MICROMETRICAL, HISTOLOGICAL AND HISTOCHEMICAL STUDIES ON THE SEMINAL VESICLES OF BAKERWALI GOAT (KANGANI)

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ABSTRACT
The seminal vesicles glands of adult (29) and senile (6) Bakerwali goat were utilized for recording micrometrical and histological parameters. The seminal vesicles were paired lobular glands with distinct lobulations. Histologically glands were compact compound tubulo-alveolar with lobulated surface. The glands were divided into lobes with a fibro muscular capsule. The glandular parenchyma consisted of alveoli, tubules and ducts which were lined with pseudostratified columnar epithelium. In the epithelium three types of cell had been identified viz A, B, C. The central collecting ducts of each lobule was lined with pseudostratified columnar epithelium. Moderate cholesterol was observed at apical and basal border of alveoli and tubules. The secretion and apical blebs exhibited mild to moderate reaction for cholesterol. Many blood vessels, nerves and parasympathetic ganglia were seen in tunica adventitia.

Key words: Bakerwali goat, Histological, Study, Histochemical study, Micrometrical, Seminal vesicle.

INTRODUCTION
Jammu and Kashmir is bestowed with unique breeds of goat and one such goat breed is Bakerwali (kaghani). The secretions of the accessory genital glands constitute 60-90% of total volume of semen. Accessory genital gland contributes major part in composition of semen. The secretion of accessory gland serves to nourish the spermatozoa, activates the spermatozoa, clears urethral tract before ejaculation and act as a vehicle to transport the spermatozoa within the female genital tract (Dukes, 2005). No study has been done on seminal vesicles of this breed so the present work was planned to record the microscopic appearance of it in Bakerwali goat.

MATERIALS AND METHODS
The study was conducted on the seminal vesicles of male adult (29) and senile (6) Bakerwali goat. Complete male genitalia of Bakerwali goat were collected immediately after slaughter from local abattoirs. During the ante-mortem examination, the age of the animals was confirmed by teeth eruption. The accessory sex glands were carefully dissected and washed with normal saline. Then the tissue were fixed in 10 % neutral buffered formalin and 90 % chilled alcohol. The pieces of the gland were collected from different regions- proximal, middle and distal. The fixed tissues were processed through the alcohol-benzene schedule, infiltrated and embedded in paraffin (60-62°C melting point). The paraffin sections (5µm) were cut and stained with Harris hematoxylin and eosin (Luna 1968) for histomorphology, Van Gieson and Verhoeff’s for Connective Tissue, Gomori method for reticular connective tissue, Periodic acid Schiff Reaction for carbohydrates, Diastase digestion for glycogen and Schultz method for cholesterol (Luna 1968). The genital glands were fixed in 90% chilled alcohol and were utilised for glycojen studies. Fresh tissues of few genital glands were preserved at -22°C in cryostat for frozen sections to demonstrate cholesterol.

RESULTS AND DISCUSSION
Histologically the seminal vesicles of Bakerwali goat were compact compound tubulo-alveolar glands with lobulated surface. Also described in murrah bull by Sudhakar et al. (1986) in goat by Kundu (1980), in Gaddi goat and sheep by Suri (2007) and Roy et al. (2006) in Murrah buffalo. Seminal vesicles consisted of capsule, septa and glandular parenchyma, these were comparable with

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tunica mucosa and tunica muscularis. The mucosa formed folds of variable length that extended into the lumen. Similar description has been given by Trautmann and Fiebiger (1957), Dellmann and Wrobel (1983).

The glands were divided into lobes and fibromuscular capsule surrounded each lobe of the seminal vesicles. Each lobe was divided into lobule by connective tissue septae. Course collagen and fine reticular fibers were observed in capsule, septae and in glandular parenchyma (Plate 4). The collagen fibres formed wavy sheets in septae (Plate 3). These septae were tapering from the base towards the center. These findings were reported in buffalo by Sudhakar (1982) and Suri et al. (2008) in Gaddi goat and Gaddi sheep. Dellmann and Wrobel (1983) in other domestic animals and Gupta (1978) in goat noted that the tunica muscularis consisted, mainly of smooth muscle fibers. Farooqui et al. (1997) recorded that tunica muscularis was made up of scattered smooth muscle fibers in Barbari goat. The thickness of capsule and septae of seminal vesicles were significantly higher in senile group more and more fibres got accumulated due to advance in age.

The glandular parenchyma consisted of alveoli, tubules and ducts which were lined with pseudostratified columnar epithelium. The central collecting duct of each lobule lined with pseudostratified columnar epithelium (Plate 1 and 2). Banks (1986) described that the excretory duct of vesicular glands were lined by stratified columnar epithelium in cattle. However Dellmann and Wrobel
(1983) observed cuboidal epithelium in main excretory ducts. The central collecting duct of each lobule united to form the interlobular duct. The union of several such ducts, in turn formed the main excretory duct of the vesicular gland.

