

**REPUBLIC OF AZERBAIJAN**

*On the rights of the manuscript*

**ABSTRACT**

of the dissertation for the degree of Doctor of Philosophy

**COMPARATIVE STUDY OF THE EFFECT OF DIFFERENT  
STORAGE TECHNOLOGIES ON THE PRODUCTIVITY  
AND QUALITY OF MEAT OF PHARAON  
(COTURNIX COTURNIX) QUAIL**

**Speciality: 3110.03 - Special zootechnics, livestock  
products production of technology**

**Field of science: Agrarian Sciences**

**Applicant: Ramil Telman Mammadov**

**Ganja-2022**

Dissertation work done in the Azerbaijan State Agrarian University

Supervisor: Doctor of Agrarian Sciences, professor  
**Arif Alirza Tagiyev**

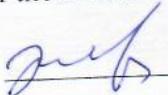
Official opponents: - doctor of agrarian sciences, professor  
**Rauf Latif Sultanov**  
- doctor of philosophy in agrarian sciences,  
assitate professor  
**Mahir Hamza Hajiyev**  
- doctor of philosophy in agrarian sciences,  
**Ramig Tofiq Abbasov**

One-time dissertation Council BFD 2.18 at the Azerbaijan State Agrarian University of the Higher Attestation Commission under the President of the Republic of Azerbaijan

Chairman of the Dissertation Council: Corr. Member of ANAS,  
doctor of agrarian sciences, professor

  
**Ibrahim Hasan Jafarov**

Scientific Secretary of the dissertation council: PhD of agrarian sciences, assitate professor

  
**Mahsati Mikhail Alekperova**

Chairman of the scientific seminar: doctor of agrarian sciences,  
professor

  
**Ganbar Gara Abdullayev**



## GENERAL DESCRIPTION OF THE RESEARCH

**Relevance and degree of completion of the topic.** The geographical position and natural climatic conditions of the Republic of Azerbaijan are considered favorable for the development of all areas of agriculture, including poultry farming and quail farming, which is one of its branches. Today, we can say with confidence that the increase in economic opportunities of our country has led to the successful solution of global projects.

A number of important production areas are being investigated to address the problem of shortage of food, especially protein in the population. One of such new agricultural sectors related to production in Azerbaijan is quail farming. Our republic has great potential for the development of quail farming. The idea of the impossibility of high yields of quail in the natural and climatic conditions of Azerbaijan has been already refuted.

According to the State Statistics Committee, in Azerbaijan in January- March 2021 the birds meat was produced 18,9 thousand tons in alive weight for poultry factories ( but last year it was produced 19,1 thousand tons). In general the total number of birds due to the fabrics was 11307,6 thousand head.

The development of poultry in Azerbaijan made by scientists such as D.Q.Tuayev, A.A.Asgarov, A.A.Aliyev, R.M.Mehdiyev, M.A.Akhundov, Y.Q.Khasanov, D.Q. Verdiyev, Q.T.Mustafayev, F.X. Huseynov, H.M.Gadgiyev, İ.M.Feiyzullayev, A.A.Taghiyev, E.H.Sultanov, M.H.Gadgiyev, F.M.Mirzayev, G.A.Mustafayeva, D.V. Mustafayev and the other scientists. At same time at the field of developing quail and studying its diseases abroad living scientists the research work they carried out was of great importance, as E.Basher, C.Erensayın, O.Altan, İ.Oghuz, Y.Akbash, E.Kaya, S.Aktan, O.Ozbey, F.Ekmen, O.N.Erta, M.Chiftchi, T.Cufer, P.Dalkılıç, V.İ.Fisinin, İ.A.Yegorov, F.Bernkhard, T.F. Plotnikova, N.V. Kadenkova, O.A.Kornilova, Y.İ. Kharchuk, B.F. Bessarabov, A.A.Krakanov, A.K.Shirivastav.

Studies hold in Azerbaijan had showed that there were all real and potential opportunities for the development of quail breeding in

the Ganja-Gazakh region. To do this, necessary to correctly determine the development direction of quail breeding, to adapt the technological factors carried out during the production, processing, procurement of the product to local conditions. By properly organizing the storage systems of quail breeds, it is possible to obtain high yields from them.

**Purpose and objectives of the study.** The purpose of the study was to study the effect of pharaon's quail storage systems on their biological characteristics and quality of quail meat in Azerbaijan and to determine a more efficient storage system based on this.

In connection with the research work, the solution of the following issues has been set out:

- To identify microclimate in buildings where quail are stored.
- To examine the effect of storage systems on clinical and physiologic indicators of quail.
- to study their meat productivity, depending on the storage systems of quail for meat.
- To study the quality indicators of quail meat depending on the storage systems.
- To examine the effect of quail on meat productivity when replacing incandescent and halloïd lamps with sodium lamps to reduce the cost of energy spent on lighting in buildings stored quail in winter months.
- To develop ways to improve the quality of quail meat and reduce the costs of their feeding (light and heat) during storage of quail in spring and summer months.

**Method of research.** As an object of research work it was used pharaoh quails for slaughter breeding and for keeping them it was learned how to use the floor, cage systems, building and penthouse. For the operating the research work it was also used the methods of breeding and developing productivity of different agricultural birds. During the investigation work it was used biological, zoohygienic, clinical-physiological, zootechnical, and economical methods.

