EFFECT OF PARITY AND AGE ON UDDER CHARACTERISTICS OF WHITE FULANI AND SOKOTO GUDALI COWS

***[1]Abisoye, F. O., [1]Adebayo, O. M., [2]Atteh P. O. And [1]Aliyu K.**
[1]Department of Animal Health and Production Technology, School of Agriculture, Kogi State Polytechnic, Itakpe, Kogi State
[2]Collegeof Agriculture Kabba, Division of Agricultural Colleges, Ahmadu Bello University, Zaria.
**Corresponding author: faith.abisoye@gmail.com, 08065333496*

ABSTRACT
This study assessed of age and parity on growth parameters, udder and teat characteristics of White Fulani (WF) and Sokoto Gudali (SG) cows. The research was conducted at the Dairy cattle breeding section of the National Animal Production Research Institute (NAPRI), Shika. The age and parity of each cow were obtained from the previous record. Also, the body weight was measured through the use of Birmingham – England Weighing bridge at each classes of the age. The age of the animal was classified into three (3) groups (1 to 5, 6 to 10 and 11 to 15) and statistical analysis was carried out using the General Linear Model (GLM) of measurements. The results showed that all the measured traits were significant different (P < 0.05) except in udder length (ULT), udder circumference (UCF), udder cleft (UCL) and body condition score (BCS). Cows of age class 11 to 15 years had the highest value for all significant traits except for udder depth (UDT) and Distance of teat tip from the ground (DTG), while, the lowest values were recorded in cows of age one to five years except for a distance of teat tip from the ground (DTG) this is because of progressive udder hypertrophy to cow's age and parity. Most of the traits measured were not influenced (P > 0.05) by parity of the cows except for udder depth (UDT), teat length (TLT) and teat diameter (TDR) which were significant (P < 0.05) because the variation could however be due to genetic characteristics of both breed.
Keywords: Parity, Udder, Teat, Sokoto Gudali and White Fulani.

INTRODUCTION

The udder conformation is an important element for the assessment of milk production and it is one of the criteria for predicting milk production and dairy performance in a cow (Ahmed *et al.,* 2023). Parity had a significant effect on udder and teat characteristics while shapes of the udder have a considerable relationship and affect milk yield and lactation length of an animal (Ahmed *et al.,* 2023). The conformation of the udder and teats is one of the key things in the evaluation of lactating cows because their shape aid in the development of the milking process in cows (Marnet *et al.,* 2016).

A quantitative measure of the udder and teat conformation is desired as it enables reliable genetic parameters for traits to be estimated and permitted in the breeding programme. Cow with good udder quality not only takes less labour but also may have improved longevity due to a lower incidence of injury (Akpa *et al.,* 2011). Teat shapes are critical because they go directly into the calves 'mouth and it is a projection from the mammary glands of mammals from which milk flows to feed young ones.

Condition scoring is a technique for assessing the condition of livestock at regular intervals. The purpose of condition scoring is to achieve a balance between economic feeding, good production and good welfare. Condition scoring is instrumental and correlated with age as an indicator of dry cow and pre-calving management (Pryce and Harris 2006). Subsequently, in early lactation the cow is under considerable nutritional pressure and body condition is a vital indicator of excessive weight loss. This can lead to metabolic disorders and other welfare problems and should be avoided (Battagin *et al.,* 2012). Body condition score is correlated with body weight and has been reported to have either a positive linear relationship (Jimmy *et al.,* 2020) or to affect the average changes in body weight as associated with the physiological status of an individual animal, Body Condition Score (BCS) contributed substantially to the differences in body weight which are related to the age. Thus, this study is aimed at assessing the relationship between age, parity and body condition score of White Fulani and Sokoto Gudali cows.

