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PRODUCTIVITY AND MORPHOMETRIC CHARACTERIZATION OF BOER GOATS IN MAJESTIK FARM BIRNIN-KUDU, JIGAWA STATE, NIGERIA

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ABSTRACT

The study was conducted to assess the productivity and morphometric measurements (MM) of Boer goats raised in Nigeria. Data were collected from the imported flock of Boer goats maintained at Majestik Farm Birnin-Kudu, Jigawa State. A total of 110 Boer goats (40 males and 70 females) of different ages (>3 years, 2-3 years, 1-2 years and <1 year) were considered for morphometric characterization. Secondary data on reproductive performance were collected. Six morphological characteristics; body length (BL), height at wither (HW), chest girth (CG), head length (HeL), ear length (EaL) and neck circumference (NC) were measured. Data were collected according to standard guidelines for characterization of goat breed. Data obtained were subjected to simple descriptive statistics and analysis of variance using Statistical Package for social science version 23. The results showed that age at first kidding, kidding interval, kidding, twinning and mortality rates were 14.26 ± 2.07 months, 10.38 ± 1.81 months, 150.00%, 46.91% and 4.94% respectively. All MM were significantly ($P < 0.01$) varied between the age groups of Boer goats studied. Male Boer goats had significantly ($P < 0.01$) higher MM except for CG than female. It was concluded that Boer goats in this study were prolific and good producers of multiple birth.

Key words: Boer goat, body length, height at withers, chest girth, Kidding rate.

INTRODUCTION

Small ruminants, particularly goats play an important role in the economic life of the smallholder farmer, converting low-cost inputs to high-value products in the form of meat, milk and skin (Ikwuegbu and Ofodile, 1995). They are also an important source of animal protein and immediate cash, and have a variety of socio-cultural values (Odoi *et al.*, 2000). They are a secure form of investment. Majority of goat breeds of Nigeria are kept extensively by smallholder rural farmers. Sahel, Red Sokoto, Kano Brown and West African Dwarf goats are the most important indigenous goats breed found in Nigeria. Boer goat is originated from South Africa. It is used in many countries to improve indigenous goats for meat production. This meat breed of goats has been described as having the ability of rapid acclimation and adaptation, low water turnover rates and low parasites infestation (Shelton, 1978; Erasmus, 2000). Reproductive performance is one of the main determinants of productivity of goats and entails measurements that can be expressed as the kidding rate, weaning rate, kidding interval, live weight of kids born or weaned and the length of the reproductive cycle (Thomas, 2010). The morphometric traits can be categorized into three main groups viz. traits associated with length, height and girth (Yakubu *et al.*, 2010). They can be used as a management tool to promote the productivity of goats (Abdallah *et al.*, 2019). In

Nigeria a lot of studies have been carried out on indigenous goat. However, information on imported Boer goat is scanty. Therefore, this study was conducted to evaluate the productivity and characterize Boer goat using morphometric indices based on age and sex in Nigeria.

Materials and Methods

Description of the Study Area

The study was conducted at Majestik farm; No1 Sidimina Birnin Kudu, Birnin Kudu Local Government of Jigawa State, Nigeria. The farm lies within latitude $11^{\circ}27'06.2''\text{N}$ and longitude $9^{\circ}28'55.7''\text{E}$. The climate is semi-arid characterized by long dry (October - May) and short raining (May - October) seasons with a mean annual

**NSAP****47th Annual Conference (JOS 2022)****CONFERENCE PROCEEDINGS**THEME
SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

temperature of 25°C, relative humidity ranges from 80% in August to 23% between January and March and total annual rainfall ranges from 600-1000mm (Adejoke *et al.*, 2014).

Experimental Animal

Boar goats were imported from South Africa and reared under semi-intensive farming condition of Majestik Farm Birnin-Kudu, Jigawa State. A total of 110 (40 males and 70 females) Boar goats of different ages (>3years, 2-3years, 1-2years and <1year) were used for this study.

Data Collection

Data were collected according to the FAO (2012) guidelines for characterization of goat breed. All the measurements were taken early in the morning prior to feeding. Live body weight was measured using digital weighing scale in kilogram while linear body measurements (cm) were measured using measuring tape. Secondary data on reproductive performance were collected from the farm records of the animals.

Data Analysis

Data collected were subjected to descriptive statistics (mean and standard deviation) and analysis of variance (ANOVA) using SPSS version 23 (2013). Significant means were separated using the least significant differences (LSD).

