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THE INFLUENCE OF MICROCLIMATE ON THE PHYSIOLOGICAL STATE AND PRODUCTIVITY OF BROILER CHICKENS

ANNOTATION

This scientificarticlepresents the results of a studyon the influence of microclimateparametersandmethods of keepingbroiler chickens ontheirphysiologicalprocessesandgeneralconditioninPRIMAKUSLLP. The studyshowedthatbothhighandlowtemperaturessignificantlyaffectthe average dailyweightgain of broilers, dependingontheirage(g/day),aswell as thetotalbodyweight of birds.Thearticlealsoexamines the effect of a complex of microclimaticparameterson the body of chickens,emphasizing the importance of creatingoptimalconditionsfortheirgrowthanddevelopment. The results of the studyemphasize the need to take thesefactors into account in order toincrease the efficiencyofbroiler farming. The effect of the microclimateon the productivequalitiesandsafety of broiler chickens is presentedinTables2and3.Thesetablescontaindataon the effects of highandlowtemperatureson the average dailyweightgain of broilersatdifferentages,aswell as ontheirbodyweight.

A. F. Kuznetsov, I.I. Kochish and V.G. Semenov [2], as well as A.A. Alimov [3] believe that due attention is not always paid to the problem of optimizing the air regime of poultry houses, which has a significant impact on the productive qualities of poultry and the economic efficiency of poultry farming. During the research period, broiler chickens received the same type of diets, which were sufficiently complete and satisfied the chickens' needs for protein, metabolic energy, minerals and vitamins. The results of the conducted research can be applied in the design and construction of standard windowless poultry houses, as well as in their internal equipment. These data can be integrated into the zonal poultry management system and in the educational process at the veterinary and animal engineering faculties, in particular, when studying the educational programs «Poultry farming» and «Hygiene of farm animals».

Key words: *microclimate parameters, air temperature, relative humidity, air velocity, broiler chickens, physiological processes, feeding.*

Introduction.B In today's difficult conditions prevailing in agriculture and the economy of the country as a whole, more and more poultry producers are looking for ways and means to increase the efficiency and competitiveness of their productions [1, 2, 3]. To do this, it is necessary to create such conditions for keeping and feeding poultry that will ensure the maximum realization of the genetically determined potential of the organism [4, 5].

Poultry farming in Kazakhstan is one of the most intensive and dynamic branches of agricultural production, which has the potential to significantly increase the production of high-calorie dietary products such as meat and eggs in a short time in order to provide people with a physiologically necessary diet. Poultry meat differs from livestock meat in its high content of high-grade proteins. It contains from

16 to 25% protein, turkey meat in terms of protein content (24.7%) is dominated by all other types. Poultry meat is also rich in essential amino acids, contains glutamic acid, vitamins B_1, B_2, P, etc. [6, 7, 8].

It is not surprising that poultry meat, especially young poultry, is highly appreciated by consumers. In this regard, the broiler has no competitors in terms of nutritional benefits and taste. Broiler meat protein contains about 92% of essential amino acids (pork protein - 88%, lamb – 73%, beef – 72%). The broiler is a record holder in terms of growth rate. Its live weight increases from 40 g to 2 kilograms or more in 6 weeks, that is, by 50 times. That is why, in order to increase meat production with limited feed resources, most developed countries of the world have adopted the rapid production of broilers [9, 10, 11].

The need for further development of poultry farming is also due to the fact that feed costs for protein and energy production are lower compared to other animal products. For example, feed protein is used by broilers by 23%, turkeys by 22%, laying hens by 26%, pigs by 14%, beef cattle by 4%, dairy cows for milk production by 25%. It should be noted that in poultry farming, it takes 12 times less time to produce 1 ton of meat than in cattle breeding, and 8 times less than in pig farming [12, 13, 14].

