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UDC 631.15:636.597.033(100+477)

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DUCK MEAT PRODUCTION TRENDS in the world and in Ukraine

Abstract. ***In the article, according to international statistics (FAOSTAT), the dynamics of the duck population and the production of duck meat in the world, in Ukraine and in certain countries in the period 2016-2020 are given. It is established that in 2020 the duck population in the world slightly decreased (by 0.75%). At the same time, the largest number of ducks is concentrated in China – 62.7 and 60.6% of the world's population, respectively, in 2016 and 2020. Ukraine took tenth place in this ranking in 2020. With a slight fluctuation in the number of ducks in the world, a tendency to its increase was noted in the production of meat – by 37.8% compared to 2016. However, in Asian countries, ducks are bred not only for meat, but also for eggs, which are used as food. Duck egg consumption is about 10-30% of total egg consumption in China and Southeast Asia. Among the population of South-East Asian countries, such a product as "balyut" is popular, which is prepared using a duck egg with an embryo about 18 days old.***

Based on the analysis of data from various literary sources, the issue of duck keeping systems in different countries of the world and Ukraine is highlighted. Since ducks belong to waterfowl, along with the intensive technology of keeping them (in closed rooms with a microclimate that is controlled and regulated), extensive technology is also used – using walks, including water ones. In Ukraine, 97.5% of the duck population is kept in public farms, and therefore the main system of their keeping is extensive. The importance of complete feeding of ducks is also indicated, recommendations are given regarding the nutritional value of rations depending on the age of the bird.

In Ukraine, the largest farm engaged in the industrial production of duck meat is the Poultry Brood Plant "Korobivskyi" JLLC of the Zolotonosha district of the Cherkasy region. The production of duck meat using intensive technology involves the use of high-production crosses, the keeping of poultry in poultry houses with a regulated microclimate and complex mechanization and automation of technological processes, and the feeding of poultry with complete ration compound feed.

Key words: *ducks, livestock, meat production, technology, maintenance, feeding*

Agricultural poultry is characterized by an intensive process of conversion of vegetable protein into animal protein in its body and significantly exceeds cattle and pigs in this respect. The short period of reproduction and breeding of poultry provides an opportunity to quickly increase meat production. In solving the task of increasing the production of poultry meat in Ukraine and the world, an important place belongs to duck breeding. The technology of industrial production of duck meat involves the use of high-performance crosses, keeping with the use of modern specialized equipment, feeding with full-rational compound feed, and the application of a complex of veterinary and sanitary measures. However, the production technology of duck farming products differs in different countries of the world.

Analysis of scientific publications in recent years shows that Ukrainian researchers pay attention, first of all, to the problem of feeding ducks, selection *(Balanchuk, 2014; Sychov, 2016; Ibatullin, 2018; Patrieva, 2013; Shkurko et al., 2015; Bondarenko and Shkurko, 2019).*

There are a large number of published results of research by scientists from different countries regarding the technology of keeping and feeding ducks, their numbers, etc. *(The Wel-*

1. Duck, thousand heads (country rating)

Rating	Area	2016	Area	2020
	World (Total)	1117444	World (Total)	1109054
1	China, mainland	700201	China, mainland	671782
2	Viet Nam	71286	Viet Nam	86563
3	Bangladesh	52240	Bangladesh	59716
4	Indonesia	47424	Indonesia	56570
5	India	27529	India	35338
6	France	24439	France	21978
7	Myanmar	23636	Russian Federation	21422
8	Russian Federation	21317	Thailand	14907
9	Thailand	15360	Philippines	11794
10	Egypt	10599	Ukraine	11418
11	Philippines	10519	Malaysia	9511
12	Ukraine	10150	Cambodia	8765

fare of Farmed Ducks, 2012, July; Van der Meulen and den Dikken, 2004; Fouad, 2018; Ismoyowati and Sumarmono, 2019).

However, recently, no research has been conducted on the generalization of statistical data on the population and volume of duck meat production, housing systems and feeding conditions of birds of this species in Ukraine and in the countries of the world.

In this regard, **the purpose of our work** was to analyze the data of international statistics, as well as the results of research by domestic and foreign scientists regarding the keeping and feeding of ducks and to highlight the issues related to the production of duck meat in the world and in Ukraine in 2016-2020.

As highlighted by Ismoyowati and *Sumarmono (2019),* poultry meat and eggs are among the most widely consumed animal products in different parts of the world. However, the production of duck meat and eggs is still lower than that of chickens, but ducks make a significant contribution to meeting the needs of quality nutrients. Duck eggs contain all the essential amino acids needed for human nutrition and are a good source of vitamins and minerals. Due to their lower water content, they are more nutritious than chicken eggs. People consume duck meat because of its high nutritional value with a complete composition of essential amino acids and a good fatty acid composition with a high percentage of polyunsaturated fatty acids and a balanced ratio between omega-6 fatty acids and omega-3. Large-scale production of ducks requires more efforts to increase efficiency and improve product quality through breeding, feeding and management in accordance with animal welfare and environmental protection requirements.

