

STUDIES ON THE GROWTH OF CALVES REARED ON RESTRICTED SUCKLING SUGAR CANE AND MOLASSES/UREA

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Summary

Analyses were made on 33 calves from a herd of crossbred Holstein/Zebu cows which received the following treatments: (A) grazing on pangola pasture without supplementation; (B) feeding in drylot with chopped sugar cane, molasses/urea (50 g urea/kg of molasses) and 600 g/d cotton seed cake with restricted grazing for 3 hr daily. The cows were milked twice daily by hand, being allowed to suckle their calves for a few seconds prior to milking to stimulate let down and for 30 minutes after milking. In general, the cows suckled only their own calves but there were some instances of crosssuckling. The calves were kept in open shaded pens with free access to chopped sugarcane, morasses with 10% urea and 250 g/d of cotton seed cake . They were mostly crossbred by Zebu and Holstein sires. Analysis of regression of live weight on age for these two groups of calves gave daily live weight gains of 419 - 28 g/d for crossbred calves and 260 ± 11 for Holstein calves, significantly in favour of the former. Milk intake was in the range 2.88 to 2.4 kg/d and was related to age (days) by the equation $Y = 2.76 - .002X$. Average intakes of the nonmilk components of the ration at three months of age were 3.5 kg /d of sugar cane and 1.01 kg/d of molasses/urea, the last representing a daily intake of 101 g urea. Predictions from these data indicate that the calves should reach a ,live weight of over 170 kg at 300 days.

Key words: Sugarcane, calf growth, suckling

Introduction

It has been proposed that an important component in a dual purpose scheme for milk and beef production under tropical conditions is the rearing of the calf by restricted suckling (Preston 1976). The justification for restricted suckling as

a rearing system in the tropics is based on the findings reported by Preston and Ugarte (1972) that for cows which suckle their calves on this system: (1) there is up to 20% more total milk per lactation than in cows that are milked without calves; (2) there is less mastitis (3) the growth rate of their calves is higher and mortality and incidence of diarrhoea is reduced; (4) apparently there are no effects on cow fertility.

Rearing calves by restricted suckling is a traditional system in many tropical countries and therefore more likely to be adopted at the practical level; an important factor in developing countries where the technical level of workers is relatively low.

The objective of the study described in this paper, which is the first in a series, was to obtain preliminary data on the performance of calves raised by restricted suckling as part of a dual purpose management system (MacLeod et al 1976) where the diet is based on sugar cane and molasses/urea.

Materials and Methods

Animals:

A total of 33 calves was used in the study. These were the progeny of crossbred Holstein/Zebu cows (60 to 80% Holstein "blood") sired by either Zebu or Holstein bulls. The calves were born over the period April to December 1975.

Management and Feeding:

The calves were suckled by their dams for a few seconds prior to milking in order to stimulate let down and then for a period of 30 minutes after hand milking was completed. At this time the cows and calves were held in one large group and there were some instances of cross suckling. Milking and suckling was twice daily at 6 a.m. and 3 p.m.. After suckling, the calves were separated from the cows and put in a shaded corral with a cement floor where they had free access to chopped sugar cane and molasses with 10% urea, fed on a free choice basis in separate troughs. In addition, 250 g/d of cotton seed meal was given and there was free access to minerals. Milk consumption was determined by weighing the calves before and after suckling at each milking/suckling period.

Measurements:

Weekly live weights were computed as the mean of 4 measurements daily carried out 7 times per week. Group intakes of the different diet components were determined daily.

Statistical Analysis:

The data were grouped according to age of calves at weekly intervals. The means of these measurements were then calculated and regressed against the average age (in days). This was done for the complete group of animals and separately (for live weight) for those judged to be crossbred as opposed to mainly Holstein (more than 75% Holstein breeding).

Results and Discussion

The mean values for the different parameters are given in table 1. Figure 1 shows the average growth rate for the total group of calves and for the two breed groups separately. Figure 2 is feed conversion ratio. Table 2 summarises the relationships between feed intake components and age.

Rate of growth was essentially linear up to 100 days of age and significantly higher for crossbred as opposed to Holstein type calves. The growth rate of the crossbred animals (490 g/d) is only slightly less than was reported by Alvarez and Preston (1976) for similar animals over a slightly older age range. There was a tendency for daily milk consumption to decrease with increased age of calf, while intake of fresh sugar cane and values was linearly related to age (table 2).

