



## **The Impact of Natural Suckling on Milk Yield and Growth Rates of Kids of Nubian Goats**

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### **Abstract**

This study was carried out to evaluate the effect of suckling on milk production of Nubian goats and growth rates of respective kids. The study involved 20 multiparous Nubian goats allocated randomly according to body weight and age to two equal groups of 10 does each. Group A suckled their kids for 13 weeks, while group B (control) was not suckled and their kids were reared artificially by bottle for 13 weeks. The results indicated a significant ( $P < 0.05$ ) difference for the daily milk yield (kg/day) in favour of the suckled group. The recorded values were  $1.07 \pm 0.3$  versus  $0.8 \pm 0.28$  (kg/day) for group A and B, respectively. The peak yield in group A and B was  $1.5 \pm 1.1$  and  $1.2 \pm 0.1$  (kg/day), respectively. The present study revealed significant ( $P < 0.01$ ) differences of the total milk yield per lactation with values of  $180.7 \pm 45.4$  compared to  $110.2 \pm 65.3$  (kg/lactation) for the two groups, respectively. The lactation length was significantly ( $P < 0.05$ ) longer in group A than that in group B with values of  $174.6 \pm 46.7$  and  $128.6 \pm 36.9$  days, respectively. Kids milk consumption and conversion efficiency in the two groups were in significant ( $P > 0.05$ ) as indicated by the similar growth rate in the two groups. The sex of kid, however had exerted a significant effect on growth rate during the second and third week of age, whereby the male kids had a highly significant ( $P < 0.05$ ) growth rate than female mates.

**Keywords:** Nubian goats; Suckling; Growth rates; Productive performance.

### **المستخلص**

أختير عدد 20 معزه . أجريت هذه الدراسة لتقييم أثر الرضاعه الطبيعيه علي إنتاج اللبن في الماعز النبوي ومعدلات نمو السخالن نوبه متعدد اللادات وقسمت عشوائياً حسب الوزن والعمر إلى مجموعتين متساويتين المجموعه أ أرضعت مواليدها لمدة 13 أسبوع في إنتاج ( $P < 0.05$ ) أشارت النتائج إلى وجود فرقاً معنوياً بينما المجموعه ب (الشاهد) تمت رعايه مواليدها اصطناعياً لنفس المدة 1.07 كجم/اليوم للمجموعتين على التوالي وبلغت قمة إنتاج اللبن اليومي  $0.8 \pm 0.3$  مقابل  $0.8 \pm 0.28$  للبن اليومي وقد سجلت القيم  $180.7 \pm 45.4$  كجم/اليوم للمجموعه ب وب علي التوالي  $110.2 \pm 65.3$  كجم/لactation مقارنة ب  $174.6 \pm 46.7$  و  $128.6 \pm 36.9$  يوماً (P<0.01) وكانت فترة الإدرار أطول معنوياً  $45.4 \pm 180.7$  مقارنة ب  $65.3 \pm 110.2$  يوماً (P<0.05) حيث سجلت النتائج  $1.5 \pm 1.1$  و  $1.2 \pm 0.1$  كجم/اليوم للبن الكلي خلال فترة الإدرار كما أظهرت الدراسة فرقاً معنوياً (0.1) كجم/اليوم مقابل (0.1) كجم/اليوم (P<0.01) مما أشارت النتائج إلى عدم وجود فرقاً معنوياً (P<0.05) في المجموعه أ حيث إمتدت إلى  $128.6 \pm 36.9$  يوماً (P<0.05) كما أشارت النتائج إلى عدم وجود فرقاً معنوياً (P<0.05) في المجموعه ب حيث إمتدت إلى  $174.6 \pm 46.7$  يوماً (P<0.05)

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فروقات معنوية لاستهلاك اللبن والكافأة التحويلية للبن للسخالن في المجموعتين طوال فترة التجربة عدا فترتي الأسبوع الثاني والثالث في السخالن المرباه إصطناعياً حيث اثر جنس المولود معنويّاً على معدلات النمو المولود الذكور. ( $P<0.05$ )

## Introduction

Most goat breeds in the Mediterranean region are utilized as dual purpose animals for the production of milk and meat. Numerous studies have been conducted in the past 30 years examining suckling regimes and their effects on commercial and total milk production as well as on the growth rate of the kids (Louca *et al.*, 1975).