MATERIALS AND METHODS

A total of 30 animals (15 white Fulani and 15 Sokoto Gudai cows) were used for these experiments that were in first state of lactating, the age and parity were obtained through secondary data from the management. The animals were managed under a semi-intensive system where the cows had access to unrestricted free–grazing in addition to supplementary feeds (crop residue, concentrate and hay) which were supplied during the dry season to maintain the body posture and production. The body weight of the animal was measured using an Avery Birmingham – England Weighing Scale Bridge planted for measuring weight, the animals were allowed to move freely in the crush. The udder linear measurements of WF and SG cows were taken by using flexible tape (Abisoye *et al.,* 2021) and all measurements were in centimeters (cm), the traits considered are udder length (ULT), Udder Width (UWT), Udder Circumference (UCF), Udder Depth (UDT) and Udder Cleft (UCL) while the teat characteristics were measured using vernier caliper in millimeters (mm). Teat Length (TLT), Teat Diameter (TDR) and distance of the teat tip from the ground (DTG) were measured by flexible tape. (Abdelgadir *et al.,* 2017).

Statistical Analysis

The statistical analysis was carried out using the General Linear Model (GLM) procedure of statistical analysis software (SAS, 2002). The correlation coefficient of udder traits was also determined by subjecting it to statistical analysis using (9) statistic (Version 25) predictive analysis at 1% and 5% level of significance.

RESULTS AND DISCUSSION

Table 1 shows the effect of age on udder, teat and growth traits (body condition score and body weight) of the cows. Differences ($P < 0.05$) were observed in all the traits except in udder length (ULT) with 0.2434 , udder circumference (UCF) has 0.3266, udder cleft (UCL) 0.1240 and 0.271 body condition score (BCS). Cows of age class 11 to 15 years had the highest value for all significant traits except for udder depth (UDT) and Distance of teat tip from the ground (DTG), while, the lowest value was recorded in cows of age one to five years except for a distance of teat tip from the ground (DTG). Age differences were observed for some udder and teat morphological traits which increased with age in this study. This is because of progressive udder hypertrophy to cow's age and parity (Abdou *et al.,* 2012; Mingoas *et al*., 2017). The coefficient of variation (CV) for Teat Length (TLT) and Teat Diameter (TDR) was higher than the other traits and could respond to selection faster during improvement programmes in the White Fulani (WF) and Sokoto Gudali (SG) breeds (Akinsola, 2017). Furthermore, an increase in the values of most of the characters observed with advancement in age can be explained by the activity of prolactin and udder tissue elasticity (Odegbile *et al.*, 2017).

Table 1: Least squares mean ± standard error of variation in Udder traits, Teat traits and Growth traits of different Age class in Cows

Udder traits	Age Class (years)						P-value
	1 - 5	CV	6 – 10	CV	11 – 15	CV	
ULT(cm)	8.73±056	10.7	9.22±0.37	9.0	8.53 ±0.35	9.6	0.2434
UWT(cm)	5.67±0.33^{b}	9.6	6.00±0.22^{ab}	8.2	6.37±0.21^{a}	7.2	0.0519
UCF(cm)	21.04±1.01	8.0	2201±0.69	5.6	23.08±0.64	8.6	0.3266
UDT(cm)	30.85±0.79^{b}	4.1	31.21±0.53^{a}	4.6	30.27±0.50^{ab}	4.0	0.0286
UCL(cm)	15.13±0.80	9.9	15.46±0.54	7.0	14.82±0.51	10.0	0.1240
TLT(cm)	1.15±0.0.28^{b}	34.2	1.70±0.19^{a}	20.6	2.26±0.0.18^{a}	21.9	0.0005
DTG(cm)	25.59±0.93^{a}	4.9	25.21±0.63^{a}	5.3	24.88±0.59^{b}	6.5	0.3232
TDR(cm)	0.51±0.11^{b}	28.0	0.59±0.07^{b}	20.5	0.93±0.07^{a}	32.5	0.0025
BWT(Kg)	224.14±19.18^{b}	15.2	249.30±12.99^{b}	15.3	243.28±12.16^{a}	8.6	0.0207
BCS	5.62±0.34	7.3	5.78±0.21	9.8	5.63±0.21	9.6	0.2710

