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REPRODUCTIVE PERFORMANCE OF RED SOKOTO GOAT BREED IN ADAMAWA STATE

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ABSTRACT

As a multipurpose animal, goats provide meat, milk, hides, skin, and manure. They rank next to cattle in income generation and their meat (chevon) is quite popular and well-relished. The need to develop productive and adaptive goat breeds. This study was carried out to investigate the reproductive performance of Red Sokoto goat in Adamawa state. The design of the experiment was based on supplements offered. The result obtained in the study was; gestation length was short in groups receiving maize bran and cotton seed cake but longer in the control group and significant differences ($P<0.05$) existed between the different groups. Twinning was recorded only in the groups receiving maize bran and cotton seed cake; no significant differences existed. The birth weight of the F1 kids showed significant ($P<0.001$) differences between the groups, the highest was recorded in the control group while the least was recorded in the group receiving maize bran due to the incidence of twinning. This indicates that supplementation increases productivity.

Keywords: Birth weight, gestation length, Red Sokoto goat, supplementation, twinning rate

INTRODUCTION

The major problem facing third-world countries is how to increase the biological value of their menu, improve and maintain the productive potentials of their domestic livestock, given adverse ecological and physiological constraints (Okonkwo, *et al.*, 2011). Many developing countries have long been plagued with the problem of a worsening situation of inadequate consumption of animal protein especially milk (Zahradeen *et al.*, 2010). The energy and protein intake are grossly inadequate in these countries, leading to low weight for age, and height, various degrees of stunting, higher susceptibility to disease infections, and high pre-weaning morbidity and mortality most especially among children who are vulnerable (PRB, 2012). In the tropics however, these species of livestock have low productivity partly due to slow growth rate which had been attributed to poor nutrition, managerial factors and non-genetic factors such as age and parity of dam, sex and type of birth as reported by Gbangboche *et al.* (2006). Selection of genetically superior individuals as parent stock to future generations is hindered by nongenetic factors that mask the selected individuals' actual breeding values (Dadi *et al.*, 2008). It therefore becomes imperative to identify those non-genetic factors to seek appropriate ways to accurately estimate breeding values.

MATERIALS AND METHODS

Experimental Site

The study was conducted at the Teaching and Research Farm of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, located in the northeastern part of the country, it is situated within the Guinea savanna region and lies between latitude 09.14°N and longitude 12.8°E and an altitude of 152m above sea level. Average temperature is 29°c and an annual mean rainfall of 1150m (Adebayo and Tukur, 1999).

Experimental Diets

Maize bran was purchased from small scale mills in Yola metropolis and sundried to avoid molding. Cotton seed cake was purchased from stores in Yola. It was milled to reduce the size for feeding. Similarly, groundnut haulms were purchased on-farm. They were crushed and bulk in bags prior to the study period and ensured that sufficient quantity was made available for the animals up to when new ones were available.

Treatments and Experimental Design

Twenty (20) Red Sokoto goats were randomly allocated to four (4) treatment diets. (T1, T2, T3 and T4) Replicated five times in a Randomized Complete Block Design (RCBD).

Data Collection

Data was collected on the following parameters; feed intake; body weight changes and milk production. Chemical Analyses: The proximate compositions were determined using (AOAC, 1995).

Statistical Analyses

The data obtained were analyzed using statistical package (Steel and Torrie, 1980).

RESULT AND DISCUSSION

Chemical Composition of the Supplemental Feeds is presented in Table 1

Table 1: Chemical Composition of the Supplemental Feeds (% DM basis)

Diets	DM	CP	CF	ASH	EE
Maize bran	92.23	10.53	10.53	1.16	1.89
Cotton seed cake	93.60	29.94	23.50	5.16	5.76
Groundnut haulms	93.65	15.63	23.26	7.67	2.06

Proximate composition of milk from does during first parity in the study

Milk Yield: The milk yield values were 35.530, 32.218, 39.263 and 28.433kg for the different treatment groups with no significant difference among the treatment groups. The values were higher in the group supplemented with cotton seed cake, followed by the control group. Treatment two which is supplemented with maize bran is the next and the least values were recorded in the group supplemented with groundnut haulms (Anghel, *et al.*, 2016).

