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The effects of shearing Finnish Landrace x Romney ewes in mid-pregnancy on lamb survival, birth weight and other weights.

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ABSTRACT

In each of 2 years, 600 Finnish Landrace x Romney ewes were subjected to a range of nutrition levels in early to mid-pregnancy. Half the ewes were then shorn at day 70 of pregnancy with a standard comb. In the first year (1997), shearing treatment had no impact on single lamb birth and weaning weights, which were 5 and 29 kg respectively. Treatment improved twin lamb birth weights by 0.2 kg ($P<0.01$) and weaning weights by 1.4 kg ($P<0.10$). In the second year (1998), shearing treatment benefited single lamb birth weight (0.2kg; $P<0.10$), and weaning weight (1kg; $P<0.01$) and improved twin lamb birth weight by 0.2 kg ($P<0.01$). In both years, lambing rate and survival were not affected. Ewe weaning weight, also in both years, was slightly higher in the ewes shorn at day 70 of pregnancy ($P<0.05$).

Keywords: pregnancy; ewe; shearing; lamb; survival; weight

INTRODUCTION

Breeds of sheep such as Finnish Landrace (Finn) x Romney ewes are now widely available to farmers. These animals are more productive than traditional breeds due to their higher prolificacy (Meyer & Clarke, 1982). However, the resulting increased production of twin lambs leads to greater losses at birth. Survival of twinborn lambs is usually 3-10% lower than for single-born animals (Geenty, 1997; Hinch *et al.*, 1983). Lamb birth weight is the dominant factor involved in the survival of both singles and multiples (Hinch *et al.*, 1985). Lighter, multiple-born lambs become increasingly susceptible to starvation and exposure as birth weight declines (Hight & Jury, 1970; Dalton *et al.*, 1980). At heavy weights, survival is diminished due to dystocia. Dalton *et al.* (1980) and Hinch *et al.* (1985) confirmed that there is an optimum lamb birth weight at which survival is greatest. Clearly, in highly fecund ewes, any management practise that raises twin-lamb birth weight would be beneficial.

Indoor studies in the UK (Austin & Young, 1977; Maund, 1980; Symonds *et al.*, 1986) have shown that shearing during mid-pregnancy increases birth weights in lambs. More recent trials in New Zealand have confirmed this response with the possibility of an optimum shearing time around day 70 of pregnancy (Husain *et al.*, 1997; Orleans-Pobee & Beatson, 1989; Kenyon *et al.*, 1999; Morris & McCutcheon, 1997). The responses appear to be greater in twin than single lambs (Morris & McCutcheon, 1997) and may also depend on feed levels at the time of shearing, rather than solely on the stage of pregnancy (Kenyon *et al.*, 1999). These authors also observed, that when conditions are good, the shearing effect is minimal. They produced similar birth weight response slopes for both singles and twins, relative to the birth weights of control lambs from un-shorn ewes.

In this study, half the ewes were shorn at day 70 of pregnancy to examine the findings of the above authors. Our hypothesis was that, in Finn x Romney ewes, lamb birth weight would be affected in a similar manner by shearing treatment, depending on birth rank and nutrition treatment.

MATERIALS AND METHODS

In each of two years at Whatawhata Research Centre, approximately equal numbers of half Finn and quarter Finn x Romney ewes were run on pasture at 1 of 5 (1997) or 4 (1998) levels of nutrition from day 20 (1997); or day 7 (1998) until day 70 of pregnancy (mid-June). At day 70, half the ewes, balanced across nutrition treatments, were shorn with a standard shearing comb. After this, the ewes (approximately 600 in each year) were managed similarly in mixed groups through lambing until weaning.

The trial design, including nutrition levels is described in detail by Smeaton *et al.* (1999). Very briefly, in 1997, four feeding treatments were applied from day 20 to day 70 of pregnancy. This resulted in average weight gains of +60 down to -36g/ewe/day for the highest and lowest nutrition levels respectively over the nutrition treatment period. In 1998, ewes weighing either 48.3 or 53.9kg on average at the start of mating showed weight gains of +35 to -84g/ewe/day over the range of four feeding levels applied from day 7 to day 70 of pregnancy.

All the ewes were mated during a synchronised oestrus in each year. Pasture conditions, live weight, pregnancy status, ewe and lamb survival were all documented throughout each year as described by Smeaton *et al.* (1999). In the results reported here, ewe live weights are not fleece-weight adjusted unless stated otherwise. Lamb survival is defined as lambs surviving from birth to age 3 days.

The statistical methods used have been described by Smeaton *et al.* (1999). The interactions tested; shearing treatment by nutrition treatment and breed, were all non-significant and so are not reported. Throughout the paper, shearing treatment refers to shearing at day 70 after synchronised ovulation.

