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THE SIGNIFICANCE OF VETERINARY SANITATION AND THE EFFECT OF PREVENTIVE MEASURES ON THE HEALTH OF FARM ANIMALS

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In the modern conditions of conducting various branches of animal husbandry, scientific achievements and practical experience in matters of hygienic research are summarized, as well as the main priorities of scientific research in hygiene, ethology, welfare, care, exploitation and disease prevention of agricultural animals under conditions of sustainable production of various types of animal husbandry products and raw materials are determined for food and processing industries.

The importance of veterinary sanitation in the prevention of animal diseases, increasing their productivity and reproductive capacity during the transfer of genetic potential is scientifically substantiated. The analysis of the influence of external factors (air, water, feed, technological methods, zoohygiene regimes and standards) on the formation of the natural resistance of the organism, increasing productivity, preservation and impact on the quality of the obtained products is presented.

On the basis of the above, it can be concluded that only on the basis of the existing scientific work created in the scientific schools of institutions and educational institutions, the acquired global practical experience and the implementation of new theoretical approaches and practical techniques in the hygiene of agricultural animals into the practice of animal husbandry, it is possible to ensure comfortable conditions of keeping, care and exploitation of animals, prevent stress, preserve the health of animals, and make the production of products environmentally friendly and more efficient.

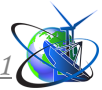
The areas of further research in the prevention of animal diseases and the training of students of agricultural universities in the specialty "Veterinary hygiene, sanitation and expertise" are highlighted.

Key words: *animal hygiene, welfare, ethology, health, disease prevention.*

Introduction.

Modern technologies for the production of livestock products are of particular importance in compliance with sanitary and hygienic requirements, technological standards, directives and rules for keeping animals, which are summarized in a number of scientific publications [1-4]. It is known that under the conditions of providing agricultural animals with nutrients and biologically active substances, issues regarding the optimization of systems and methods of their maintenance are key. Taking this into account, today the main tasks of hygiene remain the protection of animal health by rational methods of keeping, care and operation, providing comfortable living conditions, preventing the occurrence of stress and animal diseases, protecting the environment from pollution by livestock waste.

Solving these tasks at the current stage of development is not possible without innovative options for their maintenance, care and feeding. But no less important is the selection of animals with high genetic potential.



Over the past ten years, scientists and practitioners of agricultural animal hygiene have made a significant breakthrough in the development of the agricultural sector, optimized the parameters of the microclimate of premises for keeping different species and age groups of animals, which are laid down in the norms of technological design of livestock enterprises, as well as the development of practical approaches to the management of livestock industries [5-9].

A significant amount of scientific research of the Department of Veterinary Hygiene, Sanitation and Expertise of the Vinnytsia National Agrarian University is dedicated to the study of non-specific resistance of farm animals, the search for effective natural means of improving the productivity of animals, as well as the improvement of the assessment of sanitary, hygienic and technological conditions of keeping and feeding, which have a significant impact on the condition animal health and especially reproductive capacity. Considerable attention is also paid to the development of innovative design solutions to improve conditions that reduce the level of stress and disease of animals, primarily reproductive and transitional groups of livestock [10-12].

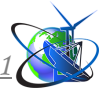
Review of literature sources.

Issues related to the development of optimal solutions for the reconstruction of typical livestock premises for keeping livestock, their sanitary and hygienic assessment, taking into account the thermal balance of the building and the comfort of the location of different groups of livestock, were not left out of consideration. The concept of ecologically safe environment - "healthy animal - healthy person - healthy country" received further development [3, 11].

Research on the development of effective ways of reducing the man-made load of livestock facilities on the environment should also be pointed out. For this purpose, we are studying the conditions for obtaining alternative sources of energy, namely, the process of processing solid (manure) and liquid (sewage) animal husbandry waste, the use of microorganisms and microalgae in these processes, the creation of optimal parameters for their biofermentation, developed by Professor Oleksandr Yaremchuk [7, 10, 12].

However, today there are still a number of unresolved practical issues that require scientific approaches to their solution for the successful development of the livestock industry.

