kazakhstan largely depends on the expanded reproduction of the herd, this guarantees not only high-quality repair of the herd, but also the ability to sell breeding animals. It is known that one of the acute problems of the development of dairy cattle breeding at the moment is the pathology of the reproductive function of cattle. Some of the reasons that cause infertility and reduce the rate of reproduction of the herd are violations of animal maintenance and feeding, poor-quality artificial insemination, inaccurate and untimely diagnosis of pregnancy and infertility, postpartum complications.

As you know, the world's population is growing every year, including in our country.

An important condition in solving this problem is to increase the reproductive function of animals. Today, most farm animals in the world are reproduced by artificial insemination. This is more than 70% of cattle, 90% of pigs, with the exception of some traditional breeds.

As a result, in order to realize the genetically determined level of dairy productivity of cows, it is necessary to maintain high indicators of the level of reproduction of the herd. At the same time, it is necessary to carry out artificial insemination of the breeding stock qualitatively, and annually receive viable offspring from them.

In this sense, biotechnological methods of reproduction play an important role, both in terms of increasing the efficiency of breeding work and in increasing the reproduction of the herd.

All of the above largely depends on the reproductive health of the breeding stock. In dairy cattle breeding, the pathology of the reproductive organs of cows after childbirth, as well as their differential diagnosis and treatment, is an urgent problem today. At the same time, there are no specific diagnostic criteria to differentiate

functional disorders from inflammatory diseases of the uterus. Therefore, one of the important conditions for the development of cattle breeding is the improvement of existing and the search for new methods of diagnosing diseases of the reproductive organs in cows.

The relatively short period of intensive production use of dairy cows requires the annual introduction of 25 to 30 percent of highly productive cows of the first calving into the main herd. This becomes impossible with a significant decrease in the level of reproduction, yield of calves and their poor preservation.

In solving this problem, a method of replenishing the herd using sexed seed is highlighted. This way allows you to selectively increase the number of animals and replace culled cows in the dairy herd with greater efficiency. The use of sexed seed in animal husbandry makes it possible to obtain over 80% of heifers from all received calves. This, in turn, allows you to update the milking herd with first-time heifers in a short time.

However, researchers and practitioners do not have a consensus on the use of sexed semen.

Some literature data show that with obvious advantages, this method reduces the percentage of pregnancy in cows. Therefore, the issues of studying the effect of sexed semen on the reproductive qualities of animals are also relevant.

In solving the problem of timely diagnosis of pregnancy and infertility of animals, ultrasound examination (ultrasound) is distinguished. Numerous studies conducted in medical scientific institutions on the effect of ultrasound on the animal and human body at the moment indicate its biological safety. In this regard, there is no information in the literature about restrictions on the use of ultrasound scanners. Therefore, specialists in farms can successfully monitor the state of reproductive organs in heifers and cows during various periods of their physiological state. It is known that the capabilities of echography significantly exceed the capabilities of humans in rectal examinations of reproductive organs, which is especially valuable in clarifying the diagnosis and in doubtful cases.

Considering the issue of the influence of indoor microclimate on the reproductive ability of cows, it can be said that the creation of an optimal microclimate in industrial animal husbandry is the most important reserve for increasing the production of high-quality products. Therefore, no matter how valuable the breed and pedigree of the animal is, under improper veterinary and sanitary conditions, a high level of morbidity is observed (especially among young animals), which leads to a decrease in productivity, a decrease in the reproductive ability of animals, an increase in feed costs per unit of production, a decrease in its quality and, ultimately, to a decrease in the profitability of production. The main dissertation research was aimed at solving the above problems.

The relevance is added by the fact that the scientific work was carried out within the framework of the project: "Adaptation of innovative technologies on model farms of Kostanay region", according to the scientific and technical program: "Transfer and adaptation of digital technologies for the production of dairy cattle products of Kostanay region" program-targeted financing of the Ministry of Agriculture of the Republic of Kazakhstan for 2018 - 2020. The purpose of the

project is the transfer and adaptation of digital technologies for the automation of livestock production processes on the basis of two model dairy farms of Turar LLP and Olzha Ak-Kuduk LLP. In accordance with the goal, one of the objectives of the project is to increase the level of herd reproduction in model farms through the introduction of innovative technologies.

In the context of digitalization of agriculture and the fulfillment of the task of this project, a scientific justification was formulated for the introduction of advanced scientific achievements of the reproduction system into the production activities of dairy farms in Kostanay region.

Considering the above, in order to complete the dissertation work, the goal was set to study the reproductive capabilities of cows in model farms of the Kostanay region, determine the effectiveness of innovative technologies designed for the reproduction of cattle and introduce them into production.

In accordance with the goal, the following tasks were set:

1. To determine the reproductive capacity and production use of cows in dairy farms of Kostanay region;
2. To study the effect of indoor microclimate on the reproductive function of cows;
3. To study the effectiveness of modern devices for reproduction in the dairy cattle breeding system (AlphaVision device for artificial insemination and diagnosis of diseases of reproductive organs, electronic Draminsky detectors for determining the optimal time of insemination of cows and for determining subclinical mastitis, ultrasound of reproductive organs, ELISA for determining the specific pregnancy protein chorionic gonadotropin).