The FAOSTAT data on the duck population and the production of meat in the countries of the world, including Ukraine we analyzed and listed them in *Tables 1-3 (FAO, 2022).*

Data analysis *(Table 1)* shows that the leading place in the duck population in the world belongs to China. In 2016, 62.7% of the world's ducks were raised in China, and in 2020 – 60.6%. The second is Viet Nam, and compared to China, this country has almost 10 times less ducks. So in the world, China will remain the leader in duck breeding in the near future. At the same time, Ukraine took 12th place in 2016, and 10th in 2020, which is due not only to an increase in the number of ducks by 12.5%, but also to the fact that the number of ducks in Myanmar and Egypt has significantly decreased, respectively in 2.7 and 2.3 times.

In general, the dynamics of duck meat production in the world and in Ukraine during 2016-2020 has a tendency to increase *(Table 2).* Compared to 2016, in 2020 the amount of duck meat in the world was produced by 35.9% more. In Ukraine, meat production increased by 10.8% over the same period.

Analyzing the ranking of countries for the production of duck meat, the first place, as well as for the population of this bird, is occupied by China *(Table 3)*. In second place is France, ahead of other countries, including Viet Nam. This is due to the fact that in Asia they consume not only meat, but also duck eggs. Thus, the consumption of duck eggs is about 10-30% of the total egg consumption in China and Southeast Asia *(Ismoyowati and Sumarmono, 2019)*.

Here it should be noted that in Southeast Asia such a product as "balut" is popular. It should be noted here that such a product as "balut" is popular in Southeast Asia. A study by *Alejandria et al. (2019)* found that the process of making hatched eggs originated in China. Balut can be criticized as alien to Philippine culture because of the many similar preparations available in other countries. Among them are Mao Dan (China), hot Viet Lon (Vietnam) and Chai Phog Khon (Cambodia). A long history of influences from various cultures, including Chinese, American, and Spanish, has led to significant changes in Filipino cuisine. Balut, along with other delicacies – siomai, bitek (beef steak) and lechon, entered the diet of Filipinos. This highlights the common culture of hatching egg production and consumption that can be found in several Asian countries. However, the discovery of balut has allowed it to become a more Filipino product in many ways. Starting with the tedious process of traditional incubation, magbabalut carefully ensures each egg receives the right amount of heat by placing it in makeshift baskets surrounded by bags of heated husks. Each egg is then examined during the transillumination process and continuously incubated until it reaches the ideal 18-day incubation balut. Balut is readily available every day on the streets, where a vendor carries it in baskets filled with sand to keep it warm before eating. It is consumed by splitting one end, straining the broth and seasoning with vinegar or a pinch of salt. This unusual production and consumption of balut symbolizes the creativity of Filipinos to create something similar to other Asian cultures, but uniquely Filipino. Balut has gained popularity as an affordable, nutritious and ready-to-eat snack, making it a staple and favorite street food of Filipinos.

Statistical data on duck meat production (State Statistics Service of Ukraine) and FAOSTAT differ significantly. This is due to the fact that the number of ducks in enterprises in Ukraine is insignificant. As of January 1, 2021, there were only 280.9 thousand heads *(Melnyk et al., 2021)*. The main number

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2. Duck population and duck meat production in the world and Ukraine (2016-2020)

Year	World (Total)		Ukraine	
	Duck, thousand heads	Meat of ducks, fresh or chilled, tonnes	Duck, thousand heads	Meat of ducks, fresh or chilled, tonnes
2016	1117444.00	4468659.68	10150.00	18683.60
2017	1147708.00	4426081.35	10876.00	18952.59
2018	1112243.00	4661054.93	10954.00	20112.38
2019	1107787.00	6072754.76	11680.00	20600.00
2020	1109054.00	6159540.38	11418.00	20700.00

3. Meat of ducks, fresh or chilled, tonnes (country rating)

Rating	Area	2016	Area	2020
	World (Total)	4468659.68	World (Total)	6159540.38
1	China, mainland	3020800.00	China, mainland	4775000.00
2	France	239158.00	France	192000.00
3	Myanmar	133514.00	Viet Nam	172919.77
4	Viet Nam	111145.99	Republic of Korea	87649.56
5	China, Taiwan Province of	82830.00	China, Taiwan Province of	82157.32
6	Republic of Korea	80000.00	Malaysia	74161.00
7	Malaysia	78985.00	Poland	63520.00
8	Hungary	78769.00	Hungary	63350.00
9	Egypt	75708.00	Thailand	62646.70
10	Thailand	70126.01	Bangladesh	58630.83
11	United States of America	61608.00	Myanmar	54685.00
12	Bangladesh	51850.44	Egypt	49000.00

