

## **DEVELOPMENT OF HYGIENE OF FARM ANIMALS IN UKRAINE (THE SECOND HALF OF THE 19th – EARLY 21th CENTURIES)**

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### **INTRODUCTION**

In recent conditions the solving the problem of food independence of Ukraine, the priority is given to the growth of the level of scientific support of the livestock industry. Among the complex of animal sciences, which are called to promote qualitative improvement of the tribal resources of the country, a special place is devoted to zoo-hygiene, the main task of which is to provide health care and high productivity of farm animals on the basis of development and introduction of rational methods of their feeding, breeding and keeping.

Zoo-hygiene as a component of animal science studies the interaction of the organism of farm animals and the environment for the development of scientifically based methods of hygiene of their keeping, care and feeding; reducing the negative impact of environmental factors on animals and maximizing the positive effects of external factors on health and improving their productivity. Thus, regulation of the influence of external conditions, managed by a person with the help of certain methods of animal keeping and care, makes it possible to achieve both the preservation and improvement of livestock, and further increase its productivity.

The achievements of scientists in the field of farm animal hygiene confirm the real scientific potential of the Ukrainian community. They are a powerful theoretical and methodological basis for developing a further strategy for animal husbandry development in Ukraine. Despite the importance of this direction, by this time, a comprehensive research of the history of its development has not yet been held. Previous researches (Alikaiev V.A.<sup>1</sup>, Demchuk M.V.<sup>2</sup>, Kalitaiev M.V.<sup>3</sup>, Krasnyi V.V.<sup>4</sup>,

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<sup>1</sup>Аликаев В. А. Достижения советской зоогиены и ее дальнейшие задачи. *Гигиена сельскохозяйственных животных*: тр. XXIX пленума ветеринарной секции Академии. М.: Сельхозгиз, 1950. С. 8–22.

Chorny M.V.<sup>5</sup>, Borodai I.S.<sup>6</sup>, etc.) have considered some aspects of the formation of hygiene of animal feeding, keeping, care.

During the period of development of statehood in Ukraine, fundamental research was not carried out which would comprehensively cover the formation and development of the scientific foundations of farm animal hygiene as a basis for the growth of profitability and competitiveness of the livestock industry. In view of this, this research has a theoretical and applied value.

The article is prepared in accordance with the tasks of the state budget topic 0116U002102 “Scientific-organizational and regulatory bases of innovative activity in the system of agrarian science: theoretical and methodological, historical and scientific studies, archival, bibliographic aspects of the research”.

The purpose of the research is to analyze the history and the periods of formation of hygiene of farm animals in the context of the development of world branch scientific thought. The general scientific and interdisciplinary methods used to solve research tasks. Particular attention paid to special historical methods, source analysis. The source base of the research includes a complex of diverse documents, the basis of which are archival materials.

## **1. Formation of Farm Animal Hygiene as a Researching Direction and Discipline**

The study and application of hygienic methods for farm animal keeping and care, as well as the development of measures for the protection of their health, have begun before the BC in India, Babylon, Ancient Egypt, Greece, Rome. Already at the beginning of the 17<sup>th</sup> century for the protection of human and animal health in the Russian Empire, state regulations namely orders for the placement of cattle mammals in special

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<sup>2</sup>Демчук М. В. Основні досягнення і перспективи розвитку гігієни тварин в Україні (в світлі розвитку наукових ідей професора А.К. Скороходька). *Науковий вісник Національного аграрного університету*. К, 1998. Вип. 12. С. 25–28.

<sup>3</sup>Калитаев М. В. О некоторых проблемах развития зоогигиены. *Ветеринария*. 1966. № 1. С. 90–92.

<sup>4</sup>Красій В. В. Роль і значення дисципліни «гігієна тварин» у підготовці сучасних фахівців тваринництва. *Науковий вісник Національного аграрного університету*. К, 1998. Вип. 12. С. 32–36.

<sup>5</sup>Чорний М. В. Зоогігієна: історія, проблеми і завдання курсу при підготовці зооветспеціалістів. *Науковий вісник Національного аграрного університету*. К, 1998. Вип. 12. С. 26–32.

<sup>6</sup>Бородай І. С. Теоретико-методологічні основи становлення та розвитку вітчизняної зоотехнічної науки. Вінниця, 2012. 416 с.

areas on base sanitary considerations, the deep burial of animal carcasses, the ways of their transportation, etc. were adopted.

