согласно биоиндустриальной технологии. Быкам опытных групп в возрасте 2, 31, 151, 361 день жизни применяли пермамик с полистимом или с йодомидолом. У животных сопоставляемых групп изучали возрастную динамику физиолого-клинических и ростовых параметров, а также качество мяса.

В моделируемых опытах показано, что назначение быкам пермамика с полистимом или с йодомидолои сопровождалось равноценным соматотропным эффектом организма. При этом пробы мяса имели аналогичные органолептические, биохимические, микробиологические и спектрометрические характеристики.

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DEVELOPMENT OF FOOD MIXTURE RECIPES FOR WATERBIRDS, ACCORDING TO THEIR PRODUCTIVITY PERIODS IN THE CONDITIONS OF WESTERN KAZAKHSTAN

ANNOTATION

The full realization of the genetic potential of the bird is possible when the environmental conditions are maximally favorable for its manifestation. In this regard, when creating and using highly productive poultry, it is important to improve the technology of its cultivation and maintenance in parallel with the improvement of feeding conditions. The article presents the results of the analysis of the chemical composition and nutritional value of the feed, on the basis of which the recipe for the preparation of feed for ducks of different sex and age groups was compiled. The analysis of the results showed that the exchangeable energy content ranged from 6.1 to 12.0 MJ, crude protein from 205.0 to 438.0 g. Also, the highest content of amino acids was observed in meat meal and fodder yeast (27.9 - 34.4 / 10.3 - 12.9). In the course of the first two weeks of growing young ducklings, starting feeding rations were used. The feeding of young ducklings met the standards, and in days 1-7, "Start" compound feed was used, and in the following 7 days (7 - 14 days) - "Rost" compound feed. In the first period of cultivation (1-2 weeks), compound feed for birds (poultry) contained 20.20 - 21.90% protein and 13.99 - 14.27 MJ of exchangeable energy. In the second period of cultivation, the developed recipe feed contains 1,274 to 1,356 MJ of exchangeable energy and 17.2 to 17.6% crude protein. The results of this study are relevant and will be used to meet the demand of consumers in domestic selection of waterfowl adapted to the natural and climatic conditions of the region.

Key words: *ducks, feed, chemical composition, nutritional value, protein, diet, feeding.*

Актуальность. Currently, in the industrial poultry farming of the republic, only hybrid poultry is mainly used, which is distinguished by high productivity, vitality, good payment for feed, and adaptability to intensive keeping technologies. The long-term plans for the development of poultry

farming in Kazakhstan should provide for a further increase in the productivity of existing and newly created crosses and a more rational use of the domestic and foreign poultry gene pool available in the republic. This problem is of particular relevance, given that breeding material is annually imported into the republic for an amount exceeding 400 million tenge [1].

The country should create all the necessary conditions for the development of effective methods of poultry breeding, modern programs based on the analysis of the genetic parameters of populations and the use of computer programs for automated control of the breeding process.

The full realization of the bird's genetic potential is also possible when environmental conditions are maximally conducive to its manifestation. In this regard, when creating and using highly productive poultry, it is important, in parallel with improving the feeding conditions, to improve the technology of its cultivation and maintenance. Today, the state of the technical base of the republic's poultry farming is critical, and it is necessary to develop a system of support measures to prevent its further collapse. In the shortest possible time, it is necessary to prepare and implement a republican program for the technical and technological renewal of public poultry farming. This is a requirement of the current stage of development of poultry farming in the republic, which in the near future should fully meet the needs of the population in valuable food products.

To reduce the cost of production and the price of its sale in the northern regions of Kazakhstan, it is necessary to create new lines and crosses of poultry, which requires appropriate conditions and the development of comprehensive programs using the best domestic and foreign achievements in the field of poultry breeding. The solution to this problem is the rationale for the urgent need for this project [2].

Poultry farming in Kazakhstan is based on the use of foreign highly productive crosses And in this regard, the question arises of creating a domestic base. There are no breeds and crosses of birds of various directions, which serves as a motivation for creating your own bird crosses. For the population of the country, in particular in rural areas, a fast-ripening local product is needed, and only poultry are such.

For modern poultry farming, which is entirely based on the production of hybrid poultry based on the use of the effect of heterosis (overdominance), it is extremely important to create genetically different parental lines. This is quite difficult, especially in cases where the selection material differs little phenotypically. The intensification of poultry farming has led to the widespread distribution of poultry belonging to a relatively limited number of breeds and crosses.

Duck breeding is one of the directions of the poultry industry of agriculture, characterized by a number of positive qualities. Ducks occupy a special place in terms of precocity, payment for feed, viability and fattening possibilities [1, 2].

An important problem of genetics and breeding is the study of the interaction of the genotype and the environment, as well as some biochemical parameters with the productivity of the bird. The study of this issue will solve the problem of using poultry in different environmental conditions and predict its productivity [3].

An increase in the production of poultry meat and eggs should occur due to such intensive factors as breeding, improving the technology of growing and keeping poultry, the rational use of cheap available feed, saving material and labor resources [3, 4, 5, 6].

Poultry farms spend more than $20 million annually importing breeding products for their own needs, and there are many reasons for this. This is the low quality of domestic breeding products, and the lack of its positive image, and the lack of formation of mutually beneficial economic ties, and the lack of trusting partnerships. As a result, domestic breeding products remain unclaimed to a greater extent, despite the existing state support measures [4].

