Management practices and productive performance on hill country sheep farms

W.J. PARKER AND R.J. TOWNSLEY

Department of Agricultural Economics and Farm Management
Massey University.

ABSTRACT

A survey of 30 Wairarapa hill country farmers during 1983 investigated how management practices influenced sheep performance. Lamb growth rates between birth and weaning which ranged from 153 to 300 g/d, were most affected by lambing date and the use of N fertiliser. Pasture cover/SU at lambing was more often a limitation to high lamb growth rates on early lambing farms, but even on later lambing properties insufficient feed at lambing was common. Pasture cover/SU at lambing was most affected by ewe winter rotation length, the use of N fertiliser, stocking rate and stock policies which enabled winter stocking rates to be progressively reduced.

Weighing of sheep was associated with the attainment of higher autumn live weights. A high proportion of farmers weighed (63%), but their knowledge of acceptable live weights was poor.

Keywords Management; hill country; survey; sheep performance; weighing.

INTRODUCTION

The positive relationship between ewe live weight and number of lambs born (Coop, 1962, 1966; Allison, 1968; Rattray *et al.*, 1981), wool production (Coop and Hayman, 1962; Hawker and Crosbie, 1985) and lamb weaning weight (Blair, 1981) forms the basis for the recommendation that hill country farmers aim for an average 2-tooth live weight of 55kg or more at the commencement of mating. Live-weight gain profiles from weaning to 2-tooth mating have therefore been widely publicised (e.g. McNeil, 1982).

Less attention, however, has been focused on the attainment of high average daily gains in lambs up to weaning. Low to moderate lamb growth rates during this period result in a loss of 3 to 10 kg in potential weaning weight (Rattray *et al.*, 1982; Smeaton and Rattray, 1984). Such losses are unlikely to be recovered in dry summer regions.

Failure to achieve recommended live-weight gains in flock replacements is a direct cause of low hill country sheep productivity. This is often attributed to harsh environmental conditions or diseases such as facial eczema and ryegrass staggers. However, the wide variation in productive performance between farms in the same locality (Clarkson, 1974; Fitzharris and Wright, 1984) suggests that inappropriate management practices and systems may also be limiting factors to higher sheep performance. This may occur because farmers do not appreciate how management decisions influence sheep live weights at various times of the year or understand the means by which their management skills can be improved in order to overcome production constraints.

This paper analyses survey data from 30 Wairarapa hill country farmers to address these issues and highlight ways in which farmers could develop more productive farming systems on hill country.

COLLECTION OF SURVEY DATA

Farmers were initially surveyed in relation to management practices during the period 1 October to April (weaning to tupping) in autumn 1983. A follow-up survey (involving 29 of the farmers) of winter and spring management was completed the following spring (Parker, 1984). Sample live weights ($n \geq 50$) of ewe lambs and 2-tooth and mixed age (MA) ewes were obtained in the autumn from 28 farms. Hogget (1 October) and ewe and lamb weaning weights were recorded in the spring from 26, 22 and 24 farms respectively. Lambing percentages for the 1980-1983 seasons were obtained.

Data were analysed using univariate descriptive statistics and multivariate regression analysis (Nie *et al.*, 1974).

RESULTS AND DISCUSSION

1983 Sheep Live Weights

The average pre-tup (mean mating date 1 April ± 15 d (mean, SD) live weights of MA and 2-tooth ewes were 52.8 ± 5.3 kg and 48.6 ± 5.8 kg respectively. Two-thirds of the farms had MA ewes which averaged 50 kg or better, but 61% had 2-tooths below this weight. Ewe lambs averaged 30.2 ± 4.8 kg (mean weighing date 2 April ± 15 d). Ewe lamb average weights ranged from 18.7 to 40.0 kg between farms. The simple correlation (r) between the sample average autumn live weights of ewe lambs and 2-tooths was 0.76. The corresponding correlation for sample average 2-tooth and MA ewe live weights was 0.85.

Overall, ewe hoggets gained 35 ± 20 g/d over the winter period to reach a shorn weight of 36.9 ± 4.6 kg by 1 October. Hoggets were still below the 35 kg 1 May target live weight at this stage on 35% of the farms, and would be unlikely to achieve an average 2-tooth mating weight of 50 kg.

Relationship between 1983 Ewe and Lamb Weaning Weights

The average weaning weights of ewes (shorn) was 52.5 ± 5.6 kg. Their lambs (woolly) averaged 23.2 ± 2.9 kg, at a mean weaning age of 86 ± 15 d. Lamb weaning weights were positively ($r = 0.64$, $P<0.01$) associated with ewe weaning weights.

Average daily gains (ADG) in lambs up to weaning were estimated by assuming a common birth weight of 4.3 kg (Duff, 1981), and average weaning ages based on mid-points of lambing occurring 10 days after the commencement date for flocks starting lambing after 20 August, and 14 days for flocks commencing lambing before this date. This indicated that lambs grew at an average of 228 g/d from birth to weaning. Thus lambs on the farms achieving the highest average ADG (300 g/d) reached a 20 kg weaning weight 53 days before those on the farm with the poorest growth rate (153 g/d).

