



## Gross and Morphometrical Studies on the Testes of Large White Yorkshire Pig (*Sus scrofa*)

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### ABSTRACT

A study was conducted on the testes of 30 Large White Yorkshire pig aged between seven months to around one and half year. The testes were procured from apparently healthy animals from private abattoir house in Bikaner. The testes were located in the perineal region. The left testis was larger and longer than right testis. Long axis of the testis was vertical in position. The parenchyma of testis was reddish grey in colour. The mediastinum testis was an axial strand of fibro-elastic tissue and white in colour. It was well developed. The parameters of length, breadth, thickness, circumference, volume and weight of left testes were non-significantly higher than right one.

**Keywords:** Testes, pig, perineal, parenchyma, mediastinum testis

Piggery is the sector that directly plays an important role in the socioeconomic status of the poor rural people, more particularly in the tribal population of the country as it acts as an insurance coverage for the downtrodden and socially weaker section of the society (Sailo *et al.*, 2016). The testes are the most essential and primary organs of the male reproductive system. The testis is a bipartite glandular organ which contain both exocrine and endocrine compartments. The knowledge of gross structure and histology of testis is important for understanding normal physiology, histopathology, surgical anatomy and breeding aspects. This sphere always attracts the researchers for adding new information by their research which results to enrich and update the knowledge.

### MATERIALS AND METHODS

The 30 pairs of testes were used for the gross anatomical studies. The samples were cleaned and the adhering connective tissue and fats were removed and placed in the surgical plate in their normal position. The measurement for various physical parameters like weight, length, circumference, volume, breadth and thickness were carried out.

#### Weight of testes

The weight was recorded in gms with the help of electronic balance after clearing and removing tissue debris.

#### Length of testes

The length was measured between the dorsal and ventral extremities of the testis with the help of measuring scale and recorded in cm.

#### Volume of testes

The volume of the testes including epididymis was measured volumetrically using the Archimede's principles of the water displacement in a measuring cylinder.

#### Thickness of testes

Thickness was measured between the free border and attached borders of the testes. It was calculated in cm.

#### Breadth of testes

Distance between the medial and lateral surfaces of the testes was measured at the mid length of testes and recorded in cm.

### Circumference of testes

The circumference was recorded with the help of the non-stretchable thread with the help of scale and recorded in cm.

Statistical Analysis was done with the help of the T test.

### RESULTS AND DISCUSSION

The testes were located in the perineal region, similar to the reports of Skidmore and Adams (2000) in camels. The left testis was larger and longer than right testis, similar to the findings of Choudhury *et al.* (2008) in adult musk deer and Adhikary *et al.* (2016) in bull. Each testis presented two surfaces, two borders and two extremities. Lateral surface was convex and medial surface was flattened. Anterior border was free and convex. The attached border was posterior border which had the epididymis closely attached to it (Fig. 1).



**Fig. 1:** Testis (T) of Large White Yorkshire pig attached with Epididymis (E)

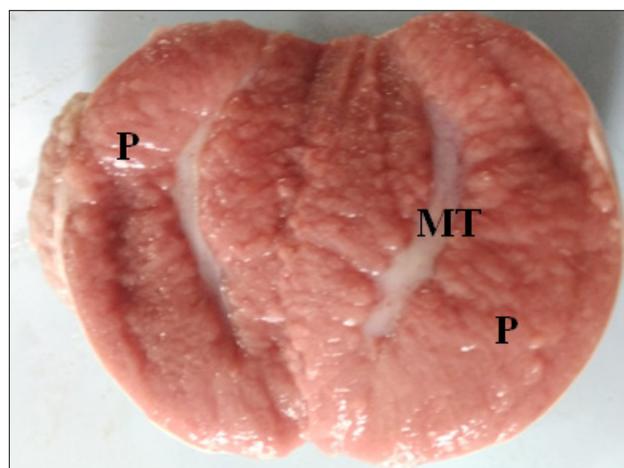
The upper end of the testis was occupied by the head of epididymis whereas lower end was slightly thicker and connected to the tail of epididymis (Fig. 1) (Sisson and Grossman, 1953 in bull, horse, sheep and dog; Raghavan (1964) in ox; Robert (1971) in boar; Getty (1977) in horse, dog and ruminant; Yaseen *et al.* (2009) in goat; Babu (2012) in pig; Pasha *et al.* (2013) in one humped camel;

Singh (2013) in Marwari sheep; Pathak *et al.* (2014) in gaddi goat; Raji and Ajala (2015) in west African dwarf buck goat and Hanumant (2016) in goat).