Supplement Intake: The total supplement feed intake was significantly (p<0.001) influenced by the different dietary treatments. Treatment 1, which was the control group did not receive any supplement. The highest supplement feed intake was recorded in treatment four 4 those supplemented with groundnut haulms, (34.27kg). This is followed by treatment three 3, those supplemented with cotton seed cake (30.550kg) and the least is obtained in treatment two 2, those supplemented with maize bran (30.235kg) similar findings by Anghel *et al.* (2016).

Table 2: Systems of goats Management in the study

Management System	No. of farmers	Percentage (%)
Free range	97	40.42
Tethering	34	14.17
Village herding system	72	30.00
Cut and Carry	37	15.42
Total	240	100

Means with different superscripts within a row are significantly different NS – Not Significant;
SEM – Standard error of mean; * (P<0.05); ** (P<0.01); *** (P<0.001).

The different systems of managing goats adopted by farmers in the study area shows 40.24% of the respondents kept their goats under the free-range method. Tethering system of managing animals was adopted by 14.17% of the respondents in the study area. However, the village herding system ranked the second largest after free range system and accounted for 30.0% of the respondents in the study area. While cut and carry system made up of 15.42% of the farmers in the study area as shown in Table 2. **Supplement Intake;** the supplement feed intake was significantly affected (P<0.001) by the dietary treatments. The supplement was not provided to the control group (1), while the values for treatment 2, 3 and 4 were 31.090, 30.798 and 32.228kg respectively. Animals on treatment four (4) had the highest supplement feed intake while the lowest was recorded for animals on treatment three (3) as observed by Farin (2015). **Milk Yield;** the milk production of does during the second parity also did not show any significant difference among the different treatment groups. The records were 42.588, 38.758, 46.708 and 33.605kg for treatments 1, 2, 3 and 4 respectively. This result shows that the highest milk yield was recorded in the group supplemented with cotton seed cake and this was followed by the control group as in earlier result by (Anghel, *et al.*, 2016). Next in the ranking was treatment two (2) which was supplemented with maize bran while the least record was obtained from the treatment receiving groundnut haulms as a supplement. **Initial Weight;** the initial weight of the animals across the different treatment groups ranged between 16.25 and 16.75kg. The differences between all the treatment groups were not significant. **Total Weight Gain;** the total weight gain was significantly affected (P<0.001) by the dietary treatments. The total weight gain values were 4.750, 5.750, 6.775 and 3.750kg for treatments 1, 2, 3 and 4 respectively. The total weight gain was low in treatment four, those supplemented with groundnut haulms and the highest value was attained in treatment three those supplemented with cotton seed cake followed by treatment two, those supplemented with maize bran and then the control group. **Supplement Intake;** the total supplement feed intake was significantly (P<0.001) influenced by the different dietary treatments. Treatment 1, which was the control group did not receive any supplement. The highest supplement feed intake was recorded in treatment four 4 those supplemented with groundnut haulms (34.27kg). This is followed by treatment three 3, those supplemented with cotton seed cake (30.550kg) and the least is obtained in treatment two 2, those supplemented with maize bran (30.235kg). **Gestation Length;** the length of the gestation period was also significantly affected by the dietary treatments (P<.0.05). The gestation length values were 152.00, 150.50, 150.50 and 150.75days for treatments 1, 2, 3 and 4 respectively. The highest value of 152.00days was recorded in treatment one (1), this was followed by treatment four (4), with 150.75days and then treatment two (2), and three (3) with 150.50 days each respectively. **Twinning Rate;** the twinning rate was not significantly affected by the different dietary treatment groups. The values were 0.00, 0.50, 0.05 and 0.00 for treatments 1,2,3 and 4 respectively. The result shows that twinning was not recorded in treatment one (1) (control) and treatment four (4). However, it was recorded in treatment two (2) (0.50) and three (3) (0.50) respectively. **Birth Weight;** The different supplements showed a significant (P<0.001) difference on birth weight of kids. The average birth weight of kids was 2.050, 1.613, 1.763 and 1.700kg for treatments 1,2,3 and 4 respectively. The highest birth weight was recorded in the control group (1). It was followed by kids on treatment three (3) and four (4). The least birth weight was recorded in treatment two (2) in relation to the findings of [7]. **Kidding Interval;** the number of days between two successive kidding vary significantly (P<0.01) between the various treatment groups. The highest was recorded in the control group with 203.75 days. This was followed by treatment four (4) with 187.50 days and then treatment two (2) with 185.00 days while the least was recorded on treatment three (3) with 182.50 days in similarity with [9]. **Gestation Length;** The length of pregnancy also varies significantly (P<0.01) among the different treatment groups. The least number of days was recorded in the control group, which was followed by treatment two (2) (149.25) and three (3) (149.25), while the highest gestation length was recorded in treatment 4 (150.25) similar result was obtained by Milliam *et al*. (2020) in Red Sokoto goats and in other breeds by Farin (2015) and Anghel *et al.* (2016). **Twinning Rate;** the number of kids reproduced in a single pregnancy was not affected by supplementation. The records for twinning rate across the different treatment groups were 0.75, 1.00, 1.00 and 0.75 for treatments 1, 2, 3 and 4 respectively.

