Date of lambing and sheep production during lactation in Southland

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ABSTRACT

The effects of date of lambing (6 September, 23 September, 6 October) and rearing category (singles, twins) on ewe and lamb live weights and ewe wool production were examined in 1981 and 1982.

Later lambing increased lamb growth in the first 6 weeks of lactation from 208 to 279 g/head/d for singles and 135 to 215 g/head/d for twins ($P < 0.001$).

Lambing date did not significantly affect lamb live weights at weaning on 5 January. Later lambing increased ewe greasy wool production between June and January by up to 0.41 kg ($P < 0.001$).

INTRODUCTION

In Southland a feed deficit is characteristic of early lactation. Restriction of feed in early lactation has been shown to reduce milk production and lamb growth rates (Jagusch and Coop, 1971). The timing of lambing in relation to seasonal pasture growth may therefore have important effects on production. Trotter *et al.* (1975) observed that lamb growth did not benefit from shifting lambing date while Rattray (1977) compared 2 lambing dates a month apart and found that later born lambs grew faster up to 4 weeks of age but by 10 weeks they were lighter. This latter effect was apparently the result of a decline in pasture quality. The present experiment investigated the benefits of synchronising feed supply and the demand of ewes rearing singles and twins. The ability of ewes to buffer feed shortages in early lactation was indirectly examined.

MATERIALS AND METHODS

The experimental design was a 3 × 2 factorial with 2 replicates repeated over 2 years. The treatments were 3 mean dates of lambing (6 and 23 September, 6 October) and 2 rearing categories (singles, twins).

Mixed-age Romney ewes were mated to Coopworth rams for 1 week to produce the appropriate mean lambing dates and grazed as 1 mob during the winter. Each lambing date group was set stocked at 20 ewes/ha 14 days prior to the predicted mean lambing date on an area which included the experimental plots that had been randomly allocated to that group. These plots had been grazed to a residual of approximately 400 kg DM/ha 54 days before set stocking.

For each lambing date, 20 days after set stocking (6 to 9 days after the mean lambing date), 2 mobs of 10 single- and 2 mobs of 10 twin-rearing ewes and their lambs were randomly selected from the pool of ewes and allocated to the 0.5 ha plots. The ewes and lambs remained on these plots until weaning on 5 January. Detailed pasture and animal measurements were recorded for early (weeks 1 to 6) and late (weeks 7 to 12) part of each separate group lactation period.

Residual dry matter and pasture growth on each plot were measured by cutting to ground level two 0.25 m^2 quadrats from inside and outside randomly placed exclosure cages once a fortnight. From these data herbage allowance and animal intakes were estimated. The digestibility of pasture collected outside the cages once a fortnight was also measured.

Ewe live weights were recorded at initial set stocking, on allocation to experimental plots, 6 and 12 weeks later and at weaning. Greasy fleece weights were recorded 10 days after weaning. Growth in specific periods was estimated by partitioning greasy fleece weight according to wool grown on midside patches. In 1982 milk production was estimated by measuring udder volumes of ewes by water displacement in week 4 of lactation (Davis *et al.*, 1980). Lamb live weights were recorded at birth, at weeks 1, 6 and 12 of lactation and at weaning.

Effects of date of lambing and rearing category were examined by analyses of variance carried out on

TABLE 1 Residual dry matter and herbage allowance and intake in weeks 1 to 6 of lactation.

Mean lambing date	6 September		23 September		6 October			Effect[1]	
Rearing category	1	2	1	2	1	2	SED	Lambing date	Rearing category
Residual dry matter (kg DM/ha)	308	294	567	432	920	885	120	***	NS
Herbage allowance (kg DM/head/d)	2.52	2.50	4.18	3.62	6.65	6.50	0.66	***	NS
Pasture intake (kg DM/head/d)	1.42	1.45	2.16	2.08	3.36	3.34	0.32	***	NS

[1] No significant interactions.

mob means. The analysis included year as a block effect.

RESULTS AND DISCUSSION

Pasture Measurements (Table 1)

Residual dry matter, herbage allowances and animal intakes during weeks 1 to 6 of lactation increased as lambing was delayed ($P < 0.001$) because lactation occurred at a time of higher pasture growth. In general, residual dry matter, herbage allowance and animal intakes increased through the spring period, with the increase being particularly rapid during September to October. Compared with results from herbage allowance trials during lactation (Rattray *et al.*, 1982 a; K. F. Thompson, unpublished) the herbage allowances were sub-optimal during early lactation, especially for the early lambing date.

Because of high pasture utilisation pasture quality was high throughout the trial (OMD > 80% in 1981).

Ewe Live Weight, Live-weight Changes, Milk Production, Wool Growth (Table 2)

On 26 August twin-bearing ewes were heavier than single-bearing ewes ($P < 0.001$), but lambing date had no significant effect on ewe live weight. After 1 week of lactation later lambing ewes were up to 5 kg heavier than early lambing ewes ($P < 0.01$) and ewes with singles were 2 kg heavier than ewes with twins ($P < 0.05$). The effects of lambing date appeared largely in the period when the ewes were set stocked for lambing. These effects are similar to results reported by Rattray (1977). Differences of this magnitude in ewe live weight at the start of lactation have small or non-significant effects on subsequent lamb growth (Rattray *et al.*, 1982 b; Monteath, 1971).

Ewe live weights were up to 14 kg higher ($P < 0.001$) for the later lambing dates by week 6 of lactation but by the end of the experiment on 5 January the differences had declined to 6 kg ($P < 0.01$). Single-rearing ewes became progressively heavier than twin-rearing

TABLE 2 Ewe live weights (kg), live-weight changes, udder volume and wool grown.

