Lambing date, ewe live weight and pasture mass effects on ewe and lamb performance during lactation

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ABSTRACT

Comparisons were made of ewe and lamb weaning weights under 2 lambing dates (6 August and 6 September) with ewes at 2 pre-lambing ewe live weights (52 and 64kg) on 2 levels of pre-lambing pasture mass (approximately 1000 and 400 kg DM/ha) in a 2^3 factorial, replicated 4 times. Mixed age Romney and Coopworth ewes were set stocked at 20 ewes/ha from 4 days before lambing until weaning on 21 November. Differential ewe live weights and pasture masses were generated during the winter.

With high pre-lamb pasture masses, early lambing advantaged single and twin lambs by 2.7 and 1.1 kg, respectively at weaning compared to late lambing. The advantages to early lambing at low pasture masses were 1.3 and 0.1 kg, respectively for single and twin lambs. Ewe fleece weight was unaffected by lambing date, but weaning weight of early lambing ewes was 4 to 5 kg lighter than late lambers. Ewes which were heavy before lambing produced heavier lambs at weaning across all treatments by 1 to 1.4 kg and heavier fleeces by 0.1 to 0.4 kg.

Pre-lamb pasture mass effects on ewe fleece weight and weaning weight were 0.3 and 6 kg, respectively and on lamb weaning weights were 3 and 3.3 kg for singles and twins, respectively.

Keywords Lambing date; pasture mass; live weight; fleece weight; ewe; lamb; weaning; nutrition

INTRODUCTION

A simulation study of management opportunities for hill country sheep farmers showed that early lambing (mid August), in association with a long winter rotation (120 d), was the best strategy to improve system profitability (McCall, 1984) where increased profit resulted from higher lamb selling weights.

High levels of feed on the farm at lambing are important for high lamb growth rates (Smeaton and Rattray, 1984) and are most likely essential to obtain benefits from early spring lambing. Indeed, when pasture mass at lambing is low, early and late spring lambing may result in lambs of the same weight by early summer (McEwan *et al.*, 1983).

The aim of this study was to examine the effects of lambing date on ewe and lamb weaning weight under different pre-lambing pasture mass and ewe live weight conditions.

EXPERIMENTAL

The experiment was run in the winter and spring of 1984. The experimental design was a 2^3 factorial. In May, mixed age Romney and Coopworth ewes (n = 500) mated to commence lambing on either 6 August or 6 September were randomly pre-assigned into 1 of 2 pre-lambing ewe live weights (52 *v* 64 kg) by 2 pre-lambing pasture mass treatments (1000 *v* 400 kg DM/ha). Treatments were allocated on the basis of breed and May ewe live weights (mean, 55 kg) within lambing date treatment.

High and low pre-lamb ewe live weights were generated over winter by grazing ewes to residuals of 250 (low) or 450 (high) kg DM/ha. Pasture mass treatments were prepared by grazing to 250 (low) or 450 (high) kg DM/ha approximately 15 and 40 d before lambing, respectively.

Four replicates of each treatment (n = 32 cells) were stocked at 20 ewes/ha 4 days before synchronised lambing. Ewes losing lambs were replaced by buffer ewes with lambs. Pasture mass on each farmlet and ewe and lamb live weights were recorded before lambing, 5 weeks after lambing and at weaning. Pasture mass was measured by the double visual assessment technique (Smeaton *et al.*, 1983) by 2 assessors.

Live weights were recorded 1 to 2 hours off pasture, mean litter size was 1.35 (+ 0.25) and mean lambing dates were 19 August and 16 September. Results for single and twins (ewes and lambs) were analysed by analysis of covariance on individual cell means. Covariates tested were pre-trial (May) ewe live weights and mean litter size (NS).

RESULTS

Pastures

Pasture results (Table 1) show pasture masses initially declined following early lambing, but increased

following late lambing in the high mass treatments. In the low mass treatments, mass increased immediately following both early and late lambing. At weaning approximately 400 kg DM/ha more feed was present on the high mass late lambing treatments than on their early lambing counterparts.

TABLE 1 Pasture mass levels (kg DM/ha), pre-lambing until weaning on areas with high or low pre-lamb pasture mass and grazed by ewes lambing early (6 August) or late (6 September).

	Pasture Mass			
	High Lambing		Low Lambing	
	6 Aug	6 Sept	6 Aug	6 Sept
Pre-lamb	1030	1030	330	430
5 weeks	850	1680	570	730
21 November	1125	1500	650	760

Lambs

In Table 2, live weights and live-weight gains for both high and low pasture mass — early lambing treatments are given, along with differences between early and late lambing (early-late) at each pasture mass.

