

EFFECT OF TWO METHODS OF RESTRICTED SUCKLING ON PERFORMANCE OF THE COWS AND ON GROWTH RATE OF THE CALVES

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20 freshly calved Creole cows were allocated alternately to two treatments which were the number of times they suckled their calves: once or twice daily, for a period of 90 days. The cows were milked once daily in the morning and suckling began 30 minutes after milking. Calves suckled twice daily were allowed to stay with their dams for 30 minutes in the morning and a second time for 30 minutes in the afternoon. Calves suckled once only were left with their dams for a period of 3 hrs from birth till one month of age after which the period was reduced to 30 minutes till the end of the trial. The calves had free access to poor quality fodder and a molasses mixture containing 5% urea. This was supplemented with a concentrate mixture providing 100 g fish meal and 200 g maize meal per day.

The growth rate of the twice suckled calves was better ($P < .001$) than that of the once suckled calves (0.44 ± 0.03 vs 0.21 ± 0.03 kg/d). This was attributed to the significantly ($P < .001$) higher amount of milk taken by twice suckled calves as compared to those suckled once daily (3.98 ± 0.22 vs 2.00 ± 0.13 kg/d). There was no significant difference in the total yield of milk (9.42 ± 0.50 vs 9.06 ± 0.41 kg/d) but there was a significant difference ($P < .05$) in the total saleable milk in favour of cows which suckled their calves only once daily (6.97 ± 0.32 vs 5.44 ± 0.49 kg/d). Although higher daily saleable milk yield was obtained in the once suckling treatment it is suggested that twice suckling is to be preferred in view of the better calf growth rate and weaning weight.

Key words: Calf rearing, restricted suckling, dual purpose, suckling frequency

Rearing calves by restricted suckling has been shown (Ugarte and Preston 1972, 1975; Gaya et al 1977) to be a better system of management in terms of total milk yield, calf growth rate and incidence of mastitis in the dams, than artificial rearing.

In Mauritius where the accent is on economic milk production, it is seen that restricted suckling reduces labour cost considerably. Moreover, the system permits the use of locally available molasses as the basis of the remainder of the ration, and the introduction of urea into the diet at an early age.

So far in Mauritius, the management system has been twice daily milking followed by restricted suckling. Where once/d milking has been done, the calves have been allowed to suckle twice daily. The objective of the present trial is to compare the effect of once milking/twice suckling a once milking/once suckling on milk yield and calf growth rate.

Materials and Methods

Animals and Treatments: 20 Creole cows from the Curepipe Livestock Breeding Station were allocated alternately to two treatments - once and twice daily suckling respectively - as they calved. The animals were allocated to the trial taking account of their age and parity. The cows were confined throughout the experiment in yoke stalls.

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Management and Feeding: In the twice daily suckling treatment, the calves had access to their dams for a 30 min period once the milking operation was completed. An interval of 30 min was maintained between the end of milking and suckling. In the afternoon the cows were not milked but were allowed to suckle their calves for 30 min starting at 14.00 hr.

In the once daily suckling treatment, the calves from birth till one month of age were suckled by their dams for a 3 hr period once the milking operation of the dams was completed. This was done because very young calves have a limited capacity to obtain sufficient milk for their requirements in a 30 min period. But from one month till weaning the suckling period was reduced to 30 min only. An interval of 30 min was maintained between the end of the milking operation of the dams and suckling of the calves. No suckling was done in the afternoon.

From the 10th day after birth, the calves on both treatments were fed a daily supplement consisting of 100 g fish meal and 200 g maize meal. Molasses containing 5% urea was available on a free choice basis as from the 15th day after birth. The urea was first completely dissolved in an equal amount of water and the resulting solution added to the molasses. The molasses/urea mixture was well mixed before being fed. Fresh cut grass, mostly *Setaria sphaecelata* var. Bua river, was offered on a free choice basis after 4 weeks of age.

The cows on both treatments were milked by hand once daily in the morning starting at 07.30 hr. Each cow was fed 40 kg cut grass daily distributed in two feeds at 09.30 hr and 14.00 hr.

A concentrate mixture was given at the rate of 5 kg/head daily for the first 7 days after calving and subsequently at the rate of 0.375 kg for every kg of milk produced by the cow. The concentrate was also given in two feeds daily at 08.30 hr and 13.30 hr.