Udder length (ULT), Udder width (UWT), Udder circumference (UCF), Udder depth (UDT),Udder cleft (UCL), Teat length (TLT): Distance of teat tip from the ground (DTG), Teat diameter (TDR), Body Weight (BWT), and Body Condition Score (BCS)

^{ab} means on the same row are significantly different($P< 0.05$)

The variation in udder traits, teat traits and growth traits as influenced by parity in cows is shown in Table 2 Most of the traits measured were not influenced ($P > 0.05$) by parity of the cows except for udder depth (UDT), teat length (TLT) and teat diameter (TDR) that were significant ($P < 0.05$). The

highest values measured for the significant traits were observed for cows at the 6th parity for TLT and TDR and the lowest values were seen in cows at first parity for similar traits. However, cows at their third parity had the highest measurement to any other parity. The effect of parity on udder and teat morphology observed in this study was however different from the findings of several authors, the findings of (Abdou *et al.,* 2012and Mingoas *et al*., 2017) who reported an increase in udder and teat traits with an increase in parity but similar to another report that teats morphology did not vary with parity in Egyptian Buffalo cows (Marai *et al.,* 2001). This variation could however be due to genetic characteristics of both breeds (Mingoas *et al*., 2017).

Table Table2: Least squares mean ± standard error in Udder, Teat and Growth Traits as influenced by parity in Cows

Udder traits	Parity						P-value
	1	2	3	4	5	6	
ULT (cm)	8.71±0.47	8.43±0.35	9.09 ±0.37	9.12±0.51	8.90±0.76	8.70±0.99	0.8349
UWT(cm)	6.15±0.27	6.28±0.21	6.25±0.21	6.23±0.30	5.64±0.44	5.54±0.58	0.6756
UCF(cm)	23.17±0.85	22.41±0.64	23.41±0.66	21.70±0.92	20.95±1.37	20.63±1.79	0.3474
UDT(cm)	29.61±0.66^{ab}	30.67±0.50^{ab}	31.76±0.51^{a}	31.82±0.72^{ab}	30.96±1.06^{ab}	29.84±1.39^{b}	0.0544
UCL(cm)	14.57±0.67	14.77±0.50	16.38±0.52	15.88±0.73	14.57±1.08	14.65±1.42	0.1982
TLT(cm)	1.85±0.23^{b}	1.90±0.17a^{b}	1.84±0.18^{ab}	1.79±0.25^{a}	1.14±0.37^{ab}	1.71±0.49^{a}	0.0521
DTG(cm)	25.31±0.78	25.56±0.59	25.43±0.61	24.56±0.85	25.73±1.26	24.78±1.65	0.9087
TDR (cm)	0.79±0.09^{b}	0.69±0.07^{b}	0.63±0.07^{b}	0.60±0.10^{b}	0.38±0.15^{b}	0.98±0.20^{a}	0.0515
BWT(Kg)	236.41±16.04	227.69±12.09	270.74±12.55	243.96±17.51	219.79±25.99	234.96±33.98	0.1461
BCS	5.58±0.28	5.84±0.21	5.91±0.22	5.48±0.31	5.55±0.46	5.72±0.60	0.7972

Udder length (ULT), Udder width (UWT), Udder circumference (UCF), Udder depth (UDT),Udder cleft (UCL), Teat length (TLT): Distance of teat tip from ground (DTG),
Teat diameter (TDR), Body Weight (BWT), and Body Condition Score (BCS)
^{ab} means on the same row are significantly different (P< 0.05)

CONCLUSION AND RECOMMENDATION

In conclusion, factors such as age, parity, and stage of lactation could influence the udder and teat formation for milk production and the occurrence of mastitis between six and ten years of age of the White Fulani cows and Sokoto Gudali, hence they should be considered during the selection against mastitis as well as the management of the breeding herd alsoWhite Fulani should be further improved upon which could assist for better milk traits, and udder and teat traits should be considered in the process.

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