MILK YIELD, UDDER AND TEAT DIMENSIONS BEFORE AND AFTER MILKING OF WEST AFRICAN DWARF DOES AT EARLY LACTATION AND AT FIRST PARITY

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ABSTRACT

Udder dimensions before and after milking was studied from 72 weekly records of 12 lactating West African goats. Positive and significant (P<0.0001) phenotypic correlations were observed between udder circumference before milking and distance between teat before milking. A study on the comparative evaluation of udder dimensions before and after milking was carried out using twelve (12) lactating WAD does for six weeks of lactation. The dams were milked once in week after isolation of their respective kid(s) for 15hr (5.00pm to 8.00am). Udder circumference before milking had positive and significant correlations with distance between teat before milking (0.61; P<0.0001), udder circumference before milking and udder circumference after milking (0.35; P<0.001), udder circumference before milking and udder length before milking (0.32;P<0.001), udder circumference before milking and distance between teat after milking (0.25; P<0.01) but negative correlation with teat length after milking (-0.25; P<0.01). Udder circumference (P<0.0001), udder length (P<0.0001), distance between teat (P<0.01) and height of teat from the ground (P<0.01) reduced significantly after milking while udder width, teat circumference and teat width remained unchanged after milking. Therefore, these traits should be taken into consideration when selecting for milk production in West African goats.

Keywords: Udder dimensions, WAD does, Teat length.

INTRODUCTION

The udder is a very important physiological and conformational characteristic of all diary animals. Low and pendulous udder are of considerable economic importance to the dairy farmer as they could have strong effects on the milk yield and composition. Milk within the udder of dairy ruminants can be divided into two fractions: the cistern fraction, which has already been transferred from the alveoli to the cistern during the inter milking interval and is immediately obtainable without milk ejection, and the alveolar fraction, which can be removed from the udder only if milk ejection occurs during machine milking (Tančin and Bruckmaier, 2001). Before milking, milking in the udder is distributed between cisternal (always available for milk removal) and alveoli compartment (Tacina *et al.* 2011).

MATERIALS AND METHODS

Twelve Lactating does in their first parity between the age of 1-2years of weight range between 16-20kg was used for the experiment for six weeks at the Directorate of University Research Farms (DUFARMS), Federal University of Agriculture Abeokuta, Ogun state, Nigeria.

The animals were managed under an intensive system with zero grazing (cut and carry) and fed a mixture of palm kernel cake, soybean meal, wheat offal, cassava peel, limestone, salt, premix and bone meal. Eight morpho-biomtrical traits of the udder were taken on each lactating animal in the morning before milking and after milking. The udder parameters were measured as described by Adewumi, 2012. Udder length (ULBF,ULAF), Width (UWBF,UWAF), Udder circumference (UCBF,UCAF), Udder width (UWBF,UWAF), and Teat circumference (TTCBF,TTCAF),Teat length (TTLBF,TTLAF), Teat width (TTWBF,TTWAF), Distance between teat (DBTTBF,DBTTAF), Height of

teat from ground (HTTGBF,HTTGAF) were all determined with a flexible tailor's tape before they were hand milked and after milking (Figure 1).

Statistical Analysis

Data were subjected to Descriptive statistics. T test analysis was used to compare before and after milking. Correlation analysis among parameter was also conducted.

RESULTS AND DISCUSSION

The descriptive analysis of udder dimension of lactating WAD goat and the relationship among udder parameters are shown in Tables 1-3. The overall mean values (cm) for udder circumference, udder length, udder width teat circumference, teat length, teat width, distance between teat and height of teat from the ground before and after milking were 31.05, 26.00; 9.38, 7.90;, 14.19, 13.09;, 3.93, 3.92;, 2.11, 1.95;, 1.44, 1.44;, 7.79, 6.10;, 16.23 and 17.24 respectively. Udder circumference before milking had positive and significant correlations with distance between teat before milking (0.61; $P<0.0001$), Udder circumference after milking (0.35; $P<0.001$) and Udder length before milking (0.32;$P<0.001$) and distance between teat after milking (0.25; $P<0.01$) but negative correlation with teat length after milking (-0.25; $P<0.01$).A combination of udder circumference after milking, teat length after milking, and distance between teat before milking were significant predictor of udder circumference before milking and jointly explained as high as 53% of the variation of udder circumference before milking. Teat length and teat diameter have been found to be highly heritable and could be effective for selection for milk production. The udder size and teat size vary greatly among animals. Some are small and short, while others are large, plump making it easier to milk (Haenlein,1992). Long teats were associated with lower milk yields (Hickman 1964, Freeman 1976, Degroot *et al.*, 2002). Udder circumference ($P<0.0001$), udder length ($P<0.0001$), distance between teat ($P<0.01$) and height of teat from the ground ($P<0.01$) reduced significantly after milking while udder width, teat circumference and teat width remained unchanged after milking (Table 4).

CONCLUSION

Udder circumference is strongly associated with distance between teats. Udder circumference, udder length, distance between teat and height of teat from the ground tends to regress after milking.

