

## THE EFFECT OF DOE MILKING ON THE GROWTH RATE OF KIDS UNDER FREE GRAZING IN COASTAL KENYA

<sup>1</sup>Kiura J.N. and D.M. Mwamachi  
KARI – MTWAPA, P.O. Box 16 (80109), MTWAPA

### ABSTRACT

Goats are an important source of protein and income through meat and milk. Goat milk fetches a premium price due to its high quality and medicinal properties. For the breeds with a high twinning percentage, there is often the concern that milking the does could deprive the kids of the milk needed for optimal performance. A study was therefore conducted at KARI-Mtwapa, whereby the growth rates of the Kenya Dual Purpose Goat kids were monitored for milked and non-milked does having twins and single births, for 130 days. The objective was to determine whether milking of goats that bore twins had any adverse effect on the growth rate of the kids. Experimental goats were systematically sampled such that successive kidding does were milked or not milked, respectively, for those kidding into twins or single, respectively. A total of 28 kids were evaluated for growth performance, 14 each from does milked or not milked. Two and twelve kids in each treatment were from single and twin births, respectively. Milking was done once a day, at 0700 h. Does and kids grazed on natural pastures during the day, from 0800 h to 1130 h and 1400 h to 1700 h. Maize bran was used as an energy supplement to all goats. Results indicated that there was no difference ( $P > 0.05$ ) in the average daily gain (ADG), for kids whose dams were milked compared to those whose dams were not milked (91.6 vs 92.1 g, respectively). The ADG of kids from single births was significantly ( $P < 0.05$ ) higher than that of twins (122.0 vs 86.8 g). The average daily goat milk production was 0.30 litres. Twinning rate of the does was 72.2%. It was concluded that milking of twinning goats under free grazing can be done without compromising the growth rate of kids. It was recommended that the trial be repeated to confirm the consistency of the results.

**Key words:** Goats milking, Kids weight gain, Free grazing.

### INTRODUCTION

The small ruminants form an important source of animal proteins and income, through meat and milk. The more than 460 million goats in the world produce over 4.5 million tons of milk and 1.2 million tons of meat annually, besides mohair, leather, and dung for fuel and fertilizer (Attfield, 2007). They are also kept as an insurance against disaster, are used in ceremonial feasting, and for the payment of social dues (Anon., 2010). In addition, Pygmy goats from Western Africa are used as laboratory and pet animals, and as meat and milk producers in areas infested by tsetse flies (Attfield, 2007). Mature does of most breeds produce more twins than single kids (Attfield, 2007; Anon., 2010), with the usual litter size being 1.4 to 2.2 kids (Attfield, 2007).

Goat milk fetches a premium price due to its higher quality than that of a cow, and its medicinal properties. It has anti-fungal and anti-bacterial properties and can be used for treating urogenital diseases of fungal origin (Anon., 2010). It is traditionally valued for the elderly, the sick, children who are allergic to cow's milk, and patients with ulcers; is preferred for raising orphan foals and other young domestic animals, and is richer than cow's milk in nutrients such as vitamin A, niacin, and choline (Attfield, 2007). Goat milk is easier to digest than cow milk (Anon., 2010).

In coastal Kenya, farm milk production levels are 0.75–2.0 and 0.25–0.75 L goat<sup>-1</sup> d<sup>-1</sup> for dairy and the local Small East African goats, respectively (Danda *et al.*, 2003). The goats are fed mainly on natural pastures. It is noted that revenue from the sale of goat milk leads to added profit or reduced goat maintenance costs beyond the proceeds obtained from the sale of live animals for meat or breeding. For the breeds with a high twinning percentage, there is often the concern that milking the does could deprive the kids of the milk needed for optimal performance. At the Kenya Agricultural

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<sup>1</sup>Corresponding author:  
kiurajn@yahoo.com, karimtw@kari.org

Research Institute (KARI)-Mtwapa, the Kenya Dual Purpose Goat (KDPG) breed kept had not been milked for a long time. The goat is a cross from four breeds; Toggenberg, Anglo-Nubian, Galla and the small East African goat. Milk production from KDPG is reported to be 1.5-3.0 L<sup>-1</sup> goat<sup>-1</sup> d<sup>-1</sup> in the high agricultural potential areas of Western Kenya (Ojango *et al.*, 2010). To obtain tangible information on the effect of milking does on the performance of the kids, data were collected on weekly body weights of kids whose dams were milked or not milked, and daily milk production of the does. The objective was to determine if milking does that had twinned affected the growth rate of kids.

## MATERIALS AND METHODS

### Site

This study was carried out in 2010 at KARI-Mtwapa, in coastal lowland Kenya. The area has an average annual rainfall of 1200 mm, mean monthly minimum and maximum temperatures of 22 and 30°C, respectively, and a high relative humidity of more than 80% (Jaetzold and Schmidt, 1983).

### Experimental design and procedures

A KDPG buck was allowed to run with 20 KDPG does that were more than 2 years old, in Feb-Apr 2010. Doe mean live weight was 35.7 ± 4.8 kg. Eighteen does kidded between July and August 2010, within a 3-week interval, in which 13 kidded to twins (72.2%) and the remaining 5 had single births (27.8%). Experimental does were systematically sampled upon kidding so that successive kidding does were milked or not milked, respectively, for those kidding to twins or single,

TABLE I- THE AVERAGE DAILY WEIGHT GAINS (ADGS) FOR KIDS CATEGORISED BY DIFFERENT PARAMETERS FOR A 130 DAY PERIOD

Parameter	Kid category	ADG (g)
Kid birth status	Single	122.0 <sup>a</sup>
	Twin	86.8 <sup>b</sup>
	LSD	2.21
Kid sex	Male	95.0 <sup>a</sup>
	Female	88.3 <sup>b</sup>
	LSD	1.55
Dam milking status	Milking	91.6
	Not milking	92.1
	LSD	1.54

Numbers bearing different superscript letters within a column for a parameter are significantly different ( $P < 0.05$ )

respectively. Milking was done once a day for both teats completely, at 0700 h. A total of 16 does were monitored for the trial, with eight being milked and eight not being milked. A total of 28 kids were evaluated for growth performance, 14 from does in each treatment (total of 4 from single and 24 from twin births). There were 14 male kids, eight whose dams were milked and six whose dams were not milked. Female kids were also 14, six whose dams were milked and eight whose dams were not milked. The mean birth weight was 2.9 ± 0.5 kg. The experimental period was 130 days.