Mean lambing date	6 September		23 September		6 October			Effect[1]	
Rearing category	1	2	1	2	1	2	SED	Lambing date	Rearing category
26 August	60.8	64.4	60.6	63.9	58.8	63.1	1.4	NS	***
Week 1	55.7	53.8	58.4	55.9	60.6	59.4	1.4	**	*
Week 6	48.6	44.0	55.6	48.2	63.2	56.6	1.7	***	***
Week 12	53.6	45.7	59.2	48.3	63.1	54.4	1.9	***	***
5 January	57.3	47.4	60.1	49.1	63.1	54.4	2.0	**	***
Live-weight change weeks 1 to 6 (g/head/d)	-171	-241	-67	-196	68	-62	3.7	**	***
Udder volume in week 4 (ml)[2]	594	799	781	909	833	1434	46	***	***
Wool grown (kg)									
June to January	1.67	1.25	1.91	1.46	1.95	1.80	0.11	***	***
August to January	1.30	0.90	1.52	1.07	1.49	1.33	0.11	**	***

[1] Only significant interaction: udder volume $P < 0.001$.
[2] 1982 only.

TABLE 3 Lamb live weights (kg) and live-weight gains.

Mean lambing date	6 September		23 September		6 October			Effect[1]	
Rearing category	1	2	1	2	1	2	SED	Lambing date	Rearing category
Birth	5.5	4.5	5.5	4.3	5.5	4.6	0.19	NS	***
Week 1	7.7	5.8	7.9	6.0	7.6	6.1	0.20	NS	***
Week 6	16.4	11.5	19.5	13.5	19.4	15.1	0.6	***	***
Week 12	25.3	16.8	28.8	19.5	28.6	20.7	1.2	**	***
5 January	30.9	20.9	31.8	21.4	28.6	20.7	1.3	NS	***
Live-weight gain weeks 1 to 6 (g/head/d)	208	135	275	177	279	215	13	***	***

[1] No significant interactions.

ewes during lactation with differences of 6 kg by week 6 ($P < 0.001$) and 10 kg by week 12 ($P < 0.001$).

Later lambing was associated with larger udder volumes, indicative of higher milk production (Davis *et al.*, 1980). Twin-rearing ewes had larger udder volumes than single-rearing ewes ($P < 0.001$) and the difference increased as lambing was delayed, resulting in a date of lambing × rearing category interaction ($P < 0.001$).

Wool growth during the spring and early summer was affected by lambing date ($P < 0.001$), with the ewes from the latest lambing date producing 0.31 kg more greasy wool than the ewes from the earliest lambing date. Ewes rearing single lambs grew 0.34 kg more wool during the spring/early summer than ewes rearing twins ($P < 0.001$).

Lamb Live Weights and Live-weight Gains (Table 3)

Twin lambs were lighter at birth and grew more slowly than single born lambs throughout lactation ($P < 0.001$). Lambing date did not significantly affect birth weights or lamb live weights at 1 week of age. The latest lambing date increased lamb growth in the first 6 weeks of lactation by about 40% over the earliest ($P < 0.01$). As a result they were 3 kg heavier at week 6 of lactation ($P < 0.001$) and this advantage was maintained until week 12 ($P < 0.01$). At weaning on 5 January there was no significant effect of lambing date on weaning weight despite a difference up to a month in the mean age of the different groups. The effects of lambing date on lamb growth were similar for single- and twin-reared lambs.

Although the ewes showed considerable ability to buffer the effect of nutrition on milk production in early lactation, changes in feeding level caused by changes in lambing date clearly affected lamb growth. A change of 133% in pasture intake resulted in an overall change of 44% in lamb growth. A large part of the ewes' live-weight loss as a result of this buffering was regained in late lactation but ewe wool production was reduced by up to 0.31 kg.

These results are largely in agreement with those of Rattray (1977). The major difference is that the lamb growth advantage in early lactation that resulted from later lambing was maintained because pasture quality did not decline under the conditions imposed.

In conclusion, under appropriate conditions lamb weaning weights at a constant date are largely unaffected by lambing date, but an optimal date will result in higher ewe fleece weights and weaning weights. The lambing date chosen would presumably depend on the seasonal pasture growth pattern and on stocking rate.

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REFERENCES

Davis S. R.; Hughson G.; Farquhar R. W.; Rattray P. V. 1980. The relationship between degree of udder development and milk production in Coopworth ewes. *Proceedings of the New Zealand Society of Animal Production* **40**: 163-165.

Jagusch K. T.; Coop I. E. 1971. The nutritional requirements of grazing sheep. *Proceedings of the New Zealand Society of Animal Production* **31**: 224-234.

Monteath M. A. 1971. The effect of sub-maintenance feeding of ewes during mid pregnancy on lamb and wool production. *Proceedings of the New Zealand Society of Animal Production* **31**: 105-113.

Rattray P. V. 1977. Effect of lambing date on production from breeding ewes and on pasture allowance and intake. *Proceedings of the New Zealand Grassland Association* **29**: 98-107.

Rattray P. V.; Jagusch K. T.; Duganzich D. M.; MacLean K. S.; Lynch R. J. 1982 a. Influence of feeding post lambing on ewe and lamb performance at grazing. *Proceedings of the New Zealand Society of Animal Production* **42**: 179-182.

Rattray P. V.; Jagusch K. T.; Duganzich D. M.; MacLean K. S.; Lynch R. J. 1982 b. Influence of pasture allowance and mass during late pregnancy on ewe and lamb performance. *Proceedings of the New Zealand Grassland Association* **43**: 223-229.

Trotter R. W.; Monteath M. A.; Kelly R. W. 1975. Combined effect of date of lambing and stocking rate on ewe and lamb live weight during lactation. *Proceedings of the New Zealand Society of Animal Production* **35**: 144.