RESEARCH PAPER

EGG PRODUCTIVITY OF CHICKENS CROSS-BREEDING IN KARAKALPAKSTAN

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Abstract. The article shows that the differences between the peaks of egg production of crosses indicate that chickens belonging to the Lohmann brown-classic crosses had an advantage of 0.8% over the Lohmann sandy crosses. According to the data obtained on egg production at 12 months, the Lohmann brown-classic crosses had an egg production of 314.2±5.52 eggs, while the egg production at 14 months was 349.3±5.65 eggs. This indicator was 319.4±4.78 and 353.1±6.28 eggs in chickens belonging to Lohmann sandy crosses, respectively, and it was observed that the egg mass increased with the age of the chickens, and at the 22nd week it was 54.7±0.26 grams in chickens belonging to Lohmann brown-classic crosses, while in Lohmann sandy chickens this indicator was 54.3±0.06 grams. By the 72nd week, the egg weight in chickens belonging to Lohmann brown-classic crosses was 25.4% and in Lohmann sandy chickens, 28.7%, and the second group chickens prevailed by 3.3%, and conclusions were drawn.

Keywords: Lohmann brown-classic, cross, egg, Lohmann sandy, vitamin, embryonic, pod, mixed feed, productivity
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INTRODUCTION. Eggs are a protein-rich food that is essential for human health. The egg production of chickens depends on many factors, the main of which are feeding technology, storage conditions, breed characteristics of chickens, and age of chickens.

When growing high-quality eggs, their composition should not be overlooked. Eggs contain an average of 11-13% protein, 11-13% fat, 2.5-3.2 mg % iron, 250-470 mcg%, vitamin A, as well as vitamins D and B2, selenium, and chromium in significant amounts.

A chicken egg is a complex system that ensures the growth and development of the embryo, the formation of tissues and organs, and the nutrition of the embryo during embryonic development. Egg cells are formed during embryonic development.

According to most scientists, egg productivity and quality depend on the composition of the feed, and it is proven that quantitative and qualitative indicators can be achieved by adding additional ingredients.

The use of degossypolated cottonseed meal to meet the amino acid requirements of chickens is emphasized, as a lack of calcium in the diet leads to a decrease in egg production, thinning of the eggshell, its brittleness, and rapid breakage [1].

The condition of the eggshell, its thickness, structure, number of pores, and color, largely depends on the feed of the chickens, and reducing the protein content in the feed to 15.0-15.5% has a less negative effect than reducing the proportion of essential amino acids. It is noted that when the crude protein ratio decreases by 1.5-2.0%, the shell decreases by 1.2-1.4%, and its thickness by 5-10%. It is necessary to add 5-10% more methionine and lysine to the diets, and for eggshell quality, it is necessary to have a ratio of 314-322 KDJ of energy per 1 g of calcium in the diet [2].

A complete diet for laying hens should contain 16-17% protein [3]. The ability to save feed costs by enriching them with such additional feeds was demonstrated by the fact that the mixed feed processing plant at the “Snezhka” poultry farm in the Bryansk region of the Russian Federation allowed the enterprise to save feed reserves [4].

Eprin, having proven a positive effect on the egg production of chickens, emphasizes that replacing fish meal in the diet from 50% to 70% reduced the egg production of chickens by 2.8-1.1%, the average egg weight by 1.7 and 0.9%, and feed consumption per 10 eggs by 0.05 and 0.02 kg [5].

The introduction of a stress-stimulating feed additive into the diet of laying hens helps to increase live weight, shelf life and egg production [6].

The economic characteristics of laying hens with the "Lohmann LSL classic" cross were studied, and egg production, feed consumption indicators, including; This proves that egg production increased to 363.3-365.4 eggs, and the cost of feed for the production of 10 eggs in groups was significantly lower - 1.23-1.24 kg. [7].

An important nutritional component in the diet of laying hens is readily available protein. With the development of the poultry industry, the need for good and high-quality feed increases. Soybean meal and sunflower cannot fully provide egg-laying birds with protein. It is emphasized that soybean and sunflower meal should be replaced with heat-treated lupin in the feed of laying hens. Replacing soybean and sunflower with lupin makes it possible to reduce the cost of feed for poultry [8].

The egg consists mainly of four components: egg white accounts for 62-66% of the total egg weight, yolk for 32-36%, integument and shell. There is an air sac at the blunt end of the egg. In addition to protein, egg white contains the main part of riboflavin. The yolk is the main reserve of nutrients. It contains more proteins, group B vitamins, all reserves of iron and fats, and vitamins A, D, choline, and lecithin than the white. The quality of eggs also depends on the methods of their storage, and the optimal conditions for storing eggs should be a temperature of 0 ºC, a relative humidity of 85% and a special gaseous environment, namely a mixture of nitrogen and carbon dioxide. When storing eggs, a special carboxymethyl cellulose protective layer is used, which is applied to the shell.