Table 3: Performance and milk Production of does (Parent stock, First Parity) in the study

	Treatments				
Parameters	**1**	**2**	**3**	**4**	**SEM**
Initial Weight (kg)	16.500	16.500	16.250	16.750	0.289Ns
Total Weight gain (kg) Supplement	4.750[c]	5.750[b]	6.775[a]	3.750[d]	0.356***
Feed intake (kg)	0.000[c]	30.235[b]	30.550[b]	34.275[a]	0.042***
Gestation Length (days)	152.000[a]	150.500[b]	150.500[b]	150.750[b]	0.315*
Twinning Rate	0.000	0.500	0.500	0.000	0.204NS
Birth Weight of Kids (kg)	2.050[a]	1.613[c]	1.763[b]	1.700[ab]	0.039***
Milk yield (kg)	35.530	32.218	39.623	28.433	5.505NS
Mortality of Kids	0.250[ab]	0.750[a]	0.000[b]	0.000[b]	0.204*
Total Weight gain of Kids (kg)	3.333[d]	4.900[b]	5.050[a]	4.325[c]	0.042***

[ab]Means with different superscripts within a row are significantly different; NS – Not Significant;
SEM – Standard error of mean; * ($p<0.05$); ** ($p<0.01$); *** ($p<0.001$)

Milk Yield; The milk yield values were 35.530, 32.218, 39.263 and 28.433kg for the different treatment groups with no significant difference among the treatment groups. The values were higher in the group supplemented with cotton seed cake, followed by the control group. Treatment two (2) which is supplemented with maize bran is the next and the least values were recorded in the group supplemented with groundnut haulms as earlier opined by Farin (2015). **Mortality of Kids;** Kids mortality was recorded only in experiments one (1) and two (2) and there is a significant ($P<0.05$) difference between the treatment groups. The values recorded are 0.250 and 0.750 for treatments one (1) and two (2) while none was recorded in treatments three (3) and four (4). This shows that mortality of kids were higher in treatment two (2) followed by treatment one (1), this is in relation to the report of Bello (2011).who also reported lower mortality. **Total Weight gain of kids;** the values recorded for total weight gain of kids across the different treatment groups showed that there were significant ($P<0.001$) differences. The values were 3.33, 4.90, 5.05 and 4.325kg for treatments 1, 2, 3 and 4 respectively. The highest weight gain was recorded in treatment three (3) which was supplemented with cotton seed cake which was followed by treatment two (2) and then four (4). The least values of kids growth was recorded in the control group which was earlier reported by Bello (2011).

CONCLUSION

Milk yield did not show any significant difference between the different supplemented groups and highest was recorded in the group receiving cotton seed cake while the least was recorded in the group receiving groundnut haulms. Mortality of kids also showed significant ($P<0.05$) differences between the treatment groups and highest was recorded in the group receiving maize bran while non was recorded in the group receiving cotton seed cake and groundnut haulms. Total weight gain of kids during weaning showed a significant difference ($P<0.001$) between the groups and the highest was recorded in the group receiving cotton seed cake while the least was recorded in the control group. Good selection programme can improve reproductive performance of goats and also its milk production. Substantial improvement in goat production can be achieved through better management, reduction in goats diseases and mortality and the use of hired labour and better housing to protect them from adverse weather conditions.

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Heavy metals such as Cadmium (Cd), Nickel (Ni), lead (Pb), Zinc (Zn), and Copper (Cu) originate from various sources including agriculture. From agricultural sources, they comprise agrochemicals such as insecticides and pesticides (Masindi & Muedi, 2018).

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