The average annual production, trade and consumption of poultry meat in the world is growing at a high rate. Currently, in the world production of poultry meat, the bulk is accounted for by broiler meat - 62.5%, turkey - 7.5%, duck - 4.2%, goose - 2.8%, other poultry meat (chickens, quail, guinea fowl, pheasants) account for 23% [5].

In Northern Kazakhstan, there is not enough data on the use in the production of specific breeds, lines and crosses of waterfowl, their conditions of keeping, feeding, breeding, etc. Almost all breeds, crosses and lines used in poultry farms in our region are used arbitrarily without comparison of economic efficiency and adaptability to local conditions.

The average annual production, trade and consumption of poultry meat in the world is growing at a high rate. Currently, in the world production of poultry meat, the bulk is accounted for by broiler meat - 62.5%, turkey - 7.5%, duck - 4.2%, goose - 2.8%, other poultry meat (chickens, quail, guinea fowl, pheasants) account for 23%.

In 2020, in the republic, in connection with the current situation on the spread of bird flu, recorded in nine regions, the death rate amounted to 900 thousand head of chickens, geese and ducks. Today it is worth noting that eggs have risen in price by 20-30% in several regions of Kazakhstan. The outbreak of highly pathogenic avian influenza has exposed food security vulnerabilities. Along with veterinary measures, it is necessary to work out economic instruments to support the villagers, restore the number of birds in the yards and poultry farms. To date, it is necessary to preserve and improve the domestic genetic material and increase the number of livestock, both on an industrial basis and in household plots and private farmsteads.

In connection with the growing need of the population of the republic in poultry products, in particular eggs and meat, there is a need for highly productive poultry of domestic origin. One of the main conditions for the successful development of the poultry industry in the Republic of Kazakhstan is the purposeful breeding work to create, preserve highly productive poultry, which ensures highly efficient production of eggs and meat, adapted both to industrial conditions and to conditions in small farms.

In meat poultry farming, breeding work is aimed at increasing the yield of hatching eggs, their hatchability, and at obtaining young animals with a high growth rate. To obtain highly productive industrial poultry meat and egg directions, it is more effective to cross matching lines (interline hybridization).

The crossing of specialized matching lines in order to obtain highly productive hybrid offspring is called a cross of lines. Crosses can be two-, three- and four-line, depending on the number of lines used in crosses to obtain the final hybrid (broiler, industrial layers, etc.).

The traits that characterize the reproductive qualities of a bird are quantitative indicators and have a polygenic nature of inheritance. Due to their low heritability (0.01-0.20), direct selection for their improvement is ineffective even when family or combined selection is used. Therefore, additional tests are used to select birds with the best reproductive qualities (for example, indicators of sperm production, sexual behavior and activity of males, development of secondary sexual characteristics, physiological and biological indicators, etc.).

The main attention in meat poultry breeding is paid to the early growth rate, feed payment, the output of day-old young animals for laying hens of the parent flock, slaughter yield, quality and composition of the carcass (reduction in the proportion of abdominal fat). Selection based on growth rate alone is becoming less and less effective, so it should be carried out taking into account other productivity indicators, i.e. there is a need for multifactorial selection: according to meat yield, carcass shape, disease resistance, egg production of laying hens of the parent flock, etc.

In Kazakhstan, there is not enough data on the use in the production of specific breeds, lines and crosses of waterfowl, their conditions of keeping, feeding, breeding, etc. Almost all breeds, crosses and lines used in poultry farms are used arbitrarily without comparison of economic efficiency and adaptability to local conditions.

The results of this study are relevant and will be used to meet consumer demand for waterfowl of domestic selection, adapted to the natural and climatic conditions of the region with a high growth rate and a lower fat content in the carcass at low feed costs per 1 kg of growth. Pedigree work with poultry proceeds from the task of increasing the production of products, raw materials for industry and improving their quality in order to fully meet the growing material needs of the population.

An increase in the production of eggs and meat is achieved both by increasing the number of livestock and by increasing the productivity of poultry. Moreover, the growth of livestock is advisable only if it is accompanied by an increase in egg production and an improvement in meat qualities. A sustainable increase in productivity is observed when using birds with high heritable qualities.

As the production of duck meat has become more intensive in recent decades, it is necessary to develop appropriate production systems to ensure that ducks are kept in the right conditions to produce good quality meat [6].

Meat duck breeds grow rapidly due to genetic selection, efficient housing systems and rational feeding [7].

Ducks are represented by an extensive gene pool of breeds, lines and populations, but their numbers are constantly declining, especially in our republic, where many populations and breed groups are on the verge of extinction. The use of the gene pool of domestic bird breeds in breeding work, the preservation of rare and endangered populations is of particular importance, due to their high adaptive properties in terms of the quality and quantity of the products obtained, and their adaptability to local fodder and environmental and climatic conditions [7].

Scientists have been solving the problem of preserving the gene pool of agricultural poultry for many years. It became especially acute with the transfer of poultry farming to an industrial basis, which led to the creation of highly productive specialized lines and crosses for the production of eggs and meat from limited genetic material [8].

