



## Growth of organs of the digestive tube of Big-6 turkeys in the early stages of the postnatal period of ontogenesis

**Nadiia Dyshliuk\***

Doctor of Veterinary Sciences, Professor  
National University of Life and Environmental Sciences of Ukraine  
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine  
<https://orcid.org/0000-0003-4753-9356>

**Natalya Mazur**

Postgraduate Student  
National University of Life and Environmental Sciences of Ukraine  
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine  
<https://orcid.org/0009-0004-5747-4335>

**Abstract.** The Big-6 turkey breed is becoming widespread in Ukraine, as it is known for its high productivity and viability. To improve their housing and feeding technologies and methods of preventing and treating gastrointestinal diseases, knowledge of the structure and functions of the digestive system is required. In this regard, the purpose of this study consisted of investigating the growth of the digestive tract organs of turkeys in the age aspect. Modern complex morphological research methods were used: anatomical, organometric, and statistical, which established new data on the features of topography and macromorphometric characteristics of the oesophagus, stomach, and intestines of turkeys aged from 1 to 50 days. It has been proven that the oesophagus of turkeys is a thin tube, which is divided by the crop into a long cervical and a slightly shorter thoracic-abdominal part. The absolute weight of this organ increased from 1 to 50 days by 18 times, and its length – by 4.3 times. The crop is an extension of the oesophagus at the entrance to the thoracolumbar cavity. Its morphometric parameters during the entire study period of the bird increased by 4.1 times (length), 3.9 times (height), and 4.3 times (width). The stomach is a significant extension of the anterior intestine and is divided into glandular and muscular parts. The growth rates of the muscular part of the stomach are higher than that of the glandular one.

### **Suggested Citation:**

Dyshliuk, N., & Mazur, N. (2024). Growth of organs of the digestive tube of Big-6 turkeys in the early stages of the postnatal period of ontogenesis. *Ukrainian Journal of Veterinary Sciences*, 15(4), 45-62. doi: 10.31548/veterinary4.2024.45.

\*Corresponding author



The total absolute weight of the stomach of turkeys aged from 1 to 50 days increased by 13 times, and its individual parts – by 15.7 (glandular) and 12.7 (muscular) times. The absolute weight of the intestine for the entire study period of the bird increased by 8.7 times, and its total length – by 2.5 times. The results obtained on macroscopic indicators of the digestive tract organs of turkeys in the age aspect allow analysing changes in growth indicators, which is an important aspect in vaccination, prevention, and treatment of the digestive organs of poultry

**Keywords:** poultry; digestive apparatus; linear indicators; absolute weight; relative weight

## Introduction

Due to the significant development of grain farming in Ukraine as a leading industry in the agricultural sector, there is an intensive growth of industrial poultry farming and the market for these products. Poultry farming enterprises and poultry processing industry have significant efficiency, as in the domestic market they provide the population with valuable meat products and eggs, so they require constant attention and scientific basis for studying this branch of animal husbandry.

S. Yatsiv (2021) proved that one of the leading elements of intensive poultry farming is breeding work to create and improve high-performance breeds and crosses to produce hybrid birds for industrial farms. Among them, the Big-6 meat turkeys occupy a key position in terms of demand. This breed has excellent characteristics of precocity, endurance, vitality, rapid weight gain and size. The Big-6 turkey meat breed provides a record meat yield of about 80-85%. It was developed by British breeders and is used as a product in dietary nutrition. Turkey meat has high taste indicators, it is tender and juicy, with a low content of saturated fat compared to meat of other types of poultry. Despite the meat direction as the main focus of breeding, turkeys of this breed also show satisfactory results in egg production. Productive qualities also include plumage. Feathers and downs are highly flexible and lightweight, which makes them ideal for filling duvets, cushions, and outerwear.

Further development of poultry farming with the use of Big-6 turkeys dictates the need to improve the methods of their rational feeding, more efficient use of feed, maintenance and keeping, prevention and treatment of gastrointestinal diseases. For this purpose, according to Z. Ahmed & T. Khalaf (2023) and H. Ali *et al.* (2023), knowledge of the morphology and physiology of the digestive organs of poultry in the postnatal period of ontogenesis is required.

The digestive apparatus of birds, like mammals, includes the digestive tract and digestive glands (liver and pancreas). However, their distinctive feature, according to M. Maksoud *et al.* (2022) is the ability to fly, which has left its mark on the location and structure of internal organs, including the digestive system. In addition, as noted by A. Skowroński & A. Butkiewicz (2024) and N. Dyshliuk *et al.* (2024), the structure of the digestive apparatus of birds depends on lifestyle and nutrition (herbivorous, granivorous, insectivorous, piscivorous, omnivorous, pollenivorous). The features of the structure include the absence of teeth, lips, cheeks, and gums, the presence of a crop in the granivorous, or fusiform expansion of the oesophagus in waterfowl, and a high rate of food digestion, which is conditioned by the weak development of the oral cavity and a significant intensity of metabolic processes in the stomach and intestines. In the course of evolution, birds have developed a beak clothed in a horny

covering, which is a continuation of toothless jaws and is the beginning of the digestive apparatus. E. Setiyono *et al.* (2021) noted that depending on the feed used, it can have different shapes and sizes.

Despite significant achievements, the information on this issue that is available in scientific sources mainly concerns the most characteristic features of the structure of the digestive apparatus of birds without detailing them and considering species, breed, sex, and age characteristics. Ultimately, it is the age morphology that establishes critical periods of development of the body and individual organs, which must be considered when carrying out therapeutic and preventive measures. In this regard, studies of the growth and development of the digestive tube organs of Big-6 turkeys in the age aspect are relevant. Therefore, the purpose of the study was to establish the growth rates of the oesophagus, stomach, and intestines of Big-6 turkeys in the early stages of the postnatal period of ontogenesis.

### Literature Review

Poultry farming, as noted by T. Savchenko & T. Savanchuk (2022), is an important component of the food market in Ukraine, which has experienced increased quarantine restrictions due to the significant spread of COVID-19 and is unfortunately in a state of full-scale war. This branch of agricultural production, according to O. Dyachenko (2020), is the most precocious and cost-effective, which in a short period of time with low feed costs allows getting high-quality products and providing the population with food-grade eggs and meat. S. Yatsiv (2021) proved that these foods are the most complete and affordable sources of protein. The main tasks of this industry are the maintenance of poultry, its cultivation, compliance with all feeding and breeding standards. The increase in poultry productivity is influenced

by the structural and functional state of all organs, their systems and apparatuses. Among them, as noted by A. Skowroński *et al.* (2024), significant importance is given to the organs of the digestive system and their age morphology. Organometric studies of the digestive organs of poultry, according to researchers, allow analyzing changes in growth indicators in the process of their individual development.

A. Tybinka (2023) and I. Kolomak (2024) pointed out that in the postnatal period of bird ontogenesis, in its early stages, uneven growth of the digestive tube organs occurs, which is manifested by an increase in morphometric indicators of their length, width and thickness, shells and their layers. According to P. Pachauri *et al.* (2024), it occurs most intensively in geese, ducks, and broiler chickens in the first 14 days after hatching, whereas in older birds growth is slowing significantly.

