Calving date effects on beef cow productivity

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ABSTRACT

Beef cows in New Zealand are traditionally calved in late winter so that calves will be as big as possible for the weaner sales. This can create spring pasture supply problems and may contribute to poor reproductive performance in many beef herds.

Early (11 August) and late (25 September) calving have been compared in 2 trials run on steep hill country. Comparisons were made in self-contained farmlets between June and February under 2 grazing strategies (set-stocking and rotational grazing).

Later calving reduced interval to first oestrus by 16 d in both trials and increased pregnancy rates by 4 to 6%. Late born calves grew at the same rate as early born calves in both trials (0.87 and 0.97 kg/d) and so were lighter at weaning at a fixed date. A rotational grazing strategy favoured cow performance, but set-stocking favoured calf weaning weight by 12 kg and 5 kg in the 2 trials.

Later calving is likely to result in better reproductive performance in many hill country beef herds, but because calves will be lighter as weaners it would best suit systems where steers are currently retained and finished over 2 years or sold as store cattle at 18 months. The 18 month finishing policy will require earlier calving to maximise steer weight at sale time.

Keywords Beef cow; beef calf; calving date; weaning weight; post-partum anoestrus; pregnancy rate; rotational grazing; set-stocking.

INTRODUCTION

Beef cows in New Zealand are traditionally calved in late winter so that calves will be as big as possible for the weaner sales. Early calving can however create pasture supply problems around calving and lambing, before spring pasture growth commences. It also results in longer post-partum anoestrous intervals in the cow (Knight and Nicoll, 1978; Morris *et al.* 1978), an effect accentuated by low levels of nutrition (Montgomery, 1985). Annual calving interval is correlated to interval to first oestrus (Morris *et al.*, 1978) and long post-partum anoestrous intervals are associated with poor reproductive performance in New Zealand beef herds (Montgomery, 1984).

The aim of the present study was to compare overall cow and calf performance in self-contained systems following early August or late September calving. The comparison was made under 2 grazing strategies: rotational grazing and set-stocking.

EXPERIMENTAL

The trial was run over 2 years, 1983-84 and 1984-85, and involved about 150 Angus and Hereford x Friesian cows in each year. All cows were mated to Angus bulls.

Mating of the last 50% of the cows to calve in 1982 was delayed 45 d to create the late calving herd for the trial. Early and late calving extended from 11 August to 25 September, and 25 September to 9 November respectively, in both years.

Four farmlets (2 calving dates by 2 grazing strategies) were established on steep hill country in June and remained self-contained until calf weaning each year. Weaning date was 20 February in year 1 and 20 January in year 2. All farmlets were stocked at 2.3 cows/ha, and balanced within calving date treatments for breed and initial live weight. Cows were re-randomised at the start of the second trial. Grazing strategies were set-stocking (SS) and rotational grazing (RG). Rotationally grazed cows were restricted on pasture allowances of 8 kg DM/hd/d before calving, 12 kg DM/hd/d from calving to mid October and then managed on a 20-d rotation.

All data were analysed using linear models except for pregnancy rate data which were analysed using logit models. Pre-trial cow live weight was fitted as a covariate within cow age and breed groups in all cow live-weight analyses. Pasture cover on the farmlets was monitored.

RESULTS

Pasture Cover

Average pasture cover on the farmlets in June was 650 kg DM/ha in year 1 and a1100 kg DM/ha in year 2. Pasture cover on the farmlets throughout the trials was generally higher for rotational grazing than set-stocking and higher at calving and mating for late calving treatments (Table 1).

TABLE 1 Average pasture mass (kg DM/ha) on farmlets set-stocked (SS) or rotationally grazed (RG) by cows calving early (E) or late (L) in spring.

Year	Treatment†	Start calving	Start mating	Weaning
1983-84	ERG	410	1030	1030
	ESS	530	940	780
	LRG	1030	1610	1150
	LSS	890	1090	820
1984-85	ERG	780	1350	1060
	ESS	580	1300	830
	LRG	960	1910	1030
	LSS	560	890	600

† ERG = early calving, rotational graze etc.

Calving Date Effects

As there were no significant interactions between calving date treatment and grazing strategy affecting cow or calf live weight or reproduction, only main effects are presented. In the second year however, 3 cows in the early calving set-stocked treatment died of hypomagnesaemia in early September and this treatment was supplemented with magnesium for 7 weeks. Blood magnesium levels on 10 September were lower in the early calving set-stocked treatment (0.97 mg%) than in the other 3 treatments (1.5 to 1.85 mg%).

Calf birth weight was slightly higher after late calving, but calf weaning weights were lower (Table 2). Early and late born calves grew at the same rate (Table 2). These results were the same in both years.

Early calving cows were lighter before calving in year 2 and lighter at mating in both years than late calving cows. At weaning, cow live weights were similar (Table 2).

Interval to first oestrus was shorter in late calving cows, but this did not translate to a shorter interval to conception in those cows conceiving (Table 2). Pregnancy rates were not significantly different between calving date treatments, but favoured late calving.