At the beginning of the 18<sup>th</sup> century, Peter I's reforms touched upon political, cultural and economic life, matters relating to the animal keeping and care. His name is associated with the development of dairy cattle farming in the north, horse breeding and fine-grained sheep. In the history of Russian legislation, the order of the Emperor of August 19, 1723, with the addition of «Кондиції про утримання овець багатовотчинних людей» of July 30, 1722, was received special significance. These rules described certain methods of feeding, drinking, equipment for saving and development of fine-grained sheep in the farms<sup>7</sup>.

The best practices of the animal keeping, care and feeding were developed by the St. Petersburg Academy of Sciences, organized in 1724. On the basis of the Academy's proposals, formulated as a result of the study of the methods of animal keeping and feeding in the Russian farms, the Senate Order «О содержании скота в удобных хлевах и на хорошем корме в предосторожность от болезней и падежа» was prepared on April 12, 1770<sup>8</sup>.

The first scientific works on farm animal hygiene have published in Russian at the end of the 18<sup>th</sup> century. One of them is the monograph «Руководство к размножению и поправлению домашнего скота» (1794) by Professor M.G. Livanov that summarizes the main zoo-hygiene rules. In the middle of the 19th century the books and manuals on farm animal hygiene have been published by a number of authors, in particular S. M. Khodetskyi's «Руководство к размножению и поправлению домашнего скота» (1851) and others. After the land reform of 1861, a state order for the production of agricultural products was formed, attention was paid to the spread of agricultural knowledge, the purchase of equipment, seeds and cattle from the West. During this period, the translated manuals on zoology by Wilkens (1880), Damman (1884), Gaubner (1878), Roeff (1878), and others were especially distributed in Russian Empire.

It should be noted that in the early 20<sup>th</sup> century the teaching of the farm animal hygiene course was mainly carried out according to textbooks

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<sup>7</sup>Аликаев В. А. Достижения советской зоогигиены и ее дальнейшие задачи. *Гигиена сельскохозяйственных животных*: тр. XXIX пленума ветеринарной секции Академии. Москва : Сельхозгиз, 1950. С. 8–22.

<sup>8</sup>Аликаев В. А. Зоогигиена. Москва : «Колос», 1976. 256 с.

prepared by German scientists. In particular, a textbook writing by Professor of Elden Agricultural Academy, Director of the Hanover Veterinary School K. Damman became very popular. Its part was translated in Russian by Y. Shmulevych and published under the title «Гигиена сельскохозяйственных домашних животных» (1884). The textbook contained 11 lectures that covered the concept of farm animal hygiene, which at that time was called “veterinary police”. The German scientist M. Climmer in famous monograph «Ветеринарна гігієна» (1908) for the first time identified the hygiene of farm animals as an independent science, systematized and synthesized its foundations<sup>9</sup>.

By that time, the first domestic zootechnical guides by I. Popov, G. Svetlov, M. Chyrvinskyi, M. Ivanov, who consider this branch of knowledge as a component of zootechnics, had already published. Thus, texbook “Общедоступный лечебник домашних животных” (1904) by Ya. Shmulevych contains a chapter entitled “Zoo Hygiene”, where the author states that farm animal hygiene is intended to study all conditions conducive to the saving of the health of domestic animals. In this sense, it includes not only immediate care, but also the conditions for rational feeding and the study of all measures to prevent the action of pathogens. The chapter consists of the following subchapters: 1) dieta; 2) caring for livestock; 3) poultry care<sup>10</sup>.

After the organization of higher veterinary schools in Russia, some information on farm animal hygiene taught in the course “General Livestock”. This information was most fully included in the textbook «Курс общего скотоводства» by Professor I. Popov – one of the founders of farm animal hygiene, published in 1894. According to his definition, the main task of farm animal hygiene is the study of various external conditions and its impact on the organism of the animals. Since external conditions can be unfavorable, farm animal hygiene develops the most appropriate measures to weaken its actions. The book «Зоогигиена. Краткий очерк разумного использования домашних животных» by G.I. Svetlov, published in 1911, played a major role in promoting farm animal hygiene information. The book «Загальне тваринництво» by

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<sup>9</sup>Бородай І. С. Теоретико-методологічні основи становлення та розвитку вітчизняної зоотехнічної науки. Вінниця, 2012. 416 с.

<sup>10</sup> Коропов В. М. Из истории ветеринарного образования в России. *Ветеринария*. 1947. № 9. С. 7–10.

M.P. Chyrvynskiy, published in 1912, consists detailed information, provided to students on farm animal hygiene<sup>11</sup>.

