Productivity and Profitability of Twinning Beef Cows

D.C. SMEATON AND J.B. CLAYTON

AgResearch, Ruakura Research Centre, Private Bag 3123, Hamilton, New Zealand

ABSTRACT

Twinning Hereford x Friesian beef cows were run in farmlets with breeding ewes at Whatawhata Research Centre. The additional inputs and outputs of twinning cows were compared with those of single calving treatments. This was carried out in a farm systems environment so that the feed-back mechanisms inherent in biological systems could operate. Typically, the twinning beef cows lost 15% of their foetuses during pregnancy and had (in the most recent year) a calf survival rate of 80%. Comparable figures for single calving cows were 5 and 95% respectively. Twin calves weighed 200 kg at weaning compared to 240 kg for singles. The twin cow farmlets required 250 kg extra DM/cow and 5.7 extra hours of labour/cow at calving. The sheep were not measurably affected by cow treatment.

Gross margin analyses using these and other trial data indicated that twinning cows were $44/cow less profitable than single cows. Further analyses showed however, that the twinning cow system would breakeven with the singles if any one of the following changes were possible, (1) twin calf wean weight 220kg, (2) twin calf survival 89%, (3) twin foetal loss 5%, (4) labour differences dropped from 5.5 (above) to 2.1 hours/cow. When all the breakeven values were assumed to have occurred at the same time, twin cows were $120/cow more profitable than single cows. This is the money available to pay for extra risk and the extra cost of getting a cow twin pregnant (at day 60) compared to single pregnant.

Keywords: beef cows; twins; calves; productivity; profitability.

INTRODUCTION

Single calving cows on sheep and beef farms provide major benefits due to their flexible feed demand, and positive contribution to the management of feed quality (Nicol and Nicoll, 1987; McCall, 1994; Pleasants, *et al* 1994). This flexibility is based around the notion that the cow calves in early spring thereby aligning her changing feed requirements closely with pasture growth. Despite the above benefits, beef breeding cows, producing 1 calf per year per cow are perceived to be not as profitable as many other stock classes (Webby and Thomson, 1994). In recent decades, selective breeding, yearling mating, use of Hereford x Friesian (HxF) or similar crossbred dams and high growth rate terminal sires have improved profitability (McMillan and McCall, 1991; Smeaton, 1996).

Despite these improvements, beef production struggles to be competitive with other meat proteins such as chicken. This is largely due to the relatively high energy cost of maintaining the herd (cow) per unit of meat output. In beef cattle, this amounts to nearly 50% of the total feed cost of the meat produced compared to only 3% in chickens. A quantum leap in beef cow efficiency would appear to be most readily achieved by increasing calf numbers rather than increasing the weight of each calf (Smeaton 1996). 'Twinning' beef cows is an attempt to capitalise on and retain the management benefits of beef cows while enhancing their efficiency and profitability. However, twinning beef cows eat more (Smeaton, *et al* 1995; Graham, *et al* 1990; Rose and Wilton, 1991), calf survival is lower, twin calves are lighter at birth and weaning and management demands and skill requirements are greater than for single calving cows (Lambert, *et al* 1996; Cummins, 1994). On the positive side, cows successfully rearing twins wean a calf litter weight about 1.6 times greater than those rearing single calves (Smeaton, *et al* 1995; Graham, *et al* 1990; Rose and Wilton, 1991; Nicoll, 1982; Diskin, *et al* 1991; Cummins, 1994).

What is the net result of these positive and negative aspects of twinning in beef cows? A farm systems experiment was set up to answer this question at Whatawhata Research Centre. Data from this project is used in the financial comparisons which follow.

MATERIALS AND METHODS

In the winter of 1995, 4 similar farmlets were established each containing 120 ewes and 20 HxF beef cows; equal numbers on a SU basis and stocked at 14 SU/ha. Two of the farmlets contained single suckling cows. The other two contained twin suckling cows. In the first year, all cows were single pregnant and the twin cow farmlets had a second calf fostered on at calving. In the second and third years, twinning cows became twin pregnant via embryo transfer. In each year, the farmlets were self contained. Stock were established on them in April of each year and remained on them until March the following year. At that time, a new set of twin and single pregnant cows were allocated to the farmlets. In the first year Romney ewes were used. In the second and third years, Finnish Landrace x Romney cross ewes were used.

All farmlets were managed similarly according to current best practice management recommendations (Sheath, *et al* 1990). Briefly, this involved:

1. A long rotation of 70-100 days over the period April to August with cows and ewes combined.
2. Separation of mobs at calving with ewes set stocked.
3. Break-feeding of calving cows and then set stocking of cows and calves with the ewes and lambs until December when the lambs were weaned.
4. A rotation of 21-35 days from December until February with lambs immediately in front of the cows, calves and ewes who were in a combined mob. Lambs were disposed of store or for slaughter according to the procedure described by Sheath, *et al* (1990) such that all lambs were off the trial by late February.
4. Ewes, cows and calves were rotationally grazed over the summer until calf weaning in March with rotation length dependent on pasture cover and pasture growth rate.
5. When pasture cover and cow liveweight were depressed in the twin-cow farmlets compared to the single-cow farmlets, silage supplement was applied until all farmlets were similar again.

Data collected from the trial included herbage mass and animal liveweights recorded monthly. Lambing and calving data (lamb/calf birth weight, date, survival, birth difficulties or abnormalities and animal health information) were all recorded. Differences in feed supplementation and labour requirements between single and twin calving farmlets were also documented. Throughout the above, cow treatment had no impact on sheep liveweights or lamb output and so all sheep data are excluded from the results and discussion below.