**The main provisions for the defence:**

- Features of storage systems of pharaon's quail for meat in Azerbaijan.

- Depending on the storage systems, the yield of pharaon's quail for meat.
- To learn the quality of the meat of the pharaon's quail depends on the storage systems.
- Economic efficiency of the product obtained from quail, depending on its storage in different systems.

**Scientific novelty of research.** For the first time in the Republic of Azerbaijan, depending on the storage systems of pharaon's quail for meat, their productivity and quality indicators of meat have been determined. Theoretically and practically, during the storage of quail for meat, it was first recommended to store it in cages for up to 12 days on thick upholstery material, up to the date of cutting, and in the spring and summer months it was kept in cages under awning. Also, for economy of electricity it was used the Natrium lamps as in building and under penthouse.

**Theoretical and practical significance of the study.** Based on the results of the research work carried out, farmers and private owners engaged in keeping quail for meat products and meat quality indicators to obtain a high yield quail for meat, they must first be stored on the floor, and then in the cage system. The theoretical significance of the work is quite interesting and important in terms of enrichment of zootechnical science with modern information. The results obtained were applied at the "Quail raising training center" of ASAU and "Saritapa poultry farm" of the village of Saritapa of Shamkir region. The results obtained during the experiment are of theoretical and practical importance for the production of quail birds. For the aim of economy energy in quails keeping buildings it was used instead incandescence and halloid lamps the natrium lamps. For the economy energy and heat in farmers the quails must be kept under the penthouse in buildings in Azerbaijan Republic is advisable.

**Testing and implementation.** Results of theoretical and practical studies had been reporting in the Annual Scientific Reports of the faculty" Veterinary Medicine and zooengineering " 2016,. Scientific conferences of ASAU in 2019, Saratov State Agrarian University named after I.I.Vavilov At the international scientific-practical conference (Saratov, 2015), International Poultry Forum

“Held in Baku (Baku, 2015), International correspondence scientific-practical conference of young scientists and specialists of Voronezh State Agrarian University in foreign languages (Voronezh, 2017-2018), XIV International Scientific Conference of Altay State Agrarian University (Barnaul, ASAU, 2019), in the Institute of Innovation center of scientific and investigation of Cattle breeding Agrarian Science on the scientific-practical seminar of the thesis “Innovative approach on the Poultry” (Goygol, 2019), Bryanskiy State Agrarian University The actual problems of intensive development of cattle-breeding – International scientific-practical conference (Bryanskiy, BSAU, 2020), Arctical State Agrotechnology University The main development of agroindustry complex in Arctical territory - International scientific-practical conference (Yakutia, 2021).

**Name of the organization where the dissertation was performed.** The dissertation work was conducted at the Azerbaijan State Agrarian University’s chair of “Cattle breeding and fish products technology “.

**The total volume of the dissertation with reference to the volume of the structural division of the dissertation.** The dissertation consists of an introduction, four chapters, results, recommendations, list of 170 references and appendices. Here 11 pictures, 47 tables and 8 diagrammes additional contents of the thesis is 7 pages 13564 characters, first chapter 30 pages 61591 characters, the second chapter is 19 pages 35735 characters, the third chapter 73 pages 128420 characters, the fourth chapter 6 pages 10903 characters, results 2 pages 4125 characters, production recommenndations 1 page contains 994 characters, and the references 170 links used are 16 pages and contain 27306 characters. The volume of the dissertation consists of 166 pages of computer printing machines, the total volume is 260282 characters (28168 characters, excluding the used list of references and applications).

## CONTENT OF THE WORK

**In the introduction**, the relevance of the topic, the problem statement and the general characteristics of the dissertation are given.

**First chapter** - is a summary of literature, which deals with the importance of quail in agriculture, the level of study of the problem and other relevant issues. The results of the studies of many scientists are analyzed in a comparative aspect when storing pharaon breed of quail for meat in different systems in the dissertation study.

**Second chapter** - "The material and methodology of the study". The object of the research work was pharaon breed quail for meat. When quail was cooked for meat, the shelf life of quail was 49 days. In the experiments were used, 6000 head of pharaon breed quail.

*In the first experiment*, meat yield and quality of quail kept in the building on different systems were determined. *In the second experiment*, from the 15<sup>th</sup> of May to the 15<sup>th</sup> of September, quail were stored in three storage systems on the floor, cage, in a combined system and the quality indicators of meat obtained from Quail were determined using the equipment of the veterinary sanitation laboratory No. 5 in Baku.

During the study, general accepted zookigiyenic methods were used to study the effect of microclimate on the quality of meat of pharaon's quail. To determine the live mass were used, the WH-B04 unit Electronic Kitchen Scale scales, the MH-Series Pocket Scale MH-500 scales to determine the weight of the internal organs.

The obtained indicators were processed by biometrics method. The difference reliability of the sample means was determined with the help of the Criterion Styudent Fisher Td (N.A.Plohinsky). During data processing, the probability level was recorded as  $P \geq 0,95$ .

**Third chapter** -the so-called "Experimental part". According to the research methodology, the microclimate in the building where the quail was first stored was determined on the 10<sup>th</sup>, 20<sup>th</sup>, 30<sup>th</sup> and 49<sup>th</sup> days of the experiment.

