Enhancing broiler economics via kulang (dakan) crossbreeding

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Abstract. This study investigated methods to enhance the locomotor system of broiler chickens for improved weight-bearing capacity. Ross-308 and Cobb-500 commercial broilers were crossed with local Kulang (Dakan) roosters to produce F1 hybrids. The first-generation offspring from these two distinct crosses were systematically compared, with particular focus on their growth performance, development characteristics, and meat productivity. Analysis revealed that the hybrid vigor effect significantly strengthened the locomotor system in F1 progeny, resulting in 10-13.3% greater viability compared to baseline standards. Furthermore, comparative evaluation demonstrated that crosses between Ross-308 and Kulang roosters produced F1 offspring with 3.84% greater body weight than those from Cobb-500 and Kulang crosses. These findings suggest that strategic crossbreeding with indigenous Kulang roosters can effectively improve both the structural integrity and productive performance of commercial broiler lines.

1 Introduction

Poultry fields occupy a special place in the animal husbandry of our republic's agriculture, and this sector plays an important role in providing our people with valuable dietary food products, meat and eggs. At the same time, poultry farming supplies fluffy feathers for the national economy. Compared to other farm animals, poultry are distinguished by their fast maturity and dietary products. In the following years, the poultry sector is rapidly developing within the framework of the population of the republic and various businessmen and farms. Therefore, further development of this direction in animal husbandry, raising their productivity to the level of genetic potential, significantly increasing the volume of production of poultry products is one of the important tasks of the poultry breeders of our republic. For this, it is important to create a solid feed base in these areas, to have accurate classifications of their genes, to properly organize their feeding in different periods on scientific grounds for different regions of the republic [1-4].

As of January 1, 2024, the number of poultry in all categories of farms of our republic reached 103 million 46.5 thousand. Analyzing the number of poultry heads by farm categories, it can be seen that the largest number of 49 million 922.1 thousand heads are

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kept in farmers' and homestead farms. 17.9% of the total number of poultry are raised in farms, 48.5% in farmers' and homesteads, 33.6% in organizations performing agricultural activities.

As of January 1, 2024, 8,487,457 eggs were produced by farms of all categories. Analyzing the indicators of egg production by economic categories, the largest volume of egg production corresponds to 4,912,839 million units of peasant and homestead farms. 15.7% of farmed eggs belong to farms, 57.9% to farmers and homesteads, and 26.5% to organizations performing agricultural activities.

There is not enough accurate information about the manifestation of genetic traits in poultry. For example, although there is information about the breeds and genetic capabilities of chickens and roosters raised in the farms of the "Poultry Industry" association, there is not enough scientific information about the breeds and genes of the chickens raised among the population and entrepreneurs, as well as their distribution in different regions. It is of urgent importance that the researches within this topic are insufficiently conducted in the field of improving the breeds of poultry in different product lines, creating promising breeds of poultry [5-10].

Nowadays, it is difficult to imagine our country's table without poultry eggs and meat. Poultry development is playing a particularly important role with its rapid production and low cost and in the sustainable provision of food security.

Scientific research works are carried out on the distribution of breeds of poultry in the direction of various products, identification of promising breeds of poultry in all branches of the national economy, selective breeding and breeding in the directions (egg, egg-meat mixture and meat) and the possibility of further increase of poultry products. It is planned to attract specialized scientific inspection institutes and companies of other countries to these works.

To date, the genetic atlas of breeds of livestock and poultry has not been created in our republic, and the breeds have not been evaluated for useful genetic and genetic characteristics. Within the framework of this topic, it is planned to fill and eliminate these shortcomings in the research and test work, as well as to develop and implement scientifically based recommendations for the development of poultry breeding in different regions of the republic, as well as their genetic and hereditary conditions [7-8].

In the framework of this topic, the industrial methods of poultry and the technology of catching, feeding, water and food supply regimes in households will be developed. It is also planned to establish the cultivation of nutritious crops for them, to carry out and use the technologies of their effective use [6, 9].

2 Materials and Methods

Domestic Kulang (Dakan) roosters, "Ross-308" and "Cobb-500" cross broiler maternal forms and F1 chicks and control groups were considered research materials. Zoo technical, biological, statistical methods were used in the research.

By crossing imported "Ross-308" and "Kobb-500" cross broiler chickens with local kulang (dakan) roosters and comparing the first generation chicks obtained from two different crosses at the experimental farm of the Research Institute of Livestock and Poultry in Qibray district of Tashkent region, they experiments were conducted to select the most suitable among them and to create a flock of hybrid broiler chickens adapted to local conditions, capable of bearing heavy weight, and to study their growth and development, meat productivity.