Industrial poultry farming is based on the use of poultry obtained as a result of crossing specialized matching lines. In order to have such lines from which it is possible to obtain parental forms, a clear organization of the production of breeding products is necessary, and the methods and techniques of breeding work must correspond to the creation of forms of highly productive poultry for intensive conditions of its keeping [9].

In the process of continuous creation of new, more productive and cost-effective lines and crosses, the replacement of previously selected ones continues, which, like breeds and breed groups, need to be preserved. However, in recent years, the number of not only small breeds and breed groups has sharply decreased, but also poultry, which quite recently had industrial significance. In this regard, it is necessary to continue the reproduction of a herd of ducks of local populations.

Ducks are among the fastest growing and most efficient producers of animal protein and can weigh over 3 kg in a 49 day fattening period.

Duck meat has a high nutritional value. The chemical composition of the pectoral muscle is characterized by a high content of protein (20.9–22.2%) and water (74.7–76.5%) and a low fat content (2.3–3.9%). Duck leg muscles contain slightly less water (72.5–75.1%) and protein (18.0–18.9%), but more fat (4.6–7.2%) than chest muscles [7, 8.9].

In addition, duck meat is a good source of polyunsaturated fatty acids and has a favorable amino acid composition compared to meat from other animal species [10]. Duck meat is gaining importance in human nutrition around the world due to its high nutritional value. Compared to broiler meat, duck meat contains a higher percentage of protein and a lower percentage of fat and water, as well as a higher content of red muscle fibers in breast meat [10].

Duck meat is also useful for the prevention of diseases such as atherosclerosis or hypertension by inhibiting the formation of cholesterol and stimulating blood circulation in the body [11].

The full realization of the bird's genetic potential is possible when environmental conditions are maximally favorable for its manifestation. In this regard, when creating and using highly productive poultry, it is important, in parallel with improving the feeding conditions, to improve the technology of its cultivation and maintenance. In this regard, when creating and using highly productive poultry, it is important, in parallel with improving the feeding conditions, to improve the technology of its cultivation and maintenance.

The gene pool is the decisive basis for the formation of poultry breeds and the source of genetic resources for their improvement. It is proposed to create heterogeneous populations with the wide involvement of domestic breeds of breed groups that would contribute to the formation of new lines based on valuable, sometimes rare useful qualities inherent in populations, lines or even individuals, as well as the development of new genetics and breeding methods that reveal the possibility of a significant increase in desirable qualities. birds [12].

For modern poultry farming, which is entirely based on the production of hybrid poultry based on the use of the effect of heterosis (overdominance), it is extremely important to create genetically different parental lines. This is quite difficult, especially in cases where the selection material differs little phenotypically. The intensification of poultry farming has led to the widespread distribution of poultry belonging to a relatively limited number of breeds and crosses. For modern poultry farming, which is entirely based on the production of hybrid poultry based on the use of the effect of heterosis (overdominance), it is extremely important to create genetically different parental lines. This is quite difficult, especially in cases where the selection material differs little phenotypically. The intensification of poultry farming has led to the widespread distribution of poultry belonging to a relatively limited number of breeds and crosses.

An important problem of genetics and breeding is the study of the interaction of the genotype and the environment, as well as some biochemical parameters with the productivity of the bird. The study of this issue will solve the problem of using poultry in different environmental conditions and predict its productivity [13].

In meat poultry farming, breeding work is aimed at increasing the yield of hatching eggs, their hatchability, and at obtaining young animals with a high growth rate. To obtain highly productive industrial poultry meat and egg directions, it is more effective to cross matching lines (interline hybridization).

The traits that characterize the reproductive qualities of a bird are quantitative indicators and have a polygenic nature of inheritance. Due to their low heritability (0.01-0.20), direct selection for their improvement is ineffective even when family or combined selection is used. Therefore, additional tests are used to select birds with the best reproductive qualities (for example, sexual behavior and activity of males, the development of secondary sexual characteristics, physiological and biological indicators, etc.).

The main attention in meat poultry breeding is paid to the early growth rate, feed payment, the output of day-old young animals for laying hens of the parent flock, slaughter yield, quality and composition of the carcass (reduction in the proportion of abdominal fat). Selection based on growth rate alone is becoming less and less effective, so it should be carried out taking into account other productivity indicators, i.e. there is a need for multifactorial selection: according to meat yield, carcass shape, egg production of laying hens of the parent flock, etc.

Information about the planned scientific and technical level of development, conclusions from them. The production of duck meat in the republic was previously based on the use of 4-5 lines and populations of the Peking breed, where the Medeo cross lines (M-1 paternal and M2 maternal) were most widely used. At the same time, many domestic lines and populations, such as the Bishkul Tsvetnaya and Kyzylzhar crosses, whose livestock is concentrated in the Northern Region, represent rich genetic material and can be used to create new crosses. This paper describes the productive and breeding qualities of ducks of the local population in the Northern region of Kazakhstan, the data obtained provide an opportunity for further targeted breeding work to create, preserve highly productive poultry, providing highly efficient production of eggs and meat, adapted both to industrial conditions and to conditions in small-scale and farm enterprises. This paper describes the productive and breeding qualities of ducks of the local population in the Northern region of Kazakhstan, the data obtained provide an opportunity for further targeted breeding work to create, preserve highly productive poultry, providing highly efficient production of eggs and meat, adapted both to industrial conditions and to conditions in small-scale and farm enterprises. On the basis of Bishkul Poultry Farm LLP, we obtained the results of incubation of eggs and productive indicators of ducks of the local population.