One of the unsolved problems of hygienic science and practice today is the study of the mechanisms of adaptation of highly productive animals to new conditions of keeping, feeding, care and operation, as well as the study of issues related to optimizing the terms of their productive use. The implementation of the current standards for the technological design of agricultural animals in production requires adjustments that must be made to the conditions of production through the technologies for obtaining livestock products, taking into account the recommendations developed in the countries of the European Union, namely: it is necessary to establish a clear, permanent control over compliance by producers with the standards, veterinary and sanitary requirements for creating optimal conditions for obtaining a safe product under the conditions of compliance with sanitary and hygienic parameters.



Thus, prevention today requires the introduction at enterprises for the production and processing of livestock products of aspects of controlling the sanitary and hygienic conditions of keeping animals, especially on farms of small capacity, where hygienic parameters are often violated [4].

It should be noted that the practice of veterinary specialists is dominated by the trend of mass use of drugs, which contradicts the definition of optimal living conditions for animals that prevent diseases and the harmful effects of environmental factors on health and productivity [7].

The purpose and objectives of the study. Show the need to provide clear information about the conditions of keeping age groups of animals in scientific and production conditions of farms of different ownership.

Research methodology. The work was performed according to the plan of research work of the Department of Veterinary Hygiene, Sanitation and Expertise of Vinnytsia National Agrarian University within the scientific topic: "Optimization of sanitary and hygienic conditions for obtaining calves by industrial technology" (State registration number 0120U104437).

The methodological approach in this work was the analysis of available scientific periodicals of textbooks, manuals, methodological instructions, magazines and web resources. The research period from 2005 to 2022 was obtained in Ukraine and publications in Poland, the Czech Republic, Slovakia and Germany.

The methodical approach and research material was the analysis of scientific data on the development and substantiation of zoohygiene standards and sanitary regimes that ensure increased resistance, productivity and prevention of animal diseases, as well as conceptual provisions formulated by prof. O.S. Yaremchuk [9, 10].

The search for ways to increase the efficiency of animal husbandry in the modern conditions of production of cattle, pig, poultry, sheep, horse, goat, rabbit, and beekeeping products must necessarily include the issue of creating comfortable conditions for keeping, providing livestock with high-quality feed and feed additives, drinking water water, stress avoidance and animal health protection.

The issue of hygienic evaluation of new feed additives, especially of foreign production, contamination of feed with heavy metals, mycotoxins, plant protection agents against microorganisms and pests in different natural and climatic zones should also not be overlooked.

The creation of genotypes of animals with high productivity potential and their wide use in modern technologies for the production of livestock products is often accompanied by a decrease in the body's resistance, which implies further searches for effective natural stimulators of the body's immunobiological reactivity.

Research on solving environmental problems related to the processing of waste from poultry farms, pig farms and modern milk production enterprises is important today. Theoretical aspects of biofermentation processes, improvement of existing and creation of new methods and technologies for processing solid and liquid livestock waste are relevant in this regard.

It is necessary to continue research on the creation and study of the effectiveness of the use of new means of disinfection, disinsection and deratization of livestock



facilities, as well as on other scientific problems that solve the issue of health protection of agricultural animals.

Research results. Of course, intensive animal husbandry, if it closes its production cycle with ecologically improved technological options, will be able to develop successfully only taking into account its three main requirements: well-established selection, organization of production or uninterrupted supply of feed, which will make it possible to balance the diet and, by making the right choice and conducting proper implementation of technology that would ensure the use of the most optimal systems, methods and methods of keeping animals. An important role will be played by proper equipment of production facilities with modern equipment that will ensure smooth, high-quality and normalized work of all links of the technological process.

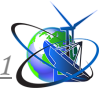
The most important prerequisite for the successful management of the entire technological process is prevention. The occurrence of diseases testified to the lack of an appropriate level of animal welfare at the facility and the impossibility of achieving profitability. Therefore, as an initial stage of establishing well-being, sanitary-hygienic and veterinary-technological monitoring, we proposed the implementation of a general prevention plan.

This measure precedes and prepares for the possibility of introducing GMP, GHP and HACCP into production, as mandatory prerequisites for obtaining licensed products.

Therefore, in our opinion, researchers still, as a rule, do not pay due attention to the evaluation of the effect of man-made factors of the environment, which significantly affect the state of health (productivity) of animals. This led to the need to develop and implement a point-based assessment of animal housing conditions based on a mathematical model (spreadsheet) for calculating the compliance of housing conditions and its impact on productivity, growth and development of animals. Data registration and evaluation can be performed both continuously and periodically. They can simply be taken into account and evaluated according to a 5-point system.

