

EFFECT OF ENVIRONMENT ON UDDER AND TEAT MORPHOMETRIC TRAITS OF BUNAJI COWS IN KADUNA STATE

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ABSTRACT

A study was conducted to look at the effect of environment on udder and teat morphometric traits of Bunaji (White Fulani) cows in Kaduna State. A total of 214 Bunaji cows were sampled in three (3) local government areas of Kaduna State, namely; Kaduna North (KN), Kubau (KU) and Zango Kataf (ZK). The udder and teat parameters measured were; udder circumference, udder length, udder depth, udder width, teat length, teat diameter, distance between fore teats, distance between the hind teats and distance between the fore and hind teats. All the parameters with the exception of teat diameter were measured using measuring tape in centimeters. Data collected were subjected to Duncan Multiple Range Test modelled in statistical package. The results obtained showed significant ($P < 0.05$) differences among the udder and teat parameters measured and the values ranges from 44.43 ± 0.80 - 10.73 ± 0.35 and 7.49 ± 0.27 - 1.01 ± 0.02 , respectively for all the udder and teat morphometric linear measurement taken. It can be concluded that environment has effect on udder and teat morphometric traits in Kaduna State and this gives information on how environment influences performance of animals.

Keywords: Udder, Teat, Morphometric, Environment, Bunaji.

INTRODUCTION

The Bunaji (White Fulani) cattle are the most numerous and widespread of all Nigerian cattle breeds (Blench, 1993; Meghen *et al.*, 1999); representing about 14.73 million cattle consisting of 1.47 million milking cows and 13.26 million beef cattle (Tibi and Alphunu, 2010), and they are estimated to represent 37% of the national herd by the Nigerian National Livestock Research Survey (NNLRS, 1999). The udder is a very important organ of the dairy animal and its morphological characteristics are linked to their dairy performance (Kominakis *et al.*, 2009). The udder and teat dimensions can be used as a breeding tool to improve milk production in dairy animals (Bhuiyan *et al.*, 2004). Evaluation of udder and teat morphology can be performed by direct measurements of the udder and teat (Sadeghi *et al.*, 2013). Udder and teat characteristics have been shown to be influenced by several factors such as management systems (environment), genotype, breeding (Milerski *et al.*, 2006). Therefore, it is important to study the effect of environment (location) on udder and teat morphometric traits. The objective of the study was to determine the effect of environment on udder and teat morphometric traits of Bunaji cows in Kaduna State

Materials and Methods

Study location

The study was carried out in three (3) Local Government Areas of Kaduna State, Nigeria. The Local Government Areas were Kaduna North, Kubau and Zango Kataf. Kaduna State is located in the Northwest Geopolitical Zone of Nigeria and it lies between latitude $10^{\circ} 31' 35.08''$ North and longitude $7^{\circ} 26' 19.64''$ East (Satellite Map of Kaduna, 2021). It has distinct wet and dry seasons within the Guinea Savannah and part of the Sudan Savannah in Nigeria.

Sampled population

A total of 214 Bunaji (White Fulani) cows of ages 5 years and above were randomly sampled from three Local Government Areas, namely; Kaduna North (72), Kubau (63), and Zango Kataf (80).

Morphometric characteristics (dimensions) of udder and teat measured

The udder and teat parameters measured were udder length, udder depth, udder width, teat length, teat diameter, distance between fore teats, distance between the hind teats and distance between the fore and the hind teats. All the parameters with the exception of teat diameter were measured with measuring tape in centimeters.

Udder length (UL): Measured as the distance between front and rear attachment of the udder (cm).

Udder depth (UD): Was measured as the distance from the base to the lowest point of the udder at the place of attachment of the teats (cm).

Udder width (UW): Was measured at the widest point of the udder (cm).

Teat length (TL): Measured as distance from the teat insertion base to the teat orifice (cm).

Teat diameter (TD): Defined as the distance between the widest points of the teat's circumference (cm). It was measured with the Vernier caliper at the middle point of the teat to the nearest 0.01cm.

Distance between fore teats (DBFT): Measured as the distance between the two fore (front) teats at the tip of the teats (cm).

Distance between hind teats (DBHT): Measured as the distance between two hind (rear) teats (cm).

Distance between fore and hind teats (DBFHT): Was measured as the distance from one of the fore teat to hind teat of the same side (cm).

Statistical analysis

The means $\pm$ standard errors were tested using Duncan's Multiple Range Test (Duncan, 1955) modeled in SAS (2004) statistical package.