RESULTS AND DISCUSSION

The reproductive performance of Boer goats in Majestik Farms Birnin-Kudu, Jigawa, State are shown in Table 1. The results showed that age at first kidding, kidding interval, kidding, twinning and mortality rates were 14.26±2.07 months, 10.38±1.81 months, 150.00%, 46.91% and 4.94% respectively. The key factors that determine the adaptability of a breed in a different agro-ecological condition than its' origin is measured through the relative ability of the individual to survive and reproduce the next generation to ensure continued survival of the population in that environment (Naskar *et al.*, 2012). Erasmus (2000) also emphasized on 'reproductive fitness' as the most important criterion relating to adaptation. Therefore, performances related to reproduction may be used as a measure for adaptation of a breed in a new environment. Age at first kidding in this study was longer than the 12 months reported for Boer goats by Wilson (1991). Kidding interval was found to be 10.38±1.81 months similar to 307.61±40.41 days in India (Bastola *et al.*, 2020) but higher than 258 days reported by Webb *et al.* (2004) and 265.35±4.42 days by Duricic *et al.* (2012). The differences may be due to difference in location and management practices as well as the Boer doe brought from South Africa were acclimatizing in the environment of Jigawa State.

Type of kidding in this study were single 38.27%, twins 46.91% and triplet 14.81% respectively. This is similar to 43%, 50% and 7% for singles, twins and triplets as reported by Wilson (1991). In Croatia, Duricic *et al.* (2012) found that Boar goats kidding were 49.20% (twins) and 18.62% of (triplets) respectively, which was similar with this study. However, their finding for singles (22.53%) was lower than 38.27% in this study. However, Erasmus (2000) recorded 33% triplets.

Kidding rates obtained in this study was 150%, lower than 189% in South Africa (Malan, 2000), 180% in Croatia (Duricic *et al.*, 2012) and 185% in the US (Browning *et al.*, 2006). The kidding rates for first and second parities were 126.5% and 161.1% respectively while the twinning rate was 49.29% (Bastola *et al.*, 2020). This variation in performances of Boer goats might be due to different agro-climatic condition and management system. Kid mortality recorded during the study period was 4.94% similar to 4.8% reported by Yousuf *et al.* (2020). Linear body measurements of Boer goats at Majestik farms Birnin-Kudu, Jigawa State are presented in Table 2. Sex had significant effect ($P < 0.01$) on mean Body Length (BL), Height at Withers (WH), Head Length (HeL), Ear Length (EaL) and Neck circumference. Male Boar goats had lengthier BL, HeL and EaL; higher height at withers and larger NC than females. But there is no significant effect of sex on mean Chest Girth (CG). Sex has been shown to be an important source of variation for body weight and morphometric traits of goats (Abdallah *et al.*, 2019). The significant ($P < 0.01$) effect of sex observed on body length, height at withers, head length, ear length and



NSAP

47th Annual Conference
(JOS 2022)

CONFERENCE PROCEEDINGS

THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

neck circumference was due to the fact that female goats were noted to be lighter in weight and shorter in linear body measurements compared with male goats as was also reported by *Nor Azhani et al. (2011)* and *Khan et al. (2006)*. The non-significant ($P < 0.01$) effect of sex on chest girth in this study was in agreement with (*Abdullah et al., 2019*) who found non-significant ($P < 0.01$) difference in chest girth between male and female Boer goat in Egypt.

Table 1: Reproductive performance of Boer goats in Majestik Farm Birnin-Kudu, Jigawa, State

Parameters	Performance
Age at first kidding(months)	14.26±2.07
Kidding interval(months)	10.38±1.81
Type of kidding	
Single (%)	31
Twin (%)	38
Triplet (%)	12
Kidding rate (%)	150.00
Twinning rate (%)	46.91
Mortality rate (%)	4.94

Significant effect ($P < 0.01$) of age on mean BL, WH, CG, HeL, EaL and NC were observed. Boer goats > 3years had the highest values for both traits while the least values were recorded in Boer goats < 1year.

The results of body length, height at withers, chest girth, head length, and neck circumference irrespective of sex and age were 58.08±1.48cm, 56.15±1.36cm, 65.57±1.62cm, 17.68±0.33cm, and 33.97±0.85cm. These observations are somewhat different from those of *Abdullah et al. (2019)* who reported 85.35cm, 62.35cm, 80.10cm, 17.90cm and 39.00cm respectively in the same breed. *NorAzhaniet al. (2011)* reported mean value of chest girth (78.80cm) and height at withers (64.15cm) in male goats of the same breed. Also, in Bangladesh, *Yousuf et al. (2020)* reported the mean values of body length, height at withers and chest girth for males to be 86.33±1.42cm, 72.12±1.20cm, 71.78±1.01cm and 75.83±1.43cm, 56.98±0.96cm, 61.99±1.21cm for female Boer goats which was in contrast with the findings of this study. The differences in body measurements in other reports on the Boer goats may be due to the difference in size of dataset, the environment and other management practices.