Zoohygiene, as a science, was created primarily for the prevention of diseases of the entire herd. Thus, the following data testify to the high morbidity of young animals: 40-50% are ill with signs of gastrointestinal disorders, 30-40% - respiratory disorders, 10-20% - metabolic disorders and 10-20% - impressions of the limbs, which are due to violations of the rules hygiene and sanitation, production technology, and on this basis - a significant departure of it reaches approximately 25%. In animal husbandry, losses from non-communicable diseases are not only due to a decrease in productivity, but also a decrease in the quality of the obtained products under the influence of certain stress factors. Ultimately, large sums of money are spent on therapeutic rather than preventive measures.

It was established that the health of 55% of animals is determined by microclimate and feeding, 20% by genetic factors, and 25% by sanitary and hygienic factors. However, disease prevention rules and measures are fully available to every household, such as providing drinking water that would meet sanitary requirements for animals.



The increased content of ammonia, carbon dioxide, and hydrogen sulfide in the air of livestock premises causes the development of hypoxia and this leads to immunodeficiency and a decrease in the body's resistance.

Keeping calves in unheated sections is an important way to reduce energy consumption. In individual houses, located on an open site, with a litter thickness of at least 50 cm and a moisture content of no more than 25%, calves' general biotone increases, the length and density of the hair coat increases, and neurovascular regulation improves. With this method of keeping calves, the cost of electricity is reduced by 34%, the capital investment for one cattle place is reduced by 20-25%, and the equipment is reduced by 18-20%. On the other hand, the connection between the macroorganism and the microflora is interrupted, and morbidity and mortality are reduced by 15-20%.

It is known that any medicine, no matter how beneficial it may be, has a negative effect, as it gradually decreases in the body, and later the body stops producing a suitable antidote to the medicine, that is, the sick animal becomes completely dependent on it. The belief that the better we treat the sick, the healthier the animals will be is increasingly being questioned. Any achievements of science and practice that could increase the effectiveness of treatment or improve the internal indicators of the health of animals, increase their productivity without ensuring normative zoohygienic indicators and a high sanitary condition, will have negative consequences. Learn about animal health from animal product technologists and veterinarians who are practitioners, not just theorists.

With the development of farms of various forms of ownership (state, collective, joint-stock, farm, own, auxiliary), the construction of complexes and automated enterprises, especially poultry and pig farms, remains a priority direction in production technology in Ukraine. It should be pointed out some negative elements that are characteristic of these giant enterprises - these are, first of all, a high percentage of concentrates in the diet of animals, larger sizes of the technological group and frequent regrouping, high burden on the environment, adynamia and hypodynamia.

The system of fixed no-walking sow maintenance throughout the reproductive cycle, which is recommended by foreign companies, needs justification. As practice shows, the period of use of animals does not exceed 3-4 farrowings, and the annual repair of the herd (40%) leads to a sharp increase in costs for repair young animals.

Currently, the main attention is paid to the regulation of environmental factors, substantiation of MPC of harmful gases, dust and microorganisms. However, this orientation of preventive measures determined the limited effectiveness of the measures and, as a result, the increasing nature of gastrointestinal and respiratory diseases, since more than 50% of harmful substances from the environment enter the body through the respiratory organs, which do not have their own chemical barrier. Therefore, the body of animals is much more sensitive to harmful substances entering it through the lungs than the gastrointestinal tract. And this means that in order to prevent respiratory and gastrointestinal diseases, it is necessary not only to reduce the concentration of harmful gases to the MPC, but also, most importantly, to reduce the population of microbes, the amount of xenobiotics, and dust in the environment of



animals - due to sanitation and compliance with sanitation rules. In animal husbandry, the mass use of a large number of antibiotics is not effective enough. Against the background of an unsatisfactory microclimate, poor feeding, this leads to damage to the gene pool of the population operated in this livestock enterprise. So, it is obvious that it is possible to stop the destruction of the environment, and, therefore, to reduce the environmental burden on animals, by changing the economy and production, and for this both means and time are needed.

The training of veterinary medicine doctors and technologists in the concept of prevention of animal diseases allows us to declare the prevention of "endo-ecological diseases", which are a consequence not only of atmospheric pollution, but also of pollution of the internal environment of the body.