In the gross margin analyses, data recorded from the trial were utilised to enable comparisons to be made between single and twin rearing beef cows. Assumptions were made about costs of supplementary feed and additional labour. From these analyses, breakeven values were then derived for the cost of getting cows twin pregnant and the required twin pregnancy rate. All prices exclude GST.

RESULTS

Data derived from the 3 years of the trial and used in the gross margin analyses are shown in Table 1.

Table 2 shows gross margin analyses for twin and single calving herds assuming, in both cases, 100 cows pregnant at ultrasound scanning at day 60 of pregnancy. Important assumptions include:

1. cost of additional labour; $12/hour
2. cost of supplementary feed; 20c/kg DM
3. value of all calves at weaning, that is, twin and single, male and female; $1.50/kg liveweight

The results in Table 2 show that, given the assumptions stated, twinning cows are less profitable than single calving cows by $44 per cow. Table 3 shows the changes that are required in selected individual parameters to make the twinning cow budget in Table 2 breakeven with single calving cows.

TABLE 1: Typical data from trial used in gross margin analyses

Item	Twin cow	Single cow
Calf wean weight (kg/calf)	198	240
Litter wean weight (kg/cow)	396	240
Foetal loss from scanning to calving (%)	15	5
Calf survival during calving (%)	80	95
Calf survival 2 weeks after birth to weaning (%)	95	95
Extra feed required (kg DM/cow)	250	0
Extra labour required (hrs/cow)	5.73	0

TABLE 2: Gross margin analyses of twin vs. single calving cows, based on a 100 cow herd

Item	Twin cow	Single cow
Cows pregnant at scanning	100	100
Calves born	170	95
Calves born alive	136	90
Calves weaned	129	86
Total weight weaned calves (kg)	25,582	20,577
Total income from calves ($)	**38,372**	**30,866**
Less marginal costs:		
Extra feed required ($)	5,000	0
Extra labour required ($)	6,876	0
Total marginal costs ($)	**11,876**	**0**
Marginal profit ($)	**26,496**	**30,866**
Advantage to twinning herd ($)	**-4,370**	

TABLE 3: Changes required in any one item for twinning to breakeven with single cow systems

Change item	Value used in Table 1	Breakeven value
Twin calf		
- wean weight (kg)	198	220.5
- survival during calving (%)	80	89.1
- loss scanning to calving (%)	15	5.32
Extra labour per cow (hrs)	5.73	2.09

Finally, the breakeven values for calf wean weight, survival at calving and extra labour were applied to the twinning budget simultaneously along with a figure for loss of twin calves after scanning of 10%. In this case the marginal profit to twinning rose from $26,496 to $42,885 compared to $30,866 for the single calving system. In other words an advantage to twinning of $12,020 or $120 extra per cow. Charging out the cost of extra feed at 10c/kg DM (the cost of DM from applied nitrogen in urea at a 1:10 growth response) increased this margin further by $25/cow to $145/cow extra.

The extra margin above is available for the extra costs associated with twinning and not accounted for above. Specifically, these include:

1. extra risk and hence required additional profit
2. extra cost of getting a cow twin pregnant via embryo

transfer to scanning compared to single pregnancies via bull or A.I.

It is important to note that the above is dependent on calf weaner price. Changes to this assumption affect the analyses. For example, in Table 2, the advantage to the twinning herd changes at a rate of $500/100 cows for every 10c increase/kg calf liveweight. In fact, the twinning herd in Table 2 breaks even with singles at a calf value of $2.37/kg - well above current values.

When all the breakeven values are applied together as described above, a 10c/kg change in calf price affects the margin to twinning by $13/cow regardless of the cost of the extra feed.

DISCUSSION

Twinning in beef cows, at the current performance levels achieved in our systems experiment, is not profitable. However, it is likely that performance levels up to the breakeven values used could be achieved on a routine basis except for the item 'loss scanning to calving'.

A 10% improvement in calf weaning weight might be achieved by changing to higher growth rate foetuses such as pure bred Charolais or Simmental (Smeaton, 1996). A similar regular increase in single calving cows using HxF cows as in this study may not be worth pursuing because of the size of calf relative to the cow at calving time. Compensatory growth of twin reared calves after weaning, compared to singles, of 20% or more (Cummings, 1994), also diminishes the problem of twin calf weight somewhat. Calf survival at calving of 90% has now been achieved 2 years in a row by Lambert (pers. comm). Similar figures (range 86 to 90%) were also reported by Cummins (1994).

It would seem reasonable that the extra labour per cow could be reduced from 5.73 hrs at the Research Station to 2.09 hrs in an efficient commercial operation.

Reducing the embryo loss figure of 15% from scanning to birth will be very challenging for 2 reasons.

The figure of 15% is difficult to confirm due to errors in scanning accuracy (Lambert, *et al* 1998).

Researchers to date have made little progress in altering this loss figure. Admittedly very little research has been carried out on twin foetus loss to date. Almost all work on this subject has been carried out on single pregnant cows where the foetal loss figure is much less. In our case it was only 5%.

The above remarks explain why we used a foetal loss figure of 10% (rather than the breakeven value of 5.32%) in the calculations of potential profit from twinning.

Finally, if all the above changes are achieved and the extra feed requirements are charged at only 10c/kg DM, the profit per cow is $145. This is the maximum that is ultimately available to spend on getting the cow twin pregnant at the same level of profit as that for getting a cow single pregnant. However, this is sensitive to the value of the weaner calf.

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