O. Troyanchuk (2012) reported that the growth and development of the digestive tube organs of Black Moscow chickens occurs asynchronously, manifested by age-related and individual changes in structures. From the day-old poultry to 180 days of age, the absolute weight of the oesophagus increases unevenly by 26.2 times, and that of the crop – by 15.5 times. Whereas this indicator and linear indicators of the length, width of the glandular and muscular parts of the stomach and duodenum increase evenly during the development of chickens. The relative weight of the digestive tube organs decreases with age. L. Horalskyi & V. Gatskivskyi (2009) conducted organometric studies of the oesophagus of sexually mature chickens of the Adler Silver breed and Bronze turkeys. They found that the oesophagus of chickens, unlike turkeys, has a shorter length (1.25 times) and width (1.53 times). Y. Lykova & L. Kharchenko (2023) investigated morphometric parameters of the digestive system of certain wild bird species. Researchers have shown

that variations in the morphological features of the digestive organs of birds have a certain biological significance, as they reproduce the specificity of the species' response to environmental conditions related to the ecology of nutrition and digestive activity.

A. Skowroński *et al.* (2024) investigated oesophageal and gastric morphogenesis in hens of Chever 579 egg-bearing cross. They found that the most intensive development of the oesophagus, crop, and stomach of poultry is observed in the first stages of life, especially in the growth (30-69 days) and development period (70-119 days). Maximum absolute weight values ( $57.65 \pm 0.71$  g) and the length ( $97.13 \pm 1.27$  mm) of the stomach were established in poultry aged 240 and 180 days, respectively, and the oesophagus (absolute weight –  $18.30 \pm 0.66$  g, length –  $206.80 \pm 2.91$  mm) and crop (length –  $48.40 \pm 0.80$  mm) – at the age of 300 days. In older chickens, the growth of these organs does not change significantly. The researchers found

that the increase in the total intestinal length of broiler ducks of Brovarsky cross occurs unevenly from the day-old ( $61.73 \pm 2.89$  cm) to the 150-day age ( $297.98 \pm 4.24$  cm). In addition, the length of the small and large intestines changes differently and asynchronously. The length of the small intestine increases to 150-day age ( $236.50 \pm 3.86$  cm), and the large intestine – to 120-day age ( $63.28 \pm 1.21$  cm).

### Materials and Methods

The research was carried out in 2023-2024 at the educational, research, and production laboratory “Centre for Biomorphological Technologies” (Department of Histology) of the Department of Vertebrate Biomorphology named after Acad. V.G. Kasyanenko of the National University of Life and Environmental Sciences of Ukraine (Kyiv). Material for the studies was selected considering the age of 36 clinically healthy turkeys (females) of the Big-6 breed aged 1, 10, 20, 30, 40, and 50 days (Table 1).

**Table 1.** Dynamics of body weight and length in domestic turkeys,  $M \pm m$ ,  $n = 6$

Age group, day	Body weight, g	Body length, mm
1	$88.75 \pm 1.96$	$133.67 \pm 1.93$
10	$309.90 \pm 3.77$	$195.17 \pm 1.93$
20	$605.50 \pm 37.92$	$245.33 \pm 3.80$
30	$804.83 \pm 21.92$	$306.67 \pm 3.36$
40	$1,554.17 \pm 40.07$	$403.17 \pm 3.83$
50	$2,693.50 \pm 61.74$	$483.00 \pm 3.74$

**Note:** weight and body length of turkeys are presented in the age aspect

**Source:** developed by the authors

Scientific research was conducted in compliance with the requirements of the international principles of the “European Convention for the protection of vertebrates used in experiments and other scientific purposes” (European Convention, 1986) and the Law of Ukraine No. 3447-IV “On the protection of animals from ill-treatment” (2006). Anatomical and organometric research methods were used during

the study. The body weight of turkeys was determined using an electronic scale A-250R (Poland). Then an autopsy was performed and the organs of the digestive tract were dissected. During the preparation, the organs were separated from the surrounding tissues, the stomach and intestines were emptied of their contents. In the separated organs, the absolute weight of the oesophagus, glandular, and

muscular with the pyloric part of the stomach and intestines was determined using an electronic scale A-250R (Poland). Their relative weight (RW) was calculated by the equation (1):

$$RW = \frac{AW}{BW} \times 100\%, \quad (1)$$

where *AW* – absolute weight of the organ (g); *BW* – body weight of the turkey (g).

To establish linear measurements, morphometric research methods measured the length of the turkey's body, oesophagus, length, width, and height of the crop, parts of the stomach and intestines using a caliper and ruler. The relative weight of the oesophagus (relative to the body length of turkeys) was calculated by the equation (2):

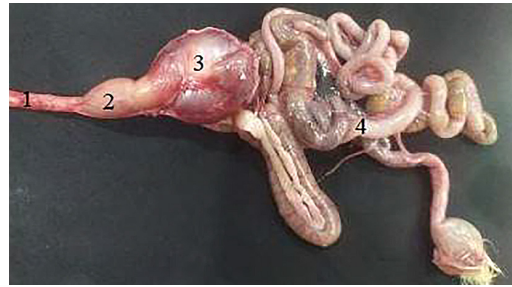
$$RW = \frac{TL}{BL} \cdot 100\%, \quad (2)$$

where *TL* – total length of the oesophagus (mm); *BL* – body length of the turkey (mm).

Digital data was processed using the statistical method on a personal computer using the Microsoft Excel software suite. The assessment of statistical reliability was determined by the Student's t-test at three probability levels  $P < 0.05$ ,  $P < 0.01$ , and  $P < 0.001$ . Individual native preparations of turkeys' digestive tube organs were photographed with a Nikon Coolpix S3100 camera (Nikon, Japan).

## Results and Discussion

Digestive apparatus of birds represents a long tube, which includes the digestive canal (Fig. 1). The latter includes the oesophagus, stomach, and intestines, which is consistent with the data by P. Pachauri *et al.* (2024). The digestive process occurs in the lumen of the digestive canal due to the action of digestive juices containing the necessary enzymes on the feed, followed by the absorption of nutrients into the blood and lymph.



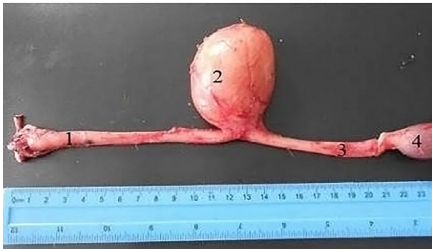
**Figure 1.** Organs of the digestive canal of a 20-day-old turkey

*Note:* native preparation: 1 – oesophagus, 2 – glandular and 3 – muscular parts of the stomach, 4 – intestines

*Source:* developed by the authors

### Topography and organometric parameters of the oesophagus

According to the results obtained, it was found that the oesophagus of turkeys is a continuation of the oropharynx and has the appearance of a long thin tube with almost the same diameter and easily stretched walls. The latter form 6-8 longitudinal folds, which are clearly visible in the mucous membrane and become more pronounced with increasing age of the bird. The folds improve the passage of feed, and due to the significant amount of elastic fibres in the oesophageal wall, this organ can expand significantly during the passage of feed and regain its previous length. The wall of the organ contains well-developed layers of the muscle membrane, the contraction of which pushes food into the stomach. L. Zakharchenko (2014) proved that some species of wild birds can fill it with food and not experience discomfort. T. Kataa & S. Ahmed (2022) found out that the oesophagus of birds is located on the front side of the neck and follows the caudal passage of the trachea, between bronchi, lungs, above the heart, and passes into the glandular part of the stomach. In the lower third of the neck of turkeys, there is a significant fusiform (sac-like) expansion – a crop with a thin wall (Fig. 2, Fig. 3).



