BEEF PRODUCTION FROM GRAZED GRASS AND GRASS/CLOVER SWARDS

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ABSTRACT

Beef output and herbage dry matter production were measured from grazed grass (fertiliser nitrogen treated) and grass/clover swards, during two grazing seasons which extended from early-April until mid-November. Both permanent (Treatments A, B and C) and reseeded (Treatment D, E and F) swards were respectively stocked with 3000, 2500 and 2000 kg liveweight/ha in Spring using fifteen steers/treatment (liveweight = 570kg/head). There were small and generally non-significant treatment effects on final liveweight in both years, but heavier carcasses were observed on the reseeded swards ($P<0.05$). Clover based swards (Treatments B, C and E, F) produced heavier carcasses ($P<0.05$) than the nitrogen fertilised grass swards (Treatments A and D). Pasture production ranged from 7540 to 10,469 and from 6360 to 11,606 kg DM/ha in year 1 and 2 respectively, with highest yields being observed on the nitrogen fertilised treatment and on the reseeded swards.

KEYWORDS

Clover, grass, beef, grazing

INTRODUCTION

Beef production in Ireland is typically characterised by low stocking rates and low nitrogen usage which on many grassland beef farms is less than 50 kg N/ha/annum. With European Union emphasis on extensive, environmentally compatible production systems of agriculture, the role for white clover to support animal production is being re-examined. Most estimates of nitrogen fixation by white clover suggest that 50-200 kg/N/ha/annum may be fixed. These fixation values are at least equivalent to the fertiliser nitrogen usage on grassland for many beef farms. Clover as a component of ruminant diets is generally considered to be nutritionally beneficial. However, seasonality of clover production, variation from year to year, lack of persistency and the likely animal health problems associated with bloat have limited the attractiveness of white clover. The present trial was undertaken (a) to measure beef production from grazed grass/clover swards, (b) to compare it with output from nitrogen fertilised pasture and (c) to measure dry matter (DM) production by grass and clover throughout the grazing season.

MATERIALS AND METHODS

Four areas of old pasture were identified in August, 1992, half of each was ploughed and reseeded with a perennial ryegrass (Lolium perenne) (cv. Green Isle)/White Clover (*Trifolium repens*) (cv. Susi) mixture, and the remainder was strip seeded with white clover. Three grazing treatments were imposed on each pasture type (Table 1): Treatments A, B and C on old pasture represented an animal stocking rate in spring of 3000, 2500 and 2000 kg liveweight/hectare, respectively; Treatments D, E and F represented the corresponding stocking rates on reseeded swards. An application of 50 kg N/ha was applied to all swards in early spring each year. While treatments B, C, E and F received no further nitrogen fertilizers, Treatment A and D received approximately 35 kg N/ha after each grazing cycle (giving a total input of 220 kg N/ha). Each treatment consisted of seven paddocks which were grazed rotationally. Fifteen Charolais crossbred steers (mean initial liveweight 570 kg and 564 kg in 1994 and 1995, respectively), were used per treatment. Cattle moved to a new paddock when the control treatment (A on old and D on reseeded pasture) was grazed to a residual stubble height of 5-6 cm; thus, old and reseeded pastures were managed separately. Stocking rates were reduced twice during the grazing season on each treatment before the final removal of the remaining animals for slaughter. Destocking dates were determined by herbage supply and all animals were slaughtered immediately after removal from the experiment. The following pasture measurements were recorded on five of seven paddocks (80% of area) throughout the grazing season. Pre- and post-grazing herbage yields, proportions of clover and grass leaf, stem and dead matter in the pre-grazed swards, and pre- and post-grazing sward heights. Data for the 1994 and 1995 grazing season are reported here.

