

Original Research Article

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A Study of Age, Body Weight and Scrotal Circumference on Semen Production in Buck

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ABSTRACT

Keywords

Buck, Semen, Scrotal circumference, initial motility, frozen straws, concentration

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The present study aimed to find out correlation of age, body weight and scrotal circumference with semen parameters in Beetal and Black Bengal Bucks. Total 12 buck selected 6 of each breed. Average Age was 24.00 ± 0.00 & 22.27 ± 0.035 months, body weight was 55.06 ± 0.306 & 42.47 ± 0.200 kg and scrotal circumference was 27.35 ± 0.57 & 26.25 ± 0.034 cm in Beetal and Osmanabadi bucks, respectively. Average Semen volume was 1.27 ± 0.027 & 1.30 ± 0.030 ml, sperm concentration was 5601.63 ± 75.810 & 4964.56 ± 100.075 million, initial motility was 83.03 ± 0.215 & 82.65 ± 0.352 per cent, 59.45 ± 0.283 & 58.96 ± 0.386 per cent was the post thaw motility and 66.26 ± 2.192 & 59.45 ± 2.692 was the number of straw produced from single ejaculate in Beetal and Osmanadi Breed, Respectively. Age was positively correlates with the body weight, scrotal circumference and concentration in Osmanabadi bucks. Body weight was found positive relation in terms of scrotal circumference and concentration in Beetal but in Osmanabadi only with Age. Scrotal circumference was positively correlate with body weight, volume and concentration in case of all selected breeds.

Introduction

The world's goat population is around 924 million and which is increasing at the rate of 2.34 per cent per annum (FAO, 2011). According to 19th livestock census the Goat population in India is around 135.2 million. Goat is a most important species because short gestation period, higher rate of fecundity and the market demand of the goat products. Profitability of goat farming is mainly influenced by reproductive efficacy of

a doe. Male fertility is directly depend on the normalcy of genital organ, age, body weight, nutrition, general health and endocrine balance (Peter, 2002).

Buck is considered as half of flock because they are responsible for conception rate and establishment of high genetic merit of the kid (Ford *et al.*, 2009). Selection of buck for the breeding purpose is most important aspect because more attention required on body weight, growth rate and soundness of sex

organ. Male Fertility is an important factor in caprine reproduction since numerous does are generally bred to a single buck. Hence, it is important to evaluate the male fertility prior to breeding (Kridli *et al.*, 2005).

Higher concentration and volume of semen obtained when semen collected at regular interval twice a day or once day for a certain period which not affect the buck semen quality (Shamsuddin *et al.*, 2000). There are limited references found on the relationship of Age, body weight and scrotal circumference on the semen quality and quantity in buck. Scrotal circumference and body are most decisive factor in breeding soundness examination of buck. Hence this study was undertaken to assess the effect of body weight and scrotal circumference on semen production in buck.

Materials and Methods

The present research trial was conducted at BAIF development research foundation at Goat semen station, Wagholi, district Pune during 1st January 2019 to 28th March 2019.

Total 12 bucks of two breeds were selected and out of that six of Beetal, six of Osmanabadi, bucks of different age groups and body weight were included in the trail. Before selection of the experimental bucks general body health were examined. Testes and scrotum were also examined to rule out any type of abnormality. All selected bucks were reared under intensive management system. Vaccination, deworming and dipping were done in all selected bucks as per MSP.

The body weights of all bucks were measured by using electronic weighing balance. Scrotal circumference was measured using flexible measuring tape in centimetre once in a three month (Akpa *et al.*, 2006). Semen sample from all bucks were collected thrice a week

on alternate day by artificial vagina method having 45°C temperature and 6 inch length. Semen samples were evaluated immediately after collection for colour, volume, initial motility and concentration. Volume of semen was measured using graduated semen collection tube in centimetres. Colour of each ejaculates was categorized as, milky, creamy, watery and bloody.

Concentration of all samples was measured with the help of photometer (IMV manufacture) by 1: 100 dilutions. Initial motility was determined by placing drop of diluted semen on pre warm glass slide and covered with cover slip and examined under the 20X magnification.

The samples were diluted by single dilution method and after 10 min packaging was carried out then produced straws were subjected for equilibration for four hours at 4°C. Freezing was undertaken by conventional method (static vapour pressure). Samples were subjected for post thaw motility 24 hrs after the freezing. Frozen straw having motility more than 50 per cent were stored in wide mouth LN₂ container according to breed and individual buck. The data were analysed with the help of statistical correlation.

Results and Discussion

Semen parameters in relation to Age, Body weight and scrotal circumference of all selected Goat breed are summarised in the following table no 1. In case of Beetal average Age was 24.00±0.00 months, body weight was 55.06 ± 0.306 kg and scrotal circumference was 27.35±0.57 cm.

The semen parameters of beetal breed in three month periods are as follows i.e. Average Semen volume was 1.27±0.027 ml, 5601.63±75.810 million sperm concentration, initial motility was 83.03±0.215 per cent,

59.45±0.283 per cent was the post thaw motility and 66.26±2.192 was the number of straw produced from single ejaculate.

Average age of four Osmanabadi breed was 22.27 ± 0.035 months, 42.47 ± 0.200 kg was the average body weight and average scrotal circumference was 26.25± 0.034 cm. In semen parameters the average volume was 1.30± 0.030 ml, 4964.56 ± 100.075 million was the concentration, 82.65± 0.352 per cent initial motility, 58.96± 0.386 per cent post thaw motility and 59.45± 2.692 was the number of straws produced per ejaculates in Osmanabadi buck. (Table no. 1).

