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Feeding Of “Big-6” And “Bronze-708” Turkeys

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Abstract. *Feeding Big-6 and Bronze-708 turkeys with nutritionally balanced and complete diets promotes efficient growth and a substantial increase in live body weight. Adequate dietary supplementation with essential macro- and microelements, vitamins, and high-quality protein is crucial for maintaining optimal physiological status, enhancing disease resistance, and improving growth and productive performance. Thus, the use of complete and properly balanced rations can contribute to the successful rearing of healthy turkeys with high productive potential.*

Keysword: macro- and micronutrients, vitamins, diet, protein, “Big-6”, “Bronze-708”, feed, nutritionally complete feed, feeding, live weight

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“Big-6” və “Bronze-708” hinduşkalarının bəslənməsi

Yo.Ş.Kərimova

Xülasə. *“Big-6” və “Bronze-708” hinduşkalarının qida maddələri baxımından balanslaşdırılmış və tam dəyərli rasionlarla bəslənməsi, onların səmərəli böyüməsinə və canlı çəkilərinin əhəmiyyətli dərəcədə artmasına şərait yaradır. Rasionun zəruri makro- və mikroelementlər, vitaminlər və yüksək keyfiyyətli zülalla zənginləşdirilməsi; optimal fizioloji vəziyyətin qorunması, xəstəliklərə qarşı müqavimətin artırılması, həmçinin böyümə və məhsuldarlıq göstəricilərinin yaxşılaşdırılması üçün həlledici əhəmiyyət daşıyır. Beləliklə, tam dəyərli və düzgün balanslaşdırılmış rasionlardan istifadə, yüksək məhsuldarlıq potensialına malik sağlam hinduşkaların uğurla yetişdirilməsinə töhfə verə bilər.*

Açar sözlər: *makro- və mikroelementlər, vitaminlər, rasion, zülal, “Big-6”, “Bronze-708”, yem, tam dəyərli yem, bəsləmə, canlı çəki*

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Introduction

One of the primary objectives of specialists in the poultry industry is to meet the population's demand for food products derived from poultry. Achieving this objective requires the development of a high-quality raw material base, the introduction of advanced production technologies, and the improvement of the genetic potential of poultry. In developed countries, turkey production occupies a prominent position within the meat-producing poultry sector. The United States, Italy, France, the United Kingdom, and Türkiye are among the leading producers of turkey meat, which is widely recognized as a palatable, nutritious, and dietary food product. In these countries, turkey meat accounts for approximately 15–25% of total poultry meat production. The successful development of meat-type poultry production depends on accelerating the growth and development of young birds and reducing feed costs while maintaining high-quality poultry meat production. Turkey farming is considered an important source for increasing the production of high-quality poultry meat. Long-term production experience has demonstrated that turkey meat production is economically viable. Turkeys are highly productive birds, and their meat is characterized by excellent dietary and health-promoting properties, as well as a high meat yield relative to live body weight.

In the CIS countries, improving the efficiency of turkey production and fully realizing the genetic potential of turkeys are achieved through properly organized breeding and selection programs. These programs involve the development of new high-performance breeds, lines, and crosses, as well as the extensive use of selective breeding, crossbreeding, and hybridization methods. In particular, industrial turkey meat production technologies have been introduced in almost all regions of the Russian Federation. Notably, turkey meat production accounts for approximately 70% of the total output of poultry meat produced by the companies "Damate" and "Cherkizovo." In Belarus, the high demand for turkey meat has contributed to the development of industrial turkey farming, with production continuing to increase and accounting for approximately 8–10% of total poultry meat production. For breeding purposes, heavy-, medium-, and light-type turkey crosses derived from different breeds are widely used.

