GRAZING MANAGEMENT STRATEGIES TO INCREASE THE ROLE OF GRAZED GRASS AS A FEED FOR DAIRY COWS LATE IN THE GRAZING SEASON

S. Crosse and P. Dillon
Teagasc, Moorepark Research Centre, Fermoy, Co. Cork, Ireland

ABSTRACT

A study was set up in autumn 1993 to investigate strategies for increasing the proportion of grazed grass in the diet of spring-calving dairy cows during the September to December period. The treatments included two stocking rates, from the 26 June until the 20 August (Weeks 1 to 9) of 4.50 and 3.80 cows/ha. From the 21 August to 6 December (Weeks 10 to 23) each of the above stocking rates was adjusted to either 2.90 or 2.47 cows/ha. A total of 56 spring-calving dairy cows were used. All pastures were grazed to a post-grazing sward surface height of 6 to 7.5 cm with similar nitrogen input. Rotation length was maintained at 21 days or greater. Where grass supply was not adequate grass silage was offered as a buffer feed. There was no interaction between stocking rate applied for weeks 1 to 9 and subsequent overall stocking rate applied for weeks 10 to 23 with respect to milk yield, milk constituent yield or concentration of milk constituents. Milk yield (19.2 v. 18.2 kg/day; $P<0.001$), fat yield (0.73 v. 0.69 kg/day; $P<0.001$), protein yield (0.65 v. 0.61 kg/day; $P<0.001$) and lactose yield (0.86 v. 0.80 kg/day; $P<0.001$) were all reduced, during weeks 1 to 9, by the lower stocking rate. Milk protein concentration was reduced (34.0 v. 33.4 g/kg; $P<0.01$) and so also was lactose concentration (44.8 v. 44.1 g/kg; $P<0.001$). For the remainder of the year (Weeks 10 to 23) milk yield, constituent yield and constituent concentrations were unaffected by treatment, except protein concentration which was higher ($P<0.05$) for the lower stocking rate (2.47 cows/ha). Over the total experimental period (Weeks 1 to 23) milk fat and protein yield were significantly reduced ($P<0.05$) by the lower stocking rate applied from week 1 to 9. Similarly, milk protein and lactose concentrations were also reduced. The lower milk yield over the period week 1 to 9 for the lower stocking rate was associated with significantly higher pre-grazing herbage yield, lower organic matter digestibility and proportion of live leaf in the herbage offered, and a longer rotation length. Where rotation length extended beyond 21 days during September/October/November period, milk yield was not affected compared to a 21-day rotation.

KEYWORDS

Dairy cows, grassland, grazing, animal performance, autumn management

INTRODUCTION

The optimum calving date for creamery milk production is that where the start of lactation coincides with the start of rapid grass growth. This will result in a large proportion of milk being produced in September to December period. A large feed deficit occurs during this period, the size of which depends on the stocking rate level and nitrogen input. This feed deficit can be made up with concentrates, silage or deferred grazed grass. Increasing the proportion of grazed grass during this period will result in significant savings to overall costs of milk production. The objective of this experiment was to develop strategies for increasing the proportion of grazed grass in the diet of spring-calving dairy cows in the September to December period. The approach involved : (1) Adjustment of the proportion of the farm allocated to grazing during the 2nd-cut silage period (June to August); (2) Overall stocking rate adjustment from the end of August to the end of the grazing season.

METHODS

Fifty-six spring-calving dairy cows were randomly assigned on the basis of calving date, lactation number and milk yield to four treatments at the end of June, 1993. The trial was a randomized block design with a factorial arrangement of treatments. The main treatment effect was the stocking level on the grazing area during the second-cut silage period (26 June to 20 August) and the sub-treatment effect was overall stocking rate (21 August to 6 December). All four farmlets were grazed at a stocking rate of 5.50 cows/ha until the end of June. From the 26th June until 20th August (Period 1), treatments AH and AL were stocked at 4.50 cows/ha while BH and BL were stocked at 3.80 cows/ha. From 21st August to 6th December (Period 2), treatments AH and BH were stocked at 2.90 cows/ha and treatments AL and BL were stocked at 2.47 cows/ha. All pastures were grazed to a post-grazing sward surface height of between 6 to 7.5 cm. Rotation length was maintained at 21 days or greater. Where grass supply was not adequate, then grass silage was fed as a buffer feed. Equal levels of nitrogen were applied to all treatments (13.7 kg N/ha/21 day period) up until early October. Milk yields, milk composition and liveweight were measured. The sward measurement included dry matter production, botanical composition, sward heights and chemical composition.

