

ORIGINAL ARTICLE

Biometric and Morphometric Characteristics of Turkey Testes in Bangladesh

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Abstract

Background: This study aimed to conduct a macro-morphometric evaluation of the primary reproductive organs, specifically the testes, in Turkey tom.

Methods: Twelve healthy, mature birds, with weights ranging from 5.450±0.12 kg to 7.570±0.51 kg, and ages between 28 weeks and 48 weeks, were sourced from the SMA Organic Agro Farm in Belgari and surrounding turkey farms in the Sherpur upazilla of Bogura district. Testicular measurements were performed along with their macroscopic description.

Results: The testes were found on the sides of the body's midline, underneath the kidneys, and at the back of the lungs. At 28 weeks of age, the turkey tom's testes were measured. The left testis had a length of 3.74±2.38 cm, width of 2.08±2.63 cm, thickness of 1.87±5.93 cm, and weighed 9.50±12.01 gm, while the right testis measured 3.55±4.50 cm in length, 1.95±2.48 cm in width, 1.58±1.99 cm in thickness, and weighed 7.83±9.91 gm. The average live body weight at this stage was 5.670±7.17 kg. At 48 weeks old, the turkey tom weighed around 7.800±9.86 kg. The left testis measured about 4.15±5.26 cm in length, 2.40±9.29 cm in width, 1.92±5.92 cm in thickness, and weighed approximately 10.50±13.28 gm. On the other hand, the right testis was around 3.57±4.51 cm long, 2.04±2.58 cm wide, 1.72±2.18 cm thick, and weighed about 9.33±11.80 gm.

Conclusions: our study shows that as the Turkey tom grows up, its testes change in size and weight. We noticed that the left testis is consistently bigger and heavier than the right one. This suggests that the left testis gets larger as the turkey tom gets older. The reason for such differences could be explored in future research.

Key words: Reproductive organ, Turkey tom, age, live weight

Introduction

Poultry rearing has gained popularity in recent years in Bangladesh, particularly turkey farming. Turkeys are favored due to their size, ease of handling, rapid growth rate, adaptability, disease resistance, low mortality, cost-effective feeding, and high market value (Asaduzzaman *et al.*, 2017). This emerging livestock subsector significantly contributes to Bangladesh's economic growth.

Turkey, a large poultry species originally from America and domesticated by Indian tribes (Becker, 2006), thrives well in arid conditions, tolerates heat, roams extensively, and yields high-quality meat (Yakubu *et al.*, 2013). Turkeys are excellent insect foragers and can aid in pest control for crops (Grimes *et al.*, 2007). The demand for lean and flavorful turkey meat has grown compared to broiler meat (Karki *et al.*, 2005), addressing protein needs and consumer preferences.

Reproduction is vital for species continuity. Livestock reproductive systems engage during sexual maturity (Murphy, 2012). Male turkeys, like other birds, possess reproductive organs, including paired testes, deferens leading to the cloaca, and a copulation tool called a phallus (Yahaya, 2017). Testes generate spermatozoa within seminiferous tubules for fertilization (Wei, 2011), alongside producing testosterone aiding sperm production (Kelly, 2013). In poultry, testes lie in the abdominal cavity, anterior to kidneys, posterior to lungs, and encased in fibrous tissue (Elbajory, 2013).

Turkeys undergo six life phases: pre-starter (0-4 weeks), starter (4-8 weeks), grower I (12-16 weeks), grower II (16-20 weeks), and finisher (20 weeks). Turkeys are sexually mature around 33 weeks, suitable for breeding (Rasyaf, 1983). Previous studies by Gerzilov *et al.* (2015) reported age-related changes in testicular morphology in other bird species. However, information on turkey tom reproductive systems, particularly testes, in Bangladesh remains limited. Thus, this research investigates biometric and morphometric characteristics of turkey testes (*Meleagris gallopavo*) across various age levels.

Materials and Methods

This research was conducted at the Laboratory of the Department of Anatomy and Histology, Faculty of Veterinary and Animal Sciences, Hajee Mohammad

Danesh Science and Technology University. The study utilized testicular samples from 12 male turkeys (*Meleagris gallopavo*) sourced from the SMA Organic Agro Farm in Belgari and surrounding turkey farms in the Sherpurupazilla of Bogura district. The samples were categorized into two age groups: 28 weeks (after the finisher phase) and 48 weeks (considered sexually mature stage) old turkeys. Each group comprised 6 male turkeys.

The live body weight of all turkey toms was measured using a digital weight machine (RFL Weight Scale). Six turkey toms from each age group were sacrificed for the study. Both testes were carefully extracted, trimmed of excess tissue, and collected. The length, width, and thickness of the testes were measured using Vernier slide calipers. Additionally, the weight of the testes was recorded using an electronic balance (RFL Weight Scale). For statistical analysis, all data were presented as mean \pm standard error (SE), and analysis of variance was conducted using SPSS software (version 15) to assess differences.