Turkeys are highly productive poultry species, and their meat is characterized by excellent dietary and health-promoting properties, as well as a high meat yield relative to live body weight. Turkey meat is highly digestible and readily absorbed by the human body, making it suitable for therapeutic and dietary nutrition. Compared with the meat of other poultry species, turkey meat contains a higher proportion of high-quality proteins. The "Big-6" and "Bronze-708" crosses are considered well adapted to intensive commercial production systems. The quality characteristics of meat obtained from these crosses make it highly competitive compared with meat from other poultry species. Therefore, their production has considerable potential for expanding the supply of poultry meat, including for specialized food products and dietary nutrition. Furthermore, the rearing and management of "Big-6" and "Bronze-708" turkey crosses for meat production under the specific environmental and production conditions of Uzbekistan have not yet been sufficiently investigated in dedicated scientific studies. Therefore, evaluating their growth performance, feed utilization, and meat-production potential under local conditions is of considerable scientific and practical relevance.

Literature review and methods

A number of national researchers have conducted studies aimed at improving the productive performance and biological characteristics of turkeys as agricultural poultry. Ye.V. Ribina investigated turkey management technologies, turkey diseases and their prevention, as well as feeding practices. S.G. Azimov studied turkey husbandry and the productive performance of the Russian White turkey breed.

R.T. Aripdjanov investigated the use of floor-rearing systems for fattening young turkey poults. Z.M. Ashurov studied the meat productivity of turkeys and the dietary value of turkey meat. T.A. Stollyarov examined dry, wet, and combined feeding systems in the rearing of turkey poults. V.B. Khon investigated the importance of incorporating stimulatory feed additives into turkey diets as nutritional supplements. D.S. Azimov studied the housing of turkeys in cages and on deep litter systems, similar to conventional poultry housing practices. A. Rakhimov established that grain feeds constitute the major proportion of feed ingredients in the diets of turkey poults. A.Kh. Urmonov investigated zoohygienic conditions in facilities used for turkey housing. Thus, researchers in this field have conducted studies in different years addressing various aspects of turkey production, with particular emphasis on productivity, viability, adaptability, feeding, housing conditions, and meat production characteristics. However, the available literature indicates that, to date, the meat productivity and meat quality characteristics of "Big-6" and "Bronze-708" turkey crosses under hot climatic conditions have not been sufficiently investigated. This indicates the need for further comprehensive research into the productive performance and meat quality of these crosses under the environmental conditions of Uzbekistan.

Discussion and Results

Properly organized feeding of turkeys contributes to improved productive performance and reproductive capacity and ultimately enables them to fully express their genetic potential for productivity. During the study, the feeding conditions of turkeys were investigated from the hatching stage through 17 weeks of age. Turkeys in the experimental groups were fed a farm-formulated diet consisting primarily of locally available feed ingredients. In establishing the feeding conditions, the birds' genotype, age, sex, and housing conditions were taken into consideration. Particular attention was paid to the first feeding of newly hatched poults. The newly hatched poults were provided with their first feed within 20 hours of hatching. At this stage, equal amounts of carrot, fresh alfalfa, and nettle juice were administered. Subsequently, boiled eggs were provided at a rate of 4–5 g per bird per day. In addition, high-quality cottage cheese, curd, and compound feed containing a mixture of various grains and skimmed milk were included in the diet. The feed was provided using two methods: in dry form and moistened with skimmed milk. During the first few days, particular attention was paid to monitoring the poults' ability to peck and consume grain feed, as this process requires careful management in young turkey poults. After 10–12 days of age, the amount of egg included in the diet was gradually reduced, while cottage cheese, various grain meals, and green fodder were progressively introduced into the diet.

For turkey poults aged 7–28 days (1–4 weeks), the diet was formulated according to the following proportions of feed ingredients: corn grain – 39%; sunflower meal – 17%; soybean meal – 12%; fish meal – 10.4%; meat and bone meal – 7%; feed-grade yeast – 5%; dried skim milk – 5%; grass meal – 2%; shell grit, feed-grade limestone, and other mineral components – 0.6%; vegetable oil – 1%; and premix – 1%.