RESULTS AND DISCUSSION

There was no interaction between stocking rate from June 26 to August 20 and stocking rate from August 21 to December 6 on milk yield, milk constituent yield and concentration of milk constituents. The main effects are therefore presented in Table 1. Milk yield and yield of constituents were significantly reduced at the lower stocking rate during period 1 (26 June - 20 August). Milk protein and lactose concentration were similarly reduced. Milk yield, constituent yields or constituent concentration were not affected by the stocking rate applied during period 2 (21 August to 6 December) except that protein concentration was higher ($P<0.05$) with the lower stocking rate. The effect of treatment on milk yields over the total experimental period is also shown in Table 1. The lower milk yields during the 2nd-cut silage period with the lower stocking rate was associated with significantly higher pre-grazing herbage yields, lower organic matter digestibilities, lower percentage live leaf on herbage offered and longer rotation lengths. Estimated total silage dry matter consumed during the experimental period was 300 and 140 kg DM/cow for treatments HH and LH. No silage was fed to the other two treatment groups. Lowering the stocking rate during period 1 (26 June to 20 August) and allowing rotation length to extend beyond 21 days during the month of July/August will result in lower milk yield and constituents. However, where rotation length extended beyond 21 days during September/October/November, milk yield was not affected as compared to a 21 day rotation. This study shows the large potential for milk production in the autumn from grass-only with spring-calving dairy cows. For a farmer to be able to extend his grazing season by deferring grass into the Autumn/Winter period, a knowledge will be required of the quantity of herbage that is possible to store on a paddock without affecting animal performance. The extent that a farmer will be able to exploit this will depend on stocking rate, calving pattern and soil type.

Table 1
The effect of grazing management strategy on the performance of Spring-calving dairy cows (July - December).

	Period	A	B	H	L	SE
Milk (kg/day)	Wk 1-9	19.2***	18.2	-	-	0.19
	Wk 10-23	12.1	11.7	11.7	12.1	0.46
	Total	14.9	14.1	14.3	14.7	0.34
Fat (g/kg)	Wk 1-9	38.7	38.2	-	-	0.36
	Wk 10-23	44.7	43.8	43.4	45.0	0.73
	Total	41.6	40.6	40.7	41.3	0.42
Fat (kg/day)	Wk 1-9	0.73***	0.69	-	-	0.009
	Wk 10-23	0.53	0.51	0.51	0.53	0.020
	Total	0.61*	0.56	0.58	0.60	0.015
Protein (g/kg)	Wk 1-9	34.0**	33.4	-	-	0.11
	Wk 10-23	38.7	38.5	37.9	39.3*	0.53
	Total	35.7*	36.3	35.7	36.2	0.20
Protein (kg/day)	Wk 1-9	0.65***	0.61	-	-	0.007
	Wk 10-23	0.46	0.45	0.44	0.47	0.017
	Total	0.50*	0.54	0.51	0.53	0.013
Lactose (g/kg)	Wk 1-9	44.8***	44.1	-	-	0.11
	Wk 10-23	43.6	43.3	43.0	44.0	0.65
	Total	44.1*	44.8	44.4	44.5	0.19
Lactose (kg/day)	Wk 1-9	0.86***	0.80	-	-	0.010
	Wk 10-23	0.54	0.52	0.53	0.54	0.023
	Total	0.68	0.62	0.64	0.65	0.017

*(P<0.05); **(P<0.01); *** (P<0.001)