Feed Analysis: The feeds were analysed regularly for chemical composition by the Chemistry Division of the Ministry of Agriculture and Natural Resources and the Environment. Total N was determined by the kjeldahl method. Ether extract and crude fibre were determined by the methods outlined by the Association of Official Analytical Chemists (AOAC 1965). Dry matter was determined by drying in an oven at 105° for 18 hr.

Measurements: The calves on both treatments were weighed daily before and after suckling in order to determine their milk consumption and at the same time serve as a check on their growth rate. A record of the intake of molasses, fish meal and maize was kept throughout the trial. Milk recording was on a daily basis. The cows were weighed immediately after calving and a second time at the end of the trial (i.e. weaning time). The data was analysed statistically by the method of Snedecor and Cochran (1967).

Results

The composition of the feeds is given in Table 1. The only noteworthy feature is the low nitrogen and high fibre content of the grass, and the high oil content of the locally produced fish meal.

Health: In the twice suckling treatment, 3 cows and 2 calves, and in the once suckling treatment, 3 cows and 3 calves, had minor therapy (chiefly for retained placentas and mastitis in the cows and diarrhoea in the calves) for some days. These effects were not related to the experimental treatments.

Table 1:
Composition of the feeds (X + SE_x)

	Cow concentrate	Fish meal	Maize meal	Fresh grass	Molasses
As received					
Dry matter, %	78.1±2.2	91.7±.71	85.8±.43	21.8±1.3	-
Brix	-	-	-	-	85.2±.5
Dry matter basis, %					
Nitrogen	3.27±0.20	7.62 ± 0.08	2.25±.35	.89±0.07	.86±.14
Crude fibre	8.2±1.2	0.8±0.3	3.1±.3	39.6 ±1.5	-
Ether extract	2.4±1.0	11.8±1.8	2.4±.18	.23	-

Suckling Behaviour: In general few or no problems were experienced with the sucking of the older cows by the calves. But all the first carvers, except for one, had to be restrained for a week or so at the beginning of the trial, to allow sucking by their respective calves, after which no restraining was necessary.

After the morning milking operation, all the experimental calves continued sucking throughout the 30 min left with their dams. But in the afternoon, where only calves in the twice suckling treatment were brought to their dams, all the 10 calves stopped sucking after about 20 min as they already had their fill.

In the once suckling system where calves were allowed to suckle their dams for 3 hr during the first month, most of the calves stopped suckling after about 1 hr or so even though their appetite was not satisfied. The reason was that no milk was left in the udders.

Calf Growth Rate: There was a highly significant difference ($P < .001$) in the average daily gain in favour of calves which suckled their dams twice daily (Table 2). Initially the growth rates of the calves on both treatments were almost the same (Figure 2). However, the effect of feeding more milk to calves suckling twice daily became apparent as from the 2nd and 3rd weeks and this difference was maintained throughout the trial.

Change in Liveweight of the Cows: The initial liveweight of the cows and their weight at 90 days post calving are set out in Table 2. In the twice suckling treatment, 4 cows lost weight, 5 cows gained weight and there was no change in weight for the remaining one. In the once suckling treatment, 2 cows lost weight and the remaining 8 cows had a weight gain. The mean differences between the two treatments were not significant.

Feed Utilization: There were no significant differences in the amounts of maize meal/fish meal or the molasses/urea mixture consumed by the calves in the two treatments. The difference in the amount of milk consumed by the calves was highly significant ($P < .001$) in favour of the twice suckling system.

The twice suckled calves were slightly more efficient in their milk conversion rate as compared to those suckled once.

Milk Production: The amount of saleable milk was significantly different ($P < .05$) in favour of the once suckling system. This is to be expected due to the lower milk intake by the calves on once suckling. There was no significant difference in the total milk yield between the two treatments.