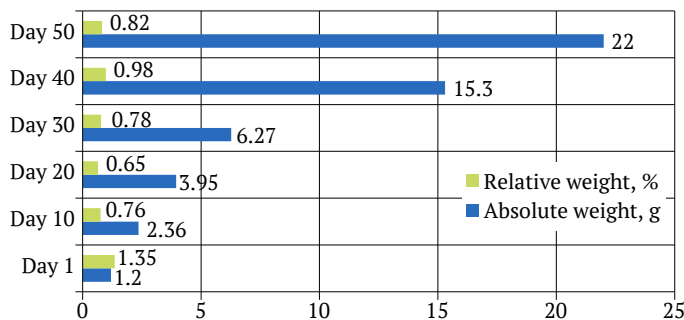
**Figure 2.** Oesophagus and crop of a turkey aged 40 days

**Note:** native preparation: 1 – cervical part of the oesophagus, 2 – crop, 3 – thoraco-abdominal part of the oesophagus, 4 – glandular part of the stomach  
**Source:** developed by the authors



**Figure 3.** Anatomical location of the oesophagus and crop of a turkey aged 50 days  
**Note:** native preparation: 1 – oesophagus, 2 – trachea, 3 – crop  
**Source:** developed by the authors

M. Mahdy & E. Mohammed (2024) noted that the pigeon’s crop represents a thin-walled outgrowth with two lateral diverticulae and contains transverse striated muscles that, when contracted, help to move food into the stomach. The oesophagus has a long cervical (cranial) part, which is located above the crop, and a relatively short thoracic-abdominal (caudal) part, which is located between the crop and the glandular stomach. The absolute weight of the oesophagus of turkeys is directly related to the increase in their body weight and age. This trend can be traced back to their 50-day age (Fig. 4). In general, during the studied period of bird life, the absolute weight of the oesophagus increases almost 18 times (by 1,733.33%). The increase in this indicator was uneven. Its most intense growth was recorded in turkeys aged 30 to 40 days (by 144.02%), and the least intense – from 40 to 50 days of age (by 43.79%,  $P < 0.001$ ). Such a pattern in the dynamics of the relative weight of this organ, which characterises the intensity of its growth, was not found. The largest relative weight of the oesophagus was recorded in 1-day-old turkeys, and the smallest – in 20-day-old turkeys. Morphometric (linear) indicators of the total length of the oesophagus increased with increasing age of the bird (Table 2).



**Figure 4.** Absolute and relative weight of the oesophagus in turkeys  
**Note:** age-related changes in the absolute and relative weight of the oesophagus of turkeys are presented  
**Source:** developed by the authors

**Table 2.** Linear parameters and relative oesophageal length in turkeys,  $M \pm m$ ,  $n = 6$ 

Age group, day	Total length of the oesophagus, mm	Relative length of the oesophagus, %	Length of parts of the oesophagus, mm	
			cranial (cervical)	caudal (thoraco-abdominal)
1	61.00 ± 1.49	45.71 ± 1.70	36.83 ± 1.81	24.7 ± 0.81
10	96.83 ± 1.06	49.63 ± 0.48*	58.50 ± 0.84	38.33 ± 0.81 <sup>2</sup> *
20	128.5 ± 1.77	52.42 ± 1.13	73.33 ± 1.25	55.17 ± 1.99
30	160.83 ± 1.21	52.48 ± 0.62 <sup>3</sup> *	90.83 ± 0.65	70.00 ± 0.56
40	215.17 ± 2.14	53.38 ± 0.47*	120.67 ± 2.18	94.50 ± 1.87*
50	263.00 ± 1.87	54.46 ± 0.42 <sup>3</sup> *	148.67 ± 1.56	114.33 ± 2.37

**Note:** \* $P < 0.05$ , compared to the corresponding indicator in the previous group

**Source:** developed by the authors

For 50 days of life of turkeys, the total length of this organ increased 4.3 times (by 331.15%) (Table 2). The increase in the length of the oesophagus was uneven. The absolute length increased most intensively in turkeys aged from 1 to 10 days (by 58.74%) and from 30 to 40 days (by 33.79%), and the least intensively – from 40 to 50 days (by 22.23%). With age, there was a wave-like increase in the relative length of the entire oesophagus (in relation to the body length of turkeys). The largest relative oesophageal length was recorded in 50 – day-old turkeys, and the smallest – in daily ones. The relative length of the oesophagus increased most intensively in turkeys aged from 1 to 10 days (by 8.57%), and the least intensively – from 20 to 30 days (by 0.11%,  $P < 0.001$ ).

The length of the cranial and caudal parts of the oesophagus in turkeys is not the same. In turkeys of all the studied ages, the length of the cranial part exceeded that of the caudal part. Thus, the highest value was determined at the 1-day and 10-day age of turkeys (increased by 1.5 times), and the lowest – at the 40-day age (increased by 1.3 times). The absolute length of both parts, and the total length of the entire oesophagus, increased with the age of turkeys. That is, for the entire study period of

life of turkeys, the absolute length of the cranial part of the oesophagus increased 4 times (by 314.96%), and the caudal part – almost 5 times (by 355.81%). The absolute length of both parts of the oesophagus increased asynchronously. The absolute length of the cranial and caudal parts of the oesophagus increased most intensively in turkeys aged from one to 10 days (by 58.84% and 55.18%,  $P < 0.01$ , respectively). The least intense increase in the absolute length of the cranial part of the oesophagus was observed in turkeys aged 20 to 30 days (by 23.86%) and from 40 to 50 days (by 23.20%), and the caudal part – from 40 to 50 days (20.98%).

L. Horalskyi & V. Gatskivskyi (2009) found that crop is characteristic of granivorous birds and is a reservoir of temporary stay of feed reserves – a pocket that accumulates and macerates. It performs the function of softening the feed and participates in regulation of digestive processes due to the slowdown in feed supply to the stomach. According to research, the volume of the crop of turkeys varies significantly, this is facilitated by the stretching of the wall, which, when significantly filled with feed masses, is translucent. It has anatomically well-defined walls: dorsal, lateral, and ventral. Food

from the crop, as the stomach is released, enters through the lower oesophagus to the glandular part of the stomach. Its morphometric

parameters are not the same in turkeys of the studied age groups. They increase with increasing age of the bird (Table 3).