The pre-lamb pasture mass main effect on lamb weaning weight was 3 kg for singles and 3.3 kg for twins ($P<0.01$). At weaning, early born singles were 2.0 ($P<0.05$) and twins 0.6 kg (NS) heavier than their late born counterparts. Late born single and twin lambs grew 33 (NS) and 41 g/d ($P<0.01$) faster than early born lambs respectively, over the first 5 weeks of lactation. There were no significant interactions between lambing date and pre-lamb pasture mass but advantages to lamb weaning weight from early lambing tended to be greater in the high pasture mass treatments (Table 2).

Table 2 also presents live weights and live -weight gains for the lambs of the heavy ewes at both pasture masses, along with differences between the heavy and light (heavy-light) ewe treatments. On average, high pre-lamb ewe live weight advantaged both singles and twins by 1.1 kg ($P<0.05$) at 5 weeks of age, but the respective 1.2 and 1.3 kg advantage at weaning was not significant ($P<0.1$). Part of the above effect was due to differences in birth weight.

No significant pre-lamb pasture mass by ewe live weight interaction occurred despite the apparent greater advantage to lambs from heavy ewes on low than on high pasture masses (Table 2).

Ewes

Table 3 summarises ewe live weights and fleece weights. No interactions occurred with lambing date. By weaning, early lambing ewes rearing singles and twins were respectively 4.5 and 4.7 kg lighter than the late lambers, but fleece weights were the same.

The difference of 11 to 12 kg between heavy and light ewes before lambing declined to between 1.5 and 6.5 kg by weaning. Live weights converged most markedly at low pasture masses (Table 3) owing to the very large decline in live weight by the previously heavy ewes. This produced a significant pre-lamb ewe live weight by pasture mass interaction ($P<0.05$) for weaning weight and fleece weight in single-rearing ewes.

TABLE 2 Effects of early and late lambing date (LD), heavy and light pre-lamb ewe live weight (LW) and high and low pasture mass (PM) on weights (kg) and weight gains in the first 5 weeks (g/d) of single and twin lambs.

	Lamb weight			Weight
	Birth	5 weeks	21 Nov.	gain
Single lambs				
High PM				
Early LD	5.0	14.4	22.7	260
Early-late LD	0.0	-1.0	+2.7	-27
Low PM				
Early LD	4.8	12.6	18.9	208
Early-late LD	-0.1	-1.4	+1.3	-40
High PM				
Heavy LW	5.2	15.3	21.8	277
Heavy-light LW	+0.3	+0.7	+0.9	+8
Low PM				
Heavy LW	5.0	14.0	19.0	243
Heavy-light LW	+0.3	+1.5	+1.5	+30
SED	0.2	0.7	1.3	15
Significance of				
LD	—	*	*	**
LW	—	*	—	—
PM	—	**	**	**
Twin Lambs				
High PM				
Early LD	3.7	11.0	18.5	195
Early-late LD	-0.15	-2.3	+1.1	-43
Low PM				
Early LD	3.7	9.4	14.6	153
Early-late LD	+0.1	-1.7	+0.1	-40
High PM				
Heavy LW	4.0	12.7	18.5	221
Heavy-light LW	+0.45	+1.1	+1.1	+10
Low PM				
Heavy LW	3.9	10.8	15.3	182
Heavy-light LW	+0.4	+1.1	+1.4	+18
SED	0.15	0.6	0.9	12
Significance of				
LD	—	**	—	**
LW	**	*	—	—
PM	—	**	**	**

DISCUSSION

Early August lambing led to improved lamb weaning weights where pasture mass at lambing was reasonably high (at least 1000 kg DM/ha). However, the advantage to early lambing occurred primarily among lambs reared as singles, and while ewe fleece weight was unaffected by lambing date, ewe weaning weights were 4 to 5 kg lighter following early lambing. With

low pre-lamb pasture masses, early and late born lambs were close to the same weight by weaning, as found by McEwan *et al.*, (1983).

Dry spring conditions coupled with a relatively high stocking rate (20 ewes/ha) meant that pasture mass levels remained low through until weaning in this experiment. Even on the highest pre-lambing pasture mass, mass would have restricted ewe and lamb intake most of the time until weaning on the early lambing treatments (Bircham, 1984). In addition, lambs were not drenched until weaning and 30 to 40% of the early born lambs had clinical parasite burdens by weaning, whereas less than 7% of the late born lambs were affected (R. Jackson, personal communication).

