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Semen Characteristics of the Brown Ecotype of Sahel Goats in the Semi-arid Zone of Nigeria

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Abstract: A study was undertaken to determine the semen characteristics of the brown ecotype of sahel bucks. Five bucks were subjected to semen collection from two to twelve months of age. It was observed that the values of the semen characteristics increased over-age (months) and that at three months of age, there were significant levels of semen characteristic values. In conclusion, the spermiogram of the brown ecotype of sahel bucks was studied with a view to document the semen profile of indigenous and possibly evolving ecotypes of sahel bucks for future studies of improved breeding and selection.

Key words: Semen characteristics, brown ecotype, sahel, bucks

INTRODUCTION

Goats are small ruminants descended from the species (*Capra oeagrags*) (Williamson and Payne, 1984) and are thought to be the first animals to be domesticated for economic purposes.

Immediately after domestication, physical differentiation into breeds and types began. Early changes affected the ears, horns, colour and hair type.

Devendra and Mcleroy (1982) described the typical Sahel goat as being long legged, medium to large size with ears of variable length, which may be long or short. The coat is short and hair covering fine. The animals generally measure between 65-85 cm at the withers and weigh between 25-35 kg.

According to Kwari (2001) there are seven ecotypes of Sahel goats. These are kano brown, Maradi, Chad, Maure, Tuareg, Burkina Faso and Borno ecotypes. All these ecotypes are present in the sub-sahelian region of North Eastern Nigeria. Sahel goats in the Borno pastoral setting are small but not dwarf.

The brown colour ecotype of sahel goats in Borno State probably owed much of their ancestry to the Kano Brown/Red Sokoto gene pool. The heterosis is diverse and had perhaps undergone local mutations necessary for local adaptability (Kwari, 2001).

Goats are said to be second to cattle in order of importance as a source of meat and milk in the tropics and temperates, respectively (Spedding, 1983). Goats have high fertility and are of short generation interval.

Therefore they can multiply their numbers within a short period. These characters among others make goats a high potential source of animal protein for man (Osuagwuh, and Akpokodje, 1981).

In order to improve the genetic make up of goats, an attempt at studying the semen characteristics is of utmost importance, as this will enhance proper selection of proven sires.

The inadequacy of data on the reproductive capacity particularly of the brown ecotype of goats which are indigenous to the Sahel belt of Borno State stimulated the need to undertake this study.

MATERIALS AND METHODS

Brown ecotype of sahel bucks were housed at the Artificial Insemination (AI) Unit of the Veterinary Teaching Hospital. The period of study covered from May, 2001 to February, 2002. They were aged 2 months and were obtained from the University of Maiduguri Animal farm. The bucks were taken out to graze in the morning and penned at night in pens with concrete floors, constant shade and good ventilation. They were fed groundnut leaves, wheat bran, maize bran, bean husks and water was given *ad libidum*.

Semen samples were collected three times at an interval of every four days every week from the age period of 8-12 weeks by the electro ejaculation method (Akusu *et al.*, 1984).

After an interval of two weeks, semen was collected three times every two weeks up to 12 months of age.

The semen colour was recorded and the volume read soon after collection from the graduated collecting vial. The semen was then kept in a water bath at 37°C until evaluation was completed.

Sperm concentration was determined by the haemocytometry method, Bearden and Fuguay (1992), progressive motility tests were conducted as described by Zemjanis (1970). The live dead ratio was determined as a percentage, only sperm cells that picked the stain were counted as dead, while those colourless were counted as live cells (Moss *et al.*, 1979).

Statistical analysis: The results were presented as Mean±SD. Analysis of variance (ANOVA) was used to analysed the data collected (Snedecor and Cochran, 1973).

RESULTS AND DISCUSSION

The semen characteristics were analysed from 2 months to 12 months of age. The colour was creamy. The pH ranged from 0.00 to 7.20, volume ranged from 0.00 to 0.98 mL, mass activity ranged from 0.00 to 3.87, progressive motility ranged from 0.00 to 87.33 and percentage live spermatozoa ranged from 0.00 to 96.07 and concentration ranged from 0.00 to 3.33. Table 1 shows that there is a systemic increase of the semen characteristics over age (months) it is also observed

that after a certain age, the value of each of the semen characteristics remains relatively constant.