Awareness of Sheep Live-weight Targets

Sheep were weighed by 63% of the farmers, although in one case only 2-tooths were weighed. Most used their own scales (53% of those who weighed), but some relied on the Ministry of Agriculture and Fisheries (MAF) (26%), or shared equipment with neighbours (21%). Weighing bimonthly or more frequently was practised by 17% of the farmers, but 20% weighed only once annually at tupping. The frequency of weighing by the remainder lay between these extremes. As expected, farmers with their own scales weighed most frequently.

Awareness of autumn average target live weights for different age groups was considerably greater than that of spring targets (Table 1). Some farmers were unable to specify any target weight. A 55 kg 2-tooth mating live weight was the most commonly cited target weight (58% of farmers weighing). Generally, farmers with heavier MA ewes tended to have higher target weights for younger classes of stock.

Farmers not weighing assessed live weight/condition by eye appraisal; in some cases this was supplemented by hand assessment of condition when sheep were yarded and by killing-sheet information. The main reasons for not weighing were:— lack of motivation; a belief that sheep could not be fed better as a result of weighing; no obvious financial benefits to be obtained and satisfaction with the accuracy of eye appraisal.

Weighing of sheep was associated with the attainment of higher live weights. Ewe lamb and 2-tooth live weights were estimated by multivariate regression to be improved by 1.7 kg and 6.8 kg respectively, in autumn 1983 on farms where weighing was practised (Parker, 1984).

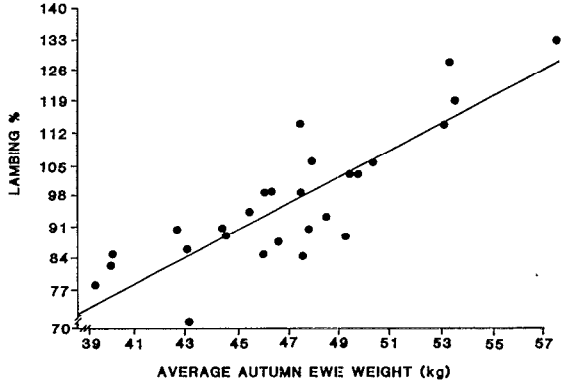

FIG. 1 Across-flock relationship between 1983 lambing % and mean live weight of ewes in the flock at mating.

Lambing Performance and Relationships with Live Weight

Lambing percentage on the survey farms averaged 98.5 ± 14.8% in 1980; 85.6 ± 16.2% in 1981; 100.5 ± 13.7% in 1982; and 97.3 ± 14.8% in 1983. Between year differences ($P<0.01$) reflect seasonal conditions, particularly those during the autumn (Parker, 1984).

The across-flock relationship between the 1983 flock average live weight and subsequent percentage of lambs docked is presented in Figure 1. An estimated 3.0% increase in lambing percentage was obtained for every kilogram increase in autumn live weight. Of note is the wide divergence in lambing percentage for flocks

TABLE 1 Awareness of live-weight targets, as indicated by the proportion of farmers weighing sheep able to specify target live weights for various stock classes.

Stock class	Time of weighing	Target weight specified (% of farmers)	Range in live weights specified (kg)
Ewe lambs	— weaning	33	20-28
	— 1 April	78	30-38
2-tooth	— spring shearing	53	40-45
	— mating	84	50-60
MA ewes	— weaning	50	45-60
	— mating	83	55-65

which had similar live weights at the time of mating. This variation may be due to differences in genotype (Gibson and Craig, 1980), environment, incorrect live-weight assessment or management practices. In the latter case, timing of mating was important as 11% and 9% more lambs ($P<0.05$) were docked in 1982 and 1983 from flocks which were mated after 1 April than from flocks mated before that date. In addition, the 16% of farmers who used shorter mating periods (of between 34 and 43 d) were not disadvantaged in terms of the percentage of lambs docked, although in all cases these matings commenced after 1 April.

saleable stock increased the amount of pasture available/SU at lambing (Table 3). Lower pasture cover/SU was necessary at the commencement of lambing if lambing date coincided with the spring pasture flush. Hence pasture cover/SU should increase with earlier lambing to make up the deficit between pasture growth and ewe requirements (McEwan *et al.*, 1983; Smeaton and Rattray, 1984). In general farmers with higher stocking rates made less provision for pasture reserves/SU at lambing compared with farmers at lower stocking rates. This may be attributable to extension advice referring to target pasture covers/ha

TABLE 2 The effect of management and farm physical characteristics on the 1983 weaning live weights of ewes and lambs adjusted to a common age between farms (13 weeks). Values are standardised regression coefficients.[1]

	Weaning weight of	
	Lambs	Ewes
Management variable		
Lambing date	0.72	—
Application N winter-spring (kg N/SU)	0.50	0.49
Pasture cover/SU at lambing (kg DM/SU)	0.31	—
Ratio of breeding cow SU: total SU wintered	-0.18	—
Ratio of hogget SU: total SU wintered	-0.61	-0.20
Years managing present farm	-0.47	—
Farm physical characteristic		
District location—Ihuraua	—	0.62
—Bideford	-0.58	-0.46
Percentage of farm area non-cultivatable	-0.57	-0.55

[1] Standardised regression coefficients indicate the relative importance of variables affecting performance levels. Explanatory variables listed are those remaining after backward elimination stepwise regression.