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Table 1: Descriptive statistics of udder parameters before and after milking

Parameters	Udder dimensions
UCBF	31.05 ± 0.45
UCAF	26.00 ± 0.46
ULBF	9.38 ± 0.16
ULAF	7.90 ± 0.15
UWBF	14.19 ± 0.35
UWAF	13.09 ± 0.52
TTCBF	3.93 ± 0.04
TTCAF	3.92 ± 0.03
TTLBF	2.11 ± 0.04
TTLAF	1.95 ± 0.05
TTWBF	1.44 ± 0.07
TTWAF	1.44 ± 0.06
DBTTBF	7.79 ± 0.14
DBTTAF	6.10 ± 0.51
HTGBF	16.23 ± 0.34
HTGAF	17.24 ± 0.36

Table 2: Pearson correlation coefficient of udder circumference before milking and some udder and teat dimensions

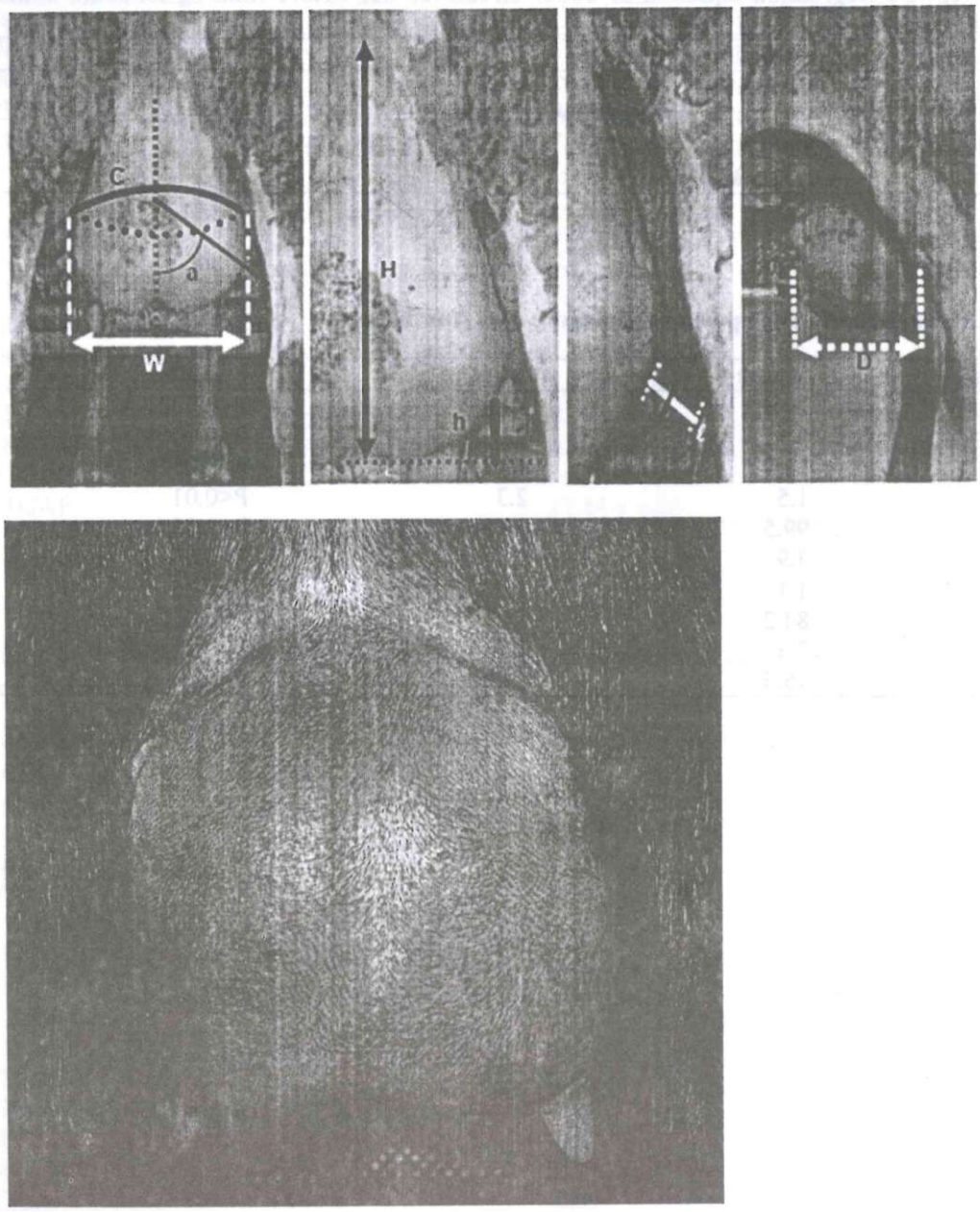
Udder and teat dimensions	Correlation coefficient
UCBF	1.00
UCAF	0.35**
ULBF	0.32**
ULAF	0.03
UWBF	0.19
UWAF	0.13
TTCBF	0.05
TTCAF	-0.03
TTLBF	0.16
TTLAF	-0.25*
TTWBF	0.18
TTWAF	-0.10
DBTTBF	0.61**
DBTTAF	0.25*
HTGBF	-0.09
HTGAF	-0.22

Table 3: Stepwise Regression equation of udder circumference before milking on some udder and teat dimensions

	Prediction equation	R^2
Step 1	Y=16.48 + 1.89DBTBF	0.37
Step 2	Y=11.03 + 0.25UCAF + 1.75DBTBF	0.43
Step 3	Y=14.47 + 0.26 – 1.71(TTLAF) + 1.72DBTTBF	0.53

Table 4: Comparison of udder parameters before and after milking

Parameters	Before	After	P value
UCC	29.8	24.8	P<0.0001
UDL	8.7	7.1	P<0.0001
UDW	13.2	10.5	P>0.05
UDA	1.5	2.3	P<0.01
UDV	99.5	99.5	P<0.05
TTC	3.9	3.9	P>0.05
TTW	1.1	1.3	P>0.05
TTA	84.2	84.2	P>0.05
DBTT	7.3	5.5	P<0.01
HTG	15.5	17.9	P<0.01



C= Udder circumference, W = Udder width, H= Udder Height, w = Teat width, I = Teat length, T = height of teat from ground.

Figure 1. Cow udder images, showing parameters measured.