In pre-revolutionary period, agriculture and animal husbandry did not create favorable conditions for introducing new rational methods of animal care, keeping and feeding. The scientific development of issues of farm animal hygiene was carried out not enough, mainly, it concerned the conditions and characteristics of landowner farms. The study of the conditions for animal keeping, care of them in the peasant farms and the scientific development of farm animal hygiene issues regarding their inquiries were casual and carried out concurrently. Research work on farm animal hygiene was carried out, as a rule, at the personal initiative of veterinarians and agronomists, employees of departments of higher educational establishments and agricultural research institutions. The attempts of some zemstvo veterinarians and agronomists to introduce into the peasant farms the rules and norms of hygiene of farm animal keeping and rational care for them did not contribute to a noticeable improvement in the sanitary state of livestock<sup>12</sup>.

The state of hygiene of farm animals as a research direct and as a discipline in higher education improved somewhat after the revolution in 1917. In 1921–1929, Soviet farm animal hygiene and popularization of industry knowledge was the forming, the restoration of the destroyed agriculture after imperialist and civil war continued, the existing small private and the collective livestock was in need of qualified assistance for creating the normal conditions of farm animal keeping and feeding, providing care of them<sup>13</sup>.

The introduction of the rules and norms of farm animal hygiene into production became possible in the 20's of the 20<sup>th</sup> century. However, during these years research work in the field of hygiene of farm animals was conducted less intensively than the promotion of zoo-hygienic knowledge through books, pamphlets, posters, various mass courses and schools. Domestic scientists M.F. Ivanov (1922), I.A. Dobromyslov (1924) and G.I. Gurin (1927) published the textbooks and teaching manual, which played an important role in the training of students of higher educational institutions and specialists in the field of farm animal hygiene and

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<sup>11</sup> Артюх И. А. Развитие ветеринарной науки на Украине. *Ветеринария*. 1954. № 1. С. 10–16.

<sup>12</sup>Бородай І. С. Теоретико-методологічні основи становлення та розвитку вітчизняної зоотехнічної науки. Вінниця, 2012. 416 с.

<sup>13</sup>Аликаев В. А. Зоогигиена. Москва : «Колос», 1976. 256 с.

veterinary medicine. Thus, in particular, I.A. Dobromislov defined farm animal hygiene as a science that studies the causes and conditions affecting animal health, preventing diseases on basis appropriate care and keeping, and developing measures to improve of animal resistance. G.I. Gurin in his book «Зоогигиена. Уход за сельскохозяйственными животными» (1927) defines farm animal hygiene as a science whose main task is to prevent animal diseases. It addresses the tasks of developing measures for the prevention and control of diseases, namely isolation, disinfection, quarantine, diagnostics, therapeutic vaccinations and insurance of cattle<sup>14</sup>.

A special need for obtaining scientifically substantiated data on the animal keeping and care appeared during the period of the so-called socialist reconstruction of agriculture, which covered 1929–1937, the organization of socialized livestock and the creation of large specialized livestock farms, that required the development of standards for the construction of the livestock premises, water supply and placement of animals, care for them, their production exploitation, raising of young animals, etc.

In this period intensive research work and organization of the farm animal hygiene departments at veterinary research institutes and research stations, in particular at the All-Union Institute of Experimental Veterinary Medicine, the All-Union Scientific Research Institute of Animal Husbandry, the Ukrainian Institute of Experimental Veterinary Medicine, the Poltava Scientific Research Institute of Pigs, Leningrad Scientific-Research Veterinary Institute, Kazan Veterinary Research Institute, Omsk Scientific Research Veterinary Institute, Belorussian, Voronezh, Rostov, Sverdlovsk veterinary research stations, some zootechnical research institutions and others, were characteristic trend<sup>15</sup>.

The research on the field of farm animal hygiene were also carried out by the departments of higher educational institutions. In the veterinary and zootechnical universities the farm animal chairs were organized in the early 30's. During this period, textbooks on farm animal hygiene by A.K. Skorohodko (1930), F.M. Ozhogin (1932), A. Ozerov (1934), V.A. Alikhaiev (1936) and also a large number of popular science literature for institutes and technical schools were published. The rules for the

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<sup>14</sup>Гурин Г. И. Зоогигиена. Уход за сельскохозяйственными животными. Москва: «Новый агроном», 1927. 197 с.

<sup>15</sup>Всесоюзный институт экспериментальной ветеринарии ВАСХНИЛ : краткий очерк / сост. Ф. А. Терентьев ; ред. Я. Р. Коваленко. Москва, 1958. 28 с.

keeping of all types and age groups of farm animals with the regulation of the minimum required for zootechnical, zoo-hygienic, veterinary and sanitary measures were proposed. The teaching of farm animal hygiene at that time became one of the main parts of the programs for the production training of livestock farmers<sup>16</sup>.

