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TRENDS IN TURKEY MEAT PRODUCTION in the world and in Ukraine

Abstract. *The article on the basis of literature sources and statistics describes the nutritional value of turkey meat, studies the dynamics of turkey meat production in the world and in Ukraine, provides information on breeding companies for breeding turkeys and modern crosses, describes the features of keeping and feeding turkeys. It is proved that turkey meat is recommended for medical and dietary nutrition, as it is well digested and easily digested by the body. Qualitative characteristics of turkey give it competitiveness in relation to meat of other kinds. The meat of turkeys is superior to the meat of broiler chickens in terms of protein content by 10.2%, iron – 3.3 times, vitamin PP – 2.1 times. Slaughter yield in turkeys is the highest among all species of poultry – 75-78%, and muscle yield in relation to the gutted carcass is 64-67%. During 2015-2019, the level of world production of turkey is characterized as unstable. In 2019, turkey meat was produced in the world 5991771 tons, which is 0.66% less than in 2018. In Ukraine during 2016-2020, there is a tendency to increase the production of turkey meat. In 2020, its production amounted to 37.2 thousand tons (live weight), which is 18.9% more than in 2019.*

Traditionally, turkey crosses are imported to Ukraine under the brand of British United Turkeys Ltd., which is owned by Aviagen Turkeys. The only domestic cross is "Kharkivsky", whose turkeys are well adapted to the conditions of both intensive and semi-intensive and extensive with the use of pastures and pastures, are resistant to disease.

The production of turkey meat by intensive technology involves the use of high-yielding crosses, keeping poultry in poultry houses with a regulated microclimate and complex mechanization and automation of technological processes, feeding poultry with complete feed dry feed.

Key words: *turkeys, nutrition value of turkey meat, behavior, density, feeding of turkeys, prospects for growing turkeys*

One of the priority tasks of the livestock and poultry industry in particular is to meet the needs of the population in food. Turkey breeding is an efficient branch of poultry farming, which supplies the most valuable and high-quality meat of all types of poultry for human consumption (Alekseev, 2005; Dubrovskaya and Gonotskiy, 2013; Yaubasarova and Zubairova, 2013).

Turkeys belong to the Phasianidae family, a number of Galliformes and are a species of bird used in agriculture. Heavy cross turkeys are now considered to be the largest farm birds (except ostriches). They are markedly different from wild turkeys in size and weight, and can reach 30 kg. The value of turkeys in human nutrition is to get dietary meat with excellent taste and excellent nutritional properties. Turkeys are characterized by high growth intensity and at the same time they have well-developed muscles. This ensures the production of quality meat by growing turkeys for a short time (Fisinin, 2007; Gudín et al., 2010)

Turkey meat is well digested and easily digested in the human body, it is recommended for medical and dietary nutrition. Turkey meat contains more complete proteins compared to other poultry species. Industrial breeding of turkeys has significant reserves to increase its production. Qualitative characteristics of turkey meat provide it with competitiveness in relation to meat of other species (Fisinin, 2007; Tsvetkova and Pismenskaya, 2010; Rebezov et al., 2020; Gorelik et al., 2020).

According to Lukashenko (2007), turkey meat (per 100 g of product) contains 21.7 g of protein, 5.0 g of fat, 90 g of sodium, 250 g of potassium, 22 mg of magnesium, 210 mg of phosphorus, 5 mg of iron, 0.03 mg of vitamin A, 0.07 mg of vitamin B1 (0.18 mg of vitamin B2, 7.6 mg of vitamin PP, caloric content is 134 kcal. At the same time, turkey meat is dominated by meat of broiler chickens in terms of protein content by 10, 2%, iron – 3.3 times, vitamin PP – 2.1 times. Slaughter yield in turkeys is the highest among all species of



poultry – 75-78%, and muscle yield in relation to the gutted carcass is 64-67%.

In this regard, **the aim of our work** was to investigate the main trends in turkey meat production in the world and in Ukraine.

