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Histomorphological studies on the testis of local pig (Zovawk) of Mizoram

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ABSTRACT

The present study was designed to elucidate the histomorphology of the testis of adult Zovawk. In the present study, the collagen and reticular fibres were abundant in tunica albuginea and interstitial tissue surrounding the seminiferous tubules. However, few elastic fibers occurred in the capsule and only in the blood vessels of both the testis in Zovawk. The different micrometrical values with regard to thickness of testicular capsule, diameter of seminiferous tubule, height of seminiferous tubule, number of leydig cells, spermatogonia, germs cells per mm^2 were found to be higher in the left testicle as compared to right one. There was no-significant difference observed in the right and left testes of Zovawk.

Key words: Histomorphology, Pig, Testis, Zovawk.

INTRODUCTION

Zovawk is an indigenous pig found in different parts of Mizoram. It is newly identified breed of pig of Mizoram approved by breed registration committee of Indian Council of Agricultural Research (ICAR), New Delhi (Choudhary, 2018). They attain puberty at the age of 2.5 months, when they are about 4.5 kg body weight (Hmar *et al*., 2010).The average body weight of adult Zovawk was 32.98±1.56 Kg (Kalita *et al*., 2015). The overall size and weight of the organs were smaller than observed in the common large breed pigs by Getty (2012). The size of the animal is small and the population of this pig is decreasing day-by-day because of lack of scientific breeding practice (Kalita *et al*., 2014). As per its behavior this pig is very alert to the social happening such as presence of any intruder in the farm by making immediate response to the sound or the gestures of the intruder (Prava *et al*., 2014). There is no literature pertaining to the histomorphology and micrometry of the testis in zovawk. Therefore, the present investigation was undertaken to study the histological and micrometrical characteristics in the testis of Zovawk. This will serve as the basis for further studies on the testis of this species.

MATERIALS AND METHODS

The present study was conducted on the testes of six apparently healthy adult zovawk pig (2-2.5 year of age). Tissue samples of testes were collected from cranial, middle and caudal parts of the testes and fix in 10% neutral buffer formalin for 24-48 hours. Paraffin blocks were made by alcohol-xylene sequence using cedar wood oil (Luna, 1968). The sections were cut at 5µ thickness using Rotary Microtome (Thermo, Germany) and paraffin sections were stained by Mayer's hematoxylin and eosin for general tissue reaction and cytoarchitectural studies (Mayer, 1891), Masson's trichrome stain for collagen fibers (Masson, 1929), Verhoeff's stains for elastic fibers (Verhoeff, 1908) and Gomori's silver stain for reticular fibers (Gomori, 1937). The mean values of all the micrometric parameters with regard to thickness of testicular capsule, diameter and height of seminiferous tubule and number of Leydig cells, spermatogonia and germs cells per mm^2 were recorded from ten different fields randomly selected from each section. The data of the present micrometrical investigation was analysed by standard statistical procedure with the help of SPSS 20 (2013) as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The histological appearance of the testis was uniform and identical in both the testes. The present study revealed that testis of Zovawk composed of tunica albuginea, trabeculae, mediastinum testis, seminiferous tubules and interstitial tissue (Fig 1) as observed earlier by Raghavan (1964) in ox, Miller (1965) in dog, Konig and Liebich (2006) in domestic animals, Gaykee *et al*. (2008) in neelgai and Yaseen (2009) in goat. The connective tissue trabeculae extended from the capsule and divided the parenchyma of the testis into number of lobules (Fig 2). These trabeculae were thick strands of collagen and elastic fibers, in which blood and lymph vessels were observed as also reported by Banks (1993) and Eurell and Brian (2006) in domestic animals. The mediastinum testis occupied a central position along the longitudinal axis of gonad and consisted of the connective tissue cords (Fig 3) as reported earlier by Girish *et al*. (2001) in dog. The seminiferous tubules contributed to the major portion of testicular parenchyma, with each seminiferous tubules comprising of outer lamina propria and seminiferous epithelium with two different types of cell populations, *viz*. non-proliferating Sertoli cells and highly

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proliferating spermatogenic cells in different stages of development (Fig 4) as observed earlier by Banks (1993) in domestic animals and Gofur *et al*. (2008) in indigenous bulls. The interstitial tissue occupied the area between the adjacent seminiferous tubules, which consisted of numerous Leydig cells, few fibrocytes and blood and lymph vessels in loose connective tissue. These findings were in accordance by Banks (1993) and Eurell and Brian (2006) in domestic animals, Gleide *et al*. (2010) in pig and Bashir *et al*. (2012) in Bakarwali goat.

