

EFFECT OF LACTATION WEEK AND MILKING TIME ON WEIGHT AND MILK YIELD OF SAHELIAN GOATS IN KANO STATE

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ABSTRACT

The experiment was carried out to evaluate the effect of lactation week and time on weight and milk yield of Sahelian kid and does, respectively. The research was conducted at the Center for Dryland Agriculture Research Farm, Bayero University, Kano. Four lactating Sahelian does of an average age of 2 years were sampled from the goat herd. Milk collection started seven days post kidding until ten weeks of lactation. Milk samples were measured using a 100 ml measuring cylinder immediately after collection. The weights of the kids were measured weekly with weighing balance in grams. The result shows significant ($P < 0.05$) effect of time on the kid weight of Sahel. Highest weights were obtained in the morning (4.61 kg) than in the evening (4.32 kg). Result also revealed highly significant ($P < 0.05$) effect of time on milk yield of Sahelian does. Milk yield was higher in the morning (115.18 ml $\pm$ 8.24) than in the evening (68.03 ml $\pm$ 8.90). Lactation week significantly ($P < 0.05$) affects kid weight. The kid weights increased throughout the lactation weeks. Mean values of Sahelian kid weight in week 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 were 1.28, 3.13, 4.14, 4.50, 4.68, 5.08, 5.27, 5.37, 5.52 and 5.72 kg respectively. Optimum milk yield of the Sahelian does was reached at the third and fourth weeks of lactation.

Key words: lactation, milking, milk yield, Sahelian, goat

INTRODUCTION

Goats in the country ranked second, followed by cattle, sheep, swine and rabbits, in population among domesticated animal species after chicken (FAO, 2006). Sahelian goat is one of the three distinct breeds in Nigeria; it is small sized animal with thin appearance, narrow body, shallow chest, and long spindly legs. Udder as well as scrotum in males split into two halves. Both sexes are horned, most have wattles, pendent or semi-pendulous ears. Stiff short hair with variety of colors from pure white, cream to red, black or gray sprinkled (Mason, 1996).

Goat farming has multifold advantages like short generation interval, high rate of prolificacy, easy in management and marketing over large ruminants in the world (Singh et al., 2014). The goat milk constituents and its production per lactation are affected by many factors such as breed, nutrition, health of the animals, environment and the number and stage of lactation (Mestawet *et al.*, 2012; Zahraddeen *et al.*, 2007). Goat milk and its products are very essential in everyday nutrition. Goat milk is used to produce butter, yoghurt, cheese and other products. Goat milk is also effective in treating eczemas, migraine, hay fever and constipation. It contains vitamin A, potassium, calcium and phosphorus making it suitable for persons suffering from cardiovascular diseases. It also contains vitamins B₁, B₂ and C which increase resistance to various diseases. Proteins contained in milk protect children from diarrhea (Zapasnikienė, 2015).

MATERIALS AND METHODS

Experimental Location

The study was conducted at Centre for Dryland Agriculture Training and Research Farm, Bayero University, Kano. The GPS coordinates of the Research farm lies within longitude 11° 58.771' East and latitude 8°25.851' North at an altitude of 472m above sea level. The average monthly minimum and maximum temperature is 18.6°C respectively. The total annual rainfall and average relative humidity are 1396 mm and 45.4% respectively (Nigeria Meteorological Agency; NiMet, 2014).

Experimental Animals and their Management

Four (4) lactating Sahelian does of two years old were sampled from the goat herd of the farm. The experimental pens were thoroughly cleaned and disinfected before the transfer of the animals and cleaned on daily basis throughout the study period. The animals were treated against endoparasites

with Albendazole suspension at 7.5 mg per kg body weight and Oxytetracycline at 10 mg per kg body weight. External parasites were also controlled using Pour-on[®] containing Cypermethrin.

The goats were raised semi-intensively. Animals were allowed to graze in morning and evening. The concentrate mixtures contained 19.14 % crude proteins which were fed to the animals in the morning and evening at 5% of their body weight. Animals were offered drinking water *ad libitum*. Feed ingredients used in formulating the diets include cottonseed cake, wheat offal, rice mill waste, poultry litter, cowpea husk, *Piliostigma reticulatum* (“Kalgo pods”), groundnut hay and salt. The mixture of concentrate and roughage provided was in the ratio of 60:40. Groundnut hay was provided to the animals *ad libitum*. Soybean wastes were also added to the rations of the lactating animals at 1% of the total feed.

Data Collection

Milk Collection Procedure

The first evaluation of milk yield was done at early stage of lactation starting after day seven (7) of kidding to exclude colostrum. The daily collection of milk samples followed until 10 weeks of lactation. Udders were wiped with damp towel with Dettol[®] as a disinfectant to avoid contamination. The samples were collected in clean bottles, with tight covers to prevent leakage and contamination. Milk samples were measured using a 100 ml measuring cylinder immediately after collection. Milk production traits were measured for each lactating doe as daily milk yield, morning and evening milk yield. Morning milk yield was measured by isolating kids from their dams at 5.00 pm and then weighed on the following morning at 8.00 am. Kids were weighed before suckling as W_1 and weighed again after suckling as W_2 . The difference in weight between $W_2 - W_1$ gave the amount of milk consumed per kid as W_3 . Similar procedure was followed in estimating the evening milk production. The sum of morning and evening milk yield represent daily milk yield. The weights of the kids were measured weekly with weighing balance in grams.