Figure 1:
Live weight change of calves with time

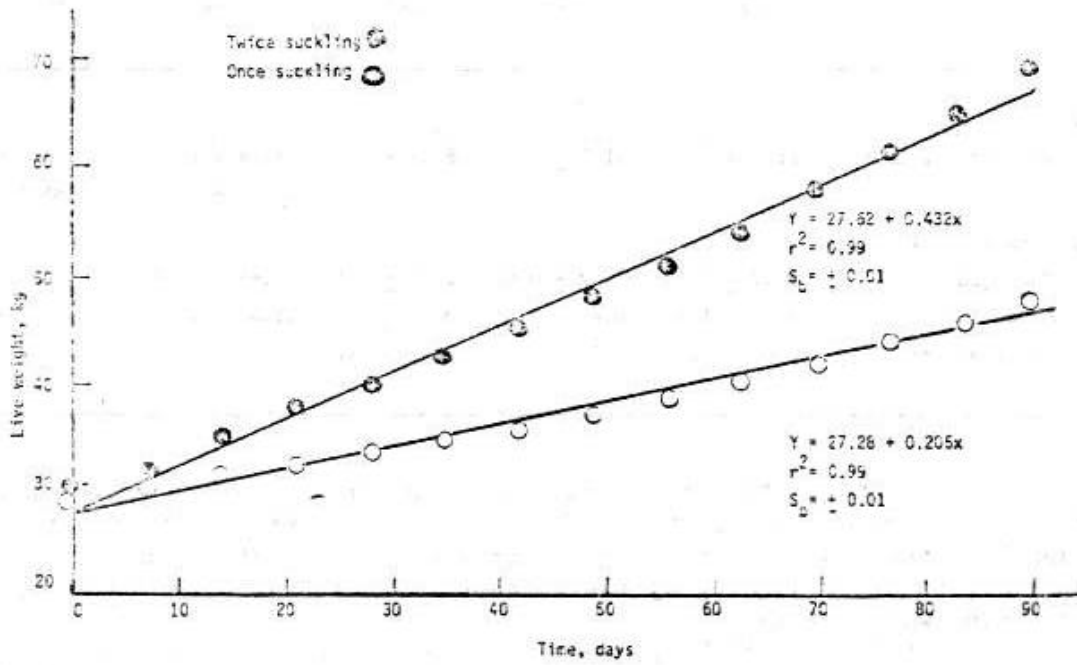


Figure 2:
Weekly gain of calves suckled once or twice daily

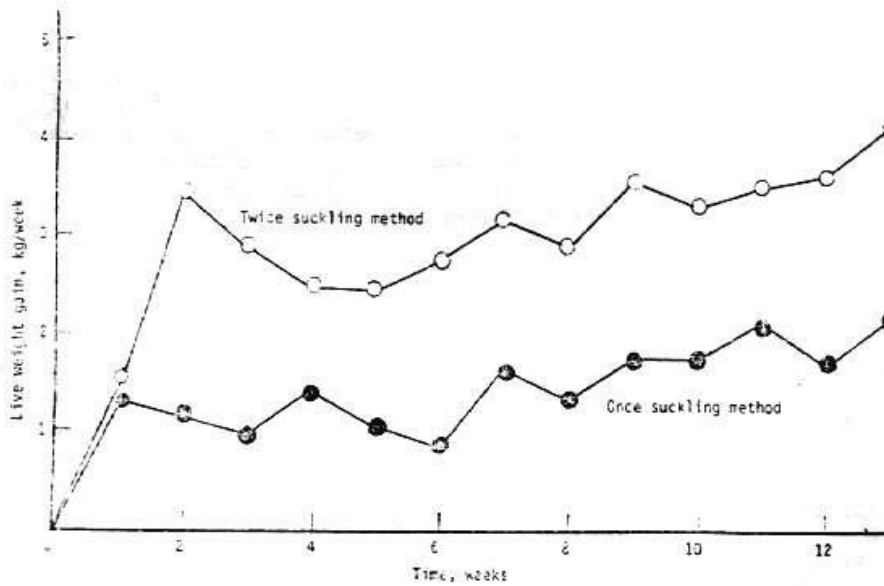


Table 2:
Table growth rate of calves to weaning (90 days) and live weight change in cows for once or twice daily suckling (10 per treatment)

	Suckling Frequency		SE diff
	Twice daily	Once daily	
Live weight of calves, kg			
Birth	29.2 ± 1.3	28.1 ± 1.2	
Weaning	68.6 ± 2.7	47.3 ± 2.6	
Daily gain	.438 ± .025	.213 ± .026	±.037**
Live weight of cows, kg			
After calving	342 ± 14	346 ± 10	
At weaning	347 ± 13	352 ± 11	
Daily gain	.052 ± .06	.067 ± .05	±.0795