Grazing Strategy Effects

The rotational grazing strategy (RG) favoured cow performance, but set-stocking (SS) favoured calf performance in both years (Table 3). Calf live weights in mid December were higher in both years under SS and remained higher at weaning in year 1. Pre-mating cow live weight and cow weaning weight were higher under RG. Interval to first oestrus was shorter under RG in year 1 and pregnancy rates tended to be higher under RG (NS) in both years.

TABLE 2 Calving date effects on cow and calf performance

Year	1983-84			1984-85		
Calving date	Early	Late	(SED)	Early	Late	(SED)
Mean calving day of year	245	277	(2.9)***	246	277	(2.7)***
Calf						
Birth weight (kg)	31.5	32.3	(0.7)	31.6	33.5	(0.8)*
Weaning weight (kg)	177	155	(3.9)***	169	139	(3.1)***
Weaning age (d)	172	139	(2.9)**	141	110	(2.7)***
Live-weight gain (kg/d)	0.86	0.89	(0.02)	0.98	0.96	(0.02)
Cow						
Pre-calving weight (kg)	432	436	(4.8)	426	448	(7.0)**
Pre-mating weight (kg)	403	445	(4.8)***	399	450	(7.3)***
Weaning weight (kg)	418	426	(5.6)	423	419	(5.2)
Interval to first oestrus (d)	73	57	(3.2)***	69	53	(3.0)***
Interval to conception (d)	85	87	(3.6)	83	80	(3.3)
Pregnancy rate (%)†	92	96	(NS)	81	87	(NS)

† 8-week mating 1983-84; 5-week mating 1984-85

TABLE 3 Effects on cow and calf performance of set-stocking (SS) or rotational grazing (RG)

Year	1983-84			1984-85		
Grazing treatment	RG	SS	(SED)	RG	SS	(SED)
Calf weight (kg)						
Mid December	102	112	(3.3)**	113	119	(2.8)*
Weaning	162	170	(3.9)*	152	157	(3.1)
Cow						
Pre-mating weight (kg)	429	417	(4.7)*	431	418	(7.2)
Weaning weight (kg)	429	414	(5.5)**	440	400	(5.1)***
Interval to first oestrus (d)	59	71	(3.1)***	61	61	(3.0)
Pregnancy rate (%)	97	91	(NS)	88	80	(NS)

Breed

Calves from Hereford x Friesian cows were heavier at weaning than calves from Angus cows in both years by 21 and 19.5 kg, respectively. The advantage at birth was 3.4 and 3.9 kg in years 1 and 2, respectively. Hereford x Friesian cows were slightly heavier than Angus cows throughout the trial, reflecting weight differences of about 15 kg at the start of the trial. There was no effect of breed on cow reproductive performance and no breed x treatment interactions.

DISCUSSION

Later spring calving reduced the post-partum anoestrous interval in the cow in both years of this study. However, this reduction in post-partum anoestrus did not translate to a reduction in interval to conception in those cows conceiving. Slightly higher conception rates were none the less achieved in the later calving cows particularly in the second year when mating was restricted to 5 weeks.

Off-setting the slight reproductive advantage of late spring calving were lighter weaning weights in the late born calves. Unlike other comparable studies with sheep where late spring born lambs have initially grown faster than those born in early spring (Rattray, 1977; McEwan *et al.*, 1983), the early and late born calves grew at the same rate throughout the trial. This was despite generally higher levels of feed on late calving farmlets prior to calving and through mating. Early calving cows successfully buffered calf growth at the expense of increasing their own live-weight reserves as was found in a previous trial where cow feeding levels were low in early lactation (Smeaton *et al.*, 1983). The calf weaning weight difference between early and late born calves therefore reflected entirely the difference in calf age. These conclusions were consistent across grazing regimes in both years.

Set-stocking is the easiest strategy for calving down cows on steep hill country but, depending on pasture growth, it can severely limit nutrition around calving. The rotational grazing strategy provided a more consistent level of nutrition through calving and early spring as reflected in feed cover on the farmlets. Rotationally grazed cows were consequently heavier before mating and had slightly higher conception rates. However, the effect of calving date on interval to first oestrus was not accentuated by low levels of nutrition (SS), as reported by Montgomery (1985). Calving dates were 3 weeks later in this study and nutritional differences achieved in the system may not have been as extreme.

Contrary to cow performance, calf growth rates were consistently higher under SS than under RG. This could reflect reduced selection opportunity for calves under the RG method of presenting feed, since more total feed was available on the RG farmlets and RG mobs were not restricted beyond early October. Pasture mass levels under set-stocking may have been below a critical mass for accessibility to cows, but not for calves.

CONCLUSIONS

These results suggest that many hill country farmers could improve the reproductive performance of their herd by later calving, especially where cow pregnancy rates are below 90 to 95% after a 9 week mating. This could be achieved without needing to greatly improve expensive late winter/early spring feeding. The above could easily be accommodated in a system where surplus weaners are finished after 2 winters or sold as store cattle before the second winter. It could however, compromise the 18 month finishing policy. This would appear to require earlier calving for maximum weights.

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