On September 14-16, 1936, an expanded meeting of the Scientific Council of All-Union Institute of Experimental Veterinary Medicine on the issues of farm animal hygiene took place. This meeting, as noted by A.K. Skorohodko, was an important event in organizational and thematic format, which showed that research work on farm animal hygienic, despite the small number of staff, has increased significantly. There were reports and speeches on microclimate and livestock hygiene, feeding and drinking hygiene, hygiene of keeping and exploitation, and hygiene of reproduction and breeding of young animals<sup>17</sup>.

On this basis the Scientific Council formed the first norms of the temperature-humidity regime in the heating and non-heating premises, the introduction of dried carrots and dried yeast in the ration of pigs in order to increase their resistance to the infectious and gastrointestinal diseases. It suggested the mineral supplements for dry cows and piglets with indication of the corresponding equivalents of acids to alkali, phosphorus to calcium, sodium and potassium. It was noted that for the sanitary-hygienic purpose, it is necessary to develop a number of measures to improve the quality of water, and, above all, the publication in the legislative procedure of the rules of sanitary protection of water supply sources in the livestock farms, as well as the preparation of a special instruction on the keeping and exploitation of livestock premises for the creation optimum conditions of the air mode in the stall period.

In December 1936 in Gorky, the Seventh plenum of the Veterinary Section All-Union Agricultural Academy of Sciences named after V. Lenin was held, which was completely devoted to the issues of farm animal hygiene. The state of scientific and research work on farm animal hygiene was evaluated. The harmful effects of high humidity on the organism of farm animals, especially at low temperatures, have been established. It was

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<sup>16</sup>Коропов В. М. Из истории ветеринарного образования в России. *Ветеринария*. 1947. № 9. С. 7–10.

<sup>17</sup>Всесоюзный институт экспериментальной ветеринарии ВАСХНИЛ : краткий очерк / сост. Ф. А. Терентьев ; ред. Я. Р. Коваленко. Москва, 1958. 28 с.

proved that to prevent high humidity should be used ventilation in combination with heating premises or blowing heated air.

The plenum also noted a number of shortcomings: insufficient study of the problems of farm animal hygiene despite the rapidly growing needs of animal husbandry; lack of planning of zoo-hygienic subjects in scientific research institutions; underestimation of farm animal hygiene as a science and, as a result, a weak development of the network of farm animal hygiene departments at peripheral veterinary research stations; insufficient number of hours in the course of farm animal hygiene in the curriculum of universities, etc.<sup>18</sup>.

During the Second World War development of farm animal hygiene issues was suspended, the lack of staff in research institutions and higher educational institutions was tangible. Despite this, domestic scientists in the field of farm animal hygiene have gained some achievements. The most important of these were the refinement and definition of goals and objectives of farm animal hygiene studies, its formation as a branch of research and compulsory discipline in veterinary and zootechnic educational institutions<sup>19</sup>.

## **2. Development of Hygiene of Farm Animals in Ukraine in the Second Half of the 40's – at the Beginning of the 21<sup>th</sup> Century**

The period 1947–1953 is characterized by the expansion of scientific research on farm animal hygiene and the implementation of its recommendations in the production of livestock products. For this period, livestock specialists are widespread use of scientifically substantiated measures for the care, keeping and feeding of farm animals. For the first time, the norms of building designing for livestock and veterinary establishments, as well as «Примерные зоотехнические и ветеринарные правила по уходу, кормлению, содержанию и воспроизводству сельскохозяйственных животных и птицы» (1950) were issued<sup>20</sup>.

Domestic scientists have conducted a research on the effects of climatic factors and gas composition of air on the organism of farm animals. V.A. Alikhaev, M.V. Kalitaiev, B.G. Levitskyi, A.K. Skorohodko have established the dynamics and character of temperature changes, humidity in

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<sup>18</sup>Бородай І. С. Теоретико-методологічні основи становлення та розвитку вітчизняної зоотехнічної науки. Вінниця, 2012. 416 с.

<sup>19</sup>Аликаев В. А., Бурксер Г. В. Зоогигиена. *Ветеринария*. 1977. № 12. С. 33–35.

<sup>20</sup>Аликаев В. А. Зоогигиена. Москва : «Колос», 1976. 256 с.



the premises. G.I. Alekseev, A.A. Kudriavtsev investigated the influence of climatic factors on metabolism and productivity, A.P. Zozulia, A.K. Skorohodko, A.O. Shylov studied the reactions of the organism to the change of climatic factors and the importance of these factors in the etiology of the farm animal diseases. The dynamics of changes in the gas composition of air in the buildings was studied by V.A. Alikaev, F.A. Ishchukov, P.E. Kravchenko, Ye.E. Shumakovych and others.

The performed research on the air environment of farm animals made it possible to develop standards for temperature, humidity, velocity and air composition in the buildings for different species and age groups, to formulate zoo-hygienic requirements for the construction of livestock constructions<sup>21</sup>.