In highly developed countries, poultry meat provides almost 30% of protein. The following main factors contributed to the dynamic growth of poultry farming in the world: – increasing population demand for dietary meat; - high growth rate of young birds. Live weight of broiler chickens at 6 weeks is 2.2 kg, ducklings (7-8 weeks) – more than 2.5 kg, turkeys (13 weeks) – more than 4 kg, goslings (8-9 weeks) – 4.5 kg, guinea fowl (10-11 weeks) - more than 1 kg, quail (9 weeks) – more than 1 kg, quail pups (9 weeks) – 110-120 g; – high cost of feed (especially for broilers and turkeys) – 2 kg of feed per 1 kg of live weight. In terms of the conversion of feed into protein products, broilers occupy the first place, they also hold the second place among all farm animals; – fast return on investment (in 2-3 years); – the technological efficiency of the industry, which allows the use of an intensive (in-line) method of production [15, 16, 17].

At the current level, the efficiency and safety of manufactured products are becoming key concepts in the poultry industry. At the same time, the requirements for the main element of the poultry production system are changing – poultry, which must have the basic properties of a developed immune system and good adaptation to intensive egg and poultry meat production technologies, high reproductive qualities and a long period of productive use.; the ability to produce products of high quality and nutritional value, effective conversion of nutrients and feed energy.

Achieving these goals is possible only with an integrated approach and systematic coordination of the efforts of geneticists, breeders, animal technicians and veterinary specialists. The main problems in the development of poultry farming are the shortage of poultry, especially breeds with high meat productivity. In this regard, it is necessary to analyze the processes of replenishment with day-old chickens in the poultry industry.

A broiler is a hybrid meat chicken that reaches the age of 5-6 weeks and is characterized by a high growth rate, low feed costs and excellent feed conversion per 1 kg gain. Broiler meat is characterized by its tenderness and juiciness, which makes it popular with consumers. The «Ross 308» broiler is an ideal meat hybrid bred in the UK by Aviagen, which today owns the rights to distribute chickens and eggs in more than 100 countries. Successful c breeding of various chicken breeds allowed the creation of the «Ross 308» hybrid, which is highly productive in both meat and egg production. This hybrid is in demand both in poultry farms and in private farmsteads [18, 19].

Various broiler crosses are grown in poultry farms in our Republic, such as «Ross-308» (England), Cobb-500 (USA), Isa (France), Gibro-N (Netherlands) and Smena 8 (Russia). These crosses are capable of providing a live weight of 2.3 to 2.8 kg of chickens at the age of 42 days at a feed cost of 1.6 to 1.8 kg per 1 kg of gain.

As of March 1, 2025, the poultry population in the Republic of Kazakhstan amounted to 46 791,884 heads, which is 3.2% more than in the same period last year. Of the total poultry population, 15.5% is kept in households, 1.3% in peasant and farm farms, and 83.2% in agricultural enterprises. The volume of poultry slaughter in all categories of farms on the specified date amounted to 74,306.8 tons in live weight and 59,040.0 tons in slaughter weight. At the same time, the production of chicken eggs decreased by 0.4%, amounting to 661,121.5 thousand units. These data highlight the importance of the agricultural sector in ensuring the country's food security, as well as the need to monitor and support various categories of farms for stable production growth.

The rapid development of the poultry industry in the agro-industrial complex of the Republic of Kazakhstan, which has been observed recently, is associated with the important problem of improving microclimate maintenance systems in poultry facilities. This is due to the need to increase productivity

and reduce the cost of poultry production. These problems are inextricably linked to the application of modern methods of energy supply to these facilities and the use of the latest means of energy supply and alternative energy sources.

An urgent problem is the detailed study of the veterinary and sanitary foundations of the maintenance and physiology of the cultivation of new bird crosses, which, along with adequate feeding, are key factors in improving the productive qualities of livestock [20]. Currently, there is no comprehensive assessment of the veterinary and zoohygienic parameters of the Ross 308 cross system when grown under the conditions of «PRIMA KUS» LLP in the Almaty region, taking into account various technological modes.

