
PHENOTYPIC CHARACTERISTICS OF SAHELIAN GOAT BREED IN KATSINA STATE

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ABSTRACT

This study was conducted to assess the phenotypic characteristics of the Sahelian goat breed in Katsina State. One hundred and sixty-three (163) physically healthy and non-pregnant Sahelian goats, comprising of male (n = 64) and female (n = 99) between one to four years, were randomly selected for this study. Data measured included; body weight (kg) and five (5) body morphometric traits on individual goat. The results obtained revealed that majority (n = 99, 60.74%) of the goats included in the study were female. The result also revealed that sex significantly affected body weight and linear body parameters in Sahelian goats, giving credence to the manifestation of sexual dimorphism among the goat population. Chest girth had the highest correlation value with body weight, this shows that chest girth is the best predictor of body weight in the goat population studied.

Key words: Body measurement, Correlation, Qualitative, Semi-arid region, Traits.

INTRODUCTION

Goats (*Capra hircus*) are small ruminant animals commonly found and are more evenly distributed in towns and villages than other ruminant animals in Nigeria (Komolafe *et al.*, 2007). The phenotypic characterization of animal genetic resources played a vital role in the classification of goats (Yakubu *et al.*, 2010). The knowledge of morphometric variables in goats could be utilized for sustainable management, production, and utilization of goats' genetic resources.

Sahelian goat originated from the Sudan desert. They have long legs with an average height of 70-85 cm for adult bucks and about 65–75 cm for does. Mature bucks weigh about 38-56 kg and the average weight of the does is about 25–35 kg. The long horns of the male are directed backwards. The coat is often white but there can be two or three patches of black, red, and white colours. The male sometimes has a beard with wattles and is often manned with pendulous ears and are well adapted to a hot dry environment but not used to a humid area. They produce high grade skin (Mason, 1996).

The characterization of this goat population will play a significant role in the conservation as well as the utilization of these genetic resources; this also serves as the baseline for their genetic improvement (Birteeb and Ozoje, 2012). This study, therefore, was conducted to assess the phenotypic characteristics and correlations of the Sahelian goats in Katsina State.

MATERIALS AND METHODS

The study was carried out in Katsina State, located within the semi-arid zone in Nigeria. Katsina state lies between latitude 12°59' N and longitude 7°36' E (Rotimi *et al.*, 2018). A total of 163 goats (99 does and 64 bucks) were used in the study. Parameters measured included body weight (BWT), height at wither (HW), body length (BL), paunch girth (PG) and heart girth (HG). Data were measured on apparently healthy and non-pregnant goats following the procedures described by Birteeb *et al.* (2012). Visual observations were used in identifying the coat colour and sex. Age of animals was identified, according to their dentition as reported (FAO 2012; Dereje *et al.*, 2013).

Data collected were subjected to statistical analysis using the statistical procedure of SPSS version 27.0.0 (IBM SPSS 27.0.0). Body measurements data were subjected to analysis of variance (ANOVA) using the general linear model (GLM) while the relationships between body weight and the morphometric traits were estimated using Pearson's correlation coefficient procedures.

RESULTS AND DISCUSSION

Table 1 shows the effect of age and sex on the body weights and morphometric traits. Age had significant effect on all the parameters measured ($P < 0.01$). Goats within 4 years were significantly ($P < 0.05$) heaviest (22.29 ± 0.53 kg), with overall mean of 17.12 ± 0.48 kg. The present study indicated

that body weight and morphometric traits consistently increased with age (Aliyu *et al.*, 2021; Tilki and Keskin, 2021).

The influence of age on body weight and linear body measurements of Nigerian Maradi goats had been documented by Akpa *et al.* (1998) that body weight, body length, height at withers and heart girth measurements increases as the Maradi goats ages. Katongole *et al.* (1996) obtained body measurements of Tswana goats in different age groups, they concluded that all the measured variables increase as the age of the Tswana goat increases.