The research of domestic scientists by M.M. Saltykov, V.A. Zingovatov have proved the efficiency of ventilation systems of stalks, barns, pig farms, and sheepfolds. A.A. Kudryavtsev, V. E. Parunin, V.P. Ryzhkov, M. M. Saltykov have provided physiological substantiation and calculations of requirements for the air volume of ventilation, V.V. Bokov, M.V. Kalitaev, E.I. Rybchinskyi tested new ventilation systems and installations, V.A. Alikaev, V.M. Pichugin, T.K. Starov, D.P. Troyanovskyi established the norms of the space cubic and the methods of the most hygienic placement of farm animals. The samples of interior equipment of the buildings were proposed in accordance with the requirements of farm animal hygiene by G.K. Grigoriev, Ye.I. Rybchinskyi and other scientists. The research by A. Orlov, A. Sidorovskyi, A.K. Skorohodko, V.A. Skvortsov, M. F. Tommé, who studied zoo-hygienic properties of various litter materials, have a significant scientific significance.

In the postwar years, the questions of the evaluation of the quality of feed were studied comprehensively by I.A. Gusin, M.A. Golubev, A.K. Skorohodko, P.Y. Kravchenko, A.K. Reinfeld, the influence of mineral and vitamin feeding of farm animals on the increase of resistance organism to diseases – by V.A. Alikaev, B.G. Levitskyi, A.P. Onegov, I.F. Soldatenkov, the dietary prophylaxis of farm animal diseases – by M.I. Aizatullof, B.G. Levitskyi, A.P. Onegov and others. Some data on the hygiene of feeding, obtained by domestic scientists, made it possible to significantly prevent diseases of the digestive system and feed poisoning,

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<sup>21</sup>Калитаев М. В. О некоторых проблемах развития зоогигиены. *Ветеринария*. 1966. № 1. С. 90–92.

to organize dietary prophylaxis of various diseases and to use the influence of full feeding to increase the resistance of the organism of farm animals to infectious diseases<sup>22</sup>.

System research on the sanitary state of water supply sources was initiated by M.A. Golubev, F.A. Ishukova, K.A. Kotliar, K.A. Pokrovskiy, V.A. Tsingovatov and others. Quantitative norms of water supply of livestock farms for maintenance of the necessary sanitary condition were developed by K.M. Vasilieva, D.V. Yel'pateievskiy, A.P. Markushin, V.P. Fediushin, while the issues of zoo-hygienic organization of water supply of farm animals by V.K. Bauman, C.V. Ivanitskiy, P.F. Kuiatkin and others. Some data on hygiene of water supply and water drinking of animals have found industrial application.

Particularly valuable researches have carried out on the hygiene of breeding young farm animals. V.A. Alikhaev, I.A. Lebedev, V.F. Matusovich, P.D. Pshenychny, A.S. Solun have determined the importance and influence of the conditions of feeding and keeping of mothers during pregnancy on their resistance to diseases and the development of the born young. A.A. Kudriavtsev, P.Ye. Kravchenko, A.K. Skorohodko, T.K. Starov have investigated the influence of climatic factors on the state of health, growth and development of young farm animals. A. Aizatulov, V.A. Alikhaev, A.P. Onegov, A.K. Skorohodko, A.P. Yurmalat have used effective hygienic methods and norms of young animal feeding. The issues on keeping and newborn animal care were subject of scientific research of P.P. Vishnevsky, F.A. Ishukova, V.S. Litash, P.M. Tikhonov<sup>23</sup>.

The scientific researches and production observations on animal care and their exploitation became the basis for the introduction of a number of new animal husbandry techniques into the practice of livestock farms. Among the main scientific studies of this field should be noted works by F.K. Borysovykh, K.N. Vasiliev and A.K. Skorohodko on the rationalization of animal skin care; V.A. Alikhaev, S.F. Mironov, N.F. Myshkin, P.N. Tikhonov, D.P. Troianskiy on the hygiene of milking (including mechanical type); V.A. Alikhaev, F.A. Amfiteatrov, V.M. Onisimov, M.M. Shpaier on the hygienic normalization of harnesses and methods of use of working animals. Professors V.A. Alikhaev and P.T. Lebedev first proposed norms for the content of carotene, phosphorus

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<sup>22</sup>Муромцев С. Н. О новых задачах в работе по зоогигиене. *Ветеринария*. 1949. № 7. С. 4.

<sup>23</sup>Артюх И. А. Развитие ветеринарной науки на Украине. *Ветеринария*. 1954. № 1. С. 10–16.

and calcium in serum of animals and fodder, that played an important role in organizing extensive studies on the diagnosis of metabolic disorders in farm animals and assessments nutritional value of feed in 1953–1956<sup>24</sup>.