3 Results and Discussion

If we conclude from the research, the productivity indicators of F1 generation chicks in experimental group I compared to experimental group II: - live weight 3.84%, - economic efficiency 20.28%, - viability 3.33%, - brood circumference 0.5 it was found to be higher by cm.

Compared to the control group, our experimental group I achieved a 48% higher economic efficiency. Compared to control group II, our experimental group II achieved a 60% higher economic efficiency.

F1 generation chicks of experimental group I compared to experimental group II were superior in terms of productivity indicators, growth development and live weight and showed their genetic characteristics. Thus, the experimental works on the topic "Improving the beneficial economic indicators of broiler birds by crossing them with roosters of the kulang (dakan) breed" have been completed.

In order to fill and form breeding and production flocks, they are selected from the growing chicks in the rearing shop depending on their live weight and development level. Birds of the same age were placed in each hall (chicken house).

Roosters whose appearance and seed quality have been evaluated are used for the flock of breeding chickens, the ratio of roosters to hens is 1:10. In this case, 1 Dakan rooster was added to 10 chickens in each part of the room. In the henhouse, mangers were installed for feeding the roosters.

The density of chickens was within the norm, as a result, sufficient conditions were created for them to feed and drink water.

Laying laying hens always look for a safe place to lay eggs, it is considered a natural instinct of birds, therefore a special nest for laying eggs was made for chickens.

Live weight of chickens was measured once a month. According to the environment of care and maintenance of chickens, eggs are collected in the morning before feeding, and subsequent egg collections are made before lunch, after lunch and in the evening. Feeds are distributed to the birds after each egg is collected.

Poultry is fed mainly with dry grains, grains are made into porridge and enriched with nutritional supplements. The feed ration of enriched grain mainly depends on the amount of protein, which is 22% in young chickens and 17% in older chickens.

Table 1. Broiler crosses in the form of father and mother and ration of dakan roosters, %

№	Food types	%
1	Maize	31,3
2	Wheat	33
3	Soy	10
4	Bran	3,82
5	Pistachio porridge	4
6	Alfalfa	2,55
7	Fat	1,2
8	Lime	9,04
9	Barley	4,04
10	Monocalcium phosphate	0,5
11	Premix	0,20
12	Table salt	0,35
Total		100 %

We have connected the recommended nutritional dimensions of the dry feed, the norms of adding biologically active substances to it, and the daily amount of feed given to the chickens.

Broiler chickens can lay up to 220 eggs during their 80-week lifespan. The relative length of new cross hybrids is due to their higher viability, which makes it possible to extend the period of use of chickens. In addition, they have improved feed cost recovery indicators. Breeding and production galas do not differ from each other in terms of the amount of nutrients and minerals contained in the diet. However, the composition of the breeding (parental) gala diet should be fresh and high quality, not moldy and unfermented food.

It is advisable to feed production flock chickens with meat-bone and meat-feather meals. It is not allowed to introduce cotton oil and rapeseed in the diet of breeding birds. It is necessary to prepare feed on the farm and make sure that 60-65% of the recipe of feed mixes is grain feed, 10-15% protein feed, 2-3% vegetable oil and mineral substances.

Broiler birds are divided into 2 groups. That is, 10 heads of "Ross-308" broiler crosses and 1 head of Kulang (dakan) cock, and in the 2nd experimental group, 10 heads of "Cobb-500" broiler cross mother chickens and 1 head of Kulang (dakan) roosters were formed. Experiment group 2 was kept at the same room temperature, the same diet and kept. The inside of the building was divided into 2 and surrounded by a special net.

2 Dakan breed roosters were brought. They were kept in a special room prepared for them. Wood shavings were ground for them. Ease of storage and maintenance. They are quarantined for 3 days because they are brought from far away. After 3 days, he entered the prepared room. The main reason for being in quarantine is to adapt to the air environment, to get out of it if he gets stressed, and to show himself within 3 days of the disease he brought from the place where he lived. Body weight and exterior parameters of Kulang (dakan) rooster breeds were studied.

Table 2. Live weight and body dimensions of experimental Dakan roosters

№	Indicators	I-experiment	II-experiment
1	Live weight	4,870	3,995
2	Chest palm circumference	55	52
3	Body height	69	64
4	Thigh circumference	19,8	17
5	Knee length	22	15
6	Wing length	42	40
7	Body length	80	77
8	leg circumference	9	8,7

The live weight of Dakan roosters in the I-experiment was 4.8 kg, and the live weight of the Dakan roosters in the II experiment was 4 kg.

It can be seen in this table that the weight of birds in our group differs by 1 kg, and our experimental group I is slightly superior. Body weight was measured in the morning before feeding. Body weight was measured on an electronic scale. The number of birds in the experimental groups was divided into 10 heads, and 1 cockerel (dakan) breed was placed in both groups. Roosters were observed to be able to inseminate.