RESULTS

TABLE 1 : Effects of shearing treatment on ewe weights (kg) in 1997.

Treatment	Fleece	Total	Ewe live weights			
	17 June	Fleece ²³	20 July	13 Aug	6 Nov	3 Dec
Shear	2.34	3.67	51.2	55.6	47.1	51.8
Not Shear	-	3.47	55.6	58.3	46.7	51.6
SED	-	0.09	0.19	0.28	0.37	0.38
Signif ¹	-	**	***	***	n.s.	n.s.

¹ n.s. = non-significant, ** P<0.01, *** P<0.001

² June (if shorn) and December fleece weights combined

³ The nutrition treatment shear treatment interaction was significant also (P<0.01)

TABLE 2 : Effects of shearing treatment on ewe weights (kg) in 1998.

Treatment	Fleece	Total	Ewe live weights			
	fleece ²	22 Jul	19 Aug	12 Nov	1 Dec	
Shear	2.37	3.92	52.1	57.3	49.2	52.9
Not-shear	-	3.27	55.1	59.6	47.7	51.9
SED	-	0.075	0.32	0.35	0.40	0.40
Signif ¹	-	***	***	***	***	*

¹ * P<0.05, *** P<0.001

² June (if shorn) and December fleece weights combined.

In both years, Tables 1 and 2, shearing treatment (mid-June) resulted in greater ewe liveweight loss (July weights) than the weight of fleece removed. The weight differential between the shorn and un-shorn ewes was still present in August, approximately 2 weeks prior to lambing, but was smaller than in July. However, after lambing, the direction of the weight differential was reversed. In November and December, the shorn ewes were **heavier**, by up to 1.5kg than the un-shorn ewes although the differences were small and not significant in 1997.

In both years, combined June and December fleece weights of the shearing treatment ewes were 0.2 to 0.6kg heavier than the December fleece weight of the non-shorn treatment.

TABLE 3 : Effects of shearing treatment on lamb weights (kg) and survival ratios in 1997.

Treatment	Singles		Twins		EL/EPL ²	ELM/EL	LS/LB	LW/LB
	Birth	Wean	Birth	Wean				
Shear	5.2	29.3	4.1	21.2	0.96	0.51	0.92	0.84
Not-shear	5.2	29.0	3.9	19.8	0.93	0.58	0.90	0.79
SED	0.1	0.6	0.08	0.7	-	-	-	-
Signif ¹	n.s.	n.s.	**	+	n.s.	n.s.	n.s.	n.s.

¹ n.s. = non-significant, + P<0.10, ** P<0.01

² Ratios analysed as binomial distribution; EL etc. = ewes lambing, ewes present at lambing, ewes lambing multiples, lambs surviving, born, weaned.

TABLE 4 : Effects of shearing treatment on lamb weights (kg) and survival ratios in 1998.

Treatment	Singles		Twins		EL/EPL ²	ELM/EL	LS/LB	LW/LB
	Birth	Wean	Birth	Wean				
Shear	4.85	28.4	4.1	20.0	0.94	0.45	0.97	0.80
Not-shear	4.64	26.9	3.9	19.1	0.94	0.46	0.95	0.75
SED	0.12	0.57	.09	0.48	-	-	-	-
Signif ¹	+	**	**	n.s.	n.s.	n.s.	n.s.	n.s.

¹ n.s. = non-significant, + P<0.10, ** P<0.01

² Ratios analysed as binomial distributions; refer TABLE 2 for definition of terms.

Shearing treatment affected lamb **birth** weights in both years (Tables 3 and 4) except for the single lambs in 1997, which were not affected. These differences tended to carry through to **weaning** but were barely significant (p<0.1) in 1997, and in 1998 were not significant. The 0.2kg birth weight advantage to the twin lambs due to the shearing treatment increased to nearly 1kg at weaning. In 1998 a similar birth weight advantage in the singles increased to 1.5kg at weaning.

The lamb survival results in Tables 3 and 4 show no significant responses to the shearing treatments in either year, although the shearing treatment always favoured lamb survival by 2% and survival to weaning by 5%.

DISCUSSION

The effects of mid-pregnancy shearing on ewe live weight, initially detrimental, (even after allowing for the weight of fleece lost), and then ultimately beneficial, in the second year at least, have not previously been noted as a benefit of this practice. Nor has the small gain in fleece weight, observed in both years, been included as a further benefit. The benefits, in terms of lamb birth weight, as observed in work with other breeds (Kenyon *et al.*, 1999), were fairly small but consistent.

