A COMPARISON OF AD LIBITUM WITH ONCE DAILY FEEDING OF CALVES ON A COMMERCIAL DAIRY FARM IN SOUTH-WEST VICTORIA.

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SUMMARY

Jersey calves on a commercial dairy farm were fed milk either at a restricted level (3.5 L) once daily or ad lib. Calves fed ad lib drank an average of 7 L/day, grew faster to weaning (578 vs. 481 g/d> and were weaned earlier (82 vs. 100 days) but were not significantly (P > 0.05) heavier in the following summer or autumn. They took less time to feed (10 vs. 40 min/d) and ate less pellets (5 vs. 40 kg), but since they drank more milk (574 vs. 350 L), cost more to rear ($105.23 vs. $78.70) than calves fed once daily.

INTRODUCTION

There is considerable interest from dairy farmers in the ad lib system of feeding calves following reports of its use in New Zealand (Dawson et al. 1982) and in the Maffra Irrigation District in Victoria. Most of the information relating to the ad lib feeding of colostrum or whole milk to calves at pasture is anecdotal and applies mainly to Friesian calves. Since the system offers the potential for saving time it merits closer attention in comparison with other calf rearing methods.

In this experiment, Jersey calves on a commercial farm were used to compare ad lib feeding with a once daily feeding system

MATERIALS AND METHODS

Animal Management

Jersey heifer replacement calves on a property at Nirranda South, near Warrnambool, Vic., were allowed to suckle their dams for about 24 hours from birth and then allocated sequentially to either an ad lib or once daily feeding system. Liquid feed consisted of a mixture of colostrum and whole milk but, for simplicity, this is generally referred to as milk in this paper.

Ad lib - The calves fed ad lib were initially placed in a small pen and taught to drink milk through 2 rubber teats attached to a 25 L drum so that there was continuous access to the milk. After 3 - 4 days they were removed to a paddock of green pasture. Milk was continuously available in a 200 L plastic drum initially fitted with three rubber teats. Subsequently, three extra teats were fitted to improve access for the 16 calves ultimately allocated to this group. A pelleted concentrate was also freely available.

Once daily - Twenty calves were fed once daily, in individaul buckets with teats, at the rate of 3.5 L per calf. Initially they were kept in pens of 4 - 5 calves each, on sawdust bedding, with hay and pellets freely available. After about 8 weeks they were removed to a paddock of green pasture.

Each calf was weaned when its live weight exceeded 65 kg.

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Measurements and Analyses

Calves were weighed at birth (mean date July 6, 1982; S.D. 9 days), irregularly at about 2 - 3 week intervals until October 27 and again on December 23 and April 4, 1983. A record was kept of milk and pellet consumption of each group and the time taken to feed each group was noted.

Because weighings were irregular, daily liveweight gain to weaning was predicted for individual calves by linear regression of live weight on age for the period of milk feeding. Since the average live weight of calves at weaning was about 70 kg, individual regression equations were used to predict the time taken for each calf to arrive at a common weaning weight of 70 kg. Liveweight gain to weaning, time to 70 kg and live weight on December 23 and April 4 were analysed by step-down multiple regression ($P = 0.05$) with the feeding method effect forced in irrespective of significance. Independant variables used were birth day (coded as day of year - 170 days), initial live weight at birth and a pseudovariate for feeding method (once daily = 0; ad lib = 1).

RESULTS

The incidence of neonatal diarrhoea was negligible, the only health problem being an outbreak of coccidiosis in early March 1983. The calves fed once daily drank all the milk offered (3.5 L/calf/day) whilst calves fed ad lib consumed, on average, 7.0 L/calf/day. Calves fed once daily each consumed an average of about 40 kg pellets and calves fed ad lib each consumed about 5 kg pellets. Time taken to feed calves was about 35 - 40 minutes for those fed once daily and about 10 minutes for those fed ad lib.

Regression equations are shown in Table 1. Using these equations and mean values for birth day (17.3 days) and initial weight (24.7 kg) mean predicted values for each measure were obtained for each group (Table 2).