Both the testes were covered by the connective tissue capsule called tunica albuginea Miller *et al.* (1965) in dog, Hafez (1980) in domestic animals, Moonjit and Suwanpugdee (2007) in rusa deer; Babu (2012) in pig; Pasha *et al.* (2013) in one humped camel and Hanumant (2016) in goat.

Long axis of the testis was vertical in position (Sisson and Grossman, 1953 in bull and sheep; Raghavan, 1964 in ox; Pasha *et al.* (2013) in one humped-camel; Singh (2013) in Marwari sheep and Pathak *et al.* (2014) in gaddi goat whereas according to Sisson and Grossman (1953) the long axis in horse was nearly longitudinal and in boar was directed upward and backward.

The parenchyma of testis was red in colour (Fig. 2). On the contrary, Sisson and Grossman (1953) stated that parenchyma was yellow in colour in ruminant. Lambate (2012) described that the parenchyma was faint red to slightly pinkish in colour in pig and Hanumant (2016) studied that colour of the parenchyma was yellow in goat. The mediastinum testis was an axial strand of fibro-elastic tissue and white in colour (Fig. 2) (Sisson and Grossman (1953) in ruminant and dog; Raghavan (1964) in ox and dog, Miller *et al.* (1965) in dog; Babu (2012) in pig and Pathak *et al.* (2014) in goat). However, Getty (1977) mentioned that the mediastinum testis was absent in horse.



**Fig. 2:** Photograph showing bisected fresh testis of Large White Yorkshire pig having Parenchyma (P) and Mediastinum Testis (MT)

The testes were very large and were irregularly elliptical in contour (Fig. 1), which was in concordance with the description given by Babu (2012) in pig and Hanumant (2016) in goat. The testes were whitish grey in colouration (Fig. 1) which was in concordance with the description of (Miller *et al.*, 1965 in dog; Yaseen, 2009 in goat and Sharma *et al.*, 2011 in dog).

The averaged weight, length and volume of right testis were  $110.27 \pm 7.97$  gm (Fig. 3),  $8.72 \pm 0.30$  cm (Fig. 4) and  $87.03 \pm 4.89$  ml (Fig. 5) respectively while averaged weight, length and volume of left testis were  $116.72 \pm 7.89$  gm,  $9.43 \pm 0.33$  cm and  $93.40 \pm 4.66$  ml, respectively.

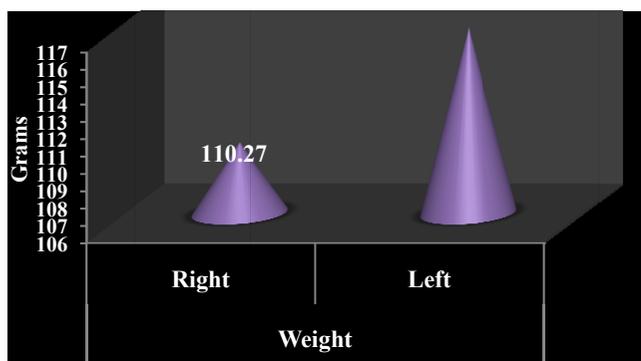


Fig. 3: Graph showing comparison between weight of right and left testes (gm)

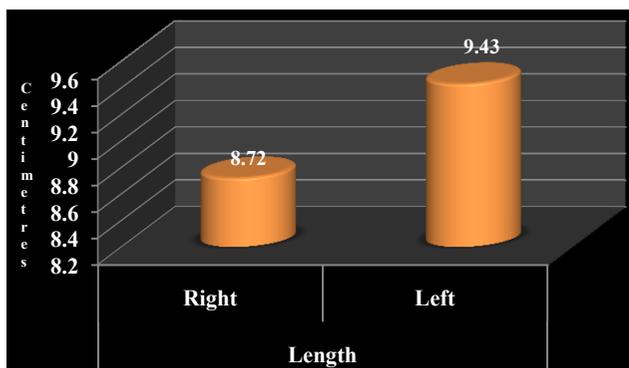


Fig. 4: Graph showing comparison between length of right and left testes (cm)

