ASSESSMENT AND CLASSIFICATION OF SEMEN QUALITY FROM THREE BREEDS OF SHEEP FED SUPPLEMENTED *BRACHIARIA DECUMBENS* OR *DIGITARIA SMUTSII* HAY

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ABSTRACT

The aim of the study was to assess and classify the quality of semen from Balami, Uda and Yankasa breeds of sheep fed *Brachiaria decumbens* or *Digitaria smutsii* supplemented hay. Thirty rams, 10 each of Balami, Uda and Yankasa breeds aged 18 months and weighing 24.75, 25.50 and 25.50 kg, accordingly were used. All semen quality traits were influenced by genotype and hay type. Semen taken from rams fed *Digtaria smutsii* had higher number of live spermatozoa and lower number of abnormal spermatozoa than those fed *Brachiaria decumbens* hay. Balami rams were superior for semen volume and concentration while Uda rams were superior in normal and live spermatozoa percentage. There was interaction between breed and hay type in most of the traits where rams on *D. smutsii* hay had higher values than those on *B. decumbens*. It was therefore, concluded that variation in some semen characteristic of indigenous breeds of sheep was both breed and feed inclined. Hence it is recommended that farmers feed their animals quality forages to improve their reproductive performance.

Key words: *fertility, breed, reproduction, hay type, rams*

INTRODUCTION

The importance of small ruminants especially sheep are for the subsistence, economic and social livelihood of small-holder farmers in Nigeria cannot be overemphasized. Improvement in flock performance by selection of breeding rams based on phenotypic data is still the most practiced method for the genetic improvement of livestock. Evaluation of breeding male animals on the basis of their reproductive traits has been studied in different species for example, in bulls (Sekoni,1993; Rekwot *et al*., 1998), bucks (Bitto and Egbunike, 2005), sheep (Jibril *et al.*, 2011) and camels (Ibrahim *et al.*, 2012) and are available in literature. However, there is little that has been done on within species comparison of their semen quality hence the need for comparing the semen quality of rams.

The objective of this research was to assess and classify the quality of semen from Balami, Uda and Yankasa rams fed *Brachiaria decumbens* or *Digitaria smutsii* supplemented hay.

MATERIALS AND METHODS

Study area

The study was carried out at the National Animal Production Research Institute (NAPRI) Shika, Ahmadu Bello University Zaria, situated in the Northern Guinea Savannah, and lying between latitudes 11° 11′ 60 N and between longitude 7° 34′ 60 E at an elevation of 646 m above sea level.

Experimental animals and management

Thirty growing rams comprising Balami, Uda and Yankasa breeds averagely aged 18 months and weighing 24.75, 25.50 and 25.50 kg for Balami, Uda and Yankasa, respectively were used in a complete randomized design (CRD) with each breed serving as a treatment with five replicates. They were quarantined for thirty days after which they were fed B. *decumbens* or *D. smutsii* hay *ad libitum* supplemented with concentrate at 2 % of their body weight. Semen samples collected were evaluated with modifications. The volume of semen was measured directly from the calibrated tube used for collection. Microscopic examination for wave pattern (gross sperm motility) was determined by placing a drop of raw undiluted semen on a pre-warmed slide then cover-slipped and viewed using a field microscope at X40 magnification. Sperm concentration was determined using a haemocytometer. Live dead ratio of the sperm cells was determined as described by Esteso *et al.* (2006). A thin smear of the semen sample was made on clean grease free glass slide and stained with eosin-nigrosin stain. Four hundred sperm cells were counted using light microscopy at X40 magnification. Sperm abnormalities were determined by making a thin smear of the semen sample on clean grease free glass slide and fixed with buffered formol saline.

Table 1: Ingredient, chemical composition and cost per kg of concentrate diet

Ingredients	*(%)*	*Cost (₦ per kg)*
Maize	37.87	26.13
Maize offal	18.94	13.07
Cottonseed cake	39.19	27.04
Bone meal	2,50	1.72
Table Salt	1.50	1.03
Total	100	68.99
Chemical composition		
Dry matter	92.78	
Organic matter	81.23	
Crude protein	13.63	
Ether Extract	17.15	
Crude fibre	27.40	
Acid detergent fibre	45.95	
Neutral detergent fibre	56.27	
Ash	11.55	
ME (MJ/kg DM)	10.52	

