PASTURE ALLOWANCE AND LAMB GROWTH

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SUMMARY

Groups of 20 Romney lambs grazing ryegrass/white clover-based pastures were offered allowances of 1, 2, 3, 4, 5 and 6 kg DM/head/day for 8 or 16 weeks commencing in December, February and April. There were curvilinear relationships between lamb growth rate and pasture allowance. As lamb liveweight increased, growth rates declined at any given allowance. The implications for feed budgeting are discussed. Pasture utilization at each grazing was linearly correlated to liveweight gain by the relationship: Growth rate (g/day) = 260 — 2.98 % utilization. The relationship appeared independent of liveweight, and its possible use in grazing management is discussed.

INTRODUCTION

The amount of herbage dry matter (DM) on offer to each animal per day (pasture allowance) has been used as an index of level of feeding in recent studies to determine animal response. Jagusch *et al.* (1979) demonstrated a curvilinear relationship between pasture allowance and growth rate for finishing lambs on ryegrass/white clover pastures, and a similar relationship has been determined by Thompson (1979) for Romney ram lambs. In both reports the initial liveweight of lambs was about 25 kg and the trials were conducted for 6 to 8 weeks between December and February. The following trial was undertaken in 1979 to determine whether the relationship was applicable to Romney lambs starting feeding at different times and consequently at different mean liveweights. The duration of feeding was longer than in the previous studies.

EXPERIMENTAL

The design adopted included 3 groups × 3 periods with 10 ewe and 10 wether lambs per cell (Table 1). The pasture allowance treatments within each group were 1, 2, 3, 4, 5 and 6 kg DM/head/day. Groups were shifted twice a week, and usually grazed the same paddock separated by electric fences. The appropriate area for each allowance was determined from standing DM

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TABLE 1: GROUPS GRAZED, DURATION OF PERIODS, AND INITIAL LIVEWEIGHT OF LAMBS

Period	*Duration*	*Groups Grazed*	*Initial Liveweight (kg)*
1	6/12–9/2	1	19.7
2	10/2 –4/4	1, 2	24.4
3	5/4 –25/5	2, 3	31.3

and grazing interval (3 or 4 days). During period 1, lambs from groups 2 and 3 were run together on an allowance of approximately 1.5 kg DM/head/day, and during period 2 group 3 was given an allowance of approximately 3.5 kg DM/head/day to ensure a mean liveweight of over 30 kg at the commencement of experimental feeding.

Pregrazing standing DM was measured to ground level on each paddock by cutting six 0.25 m^2 quadrates, selected after using a falling-disc meter. Post-grazing standing DM was measured in periods 2 and 3 on the 1, 3 and 5 kg DM/head/day allowances by cutting to ground level four strips (each 2 m × 0.08 m) per treatment.

In vitro digestibility estimates (Drew, 1966) were made on pastures sampled immediately prior to grazing. Pasture composi-

TABLE 2: MEAN LIVEWEIGHT GAIN (g/day) AND (SE) OF LAMBS FOR THE THREE GRAZING PERIODS

Group	*Allowance (kg DM/head/day)*	*Period 1*	*Period 2*	*Period 3*
1	1	52 (4)	45 (7)	
	2	102 (6)	72 (5)	
	3	123 (5)	106 (4)	
	4	128 (5)	115 (4)	
	5	128 (6)	127 (7)	
	6	126 (7)	112 (8)	
2	1		55 (6)	19 (4)
	2		93 (7)	50 (6)
	3		124 (6)	87 (7)
	4		148 (6)	95 (5)
	5		157 (5)	103 (5)
	6		164 (5)	107 (5)
3	1			–4 (9)
	2			58 (4)
	3			94 (4)
	4			104 (4)
	5			133 (6)
	6			136 (5)

TABLE 3: MONTHLY MEAN (SE) STANDING DM, PASTURE COMPOSITION AND *IN VITRO* DIGESTIBILITY

	Period 1		*Period 2*		*Period 3*	
	Dec.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*
Standing DM (t/ha)	3.0	2.9	3.1	3.2	3.1	2.0
	(0.18)	(0.12)	(0.11)	(0.10)	(0.15)	(0.09)
Pasture composition						
% Dead material	14	9	14	13	5	8
	(3.3)	(1.9)	(2.6)	(2.2)	(0.8)	(1.4)
% Grass	N/A		74	77	89	89
			(2.8)	(2.3)	(1.4)	(1.4)
% Clover	N/A		13	10	6	3
			(2.7)	(0.8)	(1.2)	(0.5)
OMD (%)	65	68	70	68	71	67
	(6.6)	(1.4)	(2.2)	(1.0)	(1.8)	(1.0)

N/A: Not available.

tion was determined in terms of grass, clover and dead material. Twenty-four-hour fasted liveweights were measured at the beginning of each period and at the end of the experiment. Lambs were drenched fortnightly with an anthelmintic.