Results and Discussion

The study revealed that the testes shape in Turkey tom was bean-shaped, positioned bilaterally on the lateral sides of the body's midline, beneath the kidneys on the ventral surface, and behind the lungs within the abdominal cavity of the turkey toms (Figure 1a). In a study involving Japanese quail, the testes were found as paired tubular organs enclosed by peritoneal covering within the body cavity (AI-Tememy *et al.*, 2010; Kannan *et al.*, 2015). Another study mentioned that in male birds, the testes are a pair of organs situated along the dorsal body wall (Kirby *et al.*, 2000). It was noted that the left testis was positioned more anteriorly than the right one. A different study (Kigir *et al.*, 2010) discovered that the left testis was generally higher and larger than the right one in pigeons. Similarly, Rajendranath *et al.* (2015) also observed that the left testis held an anterior position compared to the right one. These observations align with findings in Ostrich and Rhea as well (Babic *et al.*, 2004; Elias *et al.*, 2007). At 28 weeks of age, the average live body weight of the turkey was 5.670 ± 7.17 kg.

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Figure 1. (a) Location of the testes (RT & LT) in the abdominal cavity, (b) Bean shaped right and left testis, (c) Length of right testis, (d) Width of left testis, (e) Weight of left testis at 28 weeks

Table 1. Macro-morphometric data for the testes of Turkey tom

Age: 28 Weeks				Age: 48 Weeks			
Live Body weight (kg) (Mean ±SE)	Parameter	Left testis (Mean ±SE)	Right testis (Mean ±SE)	Live Body weight (kg) (Mean ±SE)	Parameter	Left testis (Mean ±SE)	Right testis (Mean ±SE)
5.670±7.17	Testis Length(cm)	3.74± 22.38*	3.55± 4.50	7.800±9.86	Testis Length(cm)	4.15± 5.26*	3.57± 4.51
	Testis Width(cm)	2.08± 2.63*	1.95± 2.48		Testis Width(cm)	2.40± 9.29*	2.04± 2.58
	Testis Thickness (cm)	1.87± 5.93*	1.58± 1.99		Testis Thickness (cm)	1.92± 5.92*	1.72± 2.18
	Testis Weight (gm)	9.50± 12.01*	7.83± 9.91		Testis Weight (gm)	10.50± 13.28*	9.33± 11.80

The macroscopic measurements of the left testis included a length of 3.74±22.38 cm, width of 2.08±2.63 cm, thickness of 1.87±5.93 cm, and a weight of 9.50±12.01 gm. Meanwhile, the right testis had

dimensions of 3.55±4.50 cm in length, 1.95 ± 2.48 cm in width, 1.58± 1.99 cm in thickness, and weighed around 7.83± 9.91 gm. At 48 weeks, turkey toms exhibited a mean live body weight of 7.800± 9.86 kg.

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The left testis measured approximately 4.15 ± 5.26 cm in length, 2.40 ± 9.29 cm in width, 1.92 ± 5.92 cm in thickness, and weighed around 10.50 ± 13.28 gm. In comparison, the right testis displayed measurements of 3.57 ± 4.51 cm in length, 2.04 ± 2.58 cm in width, 1.72 ± 2.18 cm in thickness, and weighed approximately 9.33 ± 11.80 gm (Table 1). Notably, significant increases were observed in the left testis for its length, width, thickness, and weight in comparison to the right testis ($P \leq 0.05$). Our findings regarding the bean-shaped shape of the testes align with results of other studies (Elbajory *et al.*, 2013; Royhan, 2020). The length of left testis (4.15 cm) in our study is in accordance with other report (Razi *et al.*, 2010). However, differences were observed in the width

Conclusion

Our study shows that as the Turkey tom grows up, its testes change in size and weight. We noticed that the left testis is consistently bigger and heavier than the right one. This suggests that the left testis gets larger as the turkey tom gets older. This could mean there is something special happening on the left side, and it would be interesting to find out why this is the case.

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Conflict of interest

Authors declare no conflicts of interest

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measurement, with our results indicating a width of 2.40 cm for the left testis, differing from Razi *et al.* (2020). Our study findings regarding the shape and length of the testes agreed with Bull *et al.* (2007), who noted an oval shape for these organs and observed a greater length in the left testis compared to the right in domestic fowl. Conversely, our results did not align with the observations of Razi *et al.* (2010), who reported similar lengths for the two testes in Iranian roosters. In this study, the mean weight of the left testis in 48-week-old turkey toms was 10.50 gm, which closely resembled the findings of Elbajory *et al.* (2013) in ducks. However, the mean weight of the right testis in turkey toms was lower than that of the left testis in our research.

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