The continuous process of creating new more productive cost-effective lines and crosses continues to replace previously selected ones, which, like breeds and breed groups, need to be preserved. However, in recent years, not only the number of small breeds and breed groups has sharply decreased, but also poultry, which quite recently had industrial significance. Along with the reduction in their livestock, breeding work with them has ceased, although many of them retain a certain breeding value for one or another trait characterizing the economically useful qualities of the bird, and in the future can be used in breeding to create new crosses adapted to the conditions of industrial technology. and for household households. The use of such non-competitive crosses in crosses with newly created or industrially important lines will allow the creation of new parental forms and crosses, as well as heterogeneous populations, which, in turn, are the genetic source for the creation of new bird forms [14].

In Kazakhstan, there is not enough data on the use in the production of specific breeds, lines and crosses of waterfowl, their conditions of keeping, feeding, breeding, etc. Almost all breeds, crosses and lines used in poultry farms are used arbitrarily without comparison of economic efficiency and adaptability to local conditions.

In this regard, the results of this study are relevant and will be used to meet consumer demand for waterfowl of domestic selection, adapted to the natural and climatic conditions of the region with a high growth rate and lower fat content in the carcass at low feed costs per 1 kg of growth.

In the field of agro-industrial production, one of the key areas is poultry farming, as it is the most dynamic industry in providing the most important sources of replenishment of food resources. The poultry industry is competitive compared to various agricultural sectors, as the cost of required feed is very low.

The development of bird feeding rations must be scientifically based and for the highest benefit, which in turn will synchronize the development of the poultry industry.

Industrial poultry farming of waterfowl is invariably associated with the development of gastrointestinal diseases of non-contagious and contagious etiology, which ranks second after viral diseases, and are also the main cause of death of young birds, causing significant economic damage to poultry farming [15].

This project explores the development of effective breeding programs to create highly productive breeding herds. The qualitative characteristics of birds are studied by determining productivity, adaptation to the conditions of the food supply, natural and climatic conditions of various regions of Kazakhstan.

Subject to the duck meat production technology, first of all we prepare the replacement young for oviposition, this determines the duration of the productivity period, egg production, organoleptic and qualitative characteristics of eggs, on which the next cross population depends. The main condition for obtaining a highly productive laying duck is a complete feeding ration during their growing period. The main objective of our study was to prevent the accumulation of fat in the subcutaneous tissue and in the whole body. If free access to feed is allowed for all types of birds, then they are prone to excessive overeating, due to which metabolism is disturbed. Subsequently, this leads to a decrease in fat productivity, viability and resistance to various pathogenic factors. Subsequently, this leads to a decrease in fat productivity, viability and resistance to various pathogenic factors. The profitability and efficiency of feed research is declining. By the beginning of egg production in laying hens - ducks, fat is collected about 30-40% of the live body weight of birds

With uncontrolled feeding of replacement waterfowl, puberty occurs prematurely, the body weight of birds increases, which adversely affects the reproductive system of birds.

The most profitable diets and feeding regimes for young animals and birds of the repair group were developed. The data applied in practice minimized the cost of feed, and also ensured normal growth and development with the condition of using various additives in the composition of premixes.

In order to have an objective idea of the nutritional value of a particular feed and its variability under the influence of various factors, it is necessary to know the content of the main nutrients and biologically active substances in the feed. In other words, it is necessary to know the chemical composition of feed, their digestibility and use, the age and direction of productivity of various animal species when kept in various economic conditions. Therefore, the nutritional value of feed can be determined by the physiological state of the animal and the results of changes in its productivity. Usually, the nutrients obtained during digestion are converted into simpler soluble compounds, which are then absorbed into the blood and used to synthesize complex organic substances in the body. There fore, the study of the process of digestion of various bird feeds is a necessary factor for a deeper assessment of their nutritional value [16].

The production effect of feed is not a constant value, since the degree of assimilation of potential energy by organisms depends on the age, productivity and physiological state of animals of different species.

The results of the research on the use of the developed recipes of feed mixtures with the addition of premix components to feed from local resources and the determination of the optimal diet for replacement ducks during the rearing periodAlong with an increase in productive indicators and the safety of birds, it will have a significant impact on increasing the profitability of duck breeding in Kazakhstan, its expansion, an increase in meat production, and contributes to the reduction in the cost of the resulting products in general.

Determining in the conditions of Kazakhstan the optimal composition of feed mixtures for replacement ducks in the period of preparation for the upcoming laying allows to reduce feed costs per head within 7-8%, rearing costs - 6-7%.

The purpose of the research: development of technologies and methodology for effective management of the breeding process in poultry farming based on the achievements of biotechnology and modern zootechnical, informational and statistical breeding methods.

Research objectives:

– study the chemical composition of feed and feed additives from local resources;

– to develop recipes for feed mixtures for waterfowl of different sex and age groups, taking into account the periods of their productivity.

Materials and research methods.

To fulfill the tasks set in the conditions of NJSC "West Kazakhstan Agrarian and Technical University named after Zhangir khan" of the West Kazakhstan region, scientific and economic experiments were carried out, as well as an analysis of the composition of feed for young ducklings of the Medeo breed (Beijing white).