Table 2. Semen quality of three breeds of sheep

	Breed			SEM	Hay type		SEM
Parameters	Balami	Uda	Yankasa		*B. decumbens*	*D. smutsii*	
Color	2.1^{b}	2.0^{b}	2.3^{a}	0.03	2.05^{b}	2.2^{a}	0.03

Volume(ml)	1.14[a]	0.92[ab]	0.7[c]	0.04	0.9	0.93	0.04
Concentration 10^6/ml	136[a]	128[b]	111[c]	3.7	110[b]	125[a]	3.7
Motility	96.33[a]	95.00[ab]	93.00[c]	0.86	95.00[a]	93.00[b]	0.86
Live sperm (%)	83.6[b]	83.87[b]	84.65[a]	0.25	82.8[b]	84.7[a]	0.24
Abnormality (%)	10.04[a]	9.41[a]	6.78[b]	0.35	11.1[a]	7.69[b]	0.3

[abc] *Means with different letters for a trait across breeds and hay type are different (p<0.05)*

Table 3. Semen quality traits and its interaction between breeds and hay type

	Colour	Volume(ml)	Motility	Conc. 10^6/ml	Live (%)	Abnormal (%)
B. decumbens						
Balami	2.2	1.17[a]	97.5[a]	126[a]	82.2	13[a]
Uda	1.95	0.94[b]	94.5b	122[b]	82	11.4[a]
Yankasa	2.1	0.62[c]	91.0c	110[c]	84.7	8.8[b]
SEM	0.06	0.04	0.86	3.5	0.4	0.5
D. smutsii						
Balami	2.1[b]	1.18[a]	98.1[a]	130[a]	84.4	8.5[a]
Uda	2.0[b]	0.98[b]	96.3[b]	127[a]	85	8.3[a]
Yankasa	2.4[a]	0.68[c]	93.2[c]	118[b]	84.7	6.2[b]
SEM	0.1	0.03	0.86	3.5	0.04	0.5

[a, b, c] *Means with different letters for a trait between breeds are different (p<0.05), conc. =concentration*

Statistical analysis

All data generated were analysed according to the general linear model in the ANOVA program of the SAS 9.0 program using the following model; $Y_{ijkm} = \mu + B_i + S_j + W_k + E_{ijkm.}$ Where: Y_{ijkm} = the dependent variable, μ= the overall mean, B_i= the fixed effect of i^{th} breed, S_j= the fixed effect of j^{th} hay, W_k= the interaction effect of k^{th} breed and hay and E_{ijkm}= the residual error

RESULTS AND DISCUSSION

Table 2 shows that spermatozoa traits were not significantly different (p>0.05) among the breeds while spermatozoa concentration and the spermatozoa livability differ significantly (p<0.05) for the different breeds of sheep.

The result showed that the motility of spermatozoa in fresh semen sample of Nigerian sheep breeds ranges between 93.0 and 96.33 %. This result was higher than 83.0% and 80% reported by Oyeyemi *et al*. (2002). The mean spermatozoa concentrations were between 110 and 136 x10^6. This is higher than 35 and 60 x10^6 sperm/mL in the ram ejaculate as reported by Evans and Maxwell (1987) but lower than 250 x 10^6 sperm/ml reported by Gil *et al*. (2003). The variation in the results obtained in this study and other works could be as a result of breed difference between temperate and tropical breeds as well as the environmental and nutritional influence on the animals. The mean livability ranges between 93.33 and 98.0%. It also shows significant differences between breeds. However, the values were far higher than range of 70 - 80% recommended by Kuster *et al*. (2004). However, range reported in the current study was higher than the value of 70 % and 85 % in boar by Roca *et al*. (2006) and this could be attributed to species difference. Spermatozoa acrosome integrity ranges from 96.33 – 97.67% and it was not significantly different between the ram breeds. The semen volume obtained in the study ranges between 0.35 – 0.45 mL which is lower than 0.5 – 2.0 mL for matured rams and 0.5 - 0.7 mL for young rams by Hafez and Hafez (2000). The variation could be as a result of genetic superiority between temperate and tropical breed of animal. For most of the traits studied, interaction existed between breeds and hay type.

CONCLUSION

The study showed that variation in some semen characteristic of indigenous breeds of sheep was both breed and feed inclined. It showed that the Yankasa breeds of sheep had the lowest spermatozoa motility compared to Balami and Uda breeds although the variation was not clearly understood in this study. However, further studies were recommended.

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