Goats have been successfully utilized for the biological control of weeds and the improvement of grazing capacity of ranges, due to their tolerance toward bitterness (Malechek and Provenza, 1983). Beside these merits goats are very efficient converters of grass into pounds of milk, meat, hair and skin, a character which make goat production amore attractive livestock enterprise. Furthermore, goats contribute to the health and nutrition of several million people in the developing countries, especially those on the poverty line. Hence their significant contribution to less developed regions continues unabated (Gutierrez, 1986). Growth rate varies according to energy, protein availability, sex and genotype (Susmel *et al.*, 1986). The present study aimed to investigate the effect of suckling on productive performance of goats in addition to compare growth rates of suckling and non suckling regimes of kids.

## Materials and Methods

### Study Site

This experiment was conducted at the Small Ruminant Department (SRD) affiliated to the Animal Production Research Centre (APRC), Kuku - Khartoum North.

### Experimental Animals

Twenty seven multiparous Sudan Nubian goats were purchased from livestock market of Al Damar city, River Nile state. On arrival each individual animal was identified by ear tag and

treated against internal and external parasites. From the above flock, 20 goats were selected and divided according to weight and age into two groups of 10 does each. The two groups were housed in separate pens, supplied with water troughs and feed mangers. Both groups were managed under group feeding of concentrate ration and *Medicago sativa* (barseem) adlibitum once a day throughout the experimental period.

### Management

**Dams:** The two groups were divided at random to the following treatments:

**Group A** suckled their kids for 13 weeks (each animal suckling single kid) (Fig 1).

**Group B** (control) non-suckling and their kids were reared artificially by bottle for 13 weeks (Fig 2).

### Kids

**Group A** The born kids were allowed to remain constantly with their dams for the colostral period (seven days) following that the kids were separated and allowed to suckle twice a day (morning and evening) till weaning.

**Group B** The kids treated similarly during the first 7 days post kidding and then separated from their dams and reared artificially by bottle feeding twice a day (morning and evening) till weaning. Kids of both groups were allowed to feed on concentrate ration and barseem (the same ration of their dams) adlibitum once a day starting from the second week of age up to weaning. The data pertaining to milk yield, lactation length and kids growth rates was collected on day one of lactation and continued up to the end of the experiment.

### Milk yield and lactation length

Total milk yields were collected by weigh-suck-weigh techniques following the procedures outlined by Jenkins and Ferrell (1984). A 24 hrs milk production was estimated as follows:

A kid was weighed, allowed to suckle freely to satisfy, and then reweighed. The difference in the pre and post suckling weight gave an estimate of

milk suckled. The remaining milk; if any; was removed by hand milking and weighed. This together with the suckled milk comprises a 12 hrs production. The same procedure was adopted in the evening to have the other 12 hrs yield. Both yields were considered as the 24 hrs milk yield. This procedure was repeated every day till weaning. Following weaning the does were hand milked twice a day at 12 hrs interval till drying up. In group B, total milk yield was estimated by hand milking twice a day till drying. The total milk yield of lactation for individual doe and length of lactation were determined for each doe. Milk consumption of kids in group A was determined by weigh-suck- weigh techniques from day 8 postpartum until the kids were weaned, while in group B, the consumption was determined by a calibrated bottle feeding from day 8 postpartum up to weaning at 3 months of age.

#### **Growth rate of kids**

After kidding, birth weight of kids was recorded and monitored weekly up to weaning at 3 months of age.