Table 1

Feeding ration of turkeys aged 1–8 weeks in the experimental groups (per bird per day, 2022–2024)

Feed Ingredients and Nutrients	Unit of measurement	Age, weeks							
		1	2	3	4	5	6	7	8
Corn grain	g	13,5	24,0	24,0	30,8	76,5	103,5	127,5	150,0
Wheat grain	g	-	-	-	30,0	45,8	60,0	75,0	90,0
Oat groats	g	1,5	6,0	27,0	22,5	-	-	-	-
Sunflower meal	g	1,5	12,0	15,0	22,5	21,0	15,0	22,5	27,0
Feed yeast	g	4,5	12,0	15,0	21,0	22,5	27,0	36,0	42,0
Fish meal	g	4,5	4,5	15,0	15,0	22,5	37,5	46,5	54,0
Meat and bone meal	g	1,5	3,0	3,0	6,0	9,0	9,0	10,5	12,0
Boiled egg	g	1,5	-	-	-	-	-	-	-
Cottage cheese	g	4,5	-	-	-	-	-	-	-
Skim milk	g	-	15,0	75,0	90,0	105,0	105,0	105,0	123,0
Cottonseed oil	g	0,075	1,5	1,95	4,05	2,7	4,65	6,75	7,35
Green fodder	g	6,0	15,0	30,0	75,0	105,0	150,0	150,0	180,0
Premix	g	0,3	0,6	1,2	1,8	2,25	3,0	3,75	4,5
Diet composition*:*									
Feed units	g	91,08	194,0	329,0	505,7	670,1	874,5	1080,9	1270,8
Metabolizable energy	Kdj	372,0	811,2	1374,0	2112,7	2799,0	3655,5	4518,0	5311,5
Dry matter	g	32,25	68,85	116,85	179,55	234,15	305,4	377,25	444,0
Crude protein	g	9,04	18,6	42,09	46,65	57,72	72,44	89,70	105,43
Lysine	g	0,564	0,966	1,876	2,457	3,084	4,056	4,993	5,842
Methionine	g	0,294	0,562	1,080	1,458	1,821	2,331	2,899	3,405
Crude fiber	g	0,960	3,105	4,740	7,396	9,090	10,695	13,095	15,585
Calcium (Ca)	g	0,747	0,867	1,800	2,473	3,489	5,112	6,975	8,146
Phosphorus (P)	g	0,396	0,729	1,354	1,803	2,425	3,198	3,9697	4,617
Sodium (Na)	g	0,142	0,192	0,469	0,553	0,775	1,116	1,360	1,579

As shown in Table 1, the amounts and composition of feed provided per bird per day to turkeys belonging to different crosses in the experimental groups from 1 to 8 weeks of age are presented. According to the data in the table, in addition to the main feed ingredients, 1.5 g of boiled chicken egg and 4.5 g of cottage cheese were provided to one-week-old turkey poults. As the poults increased in age, both the amount and types of grain-based feed ingredients included in the diet were gradually modified. In particular, skim milk was introduced into the diet starting at two months of age. Oat groats were provided up to five weeks of age, while wheat grain was introduced beginning at four weeks of age. The provision of oat groats was discontinued after the poults reached five weeks of age.

From 1 to 8 weeks of age, each turkey poult in the experimental groups consumed a total of 3,848.6 g of corn grain, 2,105.6 g of wheat grain, 399.0 g of oat groats, 955.5 g of sunflower meal, 1,260.0 g of feed yeast, 1,396.5 g of fish meal, 378.0 g of meat and bone meal, 10.5 g of egg, 31.5 g of cottage cheese, 4,326 g of skim milk, 203.18 g of cottonseed oil, 4,977.0 g of green fodder, and 121.8 g of premix. The total nutrient content of the feed consumed was equivalent to 35,112.6 g of feed units, 146,677.3 kJ of metabolizable energy, 12,308.1 g of dry matter, 3,091.7 g of crude protein, 166.9 g of lysine, 95.95 g of methionine, 452.7 g of crude fiber, 207.3 g of calcium, 129.4 g of phosphorus, and 43.3 g of sodium. During the study period, the feeding conditions of turkey poults belonging to different crosses from 9 to 17 weeks of age were investigated (Table 2).

