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Effect of slope on lamb mortality

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ABSTRACT

Two experiments were designed to estimate the effects of paddock contour on lamb mortality between 1 and 4 d of age (Expt 1) and 5 and 28 d of age (Expt 2).

In Expt 1, 153 lambs born to 2-year-old ewes lambing in easy contoured paddocks ($<20^\circ$) were shifted into either steep (40 to 45°) or easy paddocks at 1 d of age. Lambs dying within the next 3 d were autopsied. Live lambs were tallied at weaning. In Expt 2, 323 lambs born to 3 to 7-year-old ewes were reared from 5 to 28 d in paddocks with mean slopes of easy, moderately steep (20 to 30°) or steep contour. Dead lambs were autopsied.

In Expt 1, lamb mortality in steep and easy paddocks was 2% at 4 d of age and 10 v 9% at weaning. In Expt 2, 2% of all lambs died with contour having no effect.

These results demonstrate that lambs born in easy contour paddocks can be successfully reared from a young age in steep paddocks.

Keywords Lamb mortality; hill country; slope.

INTRODUCTION

Mortality estimates for Romney lambs are usually higher on hill country than on lowlands (e.g. in multiples, Dalton *et al.* (1980) found 34% mortality on hill country whereas Johnson *et al.* (1982) found 24% under lowland conditions). Much of this difference is likely to be related to contour since a large increase in neonatal mortality occurred in lambs born on slopes in excess of 30° (Knight *et al.*, 1983). This increase was mainly due to lamb slippage resulting in mismothering of newborn lambs. A few hours after birth, however, lambs were observed to safely move about these slopes. This suggested that if slope-induced neonatal mortality was minimised, young lambs could be successfully reared in steep paddocks. This study investigated this possibility in lambs from 1 to 28 d of age.

The objectives were to test the effect on mortality when lambs were:

1. born in easy contoured paddocks but reared in either steep or easy paddocks from 1 to 4 d of age,
- and 2. reared from 5 to 28 d of age in paddocks ranging from easy to very steep.

MATERIALS AND METHODS

Experiment 1

Over 2 years, 170 2-year-old ewes previously mated to Marshall Romney (MR) or Control Romney (CR) rams (Knight and Hockey, 1982) were allocated equally within strain of ram to be lambled in 1 of 2 flat paddocks. Ewes with live lambs (105 ewes 1983, 37 ewes 1984) were drifted out of these paddocks

within 24 h of birth into an adjacent flat 2 ha paddock ($<20^\circ$ slope) or an adjacent steep 1 ha paddock ($>40^\circ$) for rearing. The lambs were then checked daily for 3 d and dead lambs were removed and autopsied. To facilitate daily checking, every 7 to 10 d ewes with lambs older than 4 d were removed from their rearing paddocks and grazed with other ewes and lambs until weaning.

Birth weight data was analysed using Genstat and lamb mortality differences were tested using χ^2 .

Experiment 2

Three hundred and twenty-three lambs born to 3 to 7-year-old MR and CR ewes in 1983 were allocated within strain of ewe to 1 of 4 rearing mobs of about 70 to 90 lambs. About one-third of the ewes in each mob reared twins. The lambs remained in these mobs from 5 or 6 d of age to 27 or 28 d of age. Each mob was randomly allocated 1 of 2 easy ($<20^\circ$ slope), 1 moderately steep (20 to 30°) or 1 steep paddock ($>30^\circ$) for the first 8 d (Period 1). Similarly, for the next 14 d (Period 2), 1 easy, 1 moderately steep and 2 steep paddocks were used. Paddocks were about 2 ha and were used only once. Ewes and lambs were checked daily and dead lambs autopsied. Slope effects on lamb mortality in each period were tested using χ^2 .

RESULTS

Experiment 1

Lambs reared in flat or steep paddocks in each of 1983 and 1984 had similar mean birth weights (Table 1). Single-born lambs and MR-sired lambs were

heavier than twin-born ($P < 0.001$) and CR sired lambs ($P < 0.01$) respectively.

Overall, 2% of the lambs died within 3 d of drifting and 10% were dead by weaning. No lambs died between 4 and 7 d of age. Slope, year, rearing rank and sire strain did not affect mortality (Table 1).

Two of the 3 lambs dying by 4 d of age had infections, the third exhibited exposure lesions.

TABLE 1 Slope, year, rearing rank and sire breed effects on birth weight (kg) and lamb mortality (Expt 1).

	No. lambs	Birth weight	% Mortality to day 4	% Mortality to weaning
Slope				
Steep	83	3.8	2	10
Easy	70	3.7	2	9
Year				
1983	115	3.8	3	11
1984	38	3.7	0	8
Rearing rank				
Single	133	4.1	2	10
Twin	20	3.1***	2	8
Sire				
Marshall	88	4.0	0	7
Control	65	3.6***	4	12

Experiment 2

Only 2% of the 323 lambs died during Period 1. During Period 2 fewer than 1% of the lambs died. Slope during rearing had no effect on lamb mortality (Table 2).

Seven of the 8 dead lambs were diagnosed with infections and the remaining lamb starved following mis-mothering.

TABLE 2 Effect of slope on lamb mortality from 5 to 28 d of age (Expt 2).

Slope	Period 1 (5-13 d old)		Period 2 (14-28 d old)	
	No. lambs	% mortality	No. lambs	% mortality
Easy (<20°)	176	2	86	0
Moderate (20-30°)	77	3	70	1
Steep (>30°)	70	0	162	1

DISCUSSION

Slope during rearing from 1 to 4 d of age had no effect on lamb mortality over this period. Furthermore, there was no carryover effect on mortality between 5 d and weaning at about 70 d of

age. Lamb mortality from 5 to 28 d of age was unaffected by contour during rearing over this period. These findings contrast with the large increase in slope-induced mortality for lambs born on slopes in excess of 30° (34% for singles, 52% for twins (Knight *et al.*, 1983)). The slope-induced deaths were initiated at or soon after birth during attempts to stand and suckle. In addition, Kilgour and de Langen (1980) observed lamb slippage in 24/28 (86%) lambs born on steep hill country. Although they provided no information on lamb mortality, it is likely their 6 lambs that slipped and were returned to their dams would have otherwise died. Lambs were 1 or 5 to 6 d old at the start of the present study. It is not surprising that contour during rearing did not affect mortality as lambs of this age were previously observed to move freely about steep slopes.

The levels of mortality in this study are similar to those for lambs of similar age under hill country conditions (Dalton *et al.*, 1980). Although most deaths were the result of infections, only 2% of the lambs died from this cause. This compares favourably with the 1% infection deaths reported elsewhere (Hight and Jury, 1970; Dalton *et al.*, 1980).

The lack of an effect of slope on mortality in Experiment 1 occurred in lambs sired by rams from either a high (MR) or low (CR) survival background. The small birth weight and mortality advantage to MR sires is similar to that reported in other studies under hill country conditions where this strain has demonstrated superior lamb survival (e.g. 91% v 86%, Knight, 1982).

CONCLUSIONS

These results demonstrate that lambs can be successfully reared in steep paddocks from a young age. Where possible, lambs should be born in easy contoured paddocks. To effectively implement this strategy on hill country properties where the availability of flat land is low would require batches of ewes lambing at high densities before being moved to steeper paddocks for rearing. The identification of ewes marked with crayons at about weekly intervals during joining would allow batch lambing of ewes. The effects of sheep density about lambing time on lamb mortality are currently being investigated at the Whatawhata Hill Country Research Station. Some preliminary estimates suggest that as little as 6 to 7 ha are required to lamb 1000 ewes over 12 d.

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