The secretory end-pieces included solid end-pieces, and were found scattered in between alveoli and tubules in each lobule, separated by thin interlobular connective tissue comprising smooth muscles, collagen and reticular fibers. The diameter of solid end-pieces was recorded significantly higher in adult Bakerwali goat. The nuclei of solid end-pieces vary from round to oval in shape. The solid end-pieces showed mild to moderate reaction for glycogen. Farooqui et al. (1997) reported that solid end pieces were more in prepubertal goat. Suri (2007) reported solid end pieces also showed secretory activity in the autumn season in both Gaddi goat and Gaddi sheep.

The alveoli were lined with pseudostratified columnar epithelium. In the epithelium, three types of cell had been identified viz, A, B, C. A-type cell were tall columnar having bottle shaped with distinct cell boundaries. The nuclei were ovoid in shape. B-type cells were spherical in shape and placed basally with rounded nuclei which were smaller than those of A -cell. C type cells were narrow compressed columnar cells. Similar findings were observed by Cons (1957) in bull.

The mean diameter of mast amended alveoli was recorded statistically higher in both right and left seminal vesicle of adult group (P<0.05) Table 1. The secretions were present in lumina of alveoli and tubules. The secretions and apical blebs were less in alveoli and ducts of senile Bakerwali goat. Similar finding were also reported by Suri (2007), Singh (1967), Chandrapal (1976) observed spermatozoa in the lumen of seminal vesicles of buffalo, where as Sudhakar (1982) did not reported in buffalo.

The diameter and epithelial height of tubules were statistically higher in adult group in right and left. Some of the secretory masses present in alveolar and tubular lumen stained heterogeneously with Harris Haematoxylin and eosis. The periphery contained eosinophilic (pink) secretions and the

| Parameters | Capsule thickness | Septal thickness | Diameter of solid end - pieces | A) Alveoli
|------------|------------------|-----------------|-----------------------------|---
|            | Right (µm)       | Left (µm)       | Right (µm)                  | i) Diameter |
|            | ( )                     | ( )                 | ( )                          | 100.85±5.72 |
|            | 140.96±6.26a        | 145.34±8.89a      | 167.80±11.41b               | 98.28±2.97  |
|            | (85.74-242.93)      | (85.74-314.38)    | (71.45-371.54)              | 94.90±3.50  |
|            | 127.89±5.18a       | 137.58±7.53a      | 167.80±11.23b               | 153.57±7.87b|
|            | (85.74-200.0)       | (85.74-314.38)    | (71.45-371.54)              | (71.45-257.22)|
|            | 66.96±4.09a        | 77.57±4.43a       | 48.99±3.00ab                | 55.12±2.69b|
|            | (28.57-171.48)     | (28.57-171.48)    | (28.57-100.00)              | (28.57-100.0)|
| B) Tubules |                   |                  |                             |---
| i) Diameter| 95.43±4.04a        | 93.71±3.49a      | 74.31±2.74b                 |---|
|            | (63.27-153.18)     | (53.28-153.18)    | (49.95-103.23)              | (49.95-143.19)|
| ii) Epithelial height| 18.25±0.95a| 17.88±0.96a      | 15.18±0.31b                 | 14.21±0.61b|
|            | (9.90-23.31)       | (9.70-23.31)      | (9.90-16.50)                | (9.90-19.98) |
| iii) Nuclear length| 8.20±0.28a| 8.30±0.28a       | 6.88±0.41b                  | 6.03±0.50b|
| iv) Nuclear breadth| 4.26±0.06| 4.35±0.08        | 4.36±0.10                   | 4.26±0.06|
|            | (4.20-6.30)        | (4.20-6.30)       | (4.20-6.30)                 | (4.20-6.30)|

Values between the groups with different superscript (a&b) differ significantly (P<0.05)
center had basophilic (blue) secretions. The apical border and basal border stained moderately with PAS (Plate 5). The SNR also showed moderate PAS reactivity, the secretions stained moderately with diastase resistant PAS. Acidic mucopolysaccharides were absent. Moderate cholesterol was observed at apical and basal border of alveoli and tubules. The secretion and apical blebs exhibited mild to moderate reaction for cholesterol (Plate 6). Suri (2007) recorded in Gaddi goat and Gaddi sheep apical border as apical blebs, which were also diastase resistant PAS positive in all seasons of the year. Aitken (1955) in sheep, Gupta (1978) in goat and Sudhakar (1982) in buffalo recorded presence of glycogen in prepubertal animals and PAS- positive diastase resistant carbohydrates in pubertal animals. Roy et al. (1987) described that the glandular epithelium of seminal vesicles was moderately positive for glycogen. Pyne (1986) observed intense PAS reactivity in infranuclear cytoplasm and moderate to intense positivity in supranuclear cytoplasm of epithelial cells. Sudhakar (2005) reported that secretion was mild to strong in PAS activity in yak.

Tunica adventitia consisted of loosely arranged meshwork of collagen, elastic and reticular fibers surrounding the fibromuscular capsule. Many blood vessels, nerves and parasympathetic ganglia were seen in tunica adventitia. Similar observations were recorded by Suri et al. (2008) in Gaddi goat and Gaddi sheep.

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