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Ewe live weight, level of pasture feeding and live-weight gain

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ABSTRACT

The live-weight response of light and heavy ewes to a range of pasture allowances was investigated in 3 experiments. Differential feeding levels prior to the commencement of Expt. 1 generated light and heavy ewes (52 v 57 kg live weight, $P < 0.001$; 3.5 v 4.1 body condition score, $P < 0.01$) that were subsequently offered pasture allowances of either 1, 2 or 4 kg DM/ewe/d for a 10-week period. Light ewes gained more weight than heavy ewes on all allowances. With time, ewes tended to approach a constant live weight in equilibrium with their level of feeding. Both light and heavy ewes harvested pasture to similar post-grazing residuals and rejected the dead material in the sward.

In Expts. 2 and 3 low and high live weight ewes were selected from within large flocks of 4-tooth ewes that had been run as 1 mob (live weight 38 v 49 kg Expt. 2, 41 v 55 kg Expt. 3, $P < 0.001$; body condition 1.8 v 2.4 Expt. 2, 2.1 v 3.1 Expt. 3, $P < 0.01$). Light and heavy groups were mostly grazed separately on allowances of 1.2 or 4 kg DM/ewe/d for 6 weeks although Expt. 3 partly comprised mixed groups for assessment of competition effects. No such effects were apparent on the higher allowance where light and heavy ewes had similar live-weight gains. On the lower allowance however, light ewes were more responsive than their heavier counterparts with this being less pronounced under mixed grazing.

The implications for flock management are discussed.

INTRODUCTION

The terms 'light' and 'heavy' have been used to describe ewes differing in live weight and body condition. In preferentially feeding light ewes, particularly in the autumn, the farmer assumes the light ewes are more responsive and tends to overlook the reasons why particular ewes are light.

This paper reports 3 experiments in which live-weight gains on a range of pasture allowances were measured for ewes of different initial live weight generated either by prior feeding mobs differentially or by selecting low and high live weight ewes from within a flock.

DESIGN AND METHODS

In Expt. 1 (1980) Romney ewes averaging 53 kg were

randomly allocated to either restricted or abundant feed during the period 6 February to 11 March. The resulting light and heavy mobs averaged 52 and 57 kg live weight ($P < 0.001$) and 3.5 and 4.1 body condition score ($P < 0.01$) respectively. Pasture allowances of 1, 2 and 4 kg DM/ewe/d were then offered to groups of 50 ewes for 10 weeks until 23 May. Live weight and body condition were recorded after a 24-hr starve on days 22, 41, 59 and 74, the end of the experiment.

The design details relating to Expt. 2 (1981) and Expt. 3 (1982) in which light and heavy ewes were selected from within large mobs are reported by Kelly *et al.* (1983). To summarise, groups of light and heavy ewes, replicated twice, were offered pasture allowances of 1.2 or 4.0 kg DM/ewe/d for 6 weeks. In Expt. 2 light and heavy ewes were grazed separately and in Expt. 3 light and heavy ewes were grazed both separately and together to assess the effect of competition between groups.

Techniques and methods pertaining to live-weight measurements, pre-grazing herbage assessment and composition, paddock sub-division for allowance treatments and frequency of shifts as detailed by

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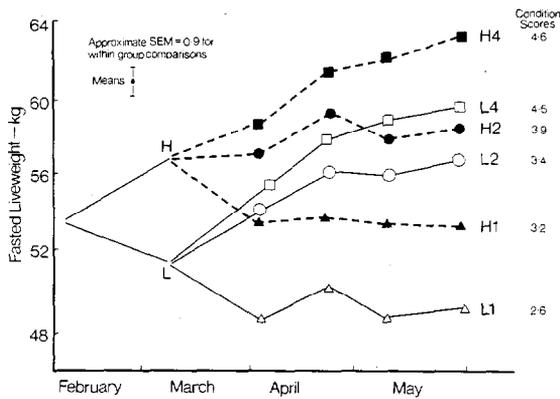


FIG. 1 Patterns of live weight and final body condition scores in Expt. 1 for light (L) and heavy (H) ewes on pasture allowances of 1, 2 and 4 kg DM/ewe/d.

Kelly *et al.* (1983), are common to all 3 experiments. Post-grazing measurements (Expts. 1 and 2) of residual herbage were made by cutting four 2 m × 0.08 m strips to ground level for each group after every second shift.

