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THE RELATIONSHIP BETWEEN BODY CONDITION SCORE AND SCROTAL CIRCUMFERENCE IN NORTH- WESTERN NIGERIAN INDIGENOUS BREEDS OF ZEBU CATTLE

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ABSTRACT

The aim of the study was to evaluate the relationship that exist between body condition score and scrotal circumference of the three major Nigeria indigenous breeds of Zebu cattle in North-western Nigeria. Sixty bulls comprising twenty each of the Bunaji, Bokoloji and Rahaji breeds of 3-6 years of age were used for the study. Age was estimated using their dentition. Body condition score (BCS) was measured using the five-score scale and scrotal circumference (SC) measurements were performed using a flexible measuring tape. The overall mean values for age, BCS and SC for the Bunaji bulls were 3.50 ± 0.12 years, 3.05 ± 0.20 score and 28.33 ± 0.69 cm, respectively; for Bokoloji bulls, the values were 4.10 ± 0.23 years, 3.00 ± 0.11 score and 33.70 ± 1.47 cm, respectively; and for the Rahaji bulls were 5.4 ± 0.17 years, 3.30 ± 0.06 score and 30.90 ± 0.78 cm, respectively. Bokoloji bulls had the highest mean value of SC than Rahaji and Bunaji breeds. The correlation between BCS and SC were positive and significant in Bunaji ($r = 0.518$, $P < 0.5$), Bokoloji ($r = 0.606$, $P < 0.01$) and Rahaji ($r = 0.560$, $P < 0.5$) breeds of cattle. It was concluded that BCS influenced SC positively and subsequently influence sperm production in Bunaji, Bokoloji and Rahaji breeds of Zebu bulls in North-Western Nigeria.

Keyword: Bunaji bulls, Bokoloji bulls, Rahaji bulls, Body condition score and Scrotal circumference.

INTRODUCTION

Bunaji, Bokoloji and Rahaji breeds, are fairly large breeds of cattle that are very common in Nigeria, but most of these animals are reared under the extensive or pastoral system of management, in which detailed records on birth, age, growth and reproductive characteristics are usually not done (Kubkomawa, 2017). However, the relationship between growth, body condition score (BCS), testicular development, testicular dimensions, scrotal circumference and spermatogenesis and/or semen quality are of importance in Artificial Insemination Centres and progeny test stations (Baharun *et al.*, 2021). Traditionally, these breeds of bulls have been selected on the basis of growth, rather than on reproductive potentials (Kubkomawa, 2017). However, reproduction is one of the most important factors affecting livestock production (Hess *et al.*, 2005). Scrotal Circumference (SC) has been the most widely used and studied criterion in screening programmes as a measure indicative of morphological and physiological characteristics of gonads and quantitative and therefore, the qualitative characteristics of semen in cattle (Perumal, 2014). Measuring SC of young bulls is an adequate, reputable method to assess current and future sperm-producing ability which gives an estimate of the testicular weight which is directly related to sperm production level (Hamilton, 2009). Condition scoring is a system of describing or classifying animals by differences in relative body fatness (Thomas and Kott, 2002). The advantage of a condition score measurement is that it is easy to learn, fast, simple, cheap, does not require specialized equipment and is sufficiently accurate for many research and management situations (Rutter *et al.*, 2002). It is useful not only for research scientists but also for farmers and development planners (Nicholson and Butterworth, 1986; Cisse *et al.*, 1990; Song *et al.*, 2019). Studies have shown that body weight influences SC (Gopinathan *et al.*, 2018) and also body weight is said to be positively correlated with BCS (Sanson *et*



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al., 1993) hence this study was to predict the relationship that exist between BCS and SC. Knowledge is required on the relationship between the BCS with the SC. This would enhance the possibility of early commencement of semen collection from bulls with adequate body condition score.

MATERIALS AND METHODS

Sixty (60), apparently, healthy post-pubertal bulls comprising 20 Bunaji (White Fulani), 20 Bokoloji (Sokoto Gudali) and 20 Rahaji (Red Bororo) breeds were used for the experiment. Samples were collected at the Zango-Zaria and Kano Central abattoirs. Apparently healthy Bunaji and Bokoloji bulls between the ages of 3 and 6 years were randomly selected as they entered the Zango-Zaria abattoir, and, also, apparently healthy Rahaji bulls between the ages of 3 and 6 years were randomly selected as they entered the Kano Central abattoir. The bulls were from different backgrounds. The age of each selected bull was determined using the dentition according to Lasisi *et al.* (2002). BCS of each selected bull was assessed using a five-score scale and; their SC was measured with a flexible tape after restraining the bull and pushing the testicles to the bottom of the scrotum and then measuring the greatest circumference with a flexible tape (Varghese *et al.*, 2019).

Data Analysis

Values obtained were expressed as mean $\pm$ standard error of mean ($\pm$ SEM). Mean values ($\pm$ SEM) for each parameter were computed. Data were analysed using one-way analysis of variance (ANOVA) and Tukey's *post-hoc* test to compare between the groups. Significant of differences between groups were estimated as $P < 0.05$. Correlation coefficients using Pearson's correlation was estimated between the parameters. Differences at $P < 0.05$ were considered to be statistically significant.