Statistical Analysis

Data were collected and analyzed using Excel and JMP pro 14.0 Statistical Analysis System (SAS, 2018).

RESULTS AND DISCUSSION

Effect of lactation week on Sahelian kid weight (kg)

The effect of lactation week on Sahelian kid weight is presented in Table 1. The result shows that lactation week significantly ($P < 0.05$) affect kid weight. The kid weights increased throughout the lactation weeks. Mean values of Sahelian kid weight in week 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 were 1.28, 3.13, 4.14, 4.50, 4.68, 5.08, 5.27, 5.37, 5.52 and 5.72 kg respectively.

Table 1: Effect of lactation week on Sahelian kid weight (kg)

Weeks	Kid weight (kg)
1	1.28 ^f ±0.24
2	3.13 ^e ±0.17
3	4.14 ^d ±0.17
4	4.50 ^{cd} ±0.17
5	4.68 ^{bc} ±0.17
6	5.08 ^{ab} ±0.17
7	5.27 ^a ±0.17
8	5.37 ^a ±0.17
9	5.52 ^a ±0.17
10	5.72 ^a ±0.29
P-value	< 0.0001

a,b,c: means with different superscripts on the same column are significantly ($p < 0.01$) different.

LSMean ± SE; Least Square Mean ± Standard Error

Effect of Time on Kid weight (Kg) and Daily Milk Yield (ml) of Sahelian does

Table 2 shows the effect of time on kid weight and daily milk yield of Sahelian does. The result shows significant ($P < 0.05$) effect of time on the weight of Sahelian kid. Highest weights were obtained in the morning (4.61 kg) than in the evening (4.32 kg). Result also revealed highly

significant ($P < 0.05$) effect of time on milk yield of Sahelian does. Milk yield was higher in the morning ($115.18 \text{ ml} \pm 8.24$) than in the evening ($68.03 \text{ ml} \pm 8.90$).

Table 2: Effect of Time on Kid weight (Kg) and Daily Milk Yield (ml) of Sahelian does

Time	Morning	Evening	P-value
Kid weight (kg)	$4.61^a \pm 0.08$	$4.32^b \pm 0.09$	0.0176
Daily Milk Yield (ml)	$115.18^a \pm 8.24$	$68.03^b \pm 8.90$	0.0002

a,b,c: means with different superscripts on the same row are significantly ($p < 0.01$) different. LS Mean $\pm$ SE; Least Square Mean $\pm$ Standard Error

Effect of lactation week on daily milk yield (ml) of Sahelian does

The result obtained for the effect of lactation week on daily milk yield of Sahelian does is presented in Table 3. Non-significant difference ($P > 0.05$) was observed on the daily milk yield of lactating does throughout the lactation weeks. However, highest daily milk yield were obtained in week 3 ($133.80 \text{ kg} \pm 16.81$) and week 4 ($108.84 \text{ kg} \pm 16.81$).

Table 3: Effect of lactation week on daily milk yield (ml) of Sahelian does

Week	Milk yield (ml)	P-value
1	98.51 ± 23.77	0.125
2	99.89 ± 16.81	
3	133.80 ± 16.81	
4	108.84 ± 16.81	
5	67.27 ± 16.81	
6	83.22 ± 16.81	
7	99.72 ± 16.81	
8	93.67 ± 16.81	
9	59.94 ± 16.81	
10	71.17 ± 29.11	

DISCUSSION

The mean weight obtained for Sahel kid at birth were lower than 1.8 kg for Red Sokoto goats raised under smallholder production system at Saunawa and Amarzakawa villages in Kano State of Nigeria (Akpa *et al.*, 2009). The kid weights increased throughout the lactation weeks. This progressive increase in kid weight across the weeks shows that age is a determinant of growth and physiological development which is an indication that as the animal grows; all the other parts are growing concurrently. Body weights and growth rates at pre-weaning stage are often considered as early indicators of the later growth and economic benefit and can affect body weight at puberty and at first kidding (Hanford, Van Vleck and Snowden, 2006). Ahamefule *et al.* (2012) reported similar result with the present study who obtained highest daily milk yield in week 3 and week 4. The present study reported higher mean daily milk yield than the findings of Makun *et al.* (2008) who observed 134.7 ml for Sahelian goats respectively. Also, Makun *et al.* (2013) reported higher average milk yield of Red Sokoto and Sahelian goats as 414.1 and 203.2 ml/day respectively than this study. The higher milk yield obtained for the morning hours milking could be attributed to the period of physiological rest experienced by the animals. Akpa *et al.* (2003) observed that twice a day milking appears to be the optimum milking interval in Red Sokoto goats because it increased milk yield by 52.7%.

CONCLUSION

It can be concluded that lactation week significantly affect Sahelian kid weight. The low milk yield of the Sahelian does in this study is an indication that their milk potentials are unimproved which could be achieved through selection and better management practices. More milk yields could be obtained in the morning and during third and fourth weeks of lactation which should be the target period of milk collection by consumers.

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