To achieve the set goal, as well as to fulfill the objectives of the research, production checks to study the composition of feed and feed additives from local resources and recipes of feed mixtures for each sex and age group of birds, taking into account periods of their productivity, were compiled. Samples of the main types of feed were taken (barley, wheat, millet, soybeans, peas, wheat bran, sunflower cake, fodder yeast, meat meal and meat and bone meal) and the nutritional value of the feed was determined in the laboratory of the Testing Center of WKATU named after Zhangir Khan Samples of the main types of feed were taken (barley, wheat, millet, soybeans, peas, wheat bran, sunflower cake, fodder yeast, meat meal and meat and bone meal) and the nutritional value of the feed was determined in the laboratory of the Testing Center of West Kazakhstan Agrarian Technical University named after Zhangir Khan. (Study indicators: Metabolic energy MJ; Dry matter; Crude protein; Digestible protein; Lysine; Methionine + cystine; Tryptophan; Crude fat; Crude fiber; BEV; Calcium; Phosphorus; Magnesium; Potassium; Iron; Copper; Zinc; Manganese; Cobalt; Carotene). Various recipes for feed mixtures were developed with a wide use of local feed resources for each period of rearing young animals according to the experimental scheme.

Research work on the study of the effect of the prepared feed mixture for each sex and age group of feeding replacement young ducks was carried out in the conditions of NAO "West Kazakhstan Agrarian and Technical University named after Zhangir Khan" of the West Kazakhstan region.

All technological parameters for growing and feeding conditions for young ducklings met the standards. Feeding scheme: in the period of 1-7 days - with the use of "Start" feed, 7 - 14 days - "Growth" feed.

During the research period, the following indicators of the experimental groups were taken into account and calculated:

– the chemical composition of feed (method of preparing feed for analysis, basic requirements for sampling, initial and hygroscopic moisture (by evaporation in an oven at a temperature of 60-650C, and then 105 0C), Metabolic energy MJ (GOST 18221-2018), dry matter (ST RK GOST R 52838-2011), crude protein (GOST 13496.4-2019); digestible protein (GOST 13496.4-93); lysine, methionine + cystine, tryptophan (MVI-04-38-2009), crude fat (GOST 13496.15-2016), crude fiber (GOST 13496.2-91), BEV (GOST 26176-2019), calcium (GOST 26570-95) , phosphorus (GOST 26657-97), magnesium (MVI M04-77-2012), potassium (MVI M04-77-2012), iron, copper, zinc, manganese, cobalt, carotene (M04-65-2010);

– when calculating the feed formulas, the data of the laboratory analysis of the chemical composition of the ingredients were used. The minimum set of indicators for laboratory analysis and control: crude protein, crude fiber, crude fat, calcium, phosphorus, lysine, methionine and cystine;

All digital data obtained during the research were processed by the method of variation statistics using computer programs.

Research results.

In the conditions of the West Kazakhstan region, we studied the technology of feeding waterfowl, the chemical composition of feed and feed additives, and on the basis of the experimental data obtained, we created a compound feed formula with a balanced diet for feeding experimental groups of ducks and drakes. According to the data presented in Table 13, an analysis of the chemical composition and nutritional value of the feed was carried out, on the basis of which recipes were made for the preparation of feed mixtures for ducks of different sex and age groups, bred in West Kazakhstan Agrarian and Technical University named after Zhangir Khan.

Analysis of the results showed that the content of the exchange energy ranged from 6.1 to 12.0 MJ, and the highest exchange energy was in fodder yeast (12.0 MJ) and in barley with soybeans

(11.7 MJ). The relatively highest content of crude protein per 1 kg is observed in technical waste feed, in sunflower cake, meat and bone meal and fodder yeast (from 205.0 to 438.0 g). Among grain feeds, soy contains more protein than barley, wheat, millet and peas, respectively, by 160.0 g (51.2%), 183.0 g (58.6%), 209.0 g (66.9 %) and 102.0 g (32.6%).

An important indicator is the percentage of amino acids such as lysine, methionine and cystine, which have a direct impact on the productivity and full development of the body. The highest content of amino acids is observed in meat meal and fodder yeast (27.9 - 34.4 / 10.3 - 12.9).

Based on the data on the chemical composition of the feed of farms like the West Kazakhstan region, it is possible to make recipes for feed mixtures that will be most effective. One of the conditions for obtaining maximum poultry productivity is balanced feeding. The diets of birds are based on the physiological need of the body for nutrients.