In this regard, there is a need to substantiate zoohygienic standards and study the effect of microclimate on the physiological processes and biological condition of chickens of various age groups in the conditions of «PRIMA KUS» LLP farm.

The purpose of this "work is to study the effect of microclimate on the physiological state and productivity of broiler chickens in the conditions of «PRIMA KUS» LLP. We aim to analyze how various microclimate parameters such as temperature, humidity, and ventilation affect the health and growth of chickens, as well as their overall productivity. The results of this study can contribute to optimizing the conditions of detention and increasing production efficiency in this industry.

The research objectives include: analyzing the effect of microclimate on the physiological state and productivity of broiler chickens, as well as studying the dynamics of live weight gain of chickens as a criterion for the effectiveness of measures aimed at creating favorable microclimate conditions.

Materials and methods. The research was conducted at the Department of Veterinary Sanitation at the Kazakh National Agrarian Research University. Practical work on the cultivation of broiler chickens was carried out in «PRIMA KUS» LLP in the Almaty region. «PRIMA KUS» LLP sells products in major cities of Kazakhstan and other localities. In the future, the possibility of exporting some of the products to the near and far abroad is being considered. The territory of «PRIMA KUS» LLP belongs to a temperate continental climatic region according to the sum of average temperatures. Long-term observations show that the average annual air temperature is +8°C. The summer period begins in the second half of May and ends in the second half of September, providing a growing season lasting 207-220 days. The average annual precipitation in this area is 520 mm. The terrain of the territory is characterized by flatness. The groundwater level in most of the territory is at a depth of 15 meters, while soil moisture is mainly due to precipitation. The soil and climatic conditions are recognized as favorable for the cultivation of major crops.

A significant factor influencing the growth, development and future productivity of broiler chickens is the density of their planting under any technological scheme. The optimal density is that which makes it possible to make the most useful use of the available premises, reduce depreciation, increase the survival rate of poultry, eliminate outbreaks of cannibalism and injury in the herd, and reduce the likelihood of respiratory and bacterial infections.

When raising broilers from a day-old chicken to slaughter for meat, various cultivation systems can be used: on deep non-removable bedding, in cell batteries and using a mesh floor. In our country, the system of growing broilers in large batches of 10-20 thousand pieces on deep bedding has become widespread, and it is also used at the «PRIMA KUS» poultry complex (Figure 1).

Production facilities designed for raising chickens of different age groups are modern complexes equipped with the latest technological capabilities. Automated life support systems manufactured by the largest European companies - leaders in their industry. Almost all production processes, such as feeding and watering animals, ventilation, and maintaining optimal indoor climate parameters, including temperature and humidity, occur automatically. Insulated cross shafts are provided for air extraction (Figure 2), equipped with automatically controlled dampers. Due to the increased length of the shafts (4 m from the roof), they suck air out of the lower part of the room.

Figure 1 – Placement of young broilers is carried out in specially equipped production facilities

Figure 2 – Exhaust ventilation shaft mounted on the roof, with flap

Each room for raising chickens at «PRIMA KUS» is equipped with supply and exhaust ventilation. The air exchange in the poultry house of the farm ensures the physiological oxygen demand of birds and removes excess heat and dust. The calculation of air exchange takes into account the number of chickens, body weight, season and planting density. In 1 hour it provides 3 - 5 cubic meters of fresh air per 1 kg of live weight in summer, and 1.5 - 2.3 cubic meters of fresh air in winter. The air supply inside the premises is carried out through controlled insulated air vents, the inflow mechanism consists in a higher pressure outside the poultry house than inside. The object of the research was the «Ross – 308» cross broilers, bred in England by Aviagen, whose age ranged from 1 to 40 days.

The growth period of broiler chickens is divided into three stages, and three stages of feeding a complete feed mixture are adopted: weaning (1 - 14 days), fattening (15 - 33 days) and fattening (34 - 42 days). The rations for broilers are divided into three age groups. In the first 3 - 4 days, broilers are fed a starter ration, which includes easily digestible feed.