The averaged thickness of right testis was  $4.45 \pm 0.19$  cm while the averaged thickness of left testis was  $4.65 \pm 0.19$  cm. The averaged breadth of right testis was  $5.57 \pm 0.20$  cm while the average breadth of left testis was  $5.72 \pm 0.22$  cm (Fig. 6).

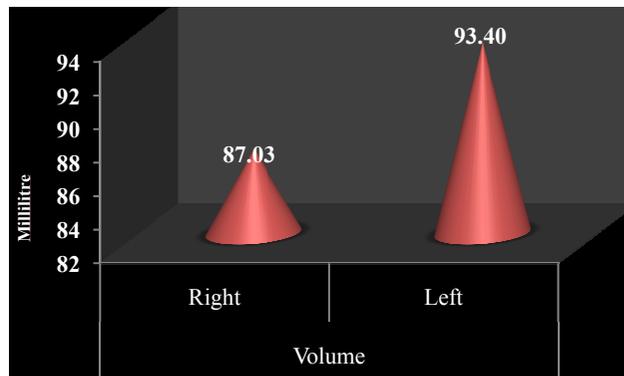


Fig. 5: Graph showing comparison between volume of right and left testes (ml)

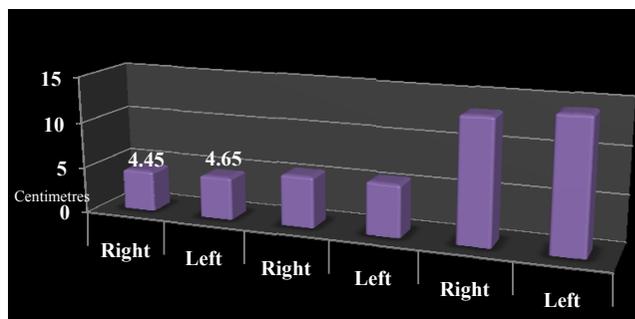


Fig. 6: Graph showing comparison between thickness, breadth and circumference of right and left testes (cm)

The averaged circumference of the right testis was  $13.47 \pm 0.38$  cm while that of the left testis was  $14.26 \pm 0.38$  cm (Table 1).

Table 1: Biometrical values of the testes of Large White Yorkshire pig

Parameters	No. of animals	Right testis	Range	Left testis	Range
Weight (gm)	30	$110.27 \pm 7.97$	44.11-172	$116.72 \pm 7.89$	52.30-174
Length (cm)	30	$8.72 \pm 0.30$	6-11.77	$9.43 \pm 0.33$	6.6-12.28
Volume (ml)	30	$87.03 \pm 4.89$	40-132	$93.40 \pm 4.66$	50-138
Thickness (cm)	30	$4.45 \pm 0.19$	2.45-7.2	$4.65 \pm 0.19$	2.71-7.11
Breadth (cm)	30	$5.57 \pm 0.20$	3.20-7.85	$5.72 \pm 0.22$	3.31-7.97
Circumference (cm)	30	$13.47 \pm 0.38$	9.7-16.72	$14.26 \pm 0.38$	10.6-17.40



The parameters of weight, length, volume, breadth, thickness and circumference of left testes were non-significantly higher than right one in present study (Raghavan, 1964 in ox; Choudhary *et al.*, 2008 in musk deer; Yaseen, *et al.*, 2009 in goat; Bhattacharyya *et al.*, 2010 in sheep; Pasha *et al.*, 2013 in one humped camel; Singh, 2013 in marwari sheep; Raji and Ajala, 2015 in west african dwarf buck goat; Adhikary *et al.*, 2016 in bull and Hanumant, 2016 in buck). However, Bansal *et al.* (2003) mentioned that there were no significant differences between left and right testes but the value of left testes were comparatively higher in donkey.

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