#### **Statistical analysis**

The obtained data were subjected to statistical analysis. T-test was used for the quantitative traits, while the data of body weight of kids were analyzed using analysis of covariance, type of birth being the covariate (Stat Soft, 2001).

**Table 1: Milk yield parameters of Nubian does during lactation**

Parameters	Suckling	Artificial Rearing	SE $\pm$	Significance
<b>Total milk yield kg/lactation</b>	180.7	110.2	25.16	* *
<b>Daily milk yield kg/ day</b>	1.07	0.8	0.116	*
<b>Peak yield kg/day</b>	1.5	1.2	1.057	NS
<b>Lactation length/days</b>	174.6	128.6	18.80	*

\* Means are significantly different ( $P<0.05$ ).

\*\* Means are significantly different ( $P<0.01$ ).

NS = Means on the same row are not different ( $P>0.05$ ).

#### **Performance of kids**

##### **Feed intake**

Table 2 provides data of the consumed milk (kg) per head during the experimental

##### **Growth performance of kids**

The data in table 3 portrayed the growth performance of kids including treatment, sex and their interactions. The results revealed non significant ( $P>0.05$ ) effect on all studied traits with the exception of sex in the second treatment



**Fig.1: Natural suckling**



**Fig.2: Artificial Rearing**

## **Results**

### **Milk yield**

The data pertinent to milk yield of the experimental groups is shown in table (1). The total milk yield per lactation was 180.7 and 110.2 kg for group A and B, respectively. The analysis revealed significant ( $P<0.01$ ) difference between the two groups. The daily milk yield and lactation length also indicated significant ( $P<0.05$ ) differences between the two groups. The peak milk yield for the two experimental groups however, indicated a non significant ( $P >0.05$ ) effect.

during the second and third weeks of age. The male kids showed a significantly ( $P<0.05$ ) higher growth rate than their counterparts female kids. It worth mentioning that male kids had secured better growth performance compared to their female mates throughout the experimental period. period. The results indicated non significant differences ( $P>0.05$ ) between the two groups for milk consumption and milk conversion efficiency during the experimental period.

**Table 2: Milk consumption and milk conversion efficiency in the two groups during the experimental period**

Parameters	Suckling	Artificial Rearing	SE $\pm$	Significance
Milk consumption (kg)	92.01	88.67	28.401	NS
Milk conversion efficiency (kg milk/kg live weight gain)	9.86	10.82	1.963	NS

NS = Means on the same row are not different ( $P > 0.05$ ).**Table : Live body weight (kg) of Kids during 13 weeks**

Treatment	Suckling		Artificial Rearing		SE $\pm$	Sig
	Male	Female	Male	Female		
Sex						
No of kids	5	5	3	7		
Birth weight	2.64	2.47	3.13	2.59	0.184	NS
1 <sup>st</sup>	3.24	3.20	3.64	3.06	0.234	NS
2 <sup>nd</sup>	4.17 <sup>a</sup>	4.06 <sup>ab</sup>	4.44 <sup>a</sup>	3.26 <sup>b</sup>	0.285	* Sex
3 <sup>rd</sup>	5.15 <sup>a</sup>	5.06 <sup>ab</sup>	5.48 <sup>a</sup>	3.86 <sup>b</sup>	0.367	* Sex
4 <sup>th</sup>	6.07	5.89	6.35	4.71	0.455	NS
5 <sup>th</sup>	6.91	6.76	7.18	5.55	0.550	NS
6 <sup>th</sup>	7.69	7.31	8.00	6.25	0.585	NS
7 <sup>th</sup>	8.52	8.03	8.58	6.75	0.607	NS
8 <sup>th</sup>	9.24	8.72	9.15	7.46	0.685	NS
9 <sup>th</sup>	10.15	9.44	9.87	8.03	0.778	NS
10 <sup>th</sup>	10.69	10.04	10.18	8.56	0.877	NS
11 <sup>th</sup>	11.33	10.68	10.70	9.17	0.911	NS
12 <sup>th</sup>	12.01	11.15	11.73	9.67	0.911	NS
13 <sup>th</sup>	12.59	11.67	12.69	10.11	0.987	NS

SE = standard error of means.