From the results obtained, it became clear that the temperature, relative humidity of the air, the air flow velocity when storing

partridges on the floor in the building in the first days are within the zoohygienic norm, and after 40 days the content of ammonia, dust, germ cells here in many cases does not correspond to zoohygienic norms. In the lattice system, on the contrary, there are interstory temperature, humidity, and air flow velocity differences. As in other groups when storing vaccines in a combined way, here in the first days the microclimate indicators fully comply with zoohygienic standards. However, after 30 days there is a decrease in relative humidity and temperature depending on the floors of the cells, especially on the 3rd floor. Naturally, such a change in the microclimate inside the building has its effect on the yield of partridges.

Studies have shown that the living mass of quail kept on the floor for 49 days in a building whose microclimate indicators do not comply with zoological and hygienic rules was  $313.6 \pm 2.40$  gr, quail kept in the cage system was  $322.3 \pm 2.74$  gr, while quail kept in the combined method was 16.5 and 7.8 gr, respectively. During the study of 100 quails, two wasps died in the cell and one in the combined condition.

#### ***Indicators of exterior dimensions of quail stored in various systems in the building.***

The study was conducted on the 10<sup>th</sup>, 30<sup>th</sup> and 49<sup>th</sup> days of the experiment, depending on the storage systems of their body sizes, while the quail was stored on the floor, cage and combined systems in the building. Each time, 25 females and 25 males were selected from each group, their live mass was determined. The results of the obtained studies are given in.

It is clear that there was no significant noticeable difference in the body size of 10-day-old partridges. The live weight of 30-day-old partridges was 212.6 g in the combined system and 206.6; 200.6 g in other systems. This advantage was also observed in terms of body size of partridges (for example, trunk length, chest width, head length, chest depth, waist circumference, toes). Since the indicators were higher in the combined system, the length of the body was higher in this group. This indicator was 9.6 cm in the first group (mattress storage system), 9.8 cm in the cellular system and 10 cm in

the combined system. When calculating the width of the breast, it turned out that the highest indicator is observed here among the partridges kept in the combined system (10.0 cm)..

**Study of meat productivity while quail are kept in different systems in the building.** The results obtained during cutting of quail stored in different systems are given in table 1.

While, learning this table 1 it turned out that in combine system the alive weight of quails is more higher that the other systems on 49 days age. So, on floor system it was on 49 days age 296,6±0,26, in cage system it was 306,23±0,24 and in combine system it was 332,99±0,66.

The biometrical indicators were different. Thus, on floor system the average removed quadrature was  $\sigma=0,44$ , changements was  $C_v=0,15$  but in cage system the average removed quadrature was  $\sigma=0,41$ , variation  $C_v=0,14$ . But, in combine system these indicators was  $\sigma=1,14$ ;  $C_v=0,34$  p.c.

**Table 1. Analysis of quail cuttings in different storage systems in the building on 49 days (X±m)**

Indicators	Storage system								
	On the floor			In the cage			Combined		
	X±m	$\sigma$	Cv	X±m	$\sigma$	Cv	X±m	$\sigma$	Cv
live weight, gr	296,0±0,26	0,44	0,15	306,23±0,24	0,41	0,14	332,99±0,66	1,14	0,34
slaughter weight, gr	218,64±0,26	0,46	0,21	230,10±0,25	0,43	0,19	253,15±0,22	0,39	0,15
Meat production, p.c.	73,92	-	-	74,94	-	-	75,9	-	-

From the table 1 it turned out that the alive weight of quails is highly both on floor and in combine keeping systems. But it was determined different changes in morphological structure of carrion in various keeping systems.

**Table 2. Morphological composition of 49-day quail kept in different system in the building, p.c. (n=10)**

Indicators	Storage system								
	On the floor			In the cage			Combined		
	X±m	$\sigma$	Cv	X±m	$\sigma$	Cv	X±m	$\sigma$	Cv
Breast muscle	59,6±4,5	0,65	1,09	61,7±4,7	0,75	1,22	62,6±4,8	0,77	1,23
Surrounding muscles	40,4±2,8	0,52	1,29	38,3±2,5	0,53	1,38	42,4±2,9	0,58	1,37
Inner fat	4,5±0,03	0,05	1,11	6,3±0,04	0,07	1,11	4,2±0,04	0,06	1,14
Skin, along with subcutaneous puncture	32,7±1,6	0,45	1,38	33,4±1,7	0,49	1,47	32,4±1,6	0,48	1,48

As can be seen from table 2, compared to the floor and cage storage systems, quail in the combined system had differences between the breast muscle, surrounding muscles, internal fat and subcutaneous fat indicators of quail. If the stone muscle of quail in the floor storage system was equal to the average square deviation  $\sigma = 0.65$  compared to the average number of 59.6 (X), then in the combined system the coefficient of variability was  $C_v = 1.23$  p.c., since this indicator was  $\sigma = 0.77$ . The reliability criterion between groups is indicated by the difference  $t_d = 3,8$  and  $t_d = 2,9$ .