Factors Affecting Ewe and Lamb Weaning Weights

Lamb weaning weights, and to a lesser extent ewe weaning weights, were sensitive to spring feeding levels (Table 2). Thus later lambing, higher pasture cover/ewe at lambing, and the application of N—all of which can be expected to increase ewe feeding levels, especially in the early stages of lactation—resulted in improved lamb production. Live weights were affected by the ratios of other stock classes, and were depressed by increasing proportions of breeding cows, other cattle and hoggets, reflecting competition for spring pasture.

Factors Affecting Farm Pasture Cover at Lambing

In order to obtain field measures of farm pasture cover from the survey farms, a pasture cover score at the commencement of lambing was calculated by ascribing pasture yields (kg DM/ha) to the proportion of effective grazing area estimated by the farmer to fall within specified categories of pasture height. Pasture cover/stock unit wintered (kg DM/SU) was then estimated to provide a measure of the amount of pasture available to each stock unit (Parker, 1984). (As stocking rates increase farmers could be expected to implement management strategies to increase average pasture cover/ha at lambing, other things being equal.)

Longer ewe winter rotations, later lambing, application of N and higher proportions of readily

TABLE 3 The effect (standardised regression coefficient) of farm physical charactistics and management practices on average farm pasture cover score/stock unit at lambing in 1983.

	Standardised regression coefficient
Management variable	
Lambing date	-0.29
Winter ewe rotation length (d)	0.66
Application winter-spring N (kg N/Su)	0.23
1983 winter stocking rate (SU/eff. ha)	-0.54
Ratio of dry cattle SU: total SU wintered	0.53
Ratio of hogget SU: total SU wintered	0.28
Farm physical characteristic	
Effective area (ha)	-0.51

at lambing, irrespective of the stocking rate or lambing date.

Low pasture cover at the commencement of lambing was common with ewes being set stocked onto pastures of 2.5cm or less on 53% and 47% of the farms in 1982 and 1983 respectively. Most (86%) of the farmers who experienced feed shortages in 1982 faced the same situation again in 1983. Set stocking of ewes was delayed until 10 days or less before the due lambing date by 76% of the farmers. Low feed reserves were therefore primarily due to fast ewe winter rotations—

ewe rotation lengths exceeded the recommended 80 to 100 days on only 18% of the farms—and to some extent, depleted autumn pasture reserves. The latter situation may have resulted from extended flushing, retention of lambs for fattening, dry conditions or a combination of these factors. Formal monitoring of farm feed supplies to provide information for management planning and control would help eliminate this problem (Parker, 1985).

CONCLUSIONS

This survey provides further evidence of the strong positive relationship between live weight and lambing percentage, and of the failure of a high proportion of farmers to achieve acceptable weaning or autumn live weights in flock replacements.

Improved spring feeding levels, through longer winter grazing rotations or later lambing (or a combination of these 2 factors) are likely to improve lamb weaning weights. These will be reflected in improved autumn live weights and better overall farm performance. Furthermore, high lamb ADG increases the opportunity to wean ewes earlier (8 to 10 week lamb age) and improve their live weights prior to drier summer conditions, lessening the need for the risky practice of autumn flushing.

A high percentage of the survey farmers weighed sheep, but their knowledge of acceptable age class live weights was generally poor. Although target live weights have been criticised because "they are too rigid" or that they give the "impression that further increases are undesirable", they are an essential part of management. Without a plan and associated performance targets (objectives) the farmer has no direction, or standards with which to compare the acceptability or otherwise of current management practices and associated levels of performance. It is not surprising then that in general, farmers who fail to plan, also fail to improve. This phenomenon is likely to be a factor in the repeating of poor performances, such as low pasture cover at lambing, and is probably one reason why weighing was associated with higher sheep live weights.

Emphasis has been placed on autumn live weights in New Zealand. This was reflected in farmers' knowledge of target live weights. However, this has probably misled hill country farmers as opportunities to alter sheep live weights at this time of year are limited by time and the availability of pasture. Considerably greater opportunity to influence sheep live weights during the late spring/early summer exists when pasture growth rates are high. High live-weight gains during this period will be reflected in improved autumn live weights and wool productions (Parker and McCall, 1986; Hawker and Crosbie, 1985). To ensure that the desired live-weight gains are being achieved regular sample weighing (3 to 4 weekly) during this period should be adopted.

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