NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

UDDER CHARACTERISTICS OF GRAVID WAD DOES FEDGUINEA GRASS (*PANNICUM MAXIMUM*) SUBSTITUTED WITH MULBERRY (*MORUS ALBA*) LEAVES WITH CASSAVA PEEL-BASED CONCENTRATE

*Atansuyi, A.J., Adebayo, O.A., Mustapha, R.O and Ibhaze, G.A.
Department of Animal Production and Health,
The Federal University of Technology, Akure, Ondo State, Nigeria
E-mail: ajatansuyi@futa.edu.ng (+234(0)8034832175)

ABSTRACT

A five (5) months study was conducted to evaluate the udder characteristics of gravid West African Dwarf goats (WAD) fed mulberry leaves and guniea grass with cassava peels-based concentrates. Five experimental diets were formulated with diet 1as control which ***contains*** *100% Panicum maximum, while diets 2, 3, 4 and 5 contained 75% Panicum maximum + 25% Morus alba, 50% Panicum maximum+ 50% Morus alba, 25% Panicum maximum + 75% Morus alba and 100% Morus alba respectively. The diets were fed to 25 WAD Does with 5 Does per treatment and each served as replicate aged between 12-18 months. An average live weight of 10-13kg were assigned in a completely randomize design..Result showed that Mulberry inclusion has no significant (p>0.05) effect. The udder values obtained in the study were 19.83-22.33cm (UH), 30.33-37.17cm (UC),9.33-10.83cm (DBT),3.83-4.00cm (TL),4.17-4.50cm (TC),22.67-28.83cm (UW)and473.20-696.86cm^3(UV).The study revealed that diet 2 exerted the greatest effects on udder height, distance between teat, teat circumference, udder width and volume while diets 3 and 4 had their effects on udder circumference and teat length. It was recommended that dairy goat farmers could feed the combination of Morus alba leaves* ***and*** *Panicum maximum to their does for better udder development that can inturn improve their milk yields***.**

Key words:Genotype, dairy goat, udder morphometry, forage **and** nutritional potency

INTRODUCTION

Udder traits comprising udder morphometrics and shapes have been shown to be important determinant of milk yield (Agbede*et al*.,1997; James and Osinowo, 2004) and milking ability of goats. Several udder traits like udder shape, udder attachment, udder depth, udder consistency and udder circumference influence milk yield in dairy animals (James, 2000).Milerski*et al.* (2006) reported that udder and teat characteristics are influenced by several factors such as genotype, breeding and management systems. Furthermore, Miglior*etal.* (2005) suggested that selection with a good heritability is a good indicator for increasing milk yield. Mulberry has been reported to contain many bioactive constituents such as flavonoid, polyphenol, 1-deoxynojirimycin (Boras-Granic*et al*., 2006) which are rich in crude protein and are highly digestible. This1-deoxynojirimycin (DNJ) compound is a natural alkaloid and has been found to have a positive activity in primary breast epithelial cell growth of dairy goats (Boras-Granic*et al*., 2006). Thus, the present study was undertaken to evaluate the impact of mulberry inclusion on the udder development of gravid WAD does.

MATERIALS AND METHODS

The experiment was conducted at the Livestock Section (Small Ruminant Unit) of the Teaching and Research Farm, Federal University of Technology Akure, Ondo State, South Western Nigeria;located on Latitude 7^0 18" and Longitude 5^0 10''E (Aro *et al*., 2008).

The system of management was intensive. The animals were fed cassava peel-based diet in the morning and fed a mixture of *Morus alba* and *Panicum maximum* in the afternoon .The udder dimensions of all the does were measured weekly for the five months experimental period before and after parturition by using

flexible canvas tape. The udder dimensions were determined according to the procedures used by Agbede *et al*. (1997) and Adegoke *et al*. (2015)as follows:

1. Udder Height (UH): This is the distance between the base of udder attachment to the abdominal region and the point of teat protrusion from the udder
2. Udder width (UW): The distance between the widest points of the udder
3. Udder circumference (UC): The distance (perimeter) round the widest point of the udder
4. Teat length (TL): The distance between teat tips and the base of attachment to the udder
5. Teat circumference (TC): The distance round the widest points of the teats
6. Distance between teats (DBT): The distance between the tips of the teats
7. Udder volume (UV): This was derived using the formula:

$UV = {}^{4}/_{3}\ \pi r^{3}$

Where $\pi = {}^{22}/_{7}$

$r = {}^{UH+UW/}{}_{4}$ (UL = Udder Height, UW = Udder Width)

The data collected were analyzed using one-way analysis of variance (ANOVA) of SAS (2008) version 13 statistical package. Where significant differences exist, Duncan Multiple Range Test (DMRT) of the same statistical package was used to compare the means.