4. Nutritional requirements of meat-type (White Pekin ducks) in commercial production

Nutrient	1-21 d	22-42 d
Metabolizable energy, kcal/kg	2,900	3,000
Protein, %	20	18
Methionine, %	0.48-0.50	0.47-0.50
Lysine, %	1.1	1.0
Threonine, %	0.70-0.80	0.70-0.80
Tryptophan, %	0.23	0.23
Available phosphorus, %	0.40	0.40
Calcium, %	0.83	0.89
Manganese, mg/kg	80-100	80-100
Zinc, mg/kg	60	60
Iodine, mg/kg	0.2	0.2
Iron, mg/kg	60	60
Copper, mg/kg	10	10
Selenium, mg/kg	0.3	0.3
Vitamin A, IU	10,000	8,000
Vitamin D_3, IU	3,000	3,000
Vitamin E, mg/kg	20.0	20.0
Thiamine, Vitamin B_1, mg/kg	2.0	2.0
Riboflavin, Vitamin B_2, mg/kg	10.0	8.0
Pyridoxine, Vitamin B_6, mg/kg	4.0	4.0
Cyanocobalamin, Vitamin B_{12}, mg/kg	0.02	0.02
Choline, mg/kg	1,000	750
Pantothenic acid, mg/kg	20.0	10.0
Vitamin K, mg/kg	2.0	2.0
Biotin, mg/kg	0.2	0.2
Niacin, mg/kg	50.0	50.0
Folic acid, mg/kg	1.0	1.0

of ducks is concentrated in households – 97.5%. The maintenance system in these farms is extensive.

In general, ducks are raised in both intensive and extensive systems in the world. Thus, *van der Meulen and den Dikken (2004)* analyzed different systems of keeping ducks in the world and provided recommendations. Keeping ducks is well combined with other types of farming. Two integrated systems are known: keeping ducks in combination with rice cultivation and keeping ducks in combination with fish ponds. In these systems, different forms of production complement each other, and the farmer will have better output and more profit. Waste and by-products are used, e.g. duck manure is used instead of waste: in fish ponds, it is directly used to fertilize the pond, which increases food for fish; in the rice fields, ducks eat harmful insects and snails, this is a help for the rice and at the same time the ducks get nutritious food. Some inputs are used more efficiently, e.g. the fish tank is used for fish and for ducks at the same time. Ducks grow better if they have access to a pond. The farmer shares the risks. For example, if the rice harvest is low, the output of eggs and duck meat still remains.

Free-range system: ducks are kept only at night. During the day, the ducks roam freely in the street in search of food. They are brought inside at night, putting extra food in the shelter. Ducks only need roosting places and nests for laying eggs. Ducks will stay here if you treat them well. The advantage of this system is that the ducks themselves go to the feed and collect it. In this way, nutrients become available that the farmer cannot otherwise obtain. Some farmers in Asia gather their flocks to graze large areas after the rice harvest.

Closed system: ducks are permanently kept indoors or in a covered shelter (indoor system) or outdoors. Ducks stay in the same place. They are easy to monitor, observe and verify. An outdoor walk makes it easier for ducks to access water, as a pond can be placed on the open walk.

Indoor system: The closed system is designed for large duck farms where production is mechanized to reduce labor costs. The system requires more investment than the other two housing systems. Not only do you need to build a shelter, but you also need to provide it with food and water, as well as clean it regularly. If managed correctly, growth can be fast and production cheap.

To keep ducks under an intensive system, the German company "Big Dutchman" manufactures specialized equipment that is also used in Ukraine *(Big Dutchman, 2022)*. To meet these requirements, a variety of feeders are offered that can be filled with feed using the well-known AugerMatic conveyor system. The feeding system for growing poultry must meet high standards - depending on the distribution of feed (ad libitum or controlled feeding), age and type of birds. The system should meet the needs of day-old and heavy birds. Easy access to feed and avoiding its loss are of great importance. "BigPan Plus" is used for controlled breeding of ducks. Today, especially birds with a live weight of more than 2 kg can receive controlled feeding. An important prerequisite for controlled feeding is that the feeding system rapidly distributes the feed throughout the house during each feeding. The AugerMatic with BigPan Plus is ideal for this purpose. The in-

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sert to reduce the volume in combination with the sectional plate reduces the volume of the feed by about 2/3. This allows you to quickly fill the trays of one line with fodder.

Fouad et al. (2020) analyzed research on feeding ducks and listed recommended standards *(Table 4)*. An unbalanced diet is associated with low performance and signs of nutrient deficiency, as well as high feed costs and manure problems, which reflect the health and welfare of the herd. Therefore, the main objective of this review is to summarize the results of previous studies that have assessed the nutrient requirements of meat and egg-type ducks in order to assess current knowledge and identify further challenges that need to be addressed.