This study has shown that after three months of age there was no marked increase in semen characteristics and that the values of the semen characteristics remain relatively constant. Studies by Salhib *et al.* (2003) showed that there were significant effects (p<0.01) for the age and weight of lambs on ejaculate volume, progressive mortality and spermatozoal concentration and that ejaculate volume and spermatozoa concentration increased significantly (p<0.001) with age despite monthly variations which also agrees with findings of this study.

The finding of this study of increment of semen characteristics values with age is in consonance with Morris *et al.* (1978) and Coulter (1982) who stated there is a good correlation between sperm production and age of the animal.

The marked increase of semen characteristic value by three months of age indicates that, it maybe the age for the onset of puberty. The value of 1.06x10⁹ for concentration is within the value of 0.8x10⁹ reported by Mann (1980) as the minimum concentration required for fertilization in West African Dwarf Goats.

Significant levels of semen characteristics at three months indicate that males sahel goats could begin producing semen with viable sperms by then. This agrees with reports of early maturing breeds reaching puberty as early as 3 months (Shelton, 1978) and even 2 months (Wang *et al.*, 1991).

Table 1: Semen characteristics of the brown ecotype of sahel bucks

Month	pH		Mass activity		Motility		% Live		Concentration	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.25	6.23	0.26	0.20	0.41	1.33	3.52	0.67	2.58	0.00	0.00
2.50	6.37	0.23	0.67	0.49	8.00	6.21	8.33	6.73	0.23	0.26
2.75	6.33	0.24	1.60	0.51	29.00	11.98	27.00	6.76	0.42	0.23
3.00	6.77	0.32	2.73	0.46	61.67	7.72	49.00	5.73	1.06	0.57
3.50	6.95	0.31	2.80	0.41	66.67	6.73	50.33	7.90	1.41	0.50
4.00	7.07	0.24	2.87	0.35	69.00	5.73	57.00	5.61	1.70	0.24
4.50	7.01	0.25	2.80	0.41	68.67	6.11	59.00	5.07	1.75	0.13
5.00	7.11	0.26	2.80	0.41	68.67	5.81	64.00	5.73	1.68	0.18
5.50	7.02	0.32	2.73	0.46	67.67	4.58	69.00	4.71	1.95	0.60
6.00	7.11	0.26	3.33	0.49	74.00	6.04	73.67	6.11	2.41	0.59
6.50	7.01	0.25	3.47	0.52	77.67	6.23	77.00	5.28	2.82	0.10
7.00	7.03	0.33	3.53	0.52	80.67	4.95	85.13	7.89	2.69	0.28
7.50	7.18	0.24	3.40	0.51	81.00	3.87	93.80	2.14	2.88	0.41
8.00	7.14	0.20	3.20	0.41	81.33	3.52	94.40	1.72	2.76	0.36
8.50	7.11	0.28	3.07	0.46	80.00	3.78	94.80	1.82	2.80	0.23
9.00	7.10	0.21	3.27	0.46	83.00	4.55	94.27	2.34	2.98	0.42
9.50	7.17	0.24	3.20	0.41	84.00	5.73	94.33	2.26	2.91	0.32
10.0	7.17	0.24	3.33	0.49	85.67	5.30	94.67	1.91	3.31	0.40
10.5	7.20	0.25	3.47	0.52	85.67	4.95	94.80	2.33	3.32	0.50
11.0	7.13	0.30	3.73	0.80	84.00	3.87	93.93	2.28	3.27	0.45
11.5	7.17	0.24	3.87	0.74	84.00	3.87	95.40	2.16	3.33	0.58
12.0	7.13	0.23	3.80	0.94	87.33	5.30	96.07	1.91	3.22	0.51

In conclusion, the spermiogram of the brown ecotype of sahel goats was studied with a view to document the semen profile of indigenous and possibly evolving ecotypes of sahel bucks for future studies of improved breeding and selection.

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