

## SHORT COMMUNICATION

# Relationship between Scrotal Biometry and Seminal Attributes in Berari Bucks

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### ABSTRACT

Berari goat is the heritage and one of the potential animal genetic resources of Vidarbha region of Maharashtra. The present experiment estimated semen characteristics and their relationships with scrotal circumference in Berari bucks. The means of scrotal circumference, testicular length, and testicular width were  $24.62 \pm 0.51$ ,  $7.67 \pm 0.30$  and  $5.04 \pm 0.23$  cm, respectively, with significant variations among the bucks. All the three traits were highly significantly and positively interrelated ( $r = 0.812$  to  $0.861$ ), and had positive associations with most seminal attributes ( $r = 0.176$  to  $0.581$ ), except pH. Scrotal circumference of bucks significantly affected all the semen characteristics, except seminal pH. Sperm concentration is the important semen trait of Berari goat where reasonable genetic progress may be possible through selection. The study demonstrated that the selection for increased scrotal circumference should have a favorable correlated response in semen characteristics of Berari bucks.

**Keywords:** Berari goat, Interrelationship, Scrotal circumference, Semen characteristics.

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### INTRODUCTION

In most livestock farming, artificial insemination (AI) is used for reproductive management and is probably the most important technique devised to facilitate the genetic improvement and conservation of animals on a large scale. Using AI, frozen semen from a single buck can impregnate many thousands of does yearly. Evaluation of the semen characteristics is the most important for selecting breeding buck. The quality of semen in relation to fertility is determined by evaluating various quality parameters (Kumar *et al.*, 2022). Sexual behavior and semen quality are the main factors that limit male reproductive efficiency during the year (Kumbhar *et al.*, 2019).

Only very sparse studies have been done examining the association between measures of scrotal size with components of semen and spermatozoa quality or sperm output. Evidence of a relationship between testicular size and spermatological characteristics is inconclusive. Some researchers suggested that testicular size provides a good index of sperm output in rams (Akpa *et al.*, 2012). Therefore, this study aimed to examine the relationships between semen characteristics and scrotal circumference of Berari buck, the only goat breed of Vidarbha region of Maharashtra.

### MATERIALS AND METHODS

A total of six selected Berari bucks were reared under the standard ideal iso-managerial conditions. Scrotal circumference (SC), testicular length, and testicular width of mature bucks were determined with a flexible measuring tape at weekly intervals for 6 months (N=24 observations

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per buck). Collection of semen was done at weekly intervals with artificial vagina (AV) maintaining optimum pressure and temperature of 41 to 43°C. Immediately after collection, the semen samples were evaluated for ejaculate volume, mass motility, sperm concentration, live and dead sperm, and abnormal spermatozoa as per the routine techniques. The data were analyzed using a completely randomized design (CRD) for buck effect, and the correlations of scrotal circumference, testicular length and testicular width with the semen characteristics were established according to Snedecor and Cochran (1994).

## RESULTS AND DISCUSSION

The scrotal biometry (scrotal circumference, testicular width and testicular length) and its correlations with seminal attributes are depicted in Tables 1 and 2, respectively.

### Scrotal Circumference

The overall mean scrotal circumference (SC, mean  $\pm$  SE) in Berari bucks was  $24.62 \pm 0.51$  cm and the individual variation among bucks was significant ( $P < 0.05$ ). This observation was in close agreement with Okere *et al.* (2011). Conversely, higher SC values were recorded in Damascus (Ghalban *et al.*, 2004) and Rayini (Zamiri and Heidari, 2006) bucks by some researchers, while others (Oyeyemi *et al.*, 2000; Khan *et al.*, 2007; Gogoi *et al.*, 2008; Olurode, 2018) recorded lower values in different breeds of goats. The scrotal circumference was significantly ( $P < 0.05$ ,  $P < 0.01$ ) and positively correlated with testicular length, testicular width, ejaculate volume, seminal pH, mass motility, individual motility, live sperm count and concentration (Table 2). Similar highly significant correlations of scrotal circumference, including testicular biometry with seminal traits in different breeds of goats were also reported by earlier workers (Zamiri and Heidari, 2006; Gogoi *et al.*, 2008). However, Aliyu *et al.* (2016) reported significant positive

correlations of scrotal circumference with semen volume, motility and live-dead ratio, and negative correlations with semen pH and semen concentration. Moreover, Patel *et al.* (2021) and Singh *et al.* (2022) also reported significant positive correlation of testicular volume with semen volume, sperm concentration, total sperm output, per cent sperm motility, longevity, HOS reactivity and abnormal droplets and significant negative correlation of testicular volume with abnormality of sperm head and tail. These differences in results might be due to difference in breed, age, season and other factors.

### Testicular Length

The overall mean testicular length in Berari bucks was measured as  $7.67 \pm 0.30$  cm, which varied significantly ( $P < 0.05$ ) among the individual bucks (Table 1). These observations were in close agreement with testicular length of  $6.90 \pm 0.33$  cm reported by Bogra *et al.* (2016), and  $8.56 \pm 0.07$  cm by Khan *et al.* (2007). Zamiri and Heidari (2006) reported the mean testis length of Rayini bucks weighing 55–60 kg and 50–54 kg as  $9.90 \pm 0.07$  and  $9.68 \pm 0.06$  cm, respectively. The present study observed significant and positive correlations of testicular length with testicular width, ejaculate volume, mass motility, live sperm count, and sperm concentration (Table 2). The correlation of testicular length with seminal pH was statistically non-significant. These findings corroborated with Zamiri and Heidari (2006), who reported significant correlations of testicular length with testicular width, scrotal circumference, live sperm count, sperm concentration and ejaculate volume.