TABLE 3 Effects of early and late lambing date (LD), heavy and light pre-lamb ewe live weight (LW) and high and low pasture mass (PM) on ewe live weights (kg) and fleece weights (kg) of ewes rearing single and twin lambs.

	Ewe live weight			
	Pre-lamb	5 weeks	21 Nov	Fleece weight
Ewes w/single lambs				
High PM				
Early LD	55.7	53.0	50.0	1.83
Early-late LD	+1.0	-3.5	-4.3	+0.11
Low PM				
Early LD	57.3	44.5	43.7	1.43
Early-late LD	+0.4	-5.1	-4.7	0.0
High PM				
Heavy LW	61.5	57.9	55.4	1.99
Heavy-light LW	+10.6	+6.3	+6.5	+0.42
Low PM				
Heavy LW	63.4	48.4	47.0	1.47
Heavy-light LW	+12.7	+2.6	+1.9	+0.08
SED	1.8	1.2	1.1	0.08
Significance of				
LD	—	**	**	—
LW	*	**	—	—
PM	—	**	—	—
LW x PM	—	—	*	*
Ewes w/twin lambs				
High PM				
Early LD	61.6	51.8	47.7	1.59
Early-late LD	+0.3	-4.0	-5.0	+0.02
Low PM				
Early LD	61.2	43.8	42.1	1.29
Early-late LD	-0.2	-4.6	-4.5	-0.01
High PM				
Heavy LW	66.9	55.3	51.9	1.70
Heavy-light LW	+10.8	+3.0	+3.3	+0.23
Low PM				
Heavy LW	67.2	47.4	45.1	1.40
Heavy-light LW	+11.8	+2.6	+1.5	+0.21
SED	2.0	1.4	1.1	0.1
Significance of				
LD	—	**	**	—
LW	**	*	**	**
PM	—	**	**	**

An effective drenching programme and "normal" spring rainfall should have conferred greater benefits to early lambing than occurred. Under "normal" conditions, early born lambs may also have gained benefit from the maintenance of pasture quality longer into spring. However, under high stocking rates and with high lambing percentages, it appears that more than 1000 kg DM/ha average pasture cover needs to be on hand at lambing to support early August lambing. The possible problem with transferring, in situ, larger masses of pasture through to lambing is the build-up of dead matter in the base of the sward and hence reduced pasture quality and subsequent growth rates (Bircham and Korte, 1984). For this reason integration of ewes with other stock classes to give ewes priority around lambing, may also be necessary to gain full benefit from early lambing.

Additional live weight on ewes at lambing conferred similar lamb weaning weight advantages to both early and late born lambs. The results suggest improvements to lamb birth weight and presumably potential milk production in the heavier ewes. The lack of difference in fleece weight between early and late lambing ewes, despite a large difference in weaning eight, probably occurred because of a compensating effect among early lambing ewes of less competition for energy from lactation demands in late spring; late spring is a more responsive period for wool growth than winter or early spring (Summer, 1979).

The accumulation of winter pasture for lambing requires ewe live weight to be sacrificed. Extremes in pre-lamb ewe live weight influenced lamb weaning weight less than extremes in pre-lamb pasture mass, in agreement with Rattray *et al.*, (1982) and Smeaton and Rattray (1984).

Additional pasture mass required at lambing to compensate for production lost due to a decrease in ewe live weight by 1 kg over winter was calculated from the data assuming lambing percentage was 125%. Additional pasture mass required to compensate for the effect on lamb weaning weight was 18 and 23 kg DM/ha for early and late lambing, respectively. Additional pasture mass to compensate for effects on ewe weaning weight and fleece weight was 34 and 40 kg DM/ha, respectively for both early and late lambing. To recoup ewe performance lost from reducing ewe live weight by 1 kg in winter requires higher levels of additional pasture mass to be supplied at lambing than to recoup lamb performance. Whether or not ewe live weight should be decreased over winter will depend on whether the appropriate additional pasture mass can be supplied at lambing as a result.

CONCLUSIONS

The findings of this study suggest that early August lambing could be beneficial in improving lamb selling weights on hill country farms. However, under high stocking rates and with high lambing percentages,

more than 1000 kg DM/ha average pasture mass needs to be on hand at lambing and pre-weaning drenching may be required. Where high levels of pasture mass can not be achieved, or priority not given to ewes around lambing, ewe weaning weight will be severely penalised by early lambing with little or no advantage to lamb weaning weight.

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