The tunica albuginea and interstitial tissue surrounding the seminiferous tubules consisted mainly of collagen and reticular fibres (Fig 5 and 6) as earlier reported Gaykee *et al*. (2008) in neelgai, Yaseen (2009) in goat and Gofur *et al*. (2008) in indigenous bull. However, few elastic fibers occurred in the capsule and only in the blood vessels (Fig 7) as reported earlier by Kaur *et al*. (2009) in buffaloes and Shukla *et al*. (2013) in Chamurty horse. There was no histological difference noted in the staining of both the right and left testis of Zovawk.

The average thickness of testicular capsule of the right and left testicles of adult Zovawk was 172.45±7.11 and 187.64±8.74 ìm, respectively. Abdul *et al*. (2011) reported that morphometric description of testicular capsule in goat was 230±3.5 µm. Shukla *et al*. (2013) observed the thickness of tunica albuginea of left and right testis of Chamurthi horse was recorded to be 1336.91± 85.56 µm and 1790.71±141.19 µm, respectively. The average diameter of the seminiferous tubules of the right and left testicles of adult zovawk was 129.87±5.63 and 147.19±3.71 µm, respectively. Costa and Silva (2006) observed the tubular diameter in castrated adult wild boar as 249.2±33.0 µm. Shukla *et al*. (2013) reported that the mean seminiferous tubule diameter in left and right testes was 151.29±1.02 µm and 152.64±1.32 µm, respectively in Chamurty horse. The average height of the seminiferous tubules of the right and left testicles of adult Zovawk was 40.40±1.63 and 42.19±1.19 µm, respectively. Franca and Godinho (2003) reported the seminiferous epithelium height was 81.00±3.00 µm in domestic cat. The average number of Leydig cells per mm^2 in the right and left testicles of adult Zovawk was 145.24±7.48 and 153.79±6.81, respectively. Franca and Godinho (2003) and Shukla *et al*. (2013) reported that the number of Leydig cells per mm^2 as 14.0±0.79 in domestic cat and 36.61±1.94 and 35.38±2.015 in Chamurty horse respectively. The average number of Spermatogonia per mm^2 in the right and left testicles of adult Zovawk was

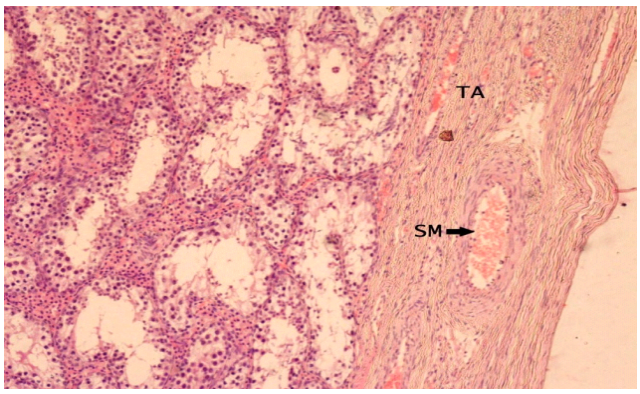

Fig 1: Testis of Zovawk showing Tunica albuginea (TA) and Smooth muscle (SM). (H&E, 100X).

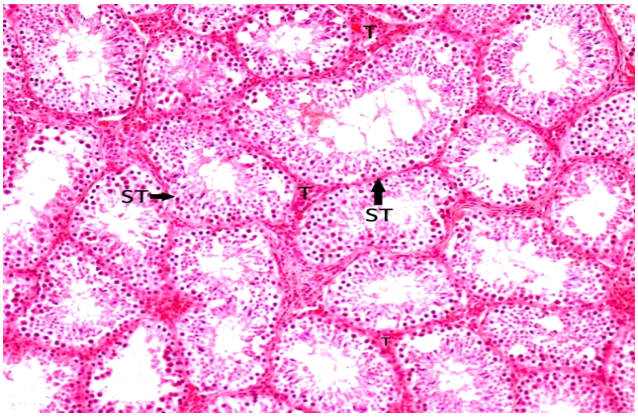

Fig 2: Testis of Zovawk showing Trabeculae (T) and seminiferous tubule (ST). (H&E, 100X).

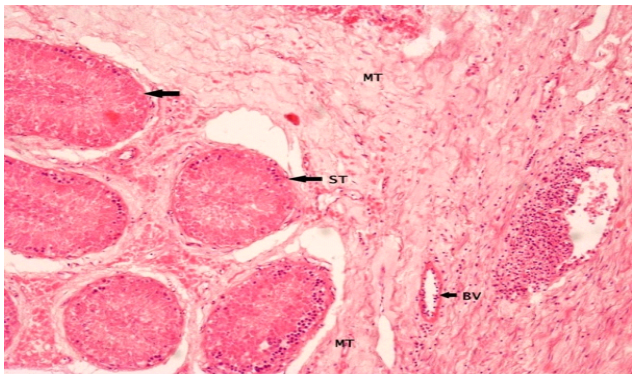

Fig 3: Testis of Zovawk showing seminiferous tubule (ST), Blood vessel (BV) and Mediastinum testis (MT). (H&E, 100X).