RESULTS AND DISCUSSION

Live-weight Gain

In Expt. 1 distinct patterns of live-weight change occurred at each level of feeding (Fig. 1). Ewes on the 1 and 2 kg DM/ewe/d allowances tended to reach a stable live weight. This pattern is important when interpreting the rate of live-weight response to a level of feeding since the period over which gains are calculated will affect the magnitude of the rate of gain. Accordingly, Table 1 presents gains for the first 6 weeks of experimental feeding. Light ewes lost less or gained more live weight than heavy ewes at the same pasture allowances ($P < 0.05$). Despite this higher rate of gain the light ewes had only partially recovered the initial 5 kg live-weight difference by the end of the experiment.

TABLE 1 Live-weight gain (g/d) for the light and heavy ewes in the first 6 weeks of Expt. 1.

Ewe live weight	Pasture allowance (kg DM/ewe/d)		
	1	2	4
Light	-6	87	157
Heavy	-68	54	111

In contrast the light ewes in Expts. 2 and 3 showed similar live-weight gains to the heavy ewes at the 4.0 kg DM/ewe/d allowance with no apparent competition effect (Kelly *et al.*, 1983). On the 1.2 kg DM/ewe/d

allowance however, heavy ewes gained 0.6 kg (Expt. 2) and lost 1.1 kg (Expt. 3) while the light ewes gained 1.5 kg in both experiments when grazed separately from heavy ewes. This effect, although still significant, was less pronounced under mixed grazing.

The results of the 3 experiments suggest that the manner in which live-weight differences have been achieved may influence the response of ewes to the level of pasture feeding. Ewes with recent live-weight loss may be more responsive in subsequent live-weight gain than heavier ewes which have not experienced the restricted nutrition. Rattray *et al.* (1980) reported a similar result. On the other hand light and heavy ewes selected from within a flock are likely to show similar live-weight responses to generous feeding.

In practical terms drafting of light ewes for preferential feeding may give improved live-weight gain only if they are light due to recent nutritional restriction, not suffered by heavier ewes. For instance, one can equate this with ewes of similar mating weight but varying lactation status; a case for differential feeding may exist post weaning between ewes having reared twin or single lambs.

When all ewes have had similar treatment there appears to be no advantage in preferentially feeding light ewes. On the contrary, Kelly *et al.* (1983) suggest that there may be advantages in offering the heavier ewes preferential treatment because they should be better able to rear extra lambs.

Residual Herbage

Similar swards were used for the 3 experiments, herbage masses were high, averaging 3335, 3270 and 3560 kg DM/ha and dead material was low averaging 17%, 10%, and 3% for Expts. 1, 2 and 3 respectively. In Expts. 1 and 2 in which post-grazing measurements were undertaken, residual (post-grazing) herbage (Table 2) increased with pasture allowance ($P < 0.001$) but was similar for swards grazed by light and heavy ewes at each allowance within experiments.

TABLE 2 Mean residual pasture dry matter (kg DM/ha) for light and heavy ewes in Expts. 1 and 2.

Initial live weight	Expt. 1			Expt. 2	
	Pasture allowance (kg DM/ewe/d)			Pasture allowance (kg DM/ewe/d)	
	1	2	4	1.2	4
Light	747	1141	2030	995	2170
Heavy	560	1262	1957	859	2083
SED		144			65

The composition of the residual herbage was measured only in Expt. 1 and when related to the pre-grazing sward indicated selection during grazing. Ewes ate the green material in preference to dead

material of which only 17% was eaten. Although grass was the major component of the sward a higher proportion of clover was harvested (82% of clover v 65% of grass, $P < 0.01$). The residual herbage on the 1, 2 and 4 kg DM/ewe/d allowances had 409, 464 and 530 kg dead DM/ha respectively.

The rejection of dead material by grazing ewes (also reported by Rattray, 1978 and Smeaton *et al.*, 1981) should be considered when using residual herbage — live-weight gain relationships for planning grazing management. The magnitude of the residual is likely to be influenced by the quantity of dead material in the sward.

CONCLUSION

Bearing in mind that the 3 experiments discussed here were not primarily designed nor undertaken to examine live weight/intake relationships comparisons, some aspects of our conclusions are based on 1 year's data only and should be viewed accordingly.

Within a flock where all ewes have had the same level of feeding there are unlikely to be differences in live-weight gain between light and heavy ewes offered generous allowances of high quality herbage, other things being equal (e.g., lactation status). By competition when the live weight and body condition of a group of ewes is lowered due to restricted feeding their live-weight gain response may be greater at the same level of feeding than their heavier flock mates that have been well fed. At constant feeding level ewes change in live weight and body condition to

reach a condition stable with the level of feeding. Relationships between level of feeding and rate of live-weight change depend on the duration over which the live-weight change is calculated.

Under grazing conditions light and heavy ewes eat to similar levels of residual herbage. Residual herbage — live-weight gain relationships may be affected by the quantity of dead material in the sward and the live weight of the ewes.

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