Table 1 – The chemical composition of forage farm West - Kazakhstan region

Stern	types of feed									
	Barley	Wheat	Millet	Soy	Peas	wheat bran	Sunflower cake	feed yeast	meat meal	meat and bone meal
OE, MJ	11,7	8,8	6,1	11,7	8,1	7,9	9,1	12,0	10,0	6,6
Dry matter, g Dry matter, g	880,0	800,0	810,0	770,0	750,0	820,0	600,0	600,0	500,0	700,0
Crude protein, g	152,0	129,0	103,0	312,0	210,0	141,0	205,0	438,0	461,0	301,0
RP, g	128,4	90,8	41,8	174,6	154,1	95,7	304,0	390,5	264,7	160,7
NRP, g	24,5	27,2	26,2	99,4	23,6	35,3	71,0	41,0	192,4	100,4
Digestible protein (PP), g	109,0	96,0	66,0	251,0	172,0	90,0	314,0	300,0	510,0	321,0
Lysine, g	4,2	1,0	1,2	34,8	7,2	4,4	12,4	27,9	34,4	19,7
Methionine + cystine, g	1,9	2,7	3,6	4,0	4,5	2,9	10,8	10,3	12,9	8,8
Tryptophan, g	1,7	1,0	1,2	2,4	0,3	0,3	2,2	3,1	2,9	1,6
Crude fat, g	13,0	17,0	28,0	27,0	10,0	39,0	67,0	12,0	143,0	100,0
Crude fiber, g	15,0	10,0	72,0	40,0	34,0	78,0	109,0	1,0	-	-
BEV, g	843,0	843,0	547,0	-	512,0	516,0	201,0	349,0	31,0	-
Calcium, g	0,2	0,7	0,8	-	1,0	1,0	4,9	3,7	51,0	123,0
Phosphorus, g	2,0	1,6	4,1	-	3,3	7,6	10,9	12,7	29,0	73,0
Magnesium, g	21,3	0,07	0,2	4,5	0,2	2,3	2,8	1.2	0,8	1,5
Potassium, g	3,1	2,4	2,4	3,1	3,7	8,9	7,5	12,5	4,8	12,0
Iron, mg	150,0	150,0	150,0	150,0	150,0	150,0	205,0	90,2	295,0	41,0
Copper, mg	9,3	9,3	9,3	9,3	9,3	9,3	8,2	10,9	6,7	1,0
Zinc, mg	30,2	13,0	25,0	115,0	15,7	71,0	38,0	37,8	49,5	75,0
Manganese, mg	40,5	36,4	12,9	12,2	19,2	98,0	32,9	77,0	1,2	9,3
Cobalt, mg	0,09	0,02	0,01	27,0	0,12	0,7	0,11	1,31	0,0	0,2
Carotene, mg	0,0	0,01	1,0	0,002	-	2,4	1,70	1,9	-	-

During the first two weeks of growing young ducklings, starter feeding rations were used. Feeding of young ducklings corresponded to the norms and in 1-7 days the Start compound feed was used, in the next 7 days (7-14 days) the Rost compound feed was used (Table 2).

Table 2 – Compound feed for young waterfowl in the West Kazakhstan region for a growing period of 1-14 days

№	Indicators	Growing periods, days			
		1 – 7		7 – 14	
		Compound Feed Start		Compound feed Rost	
		Content, g	Content, %	Content, g	Content, %
1	Dry matter, g	875,00	87,50	875,00	87,50
2	Organic matter, g	814,00	-	814,00	-
3	Humidity, g	125,00	12,50	125,00	12,50
4	Raw ash, g	61,00	6,10	61,00	6,10
5	Crude protein, g	202,00	20,20	219,00	21,90
6	including digestible, g	133,98	13,40	145,25	14,53
7	Crude fat, g	36,00	3,60	57,00	5,70
8	Crude fiber, g	37,00	3,70	46,00	4,60
9	BEV, g, incl.	539,00	53,90	492,00	49,20
10	Starch	38,00		34,10	
Nutritional value of feed:					
11	Exchange energy, MJ	13,99		14,27	
12	Metabolic energy, kcal	3331,61		3399,77	

The results of the study showed that in the first growing period (1-2 weeks) feed for birds (ducklings) contained 20.20 - 21.90% protein and 13.99 - 14.27 MJ of metabolic energy. The highest content of crude protein in 1 kg is observed in the compound feed "Growth" (219.0 g). Also, in terms of the content of exchangeable energy, the compound feed "Growth" exceeds the compound feed "Start" by 0.28 MJ (1.96%). According to the study of the chemical composition of feed, recipes for feed mixtures for waterfowl in the Western region of Kazakhstan were compiled. So for each sex and age group of ducklings of the breed "Medeo" (Beijing white) of the West Kazakhstan region for a growing period of 14-49 days, a feed mixture formula was developed for various groups (table 3).

Table 3 – Feed mixture recipe for young ducks of the control and experimental groups for growing periods of 14-49 days for the Western region of Kazakhstan

Indicators		Experimental groups, % input	
		Control I	Experimental II
Wheat		25	25
Millet		20	20
Barley		25	21
Soya		10	10
Peas		10	10
Sunflower cake		4	4
feed yeast		2	2
meat and bone meal		4	4
Composite mineral feed additive		-	4
The feed mixture recipe contains:			
exchange energy	Ккал/100г	304,0	318,6
	МДж/100г	1,274	1,356
Crude protein, %		17,2	17,6
Crude fiber, %		2,73	2,64
Lysine, %		3,56	3,81
Methionine + cystine, %		1,65	1,72
Ca, %		25,1	30,6
R, %		1,01	1,34
Na, %		1,01	1,23
Crude fat, %		0,48	0,51
Raw ash, %		0,32	0,29
BEV, %		41,64	45,78