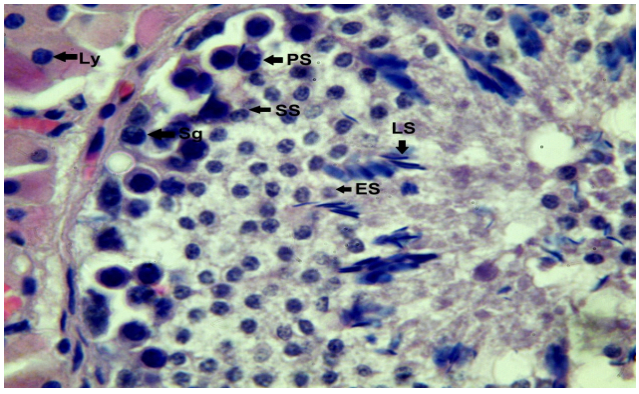

Fig 4: Testis of Zovawk showing Leydig cells (Ly), Spermatogonia (Sg), Primary spermatocyte (PS), Secondary spermatocyte (SS), Early spermatid (ES) and Late spermatid (LS). (H&E, 1000X).

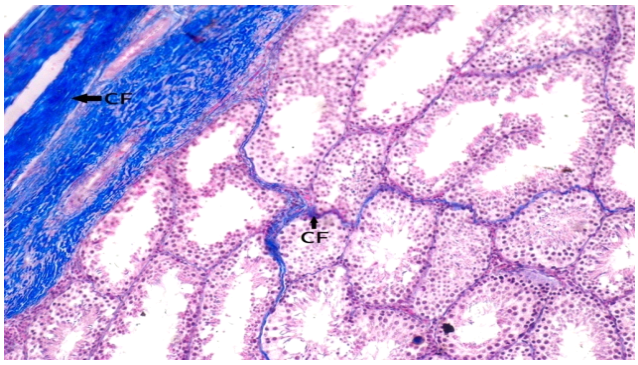

Fig 5: Testis of Zovawk, Arrow showing collagen fibers (CF). (Masson's, 100X).

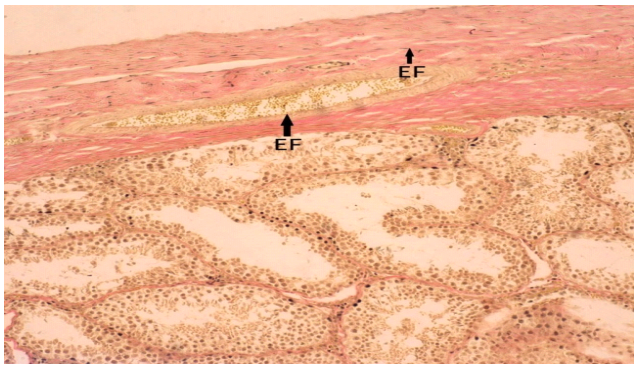

Fig 7: Testis of Zovawk, Arrow showing elastic fibers (EF). (Verhoeff's, 100X).

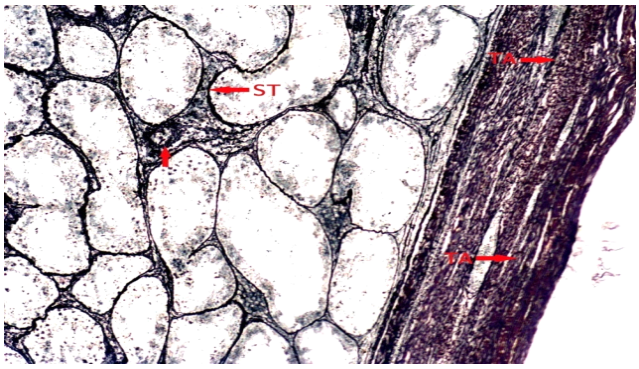

Fig 6: Testis of Zovawk, Arrow showing reticular fibers in Tunica Albuginea (TA) and basement membrane of seminiferous tubule (ST). (Gomori's, 100X).

102.26±8.73 and 113.12±5.42, respectively. The average number of Germ cells per mm^2 in the right and left testicles of adult Zovawk was 1113.99±85.97 and 1269.09±54.90, respectively. Bhosale (2016) reported that the average number of germ cells per mm^2 in anterior middle and posterior region of right testicle were 2698.51±71.60, 2794.06±55.91 and 2963.99±80.91, respectively. The average number of germ cells per mm2 in anterior, middle and posterior region of left testicle was 2908.14±85.88, 2867.25±32.73 and 2944.89±74.98, respectively. In this present study, all the micrometrical parameters were more in left testis as compared to right testis. The difference was statistically non-significant between the right and left testis in Zovawk.

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