Table 2

Feeding ration of turkeys aged 9-17 weeks in the experimental groups (per bird per day, 2022–2024)

Feed Ingredients and Nutrients	Unit of measurement	Age, weeks								
		9	10	11	12	13	14	15	16	17
Corn grain	g	181,5	202,5	225,0	247,5	264,0	285,0	307,5	330,0	337,5
Wheat grain	g	120,0	147,0	166,5	150,0	157,5	165,0	175,5	192,0	195,0
Barley grain	g	-	-	-	30,0	30,0	33,0	34,5	36,0	36,0
Sunflower meal	g	30,0	30,0	30,0	31,5	33,0	49,5	52,5	54,0	55,5
Feed yeast	g	30,0	30,0	37,5	40,5	42,0	37,5	42,0	46,5	48,0
Fish meal	g	30,0	30,0	25,5	27,0	25,5	18,0	16,5	15,0	15,0
Meat and bone meal	g	12,0	12,0	12,0	13,5	15,0	15,0	13,5	12,0	12,0
Skim milk	g	150,0	150,0	150,0	165,0	165,0	165,0	165,0	165,0	165,0
Cottonseed oil	g	7,50	7,35	7,65	8,55	8,40	8,40	8,55	8,40	9,45
Green fodder	g	195,0	210,0	225,0	225,0	225,0	225,0	225,0	225,0	225,0
Premix	g	4,50	5,25	6,0	6,0	6,45	6,75	7,50	7,50	7,50
Diet composition:										
Feed units	g	1394,7	1548,9	1693,8	1829,5	1914,6	2017,5	2137,5	2269,2	2318,5

Metabolizable energy	Kdj	5829,0	6474,0	7080,0	7648,5	8004,0	8434,5	8935,5	9486,0	9693,0
Dry matter	g	480,6	533,85	583,8	630,45	660,0	695,55	736,95	781,8	799,35
Crude protein	g	95,74	101,89	108,04	115,23	118,89	122,59	128,07	133,68	136,08
Lysine	g	4,695	4,944	5,040	5,427	5,527	5,361	5,539	5,713	5,810
Methionine	g	2,959	3,127	3,219	3,460	3,546	3,666	3,802	3,936	4,003
Crude fiber	g	18,36	20,26	22,05	24,40	25,59	28,84	30,55	32,25	32,83
Calcium *(Ca)*	g	7,633	8,290	8,457	9,025	9,387	9,294	9,696	9,526	11,253
Phosphorus *(P)*	g	3,717	3,871	3,928	4,254	4,377	4,263	4,326	4,393	4,461
Sodium (Na)	g	1,086	1,101	1,032	1,116	1,117	0,973	0,937	0,901	0,907

As presented in Table 2, the daily feed allowance and nutritional composition of the diets provided to turkeys representing different crosses in the experimental groups during the 9–17-week growth period are described. The data show that barley grain was not included in the diets of turkeys during the 9–11-week age period. Beginning at 12 weeks of age, barley grain was incorporated into the ration as one of the major feed ingredients and remained an important component of the diet throughout the subsequent growth period.