In the second growing season (4 weeks or more), 3 - 5 % of high-quality animal and vegetable fats are added to the feed mixture in a 1:1 ratio. The energy source in the diets is wheat, corn, oil, and protein sources are soy meal, sunflower meal, fishmeal, and methionine preparations. The approximate composition of the diet depending on the age group of birds is shown in Table 1.

Table 1 – Composition of the diet of birds of different age groups

Components	Age of young birds, days					
	1-14		15 - 33		34 - 42	
Wheat	18,4		26,6		7,93	
Corn	37,0		37,0		52,0	
Sunflower meal	-		-		9,0	
Vegetable oil	3,3		3,3		3,3	
Methionine	0,3		0,15		0,27	
Fishmeal	3,5		0,3		3,5	
Contained in compound feed	In fact	+ to the norm	In fact	+ to the norm	In fact	+ to the norm
Exchange energy, kcal	306	1	304	11	311	14
Raw protein	22,9	0,1	21,0	-	19,1	1,1
Lysine	1,22	0,6	1,13	0,7	0,88	0,12
Fat	5,33	0,02	0,50	0,6	0,52	0,01
Calcium	1,06	0,03	0,99	0,02	0,94	0,03
Phosphorus	0,70	0,24	0,10	0,19	0,65	0,11
Sodium	0,06	0,4	0,64	0,3	0,14	0,15

Basically, feed mixtures for broilers should contain protein feeds of animal origin, which in the first and second growing season account for 30 - 25 and 75 - 70 % of the total crude protein content. The main productivity of the Ross-308 broiler chickens at «PRIMA KUS» is meat. Meat is considered to be all the tissues of a slaughtered animal that a person uses for food.

When evaluating meat efficiency, such indicators as live weight, chicken growth rate, meat forms, body structure, fatness, carcass weight, etc. are taken into account. To characterize the performance of

broilers, their live weight is determined weekly by weighing (Figure 3). Live weight is an indicator that allows you to control their growth and development during cultivation. The bird weighing system works automatically, for which the platform scales are connected to the central controller. The frequency of weighing is after 5 days. Feeding at «PRIMA KUS» LLP is fully automated. The imported feed is fed first into the outer hopper (Figure 4), and then distributed automatically to the feeders.

The feed that enters the hopper is in the form of granules, which consist of a crushed mixture of various grains. This helps increase the productivity of the birds and boosts their immunity when consumed. The feed storage hopper has a volume of 23.4 m³, a height of 5.79 m, and holds enough feed to cover the maximum need for 5 days. To reduce the risk of fungal growth and mold formation, the hoppers must be waterproof.

Figure 3 – Platform scales for determining the live weight of broilers

Figure 4 – External feed storage bin

The «TKA-PKM – 42» device, shown in Figure 5, is designed to measure the following parameters: □ - illuminance (E, lx) in the visible spectrum 380...760 nm; □ - radiant exposure (Ee, mW/m²) in the spectrum 280...400 nm (UV-(A+B) zones); □ - relative humidity (RH, %) of the air; □ - air temperature (t, °C).

The device is designed as two functional blocks: an information processing unit (IPU) and a measuring head (MH), connected by a communication cable. The «TKA-PKM-50» device, shown in Figure 6, is designed to measure the following environmental parameters:□ - air velocity (V, m/s), and also to display the calculated parameter: □ - volumetric flow rate (Q, m³/h or l/s) of the air.

Figure 5 – The «TKA-PKM-42» device

Figure 6 – The «TKA-PKM-50» device

Figure 7 – NP-3M sampling pump

The principle of operation of the device consists in converting the air velocity sensor into electrical signals with processing and digital display of the received numerical values of the parameters on the device display.

Determination of the indoor air content of certain gases, the increased concentration of which negatively affects the physiological state of chickens, using an NP-3M manual aspirator pump

The NP-3M sampling pump shown in Figure 7 is designed to take single samples of gas-air mixtures in order to subsequently determine their chemical composition using indicator tubes.