Analyzing the world production of turkey meat in the world, it should be noted that according to FAOSTAT in 2019 it was produced 5,991,771 tons, which is 0.66% less than in 2018. During 2015-2019, the level of world production of turkey is characterized as unstable. The reason was various factors, one of which is the outbreak of bird flu (*Influenza (Avian and other zoonotic)*, 2018, November 13).

The domestic turkey is a popular form of poultry, and it is raised throughout temperate parts of the world, partially because industrialized farming has made it very cheap for the amount of meat it produces. Its meat is highly nutritious and a popular protein source consumed around the world. The nutrients in turkey depend on the cut. For example, dark meat, which is found in active muscles such as the legs or thighs, tends to have more fat and calories than white meat – whereas white meat contains slightly more protein.

In many countries around the world, turkeys are widely grown for meat and eggs. Top countries in Turkey Meat Production are given in Table 1 (*Top countries for Turkey Meat Production, 2019; FAOSTAT*).

The great majority of domestic turkeys are bred to have white feathers because their pin feathers are less visible when the carcass is dressed, although brown or bronze-feathered varieties are also raised. The fleshy protuberance atop the beak is the snood, and the one attached to the underside of the beak is known as a wattle.

Young domestic turkeys readily fly short distances, perch and roost. These behaviors become less frequent as the birds mature, but adults will readily climb on objects such as bales of straw. Young birds perform spontaneous, frivolous running ("frolicking") which has all the appearance of play.

Commercial turkeys show a wide diversity of behaviors including "comfort" behaviors such as wing-flapping, feather ruffling, leg stretching and dust-bathing. Turkeys are highly social and become very distressed when isolated. Many of their behaviors are socially facilitated i.e. expression of a behavior by one animal increases the tendency for this behavior to be performed by others. Adults can recognize

"strangers" and placing any alien turkey into an established group will almost certainly result in that individual being attacked, sometimes fatally. Turkeys are highly vocal, and "social tension" within the group can be monitored by the birds vocalizations. A high-pitched trill indicates the birds are becoming aggressive which can develop into intense sparring where opponents leap at each other with the large, sharp talons, and try to peck or grasp the head of each other. Aggression increases in frequency and severity as the birds mature (*Kazimova, 2018*).

For the industrial production of turkey meat, crossbreeds of light (weight of adult females reaches 5-8 kg, males up to 18 kg), medium (respectively 8-10 and up to 25 kg), medium-heavy and heavy types (10-13 and up to 35 kg). Turkeys of light and medium crosses are intended for sale mainly in the form of whole carcasses, medium-heavy both in the form of whole carcasses and divided into parts, heavy crosses in divided form and for deep processing (*Melnyk, 2014*).

The advantages of light crossbreeds are better reproductive qualities of turkeys, and, consequently, lower cost of daily turkeys, slightly lower requirements for growing and feeding. The advantages of heavier crosses are intensive growth, slightly lower feed costs per 1 kg of live weight gain, the ability to obtain large carcasses suitable for processing, an increase of 1-3% in meat yield at slaughter.

Almost 90% of the world's turkey meat production is currently accounted for by crossbreeds of the following breeding firms (groups of companies): Aviagen Group ("Aviagen Turkeys, Inc.", USA, "Aviagen Turkeys, Ltd.", Europe) and "Hendrix Genetics Company". headquartered in the Netherlands, and the turkey breeding division is Hybrid Turkeys.

The Aviagen group owns the trademarks of "British United Turkeys Ltd." and "Nikolas Turkey Breeding Farms".

Traditionally, turkey crosses under the brand of "British United Turkeys Ltd." are traditionally imported to Ukraine. This is primarily a heavy type "B.U.T Big 6" cross (*B.U.T. 6 Commercial, 2020; Our Breeds*).

The only domestic turkey cross is the Kharkiv cross, created at the Institute of Poultry Breeding of the National Academy of Agrarian Sciences of Ukraine (currently it has been reformed into the NAAS State Poultry Research Station, Kharkiv Region, Birky). By weight refers to the middle type. Cross turkeys are well adapted to the conditions of both intensive (in particular, cage keeping) and semi-intensive and extensive with the use of pastures and pastures, are characterized by resistance to disease (*Melnyk, 2014*).