RESULT AND DISCUSSION

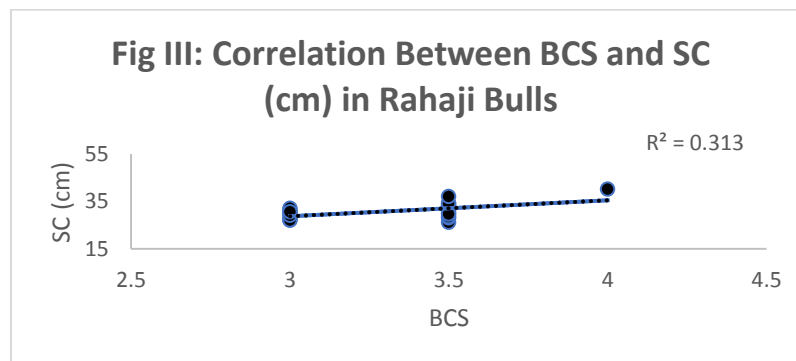
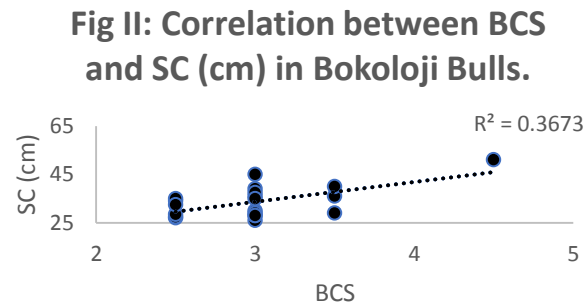
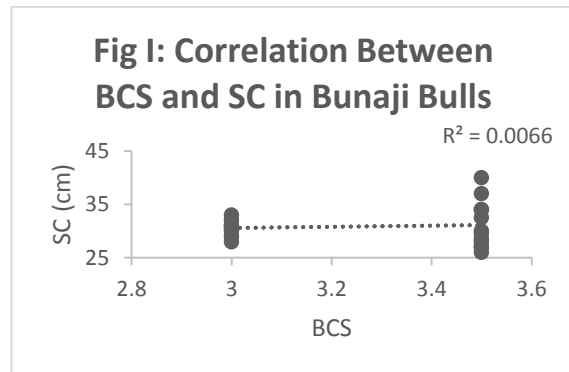
The mean BCS ranged from 3.05 ± 0.02 to 3.30 ± 0.06 score and the mean values were not significantly ($P > 0.05$) different from one another. The mean values of the SC ranged from 28.33 ± 0.69 cm to 33.70 ± 1.47 cm, with the Bunaji breed having the significantly lowest ($P < 0.05$) value. The Bokoloji breed recorded the highest ($P < 0.05$) value as seen in Table 1. Bokoloji bulls showed similar findings to those observed by Ahmad *et al.* (2005) in Sahiwal bulls (32.14 ± 1.02 cm) of above 5 years of age, Brito *et al.* (2004) in Nelore (*B. indicus*) bulls (28.50 ± 0.90 cm) of 2 years of age, Perumal (2014) in Tho Tho (*B. indicus*) bulls (31.28 ± 0.98 cm and 32.27 ± 1.22 cm) of above 3 years of age, Nwakalor and Obasi (1991) in Bunaji bulls (30.80 ± 0.90 cm) and Addass (2011) in Nigerian indigenous breeds (30.37 ± 0.12 cm) of $3\frac{1}{2}$ -4 years of age. Mahmood *et al.* (2014) reported a higher value of 36.02 ± 2.25 cm for Cholistani bulls of 7 years of age and also Daudu and Shoyinka (1983) recorded higher values (34.12 ± 0.42 cm and 34.54 ± 0.65) of SC measurement in Nigerian indigenous bulls of over 4 years of age than those observed in this study. The variations in SC observed in this study may be due to the differences in body weight, breed, scrotal shape and husbandry practices of the experimental animals. Positive and significant correlations were predicted in Bunaji ($r = 0.518$, $P < 0.5$), Bokoloji ($r = 0.606$, $P < 0.01$) and Rahaji ($r = 0.560$, $P < 0.5$) breeds of cattle as seen in Figure I, II and III respectively. These predictions were similar to those observed in Addass (2011) who reported that body condition score affects the sperm production potentials of some indigenous bull cattle in Mudi Adamawa state, Nigeria. The low to moderate positive correlation observed in this study shows that there is a direct linear relationship between BCS and SC. Studies has shown that there is a direct linear relationship between SC and sperm production (Susilawati *et al.*, 2020), hence a bull with a good condition scoring will have a good sperm production capacity.

Table 1: Mean ($\pm$ SEM) Values of the BCS and SC of Bunaji, Bokoloji and Rahaji Breeds of Cattle

Breeds/ Parameter	Age (years)	Body Condition Score	Scrotal Circumference (cm)
Bunaji	3.50 ± 0.12	3.05 ± 0.20	28.33 ± 0.69^a
Bokoloji	4.10 ± 0.23	3.00 ± 0.11	33.70 ± 1.47^b
Rahaji	5.4 ± 0.17	3.30 ± 0.06	30.90 ± 0.78



ab=Values with different superscripts across the same column differ significantly ($P < 0.05$), $n=20$



CONCLUSION

In conclusion, body condition score has a strong influence on scrotal circumference, hence also has an influence on sperm production, animals with higher body condition score at a maturity tends to have a higher scrotal circumference. We recommend that for selection of bull cattle for breeding, body condition score should be one of the selected criteria.

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