From table 2 it becomes clear that the muscles are most often collected in the breast part of the totality of the pharaon's quail. Once again, it turned out that the breast muscle of quail kept on the floor is  $59,6 \pm 0,3$  p.c. of the total muscle mass,  $61,7 \pm 0,2$  p.c. of the caged system,  $62,6 \pm 0,1$  p.c. of the combined system.

**Table 3. Chemical composition of 49-day quail meat in the building under conditions of various storage systems p.c**

Indicators	Storage system								
	On the floor			In the cage			Combined		
	X±m	σ	Cv	X±m	σ	Cv	X±m	σ	Cv
Water	68,9	0,72	1,04	69,89	0,70	1,00	68,41	0,68	0,99
Dry substance	31,1	0,36	1,16	30,11	0,31	1,03	31,59	0,35	1,01
Protein	18,63	0,22	1,18	16,61	0,17	1,02	19,2	0,18	1,11
Fat	11,17	0,13	1,16	12,1	0,15	1,24	11,09	0,16	1,14
Ash	1,3	0,02	1,54	1,4	0,02	1,40	1,3	0,2	1,54

The analysis of table 3 above shows that the amount of water contained in the floor system is about 68.9, and the mean square displacement is  $\sigma = 0.72$  and the variation coefficient is 1.04. Water, dry matter, protein and so on in the cage and combined system. Among biometric analyzes ( $\sigma$ : cv), there wasn't much difference.

68.9 p.c. of the sample taken from the quail muscle stored on the breast is water, 31.1p.c. is dry matter. In muscle samples taken from quail stored in the caged system, water was 69,89 p.c., dry matter was 30,11p.c., in the combined system these indicators were 68,41 p.c. and 31,59 p.c., respectively. As can be seen from table 3, the amount of protein in the combined system was 19.2 p.c., which

was 0.57 p.c. higher than those stored in the floor and 2.59 p.c. higher than those stored in the cage (table 3).

***Learning the categories of meat carcass while quail are kept in different system in the building.***

In determining the category of meat carcasses quail, we have obtained the following results, that of the 300 heads of quail to determine the amount of meat brisket 247 heads were full of breast meat, there was no gap between the skin and muscle tissue, the breast bone was not known, guided by these indicators in birds contained in the cell system was 231 of 300 to category I, in the combined system of 69 of 300 heads of birds. The results of the research showed that the number of quails of the first type is also high when storing quails in a combined system.

***Study of meat quality indicators when storing pharaon's quail in different systems*** In different storage systems, the indicators of brood partridges were different, so that the average quantitative indicator of brood partridges ( $X \pm m$ ) under outdoor conditions was  $59.2 \pm 1.31$ , and when stored with a cellular system  $-60.6 \pm 1.35$  (table 4).

**Table 4. Pharaon's quail slaughter in different storage systems p.c., (n=20)**

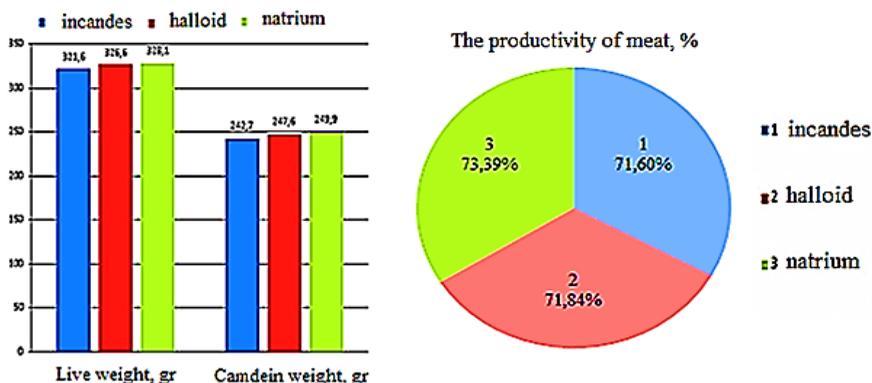
Indicators	Storage system								
	On the floor			In the cage			Combined		
	X±m	σ	Cv	X±m	σ	Cv	X±m	σ	Cv
Cutting edge	59,2±1,3	1,40	2,36	60,6±1,4	1,30	2,15	62,4±1,6	1,55	2,48
The extract of breast meat	26,78±2,7	0,60	2,24	26,96±1,25	0,55	2,04	28,01±0,75	0,45	1,60
Meat of lower extremities (thigh, calf)	12,83±0,3	0,35	2,73	13,09±0,4	0,38	2,90	13,26±0,2	0,39	2,94
Meat extract of the upper extremities (wings)	8,91±0,15	0,25	2,80	9,07±0,2	0,26	2,86	9,11±0,2	0,28	3,07
The ratio of pus to bone tissue	3,1:1	-	-	3,2:1	-	-	3,3:1	-	-
The ratio of the eaten portion of the jam to the inedible portion	4,2:1	-	-	4,3:1	-	-	4,5:1	-	-

In the combined system, compared with both storage systems, these indicators are respectively 3.2 and 1.8 p.c. In the groups in each storage system, the displacement between the individuals was equal

to  $\sigma = 1.40$  in the sex system:  $\sigma = 1.30$  in the cell system and  $\sigma = 1.55$  in the combined system. These indicators show that in the combined system the deviation between individuals is higher than in the average numerical value. So apply a balanced feeding, this system is easier to maintain.