During the experimental period, the total feed consumption per turkey from 9 to 17 weeks of age consisted of 16,663.5 g of maize grain, 10,279.5 g of wheat grain, 1,396.5 g of barley, 2,562.0 g of sunflower meal, 2,478.0 g of feed yeast, 1,417.5 g of fish meal, 819.0 g of meat-and-bone meal, 10,080.0 g of skimmed milk, 519.75 g of cottonseed oil, 13,860.0 g of green forage, and 402.15 g of premix. The nutrients supplied through the consumed feed comprised 119,869.4 g of feed units, 501,091.5 kJ of metabolizable energy, 30,128.7 g of dry matter, 7,421.5 g of crude protein, 336.4 g of lysine, 222.026 g of methionine, 1,645.9 g of crude fiber, 577.93 g of calcium, 263.13 g of phosphorus, and 64.19 g of sodium. The calculated feed consumption of turkeys from 1 to 17 weeks of age during the study period is presented in Table 3.

During the study period, turkeys in both experimental groups were reared under identical feeding conditions from 1 to 17 weeks of age. According to the analysis of the data presented in Table 3.1.3 and the experimental results, grain-based feeds, protein sources, and supplementary feed ingredients constituted the major components of the diets provided to the turkeys from 1 to 17 weeks of age. Among the grain components, maize grain served as the primary source of dietary energy. Its consumption amounted to 3,848.6 g during the 1–8-week period and 16,663.5 g during the 9–17-week period, giving a total consumption of 20,512.1 g per turkey. This relatively high proportion indicates the predominant role of maize grain in the overall dietary composition. Wheat grain also represented a substantial proportion of the diet, with a total consumption of 12,385.1 g per turkey. The majority of the wheat grain (10,279.5 g) was consumed during the subsequent growth period, from 9 to 17 weeks of age.

A clear difference was observed in the use of oat groats and barley grain across the different growth periods. Oat groats were used exclusively during the initial growth period (1–8 weeks of age), at a total amount of 399.0 g per turkey, whereas barley grain was predominantly incorporated into the diet during

the 9–17-week period, with a total consumption of 1,396.5 g. This difference may be associated with age-related changes in digestive capacity and the nutritional requirements of turkeys during different stages of growth.

Table 3

Total feed consumption by turkeys in the experimental groups from 1 to 17 weeks of age

Feed ingredients	Feed consumption by age period, g		Total per turkey, g	Total consumption for 100 turkeys, kg
	At 1–8 weeks of age	At 9–17 weeks of age		
Corn grain	3848,6	16663,5	20512,1	2051,21
Wheat grain	2105,6	10279,5	12385,1	1238,51
Oat groats	399,0	-	399,0	39,]
Barley grain	-	1396,5	1396,5	139,65
Sunflower meal	955,5	2562,0	3517,5	351,75
Feed yeast	1260,0	2478,0	3738,0	373,8
Fish meal	1396,5	1417,5	2814,0	281,4
Meat and bone meal	378,0	819,0	1197,0	119,7
Boiled egg	10,5	-	10,5	1,05
Cottage cheese	31,5	-	31,5	3,15
Skimmed milk	4326,0	10080	14406,0	1440,6
Cottonseed oil	203,175	519,75	722,925	72,3
Green fodder	4977,0	13860,0	18837,0	1883,7
Premix	121,8	402,15	523,95	52,4
Diet composition:				
Feed units	35112,6	119869,4	154982,0	15498,2
Feed units consumed per 1 kg of live weight gain			5,17	
Metabolizable energy, Kj	146677,3	501091,5	647768,8	64776,]
Dry matter	12308,1	30128,7	42436,8	4243,7
Crude protein	3091,7	7421,5	10513,2	1051,3
Lysine	166,9	336,4	503,3	50,3
Methionine	97,0	222,026	319,0	31,]
Crude fiber	452,7	1645,9	2098,6	209,]
Calcium (Ca)	207,3	577,9	785,2	78,5
Phosphorus (P)	129,4	263,1	392,5	39,3
Sodium (Na)	43,3	64,2	107,5	10,7

Among the protein sources, sunflower meal (3,517.5 g), feed yeast (3,738.0 g), and fish meal (2,814.0 g) showed relatively high values. In particular, the consistent use of feed yeast during both periods indicates its high biological value. Although meat and bone meal was used in a relatively smaller amount (1,197.0 g), it played an important role in supplementing the diet with minerals. Among the animal-based feed supplements, boiled egg (10.5 g) and cottage cheese (31.5 g) were used only during the initial period and served to support the rapid growth of the young organism. In addition, skimmed milk (14,406.0 g) was provided in a large amount, indicating its importance as a source of protein and minerals.

