

PRODUCTION COEFFICIENTS IN A DUAL PURPOSE HERD MANAGED FOR MILK AND WEANED CALF PRODUCTION¹

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Data were collected from 29 cows and their calves in a dual purpose herd of crossbred Holstein/Zebu. The cows were milked twice daily, allowing the calf to be suckled for a few seconds prior to milking in order to stimulate letdown and after milking for 30 minutes to consume the residual milk. Generally, in the rainy season the cows grazed pangola pasture with no supplementation. However, in certain periods they were kept in drylot where they received either molasses containing 5% urea or chopped sugar cane containing 1% urea and had access to grazing for 3 hr daily. In the dry season the cows were always confined in drylot with restricted grazing for 3 hr daily. Feeding in the drylot was chopped whole sugar cane and free access to a solution of final molasses containing 5% and 600 g daily of cotton seed cake. The calves were always kept in partially shaded pens with a cement floor and had free access to chopped whole sugar cane, final molasses containing 10% of urea and 250 g/d of cotton seed cake. The calves were the progeny of Zebu or Holstein sires. The data related to cows which calved between April 1975 and February 1976 Mean values with standard deviations were saleable milk (kg) during the lactation $1,742 \pm 466$, daily yield $5.95 \pm .148$; milk consumed by the calf from birth to weaning 454 ± 83.4 and daily $1.93 \pm .26$; total milk production in the lactation $2,197 \pm 472$ and daily 7.5 ± 1.5 ; the length of lactation was 255 ± 41 days and the calving interval 380 ± 37 days. The calf data were: birth weight 37.3 ± 5.36 ; weight at weaning 156 ± 19.8 (kg). age at weaning (days) 242 ± 61 , daily gain to weaning (g/d) 519 ± 122 , weight for age at weaning (kg/d). $69 \pm .17$. In this sample of animals mortality in the calves was zero.

Key words: cattle, dual purpose, restricted suckling, milk production

The arguments in favour of dual purpose systems of milk and beef production in the humid tropics have been put forward by Preston (1977). Preliminary results from the dual purpose herd in this centre for the first 9 months of its existence were summarised by MacLeod et al (1976) and Giraldez et al (1976). The data presented in this paper relate to the complete lactations of the first 29 animals that calved at the centre, over the period 6 April 1975 to 7 January 1976.

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Materials and Methods

Animals and Diets: The exact history of the cows in the herd is not known as they were purchased from a variety of sources and arrived without any previous records. The genetic composition varied over the range 100% Holstein to 50% Holstein/50% Zebu. A reasonable assumption is that on average the herd had about 75% Holstein breeding. All the cows had been served before arrival at the centre and on the basis of the appearance of the offspring, it seemed that the majority had been crossed with either Zebu or Brown Swiss sires. Most of the animals were in their second or later lactations. Milking was by hand twice daily at 6 a.m. and 3 p.m., first letting the calf suck each teat for a few seconds to stimulate let-down. After each milking, cows and calves were grouped together for approximately 30 minutes in an adjoining corral to allow suckling to take place.

During the wet season, the cows grazed pangola pasture and received no concentrate supplement; in the dry season, grazing was restricted to 3 hr daily after the morning milking, the cows spending the rest of the day in drylot where they had free access to sugar cane and molasses containing 5.0% urea; in addition 600 g/d of cottonseed cake was given. Some of the cows were confined in drylot throughout the whole of the day according to the experiment described by MacLeod et al (1976). However, this accounted for only a small part of the total experimental period, and can be considered to have had only a minimum effect on overall performance.

Calves had free access to their dams for the first 7 days after birth. They were then housed in groups of 20 to 40 in corrals which were partially covered and had a cement floor. Feeding was on chopped whole sugar cane with free access to a solution of molasses containing 10% urea. They also received 250 g/d of cottonseed cake. The calves were confined in drylot permanently irrespective of the season, until weaning. Weaning generally coincided with the end of the lactation but occasionally was at an earlier date according to the requirement of animals for other rearing trials.

Measurements: The saleable milk was recorded daily for each individual cow and once per week the calf was weighed before and after suckling in order to estimate the amount of milk that was consumed.