Sex also showed significant ($P<0.01$) effects on the traits measured with higher values in female goats for all the traits than in male goats. This trend reveals the manifestation of sexual dimorphism in the goats. Sexual dimorphism is the differences in appearance between males and females of the same species. Mavule *et al.* (2013) reported that the differences in the body measurements between male and female goats may reflect differences in the hormonal secretion and their activities in the two sexes. This report is not in agreement with the results obtained by Okpeku *et al.* (2011), on goats and Birteeb and Ozoje (2012) on sheep who reported that male goats had higher values than females in all the body measurements. Sexual dimorphism in body size is clearly widespread among many mammalian taxa (Isaac, 2005).

The correlation coefficient values among the traits measured is presented in Table 2. All the correlations among the traits were positive and highly significant ($P<0.01$). Correlation values were all positive and highly significant ($P<0.01$), ranging from 0.478 (between BL and HG) to as high as 0.947 (between HW and RH). The highest value was recorded between BWT and RH (0.788) while the lowest was between BWT and HG (0.712). Pesmen and Yardimci (2008) recorded the highest correlation value between BWT and HG. Heart girth is the best parameter for estimating body weight due to high correlation estimates. Positive and highly significant correlations in the present study would be useful for predicting body weight in the goats studied as reported by different researchers (Grum, 2010; Halima *et al.*, 2012; Yaekob *et al.*, 2015; Belete *et al.*, 2017).

Table 1. Effect of age and sex on the body weights and linear body measurements (cm) of Sahel goats in Katsina state

Parameters	N	BWT	HW	RH	BL	PG	HG
Age (Years)		*	*	*	*	*	*
1	26	9.92±0.57 ^d	52.69±1.17 ^d	54.27±1.18 ^d	57.85±1.12 ^d	57.31±1.44 ^d	47.77±1.42 ^d
2	46	13.28±0.50 ^c	61.20±0.76 ^c	63.02±0.66 ^c	65.39±1.08 ^c	66.30±0.93 ^c	54.11±0.88 ^c
3	28	18.46±0.72 ^b	67.18±0.65 ^b	67.71±0.70 ^b	73.43±1.42 ^b	72.21±1.23 ^b	58.43±1.13 ^b
4	63	22.29±0.53 ^a	71.56±0.52 ^a	73.54±0.48 ^a	77.65±0.65 ^a	77.46±0.81 ^a	63.84±0.75 ^a
Sex		*	*	*	*	*	*
F	99	18.53±0.58 ^a	66.44±0.78 ^a	68.39±0.76 ^a	74.07±0.85 ^a	73.27±0.93 ^a	59.16±0.85 ^a
M	64	14.94±0.75 ^b	62.44±1.03 ^b	63.56±1.01 ^b	64.48±1.07 ^b	65.44±1.05 ^b	55.19±0.99 ^b
Overall	163	17.12±0.48	64.87±0.64	66.50±0.64	70.31±0.76	70.20±0.76	57.60±0.66

BWT = body weight, HW = height at wither, BL = body length, PG = paunch girth, HG = heart girth, SE = Standard Error, * $P<0.01$.

Table 2. Phenotypic correlations coefficient between linear body measurements and body weight of Sahel goats in Katsina state.

	BWT	HW	RH	BL	PG	HG
HW	0.777**	1				
RH	0.788**	0.947**	1			
BL	0.723**	0.673**	0.709**	1		
PG	0.754**	0.733**	0.770**	0.718**	1	
HG	0.712**	0.768**	0.791**	0.478**	0.752**	1

BWT = body weight, HW = height at wither, BL = body length, PG = paunch girth, HG = heart girth, **Correlation is significant ($P<0.01$).

CONCLUSION

The study shows that the major and dominant coat colour among the goats is white, this indicates that selection can be done along the line of coat colour. The study also revealed that sex significantly affected body weight and linear body parameters in Sahelian goats, giving credence to the manifestation of sexual dimorphism among the goat population. Chest girth had the highest

correlation value with body weight, this shows that chest girth is the best predictor of body weight in the goat population studied.

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