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BLOOD-BIOCHEMICAL INDICATORS OF WHITE TEXAS, PHARAOH QUAILS DURING TEMPERATURE STRESS

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ГЕМАТО-БИОХИМИЧЕСКИЕ ПОКАЗАТЕЛИ ПЕРЕПЕЛОВ ПОРОДЫ ТЕХАССКИЙ БЕЛЫЙ, ФАРАОН ПРИ ТЕМПЕРАТУРНОМ СТРЕССЕ

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Abstract. In the development of poultry farming in Azerbaijan, there are big changes in the microclimate indicators in the building due to the rise in temperature in the summer months. The variability in the microclimate, in turn, affects the productivity of the birds and the blood-biochemical indicators. The research work was carried out on White Texas, Pharaoh meat-oriented quails in laboratory no. 23 of the Anatomy, Pathoanatomy and Pathophysiology department of the Azerbaijan State Agrarian University's training and practice center for quail breeding. The experiment was carried out mainly in hot summer days depending on the air temperature, and during the experiment, the indicators formed in the homeostasis of the quails along with their productivity were clarified. In order to investigate the reasons preventing high yield from White Texas, Pharaoh quails during temperature stress, we aimed to study the factors affecting their homeostasis along with studying other factors. In the article, a change in the feed ration of quails was made in order to avoid the negative factors created in homeostasis caused by temperature stress which occurs frequently among quails in the summer months. It is better to keep full-grown quails in cages under the shed during the warm months. We reduced the amount of corn, wheat and barley used in the ration and replaced it with other non-traditional feeds determining the period in advance when temperature stress will increase. To prevent changes in homeostasis, acorn flour from non-traditional forages was used in the feed ration. This feed supplement-acorn flour was applied to each quail per a day in order to increase temperature tolerance during temperature stress.

Аннотация. При развитии птицеводства в Азербайджане происходят большие изменения показателей микроклимата в здании из-за повышения температуры в летние месяцы. Изменчивость микроклимата, в свою очередь, влияет на продуктивность птиц и биохимические показатели крови. Научно-исследовательская работа проводилась на перепелах породы техасский белый, фараон мясной направленности в лаборатории №23 кафедры «Анатомия, патанатомия и патофизиология» Учебно-практического центра по разведению перепелов Азербайджанского государственного аграрного университета. Эксперимент проводился преимущественно в жаркие летние дни в зависимости от температуры воздуха, в ходе эксперимента уточнялись показатели, формирующиеся в гомеостазе перепелов, а также их продуктивность. Для выяснения причин, препятствующих получению высокой продуктивности перепелов породы техасский белый, фараон при температурном стрессе, наряду с другими факторами мы поставили перед собой задачу изучить факторы, влияющие на их гомеостаз. В статье произведено изменение рациона корма перепелов во избежание негативных факторов, вызванных температурным стрессом, который

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часто возникает у перепелов в летние месяцы и создает нарушение гомеостаза. В теплое время года перепелов лучше содержать в клетках под навесом. Мы заранее определили период, когда температурный стресс усилится, сократили количество используемой в рационе кукурузы, пшеницы и ячменя и заменили ее другими нетрадиционными кормами. Для предотвращения изменений гомеостаза в рационе кормов использовали желудевую муку. Данную кормовую добавку вводили каждому перепелу в количестве 5 г в сутки для повышения термоустойчивости при температурном стрессе.

Keywords: temperature, quails, stress, homeostasis, platelets, haematology, humidity, microclimate, air exchange.

Ключевые слова: температура, перепела, стресс, гомеостаз, тромбоциты, гематология, влажность, микроклимат, воздухообмен.

The interest in the study and use of quails is due to the high nutritional value of its meat and eggs. At present, keeping and raising quails in Azerbaijan is also carried out in many backyard farms. In the process of studying quails, it was found that after they were domesticated, they lost their ability to fly with wings, build a nest for themselves, and sleep on their backs. The most widespread in the world are Japanese quails, which lay 250-300 eggs per year, and their live mass varies between 90-100 g. It is known that this breed quickly reaches sexual maturity in 35 days [1, 3, 10].

Quail meat has a high taste quality and is distinguished by its delicate consistency, juiciness and pleasant aroma. Although quail eggs are five times smaller than chicken eggs, they contain 2-3 times more phosphorus, potassium, iron, and vitamins (group A and B vitamins). One of the main goals in raising quails is related to the presence of 5 times more phosphorus, 7.5 times more iron (Fe), 6 times more vitamin B_1, and 15 times more vitamin B_2 than chicken eggs. D vitamin is in active form in quail eggs. In addition, quail breeding is a profitable and efficient field of business that brings large profits in a short period of time without investing large amounts of money [2, 8].

Taking into account the above, a coordination center for quail breeding was established at the Azerbaijan State Agrarian University under the leadership of Professor A. E. Taghiyev. With the participation of that center, a Quails training center on breeding operates here to keep 108,000 quails per year. At present, 4 doctoral students are doing scientific research in that center. Currently, the most common quail of the Japanese breed is kept in Azerbaijan. However, when meat-oriented quails are kept in Azerbaijan, their productivity is very low, and the percentage of safe keeping among them is 60-70% [9, 11, 15].

In order to investigate the reasons that prevent high production of meat-oriented White Texas, Pharaoh quails in our country, we set out to study other factors and also to investigate the factors affecting their homeostasis. The purpose of conducting the research is to study the changes that occur in the homeostasis of quails during temperature stress in the summer months. The aim is to evaluate the physiological state and productivity of White Texas meat-oriented quails during temperature stress and to prevent abnormal changes in homeostasis of quails by bringing air exchange to zoogihygienic norms during temperature stress. The study of the influence of various factors on the homeostasis of quails showed that such research works were not carried out in Azerbaijan or in other countries.