**Table 3.** Linear indicators of turkey crop, mm, M ± m, n = 6

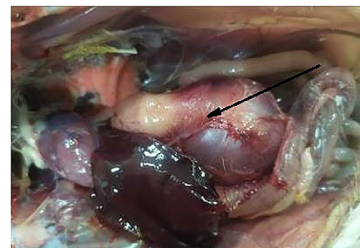
Age group, day	Length	Height	Width
1	12.33 ± 0.68	17.33 ± 0.44	15.16 ± 0.31
10	14.33 ± 0.37**	20.33 ± 0.37***	18.17 ± 0.65***
20	21.83 ± 0.68	38.17 ± 0.65	32.17 ± 0.65
30	28.33 ± 0.56	47.50 ± 0.84	38.16 ± 0.84***
40	39.33 ± 0.68	63.17 ± 0.84	51.67 ± 0.93
50	50.17 ± 0.68	67.17 ± 0.84***	65.33 ± 0.81

**Note:** \*\*P < 0.01; \*\*\*P < 0.001 compared to the corresponding indicator in the previous group

**Source:** developed by the authors

During the period from 1 to 50 days of life of turkeys, the length of the crop increased by 4.1 times (by 306.89%), height – by 3.9 (by 287.59%), and width – by 4.3 times (by 330.94%). The increase in the length, height, and width of the crop was uneven. The most intensive increase in the length, height, and width of the crop occurred in turkeys aged from 10 to 20 days (by 52.33%, 87.75%, and 77.05%, respectively). The least intense length of the crop increased in turkeys aged from one to 10 days (by 16.22%, P < 0.01), height – from 40 to 50 days (by 6.33%, P < 0.001), and width – from 1 to 10 days and from 20 to 30 days (respectively, by 19.85% and 18.62%, P < 0.001).

glandular (proventriculus) and muscular (ventriculus, gizzard), and almost undeveloped pyloric (Fig. 6).



**Figure 5.** Anatomical location of the stomach of a 30-day-old turkey

**Note:** native preparation, presented topographic features of the bird's stomach

**Source:** developed by the authors

### Anatomical location and organometric parameters of the stomach

The results of the study provided in this paper confirm the data of N. Dilmurodov *et al.* (2021), that the stomach of birds is a volumetric extension of the anterior intestine. It is located in the initial part of the thoracolumbar cavity between the oesophagus and duodenum (Fig. 5). In this organ, feed is accumulated and processed under the influence of gastric juice enzymes. Studies have shown that the stomach of turkeys has two well-developed parts (chambers):



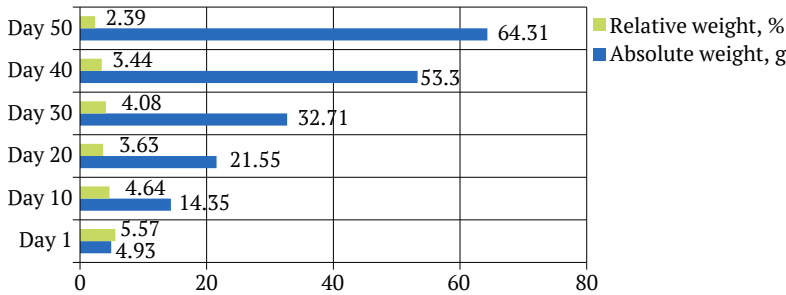
**Figure 6.** Stomach of a 40-day-old turkey

**Note:** native preparation: 1 – glandular part, 2 – muscular part

**Source:** developed by the authors

The latter is well expressed in individual birds of wild species. S. Al-Taai & M. Hasan (2020) proved that parts of the stomach have different shapes and structures. The glandular stomach has the form of an expanded tube in which the food is exposed to gastric juice, and the muscular stomach has a disc-shaped

form, in which it is mechanically ground. Such a combination of chemical and mechanical processing, according to Q. Shang *et al.* (2020), promotes maximum absorption of nutrients from the feed mass. According to the results of the study, the overall growth rates of the stomach change with increasing age of turkeys (Fig. 7).



**Figure 7.** General indicators of absolute and relative weight of the stomach in turkeys

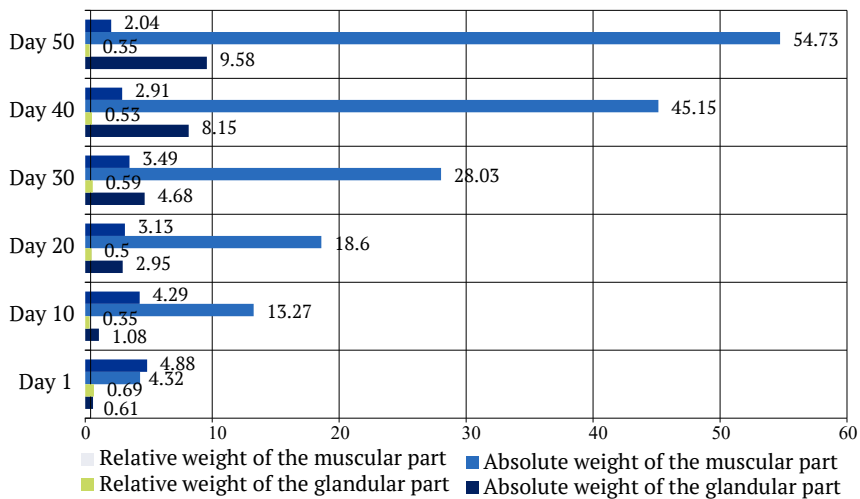
**Note:** age-related changes in absolute and relative weight of the stomach of turkeys are presented

**Source:** developed by the authors

The absolute weight of this organ increased unevenly from 1-day to 50-day age. During this period, the absolute weight of the stomach increased 13 times (by 1,199.39%). The absolute weight of turkeys increased most intensively at the age of 1 to 10 days (by 191.07%), and the least intensively – from 40 to 50 days (20.66%). The absolute weight of the stomach in turkeys aged from 10 to 20 days, from 20 to 30, and from 30 to 40 days increased, respectively, by 50.17%, 51.78%, and 62.95%.

With increasing age of turkeys, the total relative weight of the stomach changed. During the study period, the total relative weight of the stomach decreased with slight fluctuations from the daily age to the 50-day age. The decrease in the total relative weight of the stomach took place in waves. Most intensively, the total relative stomach weight of turkeys decreased from 10 to 20 days of age and from 40 to 50 days of age, respectively, by 21.77% and 30.52%. With less intensity, there was a decrease in the

relative weight of the stomach in turkeys aged from 1 to 10 days (by 16.70%) and from 30 to 40 days (by 15.69%). In turkeys of all the studied age categories, the growth of individual parts of the stomach (glandular and muscular) occurred with different intensity and changed with the age of the bird (Fig. 8). The growth rates of the muscular part of the stomach are higher than that of the glandular one. The absolute weight of the glandular part of the stomach increased unevenly from the daily to 50-day age of turkeys, that is, by 15.7 times (Fig. 8). The absolute weight of the glandular part of the stomach increased most intensively in turkeys from 10 to 20 days of age – by 173.15%, and the least intensively – from 40 to 50 days (by 17.55%). An increase or decrease in the relative weight of the glandular part of the stomach has not been established. Moreover, the largest value was observed at the 1-day age ( $0.69 \pm 0.02\%$ ), and the smallest – at the 10-day and 50-day age, respectively, at  $0.35 \pm 0.02\%$  and  $0.35 \pm 0.01\%$ .