Kenyon *et al.* (1999) presented a response function showing the expected benefits of mid-pregnancy shearing, given the birth weights of 'control' lambs from un-shorn ewes. From their equations, we would have expected birth weight advantages to shearing of 0.6kg for the twins and the same or slightly more for the singles. In fact, we gained only 0.2kg in birth weight of our twin lambs and nil to 0.2kg in the single lambs. We speculate that this discrepancy is due to both random variation and also the fact that Finn x lambs are probably smaller at birth (Meyer & Clarke, 1978) than the breeds used in the trials summarised by Kenyon *et al.* (1999). Despite the rather small gain that we observed, relationships between birth weight and survival, determined by Hinch *et al.* (1985), suggest this extra birth weight could result in 5 more twin lambs surviving per 100 born. Note that, as stated in the 'Methods' section above, nutrition did not affect the response to shearing

CONCLUSION

Our work has confirmed that when Finn x Romney ewes are shorn at day 70 of pregnancy there is a small but consistent advantage in twin lamb birth weight in particular, total ewe fleece weight and possibly ewe live weight at weaning.

On balance, shearing at day 70 would appear to be a practice that farmers of Finn x Romney ewes should seriously consider, remembering always the potential risks to the ewe (and lamb) of shearing in the winter (Dabiri *et al.*, 1995).

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REFERENCES

- Austin, A. R.; Young, N. F. 1977. The effect of shearing pregnant ewes on lamb birth weights. *Veterinary Record*. **100**: 527-529.
- Dabiri, N.; Morris, S.T.; Parker, W. J.; McCutcheon, S. N.; Wickham, G. A., 1995. Productivity and cold resistance in ewes pre-lamb shorn by standard or cover comb. *Australian Journal of Agricultural Research* **46**: 721-732.
- Dalton, D. C.; Knight, T. W.; Johnson, D. L., 1980. Lamb survival in sheep breeds on New Zealand hill country. *New Zealand Journal of Agricultural Research* **23**: 167-173.
- Geenty, K. G., 1997. Lambing. Chapter 5, pp75-95 in '200 by 2000'. A guide to improved lambing percentage. Ed. K. G. Geenty. Published by Wools of New Zealand and Meat New Zealand.
- Hight, G. K.; Jury, K. E., 1970. Hill country sheep production II. Lamb mortality and birth weights in Romney and Border Leicester x Romney flocks. *New Zealand Journal of Agricultural Research* **13**: 735-752.
- Hinch, G. N.; Crosbie, S. F.; Kelly, R. W.; Owens, J. L.; Davis, G. H., 1985. Influence of birth weight and litter size on lamb survival in high fecundity Booroola-Merino crossbred flocks. *New Zealand Journal of Agriculture Research* **28**: 31-38.
- Hinch, G. N.; Kelly, R. W.; Owens, J. L.; Crosbie, S. F., 1983. Patterns of lamb survival in high fecundity booroola flocks. *Proceedings of the New Zealand Society of Animal Production* **43**: 29-3.
- Husain, M. H.; Morris, S.T.; McCutcheon, S. N. 1997. Pasture management to minimise the detrimental effects of pre-lamb shearing. *New Zealand Journal of Agricultural research*. **40**: 489-496.
- Kenyon, P. R.; Morris, S. T.; Revell, D. K.; McCutcheon, S. N., 1999. Improving lamb birth weight through mid-to late-pregnancy shearing: a review of recent studies. *Proceedings of the New Zealand Society of Animal Production* **59**: 70-72
- Maund, B. A. 1980. Shearing ewes at housing. *Animal Production*. **30**: 481.
- Meyer, H. H.; Clarke, J. N., 1982. Effect of ewe ovulation rate and uterine efficiency on breed and strain variation in litter size. *Proceedings of the New Zealand Society of Animal Production* **42**: 33-35.
- Meyer, H. H.; Clarke, J. N. 1978. Genetic and environmental effects on incidence and causes of lamb mortality. *Proceedings of the New Zealand Society of Animal Production* **38**: 181-184.
- Morris, S. T.; McCutcheon, S. N., 1997. Selective enhancement of growth in twin foetuses by shearing ewes in early gestation. *Animal Science* **65**: 105-110.
- Orleans-Pobee, J.; Beatson, P. R. 1989. Effects of nutrition and shearing during pregnancy on birth weight in highly fecund Booroola-cross sheep. *Proceedings of the New Zealand Society of Animal Production* **49**: 285-290.
- Smeaton, D. C.; Webby, R. W.; Tarbutton, I. S. 1999. Nutritional effects, in early pregnancy, on lamb production of Finnish Landrace x Romney ewes. *Proceedings of the New Zealand Society of Animal Production* **59**: 108-110.
- Symonds, M. E.; Bryant, M. J.; Lomax, M. A. 1986. The effect of shearing on the energy metabolism of the pregnant ewe. *British Journal of Nutrition*. **56**: 635-643.