RESULTS AND DISCUSSION

Herbage production data for the 1994 and 1995 grazing season (early-April until mid-November) are shown in Table 1. Production ranged from 7540 to 10,469 kg DM/ha and from 6360 to 11,606 kg DM/ha in 1994 and 1995, respectively. Reseeded pastures gave highest yields ($P < 0.001$). The greatest difference was observed on the nitrogen fertilised treatments (A vs D). Higher ($P < 0.05$) pre-grazing yields (cut to a 4 cm stubble height) were observed on the reseeded swards. Post-grazing yield (cut to a stubble height of 4 cm) were generally less than 1000 kg DM/ha and both old and reseeded swards had, on average, similar residual yields in 1994. However, old pastures were grazed more laxly in 1995 ($P < 0.001$). Post-grazing sward height were 4.4, 5.2, 5.9, 5.7, 5.3 and 6.5 cm in 1994 and 4.9, 5.7, 6.7, 5.2, 5.0 and 6.2 cm in 1995 for treatments A, B, C, D, E and F, respectively. Sward clover content was 20 to 25% in the low nitrogen treatments (B, C, E and F) in 1994, but were only half of these values in 1995.

Animal liveweight gains from turn-out to pasture (early April) until late-August (date of first draft for sale) were 0.91 and 1.1 kg/head/day in 1994 and 1995, respectively. Differences in final liveweight did not attain significance in 1994 (Table 2), however, heavier carcass weights were produced from the reseeded swards (B vs E, $P < 0.05$; C vs F, $P < 0.01$). The clover treatments E ($P < 0.05$) and F ($P < 0.001$) had higher carcass weights than the fertilised control (Treatment D). At slaughter, in 1995, laxly grazed animals had higher ($P < 0.05$) liveweight than those on the nitrogen treated swards. Heavier carcass weight ($P < 0.05$) were again produced on the reseeded swards, with an 18 kg carcass difference between old (A) and reseeded (D) pastures. Within pasture type, both clover treatments (B and C, and E and F) resulted in similar carcass weights, thus showing that there was no difference in liveweights between the lower stocking rate. Within pasture type there were, however, differences between clover pastures and animals on the reseeded swards had higher kill-out proportions in 1995.

Table 1

Effect of pasture type, stocking rate and nitrogen usage on dry matter production, pre- and post-grazing herbage yields (kg DM/ha), post-grazing sward height (cm) and sward clover content (%)

		Treatment									Contrasts				
		Old Pasture			Reseed Swards										
	Year	A	B	C	D	E	F	s.e.	F-test	Old pasture vs reseed	AvsD	BvsE	CvsF	BvsC	EvsF
N inputs (kg N/ha)		220	50	50	220	50	50								
Spring stocking rate (kg LW/ha)		3000	2500	2000	3000	2500	2000								
Dry matter	1	8615	7540	7809	10469	9160	8235	433	***	***	***				*
Yield (kg DM/ha)	2	7674	7246	6360	11606	9007	9806	504	***	***	***		***		**
Mean yield	1	1907	1952	2141	2388	2121	2332	118	*	*	*				
Pre-grazing (kg DM/ha)	2	1604	1713	1902	2238	1798	2143	104	***	***	***				*
Mean yield	1	575	829	981	746	652	1076	68	***						***
Post-grazing (kg DM/ha)	2	408	647	1016	412	384	643	63	***	***		***	***	***	***
Post-grazing	1	4.4	5.2	5.9	5.7	5.3	6.5	0.18	***	***	***		*	*	***
Sward height (cm)	2	4.9	5.7	6.7	5.2	5.0	6.2								
Mean sward	1	1	20	22	13	21	25	2.1	***	*	***				
Clover content (%)	2	2	10	10	6	16	17	1.3	***	***	*	***	***		

Table 2

Effect of treatment on final liveweight (kg), carcass weight (kg) and on carcass conformation and fat score.

		Treatment									Contrasts				
		Old Pasture			Reseed Swards										
	Year	A	B	C	D	E	F	s.e.	F-test	Old pasture vs reseed	AvsD	BvsE	CvsF	BvsC	EvsF
Final liveweight (kg)	1	728	730	743	722	741	741	6.8							
	2	703	718	727	698	709	718	7.0	*						
Carcass weight (kg)	1	383	387	390	386	402	405	4.5	***	***		*	**		
	2	364	382	381	382	386	387	5.1	*	*	*				
Conformation score*	1	3.4	2.8	3.1	3.1	3.2	3.3	0.16							
	2	2.9	3.3	3.2	2.9	3.2	3.1	0.14							
Fat score**	1	4.0	4.0	4.0	3.9	4.0	4.2	0.13							
	2	3.9	3.8	3.8	4.0	4.0	3.9	0.10							

*Conformation score 5 = best, 1 = poorest

**Fat score 1 = lean, 5 = fat