### Testicular Width

The mean testicular width of Berari bucks recorded was  $5.04 \pm 0.23$  cm, with significant ( $p < 0.05$ ) variation among the individual bucks (Table 1). Our result agrees with the observation of  $4.91 \pm 0.08$  cm by Khan (2007), while Bogra *et al.* (2016) recorded lower value of  $4.38 \pm 0.24$  cm in black bucks. Zamiri and Heidari (2006) reported the higher mean testicular width of Rayini bucks weighing 55–60 kg and 50–54 kg as  $6.51 \pm 0.13$  and  $6.02 \pm 0.09$  cm, respectively. Testicular width was significantly ( $P < 0.05$ ) and positively correlated with ejaculate volume, mass motility, individual motility, live sperm count and sperm concentration (Table 2). These correlations were in close agreement with the report of Zamiri and Heidari (2006).

## CONCLUSION

Semen volume and sperm concentration increased with an increase in scrotal circumference in Berari bucks. Positive correlations between scrotal circumference and semen characteristics indicate that selection for increased scrotal circumference could positively affect semen characteristics in this breed.

**Table 1:** Scrotal biometry of Berari bucks (Mean  $\pm$  SE)

Buck No.	Scrotal circumference (cm)	Testicular length (cm)	Testicular width (cm)
1 (n = 24)	25.99 <sup>b</sup> $\pm$ 0.06	8.33 <sup>b</sup> $\pm$ 0.05	5.41 <sup>b</sup> $\pm$ 0.03
2 (n = 24)	26.36 <sup>a</sup> $\pm$ 0.06	8.53 <sup>a</sup> $\pm$ 0.08	5.68 <sup>a</sup> $\pm$ 0.03
3 (n = 24)	24.35 <sup>c</sup> $\pm$ 0.05	7.28 <sup>d</sup> $\pm$ 0.05	5.21 <sup>d</sup> $\pm$ 0.03
4 (n = 24)	23.97 <sup>d</sup> $\pm$ 0.05	7.93 <sup>c</sup> $\pm$ 0.04	5.31 <sup>c</sup> $\pm$ 0.03
5 (n = 24)	23.65 <sup>e</sup> $\pm$ 0.05	7.37 <sup>d</sup> $\pm$ 0.05	4.48 <sup>e</sup> $\pm$ 0.03
6 (n = 24)	23.36 <sup>f</sup> $\pm$ 0.05	6.56 <sup>e</sup> $\pm$ 0.05	4.12 <sup>f</sup> $\pm$ 0.03
Overall (n=144)	24.62 $\pm$ 0.51	7.67 $\pm$ 0.30	5.04 $\pm$ 0.23

N= No. of observations, Means bearing different superscripts within the column differ significantly ( $P < 0.01$ ).

**Table 2:** Correlations of scrotal biometry with physical and microscopic characteristics of Berari buck semen

Parameter	Scrotal circumference	Testicular length	Testicular width
Testicular length	0.859**	--	--
Testicular width	0.812**	0.861**	--
Ejaculate volume	0.581**	0.433*	0.440*
Seminal pH	0.176*	0.133 <sup>NS</sup>	0.069 <sup>NS</sup>
Mass motility	0.423*	0.370*	0.319*
Individual motility	0.337*	0.330*	0.314*
Live sperm count	0.420*	0.422*	0.390*
Sperm concentration	0.433*	0.397*	0.282*

N=144 observations each, \*Significant ( $P < 0.05$ ), \*\*Significant ( $P < 0.01$ ), NS Non-significant.

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**ANNOUNCEMENT: SVSBT-NS-2022****IX Annual Convention and National Seminar of SVSBT**

The **IX Annual Convention** and **National Seminar** of The Society for Veterinary Science & Biotechnology (**SVSBT**) on **"Recent Biotechnological Advances in Health and Management to Augment Productivity of Livestock and Poultry"** will be **organized at Ramayanpatti, Tirunelveli - 627 358, Tamil Nadu, during September 22-24, 2022** (Thursday, Friday & Saturday) by Veterinary College & Research Institute, Tirunelveli - 627 358, TANUVAS, (TN). The detailed Brochure cum Invitation showing Theme Areas/ Sessions, Registration Fee, Bank Details for online payment and deadlines, etc. has been floated on the Whats Apps and e-mails. Accordingly, the organizing committee of **SVSBT NS-2022 invites abstracts** of original and quality research work on theme areas of seminar limited to 250 words by e-mail on [svsbtttns2022@gmail.com](mailto:svsbtttns2022@gmail.com) or [mopandian69@gmail.com](mailto:mopandian69@gmail.com) latest by 30th August, 2022 for inclusion in the Souvenir cum Compendium to be published on the occasion.

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