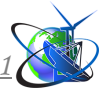
Being unforgivably late with ensuring a high sanitary and hygienic condition in livestock enterprises, and, therefore, with the protection of nature, we are criminally late with disease prevention, which should be active in form and transformative in content, that is, one that foresees the possibility of the occurrence of extreme factors of the external environment and eliminating them before the appearance of diseases. With the development of animal husbandry complexes, which are characterized by a little changing microclimate, adynamia, lack of solar insolation, new diseases that are not inherent in the traditional system of animal husbandry have been noted.

It should be noted that there is not a single research institution in Ukraine that could systematically develop and coordinate hygienic research. The urgent tasks of animal hygiene and veterinary sanitation are not even defined in environmental documents.

For farms, regardless of the forms of ownership, the main principles should become: the best "vaccine" is full and balanced feeding and optimization of hygienic conditions. The implementation of this principle will allow intensifying the livestock industry and increasing the body's natural resistance when solving the following problems:

- in the conditions of small-scale production (farms, own farms, subsidiary farms) of animal husbandry products - this is hygienic and technological support (optimal microclimate, complete feeding, free access to water, sanitation of premises, compliance with the principle "everything is empty - everything is busy"), especially for reproductive livestock;
- introduction of energy-saving technologies for growing young animals without heating on deep unchanging bedding, exercise, feeding juicy and green fodder;
- thorough sanitation of livestock premises and environmental greening in order to prevent stress caused by regrouping, moving animals, changing feed;
- the use of BAR (probiotics, prebiotics, vitamins, microelements, etc.) not only with the mandatory provision of a regulatory microclimate and good sanitary regime in the premises;
- planned and timely implementation of special preventive treatments, taking into account the epizootic state of the region.

Therefore, the direction of zoohygiene research, which involves the development of intensive technologies aimed at reducing stress loads on the animal body and realizing productive genetic qualities, is quite relevant.



Today, specialists have proven that an alternative to tethered systems can be untethered keeping of cows and rearing of young animals. Due to the fact that with untethered systems there is no such factor as hypodynamia, animals can have constant access to a walk, a warm, dry bed on straw bedding in a stall or in a combibox, and in a completely satisfactory microclimate in all seasons of the year. In such animals, the functional state of all major organs and systems remains normal. It is only necessary to strictly follow the technological requirements and the norms of veterinary prevention included in them.

Calves are very sensitive to deficiencies in both feeding and maintenance. Therefore, the application in the conditions of intensively used herds, the introduction of a flow or simply workshop system, which has been tested in a number of farms in Lviv region and other regions of the region, deserves a positive assessment, and the acquired experience and scientific justification are laid out in a number of recommendations developed by us, in manuals and textbooks.

Keeping animals in regions whose land is contaminated with radionuclides is often accompanied by industrial waste, including insufficiently adjusted conditions of keeping and feeding animals. The combination of a number of powerful negative influencing factors, including radionuclides, led to a number of shifts in metabolic processes in the body of cows and the calves obtained from them. At the same time, systemic disorders of protein and mineral metabolism developed, including the maturation of trace element diseases. Significant changes were observed in hematopoiesis with the subsequent development of a number of forms of anemia. In addition to significant barrenness in cows and a negative effect on calves, the development of pathological manifestations in the functioning of the reproductive organs of both bulls and boars was established.

One of the important reasons for these pathologies was the violation of a number of requirements stipulated by the system of keeping, in particular, bulls and boars.

Zoohygienic evaluation of pork production technologies used in farms and systems of keeping sows on reproductive farms of industrial complexes. Research on the prevention of stress in pigs practically coincided with the data obtained on cattle. Both for the development of dystrophic processes in the myocardium and heart failure, and for the reduction of the duration of the effective use of animals in non-walking systems. This term was shortened by two times, the multifertility of sows decreased by 3.7%, and the large fertility by 7.3%. Morbidity of piglets was higher with a 7% lower survival rate of young.