As for the production of turkey meat in Ukraine, in the period 2016-2020 there is a tendency to increase its production. Thus, according to the State Statistics Service of Ukraine (which we received in accordance with our request to this institution), the production of turkey meat in live weight in 2016 amounted to 31.3 thousand tons, and in 2020 increased to 37.2 thousand tons (by 18.9%). As for the population of turkeys, their number in enterprises as of January 1, 2021 amounted to 841.8 thousand heads, which is 8.4% less than in the previous year, but the number of adult turkeys (parent livestock) decreased by 25.7%, and young animals, on the contrary, increased by 3.9%.

Table 1. Top Countries in Turkey Meat Production (2019 year)

Rating	Countries	Turkey Meat Production, metric tons
1	United States	2,692,241.00
2	Brazil	588,051.00
3	Germany	475,553.00
4	France	363,828.00
5	Italy	304,253.00
6	Spain	219,025.00
7	Poland	191,162.00
8	Canada	171,469.00
9	United Kingdom	152,005.00
10	Israel	99,969.00

Stocking density is an issue in the welfare of commercial turkeys and high densities are a major animal welfare concern. Permitted stocking densities for turkeys reared indoors vary according to geography and animal welfare farm assurance schemes. For example, in Germany, there is a voluntary maximum of 52 kg/m² and 58 kg/m² for males and females respectively. In the UK, assurance scheme reduces permissible stocking density to 25 kg/m² for turkeys reared indoors (*Quality turkey from Ampfing in Germany, 2021*).

Lighting manipulations used to optimize production can compromise welfare. Long photoperiods combined with low light intensity can result in blindness from buphthalmia (distortions of the eye morphology) or retinal detachment.

Feather pecking occurs frequently amongst commercial-reared turkeys and can begin at 1 day of age. This behavior is considered to be re-directed foraging behavior, caused by providing poultry with an impoverished foraging environment. To reduce feather pecking, turkeys are often beak-trimmed. Ultraviolet-reflective markings appear on young birds at the same time as feather pecking becomes targeted toward these areas, indicating a possible link (*Duggan et al., 2014*).

Commercially reared turkeys also perform head-pecking, which becomes more frequent as they sexually mature. When this occurs in small enclosures or environments with few opportunities to escape, the outcome is often fatal and rapid. Frequent monitoring is therefore essential, particularly of males approaching maturity. Injuries to the head receive considerable attention from other birds, and head-pecking often occurs after a relatively minor injury has been received during a fight or when a lying bird has been trodden upon and scratched by another. Individuals being re-introduced after separation are often immediately attacked again. Fatal head-pecking can occur even in small (10 birds), stable groups.

Commercial turkeys are normally reared in single-sex flocks. If a male is inadvertently placed in a female flock, he may be aggressively victimized (hence the term "hen-

pecked"). Females in male groups will be repeatedly mated, during which it is highly likely she will be injured from being trampled upon.

Commercial turkey farming business has many advantages. That's why many new and existing poultry farmers are planning to start this business. Many people are trying to start this business for making profits. Turkey farming is similar to other poultry birds farming like chickens, ducks, quails etc. Turkeys are also very social with humans and raising turkeys is really very enjoyable. There are several turkey breeds available around the globe. But all those breeds are not suitable enough for commercial meat production. For profitable meat production have to use some modern turkey breeds that are raised for commercial meat production. Broad-breasted White is such a modern turkey breed for commercial production. The meat produced by raising this breed on pasture on a small farm, will be tastier and more flavorful than the meat produced from commercial farm. White Holland and Standard Bronze are other two popular meat producing turkey breed. Broad-Breasted Bronze and Whites are just non-standardized commercial strain used for meat production. This type of turkey breeds has a maximum feed to meat conversion rate. They consume less feed and convert the feeds to meat within a very short time. (*Turkey Farming Business Starting Plan For Beginners, 2021*).