RESULTS AND DISCUSSION

The Udder characteristics of gravid WAD does fed *Morus alba* and *Pannicum maximum* foliage supplemented with cassava peel-based diet during gestation is shown in Table 1.Analytical r**esults showed that** Mulberry inclusion has no significant ($p>0.05$) effect**.** The udder height (UH) ranged from 19.83cm (T_5) to 22.33cm (T_2) while udder circumference (UC) ranged from 30.33cm (T_4) to 37.17cm (T_3). The values ofdistance between teats (DBT) was least in T_1 (9.33cm) and highest in T_2 (10.83cm). Teat length (TL) was highest in T_3 (4.00cm) and least in diet T_1 and T_5 (3.83cm). The teat circumference (TC) ranged from 4.50cm (T_3) to 4.17cm (T_5) while udder width (UW) was highest in T_2 (28.83cm) and least in T_5 (22.67cm). The udder volume (UV) was highest in T_2 (696.86cm) and least in T_5(473.20cm).

The results obtained showed that mulberry had effect on the increase of udder circumference, teat circumference, udder height and width in diets T_2, T_3, T_4 and T_5. The increase in udder volume of the does was as a result of the presence of 1-deoxynojirimycin (DNJ) in the mulberry foliage. The UV, UW, UC can be used to determine the milk yield of WAD does. The does in diet 2 produced two kids after parturition and this aided increment of the udder volume and milk yield which could probably due to the presence of 1-deoxynojirimycin (DNJ) in the mulberry foliage fed.

Udder and teat characteristics have been shown to be influenced by several factors such as genotype, breeding and management systems (Milerski*et al*., 2006). In a study conducted in South Western Nigeria by Amao *et al*. (2003b) showed that age, lactation status and live weight are the major factors that influence udder traits in West African Dwarf goats. Amao *et al*. (2003) also showed that lactation status significantly influenced the udder circumference. The feed given to WAD does in the present study have no significant impact on the characteristics of udder. The presence of 1-deoxynojirimycin (DNJ) compound, a natural alkaloid has been shown to have a positive effects in primary breast epithelial cell growth of dairy goats (Boras-Granic *et al*., 2006). This was observed in this study as 1-deoxynojirimycin (DNJ) present in the *Morus alba* foliage aided the proliferation and development of mammary glands. The effects of mulberry in the increment of udder circumference, teat circumference, udder height and width in T2, T3, T4 and T5 where mulberry was included in their diets at 25%, 50%, 75% and 100% were well noticeable. The udder volume of the does in T2, T3 and T4 increased since 100% guinea grassand 100% mulberry foliages were the positive and negative control for the diets. Complete mulberry inclusion in diet 5 showed that 1-deoxynojirimycin (DNJ) has effects on their udder

characteristics. Udder circumference has been reported to explain up to or above 22% of variation in milk yield in WAD goats whereas teat dimension could only explain far less than11% of the variation in milk yield of WAD does (Akporhuarho, 2015). This suggests that mulberry supplementation can be used to prepare doesfor parturition. This will allow better udder development and twining that may result in increased milk yield. The results obtained in this present study suggests that mulberry inclusion has the potential of improving udder characteristics in ruminant animals.

Table 1: Udder Characteristics of Gravid WAD Does Fed Experimental Diets

Trait	T_1	T_2	T_3	T_4	T_5	P- value
UH (cm)	21.67 ± 1.86	22.33 ± 2.89	20.50 ± 1.32	21.67 ± 1.17	19.83 ± 2.24	0.900
UC (cm)	32.50 ± 2.50	37.00 ± 5.97	37.17 ± 4.88	30.33 ± 2.03	32.33 ± 2.09	0.652
DBT (cm)	9.33 ± 0.33	10.83 ± 1.01	10.00 ± 0.50	9.50 ± 1.53	9.50 ± 1.00	0.806
TL (cm)	3.83 ± 0.17	4.00 ± 0.50	4.00 ± 0.29	4.33 ± 0.17	3.83 ± 0.17	0.737
TC (cm)	4.17 ± 0.33	4.50 ± 0.29	4.50 ± 0.00	4.33 ± 0.33	4.17 ± 0.17	0.793
UW (cm)	24.67 ± 0.60	28.83 ± 1.96	26.50 ± 1.80	26.00 ± 3.00	22.67 ± 1.69	0.319
UV (cm^3)	565.39±58.25	696.86±125.46	583.22±76.20	604.15±108.59	473.20±12.87	0.513