As a source of fat, cottonseed oil was used in a total amount of 722.925 g, contributing to an increase in the energy density of the diet. Green fodder accounted for the largest quantity, at 18,837.0 g, and played an important role in supplying vitamins and biologically active substances. Premixes (523.95 g) ensured that the diet was balanced in terms of micronutrients and vitamins. Analysis of the overall nutritional

indicators of the diet showed that, during the 1–17-week period, 154,982.0 g of feed units were consumed per turkey, which was sufficient to support intensive growth. The amount of metabolizable energy was 647,768.8 kJ, reflecting the sharp increase in energy requirements as the young birds grew.

The dry matter (42,436.8 g) and crude protein (10,513.2 g) values indicate the high nutritional value of the diet. In particular, a large proportion of the protein was provided during the 9–17-week period (7,421.5 g), supporting the intensive development of muscle tissue. Among the amino acids, the amounts of lysine (503.3 g) and methionine (319.0 g) were at optimal levels, providing adequate conditions for protein synthesis. The increase in crude fiber (2098.6 g) corresponded with the development of the digestive system during the subsequent period. Among the minerals, calcium (785.2 g) and phosphorus (392.5 g) played an important role in the development of the skeletal system, while sodium (107.5 g) was involved in regulating water and electrolyte balance in the body.

Overall, the diets used in the experimental groups were formulated using a differentiated approach according to the age periods of the birds. The balanced distribution of feed components and nutrients contributed to the intensive growth and development of the turkeys. These results confirm that the scientifically based formulation of diets is an important factor in improving the efficiency of livestock and poultry production.

Table 4

Feed consumption rate of turkeys in the experimental groups at 1–17 weeks of age, %

Age, weeks	Feed consumption rate, %	
	Main diet feeds — grain mixtures + green forage	Skimmed milk (whey/skim milk)
1	85,0	-
2	96,7	97,5
3	98,2	98,1
4	98,2	98,1
5	98,2	98,3
6	98,3	98,3
7	98,3	98,5
8	98,3	98,3
9	98,4	98,4
10	98,4	98,4
11	98,4	98,5
12	98,4	98,4
13	98,6	98,4
14	98,6	98,5
15	98,6	98,5
16	98,6	98,5
17	98,6	98,5

As shown by the data presented in Table 4, no significant differences between the experimental groups were observed in the consumption of all types of feeds provided to the turkeys. The consumption rate of grain mixtures and green forage included in the diet by 1-week-old turkeys in the experimental groups was 85.0%, increasing to 96.7% at 2 weeks of age, 98.2–98.3% at 4–8 weeks of age, 98.4% at 9–12 weeks of age, and 98.6% at 13–17 weeks of age. In addition, skimmed milk was introduced into the basal

diet of the turkeys in the experimental groups starting from 2 weeks of age. The turkeys consumed the skimmed milk readily. The consumption rate was initially 97.5%, after which it increased and remained within the range of 98.3–98.5%.

Conclusion

It was established that, from 1 to 17 weeks of age, the turkeys in all experimental groups consumed a total of 15,498.2 kg of feed units, 64,776.9 kJ of metabolizable energy, 4,243.7 kg of dry matter, 1,051.3 kg of crude protein, 50.3 kg of lysine, 31.9 kg of methionine, 209.9 kg of crude fiber, 78.5 kg of calcium, 39.3 kg of phosphorus, and 10.7 kg of sodium. These findings demonstrate the feasibility of organizing industrial-scale turkey production under feeding conditions with the same nutritional composition.

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