In Ukraine, the most powerful producer of duck meat is the Poultry Brood Plant "Korobivskyi" JLLC (Cherkasy region). Recently, cross breeds of foreign selection have been used in this farm. Thus, the results of Melnyk et al. (2022) testify that in the conditions of the Poultry Brood Plant "Korobivskyi", the ducklings of the cross "Super M3" (company ("Cherry Valley", Great Britain) compared to the cross-"STAR 53" (firm "Grimaud Frères", France) have a higher live weight at the age of slaughter by 3.48% and in most age periods are characterized by more intensive growth. As for keeping ducklings, the poultry houses are equipped with the equipment of the Ukrainian company TOV "ChK Alternatyva". The poultry in the farm are kept on the floor on a deep litter. The ducklings are raised without transplants; therefore, the entire area of the poultry house is divided by portable partitions 50-60 cm high into equal sections. The area of the section is determined according to the planting density, which is set in the range of 8 to 10 heads/m2 of the floor. The entire area of the poultry house is divided by a longitudinal service passage with a width of 0.8- 1.0 m into two parts. For the first 7 days, the ducklings are kept under 24-hour lighting, and from the 8th day, the light day is shortened by 30 minutes daily and brought to 15 hours on the 25th day, leaving it at this level up to 49 days of age. When the ducklings are planted, the air temperature in the poultry house is 35 °C, and later it is gradually lowered, bringing it to 20 °C at the age of 3 weeks of the bird, and maintaining it at this level until the end of rearing. The ducklings are fed with complete combined feed, the nutritional content of which is changed depending on age.

CONCLUSIONS

The analysis of duck meat production indicates its growth trends in the world and in Ukraine during 2016-2020. The main population of ducks is concentrated in Asia. More than 60% of the world's ducks are kept in China. Ducks belong to waterfowl, so along with intensive technology of keeping them, extensive technology is also used. In Ukraine, 97.5% of the duck population is kept in public farms, and therefore the main system of their keeping is extensive. The German company "Big Dutchman" is a powerful manufacturer of equipment for keeping ducks for intensive industrial meat production. It is also important to follow the rules of feeding ducks to ensure their health and high productivity.

In Ukraine, 97.5% of ducks are concentrated in households. The largest farm engaged in the industrial production of duck meat is Poultry Brood Plant "Korobivskyi" in Zolotonisha district of Cherkasy region.

Prospects for further research are in-depth study of duck meat production technology in different regions of the world. ■

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Тенденції виробництва качиного м'яса у світі та в Україні

Анотація. ***У статті, за даними міжнародної статистики (FAOSTAT), наведено динаміку поголів'я качок і виробництва качиного м'яса у світі, в Україні та окремих країнах у період 2016-2020 рр. Встановлено, що у 2020 році поголів'я качок у світі дещо зменшилося (на 0,75%). При***

цьому, найбільше качок зосереджено в Китаї – 62,7 і 60,6% від поголів'я у світі, відповідно у 2016 та 2020 рр. Україна в даному рейтингу у 2020 році посіла десяте місце. На тлі незначних коливань щодо чисельності качок у світі, у виробництві м'яса відмічено тенденцію до його збільшення – на 37,8% порівняно з 2016 роком. Однак, у країнах Азії качок розводять не лише для отримання м'яса, а й яєць, які вживають в якості харчових. Споживання качиних яєць становить близько 10-30% від загального споживання яєць у Китаї та Південно-Східній Азії. Серед населення країн Південно-Східної Азії популярним є такий продукт як "балют", який готують, використовуючи качине яйце з ембріоном віком приблизно 18 діб.

На основі аналізу даних різних літературних джерел висвітлено питання щодо систем утримання качок у різних країнах світу та Україні. Оскільки качки належать до водоплавної птиці, то поряд з інтенсивною технологією їх утримання (у закритих приміщеннях з мікрокліматом, який контролюють і регулюють) застосовують і екстенсивну – з використання вигулів, у тому числі й водяних. В Україні 97,5% поголів'я качок утримують у господарствах населення, а тому основна система їх утримання – екстенсивна. Зазначено й важливість повноцінної годівлі качок, наведено рекомендації щодо поживності раціонів залежно від віку птиці.

В Україні найбільшим господарством, що займається промисловим виробництвом качиного м'яса є СТОВ "ППЗ "Коробівський" Золотоніського району Черкаської області. Виробництво м'яса качок за інтенсивною технологією передбачає використання високопродуктивних кросів, утримання птиці у пташниках із регульованим мікрокліматом і комплексною механізацією та автоматизацією технологічних процесів, годівлю птиці повнораціонними комбікормами.

Ключові слова: *качки, поголів'я, виробництво м'яса, технологія, утримання, годівля*

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