A new period in the development of farm animal hygiene began in the 60's of the 20th century. Its new tasks consisted in the creation of a material and technical base, the transition to a new technology of animal husbandry, the implementation of integrated mechanization, automation of work on animal care, the introduction of group methods of keeping, chemicalization and electrification of agriculture, irrigation and melioration of land and specialization of production processes. Under such conditions, farm animal hygiene was directed on studying the modes of animal keeping in the changed conditions of livestock industry, improving methods of zoo-hygienic assessment of the new systems and methods of keeping, clarifying the norms of the construction of farms and premises, substantiating the farm animal hygienic norms of feeding and keeping, caring for them, finding out the causes and the laws of increasing and reducing the resistance of animals to diseases and other issues<sup>25</sup>.

These issues were considered in the recommendations of the Ministry of Agriculture of the USSR «Основные условия и требования при переводе крупного рогатого скота на беспривязное содержание» (1963), «Рекомендации по машинному доению коров» (1964), «Рекомендации по повышению эффективности крупногруппового содержания свиней» (1964), as well as in the norms of technological design of livestock farms and veterinary facilities (1966–1967), rules of testing and exploitation of the ventilation systems (1959) and methodical instructions on air ionization in livestock buildings (1965). In these years, the effective means of saving and automatic control of optimal microclimate in new modern buildings have developed, issues on zonal specificity of the conditions of keeping and evaluation of the means of mechanization of animal care processes have solved<sup>26</sup>.

Domestic scientists have tested the principle of the allocation of “white” and “black” zones on the territory of the farms, which had different conditions and possibilities of shops of the different zones with

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<sup>24</sup>Аликаев В. А. Достижения советской зоогигиены и ее дальнейшие задачи. *Гигиена сельскохозяйственных животных*: тр. XXIX пленума ветеринарной секции Академии. Москва : Сельхозгиз, 1950. С. 8–22.

<sup>25</sup>Калитаев М. В. О некоторых проблемах развития зоогигиены. *Ветеринария*. 1966. № 1. С. 90–92.

<sup>26</sup>Аликаев В. А. Зоогигиена. Москва : «Колос», 1976. 256 с.

outdoor lighting. They have tested the zoo-hygiene breaks between some shops and buildings in different zones and in relation to farms with different composition and number of farm animals. F.F. Porokhov, S.S. Abramov, S. Stoyanovskyi, I. Melnyk have received satisfactory results on the regulation of the impact on the organism of the animals of the environment for the use of ultraviolet irradiation. S.I. Plyaschenko, V.I. Cherniak, V.S. Dolgov, K.V. Melnikov have developed ways of manure removal on the basis of the application of lattice-slit floor, hydrosmling, methods of manure disinfection and sewage. The name of I.F. Khrabustovskyi is related to studies on the resistance of animal organisms. He is co-author of the textbook «Гигиена сельскохозяйственных животных», which was reissued three times<sup>27</sup>.

In 1971, in Budapest took place the first congress of the International Zoo-Hygienic Society. In the subsequent society held congresses and working symposiums, which considered the achievements of zoo-hygienists in most countries of the world. In the 70's – 80's, domestic scientists have conducted an experimental and natural assessment of the main types of buildings for different species of the animals and poultry. G.K. Volkov, A.T. Semeniuta, I.F. Khrabustovskyi theoretically substantiated and tested reliable sanitary breaks in poultry farms and complexes, zoning of the territory of the farm, norms of veterinary and sanitary protection, etc.<sup>28</sup>.

Scientists of the All-Union Institute of Experimental Veterinary Medicine K.P. Andreiev, S.D. Pavlov, T.I. Yanovich have conducted research on farm animal protection from ticks. I.I. Arkhangelskyi, N.A. Spesivtsev, I.P. Danilenko have proposed means and methods for increasing the sanitary quality of milk and feed. M.M. Komarov, A.A. Polyakov, V.S. Yarnych had developed and implemented means for mechanization of sanitary, hygienic, disinsection, disinfection works on the livestock farms<sup>29</sup>.

In this period an important role in the development of farm animal hygiene was played by academician K.I. Scriabin. Developing helminthiasis control, he has pointed to the need to strictly adhere to the

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<sup>27</sup> Аликаев В. А., Бурксер Г. В. Зоогигиена. *Ветеринария*. 1977. № 12. С. 33–35.

<sup>28</sup> Зоогігієна і профілактика захворювань сільськогосподарських тварин / за ред. І. Ф. Храбустовського, В. К. Чернуха. Київ: Урожай, 1981. 224 с.