Table 2: Mean ± SE linear body measurements of Boer goats at Majestik farm Birnin-Kudu, Jigawa state

Factors	N	BL	HW	CG	HeL	EaL	NC
Overall mean	110	58.08±1.48	56.15±1.36	65.57±1.62	17.68±0.33	19.16±0.31	33.97±0.85
Sex		**	**	NS	**	**	**
Male(1)	40	66.74±1.22	65.41±1.2	71.40±1.52	19.77±0.45	20.89±0.42	42.32±0.74
Female(2)	70	59.91±0.77	56.65±0.76	69.25±0.96	17.61±0.28	19.45±0.26	33.33±0.47
Age							
>3yrs(1)	13	78.50±2.03*	72.70±1.99*	87.17±2.52*	20.73±0.75*	22.97±0.69*	46.72±1.23*
2-3yrs(2)	30	71.83±1.20*	71.05±1.17*	78.90±1.48*	20.40±0.44*	21.92±0.41*	42.25±0.72*
1-2yrs(3)	27	60.31±1.36*	58.45±1.33*	66.57±1.68*	18.80±0.50*	19.41±0.46*	36.35±0.82*
<1yrs(4)	40	42.68±0.98	41.93±0.96	48.65±1.21	14.83±0.36	16.38±0.33	25.98±0.59

** = Significant ($P < 0.01$), * = Significant ($P < 0.01$), NS = Not Significant. Number of observation (N), Body Length (BL), Height at Wither (WH), Chest Girth (CG), Head Length (HeL), Ear Length (EaL), Neck Circumference (NC). SE = standard error.



NSAP

47th Annual Conference
(JOS 2022)

CONFERENCE PROCEEDINGS

THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES

CONCLUSION

Boer goats in this study are prolific and good producers of multiple birth. There was variation in body measurements between males and females as well as age groups of Boer goats studied.

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**NSAP****47th Annual Conference (JOS 2022)****CONFERENCE PROCEEDINGS**THEME
SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

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RUMEN METABOLITES OF YANKASA RAMS FED UREA TREATED AND ENSILED MILLET STOVER BASED DIET WITH CONCENTRATES

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ABSTRACT

An experiment was conducted to evaluate the effect of feeding urea treated and ensiled millet stover based diet with supplements on rumen metabolites of growing Yankasa. Thirty (30) growing Yankasa rams weighing 16.35 to 18.21 kg were allotted to six treatments of five animals per treatment in a Completely Randomized Design. Four kg urea was dissolved in 100 litres of water sprinkled on 100kg of crushed millet stover and ensiled for 21 days was used as basal diet. A concentrate diet consisting of 300g of cotton seed cake diet 1, Faidherbia albida meal diet 2, CSC and maize offal diet 3, FA and maize offal diet 4, CSC and wheat offal diet 5 and FA and wheat offal diet 6, all

fed 150g twice daily. Fifty (50mls) of rumen liquor was withdrawn from 3 Yankasa rams of each diet to determine pH and short chain fatty acids. The values ranged from 5.87 to 7.68 for pH after feeding while for total short chain fatty acids they ranged from 40.26 to 51.60 after feeding respectively. Rams fed FA:WO 50:50 diet recorded higher pH and total short chain fatty acids and could be recommended for growing Yankasa rams.

Key words: *Faidherbia albida, millet stover, rams, rumen pH, Short Chain Fatty Acids and urea*

INTRODUCTION

Livestock is an important part in the agricultural production system which plays an essential role in the economy (Hassan *et al.*, 2010). However, livestock productivity in the tropics has suffered major setback due to inadequate quantity and quality of feeds for animals especially during dry season (Peters, 1998). Leguminous trees and other fodder plants maintain higher protein and mineral contents during growth than grasses, which do not, and decline rapidly in quality as they advance to maturity (Aganga and Tshwenyane, 2003). The economic importance of sheep in developing nations cannot be over-emphasized. In sub-Saharan Africa, sheep provide almost 30% of the meat consumed and around 16% of the milk produced (FAO, 2007). Sheep milk yields 18%