

COMPLEMENTARY LEGUME GRAZING IN DRY SEASON MILK PRODUCTION

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In San Javier, under a dairy ranching system, dry season access to 25% of the grazing area sown to forage legumes increased milk production by 20%, raised the butterfat content of the milk by 0.5 percentage points and allowed the cows to increase their body weight twice as fast as their contemporaries grazing on grass alone. The performance of calves was not affected by the grazing offered to their mothers, but their growth may have been limited by factors other than milk availability.

Key words: pasture legumes, milk production, liveweight gains

The work described is a continuation of that reported by Paterson et al (1981). In addition to the effect of dry season access to a forage legume reserve on milk production in a dairy ranching system, liveweight changes of cows and calves were also measured.

Materials and Methods

The pastures used and their management were as described by Paterson et al (1981). The two paddocks used consisted of 4 ha of *Hyparrhenia rufa* (Nees) stapf. (Yaraguá), and 3 ha of Yaraguá plus 1 ha of forage legumes, mainly *Macrotyloma axillare* (E.Mey.) Verdc. cv. Archer, respectively.

Animals: At the beginning of June 1981, 30 cows with 2 - 3 month old calves were selected from the general herd. On the basis of individual milk yields for 3 consecutive days, while grazing pastures dominated by Yaraguá, 8 pairs of cows were selected. Phenotype of the cows, and ages of cows and calves were also considered in the pairing of the cows, as recommended by Minson et al (1976). A cross-over design was employed in which one of each pair was assigned at random to each of two groups, and each group spent 16 days (9 days of standardisation followed by 7 days of measurement) in each of the two different pastures.

Cows and calves were weighed at the start, when they changed paddocks, and at the end of the trial period (days 0, 16 and 32) immediately after the morning milking.

One composite milk sample was taken from each group of cows at days 0, 16 and 32 for measurement of butterfat content.

Results

Milk yield: In the pre-treatment period, no significant yield difference ($P > 0.05$) was noted between groups of cows (2.13 compared with 2.06 kg/d, SE diff. ± 0.050 kg/d).

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Average yields (kg/d) and butterfat content (%) are shown in Table 1. The yield in the pre-treatment period is the daily mean of 16 cows over 3 consecutive days, while in the other periods it is the daily mean of 8 cows in each group for the final 7 days of each 16 day grazing period. At

Table 1:

Mean yield (kg/d) and butterfat content (%) of milk

	Yield/d			% Butterfat	
	Legume	No legume	SE(±)	Legume	No legume
Pre-treatment	-	2.09	0.023	-	5.0
Period 1	2.55	2.07	0.097	5.5	5.2
Period 2	2.33	1.99	0.097	6.1	5.3
P1 + P2	2.44	2.03	0.068	5.8	5.3

the 5% level no significant differences existed between periods, but legumes significantly increased milk yields ($P < 0.01$)

Cow weights: At the start of the trial, no significant weight differences ($P > 0.05$) existed between groups of cows (296.1 vs 307.9 kg, SE diff. ± 13.65 kg). Average weight gains (kg/d) are shown in Table 2. No significant differences were shown between periods, but the cows on legumes gained faster than the others ($P > 0.05$).

Table 2:

Mean weight gains (kg/d) of cows and calves

	Weight gains of cows kg/d			Weight gains of calves kg/d		
	Legume	No legume	SE(±)	Legume	No legume	SE(±)
Period 1	0.45	0.16	0.094	0.26	0.25	0.061
Period 2	0.36	0.20	0.094	0.12	0.14	0.061
P1 + P2	0.41	0.18	0.067	0.19	0.20	0.043

Calf weights: At the start of the trial, the groups of calves weighed, on average, 51.5 and 49.3 kg (SE diff. ± 2.78 kg) and the groups may reasonably be assumed to be similar. Average weight gains over the course of the trial are shown in Table 2. No significant differences were noted either in periods or treatments. ($P > 0.05$)

Discussion

This trial was carried out at the start of the dry season. Although little rain fell in the experimental period, soil moisture was still adequate for plant growth, but the quality of the grass was severely limited by physiological maturity. The advantage in terms of daily milk yield per cow conferred by the legumes was 0.48 kg (23.2%) and 0.34 kg (17.1%) respectively in the two consecutive periods, giving a mean increase of 0.41 kg (20.2%). The figures are thus in general agreement with the range of 11.5 - 19.8% quoted for the 1980 dry season by Paterson et al (1981), who showed overall increases of 14.5% and 16.6% in two separate trials. Butterfat content of the milk was increased by 0.5 percentage points, and this also agrees with the rise of 0.4% obtained in both trials conducted in 1980. The greater production of milk, and its higher butterfat content when cows have access to a

limited area of forage legume during the dry season, has been confirmed by the present work.

Cows with young calves at foot gained weight twice as fast on pastures with a legume component than on pure grass and it is to be expected that they would therefore have a greater chance of reconceiving rapidly due to their improving body condition. No meaningful measurement of fertility could be made in the present work.

No differences were detected in calf growth rate, although it was expected that higher milk yields would lead to greater consumption and faster growth of the calves (Pullan and Grindle 1980). The coefficient of variation (CV) of the mean growth rate of all calves over both periods was 90.6% which was reduced to 68.2% when a sex correction factor of 1.1 was applied to the female weight gains. The magnitude of the CV emphasizes the problems involved in the weighing of young calves without first subjecting them to a period of starvation, even though every care was taken to ensure that the separate weighings were conducted at the same time of day, and after the same period of suckling.

The mean calf growth rate of 0.19 ± 0.031 kg/d (mean \pm SE) was low, and if maintained at this level, would only represent 205 day weaning weights of 60-70 kg. Although firm data are not available, under the San Javier dairy ranching system, normal 205 day weights are not less than 100 kg. It seems likely that the growth of the calves was limited by factors other than milk intake, and although these factors were not investigated, an excessive endoparasite burden is suspected of contributing to the poor growth. The failure to demonstrate a growth response in the calves must be interpreted with caution, since it is possible that animals growing at more normal rates of 0.4 kg/d may have responded to increased milk production by their dams.

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