**Figure 8.** Indicators of absolute (g) and relative (%) weight of individual parts of the stomach in turkeys

**Note:** age-related changes in the absolute and relative weight of the glandular and muscular parts of the stomach of turkeys are presented

**Source:** developed by the authors

The increase in the absolute weight of the muscular part of the stomach of turkeys occurred unevenly from the 1-day to 50-day age. In general, the absolute weight of the muscular part of the stomach increased by 12.7 times, and the most intense increase was observed in turkeys aged from 1 to 10 days (by 207.18%). In turkeys aged 40 to 50 days, the absolute weight of the stomach increased by 21.22%. In turkeys aged from 10 to 20 days, from 20 to 30 and from 30 to 40 days, it increased with average intensity (by 40.17%, 50.70%, and 61.07%). The relative weight of the muscular part of the stomach decreased in waves from 1-day to 50-day age, and most intensively decreased in turkeys aged from 10 to 20 days – by 27.04% and from 40 to 50 days – by 29.89%, and least intensively decreased (by 12.09%) – from 1-day to 10-day age.

#### Features of topography and linear indicators of the glandular part of the stomach

Topographically, the glandular part of the stomach of turkeys is an extension of the oesophagus

and has the shape of a tube with narrowed ends and an expanded middle area. Its anterior end is located between the thoracic air sacs, and its other parts lie between the hepatic lobes. The posterior end of the glandular part of the stomach is the intermediate zone, or isthmus, which connects to the muscular part. The left surface is adjacent to the caecum, and the right surface is adjacent to the spleen and ileum. On the inner surface of the glandular part of the stomach, small longitudinal folds formed by the mucous membrane with a small amount of mucus with admixtures of feed residues are clearly visible. P. Pachauri *et al.* (2024) found that the mucous membrane forms cone-shaped elevations – papillae, on the tops of which, according to data, the excretory ducts of the gastric glands open. The current study showed that with increasing age of turkeys, linear indicators of the length, greatest width and height of the glandular part of the stomach increased, respectively, by 2.4 times, 2.7, and 2.8 times (Table 4).

**Table 4.** Linear indicators of the glandular part of the stomach of turkeys, mm, M ± m, n = 6

Age groups, day	Length	Width	Height
1	16.08 ± 0.23	8.87 ± 0.37	7.93 ± 0.26
10	20.43 ± 0.88***	9.17 ± 0.31*	8.88 ± 0.87
20	25.97 ± 0.65***	11.15 ± 0.64**	10.87 ± 0.47*
30	26.42 ± 0.35*	16.17 ± 0.68***	15.92 ± 0.90***
40	34.10 ± 0.41	20.67 ± 0.56***	17.83 ± 0.68*
50	38.72 ± 0.46	24.00 ± 0.75***	22.17 ± 0.31***

**Note:** \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$  compared to the indicator in the previous group

**Source:** developed by the authors

The length of the glandular part of the stomach of turkeys increased most intensively by 29.07% at the age of 30 to 40 days, and the width and height, respectively, by 45.02% and 46.46% ( $P < 0.001$ ) – from 20 to 30 days. The least intense length of the glandular part of the stomach increased in turkeys aged from 20 to 30 days (by 1.73%,  $P < 0.05$ ), and width and height, respectively, by 3.38% and 11.98% ( $P < 0.05$ ) – from 1 to 10 days.

#### Features of topography and linear indicators of the muscular part of the stomach

In turkeys, the muscular part of the stomach is

well developed and located slightly to the left of the liver, accommodates the entrance and exit openings. The entrance opening is located on the side of the glandular part of the stomach, and the exit is located on the side of the duodenum. The muscular part of the stomach is disc-shaped and has thick walls, as reported by S. Al-Taai & M. Hasan (2020) who studied it in birds of other species. It is based on the main and intermediate muscles, which are formed by smooth muscle tissue. In the current study, linear indicators of the length, greatest width, and height of the muscular part of the stomach of turkeys increased from daily to 50 days of age (Table 5).

**Table 5.** Linear indicators of the muscular part of the stomach of turkeys, mm, M ± m, n = 6

Age group, day	Length	Width	Height
1	28.32 ± 0.98	22.77 ± 0.43	14.18 ± 0.31
10	32.83 ± 0.87***	29.50 ± 0.28	24.33 ± 0.75
20	49.32 ± 0.80*	31.25 ± 0.51**	26.33 ± 0.56*
30	51.67 ± 0.81	35.83 ± 0.87***	28.67 ± 0.56**
40	61.17 ± 0.99	48.50 ± 0.47	32.17 ± 0.68***
50	70.33 ± 0.75	55.00 ± 0.37	37.83 ± 0.31

**Note:** \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$  compared to the indicator in the previous group

**Source:** developed by the authors

The length and greatest width of the muscular part of the stomach of turkeys increased by 2.4 and 2.7 times, respectively. With maximum intensity, the length increased in turkeys aged from 10 to 20 days (by 50.23%,  $P < 0.05$ ), and the greatest width – from 30 to 40 days

(by 35.36%) and the greatest height – from 1 to 10 days (by 71.58%). With the lowest intensity, linear indicators increased from 20 to 30 days (by 4.76% length) and from 10 to 20 days (by 5.93%,  $p < 0.01$  and 8.22%,  $P < 0.05$ ), respectively, width and height.

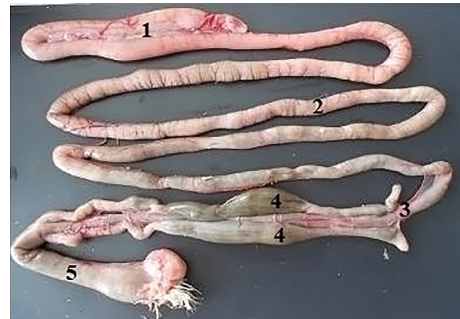
**Topography and organometric parameters of the intestine**

The results of the study confirmed the data of D. Makhotina *et al.* (2020), who proved that the intestines of birds are differentiated into divisions of the intestine, which differs in the nature of the relief and features of the structure of the mucous membrane. There are small and large divisions in the intestines. The small part consists of the duodenum, jejunum, and ileum, and the large part consists of the caecum and the rectum, which ends in the cloaca (Fig. 9, Fig. 10). In the small intestine, due to a well-developed villous apparatus and crypts, nutrients are absorbed, and in the large intestine,

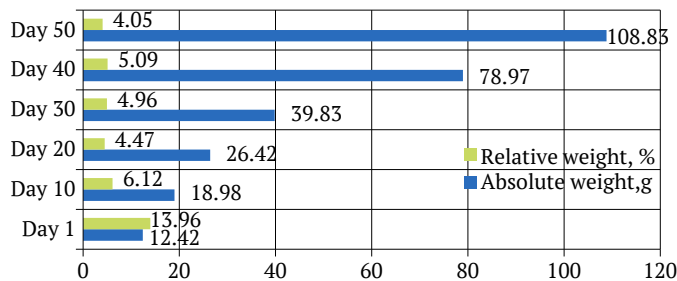
indigestible residues are formed, which are excreted through the cloaca into the external environment. The absolute, relative weight and linear parameters of the intestines of birds depend on their species and breed characteristics. M. Kushch *et al.* (2018) proved that the absolute intestinal weight of black white-breasted ducks aged from one to 365 days increases by 114.7 times, and its length – by 4.3 times. The maximum absolute weight of the intestine is acquired at the age of one year, relative weight – at 21-day age, length – at 180-day age. According to the current study, the absolute intestinal weight of turkeys aged from one to 50 days increased by 8.7 times, or by 776.25% (Fig. 11).