Two poultry houses with broiler chickens of the «Ross 308» cross were used for the study. The difference between poultry houses was as follows. The control poultry house contained 20,000 head of chickens using outdoor housing. The size of the aviary is 76 × 18 (1,368 м²).

Results and discussion. No matter how high the breed and breeding qualities birds possess, without creating a favorable microclimate for them, they are unable to maintain their health and show their potential productive ability. The microclimate affects the physiological processes in the body of birds (thermoregulation, respiration, blood circulation, digestion, metabolism), as well as productivity, reproducibility, resistance and health. As a result of the unfavorable microclimate, feed costs per unit of

production increase, the service life of mechanisms, equipment and the premises themselves is shortened, and diseases are manifested among the service personnel.

Thus, the state of the microclimate in poultry facilities must meet the physiological needs of a particular species or age group. The microclimate affects animals both by the combined effect of its various parameters, and by individual parameters in particular.

In the early days, the thermoregulation apparatus in chickens is imperfect, although with age the bird is significantly inferior to mammals in this. In birds, heat is released mainly through open skin areas. The body of the bird is covered with a fairly dense layer of feathers, while only the scalp, crest and earrings remain open. A bird does not have sweat glands, which means that it has fewer body cooling capabilities than other animals. All this limits the bird's ability to thermoregulate.

However, a bird, like all warm-blooded birds, is able to maintain a relatively constant body temperature. The normal body temperature of a bird varies widely. The body temperature of an adult bird is highest at noon, it decreases in the evening, and the lowest at night.

The hygienic importance of air humidity lies in the fact that it affects the animal body both directly and indirectly. Cold humid air, as it is more heat-intensive and thermally conductive, increases heat transfer from the body, lowers body temperature, causes overconsumption of feed, and causes colds.

The movement of air affects the heat transfer from the surface of the body of birds by conduction and convection. In combination with the temperature and humidity of the air in the cold season, increased air currents cause colds in chickens, and in the hot summer period, on the contrary, they alleviate their physiological condition. Indicators of the effect of elevated and very low air temperatures in industrial premises on the average daily weight gain of boiler chickens are shown in Table 2).

Table 2 – The effect of relatively high and low temperatures on the average daily weight gain of broilers at different ages (g/day), M ± m

Group	Age						
	1 - 7 days	1 - 14 days	14 - 21 days	21 - 28 days	28 - 35 days	35 - 42 days	1 - 42 days
High temperature	11,26 ± 1,31	26,89 ±2,07	86,78 ±4,83	129,71 ±4,7	200,36 ±21,19	279,05 ±16,78	49,98 ±2,80
The control group	10,50 ± 2,90	30,17 ±4,41	87,11 ±3,42	141,00 ±4,86	204,11 ±10,27	288,25 ±9,41	51,79 ±1,93
Low temperature	9,17 ± 1,13	16,17 ±5,25	85,04 ±1,35	134,00 ±8,28	208,32 ±14,36	221,73 ±18,83	40,37 ±3,51

As shown in Table 2, the average daily increase in each group of broilers tended to increase in each time period, however, the average daily increase in broilers in the low-temperature group for 7-14 days and 35-42 days was significantly lower than in the high-temperature and control groups ($P<0.05$). The average daily increase in broilers in the high temperature group during the period of 21-28 days was significantly lower than in the control group ($P<0.05$). The highest value of the average daily increase in broilers for the full period of 1-42 days was observed in the chickens of the control group, the lowest in the group with low temperature ($P<0.05$). Table 3 shows the results of a study of the effects of moderately high and low temperatures on the average body weight of broilers.