***Study of the effectiveness of the application of sodium lamps in buildings where quail are stored.***

As can be seen from, it is clearly seen that the not efficiency of sodium lamps is 55-140 lm/W, higher than incandescent and halloïd lamps. It is known that lamps work between 10000-40000 hours in high-pressure sodium lamps during the working period. This is also of great importance for fermers to use repeatedly incandescent and halloïd lamps economically. In addition to the above, it is clear from the results of the research work that the yellow orange rays of sodium lamps with low energy and prolonged operation in buildings do not cause any stress in the quail. Even when applying these lamps, the cutting indicators of quail are higher than the indicators of quail stored in buildings where incandescent and halloïd lamps are applied. Thus, the cutting indicators of quail are shown in diagrams. In the diagram 1, the live weight of quail and the mass of camdein and the meat is shown in the figure.



**Diagram 1. Cutting indicators of quail when using different light bulbs n=20**

As can be seen from figure 1, it was found that the mass of live mass and Camden in the room, sodium lamps were used is higher than in incandescent lamps and halloid lamps. Figure 1 live weights of quails indicators in meat production when used for lighting sodium lamps. The quail, stored indoors where there is tungsten, the yield of meat is 71,60 p.c., 71,84 p.c.. in the room where the lamp used kelloidnye, in the case of quail, stored in group III, which used sodium lamps, 73,39 p.c.

***Evaluation of pharaon's quail under the awning according to their meat yield when stored in different systems***

Pharaoh quail breed can be stored indoors in Azerbaijan, as well as in the spring and summer months under the tent. The reason for this is that the climate of Azerbaijan is Sunny and warm for about 220 days.

Taking into account the above, we set a goal to keep the quail inside the building for the first 12 days, and then 37 days, that is, until the day when the quail of Pharaon will go to the slaughter.

The partridges were stored under the tent from May 15 to September 15 in a combined way and on a thick floor. The results of the conducted studies are shown in table. 5.

The biometric analysis of table 5 shows that the mean number of quantitative indicators ( $X \pm m$ ) in the control group was  $278,0 \pm 9,14$ , while the mean number of live mass indicators in the cage system was  $287,3 \pm 6,10$ . The total weight indicators were  $187,9 \pm 11,6$  ( $X \pm m$ ) and  $201,4 \pm 13,2$  ( $201,4 \pm m$ ) respectively. In the control group, the mean square deviation ( $\sigma$ ) in both storage systems was 6,31 and 5,40, the variation coefficient of which there have been 2,27 p.c. and 1,88 p.c.

In the total weight indicators, respectively ( $\sigma$ ) 4,45: 4,15 and variation coefficient 2,37 p.c.:2,06 p.c. it's equal. However, in the experimental groups, the average quadratic displacement on the floor is 6,65 p.c. living mass, and the variation coefficient ( $C_v$ ) there has been 2,29 p.c. However, in the cage system, the indicator of the average square displacement of the living mass is  $\sigma=5,55$ , the coefficient of variation  $C_v=1,86$  p.c. The weight of the sum is respectively  $\sigma = 5,45$ ,  $C_v = 2,39$  p.c.

**Table 5. The live mass of quail in different storage systems, the weight of the whole muscle and the percentage of output**

Groups	Storage method	composition, p.c.										
		Live mass, qr			Gross weight, gr			Quantity removal of meat, p.c.	Total muscle weight, qr			
		X±m	σ	Cv	X±m	σ	Cv		X±m	σ	Cv	
1. Control group (in the building)	Floor	278,0±9,14	6,31	2,27	187,9±11,6	4,45	2,37	67,58	102,1±7,19	2,55	2,49	
	Cage	287,3±6,10	5,40	1,88	201,4±13,2	4,15	2,06	70,10	109,7±5,28	2,30	2,09	
2. Practicegroup (awing)	Floor	289,4±10,4	6,65	2,29	203,7±9,21	5,45	2,68	70,38	109,6±4,32	2,51	2,29	
	Cage	298,4±7,7	5,55	1,86	219,1±10,6	2,39	2,39	73,42	116,4±6,39	2,15	1,85	

As can be seen from table 5, the live mass of quail kept in a combined system under the awing, the weight of the bulk, the weight of the bulk muscles and the percentage of output were higher than that of the pharaon's quail stored in the building.

While studying the category of quail kept under the awning, it became known that from 300 heads till 287 heads were sold as type I and 13 heads were sold as type II, while in the control group quail kept in the same system from 300 heads till 282 heads, i.e. 94 p.c. I type, 18 head to 6 p.c. It was found to belong to the second type.