**Figure 9.** Intestines of a 1-day-old turkey  
*Note:* native preparation: 1 – duodenum with pancreas, 2 – jejunum, 3 – ileum, 4 – caecum, 5 – rectum with cloaca  
*Source:* developed by the authors



**Figure 10.** Intestines of a 40-day-old turkey  
*Note:* native preparation: 1 – duodenum with pancreas, 2 – jejunum, 3 – ileum, 4 – caecum, 5 – rectum with cloaca  
*Source:* developed by the authors



**Figure 11.** Indicators of absolute and relative weight of the intestines in turkeys  
*Note:* age-related changes in the absolute and relative weight of the intestines of turkeys are presented  
*Source:* developed by the authors

The increase in the absolute weight of the intestines of turkeys occurred unevenly. The absolute weight of the intestines of turkeys increased most intensively from 30 to 40 days (by 98.27%), and the least intensively – from 40 to 50 days (by 37.99%). With increasing age of

turkeys, the total relative weight of the intestine changed in waves from 1-day to 50-day age and was most recorded in 1-day-old turkeys, and the smallest – in 50-day-old turkeys. The indicator of total intestinal length changed with the age of turkeys (Table 6).

**Table 6.** Linear indicators of the total length of the intestines of turkeys and its divisions, cm,  $M \pm m$ ,  $n = 6$

Age group, day	Total intestine length	Section length	
		Small intestine	Large intestine
1	75.83 ± 1.77	58.83 ± 0.84	17.00 ± 0.93
10	88.83 ± 1.21***	67.33 ± 0.87	21.50 ± 1.12
20	113.17 ± 2.55	88.50 ± 2.24	24.67 ± 0.68
30	131.00 ± 1.49***	101.83 ± 1.59	29.16 ± 0.49***
40	163.50 ± 2.62	127.50 ± 2.89	36.00 ± 0.75
50	196.66 ± 2.62	148.33 ± 1.99	48.33 ± 1.12

**Note:** \*\*\* $P < 0.001$  compared to the indicator in the previous group

**Source:** developed by the authors

During the study period, birds aged from 1 to 50 days increased the total intestinal length by 2.5 times (by 159.34%). It increased most intensively in turkeys aged from 10 to 20 and from 30 to 40 days (by 27.40% and 24.81%, respectively), and least intensively from 20 to 30 days of age (by 15.76%,  $P < 0.001$ ). The length of the small and large intestines varies. In turkeys of all the studied ages, the length of the small intestine exceeded that of the large one by more than 3 times. In turkeys aged 20 days, the length of the small intestine increased by 3.59 times, and at the age of 50 days – by 3.1 times. During the entire study period, the length of both

parts of the turkey intestine increased – by 2.5 (small) and 2.8 (large) times. The length of the small and large intestines varied unevenly. The most intense increase in the length of the small intestine was recorded in turkeys aged from 10 to 20 days (by 31.44%), and the large one – from 40 to 50 days (by 32.86%). At the same time, in turkeys from daily to 10-day age, the length of the small intestine increased by 14.45%, and in turkeys from 10 to 20-day age – by 14.74%. In the small intestine, segments (intestines) have different lengths. The longest intestine is the jejunum, the duodenum is much shorter, and the ileum is the shortest (Table 7).

**Table 7.** Linear indicators of the length of the small intestine in turkeys, cm,  $M \pm m$ ,  $n = 6$

Age group, day	Part of the small intestine		
	Duodenum	Jejunum	Ileum
1	8.66 ± 0.74	44.50 ± 0.47	5.67 ± 0.44
10	10.67 ± 0.75*	48.33 ± 0.93**	8.33 ± 0.75**
20	16.67 ± 0.74***	57.66 ± 1.87***	14.17 ± 0.84***

Table 7. Continued

Age group, day	Part of the small intestine		
	Duodenum	Jejunum	Ileum
30	20.33 ± 0.99**	65.33 ± 0.99**	16.17 ± 0.65*
40	29.00 ± 1.31***	76.00 ± 1.30	22.5 ± 0.65
50	36.00 ± 1.12**	84.33 ± 2.05**	28.00 ± 0.74***

Note: \*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001 compared to the corresponding indicator in the previous group

Source: developed by the authors

A. Skowroński *et al.* (2024) indicated a similar length of intestines in this part of the intestine. The length of the intestines of the small intestine increases unevenly and in waves with the increasing age of turkeys. Thus, the length of the duodenum increased 4.2 times (by 315.70%), the jejunum – 1.9 times (by 89.51%), and the ileum – 4.9 times (by 393.83%). The most intense increase in the length of the small intestine was

recorded in turkeys aged 10 to 20 days (duodenum by 56.23%, jejunum by 19.30%, and ileum by 70.1%, P < 0.001). The least intense length of the duodenum increased in turkeys aged 20 to 30 days (by 21.95%, P < 0.01), jejunum – from one to 10 days (by 8.61%, P < 0.01), and ileum – from 20 to 30 days (by 14.11%, P < 0.05). The length of the components of the colon (caecum and rectum) varied unevenly (Table 8).

Table 8. Linear indicators of the length of the intestines of the large intestine in turkeys, cm, M ± m, n = 6

Age group, day	Part (intestines)		
	Caecum		Rectum (with cloaca)
	right	left	
1	5.50 ± 0.37	6.17 ± 0.15	5.33 ± 0.62
10	7.17 ± 0.34**	8.16 ± 0.47**	6.17 ± 0.68
20	8.50 ± 0.37*	9.17 ± 0.34	7.00 ± 0.19
30	10.33 ± 0.37**	11.00 ± 0.37**	7.83 ± 0.46
40	12.84 ± 0.31***	13.83 ± 0.31***	9.33 ± 0.25**
50	17.33 ± 0.75***	18.33 ± 0.44	12.67 ± 0.25

Note: \*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001 compared to the corresponding indicator in the previous group

Source: developed by the authors

The described results of the study are consistent with the data of M. Kushch *et al.* (2018) that the caecum of birds is located at the junction of the small and large intestines, that is, the ileum and rectum. A. Hunt *et al.* (2019) noted that their size depends on the method of foraging, while in faunivorous species they are shorter, and in herbivores they are longer. In turkeys of all the studied ages, the length of

the left caecum is slightly longer than the right, and the rectum (with cloaca) has the smallest length. The length of parts of the large intestine increased from 1 to 50 days of age. Thus, the length of the right caecum of turkeys increased by 3.2 times (by 215.09%), the left caecum – by 2.9 times (188.97%), and the rectum – by 2.4 times (by 137.71%). The length of the caecum and rectum increased unevenly. The most

intense increase was recorded in turkeys aged 40 to 50 days: the right caecum – by 34.97% ( $P < 0.001$ ), the left caecum – by 32.53%, and the rectum – by 35.80%. The least intense increase in the length of the caecum was observed in turkeys from 10 to 20 days of age (right caecum – by 18.55%,  $P < 0.05$ , left caecum – by 12.38%), and rectum – from one to 10 days, from 10 to 20 days and from 20 to 30 days (respectively, by 15.76%, 13.45% and 11.86%).