In beetal breed, after statistical analysis we did not find correlation of Age with body weight, scrotal circumference and all other seminal parameters because the selected bucks were of same age. Body weight was positively correlated with scrotal circumference, concentration and frozen straws whereas, negatively correlated with volume, initial motility and post thaw motility. Scrotal circumference of beetal breed was found significant difference in terms of body weight, volume, concentration and frozen straws but non-significant difference with initial and post thaw motility (Table 2).

In case of Osmanabadi breed after statistical analysis we found significant difference of Age with body weight, Scrotal circumference, concentration and initial motility, but no significance with Volume, post thaw motility and number of frozen straws from single ejaculate whereas, body weight was positively correlated with only age but, negatively correlated with all other physical and seminal parameters. Scrotal circumference in beetal buck was found significant difference with Age, Volume and concentration but, non-significant difference with all others physical and seminal parameters (Table.3)

Chuck Okere *et al.*, (2011) reported that BCS were positively correlated with body weight and scrotal circumference shows positive and moderate correlation with semen volume, which is similar with present finding in all bucks with scrotal circumference. The body weight and scrotal circumference of crossbred bulls influenced all semen production traits except the post thaw motility was not affected very much by the body weight of bulls (Gopinathan, 2016) finding in terms of post thaw motility with all parameters was positively correlated with present study of buck.

Semen production mostly depend upon age, sexual maturity, nutritional status, general health condition, endocrine mechanism and soundness of sexual organ and the season (Peter, 2002; Karagiannidis *et al.*, 2000). Das *et al.*, (2006) documented that the volume of semen ranges from 0.16-0.51 ml in case of black Bengal buck, which is lower than that of the present study.

This difference might be due to above mentioned reason. Kabiraj *et al.*, (2011) concluded that more the testicular circumference more the concentration of spermatozoa, this could be due to higher testicular size with higher spermatogenic activity this finding positively correlated with the present finding.

Shamsuddin *et al.*, (2002) reported that the mean scrotal circumference of black Bengal breed at puberty ranged from 14.0 to 16.0 cm, which is positively support the present finding. Testicular parameters and semen parameters were increased with advancement of age and body weight (Kabiraj, 2011). Raji *et al.*, (2008) who reported a significant difference between testicular weight and body weight in indigenous goat of Nigeria.

Table.1 Average value of Age, body weight, scrotal circumference and semen parameters in Beetal and Osmanabadi bucks

Parameters Breed	Age (month) ± SE	BWT ± SE	Scrotal circum- ference ± SE	Volume ± SE	Concentration ± SE	Initial motility ± SE	Post thaw motility ± SE	Frozen straws ± SE
Beetal	24.00± 0.00 (6)	55.06 ± 0.306 (6)	27.35 ±0.57 (6)	1.27 ±0.027 (282)	5601.63 ±75.810 (282)	83.03 ±0.215 (282)	59.45 ±0.283 (282)	66.26 ±2.192 (282)
Osmanabadi	22.27 ± 0.035 (6)	42.47 ± 0.200 (6)	26.25± 0.034 (6)	1.30± 0.030 (164)	4964.56 ±100.075 (164)	82.65± 0.352 (164)	58.96± 0.386 (164)	59.45± 2.692 (164)

Table.2 Correlation of Body weight and scrotal circumference with various semen parameters in Beetal bucks

Parameters	Age	Body weight	Scrotal circumference	Volume	Concentration	Initial motility	Post thaw motility	Frozen Straws
Age	---	---	---	---	---	---	---	---
Body weight	---	---	0.2040 0.0006 (S)	0.0624 0.2963 (NS)	0.3016 0.0001 (S)	0.0414 0.4889 (NS)	0.0344 0.5655 (NS)	0.1385 0.0200 (S)
Scrotal circumference		0.2040 0.0006 (S)	---	0.3987 0.0001 (S)	0.1994 0.0008 (S)	0.1033 0.0833 (NS)	0.0009 0.9882 (NS)	0.3525 0.0001 (S)

Table.3 Correlation of Body weight and scrotal circumference with various semen parameters in Osmanabadi bucks

Parameters	Age	Body weight	Scrotal circumference	Volume	Concentration	Initial motility	Post thaw motility	Frozen Straws
Age	---	0.8214 0.0001 (S)	0.3496 0.0001 (S)	0.0678 0.3882 (NS)	0.2883 0.0002 (S)	0.1581 0.0431 (S)	0.0576 0.4636 (NS)	-0.1129 0.1501 (NS)
Body weight	0.8214 0.0001 (S)	---	0.1197 0.1267 (NS)	0.0704 0.3703 (NS)	0.1469 0.0605 (NS)	0.1170 0.1359 (NS)	0.0655 0.4049 (NS)	0.1342 0.0867 (NS)
Scrotal circumference	0.3496 0.0001 (S)	0.1197 0.1267 (NS)	---	0.2030 0.0091 (S)	0.2466 0.0015 (S)	0.0352 0.6545 (NS)	0.6545 0.3167 (NS)	0.0047 0.9522 (NS)

Aliya *et al.*, (2016) revealed that body weight and scrotal circumference was positively correlated with semen parameters like semen colour, semen concentration, semen motility,

and live and dead percentage, which is supporting the present findings in terms of semen concentration and initial motility. A satisfactory potential breeding buck should

have suitable scrotal circumference because scrotal circumference positively correlates with sperm concentration and total spermatozoa per ejaculates (Bongso, 1982).

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