**Table 6. Chemical composition of the breast muscle of quail in different storage systems**

group	Storage system	composition, p.c.											
		water			protein			oil			ash		
		X±m	σ	Cv	X±m	σ	Cv	X±m	σ	Cv	X±m	σ	Cv
1. Control group (in the building)	Floor	68,8 ± 0,34	0,95	1,38	15,4 ± 0,19	0,30	1,95	14,2 ± 0,21	0,28	1,97	1,6 ± 0,21	0,03	1,88
	Cage	68,3± 0,27	0,92	1,35	15,2 ± 0,12	0,25	1,64	14,4 ± 0,19	0,22	1,53	1,5± 0,02	0,02	1,33
2. Practicegroup (awing)	Floor	67,8± 0,17	0,99	1,46	16,7 ± 0,06	0,35	2,09	14,0 ± 0,11	0,32	2,28	1,5± 0,01	0,04	2,67
	Cage	61,7 ± 0,51	0,81	1,31	16,9 ± 0,09	0,33	1,95	14,2 ± 0,4	0,29	2,04	1,4± 0,07	0,02	1,43

Along with these indicators, when determining the chemical composition of the breastbone, it was found that the breastbone of partridges stored under a canopy contains 61.7% water, 16.9%

protein, 14.2% fat, 1.4% ash, while the water content in the breastbone of partridges stored in this system in the building was 7.1% higher. Instead, the protein content was lower in the control group by 1.5%. The chemical composition of the breast muscles of partridges is given in table. 6. If we analyze Table 6, we can see that in the control group and the experimental group in the floor and cell storage systems, the indicators of water, protein, fat and ash differed little from each other.

From a dietary point of view, a low fat content is of particular importance when evaluating the breastbone of partridges. Studies have shown that the fat content in the breast of cows stored indoors is 0.2% higher. And this suggests that the breast of partridges stored under the belly is nutritionally of higher quality.

***Excerpt indicators of pharaon's quail stored in different systems under the awning.***

In order to carry out the tasting of quail meat and broth on 49 days, austostation commission consisting of 11 people was organized. The degustation of meat and excerpt showed that while the quails were kept firstly on floor, then in cage systems the taste of these quails meat is more tastier that the other keeping systems.

Thus, on floor keeping system the smell of broth was 4,7; taste was 4,7; colour was 4,9;on cage keeping system it was 4,6;3,8;48 and in combine keeping systems the meat of it was 4,7;4,8;and 4,9 and it proved again the superiority of combine keeping systems. The degustation of breast was also higher in combine system, too. The degustators estimated the quality of breast like that. The smell of meat of quails on floor keeping system was 4,6,taste of it was 4,9 and the quails in cage keeping system the smell of meat was 3,8, taste was 4,3 mark, but in combine keeping systems it was corresponding 4,9 and 4,9 mark.

**Fourth chapter**-devoted to the analysis of the findings of the study. Economic efficiency has been determined for this purpose.

From the results obtained it became clear that 4218.4 man income was obtained while keeping quail under the new method in farm conditions, which is 958.4 man more than the income obtained during storage in farm conditions.

**Table 7. Study of economic efficiency of quail storage in different systems in farm conditions**

indicators	in terms of economy	New building	Under the new method awing
Prime number of quail,	2000	2000	2000
Prime The price of a prime quail's chicks, gap	0,25	0,25	0,25
The cost of buying quail chicks, man	500	500	500
Shelf life	49	49	49
the number of deaths and charged the birds during the experiment	34	18	30
kept healthy, p.c.	98,3	99,11	98,15
Feed was spent, kg	1769	1752	1761
Food expenses, man	1061,4	1051,2	1056,6
Prime number of Quail 49 days	1966	1982	1970
Live mass of quail 49 days, kg	552,4	612,4	609,7
Carcass taken from Quail 49 days:			
1 <sup>st</sup> type of carcass, kg	406,0	483,9	487,4
Amount obtained from sale, man	4872	5806,8	5848,8
2 <sup>nd</sup> type carcass, kg	40,0	10,2	6,7
Amount obtained from sale, man	240	61,2	40,2
Total amount obtained from sale, man	5112,0	5868,0	5889
Energy was used, man	35,6	18,7	6,5
The cost of heating the building, man	170,0	170,0	22,5
costs of prevention measures, man	25,0	25,0	25,0
Other expenses, man	60,0	60,0	60,0
Income was obtained, man	3260	4043,1	4218,4
Profitability p.c.	63,7	68,9	71,6

## Results

Based on the studies conducted, it is possible to come to the following conclusions:

1. To obtain high-quality quail meat, farmers and private farm owners engaged in quail farming in Azerbaijan are advised to keep pharaoh's quail. Pharaoh's quail can contain on the floor and in cages.

2. In order to heat the cages in the first days, additional heat sources should be installed in the cages, which is expensive for private farm owners and farmers.

3. Get quality and meat products from meat - oriented quail Pharaoh, it is recommended to keep them in cages for 12 days on the

floor, To increase the productivity of meat in private and farm recommended combined method of maintenance.

4. During the storage of Pharaoh quail for 49 days indoors, their live weight is 296.8 g, the weight of all purchased ones is 219.4 g., total (I category of species-82.3 %, The second type is 17.7 % if organized, the live weight of Pharaoh quail contained by the combined method is 334.1 g, the total weight is 253.9 p.c., the total category is 84.7 %. 1<sup>st</sup> category, 2<sup>nd</sup> category was 15.3 %. When storing quails in appropriate systems, meat from their meat is obtained by a combined method of 28.01 p.c., on the floor - 26,78 p.c., in the cell system 26,96 p.c.

5. The productivity of quail contained in different storage systems were different. Quail contained on the floor-59.2 p.c. if organized, in a cage -60.6 p.c., when stored in a combined way-62,4 p.c. The ratio of the carcass to the inedible part was on the floor-4,2:1, on the cell system-4,3:1, and on the combined storage-4,5:1.