RESULTS AND DISCUSSION

Effect of environment on udder morphometric traits of Bunaji cows in Kaduna State is presented in Table 1. The results obtained showed a significant ($P < 0.05$) differences among the udder parameters and ranges from 44.43 ± 0.80 to 10.73 ± 0.35 with Kaduna North being the highest in dimensions of all the udder parameters measured. The result obtained is similar with the findings of Alphonsus *et al.* (2012) but the values obtained in this study is slightly lower than the values reported by the authors who reported a mean udder width of 18.83 ± 0.13 and udder depth (15.09 ± 0.15) in Bunaji cows in Giwa local government area of Kaduna State. Thus, the differences observed could be due to environment, age, lactation stage and parity of the animals used. Also, this finding is in agreement with the report of Patel *et al.* (2016) who reported significant differences and obtained 23.06 ± 0.34 for udder depth among crossbred cows.

Table 1: Effect of environment (location) on udder morphometric traits of Bunaji cows in Kaduna State

Location	Morphometric traits of udder			
	UC(cm)	UD(cm)	UL (cm)	UW(cm)
KN	44.43 ± 0.80^a	24.73 ± 0.34^a	34.86 ± 0.53^a	15.68 ± 0.37^a
KU	37.72 ± 0.86^b	20.50 ± 0.36^b	28.89 ± 0.56^b	14.29 ± 0.39^b
ZK	37.57 ± 0.76^b	21.68 ± 0.32^c	28.42 ± 0.49^b	10.73 ± 0.35^c

UC= Udder circumference, UD= Udder depth, UL= Udder length, Udder width, KN= Kaduna North, KU= Kubau, ZK= Zango Kataf

Table 2 showed the effect of environment on teat morphometric traits of Bunaji cows in Kaduna State. The result revealed that teat parameters measured ranges from 7.49 ± 0.27 to 1.01 ± 0.02 with significant differences among teat parameters in all the three local government areas of Kaduna State. Kaduna North has the highest dimensions of all teat parameters measured. This current study is similar with the report of Alphonsus *et al.* (2012), who reported a mean teat length of 4.62 ± 0.61 , distance between fore teats (8.64 ± 0.12) and distance between the hind teats (5.18 ± 0.09) in Bunaji cows in Giwa local government area of Kaduna State. The differences obtained could be due to differences in environment (location), parity, age of cows and lactation stage of the animals used in this study. The values obtained for all the teat morphometric traits differs from that of Patel *et al.* (2016), who reported a mean fore length of (6.07 ± 0.05), hind teat length (5.39 ± 0.05), fore teat diameter (2.72 ± 0.02) and hind teat diameter (2.64 ± 0.02) in crossbred cows in Gujarat, India. The differences observed could be as a result of variation in the lactation stage, breed, age of the animals, and parity and other in environmental factors.

Table 2: Effect of environment (location) on teat morphometric traits of Bunaji cows in Kaduna State

Location	Morphometric traits of teat										
	DBFT	DBHT	LFTD	LFTL	LHTD	LHTL	RFTD	RFTL	RHTD	RHTL	DBFHT
KN	7.49±0.27 ^a	4.60±0.15 ^a	1.14±0.02 ^a	4.22±0.09 ^a	1.02±0.02	3.76±0.08 ^a	1.18±0.02 ^a	4.26±0.09 ^a	1.04±0.02	3.65±0.08 ^a	5.02±0.14 ^a
KU	7.09±0.29 ^{ab}	4.36±0.16 ^a	1.10±0.02 ^{ab}	3.52±0.10 ^b	0.98±0.02	3.31±0.09 ^a	1.09±0.03 ^b	3.69±0.09 ^b	1.05±0.02	3.56±0.09 ^{ab}	4.43±0.15 ^b
ZK	6.48±0.26 ^b	3.55±0.14 ^b	1.06±0.02 ^b	3.64±0.09 ^b	1.01±0.02	3.64±0.08 ^b	1.06±0.02 ^b	3.71±0.09 ^b	1.02±0.02	3.29±0.08 ^b	3.98±0.14 ^b

DBFT= Distance between fore teats, DBHT= Distance between hind teats, LFTD= Left fore teat diameter, LFTL= Left fore teat length, LHTD= Left hind teat diameter, LHTL= Left hind teat length, RFTD= Right teat diameter, RFTL= Right fore teat length, RHTD= Right hind teat diameter, RHTL= Right hind teat length, DBFHT= Distance between fore and hind teats.

CONCLUSION AND RECOMMENDATION

In conclusion, environment has influence on the morphometric traits of udder and teat of Bunaji cows in Kaduna State. This means that variation in environmental factors should be considered when doing a similar research in different location.

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