Proper growth and production are ensured by feeding healthy and nutritious food. As a result, it is critical to provide the turkey with a well-balanced and healthy diet. To gain one kilogram of body weight, turkeys require approximately 3.25 kilograms of feed. However, must supplement the poultry feed with additional protein. Along with offering a well-balanced and nutritious diet, need to provide enough fresh and clean water to meet their needs.

Turkeys are also susceptible to a variety of fungal, bacterial, and viral illnesses. Fowl cholera, erysipelas, blue comb disease, coccidiosis, new castle disease, arizonosis, chronic respiratory disease, paratyphoid, turkey coryza, turkey venereal disease, and other diseases are harmful to turkeys. Birds can be kept healthy and disease-free with timely immunization and good care.

Intensive technologies of turkey meat production include the use of turkeys of high-yielding crosses, rearing of turkeys in poultry houses with regulated microclimate, complex mechanization and automation of basic technological processes, feeding poultry with complete dry feed, application of a set of veterinary and sanitary measures.

When using turkeys in Ukraine, which are imported from abroad during their keeping and feeding, the recommendations of poultry suppliers should be followed. So, in particular, in recommendations of the German company technological parameters concerning the maintenance of turkeys, and also norms of feeding both females, and males at their cultivation on meat are in detail covered (*Informatsiia pro vidhodivliu indychok, 2017*).

Turkeys are comfortable living in the weather conditions of Ukraine.

The private joint-stock company "Rivnyanske", located in the Kirovohrad region, annually grows more than seven hundred turkeys of the BIG-6 breed. Breeding turkeys for PJSC

"Rivnyanske" began as an "auxiliary direction" in agribusiness. Over the past three years, the farm has entered a normal profitable process: turkeys are artificially inseminated, eggs are laid in an incubator, young animals are sold, young turkeys are sold, and meat is sold. Time and experience have shown that the most profitable turkey farm can only be one that sells, above all, eggs for incubation and turkeys (Lutytska, 2016).

For the technological process of growing turkeys, it is necessary to take into account a number of requirements for the farm to function normally.

Here are some of them:

- to equip the premises with all necessary communications: electricity, ventilation, water supply, as well as to install heating elements;
- establish automatic water and feed to minimize staff;
- to provide cleaning of cages, it is necessary to maintain the maximum cleanliness;
- to equip a special area for bird walking;
- hire a veterinarian to monitor the condition of the birds and treat them if problems arise;
- choose quality food, do not use different additives to accelerate the growth of chicks.

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Тенденції виробництва м'яса індиків у світі та в Україні

Анотація. У статті на основі літературних джерел і статистичних даних охарактеризовано поживну цінність м'яса індиків, вивчено динаміку виробництва м'яса індиків у країнах світу, загалом у світі та в Україні, наведено інформацію щодо селекційних компаній з розведення індиків та сучасних кросів, охарактеризовано особливості утримання і годівлі індиків. Доведено, що індичатина рекомендується для лікувального та дієтичного харчування людини, оскільки добре перетравлюється і легко засвоюється в організмі. Якісні характеристики індичатини забезпечують їй конкурентоспроможність по відношенню до м'яса інших видів. М'ясо індиченят переважає м'ясо курчат-бройлерів за вмістом білка на 10,2%, заліза – у 3,3 рази, вітаміну PP – у 2,1 рази. Забійний вихід у індиченят найвищий серед усіх видів сільськогосподарської птиці – 75-78%, а вихід м'язів по відношенню до патраної тушки становить 64-67%. Упродовж 2015-2019 рр. рівень світового виробництва індичатини характеризується

Adherence to these basic rules will help to establish the normal operation of a small enterprise for breeding turkeys.