Table 3 – Effect of high and low temperatures on body weight of broilers, M ± m

Group	Age					
	7 days	14 days	21 days	28 days	35 days	42 days
High temperature	0,13 ±0,01	0,32 ±0,01	0,63 ±0,03	1,00 ±0,03	1,53 ±0,15	2,18 ±0,09
The control group	0,13 ±0,02	0,34 ±0,03	0,64 ±0,02	1,07 ±0,03	1,57 ±0,07	2,25 ±0,16
Low temperature	0,12 ±0,01	0,23 ±0,04	0,61 ±0,01	1,00 ±0,06	1,60 ±0,10	1,72 ±0,11

As can be seen from Table 3, the average body weight of the broilers of each group tended to increase during each time period. The body weight of broilers in the low-temperature group at 14 and 42 days was significantly lower than in the high-temperature and control groups ($P <0.05$). The body weight of the broilers in the 28-day high-temperature group was significantly lower than in the control group ($P<0.05$). The body weight of the broilers in the low-temperature group at 42 days was 23.6% and 32.4%

lower than that of the broilers in the high-temperature and control groups, respectively. When birds are in low temperature conditions, the motility of the gastrointestinal tract slows down, which leads to a decrease in feed intake. In low temperature conditions, the energy consumption of an animal changes from maintaining production to maintaining body temperature, which leads to weight loss. This is consistent with the results of a 42-day low-temperature experiment, when the average body weight and average daily weight gain in this group were significantly lower than in the control group ($P < 0.05$).

The results of the experiment showed that the low ambient temperature led to a decrease in the average body weight and average daily growth of broilers, an increase in mortality and a decrease in slaughter rates. Compared with the high-temperature environment, the low-temperature environment had a greater impact on the growth rates of the broilers.

Studies have also shown that high-temperature stress at temperatures above 30 ° C causes disturbances in the behavior and physiology of poultry, which leads to a decrease in production performance. Broilers aged 35 to 40 days were exposed to high-temperature stress at 31°C and found that their productivity and immunity decreased. The feed consumption and growth rate of broilers at a high temperature of 35°C were reduced by 13% and 32% compared to a temperature of 20 °C. Low productivity of poultry can be caused by a decrease in protein synthesis and breakdown in the body, which leads to an increase in mortality. In this experiment, the mortality rate of broilers in the high-temperature group was 33.3% higher than in the control group, indicating that the high-temperature environment increases the mortality rate of broilers.

In our study, although the average body weight and average daily weight gain of 42-day-old broilers exposed to high temperatures were lower than in the control group, there was no significant difference ($P>0.05$), which indicates that the high-temperature environment did not significantly affect the weight gain of broilers under these conditions, as well as growth and slaughter rates. Climatic conditions, such as temperature, have a direct effect on the metabolism and growth of broilers. In warm climates, birds can experience stress due to overheating, which can reduce their appetite and slow down weight gain. High humidity can also contribute to the deterioration of birds and slow down their growth. Lack of sunlight affects the synthesis of vitamin D in birds, which can lead to metabolic disorders and impaired growth. In general, unfavorable climatic conditions can significantly affect the weight of broilers and the efficiency of poultry production.

Conclusion. Thus, when developing new modern technologies for raising and keeping broiler chickens, close attention should be paid to optimizing conditions and strictly observing optimal parameters of the bird's habitat (temperature, relative humidity and air velocity, etc.). However, compliance with optimal parameters of the bird's habitat is most often associated with significant costs of material and energy resources. Modern energy- and resource-saving ventilation and heating systems for poultry farms play a crucial role in the formation and maintenance of optimal microclimate parameters. In the future, it is planned to develop the simplest, relatively inexpensive and highly efficient systems and methods of ventilation and heating of premises that would create optimal conditions for the vital activity of birds.