Calves fed ad lib grew faster to weaning (+96 g/day) and consequently attained 70 kg live weight earlier (-18 days) than calves fed once daily. Although there was a tendancy for calves fed ad lib to be heavier in both December and April than calves fed once daily, the differences were not statistically significant ($P > 0.05$).

DISCUSSION

The higher daily milk intake of calves fed ad lib produced a faster rate of growth pre-weaning, but the marginal efficiency of milk utilization was low. Furthermore, the mean live weight of both groups of calves on December 23 and April 4 was similar, indicating that early post-weaning rate of growth was lower for calves previously fed ad lib than for calves which had been fed once daily. A similar phenomenon was reported by Dawson et al (1980). In Tasmania, Fulkerson (pers. comm.) also found that whilst calves fed ad lib were heavier at weaning than calves fed once daily and weaned at the same age, there was no significant difference in live weight at 5 months of age. Therefore in terms of animal production there is no advantage in ad lib feeding.

TABLE 1 Regression equations for pre-weaning liveweight gain (LWG, g/calf/day), time to reach 70 kg (T, days) and live weight on December 23 and April 4 (LWD and LWA, kg) testing independant variables for birth day (BD, day, coded as day of year - 170 days), initial live weight (ILW, kg) and feeding method (F; once daily = 0, ad lib = 1; forced in)

	100 R^2	R.S.D.
LWG = 481.4 + 96.34 F (+/- 26.9)	27.4	80.1
T = 153.0 - 2.14 ILW - 18.1 F (+/-0.56) (+/-5.0)	56.6	13.9
LWD = 77.6 - 0.64 BD + 1.76 ILW + 4.09 F (+/-0.20) (+/-0.41) (+/-3.51)	45.5	9.7
LWA = 97.4 + 1.49 ILW + 5.9 F (+/-0.63) (+/-5.6)	22.7	15.6

TABLE 2 Predicted mean values for pre-weaning liveweight gain (LWG, g/calf/day), time to reach 70 kg (T, days) and live weight on December 23 and April 4 (LWD and LWA, kg) for calves fed once daily or ad lib

	Once Daily	Ad Lib	L.S.D. P = 0.05
LWG	481	578	56.6
T	100	82	9.8
LWD	110	114	6.8
LWA	134	140	11.1

TABLE 3 Imputed feed costs ($/calf) for calves fed once daily or ad lib

	Feed *		
	All Whole Milk	75 : 25 Milk : Colostrum	50 : 50 Milk : Colostrum
Once daily	78.70	62.45	46.70
Ad lib	105.23	79.39	53.56
Difference	26.53	16.94	6.86

* Assumptions :
Once daily - 3.5 L milk/calf/day, 40 kg pellets;
Ad lib - 7.0 L milk/calf/day, 5 kg pellets;
Milk cost - 18 c/L; colostrum cost - nil; pellet cost - 38 c/kg.

Although the calves fed ad lib were weaned earlier, their total milk intake (574 L/calf) was still considerably higher than the calves fed once daily (350 L/calf). Thus, even allowing for their lower pellet consumption, the calves fed ad lib cost more to rear (Table 3). The actual and comparative costs will depend on the proportion of colostrum used. However for any given situation there would normally be a fixed amount of colostrum available so that most if not all the extra liquid feed required for ad lib feeding would need to be provided as whole milk or milk replacer.

The main advantage for an ad lib feeding system is the potential for saving time. In this experiment the time saved with the ad lib system amounted to about 25 - 30 minutes per day for 11.5 weeks (i.e. about 34 - 41 hours) and 35 - 40 minutes per day for a further 2.5 weeks (i.e. about 10 - 12 hours). The time saving potential could be greater where larger numbers of calves are reared or where, for once daily feeding, calves have to be herded to a central feeding place each day. Whether the time saved is worth the extra cost would be a matter for individual judgement.

It is concluded that whilst ad lib feeding can reduce the time required to feed calves, it is more costly than limited milk feeding systems and confers no advantage in terms of animal production.

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