The feed mixture recipe was developed with an optimal feed ratio for easy absorption by young waterfowl. The feed mixture recipe for young ducklings of the control group consists of 8 components, and the experimental group of 9 components. The total content of grain feed in the formulation of the experimental group is 4% less than in the control group, but at the same time, a composite mineral feed additive was added to the formulation. In the second growing period, the developed recipe contained from 1.274 to 1.356 MJ of metabolizable energy and from 17.2 to 17.6% of crude protein. In the recipe of the experimental group, compared to the control group, the content of crude protein was higher by 0.4%, and the content of nitrogen-free extractives by 4.14%. The content of mineral substances in the recipe of young animals of the experimental group is relatively higher compared to the recipe developed for the control group of ducklings. So the content of calcium is higher by 5.5%, phosphorus and sodium, respectively, by 0.33 and 0.22%. According to the amino acid composition, the same trend is observed, and the advantage of the formulation of the experimental group for lysine is 0.25%, for methionine and cystine only 0.07%. In general, a recipe developed for young ducklings of the experimental group has a slight nutritional and mineral advantage.

Findings.

1 The analysis of the chemical composition and nutritional value of feed was carried out, on the basis of which recipes for the preparation of feed mixtures for ducks of different sex and age groups were compiled.

2 Analysis of the results showed that the content of metabolic energy ranged from 6.1 to 12.0 MJ, crude protein from 205.0 to 438.0 g. Also, the highest content of amino acids was observed in meat meal and feed yeast (27.9 - 34, 4 / 10.3 - 12.9).

3 Starter feeding rations were used during the first two weeks of growing young ducklings. The feeding of young ducklings corresponded to the norms and in

1–7 days, the Start compound feed was used, in the next 7 days (7–14 days) the Rost compound feed.

4 The results of the study showed that in the first growing period (1-2 weeks) feed for birds (ducklings) contained 20.20 - 21.90% protein and 13.99 - 14.27 MJ of metabolic energy. In the second growing period, the developed feed mixture formula contained from 1.274 to 1.356 MJ of metabolizable energy and from 17.2 to 17.6% of crude protein.

REFERENCES

1 Adeola O. Recent advances in duck nutrition Proceedings of the 24th western nutrition conference, 10–11 September 2003, Winnipeg, Manitoba, Canada (2003), pp. 191-204.

2 Alpeysov Sh.A. Duck breeding in Kazakhstan: monograph / Sh.A. Alpeisov, K.A. Moldazhanov.-A: Bastau, 2002.-179 p.

3 Alpeysov Sh.A. Instructions for the grading of poultry: method.recommendation / Alpeysov Sh.A., Ilnitskaya I.V., Serikbaeva Sh.K. - Almaty: Kaz.NIIP, 2001.-10s.

4 Ali M.S., Kang G.H., Yang H.S., Jeong J.Y., Hwang Y.H., Park G.B., Joo S.T. A comparison of meat characteristics between duck and chicken breast Asian-Australasian Journal of Animal Sciences, 20 (2007), pp. 1002-1006

5 Bernacki, Z., M. Adamski, J. Kuzniacka, D. Kokoszynski, 2006: Comparison of meat traits in ducks of different origin to 9 weeks of age. Rocz. Nauk. Zoot. 33, 41-57.

6 Kokoszynski, D, 2011: Evaluation of meat traits in commercial crossbreds of Pekin type ducks. UTP Bydgoszcz (Poland), 1-113.

7 Lukaszewicz, E., A. Kowalczyk, M. Adamski, J. Kuzniacka, 2011: Growth parameters and meat quality of Pekin ducks fed on different level of dried distillers grains with solubles. Arch. Tierz. 54, 557-566.

8 Woloszyn J., Ksiazkiewicz J., Skrabka-Blotnicka T., Haraf G., Biernat J., Kisiel T. Comparison of amino acid and fatty acid composition of duck breast from five flocks Archiv fur Tierzucht, 9 (2006), pp. 194-204

9 Kang, G. H., T. C. Jeong, H. S. Yang, S. H. Kim, B. G. Jang, H. S. Kang, D. S. Lee, S. J. Lee, S. T. Joo, and G. B. Park. 2006. Effects of packaging methods on color and lipid oxidation of duck meat during cold storage. Korean J. Poult. Sci. 33:7-14

10 Moldazhanov K.A. Methods for the conservation of lines and populations // Poultry. - 1991. - No. 6.- P. 10-12.

11 Murtazaeva R., Skokov R. Prospects for the development of small enterprises of the poultry industry in the region // Vestn.apk Volgogr.obl.-2003.-N 5.-p.28.

12 Fisinin, V.I. Prospects for the development of poultry / V.I. Fisinin // Economics. -2000. - No. 5. - S. 67-73.

13 Davtyan A.D., Zlochevskaya K.V., Egorova A.V., Royter Ya.S. and others. Recommendations for breeding work in poultry farming.-Sergiev Posad: VNITIP, 2003.-135 p.