** Significant P < .001

Discussion

Rearing dairy calves by restricted suckling has been shown (Ugarte and Preston 1972; Gaya et al 1977) to result in higher total milk yield and lower incidence of mastitis in the dams as compared to artificial rearing. It was also reported (Ugarte and Preston 1972) that calves suckling twice daily grew at a higher rate (0.86 vs 0.6 kg/day) and had a higher weaning weight (102 kg vs 82 kg) than calves suckling once daily. These were calves from Holstein and Holstein crosses which were milked twice daily. There was, however, no difference in total milk yield (14.1 litres vs 15.1 litres daily) of the dams - from parturition till weaning - between those which suckled twice or once daily.

The same trends were observed in the present trial although here Creole cows were used and milking was done only once daily. Daily growth rates of the calves suckling twice or once were 0.438 vs 0.213 ± 0.037 kg respectively and their weaning weights were 68.7 ± 2.7 kg vs 47.3 ± 2.6 kg respectively at 90 days. The higher growth rate and weaning weight of the twice suckling calves can be related to their higher milk consumption (Figure 3).

The lack of significant difference in liveweight gain of the cows was to be expected in view of the similarity in total milk production from the cows on the two treatments.

In spite of the significantly higher saleable milk production on the once suckling system, it is suggested that twice suckling is a better system of management. The twice suckling calves were all looking healthy and well developed whereas most of the once suckling calves looked stunted. In fact some of the once suckling calves were so stunted that perhaps they had reached the stage where compensatory growth could not be expected to be complete

Figure 3:
Relationship between average daily milk consumption and average daily gain of calves suckling once or twice daily

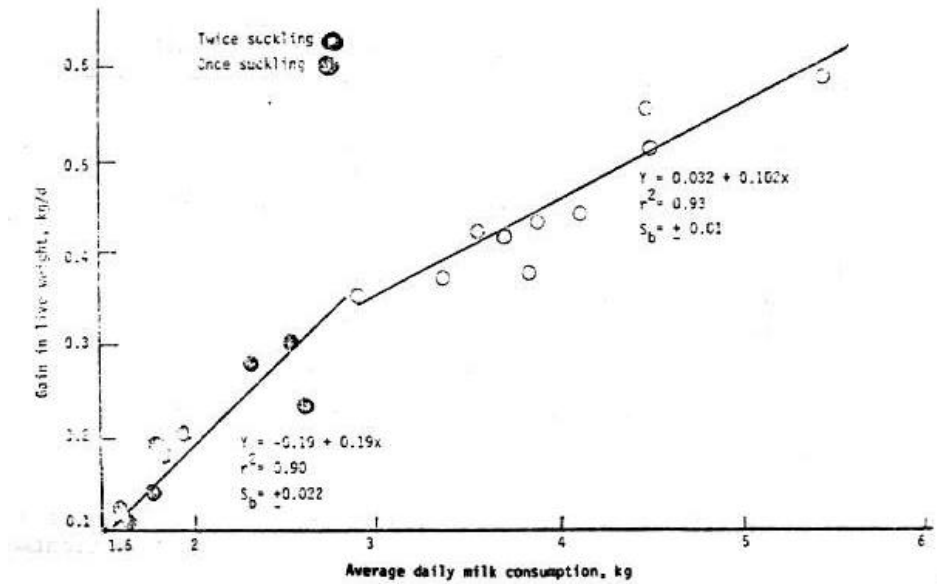


Table 3:
Feed intakes by the calves ($X \pm SE_x$)

	Suckling frequency		
	Twice daily	Once daily	SE diff
0- 90 days, kg			
Milk	358 ± 20	188 ± 20	± 24 **
Molasses	17.6 ± 1.1	17.1 ± .35	± 1.8
Maize/fish meal	12.9 ± 0.67	11.8 ± .88	± 1.1
Daily, kg			
Milk	3.98 ± .22	2.09 ± .13	
Molasses	0.23 ± .01	0.23 ± .004	
Maize/fish meal	0.16 ± .008	0.15 ± .01	

**P<.001