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ТҮЙІН

Бұл ғылыми мақалада «PRIMA KUS» жауапкершілігі шектеулі серіктестігі жағдайында бройлер балапандарын ұстаудың микроклимат параметрлері мен әдістерінің олардың физиологиялық процестеріне және жалпы жағдайына әсер етуіне арналған зерттеу нәтижелері берілген. Зерттеу көрсеткендей, жоғары және төмен температуралар олардың жасына (г/тәулігіне) байланысты бройлерлердің орташа тәуліктік салмағының өсуіне, сондай-ақ құстардың жалпы дене

салмағына айтарлықтай әсер етеді. Мақалада сонымен қатар микроклиматтық параметрлердің бірқатарының балапантарға әсері зерттеліп, олардың өсуі мен дамуы үшін оңтайлы жағдай жасаудың маңыздылығы айтылады. Зерттеу нәтижелері бройлер шаруашылығын жақсарту үшін осы факторларды ескеру қажеттігін көрсетеді. Микроклиматтың бройлер балапантарының өнімділігі мен тіршілік ету жылдамдығына әсері 2 және 3 кестелерде келтірілген. Бұл кестелерде әртүрлі жастағы бройлерлердің орташа тәуліктік салмақ қосуына, сондай-ақ олардың дене салмағына жоғары және төмен температуралардың әсері туралы мәліметтер келтірілген.

А.Ф. Кузнецов, И.И. Кочиш және В.Г. Семенов [2], сондай-ақ А.А. Алимов [3] құстардың өнімділік сапасына және құс шаруашылығының экономикалық тиімділігіне айтарлықтай әсер ететін құс қораларының ауа режимін оңтайландыру мәселесіне үнемі тиісті көңіл бөлінбейді деп есептейді. Зерттеу кезеңінде бройлер балапандары жеткілікті толық және тауықтың ақуызға, зат алмасу энергиясына, минералды заттарға және витаминдерге қажеттілігін қанағаттандыратын бірдей тағам түрін алды. Жүргізілген зерттеулердің нәтижелері стандартты терезесіз құс қораларын жобалау мен салуда, сондай-ақ олардың ішкі жабдықтарында қолданылуы мүмкін. Бұл мәліметтерді құс шаруашылығының аймақтық жүйесіне және ветеринариялық-зоотехникалық факультеттердегі оқу процесіне, атап айтқанда, «Құс шаруашылығы» және «Ауыл шаруашылығы жануарларының гигиенасы» оқу бағдарламаларын оқу кезінде біріктіруге болады.

РЕЗЮМЕ

В данной научной статье представлены результаты исследования, посвященного влиянию параметров микроклимата и методов содержания цыплят-бройлеров на их физиологические процессы и общее состояние в условиях ТОО «PRIMA KUS». Исследование показало, что как высокая, так и низкая температуры существенно влияют на среднесуточный прирост массы бройлеров в зависимости от их возраста (г/сутки), а также на общий вес тела птиц. В статье также рассматривается влияние комплекса микроклиматических параметров на организм цыплят, подчеркивая важность создания оптимальных условий для их роста и развития. Результаты исследования подчеркивают необходимость учета этих факторов для повышения эффективности содержания бройлеров.Влияние микроклимата на продуктивные качества и сохранность цыплят-бройлеров представлено в таблицах 2 и 3. В этих таблицах содержатся данные о влиянии высоких и низких температур на среднесуточный прирост массы бройлеров в различном возрасте, а также на их вес тела.

А. Ф. Кузнецов, И.И. Кочиш и В.Г. Семенов [2], а также А.А. Алимов [3] считают, что далеко не всегда уделяется должное внимание проблеме оптимизации воздушного режима птичников, который оказывает существенное влияние на продуктивные качества птицы и экономическую эффективность ведения птицеводства.В период проведения исследований цыплят-бройлеры получали однотипные рационы, которые были достаточно полноценными и удовлетворяли потребность цыплят в протеине, обменной энергии, минеральных веществах и витаминах.Результаты проведенных исследований могут быть применены при проектировании и строительстве типовых безоконных птичников, а также при их внутреннем оборудовании. Эти данные могут быть интегрированы в зональную систему ведения птицеводства и в учебном процессе на ветеринарном и зооинженерном факультетах, в частности, при изучении образовательных программ «Птицеводство» и «Гигиена содержания сельскохозяйственных животных».