NS = Means on the same row are not different ( $P > 0.05$ ).\* = Means are significantly different ( $P < 0.05$ ).

## Discussion

The average daily milk yields recorded in the present study were 1.07 and 0.8 (kg/day) for group A and B respectively, with significant ( $P < 0.05$ ) difference between the two groups. The result of group A comply with the finding of Ahmed (1995) who recorded  $1.06 \pm 0.41$  and  $1.03 \pm 0.38$  kg for Sudan Nubian goats fed molasses and sorghum based diets, respectively. The result is also close to that reported by Gubartalla (1998) who reported  $1.14 \pm 0.40$  and  $1.74 \pm 0.53$  kg for Nubian goats fed Molasses and sorghum based diets, respectively. Moreover, contradicting data was recorded by other authors (Ibrahim, 2000 and Gabr and Ashmawy, 2006). The peak milk yield was 1.5 and 1.2 (kg / day) for group A and B respectively, with no significant ( $P > 0.05$ ) effect. The results were low when compared to that found by Khalid (2002) who reported that the average peak milk yield was 2.19 (kg/day) for Sudan Nubian goats suckled their kids for 3 months of age. Also the result is not in agreement with that stated by Devendra and Burns (1983).

The total milk yield per lactation of the experimental goats indicated significant ( $P < 0.01$ ) difference between the two treatments with respective values of 180.7 and 110.2 kg for group A and B, respectively. Khalid (2002) who worked on Sudan Nubian goats found that the average milk yield was 179.63 and 181.01 for does suckled their kids for 8 weeks and 12 weeks respectively, which is the same as the result achieved in this study. However, the results are not in line with what was recorded by Koumas *et al.* (2006) and Gubartalla (1998). The variations of milk yield could be referred to different breed, environmental, nutritional and managerial conditions adopted in the different studies.

The lactation length was 174.6 and 128.6 days for group A and B, respectively. The data revealed significant ( $P < 0.05$ ) effect of suckling on the lactation length. This finding can further support the effect of suckling stimulus as an important factor in controlling lactation. The current results disagree with that recorded by Gabr and Ashmawy (2006), Khalid (2002) and Rischkowsky (1997).

The results for milk consumption of kids were 92.01 and 88.67 kg for group A and B, respectively with no significant ( $P>0.05$ ) difference. Khalid (2002) reported contradicting evidence that milk consumption was 83.13 kg for Nubian kids suckled their dams for 3 months of age. Milk conversion efficiency of kids was 9.86 and 10.82 kg for group A and B, respectively with no significant ( $P>0.05$ ) difference. This finding disagreed with that found by Khalid (2002) who recorded 11.6 kg for Nubian kids and Economides (1982) who reported that one unit of kid live weight gain results from 7 units of goat milk consumed.

The pattern of growth performance witnessed in the present study indicated that male kids had always maintained a higher body weight at all stages. The results however revealed non significant ( $P > 0.05$ ) effect for the treatment, sex and their interactions at all stages with the exception of sex in the second treatment for the second and third weeks of age. This is in agreement with what has been reported by PenaBlanco *et al.* (1985); Ozekin and Akcapinar (1983) and Mavrogenis (1983). The difference may be due to anabolic effect of Androgen or could be attributed to the high birth weight of male kids compared to their female partners.

### **Conclusion**

The present study has demonstrated that suckling is an important factor, which influences the milk yield and lactation length traits of the lactating animals. Since the suckling process is a strong stimulant for secretion and excretion of milk, which will permit the goat to exhibit her full lactation potential. Since the results revealed non significant effect by the treatment it may be recommended that breeders can use cheap milk replacers for rearing their kids and that will be reflected positively in the economy of goat milk production.

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