The intake of milk by the calf represented approximately 27% of the total milk production (total milk yield of the dams was 9.5 kg/d; see MacLeod et al 1976). On the assumption that suckling stimulates total milk production by 20% (Preston and Ugarte 1972), then it would appear that only some 10% of potentially saleable milk was lost by the restricted suckling programme. Or, to put the matter in another way, if the calf had been raised by bucket feeding using liquid milk, than the true quantities of saleable milk would have been only some 3 kg/d.

Table 1: Mean values for live weight and feed intake

No of calves	Age	Live weight	Feed intake			
			Milk	Sugarcane	Molasses/urea	Total DM
	days	kg			kg/d	
33	9	40	2.9	0.75	0.33	0.44
33	17	42	2.8	0.73	0.32	0.43
33	24	44	2.6	0.76	0.44	0.50
33	31	45	2.7	0.73	0.41	0.50
33	38	47	2.6	0.81	0.30	0.42
33	45	48	2.7	0.82	0.43	0.53
26	52	52	2.6	1.20	0.48	0.66
26	59	55	2.7	1.24	0.58	0.74
26	66	58	2.6	1.50	0.61	0.84
22	73	61	2.5	2.05	0.56	0.93
22	80	66	2.5	2.66	0.76	1.23
20	87	69	2.4	3.48	1.01	1.63
12	94	69	2.6	3.88	0.98	1.71
11	101	74	2.7	3.91	1.05	1.76
10	108	78	2.5	4.05	1.07	1.82
9	115	80	2.6	4.38	1.04	1.87
9	122	86	2.5	4.70	1.28	2.14
6	129	94	2.8	4.60	1.02	1.91
6	136	98	2.3	5.01	1.12	2.09

Table 2: Relation between age (X = days) and daily intake of the different diet components

Y	Equation	r ²
Intake, g/d		
Milk	$Y = 2760 - 1.98X \pm .75$.29
Molasses/urea	$Y = 151 + 7.85X \pm .65$.90
Sugarcane	$Y = 450 + 40X \pm 2.7$.93
Total DM	$Y = 5.9 + 16.0X \pm 1.1$.93

According to the regression equation of live weight on age, it can be estimated that by 300 days the crossbred calves would reach 179 kg live weight. In fact, this is almost certainly an underestimate as the data show a tendency to curvilinearity in the higher age range. Moreover, the mean weaning weight of the first calves produced on the system (Giraldez J, unpublished data 1976) was 210 kg at 300 days.

Figure 2: Regression of cumulative feed intake on live weight (coefficient of X is feed conversion)