Does and kids grazed on natural pastures during the day, from 0800 h to 1130 h when they returned to their housing pens to shelter against heat, and then 1400 h to 1700 h when they returned to their pens for the night. They were supplemented with *Gliricidia sepium* forage in a “goat feeding line” erected outside their pens during the day and evening resting hours. Kids joined the dams in the field after one month, before which they were being left behind for shelter against cold, wet conditions and so that they do not tire from walking into the grazing fields. Does and kids were allowed maize bran energy supplement at 150-200 g per day. Mineral lick blocks were offered in the goat pens throughout. Clean water was provided at the housing pens at all times. Maize bran and mineral licks used were purchased in bulk from a local supplier.

### Data collection and Analysis

Data were collected on daily doe milk production, weekly kid live weights and kid mortality. Analysis of variance (ANOVA) was carried out using the General linear model (GLM) procedures of Statistical Analysis System (SAS 1997). Means were separated using the least significant difference (LSD), when ANOVA indicated statistical significance ( $P < 0.05$ ).

## RESULTS

### Kid growth performance

The average daily weight gains (ADGs) for the kids is shown in Table I. There was no difference in growth rates for kids whose dams were milked or not milked (Table I). Male kids had higher ( $P < 0.05$ ) ADGs than female kids. The growth rate of kids from single births was significantly ( $P < 0.05$ ) higher than for those from twin births. The phenomenon of fostering, in which a dam allowed alien kids to suckle it, was observed.

Two male kids from the twin births (16.7%) died, both for does that were being milked, and none for singles.

### **Milk production**

The average daily milk production per doe for the experimental period was 0.29 litres. There was no significant difference ( $P > 0.05$ ) in milk production for does that had single compared to those with twin births (0.30 vs 0.29 l, respectively).

### **DISCUSSION**

The observed ADGs of 86 to 122 g for the kids were within the goat growth rates range of 20 to 291 g d<sup>-1</sup> reported by various authors (Steel, 1996; McGregor, 1985; Khusahry and Yusuff, 1985). The higher ADGs for the male kids is in agreement with findings by McGregor (1985).

The ADG for kids whose dams were milked was similar to that for the kids whose dams were not milked. It is considered that all kids had ample time to suckle their dams especially in the grazing fields.

Fostering of kids whose dams were still alive could have been an indication of weak bonding between the kids and their dams. Usually the doe recognises its kid first by smell and then by both sound and sight (Dalton, 2010). Disturbance at birth is reported to cause bonding problems (Dalton, 2010), and perhaps the separation of kids from the does during the first month after birth could have led to low bonding. Generally, all mothers prefer to nurse only their own litter, as reported by Delgadillo *et al.* (1997), who found that out of 10 creole goats and their 18 kids during the first month of lactation, only two goats (20%) fostered one alien kid each.

The death rate was higher (16.7 vs 0%) for twins than single births, in agreement with observation by Dalton (2010) that death rate for twins is higher. However, the deaths resulted from acute bloat and chronic diarrhea, which are not related to amount of milk accessed from the dam.

The doe milk production (0.3 L goat<sup>-1</sup> d<sup>-1</sup>) was within the range of 0.3–2.5 L goat<sup>-1</sup> d<sup>-1</sup> reported for KDPG (Anon., 2000), but lower than the 1.5–3.0 L goat<sup>-1</sup> d<sup>-1</sup> reported by Ojango *et al.* (2010) in the high agricultural potential areas of Western Kenya. The production was also on the lower side of the 0.25–0.75 L goat<sup>-1</sup> d<sup>-1</sup> reported for the coastal Kenya region farmers for local goats. Despite that free grazing system was employed, it raises doubt on the possibility of achieving 0.75 L goat<sup>-1</sup> d<sup>-1</sup> for coastal

region local goats. Milk yield is known to vary with breed, parturition number, level of nutrition, and on individual goats (Anon., 2010), with Swiss goat breeds (Saanen, Toggenberg, Alpine) being the highest producers (Attfield, 2007). The Swiss breeds have a potential of 1–3 L goat<sup>-1</sup>d<sup>-1</sup> (Steel, 1996). Attfield (2007) reported that in most countries, goats are milked twice a day, and the more milking is done on a doe, the more milk it produces. Similar findings were reported by Akpa *et al.* (2003). Attfield (2007) noted that routine, once-daily milking is not recommended, as production is slowed as milk accumulates. It is therefore possible that had milking been done twice a day, better daily yields would have been realized.

### **CONCLUSIONS**

This study shows that milking of twinning goats under free grazing can be done without compromising the growth rate of kids.

### **RECOMMENDATIONS**

1. Repeat the experiment to ascertain the consistency of similar growth rates for kids whose dams are milked or not milked, and preferably with a higher number of goats.
2. Conduct doe milking twice a day to determine the effect of any milk production increase on kid performance.
3. Monitor the extent of fostering and its effect on kid growth performance.

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