Materials and methods

The research case was carried out in 2016-2020 at the Quail Breeding Training-Practice

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Center of the Azerbaijan State Agrarian University, in the vivarium under the Veterinary Medicine and Zooengineering faculty, and laboratory examinations first at the Non-communicable Diseases department, and then in laboratory no. 23 of the Anatomy, Pathoanatomy and Pathophysiology department. Various methods were used to investigate the effect of stress on the homeostasis of quails and to prevent the physiological changes that occur during the rise in temperature in the hot climate zones of Azerbaijan. In order to prevent negative factors appeared in hemostasis by temperature stress which frequently occurs among quails in summer months, the feed ration of quails was changed, thus the amount of corn, wheat and barley used in the ration was reduced and replaced with other non-traditional meals.

In order to prevent changes in homeostasis by reducing the effects of high temperature on quails during the study, the meal of a corn flour from non-traditional feeds was used in the feed ration. This feed supplement was implemented to increase temperature tolerance during temperature stress. Acorn flour was applied to each head of quail in the amount of 5 g per day. In order to reduce the effect of temperature, Lybecrin preparation was added to the water that the quails drank. It is used by adding 0.5 liters of Lybecrin to 1000 liters of water. 10 ml of the obtained solution was applied to each head of quail during the period of temperature stress.

Clinical, physiological, zoohygienic, biological, economic methods were used during the research. In order to conduct the research, the microclimate indicators were first determined in the building. When determining the microclimate, electronic thermometer, psychrometer, thermograph and hydrograph, UT.2 brand gas analyzer, catathermometer and Krotov's apparatus were used. In order to analyzing blood samples, inmost research studies, after determining erythrocytes, hemoglobin, platelets, leukocytes, basophils, eosinophils, pseudoeosinophils, lymphocytes and monocytes using the EDTA K2 device at the laboratory named after H. Hajiyev in the Veterinary medicine faculty of ASAU and the Beckman coulter AU 480 device in Policlinic named after Abbas Sahhat in the city of Ganja, albumin, alphaglobulin and gammaglobulinwere determined, which are protein fractions of blood-biochemical indicators. During many experiments, the amount of total protein in plasma was investigated and used.

Research results and their discussion

In order to investigate the effect of external factors on the internal environment of the quails which is kept under the shed, the internal environment of the quails was clarified by applying the following Table. At the same time, biochemical indicators of quail blood were determined during the experiment.

Table

BIOCHEMICAL INDICATORS OF QUAILS DURING THE TIME WHITE TEXAS AND PHARAOH QUAILS ARE KEPT UNDER THE SHED WITH HIGH TEMPERATURE CONDITIONS (M±m)

Indicators	*Groups*			
	control		*experiment*	
	White Texas	*Pharaoh*	*White Texas*	*Pharaoh*
Total protein, g/l	34.0±1.51	38.7±1.59	42.4 ±2.06	45.3±1.59
ALT, mmol/l	0.7±0.1	1.1±0.2	1.9±0.2	2.2±0.1
AST, mmol/l	2.0±0.2	2.3±0.2	2.8±0.3	3.0±0.2
Creatine, mgmol/l	76.0±3.0	73.0±2.8	60.4±1.9	57.6±1.6
Immunoglobulin serum	11.7±0.7	10.9±0.9	8.1±0.6	7.7±0.7

Note: ALT— alanine aminotransferase; AST — aspartate aminotransferase

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As can be seen from Table, the ingredients in the feed ration used in the experimental group were 42.4±2.06 g/l in White Texas quails and 45.3±1.59 g/l in Pharaoh quails despite a slight decrease in the amount of total protein. In the control group, it was correspondingly recorded 8.4 g/l and 6.6 g/l less, which can be attributed to the fact that the application of C vitamin used during temperature stress could not fully increase the resistance of quails to temperature stress.

The studied alanine aminotransferase (ALT) decreased very low (0.7±0.1 and 1.1±0.2) in the quails of the control group, which it caused changes in the skeletal muscles of the quails at 40-49 days of age. It was also determined that the change in the skeletal muscle is felt more clearly in the lower limbs. Such a case was observed in aspartate aminotransferase (AST). In general, AST-aspartate aminotransferase is an intracellular enzyme involved in the replacement of amino acids. This substance is mainly an endogenous enzyme and belongs to the transferase group, which is directly involved in the synthesis of glucose that enters the liver in the body. During temperature stress, the aspartate-aminotransferase enzyme participates in the emergence of ketone bodies and glucose in the period of decreasing glucose in the organism. As seen in Table, here, in the control group, AST has also decreased. In the control group, this indicator was defined as 2.0±0.2 mmol/l in White Texas quails, 2.3±0.2 mmol/l in Pharaoh quails, while it was accordingly 28±0.3 mmol/l and 3.0±0.2 mmol/l for quails kept in experimental groups.

Conclusion

1. It is better to keep quails in cages under the shed in warm months, the building must be provided with ventilation devices.

2. By determining the period when the temperature stress will increase in advance, from 11:00 a.m. to 17:00 p.m. on the day of the temperature stress, in order to increase the stress resistance of the quails, acorn flour from non-traditional feeds and Lybecrin preparation should be added to the feed ration of quails kept for meat for up to 49 days.

3. Experience shows that Pharaoh quails are better adapted to hot climates, they do not completely lose their productivity during temperature stress in contrast to the White Texas quails. In the regions where heat is observed for a long time in Azerbaijan, it is better to reduce the effect of temperature stress by various methods, and instead of White Texas quails, Pharaoh quails should be kept under sheds in farms.

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