6. Water of meat quality indicators when quail is stored on the floor in private and farmer farms in summer months were 68,9 p.c., dry matter 31,1 p.c. in this case, of quail meat stored in a combined method water was 68,41 p.c., form a dry substance-31,59 p.c.. Dry matter is also protein -19,2 p.c., fat -11,09 p.c.. Protein in the porous system dry matter is 18,63 p.c, while the fat is 11,17 p.c.

7. In the study of the morphological structure of the Pharaon quail, the amount of pus located in the lumbar part of the quail is also higher in the quail, where the muscles in the lumbar part are combined than in the quail, which are stored in the floor and cage. The amount of pus here is 18.7 p.c. and it is more than 1.6 p.c. than quail contained in the cell system.

8. During tasting of the meat of the pharaon's quail stored in different systems in individual and farmer farms and the broth of the meat became known that the tasting of the quail stored on the floor of the building received 17.5 points by experts, while the broth received 18.6 points, the tasting of the quail stored in the chest meat at commbining method was 19.4 point, broth was 18.8 point

9. As a result of the research, we found that pharaon's quail, which is stored in Azerbaijan for meat purposes from the 15<sup>th</sup> of

May to the 15<sup>th</sup> of September, because 220 days of the year are sunny and warm, can be stored under an open awing until the day of cutting after 12 days

10. The profitability level of productivity indicators of pharaon's quail kept by flooring, cage and combined method has been high respectively 13.8 and 3.5 p.c. quail kept in flooring and cage

11. During the research carried out on 6,000 heads in the farm, 4218,4 manats were obtained from the sale of quail meat, which was stored under the awing combined method, which was 958,4 manats more than the amount obtained from quail stored in the farm system..

### **Recommendations for manufacturing**

1. According to the results of research work, in order to increase poultry production in the Republic of Azerbaijan, it is expedient to keep quail in the Ganca-Gazakh region in the winter months in a combined manner.

2. In order to get quality quail meat for farmers engaged in quail farming, I suggest that they buy pharaon's quail, which has a high meat yield in the Western region of Azerbaijan.

3. When storing pharaon-breed quail in cages in the building, in order to obtain a high yield from them, we recommend keeping quail in cages for the first 12 days on thick flooring, and then until the day of cutting. In order to save electricity, sodium lamps should be used instead of incandescent and halloid lamps.

4. In order to save energy and get a high yield during the storage of quail in the spring and summer months, it is recommended to store quail under the awing by a combined method.

**The main content of the dissertation is published in the following scientific papers:**

1. Taghiyev, A.A., Mammadov, R.T. Study of the impact of natrium lamps on quails clinical-physiological cases // – Ganja: Scintific works of ASAU, – 2014, №3, – pp. 56-58.

2. Taghiyev, A.A., Kerimov, A.G., Mammadov, T.P. Productive and meat quality in growing these under different environmental conditions // International scientific - practical conference, Students, graduates and young scientists “ APK Countries of Developing of Veterinary-medicine knowledge of young scientists ” Saratov State Agrarian University. N.I. Vavilova, – Saratov: 14-16 May, – 2015, – pp. 369-372.

3. Mammadov, R.T. Study of the impact of microclimate indicators on quail productivity at the training center for quail breeding // – Ganja: Ganja division of ANAS, News magazine, – 2016, №2 (64), – pp. 30-34.

4. Mammadov, R.T. Impact of methods of breeding of pharaoh's quail on their meat productivity and quality indicators // – Baku: Azerbaijan Agrarian Science, – 2017, №2, – pp. 156-158.

5. Mammadov, R.T. Learning of the influences quails' meat quality in different keeping systems on hot climate circumstances // GSU, the international scientific conference of young scientists, – Ganja: GSU, – 26-27 October, – 2017, – pp. 206-208.

6. Mammadov, R.T. Quality of the quail meat depending on the different keeping systems // Voronezh State Agrarian University. Emperor Peter I<sup>st</sup>, Voronezh, – 15 April: 2017, pp.150-152.

7. Mammadov, R.T. Learning of the categories of jamdey while keeping pharaoh's quail in different system in the building // a collection of scientific works of ASAU, – Ganja: – 2018, №2, – pp. 65-68.

8. Taghiyev, A.A., Mammadov, R.T. Quality quail meat in terms of content under their shady tent // – Moscow: Zoo engineering, – 2018, № 5, – pp. 26-28.

9. Mammadov, R.T. Testing of pharaoh's quail meat stored in different systems // Ganja division of ANAS, News magazine, – Ganja: –2018, №2 (64), – pp. 30-34.

10. Mammadov, R.T., Taghiyev, A.A. Learning of the clinical-physiological indicators of quails' while they were kept in different systems // Voronezh State Agrarian University. Emperor Peter I<sup>st</sup>, – Voronezh: 10 April, –2018, – pp. 200-203.

11. Mammadov, R.T. The use of soil material for keeping pharaon's quail in hot climate // GSU, international scientific conference, actual problems of modern natural and economic sciences, Part II, – Ganja: GSU, – 4-5 May, – 2018, – pp. 284-287.

12. Taghiyev, A.A., Mammadov, R.T. Study of quality indicators of incubation eggs from pharaon's quail // ASAU, academician Jalal Aliyev and materials of the Republican scientific-practical conference on genetics of biological diversity, – Ganja: ASAU, – 30 November, – 2018, – pp. 396-401.