<sup>29</sup> Всесоюзный институт экспериментальной ветеринарии ВАСХНИЛ : краткий очерк / сост. Ф. А. Терентьев ; ред. Я. Р. Коваленко. Москва, 1958. 28 с.

principles of farm animal hygiene, since resistance to helminths can be enhanced by rational care of animals and their full feeding<sup>30</sup>.

Domestic scientists have investigated the quantitative and qualitative (typical) characterization of the microflora inhabiting livestock buildings, developed the methods of microbiosis control, it has a fundamental importance for modern farms and complexes. In particular, Yu.M. Markov has found new, generalizing approaches and tests to assess the conditions of animal keeping, namely the parameters of the microclimate, developed its comprehensive score (1988). Other scientists have suggested recommendations for the use of winter and summer systems of animal keeping, methods of litter use and manure storage and disinfection. The works relating to the study of the sanitary quality of feed and its toxicological evaluation, the impact of full feeding on the increase of resistance of farm animals, especially for young animals, have special practical importance<sup>31</sup>.

In the post-Soviet period, scientists in the field of farm animal hygiene have received valuable data of biogeochemical zones with a shortage or excess of macro- and microelements in soil, feed and water, the emergence of epizootic diseases in farm animals and the development of effective measures for their prevention; introduced a new direction in farm animal hygiene – dietary feeding for the prevention of a number of diseases and diet therapy for the treatment of sick animals. These works are basis for introducing into practice the control of the full value of animal feeding by the study of feeds on the content of protein, minerals and carotene, as well as the state of protein, mineral and vitamin metabolism in productive animals<sup>32</sup>.

Ukrainian scientists have performed a research to find out the norms of the light regime in the premises, the effect of natural and artificial light on reproductive functions, productivity and resistance of farm animals, as well as the use of their ultraviolet and infrared radiation, ionization in the premises in order to stimulate growth of young animals, increase their productivity, prevent diseases and improvement of the sanitary-hygienic regime of stool keeping.

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<sup>30</sup> Зоогігієна і профілактика захворювань сільськогосподарських тварин / за ред. І. Ф. Храбустовського, В. К. Чернуха. Київ: Урожай, 1981. 224 с.

<sup>31</sup>Чорний М. В. Зоогігієна : наука і навчальна дисципліна. *Ветеринарна медицина України*. 1998. № 7. С. 32–33.

<sup>32</sup>Бородай І. С. Теоретико-методологічні основи становлення та розвитку вітчизняної зоотехнічної науки. Вінниця, 2012. 416 с.

They studied the effects on the body of such factors: natural and artificial radiation, noise, electric and magnetic fields, ozone. Thanks to the research of Ukrainian scientists, a zoo-hygienic and veterinary-sanitary assessment of the most common technologies in cattle, pig, sheep, sheep, horse breeding, poultry, fur and pond fish farming and beekeeping was conducted; the influence of hypodynamics as one of the negative consequences of a number of intensive technologies on the functional state of the organism of animals was revealed. The study of technological, transport, climatic and other stresses, which often have a negative impact on animals, is also important. On the basis of the obtained data, they have proposed methods of disease prevention and control<sup>33</sup>.

Ukrainian scientists have developed veterinary measures and included them in technology of the modern farms, most of which have a preventive or so-called hygienic and veterinary-sanitary character in particular the conditions for selection, transportation, displacement of animals, sectionalization of buildings, including quarantine, its preparation, use, principles of completing, cleaning and disinfection, etc. They have worked out improved technology options in both industrial and breeding livestock, where for the first time began to pay attention to the natural resistance of animals to diseases.

In the modern farms, the possibility of an individual approach, care and clinical examination of animals is practically excluded. The method to determine the clinical healthy herd proposed by Professor I. Kalikh in 1995 is widely used now. It is based on not only determining the main parameters of the clinical status of each animal, but also the ability of all animals of the herd to produce products in accordance with their genetic potential<sup>34</sup>.

At present, farm animal hygiene develops new scientific direction on hygiene and biochemistry of forages in order to increase the their productivity, obtaining products with high dietary properties, searches for promising directions and effective ways to reduce ecological pressures on the environment of livestock industry, technical and economic justification of local raw material base use for agricultural construction<sup>35</sup>.

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<sup>33</sup> Крaсій В. В. Роль і значення дисципліни «гігієна тварин» у підготовці сучасних фахівців тваринництва. *Науковий вісник Національного аграрного університету*. Київ, 1998. Вип. 12. С. 32–36.

<sup>34</sup> Чорний М. В. Зоогігієна : історія, проблеми і завдання курсу при підготовці зооветспеціалістів. *Науковий вісник Національного аграрного університету*. К, 1998. Вип. 12. С. 26–32.