Materials and methods. The promising "Lohmann brown-classic" and "Lohmann sandy" chicken crosses are kept on the "Nurummat Kurbanov" farm in Ellikkal'a district of the Republic of Karakalpakstan. The farm was organized on November 16, 2016.

The chickens taken for the experiment were under constant veterinary supervision, and their feeding and keeping were carried out in the same conditions. Based on the experimental data obtained, it is possible to assess the general average condition of the chicken flock.

Egg weight was measured on an electronic laboratory scale called "Electronic Kitchen Scale" with an accuracy of ±1 gram based on GOST 24104.

Egg density is determined by the storage period after laying and the thickness of the shell.

Egg laying of chickens = (total eggs taken ÷ average number of chickens) *100%

The large and small diameters of the egg white and yolk are measured with a caliper, and its indices are determined based on the following formula.

$$\frac{h}{(D + d/2)}$$

Here: h-height of egg white and yolk, D-size of egg white and yolk, d-small diameter of egg white and yolk

In addition, if eggs are paid in kg, the weight of eggs and the total number of chickens may increase.

Results and discussion. The egg production of chickens of the Lohmann brown-classic and Lohmann sandy crosses in the research work is presented in Table 1.

Analysis of the data presented in this table shows that the age of 50% productivity of chickens of the Lohmann brown-classic (n = 20) and Lohmann sandy (n = 20) crosses in the experiment was 142 days in the first groups, while in the second groups it was an average of 144 days. The differences between the peak of egg production were 0.8% higher in chickens of the Lohmann sandy crosses than in the Lohmann brown-classic crosses. The data on egg production at 12 months showed that the Lohmann brown-classic crosses produced 314.2±5.52 eggs, while the egg production at 14 months was 349.3±5.65 eggs. This indicator was 319.4±4.78 and 353.1±6.28 eggs, respectively, in chickens belonging to the Lohmann sandy crosses.

Table 1

Egg productivity

Indicators		Unit of measurement	Krosslar	
			Lohmann brown-classic	Lohmann Sandy
			n-20	
			X±Sx	
Ovulation	Age at 50% productivity	Day	141	144
	Peak egg production	%	92,4	93,2
Weight of one chicken egg	Egg production at 12 months	piece	314,2±5,52	319,4±4,78
	Egg production at 14 months	piece	349,3±5,65	353,1±6,28
Weight of one chicken egg	Egg production at 12 months	kg	18,7±0,31	18,8±0,24
	Egg production at 14 months	kg	19,4±0,4	20,7±0,31
Average egg weight	Egg production at 12	g	59,7±0,24	58,9±1,25

	months			
	Egg production at 14 months	g	61,8±1,07	61,4±1,05

Egg weight is a key indicator of productivity and egg quality. Egg weight is influenced by several factors, the first of which is the age of the hens. The ability of laying hens to realize their genetic potential largely depends on feeding, care, and veterinary care. If these requirements are not met, the hens will not produce their potential productivity. Therefore, when using promising crosses, special attention should be paid to their feeding and maintenance.

The results of our research on egg weight in the dynamics of hens' age are reflected in Table 2 below. The data obtained on egg weight in the dynamics of age (Table 2) show that at the 22nd week, the weight of the hens belonging to the Lohmann brown-classic cross was 54.7±0.26 grams, while at the 30th week, this figure was 54.3±0.06 grams. At the 30th week, this figure was 60.9±0.29 and 61.1±0.08 grams, respectively.

Table 2

Egg weight change according to age dynamics, n=20

Indicators	O'lchov birligi	Krosslar	
		Lohmann brown-classic	Lohmann sandy
		(n=20)	(n=20)
		X±Sx	
At 22 weeks	g	54,7±0,26	54,3±0,06
At 30 weeks	g	60,9±0,29	61,1±0,08
At 52 weeks	g	66,3±0,15	67,3±0,06
At 72 weeks	g	68,1±0,11	69,7±0,2
Average egg mass	g	62,5±0,11*	62,1±0,13
Average egg production	piece	314,3±5,54	329,1±6,15
Average egg mass per 1 hen	kg	19,6±0,03	20,4±0,03

Note: *P<0,05

At 52 weeks, the Lohmann brown-classic chickens had 66.3±0.15 and Lohmann sandy chickens had 67.3±0.06 grams, and at 72 weeks, this figure was 68.1±0.11 and 69.7±0.2 grams, respectively. In conclusion, it can be said that in both crossbred chickens, the highest egg weight increased with age, starting from the 22nd week of laying and continuing until the 72nd week of laying, as can be seen from the data in Figure 4.1.1.