The presented results of a study of the growth of the oesophagus, stomach, and intestines in turkeys in the early stages of the postnatal period of ontogenesis are consistent with the data of K. Kadhim *et al.* (2010), who noted different intensity and asynchrony of increasing the organometric parameters of these organs in the age aspect of the bird. The most intensive development of the digestive canal organs of poultry was observed in the first stages of life aged from 1 to 50 days. The findings of a number of researchers, in particular A. Skowroński *et al.* (2024), regarding their maximum values in birds of different species are debatable and require further study.

Thus, the paper describes the anatomical location and results of determining organometric indicators of the growth of the oesophagus, stomach, small and large intestines in turkeys of the Big-6 breed in the early stages of the postnatal period of ontogenesis (up to 50 days of age). The data obtained helped to determine the critical periods of development of both the whole organism and individual organs, which is important to consider when carrying out treatment and preventive measures in turkey breeding.

### Conclusions

In Big-6 turkeys aged from 1 to 50 days, the growth rates of the oesophagus, stomach, and intestines increase with varying intensity with increasing age of the bird. During this period, the absolute weight of the oesophagus

increased 18 times (by 1,733.33%), the stomach – 13 times (by 1,199.39%) and the intestines – 8.7 times (by 776.25%). A natural change in the relative weight of the oesophagus has not been established. This indicator was highest in the day-old bird ( $1.35\% \pm 0.05\%$ ), and the lowest – at the age of 20 days ( $0.65\% \pm 0.04\%$ ). Instead, the relative weight of the stomach and intestines decreased with increasing age of turkeys from the day-old ( $5.57 \pm 0.36\%$  – stomach and  $13.96 \pm 0.44\%$  – intestines) up to 50 days of age ( $2.39 \pm 0.07\%$  – stomach and  $4.05 \pm 0.08\%$  – intestines). Linear parameters of the oesophagus, stomach, and intestines increased with age. For 50 days of life of turkeys, the total length of the oesophagus increased 4.3 times (by 331.15%), its individual parts – 4 times (by 314.96% – cranial) and 5 times (by 355.81% – caudal). Linear indicators of the length (4.1 times, or 306.89%), height (3.9 times, or 287.59%) and width (4.3 times, or 330.94%) of the crop, which is an extension of the oesophagus, also increased. During the entire study period, the length, greatest width and height of individual parts of the stomach increased (glandular, 2.4, 2.7 and 2.8 times, respectively, and muscular, 2.4, 2.4, and 2.7 times, respectively). With increasing age of turkeys, the length of the small (2.5 times) and large (2.8 times) parts of the intestine increased. The length of individual parts of the small intestine increased 4.2 times (duodenum), 1.9 times (jejunum) and 4.9 times (ileum). Parts of the colon increased in a wave-like manner by 3.2 times (right caecum), 2.9 times (left caecum) and 2.4 times (rectum). Further research will focus on the growth rates of the oesophagus, stomach, and intestines of turkeys older than 50 days.

### Acknowledgements

None.

### Conflict of Interest

None.

## References

- [1] Ahmed, Z.R., & Khalaf, T.K. (2023). Morphological study of the small intestine in the geese (*Anser anser*). *University of Thi-Qar Journal of Agricultural Research*, 12(2), 109-119. doi: [10.54174/utjagr.v12i2.269](https://doi.org/10.54174/utjagr.v12i2.269).
- [2] Ali, H.M., Ali, K.A., & Taha, A.M. (2023). [Comparative anatomical, historical, and electron microscopic studies on the cervical region of the esophagus in some birds with different diet habits](#). *Journal of Advanced Veterinary Research*, 13(2), 181-187.
- [3] Al-Taai, S.A.H., & Hasan, M.S. (2020). [Histomorphological study of proventricular and gizzard in adult Starling bird \(\*Sturnus Vulgaris\*\)](#). *Plant Archives*, 20(1), 1671-1678.
- [4] Dilmurodov, N.B., Yakhshieva, S.K., & Rakhmanova, G.S. (2021). Probiotics influence on the glandular stomach of broiler chickens in postnatal morphogenesis. *Academia: An International Multidisciplinary Research Journal*, 11(2), 1656-1660. doi: [10.5958/2249-7137.2021.00564.4](https://doi.org/10.5958/2249-7137.2021.00564.4).
- [5] Dyachenko, O.V. (2020). Prospects for improving the competitiveness of poultry enterprises in the egg sector. *Economics Finances Law*, 7, 18-22. doi: [10.37634/efp.2020.7.4](https://doi.org/10.37634/efp.2020.7.4).
- [6] Dyshliuk, N., Huralaska, S., Kot, T., Mazurkevych, T., Stehnei, Zh., & Usenko, S. (2024). Morphology of the gastrointestinal tract and its lymphoid tissue in the common blackbird (*Turdus merula*). *Acta Fytotechnica et Zootechnica*, 27(1), 35-45. doi: [10.15414/afz.2024.27.01.35-45](https://doi.org/10.15414/afz.2024.27.01.35-45).
- [7] European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes (1986, March). Retrieved from <https://rm.coe.int/168007a67b>.
- [8] Horalskyi, L.P., & Gatskivskyi, V.V. (2009). Histomorphology of the esophagus of poultry. *Scientific Bulletin of the Lviv National Stepan Gzhytsky University of Veterinary Medicine and Biotechnology*, 11, 2(41), 72-77.
- [9] Hunt, A., Al-Nakkash, L., Lee, A.H., & Smith, H.F. (2019). Phylogeny and herbivore are related to avian cecal size. *Scientific Reports*, 9(1), article number 4243. doi: [10.1038/s41598-019-40822-0](https://doi.org/10.1038/s41598-019-40822-0).
- [10] Kataa, T., & Ahmed, S.M. (2022). [Anatomical and histological study of esophagus in small geese \(\*Anseer anseer\*\)](#). *Journal of Medicinal Plants Studies*, 10(4), 226-229.
- [11] Kadhim, K.K., Zuki, A.B.Z., Noordin, M.M., Babjee, S.A., & Khamas, W. (2010). Growth evaluation of selected digestive organs from day one to four months post-hatch in two breeds of chicken known to differ greatly in growth rate. *Journal of Animal and Veterinary Advances*, 6, 995-1004. doi: [10.3923/javaa.2010.995.1004](https://doi.org/10.3923/javaa.2010.995.1004).
- [12] Kharchenko, L.P. (2014). Macroscopic structure of the stomach of birds of different trophic specializations. *Biology and Valeology*, 16, 62-70.
- [13] Kolomak, I.O. (2024). Morphological features of the feral pigeon's (*Columba livia f. urbana*) digestive system. *Journal for Veterinary Medicine, Biotechnology and Biosafety*, 10(1), 7-13. doi: [10.36016/JVMBBS-2024-10-1-2](https://doi.org/10.36016/JVMBBS-2024-10-1-2).
- [14] Kushch, M.M., Byrka, O.V., Byrka, V.S., & Makhotina, D.S. (2018). Indicators of body weight and intestinal growth of ducks. *Veterinary Medicine, Livestock Technology and Nature Management*, 1, 119-122.
- [15] Law of Ukraine No. 3447-IV "On the Protection of Animals from Cruelty". (2006, February). Retrieved from <https://zakon.rada.gov.ua/laws/show/3447-15#Text>.
- [16] Lykova, Y., & Kharchenko, L.P. (2023). Assessment of mitotic activity in the crypts of the small intestinal epithelium of *Calidris alpina* (Linnaeus, 1758). *Biodiversity, Ecology and Experimental Biology*, 25(1), 8-14. doi: [10.34142/2708-5848.2023.25.1.01](https://doi.org/10.34142/2708-5848.2023.25.1.01).