14 Dyadichkina L.F. Biological control during the incubation of poultry eggs: a method. Instructions / L.F. Dyadichkina, N.S. Pozdnyakova, T.A. Melekhina and others - M .: Russian Agricultural Academy, 2014

15 Amantai S., Omarkhozha N., Kazhgaliev N.J., Saginbaeva M.B. and Arney D..Hatchability and hatchling sex ratio depending on holding period and physicalparameters of hatching eggs. - Europ.Poult.Sci., 82. 2018, ISSN 1612-9199, © Verlag Eugen Ulmer, Stuttgart. DOI: 10.1399/eps.2018.228

16 Tsarenko, P. P. Biological substantiation of egg storage regimes / P. P. Tsarenko, L.T. Vasilyeva // Poultry farming - 2016. - No. 11. - S. 29-34. Tsarenko, P. P. Biological substantiation of egg storage regimes / P. P. Tsarenko, L. T. Vasilyeva // Poultry farming - 2016. - No. 11. - S. 29-34.

17 Krivopishin I.P. Incubation of poultry eggs: guidelines [Text]. Moscow: Sergiev Posad, 1997. B. 32.

18 Guidelines for the incubation of poultry eggs [Text] / VNITIP. - Sergiev Posad, 2001. B. 45.

19 Lukashenko V.S., Kavtarashvili A.Sh., Saleeva I.P., Lysenko V.P. and etc. Research methodology for the production technology of eggs and poultry meat. Sergiev Posad: VNITIP, 2015.-103 p.

20 Bondarev E.I. Homestead farming. Breeding poultry. - M .: Publishing house EKSMO - PRESS, Publishing house Lik, 2001. - 256 p.

21 Dyadichkina L.F., Antonova N. Incubation qualities of chicken eggs of different ages depending on the duration of storage // Innovative solutions in egg poultry farming: Proceedings of the international. Conf., Gelendzhik, 2007.- S. 226-231.

22 Galpern I.L., Segal E.L., Fedorov I.V. The problem of conservation of poultry genetic resources and possible solutions. – Proceedings of the 18th International Conference “Innovative Provision of Egg and Meat Poultry in Russia”. - Sergiev Posad, 2015. - P.45-48.

ТҮЙІН

Құстың генетикалық әлеуетін толық іске асыру қоршаған орта жағдайлары оның көрінісіне барынша қолайлы болған кезде мүмкін болады. Осыған байланысты жоғары өнімді құсты құру және пайдалану кезінде азықтандыру жағдайларын жақсартумен қатар оны өсіру және ұстау технологиясын жетілдіру маңызды. Мақалада жемнің химиялық құрамы мен тағамдық құрамын талдау нәтижелері келтірілген, оның негізінде әр түрлі жыныстық-жас топтарындағы үйректерге арналған қоспаларды дайындауға арналған рецепттер жасалған. Нәтижелерді талдау көрсеткендей, метаболикалық энергия мөлшері 6,1-ден 12,0 МДж-ға дейін, шикі ақуыз 205,0-ден 438,0 г-ға дейін болды, сонымен қатар аминқышқылдарының ең көп мөлшері ет ұны мен жемшөп ашытқысында байқалды (27,9 – 34,4 / 10,3 – 12,9). Жас үйректерді өсірудің алғашқы екі аптасында тамақтандырудың бастапқы диеталары қолданылды. Жас үйректерді тамақтандыру нормаларға сәйкес келді және 1-7 тәулікте "Старт" құрама жемі, келесі 7 күнде (7-14 күн) - "Рост"құрама жемі қолданылды. Өсірудің бірінші кезеңінде (1-2 апта) құстарға (үйректерге) арналған құрама жем құрамында 20,20 – 21,90% ақуыз және 13,99 – 14,27 МДЖ алмасу энергиясы болды. Өсірудің екінші кезеңінде Жем қоспасының дамыған формуласында 1,274-тен 1,356 МДж-ға дейін алмасу энергиясы және 17,2-ден

17,6% - ға дейін шикі ақуыз болды. Осы зерттеудің нәтижелері өзекті және өңірдің табиғи-климаттық жағдайларына бейімделген отандық селекциядағы суда жүзетін құстардағы тұтынушылардың сұранысын қанағаттандыруда пайдаланылатын болады.

РЕЗЮМЕ

Полная реализация генетического потенциала птицы возможна, когда условия среды максимально благоприятствуют его проявлению. В связи с этим при создании и использовании высокопродуктивной птицы важно параллельно с улучшением условий кормления совершенствовать технологию ее выращивания и содержания. В статье приведены результаты анализа химического состава и питательности кормов, на основе которого составлены рецепты приготовления кормосмесей для уток разных половозрастных групп. Анализ результатов показал, что содержание обменной энергии колебалась от 6,1 до 12,0 МДж, сырого протеина от 205,0 до 438,0 г. Также наибольшее содержание аминокислот наблюдалось в мясной муке и кормовых дрожжах (27,9 – 34,4 / 10,3 – 12,9). В течение первых двух недель выращивания молодняка утят использовались стартовые рационы кормления. Кормление молодняка утят соответствовало нормам и в 1–7 суток применялся комбикорм «Старт», в последующие 7 дней (7 - 14 суток) – комбикорм «Рост». В первый период выращивания (1-2 недели) комбикорма для птиц (утят) содержали 20,20 – 21,90 % протеина и 13,99 – 14,27 МДж обменной энергии. Во второй период выращивания разработанная рецептура кормосмеси содержала от 1,274 до 1,356 МДж обменной энергии и от 17,2 до 17,6 % сырого протеина. Результаты данного исследования актуальны и будут использованы в удовлетворении спроса потребителей в водоплавающей птице отечественной селекции, адаптированной к природно-климатическим условиям региона.

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