CONCLUSIONS AND FUTURE DIRECTIONS

The modern level of technology, systematization of knowledge on feeding, keeping, health of poultry will allow to develop industrial cultivation of turkeys as effective, profitable business in Ukraine. Growing turkeys in Ukraine still has a strong potential for development and capacity building. Demand for products is growing every year. Despite the fact that the solvency of our population is still low, today there are more and more consumers who are willing to pay for a quality product. Modern producers of turkey products largely depend on the economic processes taking place in the country. The high cost of feed, rising energy costs, veterinary drugs and genetic material, difficulties with product sales and production certification can significantly slow down or even stop business development. Damage from infectious and other diseases that occasionally occur on farms can be unpredictable. This area is one of the most attractive for investment in the Ukrainian meat market. ■

як нестабільний. У 2019 році м'яса індиків у світі було вироблено 5991771 тонн, що на 0,66% менше, ніж у 2018 р. В Україні упродовж 2016-2020 рр. спостерігається тенденція до збільшення виробництва м'яса індиків. У 2020 р. його виробництво становило 37,2 тис. тонн (у живій масі), що на 18,9% більше порівняно з 2019 роком.

В Україну традиційно завозять переважно кроси індиків під брендом компанії "British United Turkeys Ltd.", яка належить "Aviagen Turkeys". Єдиним вітчизняним кросом є "Харківський", індиків якого добре пристосовано до умов як інтенсивного утримання, так і напівінтенсивного й екстенсивного з використанням вигулів і пасовищ, характеризуються стійкістю проти хвороб. Виробництва м'яса індиків за інтенсивною технологією передбачає використання високопродуктивних кросів, утримання птиці у пташниках із регульованим мікрокліматом і комплексною механізацією та автоматизацією технологічних процесів, годівлю птиці повнораціонними сухими комбікормами.

Ключові слова: індиків, поживна цінність м'яса індиків, виробництво м'яса індиків, утримання, годівля, перспективи індиківництва в Україні

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Тенденции производства мяса индеек в мире и Украине

Аннотация. В статье на основе литературных источников и статистических данных охарактеризована питательная ценность мяса

индеек, изучена динамика производства мяса индеек в мире и Украине, приведена информация о селекционных компаниях по разведению индеек современных кроссов, охарактеризованы особенности содержания и кормления индеек. Доказано, что индюшати́на рекомендуется для лечебного и диетического питания человека, так как хорошо переваривается и легко усваивается в организме. Качественные характеристики индюшати́ны обеспечивают ей конкурентоспособность по отношению к мясу других видов. Мясо индюшат преобладает над мясом цыплят-бройлеров по содержанию белка на 10,2%, железа – в 3,3 раза, витамина РР – в 2,1 раза. Убойный выход у индюшат самый высокий среди всех видов сельскохозяйственной птицы – 75-78%, а выход мышц по отношению к потрошенной тушке составляет 64-67%. В течение 2015-2019 гг. уровень мирового производства индюшати́ны характеризуется как нестабильный. В 2019 году в мире было произведено 5991771 тонн мяса индеек, что на 0,66% меньше, чем в 2018 г. В Украине на протяжении 2016-2020 гг. наблюдается тенденция к увеличению производства мяса

индеек. В 2020 г. его производство составило 37,2 тыс. тонн (в живой массе), что на 18,9% больше по сравнению с 2019 годом. В Украину традиционно завозят преимущественно кроссы индюков под брендом компании "British United Turkeys Ltd.", принадлежащей "Aviagen Turkeys". Единственным отечественным кроссом является "Харьковский", индейки которого хорошо приспособлены к условиям как интенсивного содержания, так и полунтенсивного и экстенсивного с использованием выгулов и пастбищ, характеризуются устойчивостью против болезней. Производство мяса индеек при интенсивной технологии предполагает использование высокопродуктивных кроссов, содержание птицы в птичниках с регулируемым микроклиматом и комплексной механизацией, и автоматизацией технологических процессов, кормление птицы полнораціональными сухими комбикормами.

Ключевые слова: индейки, питательная ценность мяса индеек, производство мяса индеек, содержание, кормление, перспективы индейководства в Украине

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