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Potential contribution of white clover in the uplands

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Introduction

In the upland environment, individual lamb growth rate and production per unit area of land are very important determinants of overall efficiency of production. In the experiments reported here, clover variety and proportion in the sward, compared with grass-only swards were studied relative to these two measures of efficiency.

Material and methods

Potential lamb production from grass/clover swards was compared with that from grass-only swards receiving 200 kg nitrogen (N) per ha at 310-363 m at Bronydd Mawr Research Centre. In experiment 1, conducted from 1985 to 1988, the grass/clover swards received 75 kg N per ha (50 kg in spring and 25 kg in late summer), but in 1989 and 1990 application of this N was eliminated. The two sward types of three contrasting perennial ryegrass varieties were studied, namely: Aurora, a very early-flowering diploid; Meltra, a late-flowering tetraploid; Aberystwyth S23, a late-flowering diploid. The clover was Aberystwyth S184 (small-leaved). Pastures were continuously stocked with Beulah Speckled Face ewes and their Suffolk cross lambs (ewe : lamb ratio 1 : 1·5) from spring (mid April) until weaning in mid July. Sward surface height was maintained at 4 ± 0·5 cm by regular adjustments of animal number. After weaning lambs grazed the swards at 6 cm height, reducing to 3 cm, until termination of grazing in mid November.

Experiment 2 was initiated in 1988 at Bronydd Mawr to compare lamb performance on grass/clover swards of three contrasting clover varieties namely: Aberystwyth S184, small-leaved; Ac 3351, prostrate and persistent small-leaved selection from Turkish material; Grasslands Huia, medium-leaved type from New Zealand. The varieties were sown at 3 kg seed per ha with 18 kg/ha of Talbot intermediate-flowering perennial ryegrass.

During the 3 years (1989-91) the pastures were continuously stocked from spring (mean date 11 April) until weaning (mean date 6 July) by Welsh Mule ewes and their Texel cross lambs (ewe : lamb ratio 1 : 1·67). By regular adjustments of animal number the sward surface height was maintained at 4 to 5 cm. After weaning the swards were grazed by lambs, maintaining a height of 5 to 6 cm before grazing down to 3 cm by termination of grazing in late autumn (mean date 28 October).

Results

In experiment 1, mean total lamb output during the 6 years (1985-90) at 765 kg/ha from the grass/clover swards was 0·84 of that from the grass-only swards. A summary of the relative individual lamb performance and output during individual years is given in Table 1. Also shown is the clover content of the herbage in the grass/clover swards. Individual lamb growth rates were higher on the grass/clover

Table 1 *Lamb performance on grass/clover as a percentage of that on grass-only and clover content as proportion of herbage dry matter*

	Daily live-weight gain		Annual lamb production per ha	Clover content	
	Pre-weaning	Post-weaning		Pre-weaning	Post-weaning
1986	109	127	105	0·12	0·21
1987	107	118	96	0·12	0·14
1988	105	101	86	0·02	0·02
1989	99	129	76	0·01	0·10
1990	114	211	65	0·07	0·27
Mean 1986-90	106	131	84	0·07	0·15

Table 2 *Lamb performance on grass/clover pastures of three white clover varieties, mean 1989-91*

	Daily live-weight gain (g)		Mean stocking rate (lambs per ha)		Production (kg/ha)		
	Pre-weaning	Post-weaning	Pre-weaning	Post-weaning	Pre-weaning	Post-weaning	Annual
Ac 3351	228	78	27·1	34·1	472	254	726
Huia	233	86	26·6	35·7	459	296	755
S184	239	91	29·7	40·9	512	350	862
Mean	233	85	27·8	36·9	481	300	781
s.e.	3·0	4·0	0·89	1·03	15·1	11·1	21·8
Significance				*		**	*

pastures during the pre-weaning period in 1986, 1987 and 1990 and in all years apart from 1988 during the post-weaning period. Lamb output per ha was similar from the two sward types during the years when N was applied with the exception of 1988 when the clover content was very low. This was attributed to better individual growth rates compensating for lower stock carrying capacities. When fertilizer-N was withheld, although individual lamb growth rates were superior, especially in 1990 after recovery of clover, lamb output per ha was lower from grass/clover swards. Better lamb growth rates on the grass/clover pastures was attributed to higher digestibility and intake.

Differences in animal performance between the three ryegrass varieties were much more pronounced as grass/clover than as grass-only swards. This was particularly evident during the last 3 years (1988-90) when lamb output per ha was proportionately 0·21 and 0·12 more from Meltra/clover and Aurora/clover respectively than from S23/clover. Corresponding proportional advantage of Meltra and Aurora over S23 as grass-only swards was 0·12 and 0·04 respectively. This difference in relative performance of the three varieties between the two sward types was associated with different clover productivity affecting animal output. Over the duration of the experiment Meltra was the most compatible with clover of the three ryegrasses with S23 the poorest. Mean clover proportion of herbage was 0·14, 0·11 and 0·08 on Meltra, Aurora and S23 swards respectively.

A summary of mean 1989-91 lamb data for experiment 2 are presented in Table 2. Annual lamb output per ha was 19% and 14% more from S184 than from Ac 3351 and Huia respectively. This was largely due to the superiority of S184 during the post-weaning period. At that time stocking rate on S184 was higher than that on the other two varieties. Mean clover proportion of herbage was 0·22, 0·17 and 0·13 on S184, Huia and Ac 3351 respectively.

Conclusions

Evidence presented here shows the potential of grass/clover pastures for improving the efficiency of lamb production in the uplands. However, it is very apparent that to maximize the potential it is essential to use a suitable variety of both white clover and companion ryegrass.

Although it would appear that a clover proportion of around 0·10 of herbage dry matter can have a significant benefit in individual lamb growth a higher proportion of clover would be advantageous in improving the productivity of the pasture.

Further research is needed to determine the ideal target white clover proportion in a sward, together with the grazing and fertilizer-N management that will attain and sustain such a level.

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