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

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ABSTRACT

Thestudywasconductedtoassessthe productivity and morphometricmeasurements (MM)ofBoergoatsraised in Nigeria. Datawere 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 (>3years, 2-3years, 1-2years and >1year) 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. Dataobtainedweresubjectedtosimpledescriptive statistics and analysisofvariance 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. Boar 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; Eramus, 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 threemaingroupsviz.traitsassociatedwithlength,height and girth (Yakubu *et al*., 2010). They can be usedasamanagementtool topromotetheproductivityof goats(Abdallah*etal*.,2019). In Nigeria a lot of studies have been carried out on indigenous goat. However, information on imported Boar goat is scanty. Therefore, thisstudy was conducted to evaluate the productivity and characterize Boar 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 11º27'06.2"N and longitude 9º28'55.7"E. The climate is semi-arid characterized by long dry (October - May) and short rainning (May - October) seasons with a mean annual

temperature of 25ºC, 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

Datacollectedweresubjectedtodescriptivestatistics(mean andstandarddeviation) andanalysis of variance (ANOVA) using SPSS version23(2013).Significant means were separated using theleastsignificantdifferences(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 abreed in a different ago-ecological condition than its' origin is measured through the relative ability of the individualto 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 mostimportantcriterionrelatingtoadaptation.Therefore, performances related to reproduction may be used as ameasure 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±40.41days in India (Bastola *et al*., 2020) but higher than 258 days reported by Webb*etal*. (2004)and265.35±4.42days by Duricic *et al*. (2012). The differences may be due to difference in location and management practices aswellasthe Boer doe brought from South Africawereacclimatizingin the environmentof 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%inSouthAfrica(Malan,2000), 180% in Croatia (Duricic *et al*.,2012)and185% intheUS(Browning*etal*.,2006). The kidding rates for first and second parities were 126.5% and 161.1% respectively while the twining 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 Wither (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 importantsourceofvariationforbodyweightandmorphometric traits ofgoats (Abdallah *et al*., 2019). Thesignificant (P<0.01)effectofsexobservedon body length, height at withers, head length, ear length and

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 alsoreported 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.NorAzhani*etal.*(2011)reportedmeanvalue 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 differenceinsizeofdataset,theenvironmentandothermanagementpractices.

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**
1-2ysr(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.

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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