The incubator should be started in such a way that the time to collect and work with the hatched chicks is early in the morning. After warming the cooled eggs to room temperature (18-22 °C), they are placed in the incubator.

Table 3. Live weight of broiler mother hens "Ross-308" and "Cobb-500" in the experiment, kg

№		Live weight (kg)	№	Chicken weight (kg)
Ross-308	1	4,700	Cobb-500	4,550
	2	4,660		4,600
	3	5,000		4,850

	4	5,010		5,000
	5	4,200		4,250
	6	4,600		4,600
	7	4,700		4,500
	8	5,008		4,700
	9	4,350		4,280
	10	4,010		4,005
Average		4,631		4,533
Total		46,318		45,335

63-73 g first in the incubator. weighing eggs, then spent 4 hours, 50-62 g. weighted eggs are laid.

52 g of chicken eggs aged 25-29 weeks. Than is used for incubation. Usually, the incubation period of eggs from young chickens is 4-5 hours longer.

The constructive parameters of the "Egg Box" incubator (strong ventilation, water-cooling, rapid heating) ensure the operation of the incubator according to the "all full-all empty" principle.

Table 4. Rules for hatching eggs in "Egg Box" type incubators

Incubation days	1-6 day	7-12 day	13-18 day	19 days and beyond
Temperature standard	38 ℃	37,8 ℃	37,6 ℃	37,2 ℃
Moisture standard	60%	55%	60%	70%
Ventilation standard	2 hour\15 s	2 hour \20 s	1,5 hour \25 s	1,5 hour \30s
The rotation criterion	1,5 hour \180s	1,5 hour \180s	1,5 hour \180s	Scrolling is disabled

An Egg Box automated incubator was used for hatching eggs, and hatching parameters were determined based on the above table. 50 hatched eggs from each experimental group were placed in the incubator, 30 hatched from experimental group I, and 60% of the results were achieved. 60% of our second II-experiment group opened 30 units.

The use of a separate hatching regime for hatching gives good results.

The F1 chicks obtained during the experiments were divided into 2 groups, the first and second experimental groups, and the 1st and second control groups were also conducted in the experimental farm of the Livestock and Poultry Research Institute.

During the first days of chick rearing, all inlet and outlet ventilation holes are closed and ventilators are not used. After 7-10 days, depending on the temperature inside the building and the degree of pollution of the air with waste gases, the ventilators are started gradually. In this case, it is required that there is no draft, and the internal temperature of the building does not cool down too much.

The temperature of feed and water given to chicks should be at the level of indoor temperature, and the temperature in the cage should be around 33-34 ℃.

Before placing the chicks, 5 sheets (20x30 cm) of paper are placed on the bottom of each cage, one on top of the other. A warm water sprinkler should also be installed next to the nipple sprinkler inside the cage.

Chicks placed in cages are first given water, and after 2-3 hours feed, because then the chicks will have time to excrete the uric acid accumulated in the chick's body during embryonic development.

If it is observed that the chicks are not drinking water in Mobo, 2-3 chicks are taken from each cage and their beaks are stuck in the water in the waterer and they start drinking. After that, other chicks who see them start drinking water.

After drinking water for the first time, about 1 cm thick feed is sprinkled on the bedding sheets and reduced by one sheet every day. In addition, during the first three days, chicks are recommended to drink 6-8% glucose or sugar solution mixed with 1 g/liter of ascorbic acid, 1 g/liter of baytril, macrolan and other such drugs.

The sprinklers should always be clean, the water temperature should be 31-33 ℃ in the first 3 days, 28-30 ℃ in 4-7 days, 26-280C in 8-14 days, 24-26 ℃ in 15-21 days, 22-24 ℃ in 22-28 days should be equal, around 18-20 ℃ from 29 days to the end of cultivation.

Table 5. Dimensions of air temperature and humidity required for growing chicks

Age of chicks, in days	Temperature, ℃	Humidity, %	Air exchange, m^3kg	
			In winter	In summer
1-2	33-35	60-70	0,1-0,2	0,1-0,2
3-4	31	60-70	0,1-0,2	0,1-0,2
5-7	30	60-70	0,1-0,2	0,1-0,2
8-14	29	60-70	0,8-1,0	0,8-1,0
15-25	28	60-70	0,8-1,0	5
22-28	22	60-70	0,8-1,0	5
5-7 weeks	18-20	60-70	0,8-1,0	5
8-20 weeks	18-20	60-70	0,8-1,0	5
20 weeks +	18-20	60-70	0,8-1,0	5

Chicks need more heat at night than during the day because they are inactive at night. If the chicken house is cold at night, by morning the chicks' feathers will be wet, they will be weak, they will swallow food unwillingly, and rush to the cage.