- [17] Mahdy, M.A.A., & Mohammed, E.S.I. (2024). Anatomical, histological, and scanning electron microscopic features of the esophagus and crop in young and adult domestic pigeons (*Columba livia Domestica*). *BMC Veterinary Research*, 20(1), article number 428. doi: [10.1186/s12917-024-04147-z](https://doi.org/10.1186/s12917-024-04147-z).
- [18] Makhotina, D., Kushch, M., & Bondarenko, O. (2020). Microscopic structure of the rectum of the domestic duck. *Scientific Messenger of LNU of Veterinary Medicine and Biotechnologies. Series: Veterinary Sciences*, 22(100), 41-49. doi: [10.32718/nvlvet10008](https://doi.org/10.32718/nvlvet10008).
- [19] Maksoud, M.K.A., Ibrahim, A.A., Nabil, T.M., & Moawad, U.K. (2022). Histomorphological, histochemical and scanning electron microscopic investigation of the proventriculus (*Ventriculus glandularis*) of the hooded crow (*Corvus cornix*). *Anatomia, Histologia, Embryology*, 51(3), 380-389. doi: [10.1111/ahc.12798](https://doi.org/10.1111/ahc.12798).
- [20] Pachauri, R., Rupam, S., Archana, P., Prakash, S.S., Abhinov, V., & Farooqui, M.M. (2024). Anatomical variation in the gastrointestinal tract of birds: A morphological study. *Journal of Experimental Zoology India*, 27(2), article number 1649. doi: [10.51470/jez.2024.27.2.1649](https://doi.org/10.51470/jez.2024.27.2.1649).
- [21] Shang, Q., Wu, D., Liu, H., Mahfuz, S., & Piao, X. (2020). The impact of wheat bran on the morphology and physiology of the gastrointestinal tract in broiler chickens. *Animals*, 10(10), article number 1831. doi: [10.3390/ani10101831](https://doi.org/10.3390/ani10101831).
- [22] Savchenko, T., & Savanchuk, T. (2022). Current status and trends of poultry production in the regions of Ukraine. *Economy and Society*, 46. doi: [10.32782/2524-0072/2022-46-40](https://doi.org/10.32782/2524-0072/2022-46-40).
- [23] Setiyono, E., Raharjo, A.P., & Haryanto, T. (2021). Gastrointestinal development of male and female domestic canary (*Serinus canaria*) in the starter and grower periods. *IOP Conference Series: Earth and Environmental Science*, 788, article number 012088. doi: [10.1088/1755-1315/788/1/012088](https://doi.org/10.1088/1755-1315/788/1/012088).
- [24] Skowroński, A., & Butkiewicz, A.F. (2024). Macroscopic structure of the intestines of the common pheasant (*Phasianus colchicus*). *Medical Journal of Cell Biology*, 12(3), 117-124. doi: [10.2478/acb-2024-0017](https://doi.org/10.2478/acb-2024-0017).
- [25] Skowroński, A., Butkiewicz, A.F., Frąckowiak, H., & Zdun, M. (2024). The arterial vascularization of the gastrointestinal tract of the Common pheasant (*Phasianus colchicus*). *Animal Science & Genetics*, 20(2), 27-39. doi: [10.5604/01.3001.0054.6424](https://doi.org/10.5604/01.3001.0054.6424).
- [26] Troyanchuk, O.V. (2012). Growth indicators of the esophagus, crop and stomach of chickens in the postnatal period of ontogenesis. *Bulletin of the Zhytomyr National Agroecological University*, 1(32), 393-397.
- [27] Tybinka, A.M. (2023). Morphometric features of the chickens intestinal mucosa. In *Achievements and research prospects in animal husbandry and veterinary medicine: Scientific monograph* (pp. 165-189). Riga: Baltija Publishing. doi: [10.30525/978-9934-26-316-3-9](https://doi.org/10.30525/978-9934-26-316-3-9).
- [28] Yatsiv, S.F. (2021). State and prospects of development of poultry farming in agricultural enterprises of Ukraine. *Agrosvit*, 16, 26-33. doi: [10.32702/2306&6792.2021.16.26](https://doi.org/10.32702/2306&6792.2021.16.26).

## **Ріст органів травного каналу індиків породи Біг-6 на ранніх етапах постнатального періоду онтогенезу**

**Надія Дишлюк**

Доктор ветеринарних наук, професор  
Національний університет біоресурсів і природокористування України  
03041, вул. Героїв Оборони, 15, м. Київ, Україна  
<https://orcid.org/0000-0003-4753-9356>

**Наталія Мазур**

Аспірант  
Національний університет біоресурсів і природокористування України  
03041, вул. Героїв Оборони, 15, м. Київ, Україна  
<https://orcid.org/0009-0004-5747-4335>

**Анотація.** Вирощування індиків породи Біг-6 набуває широкого поширення в Україні, оскільки вони відзначаються високою продуктивністю та життєздатністю. Для покращення технологій їх утримання, годівлі та методів профілактики і лікування захворювань шлунково-кишкового тракту необхідні знання щодо особливостей будови та функцій органів апарату травлення. У зв'язку з цим, мета дослідження полягала у вивченні росту органів травного каналу індиків у віковому аспекті. Для роботи використовували сучасні комплексні морфологічні методи досліджень: анатомічні, органометричні та статистичні, завдяки яким встановлено нові дані щодо особливостей топографії та макроморфометричної характеристики стравоходу, шлунку й кишечнику індиків віком від однієї до 50 діб. Доведено, що стравохід індиків має вигляд тонкої трубки, яка волом поділена на довгу шийну та дещо коротшу грудо-черевну частини. Абсолютна маса цього органу збільшувалась від однієї до 50 діб у 18 разів, а його довжина – у 4,3 раза. Воло є розширенням стравоходу при вході у грудо-черевну порожнину. Його морфометричні показники впродовж всього досліджуваного періоду птиці зростали у 4,1 раза (довжина), у 3,9 раза (висота) і 4,3 раза (ширина). Шлунок є значним розширенням передньої кишки і поділений на залозисту та м'язову частини. При цьому показники росту м'язової частини шлунку більші, ніж залозистої. Загальний показник абсолютної маси шлунку індиків віком від однієї до 50 діб зріс у 13 разів, а його окремих частин – у 15,7 (залозистої) і 12,7 (м'язової) раза. Абсолютна маса кишечника за весь досліджуваний період птиці збільшилась у 8,7 раза, а його загальна довжина – у 2,5 раза. Отримані результати щодо макроскопічних показників органів травного каналу індиків у віковому аспекті дають можливість проаналізувати зміни показників росту, що є важливим аспектом при проведенні вакцинації, профілактики та лікування органів травлення птиці

**Ключові слова:** птиця; апарат травлення; лінійні показники; абсолютна маса; відносна маса