In the differences between crosses (Figure 1), the egg mass of chickens belonging to the Lohmann brown-classic crosses increased by 13.4% from the 22nd week to the 30th week, that is, on the 8th day of growth, while this indicator increased by 12.5% in the Lohmann sandy chickens, and the differences between crosses amounted to 0.9%, showing the superiority of the first group. While the differences in egg weight between crosses remained, from the 30th week to the 72nd week, the egg weight of chickens belonging to the Lohmann brown-classic crosses increased by 8.9% and that of chickens belonging to the Lohmann sandy chickens by 10.1%, while the chickens of the second group prevailed by 1.2%. The weight of each chicken egg is of great importance in determining their total egg weight (in kg). In conclusion, both crossbred hens show a rapid increase in egg weight from 22 to 30 weeks of age.

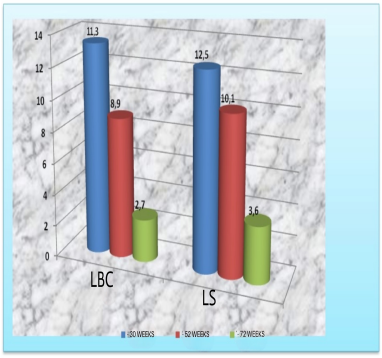


Figure 1. Change in egg weight in age dynamics,%

Eggs are divided into the following categories by weight.

B - eggs of the highest category weighing 75 g and above,

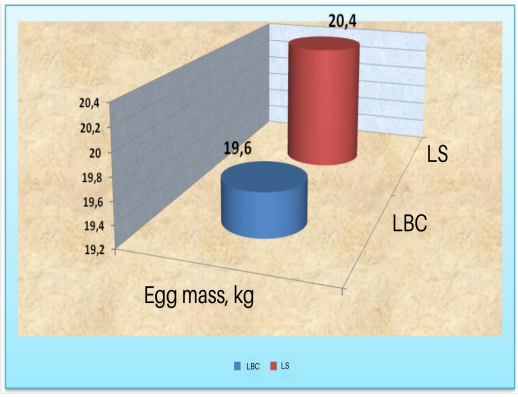
O - selected eggs, 65-74.9 g,

1 - eggs of the first category, 55-64.9 g,

2 - eggs of the second category, 45-54.9 g,

3 - eggs of the third category, 35-44.9 g

These general indicators can be seen in Figure 2.



The total egg production of chickens belonging to the Lohmann brown-classic cross was 19.6 kg, while in the Lohmann sandy chickens this figure was 20.4 kg, and the second group of chickens was superior by 0.8 kg.

Several factors affect the chemical composition of eggs, the main of which is their shelf life. To find out the freshness of eggs, we choose the simplest methods, immerse the egg in a glass of water, if the egg sinks, then it is the freshest, 1-3 days have passed

since the hen laid it, if the egg floats, but does not rise high, then this means that the hen laid the egg about 7-10 days ago, and if the egg is left floating on the surface of the water, then the hen laid such an egg more than 20 days ago. The results of studying the chemical composition of eggs (%) in our experimental work are presented in Table 2.

In the data presented in Table 2, the dry matter content of the chickens belonging to the Lohmann brown-classic cross was 25.9±0.28%, while it was 24.8±0.24%, and the dry matter content in the eggs of the first group of chickens prevailed by 1.1%. The protein content of both cross chickens was the same. The fat content was 1.0% higher in the eggs of the first group of chickens, while the carbohydrate content was 0.4% higher in the eggs of the second group.

Table 3

Chemical composition and physical properties of eggs

№ Indicators	Unit of measurement	Krosslar	
		Lohmann brown-classic, (n=20)	Lohmann sandy, (n=20)
		X±Sx	
Dry matter	%	25,9±0,28	24,8±0,24
Protein	%	14,7±0,13	14,7±0,21
Fat	%	9,1±0,17	8,1±0,09
Carbohydrates	%	0,9±0,05	1,3±0,05
Ash	%	1,2±0,004	0,8±0,102
Protein solidification temperature	degree	62,4±0,76	61,3±0,62
Freezing point of protein	degree	-0,44±0,07	-0,43±0,07
Freezing temperature of the yellow section	degree	-0,53±0,07	-0,51±0,07
100 g. Energy value	kkal	174,4±2,17	165,7±1,18

In conclusion, eggs from chickens belonging to the Lohmann brown-classic cross had an energy value of 174.4±2.17 kcal per 100 grams of egg product due to the high content of dry matter and fat (9.1±0.17%), while eggs from Lohmann sandy chickens had an energy value of 8.7%.