13. Taghiyev, A.A., Mammadov, R.T. Control of the quality of quail meat on the principle of ANAS // – Goygol: Rİ of Livestoc scientific works, – 2018, №4, – pp. 25-29.

14. Taghiyev, A.A., Mammadov, R.T. The Influence of different technologies of the content of pharaon's quails on the quality of their meat // XIV international scientific and practical conference, – Barnaul: Altai SAU, – 7-8 February. – 2019, – pp. 217-219.

15. Mammadov, R.T., Taghiyev, A.A. Additional indicators of pharaon's quail stored in different systems in the building // ASAU, application of agricultural insurance in Azerbaijan: problems and opportunities materials of the Republican scientific-practical conference, – Ganja: ASAU, – 15 March, – 2019, – pp. 158-162.

16. Mammadov, R.T. Learning of keeping systems influence to the inner organs of pharaoh quails // – Goygol: Rİ of Livestoc scientific works, – 2019, №1, – pp. 57-60.

17. Mammadov, R.T. Learning of microclimate indicators of ecological-clean pharaoh quails to the clinical—physiological case of them // Materials of scientific-practical conference of ecological clean agriculture in Azerbaijan, – Ganja: ASAU, – 29 October, – 2019, – pp. 157-160.

18. Mammadov, R.T., Rustamova, A.E. The significance of optimal microclimate in breeding pharaoh quails chickens // – Ganja: The science news Azerbaijan Technology University, – 2019, №4/31, – pp. 53-58.

19. Mammadov, R.T. The various keeping technology of pharaoh quails under penthouse in “Quails Breeding Center” of

ASAU // – Baku: Nature and Science (international science journal), – 2020, №02/03, – pp. 43-45.

20. Mammadov, R.T. The sanitary-hygienic value of pharaoh quails while they are kept in Vivarium of ASAU // The actual problems of intensive development of cattle-breeding-The journal of works international science-practical conference with international attendance, Tom I, Bryansk: Print by BSAU, – 22-23 January, – 2020, – pp. 135-137.

21. Mammadov, R.T. The clinical-physiology indicators and pro-ductivity of pharaoh quails while they are kept under penthouse // International attendance at the Scientific-practical conference " The main development of agroindustry complex in Arctical ter-ritory" devoted to the 70<sup>th</sup> anniversary day of the doctor of Vete-rinary sciences, prof. Honoured scientist of the Republic Saxa (Yakutia) Pavlov Aleksandr Innokentevniy, Yakutsk, Saxa Republic (Yakutia) 10 November 2020, statement materails/under the editorship L.P. Korkino. – Yakutsk: Dani-Almas, – 2021, – pp. 262-264.

22. Mammadov, R.T. Learning of the indicators of pharaoh quails breeding in Ganja-Qazakh zones-Baku: Nature and Science (International scientific journal), – 2021. №03/01, – pp. 62-65.

23. Mammadov, R.T. Recommendation about the keeping of pharaoh quails in different keeping systems under penthouse / – Ganja: ASAU, – 2021. – 14 pp.

24. Mammadov, R.T. Learning of the indispensable amino acids in breast muscles of pharaoh quails which are kept under penthouse – Baku: Nature and Science (International scientific journal), – 2021. №03/01,– pp. 62-65.

25. Mammadov, R.T. The breeding technology of quails in Ganja-Qazakh zones // Bishkek: Vestnik The State Agrarian University of Kirgizistan named after K.I.Skryabin – 2021.№2 (56), – pp. 131-135.

26. Mammadov, R.T., Rustamova, A.E. The sanitary-hugienic value of breeding pharaoh quails chickens in mountain and foothills regions of Azerbaijan // – Ganja: Azerbaijan Technology University Scientific News, – 2021.№1/34, – pp.73-76.

27. Taghiyev, A.A., Mammadov, R.T., Hasanova, L.A. The keeping hygiene of quails under penthouse during summer months // – Sanct – Peterburg: The questions about the right ruled of norms in Veterinary, – 2021. №2, – pp.102-105.

28. Mammadov, R.T. Efficiency of the use of sodium lamps in rooms for quails keeping // – Saratov: Saratov State Agrarian University named after I.I.Vavilov Agrarian Scientific Journal, – 2021. №11, – pp. 98-101.

29. Mammadov, R.T., Rustamova, A.E. Learning of meat quality indicators and productivity of Pharaoh quails // – Ganja: Azerbaijan Technology University Scientific News, – 2022.№1/38, – pp.254-257.

The defence will be held on « 25» November 2022 at 11<sup>00</sup> BFD 2.18 will be held at a one-time meeting of the Dissertation Council at the Azerbaijan State Agrarian University.

Address: Az 2000, Azerbaijan Republic, Ganja city, Ataturk avenue, 450.

Dissertation is accessible at the library of the Azerbaijan State Agrarian University

Electronic versions of dissertation and its abstract are available on the official website of the Azerbaijan State Agrarian University

Abstract was sent to the required addresses on « 21» October 2022

Signed for print: 18.10.2022  
Paper format: (210x297) 1\4  
Volume: 38845 signs  
Number of hard copies: 30