It is absolutely impossible to allow the internal temperature of the building to rise or fall too much, because the growth rate of the birds will almost double in it.

Feeding chicks nutritious and high-quality feed is the key to raising strong, well-developed, healthy, productive birds. After the chicks are brought from the hatcheries, they are first given water. Water is placed in a glass jar, that is, in vacuum water bottles. The number of such containers should be sufficient for chicks to drink water freely.

In order to raise healthy chicks that complete the brood, chicks should be fed starter or starter rations for the first 4-5 days. In this case, it is required that the fodder be prepared from easily digestible feed (corn, soy, fish, dry milk) that is standardized in terms of nutritional value, mineral elements, and biologically active substances.

From one day of age, it is advisable to start feeding chicks with 4-6% skimmed milk or skimmed milk mixture. Taking into account the importance of mineral metabolism for poultry, it is necessary to regulate the amount of calcium and phosphorus in the diet, especially in the first month of growing chicks. If calcium and phosphorus-rich substances should be added to the pre-starter rations, this can be solved by adding lime meal, fine particle feed wolf to the ration.

The substances included in the pre-start diet should be in the form of particles with a size of 0.5-1.0 mm. In the first 2-3 days, chicks should be fed 6-8 percent glucose or sugar solution with 1 g/l concentration of ascorbic acid.

In this ration, protein was 24%, and 2 experimental groups were fed with prepared feeds based on the same feed rations. Cornmeal was given during the first 3 days. Exchangeable energy in the diet was 282.3 kJ.

We know that the loco motor system of flying birds is strong, and the inner part of the leg bones is empty and serves as air sacs. However, in non-flying birds, the inner part of the leg bones is filled with marrow, and the bone marrow performs the function of blood production. The rapid growth of broiler chicks in the meat sector and the high development

of the muscle part make it difficult for the skeletal part to carry the body. In young broiler chickens, the articular parts of the tibia are not yet completely ossified, and most of them are made of cartilage. The lack of calcium in the feed increases this process and causes the legs of most of the birds to become paralyzed. In gray (dakan) roosters, the locomotion system is highly robust, and the thickness and length of the tibia are clearly visible from the outside. Our F1 cross-bred chickens have a leg length of 22 cm and a leg circumference of 10 cm, and due to the long and well-connected muscles and ligaments of the long leg bones, in our experimental groups, the inability to lift the body, the paralysis of the legs, the inability to keep the body upright and the legs cases of breakage and discharge were not observed.

Chicken meat is considered the most consumed meat in the world, and it contains various amino acids and vitamins. The Republic of Uzbekistan has a strong base for the production of poultry meat to fully meet the needs of the domestic market and partly for export. Taking into account these factors, it is necessary to use new crosses, to use their biological and productive properties as much as possible, in order to increase the production of chicken meat in our country. Proper and rational feeding often plays a big role in raising chickens. Chicken meat is popular not only as a cheap and economical food product, but also for diet food. Chicken meat is rich in protein necessary for the human body, and also contains a group of minerals (calcium, copper, selenium, iron, magnesium and phosphorus) and essential vitamins (fat- and water-soluble vitamins). When growing meat from egg-laying chickens, it is necessary to determine the dependence on their crosses and pay attention to the slaughtering period for meat. Therefore, in modern poultry farming, it is necessary to carry out research aimed at improving the egg productivity as well as the meat productivity of chickens, to focus on a number of feeding and storage technologies that objectively describe the level of development of the economically useful feature of this farm.

Results of the study: If we can conclude from the research, compared to the II experimental group, the F1 generation chicks of the experimental group I were superior in terms of productivity indicators, growth development and live weight, as well as showing their genetic characteristics. Such economic efficiency was mainly achieved as a result of normal feeding, care and high preservation of experimental poultry, as well as timely sale of meat products at the market price. Thus, the experimental works on the topic "Improving the beneficial economic indicators of broiler birds by crossing them with roosters of the kulang (dakan) breed" have been completed.

4 Conclusion

It was analyzed that a strong locomotor system has a positive effect on the vitality of F1 hybrid chicks, which is 10-13.3% higher.

It was found that our F1 generation chicks obtained from crossing "Ross-308" and Kulang (dakan) breed roosters with "Kobb-500" and Kulang (dakan) breed roosters have 3.84% higher body weight.

The base locomotion system of the generation obtained during breeding was well developed, its ability to move well compared to purebred broiler chickens, and the development of strong leg system were analyzed on a scientific basis.

The use of complete rations in feeding poultry showed the full genetic potential of poultry.

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