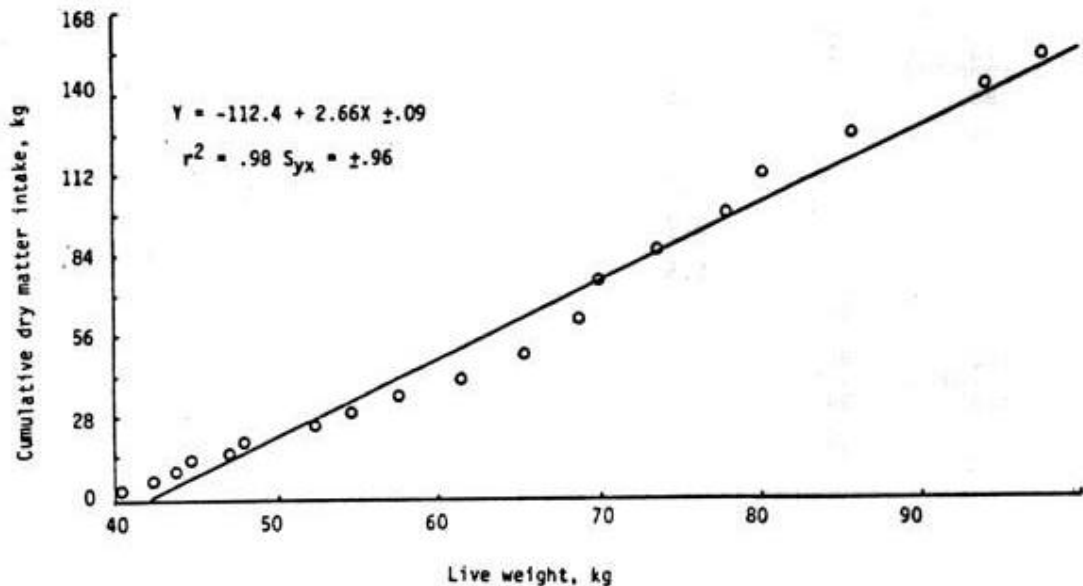
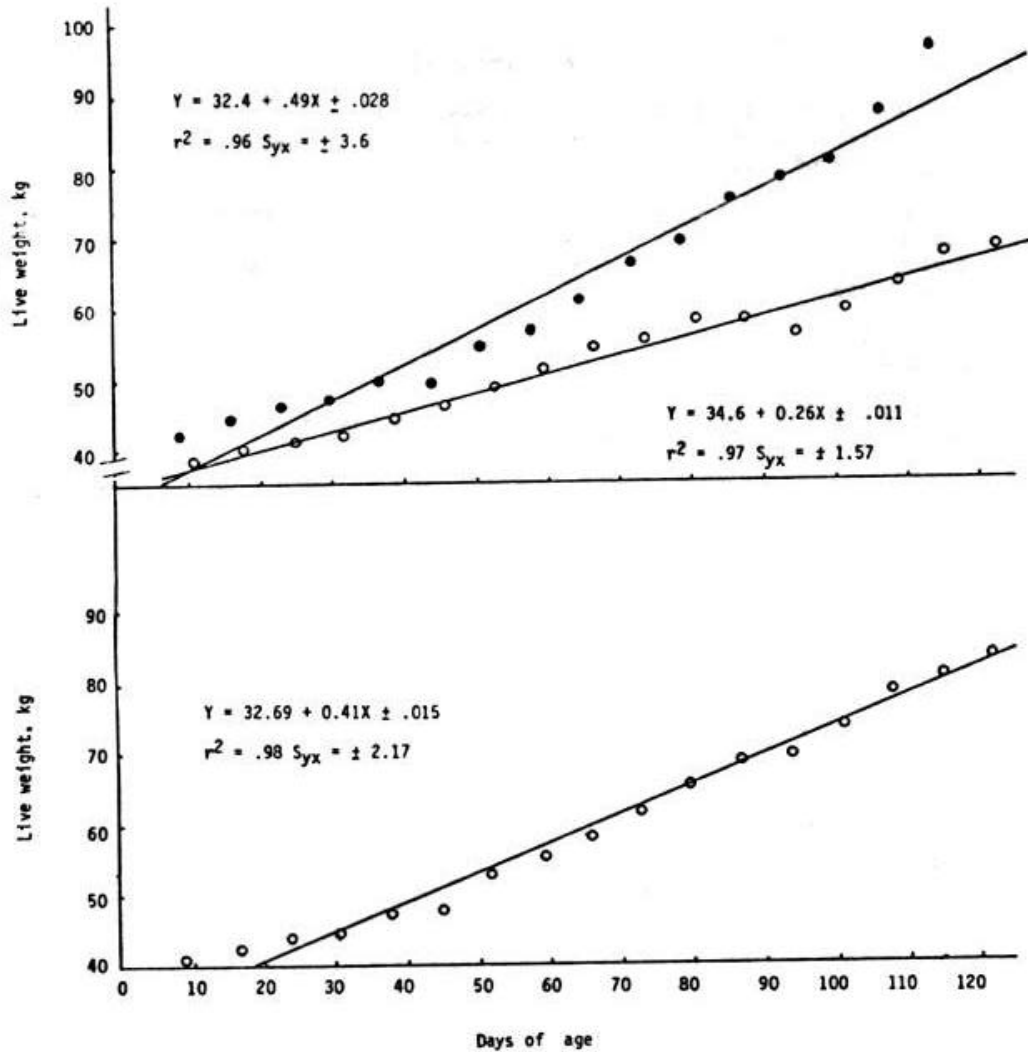


Figure 1: Regression of live weight on age for the total group of calves (lower graph) and for crossbred (•) and Holstein type (◦) calves (upper graph)



The mean daily milk intake was relatively low (2.6 kg/d) and considerably less than required for the maintenance requirements of the calf . This indicates a relatively high efficiency of utilization of the other supplements of the ration, which was principally sugar cane and molasses/urea. In view of its composition and the fact that suckling provokes an efficient closing of the oesophageal groove with direct passage to the abomasum, milk is thus a perfect supplement

for a sugar cane, molasses/urea based ration, in view of the metabolic limitations of this feed requiring supplementation with sources of amino acids and precursors of glucose (see Leng and Preston 1976).

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