Research methods. The research methodology includes both theoretical and experimental studies. The methods of theoretical research are based on the application of the laws of biotechnological processes and microclimate in the reproduction of farm animals, methods for diagnosing pregnancy, pathology of reproductive organs and udders of cattle. Confirmation of the validity of theoretical statements is supported by conclusions from the results of practical experiments. Experimental research includes conducting experiments in livestock facilities and laboratories, using standard devices and equipment, as well as the developed integrated application of innovative digital devices serving to increase the level of the dairy cattle breeding system in Kostanay region.

The main provisions submitted for protection:

- analysis of the reproduction system, reproductive capacity, as well as the production use of cows in dairy cattle breeding in Kostanay region;
- integrated use of innovative digital devices serving to increase the level of the reproduction system in dairy cattle breeding in Kostanay region;
- the results of experimental studies to improve the efficiency of the herd reproduction system through the introduction of innovative technologies in dairy cattle breeding in Kostanay region;

Scientific results, their validity and novelty.

The novelty of the research lies in the fact that for the first time in Kostanay region, on the basis of existing dairy farms, the transfer and adaptation of technologies for automating technological processes in dairy cattle breeding, namely

the use of electronic devices instead of classical tools, have been introduced and studied. For the first time in the model dairy farms of the Kostanay region, complex methods of diagnosing pregnancy and infertility of cows, as well as some diseases of the reproductive organs, based on French and Polish technologies were used. For the first time, when inseminating cows with sexed seed, the effectiveness of using the AlphaVision device, a modern technology developed by the French, based on digitalization of the visualization process, was studied.

Based on the conducted experimental studies, the results obtained will allow to increase the yield of calves per 100 queens in large agricultural enterprises by more than 85% on average, this will increase the efficiency of the reproductive function of breeding stock, as well as contribute to reducing the cost of purchasing high-value seed by 21-33.7%.

Practical significance.

The obtained data can be used by practicing veterinary specialists in the diagnosis, prevention and treatment of diseases of the reproductive system of cows

The results of the study were used in the project «Development of effective breeding methods in dairy cattle breeding industries» task «Increasing the reproductive capacity of dairy cows in Kostanay region» in the implementation of the scientific and technical program «Improving the effectiveness of breeding methods in cattle breeding» within the framework of the project of program-targeted financing of the budget program 267 «Increasing the availability of knowledge and scientific research».

The results of the study were introduced into the educational process, when lecturing and conducting laboratory and practical classes for students of veterinary specialties of the NAO «KRU named after A. Baitursynuly», «Zhangir Khan ZKATU», «KazNIVI» LLP, relevant sections on veterinary obstetrics and biotechnology of animal reproduction, as well as in the farms of LLP «SHOS «Zarechnoye», «Turar» LLP, «Olzha Ak-Kuduk» LLP of Kostanay region.

The main provisions and conclusions of the dissertation have been published in 10 scientific papers.

Description of the doctoral student's contribution to the preparation of each publication.

The doctoral student contributed to the preparation of scientific publications through: conducting a literary review; research and data analysis; conducting laboratory and production experiments; working and interacting with co-authors; preparing graphs, tables and figures; writing publication texts.

Approbation of the research results. The materials of the dissertation were reported and approved at four scientific conferences:

- Materials of the International Scientific and practical conference - The current state of animal husbandry: problems and solutions - March, Saratov 2018. - From 19 - 22.

- Materials of the International Scientific and practical Conference - Scientific support for the innovative development of the agro-industrial complex of the regions of the Russian Federation - February, Kurgan-Nalchik 2018. - From 879 to 1025.

- Materials of the International scientific and practical Conference - Digital Economy - Analytical view, KSU, Kostanay 2018., pp. 207 - 212.

- Materials of the International Scientific and Practical Conference young scientists dedicated to the 125th anniversary of the birth of T. S. Maltsev "Development of scientific, creative and innovative activities of youth" November, Kurgan 2020 - From 259 - 265.

On the topic of the dissertation, they were also published in four publications recommended by the Committee for Control in the Field of Education and Science of the Republic of Kazakhstan - Multidisciplinary scientific journal “3i-intelligence, idea, innovation” and “Science and education” - “ZKATU named after. Zhangir Khan", as well as 2 articles in the foreign publication "Veterinary World" included in the Scopus database (Elsevier), Cite Score year 2020 - 2.6 percentile - 79 WoS Q2, Cite Score year 2022 - 3.2 percentile - 80, has Impact Factor 1.6.

The research results reflected in the dissertation were introduced into the farms of Zarechnoye Agricultural Production Association LLP, Turar LLP, and Olzha Ak-Kuduk LLP in the Kostanay region.

Scope and structure of the dissertation. The dissertation is presented on 124 pages of computer text and consists of an introduction, main part, and conclusion. The text of the dissertation is illustrated with 47 figures, 29 tables, 18 appendices. The list of sources used consists of 211 items.