The eggshell (skorlupa) plays a key role in the preservation of eggs. The shell is a complex and perfect natural packaging consisting of the most valuable components of the egg. Its main purpose is to protect the egg from mechanical stress and maintain its integrity. The shell, in addition, successfully resists microbial attack, slows down the dehydration of the egg, and its pores turn the egg into an open biological system. The strength of the shell is the most important indicator of its quality.

The weakening of the shell below the standard level indicates poor egg quality and leads to an increase in the number of unfit eggs during transportation. Eggs with damaged shells cannot be stored or incubated, and the selling price as unfit eggs decreases by 1.5-3 times. Most importantly, the thinning of the egg shell leads to an increase in the percentage of unfit eggs during egg transportation, which directly affects the economic efficiency of the farm. In our research, the indicators of egg shell quality are summarized in Table 3.

Table 4

Eggshell quality indicators, n-20

Indicators	Unit of measurement	Gruppa	
		Lohmann brown-classic	Lohmann sandy
		X±Sx	
Percentage of shell to total egg weight	%	10,9±0,17	10,4±0,13
Thickness	Mkm	377,4±1,34	377,6±1,56
Ash	%	92,7±0,10***	93,6±0,10
Calcium	%	32,9±0,07	33,7±0,11

Izoh: ***P<0,001

As shown in Table 3, the percentage of shell to total egg weight in Lohmann brown-classic crosses was 10.9±0.17%, while this indicator was 10.4±0.13% in Lohmann sandy chicken eggs, and there were almost no differences (0.2%). A similar situation was not observed in eggshell thickness (0.2%). The ash and calcium content, which are indicators of eggshell quality, were 92.7±0.10 (P<0.001) and 32.9±0.07% in Lohmann brown-classic crosses, respectively, while in Lohmann sandy chicken eggs, they were 93.6±0.10 and 33.7±0.11%. The differences between crosses were proportionally greater, 0.9 and 0.8%, in eggs obtained from Lohmann brown-classic crosses. In summary, these differences are largely due to the protein and yolk content of the egg, relative to the total egg weight. The proportion of the shell portion (in grams) to the total egg weight is shown in Figure 3.

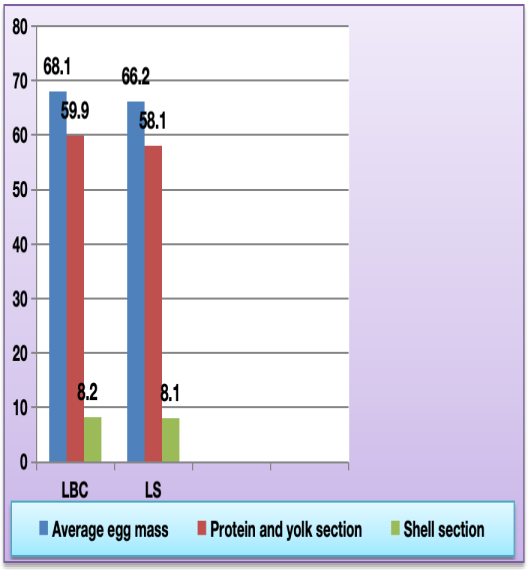


Figure 3. Shell percentage to total egg mass, g
(Egg products at 72 weeks of age)

The analysis of the data presented in Figure 3 showed that, in terms of the percentage of egg product composition at the 72nd week, the total mass of the Lohmann brown-classic crosses was 68.1 grams, the albumen and yolk part was 59.9 grams, and the shell part was 8.2 grams. These indicators were 66.2; 58.1 and 8.1 grams, respectively, in the eggs of chickens belonging to the Lohmann sandy crosses. Differences were observed between the crosses, with the shell part of the total egg weight being 12.4 and 12.2% in the Lohmann brown-classic crosses, with differences of 0.2%.

Conclusion. The differences between the peaks of egg production of crosses showed that chickens belonging to the Lohmann brown-classic crosses had an advantage of 0.8% over the Lohmann sandy crosses. The data obtained on egg production at 12 months showed that the egg production of Lohmann brown-classic crosses was 314.2±5.52 eggs, while the egg production at 14 months was 349.3±5.65 eggs. This indicator, respectively, was 319.4±4.78 and 353.1±6.28 eggs in chickens belonging to the Lohmann sandy crosses. Egg mass was observed to increase with age, and at 22 weeks of age, it was 54.7±0.26 grams in chickens of the Lohmann brown-classic cross, while in Lohmann sandy chickens this figure was 54.3±0.06 grams. By 72 weeks of age, egg weight in chickens of the Lohmann brown-classic cross was 25.4% and in Lohmann sandy chickens 28.7%, with the second group chickens prevailing by 3.3%.

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