The studies devoted to the study of the functional state of the main organs and systems of the body of cows, calves and young animals under different production technologies (super intensive, intensive and integrated) deserve special attention. Peculiarities of influence of complexes of technological factors, formed in different systems, ways and methods of keeping cows and rearing calves and young animals, have been studied. They were given a zoohygienic (normative) and then a biological (ethological) and welfare (biotic) assessment. It was established how significantly negative (stressful) technological factors affect the functional state of the main organs and systems, and in particular those that occur when animals are tied or too tight without walking in rooms with industrial ultra-intensive technologies. Therefore,



stall-walking, leashed, untethered, including on deep bedding, in boxes, using pastures, was chosen. For raising calves - in cages-prophylactics, sections of which are placed in the open air, including with transfer at an early age to semi-open calf pens. The previously worked out and improved methods of researching the functional state of the cow's body made it possible to choose the technological options for production that are most suitable for climatic and economic conditions. The obtained materials made it possible to evaluate premises (cow sheds, calf sheds), their equipment and to propose the necessary options for animal keeping systems, including small breeding farms. The summarization of the data made it possible to develop a number of recommendations and propose refined zoohygienic standards and veterinary and sanitary requirements to supplement the existing VNTP - APC - 01.05. Individual details of improved systems, ways and methods of keeping cows and raising young animals were laid out in the form of recommendations for biotechnologists and doctors of veterinary medicine of farms. Theoretical justifications made it possible to draw a conclusion about the expediency of using the most physiologically based approaches in breeding farm technologies, and their hygienic assessment made it possible to work out the ethological, welfare, zoohygienic and veterinary sanitary bases for the prevention of certain non-contagious and infectious diseases of calves, young animals and cows (tuberculosis, infectious rhinotracheitis, especially young animals, calf diarrhea), eliminate a number of factors that constantly contribute to the occurrence and development of mastitis, metritis and limb diseases, including hooves, in cows.

Implementation of the developed recommendations into production allowed breeding cows on breeding farms, which were used for effective selection work with the herd. From them, it was always possible to choose both recipients and donors, which were used in biotechnological attempts aimed at accelerating the effectiveness of breeding activities.

Thus, in dairy farming, a stall-pasture system for keeping cows with untethered and tethered methods should be provided. In pig breeding, the development of microclimate parameters, taking into account the breed affiliation and features of the genetic potential, in the free-range system of keeping pigs in machines of 10-12 heads on farms with a capacity of 3-24 thousand heads/year with a completed production cycle, remains a promising direction. Equally promising in animal hygiene are studies on the evaluation of energy-saving and energy-saving technologies in animal husbandry (cattle breeding, pig breeding, poultry farming, etc.), as well as on the use of biological heat, by-products for biogas, and building polymer materials.

Basics of preventive prevention for pig breeding enterprises and canine centers, allows a comprehensive scoring of the microclimate for livestock farms, to intensify work on the implementation of EU legislation in Ukraine. This contributes to the training of specialists in the animal husbandry profile of a preventive outlook on animal health protection in agricultural universities.

In modern conditions, the perspective of the development of zoohygienic science is the integration of scientists in the fields of nutrition, physiology, biochemistry, genetics, and ecology for the development of the following priority



studies:

- the role of natural environmental factors in the preservation of animals without mass uncontrolled use of medicines;
- reduction of energy costs for ensuring optimal parameters of the microclimate in the premises for animals, ventilation modes, use of lighting equipment;
- low-energy technology on farms, own yards, farms and the use of non-traditional energy resources (summer camp, pasture and stable maintenance, solar energy, biomass energy, water energy, etc.);
- development of hygienic and ecological control systems for animal health and product quality at all stages of the technological cycle: soil - water - fodder - animal products - people;
- interrelationships between environmental factors and animals, especially breeding ones for faster adaptation and improvement of immune status;
- issues of hygiene and sanitation in farms of various forms of ownership (complexes, small farms, farms, outbuildings, etc.);
- selection of animals resistant to stressful effects of environmental factors;
- increasing resistance and prevention of immunodeficiency) of productive animals in conditions of ecological well-being;
- carrying out comprehensive studies on animal hygiene and sanitation with evaluation environment, product quality and prevention of anthroozoonous diseases.

Discussion.

The priority direction of the further development of zoohygiene science remains the conceptual justification of the principles of animal disease prevention, increasing resistance and their productivity.

Conclusions.

The presence in the methodology of the work (article) of at least minimally necessary data on issues of real assessment of the conditions of keeping experimental and control groups of animals makes the results obtained by the author available for taking into account the significance of at least the main factors of the environment and the duration of their influence.

From here, the digital data and conclusions presented in the work can be compared with similar data obtained by other researchers and interpreted.

The methodology of zoohygiene is the provision on the unity of the animal organism and the external environment.

It forms among specialists a global view on preserving the health of animals through preventive guidance, rather than treatment.

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