<sup>35</sup> Чорний М. В. Зоогігієна : наука і навчальна дисципліна. *Ветеринарна медицина України*. 1998. № 7. С. 32–33.

In the future, it is necessary to continue theoretical, methodological and applied research on farm animal hygiene. It should be combined with zoo-ecology and veterinary sanitation, as integral components. All of them have a practical prophylactic orientation, and only in a complex able to carry out current and new, constantly emerging, orders of animal husbandry practices.

## **CONCLUSIONS**

1. The formation and development of domestic farm animal hygiene was carried out in stages. Its becoming in the 18<sup>th</sup> – 19<sup>th</sup> centuries was provided with scientific works of domestic scientists M.G. Livanov, S.M. Khodetsky, I.P. Popov, G.I. Svetlov, M.P. Chyrvinskyi and others who studied the influence of animal breeding and feeding conditions on their performance and health. The forerunner of its in the 20's – 30's of the 20th century was the socialization of animal husbandry and the organization of large specialized livestock farms, that required the development of standards for the construction of livestock buildings, water supply and placement of farm animals, care for them, their production exploitation, raising of young animals, etc.

2. The development of these issues ensured with the organization of farm animal hygienic chairs at the branch universities and zoo-hygienic laboratories. In the Soviet era, the domestic scientists have proposed some priority developments on farm animal hygiene of keeping, feeding and care, sanitary and hygienic standards, norms for the construction of animal premises, etc. V.A. Alikhaev, P.T. Lebedev, B.G. Levytskyi, A.P. Onegov, A.K. Skorohodko, I.F. Khrabustovskyi, Yu.M. Markov made a decisive contribution in the formation and development of scientific principles of zoo-hygiene. In the post-Soviet period, zoo-hygiene developed in complex with zoo-ecology and veterinary sanitation as integral components that have a practical prophylactic orientation, and able to perform existing and new, constantly emerging, orders of animal husbandry practices.

## **SUMMARY**

The purpose of the article is to highlight the main directions and periods of the establishment and development of domestic zoo-hygiene, generalize the most significant achievements of the scientists in the development of hygienic norms of feeding and drinking, keeping and care

of animals. The research is based on the comprehensive use of general scientific, special historical methods, source analysis. The historiographic analysis of this problem showed that certain aspects of the formation and development of zoo-hygienic research in Ukraine were developed by V.A. Alikayev, M.V. Demchuk, M.V. Kalitaev, V.M. Koropov, V.V. Krasnyy, M.V. Chornyi, I.S. Borodai and others.

It is proved that among the complex of agricultural sciences, which promote the improvement of tribal resources, a special place belongs to zoo-hygiene science, the main task of which is to provide health care and high productivity of farm animals, obtaining products with high dietary properties, finding effective ways to reduce ecological pressures on the environment of the livestock industry.

The author shows that the origin of zoo-hygiene in the 18<sup>th</sup> – 19<sup>th</sup> centuries was provided by the emergence of scientific works of domestic scientists M.G. Livanov, S.M. Kodetsky, I. Popov, G.I. Svetlov, M.P. Chyrvinsky and others who studied the influence of breeding and feeding conditions on productivity indices and state of animal health.

The establishment of zoo-hygiene in the 20–30's of the 20th century contributed to the socialization of animal husbandry and the organization of large specialized livestock farms, that required the development of standards for the construction of livestock buildings, water supply and placement of animals, care for them, their production exploitation, raising young animals, etc. The development of these issues was ensured with the organization of zoo-hygienic chairs at branch higher educational institutions and zoo-hygienic laboratories. In the Soviet era, domestic scientists have proposed some priority developments on hygiene of animal keeping and feeding, care, sanitary and hygienic standards and norms for the construction of the premises for animals, etc. The V.A. Alikayev, P.T. Lebedev, B.G. Levytsky, A.P. Onegov, A.K. Skorohodko, I.F. Khrabustovsky, Yu.M. Markov et al. made a decisive contribution in the establishment and development of scientific principles of zoo-hygiene in this period.

It was established that in the post-Soviet period, zoo-hygiene is developed simultaneously with zoo-ecology and veterinary sanitation as a related component which has a practical prophylactic orientation and able to fulfill existing and new orders of livestock practices in the complex. At present, priority is given to the development of such scientific direction



as the study of feed hygiene and biochemistry for improving the productivity of farm animals, the production of products with high dietary properties, active search for promising directions and effective ways to reduce ecological pressures on the environment objects of the livestock industry, ecological, technical and economic justification of using a local raw material base for agricultural construction.

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