Udder Height (UH), Udder circumference (UC), Distance between teats (DBT), Teat length (TL), Teat circumference (TC), Udder width (UW), , Udder volume (UV)
T_1 = 100% *Panicum maximum*
T_2 = 75% *Panicum maximum* + 25% *Morus alba*
T_3 = 50% *Panicum maximum* + 50% *Morus alba*
T_4 = 25% *Panicum maximum* + 75% *Morus alba*
T_5 = 100% *Morus alba*

CONCLUSION AND RECOMMENDATION

This study has shown that mulberry can trigger the increment and development of some udder parameters because of a certain natural alkaloid,especially 1-deoxynojirimycin present in the mulberry leaves fed to West African Dwarf goats. **It was observed that diet 2 exerted the greatest effects on udder height, distance between teat, teat circumference, udder width and volume while diets 3 and 4 had their effects on udder circumference and teat length.**
It could be recommended based on the findings of this study that dairy goat farmers could feed the combination of 75% *Panicum maximum* + 25% *Morus alba* **foliages to their does for better udder development that can in turn improve their milk yields.** Also, dairy farmers should be sensitized about the potentials of *Morus alba* and *Panicum maximum* in ruminant feeding to enhance the utilization of *Morus alba* for better milk yield by West African Dwarf goats

REFERENCES

Adegoke, E.O., Ezekwe, A.G. and Agaviezor, O.B. (2015). Effect of Parity and Birth Type On Udder Characteristics And Milk Yield Of West African Dwarf Sheep. *International Journal of Scientific and Technology Research,* 4:27-32.

Agbede, J.O., Alokan, J.A. and Ologun, A.G. (1997). Udder size and milk production potentialsof goats and sheep in South-West Nigeria. *Nigeria Journal Animal Production*, 24(2):175-179.

Akporhuarho, P.O. (2015). Assessment of udder size and milk yield of West African Dwarf Goats (WAD) reared under semi intensive managements systems in humid Nigeria. *Global Journal Animal Science Resource* 3:36-40.

Amao, A.O., Osinowo, O.A., Onwuka C.F., Abiola, S.S. and Dipeolu, M.A. (2003). Evaluation of Udder Traits in West African Dwarf Goats. *Nigerian Journal of Animal Product* 30:246-252.

Amao, A.O., Osinowo, O.A., Onwuka C.F., Abiola, S.S., Dipeolu, M.A. and Lakpini C. A. M. (2003b). Evaluation of udder traits as influenced by body weight and reproductive status of red Sokoto goats in guinea savanna environment. *Nigeria Agricultural Journal* 34:131-137

Aro, S.O., Aletor, V.A; Tewe, O.O., Fajemisin, A.N., Usifo, B. and Adesida, H.A. (2008). Studies on the nutitional potentials of cassava tuber wastes collected from cassava starch factory. Proceedings of 4th Annual Conference of School of Agricultural Technology held at the Federal University of Technology, Akure, Nigeria. pp 86-92.

Boras-Granic K., Chang H.R., Grossched, and Hamel P.A. (2006). "Lef-1 is required for the transition of Want signaling from mesenchymal to epithelial cells in the mouse embryonic mammary gland," *Developmental Biology*, 295, 219–231.

James, I.J. (2000). Changes in the udder traits of West African Dwarf, Red Sokoto and Sahel goats during pregnancy and lactation and their effects on partial daily milk yield. M. Agric. Dissertation. Department of Animal Breeding and Genetics, College of Animal Science and Livestock Production. University of Agriculture Abeokuta Nigeria. pp 101.

Miglior, F., Muir, B.L. and Van-Doormaal, B.J. (2005). Selection indices in Holstein cattle of various countries. *Journal of Dairy Science*, 88(3):1255-1263,

Milerski, M., Margetin, M., Čapistrak, A., Apolen, D., Španik, J. and Oravcova, M. (2006). Relationships between external and internal udder measurements and the linear scores for udder morphology traits in dairy sheep. *Czechia Journal Animal Science*. 51:383-390.