RESULTS AND DISCUSSION

Mean liveweight gains (Table 2) increased for all groups in a curvilinear manner with increasing pasture allowance. Group 1 growth rates were lower than expected, particularly in period 1, the first 8 weeks of the trial, possibly because of bad weather. Group 2 lambs in their first 8 weeks of grazing (period 2) showed growth responses to feed allowance similar to those reported by Jagusch *et al.* (1979) and Thompson (1979). Although lambs in these three studies were of similar liveweight, they varied in breed and sex. These data suggest that a generalized liveweight gain response curve could be prepared for lambs of about 25 kg.

Group 3 lambs were heavier than group 2 when they entered the trial and their growth rates were considerably lower. The lower growth rates can be attributed to pasture composition and liveweight effects. Pasture parameters (Table 3) were relatively constant throughout the trial with the exception of clover content, which showed an expected seasonal decline. The lower clover content in period 3 may have had a depressive effect on liveweight response (Jagusch, 1979), but this was probably less important than the effect of initial liveweight in determining growth response. As lambs increase in weight their maintenance requirements increase, and at any particular allowance the quantity of feed available for growth declines.

TABLE 4: MEAN PASTURE UTILIZATION % (SE) FOR THREE ALLOWANCES FOR PERIODS 2 AND 3

Group	*Allowance (kg DM/head/day)*	*Period 2*	*Period 3*
1	1	75 (2)	
	3	50 (4)	
	5	37 (5)	
2	1	74 (3)	80 (5)
	3	48 (4)	61 (7)
	5	43 (4)	51 (7)
3	1		81 (4)
	3		48 (5)
	5		50 (4)

A liveweight effect was also seen in the growth rates of groups 1 and 2 in the second 8 weeks of experimental feeding (periods 2 and 3, respectively), when the lambs were heavier and growth rates were lower than during the first 8 weeks. The effect of liveweight on the growth response is probably important only at heavier weights. For example, a common target growth rate for ewe lambs is 80 to 100 g/day. To achieve this gain, lambs of about 25 kg require an allowance of about 2 kg DM/head/day, whereas for lambs over 30 kg an allowance of about 3 kg DM/head/day would be necessary for them to grow at the same rate.

Post-grazing standing DM measurements have been used to calculate mean pasture utilization at each grazing (Table 4). The linear regression relationship between % pasture utilization and mean growth rate (GR) is (SE in parentheses):

$$GR\ (g/day) = 260(21) - 2.98\ (0.34)\ \%\ utilization$$

Figure 1 presents this, together with the data of Jagusch *et al.* (1979). Given the limited extent of the present data, it appears that this relationship is independent of liveweight.

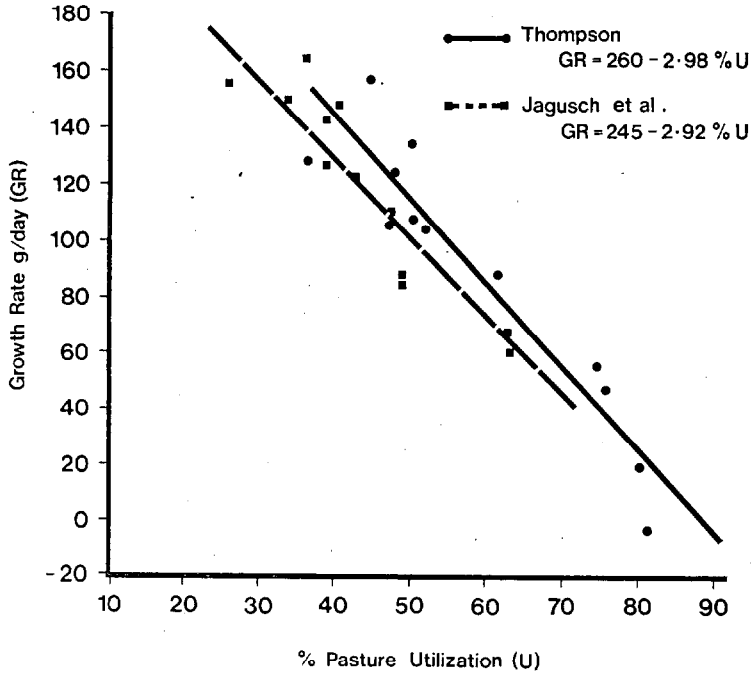

FIG. 1: *Relationship between % pasture utilization and mean growth rate.*

When rotationally grazed lambs are growing at 100 g/day they are likely to be utilizing about 50% of the pasture offered. In practice, this level of utilization may be more easily recognized from the post-grazing residual. Farmers and advisers are sometimes unwilling to undertake the detailed calculations associated with using pasture allowance data for feed budgeting, but as decisions to shift lambs to fresh pasture must be made, estimates of the post-grazing residual may be useful guides.

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