Results and Discussion

Mean values for milk production with corresponding standard deviations and coefficients of variation are set out in table 1. Table 2 gives the data for calf performance.

The results for milk production exceeded the target proposed by Preston (1977) and MacLeod et al (1976) of a minimum of 1500 kg of saleable milk per lactation, the actual mean recorded for the population being 1742 kg in 295 days.

Table 1:

Mean values and standard deviations for milk production parameters in a dual purpose herd (n = 29)

	Mean Value	SD	Coefficient of variation ¹
Saleable milk, kg			
Lactation	1742	± 466	26.8
Daily	5.95	± 1.48	25.9
Milk consumed by the calf, kg			
Total	454.2	± 83.4	18.4
Daily	1.93	± .26	13.5
Total milk production, kg			
Lactation	2197	± 472	21.5
Daily	7.51	± 1.50	20.0
Proportion consumed by the calf, %	21.0		
length of lactation, days	295	± 41	13.9
Calving interval, days ²	380	± 37	9.74

¹ $\frac{SD \times 100}{Mean}$

Mean

²These data relate to the first 22 cows in order of their date of calving; the remaining 7 are still to calve

Although it is a common belief that cows which continue suckling their calves have a poorer reproductive performance, this does not seem to have been the case in this particular sample of animals. A calving interval of 380 days is in fact less than the accepted average for either dairy cattle or beef cattle (Preston and Willis 1974).

Specific analyses were not carried out to measure incidence of mastitis. However, there were no clinical cases of this disease during the time the records were collected, thus supporting the claim of Ugarte and Preston (1972) that restricted suckling reduces the incidence of mastitis.

The data on calf performance (table 2) are slightly lower than projected targets (Preston 1977 MacLeod et al 1976), which were 200 kg weaning weight at 300 days and a daily gain to weaning of 600 g/day. The results are however satisfactory (weaning weight of 156 kg at 242 days; daily gain to weaning of 519 g), and it is proposed that these levels of performance are accepted as the required standard for dual purpose herds managed on moderate planes of feeding as described here.

The total milk consumed by the calf (454 kg) is not excessive when considered against the very acceptable rate of growth to weaning.

Table 2:

Mean values and standard deviations for calf growth parameters in a dual purpose herd (n = 29)

	Mean Value	SD	Coefficient of variation ¹
Birth weight, kg	37.3	± 5.36	14.4
Weaning weight, kg	156.0	± 19.8	12.7
Age at weaning, days	242	± 60.6	25.0
Gain to weaning, g/d	519	± 122	23.5
Weight for age at weaning, g/day	690	± 170	24.6
Mortality, %	0.0		

¹SD X 100
Mean

Expressed in terms of milk consumed daily, the quantity (1.93 kg) is very much less than is required simply to maintain live weight which was calculated by Roy (1970) to be 6.85 kg/day for a calf of 96 kg live weight (average between birth and weaning). This suggests that the remainder of the diet must have contributed, to a very significant degree, to the overall nutrition of the animal. The total milk requirement for maintenance and 500 g daily gain is estimated at 9.0 kg/d (Roy 1970). Thus the basal diet of sugar cane and molasses/urea supported slightly more than the maintenance of the animal, on the assumption that 2.15 kg milk/day is required solely for the 500 g/day live weight gain.

Milk consumed by suckling will pass directly into the abomasum without loss and thus represents a most efficient source of both protected high quality protein and of glucose precursors. In view of the importance of these two nutrients for the utilization of diets based on sugar cane, molasses and urea (Leng and Preston 1976), it is obvious that milk consumed by suckling represents the ideal supplement for such diets. The very good calf growth rates reported here provide strong evidence in support of this hypothesis.

The excellent standard of calf health also must be emphasised, and while it cannot be expected that mortality will always be zero, it is indicative of the fact that disease is not a serious problem in calves managed by a restricted suckling system. This is even more important when viewed against the background of group confinement (20 to 40 head per group) in low cost rudimentary housing.

Conclusions

This first report of production coefficients for dual purpose milk/weaned calf production is highly encouraging, in terms of the standard of performance achieved both in milk production, reproductive performance and calf growth and health. It is considered that

these data provide strong support for the concept that dual purpose systems are technically and economically feasible as a basis for milk and beef production in the humid tropics.

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