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Effect of restricted access time to pasture on dairy cow milk production, grazing behaviour and dry matter intake

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Key words: grazing, dairy cows, restricted access, grazing behaviour, milk production

Introduction Irish dairy farmers are now targeting a 300-day grazing season in order to increase the proportion of grazed grass in the diet of the dairy cow and optimise the economical efficiency of their business. However, inclement weather conditions in early spring and late autumn can reduce the number of days at pasture for lactating animals, allowing animal's restricted access to pasture during these periods may be a method of extending the grazing season. The aim of this experiment was to examine the effect of restricting pasture access time on dairy cow milk production and composition, bodyweight and body condition score change, dry matter intake and grazing behaviour.

Materials and methods Fifty-two (19 primiparous and 33 pluriparous) Holstein-Friesian dairy cows (mean calving date-17 August) were balanced on 4 weeks pre-experimental milk yield (23.8; s.d. 3.82 kg), parity (2.1 s.d. 1.32), milk fat (41.3; s.d. 6.94 g/kg), protein (34.0; s.d. 2.62 g/kg) and lactose content (45.7; s.d. 1.61 g/kg), body weight (591; s.d. 61.7 kg) and body condition score (3.00; s.d. 0.453) and randomly assigned to a four treatment study ($n=13$) from 7 March to 6 April 2007. The four treatments were: full-time access to pasture (24; control); 9 hours pasture access between milkings (9); 2 three-hour periods of pasture access after both milkings (2×3); 2 four-and-a-half hour periods of pasture access after both milkings (2×4.5). All treatments were offered a daily herbage allowance of 15.5 kg DM/cow/day and 3 kg DM of concentrate/cow/day. Fresh herbage was allocated daily, no supplementary feed was offered to animals when removed from pasture. Treatment groups grazed separately for the duration of the study. Pre and post grazing sward heights were measured daily. Milk yield was recorded daily, milk composition and bodyweight were measured weekly. Dry matter intake (DMI) and grazing behaviour were recorded on the final week of the study. All animal parameters were analysed using covariate analysis. The variables included in the model were lactation number, treatment, days in milk and the appropriate pre experimental variables were also included.

Results and discussion The pre-grazing herbage mass offered to all treatments was approx. 1282 kg DM/ha and sward OMD was 864 g/kg, indicating high quality swards conducive to high DMI. Swards where animals had full time and 2×4.5 hours access to pasture had the lowest post grazing heights (3.5 cm). Following the experimental period there were no differences in most milk production parameters however reducing access time to 2 three-hour periods significantly reduced ($P < 0.05$) milk protein concentration. Furthermore, restricting pasture access time to one period of 9 hours significantly reduced DMI ($P < 0.05$) compared to the control treatment. Restricting pasture access time resulted in much greater grazing efficiency as animals from the 9×3 and 2×4.5 treatments spent a greater proportion of their time at pasture grazing (80.97 and 78%, respectively) than control animals (38%).

Conclusions From this study it is apparent that restricting access to pasture is an innovative method of increasing the number of days at pasture during periods of inclement weather. However, for optimal results total access time should be split into two distinct periods and be at least four and a half hours long.

Table 1 Effect of pasture access time on milk yield, milk composition, dry matter intake and grazing time.

	24	9	2×3	2×4.5	Rse	Sig
Milk yield (kg/cow)	22.0	22.6	21.4	21.7	0.77	NS
Milk fat content (%)	4.12	4.18	4.18	4.04	1.557	NS
Milk protein content (%)	3.55 ^a	3.42 ^{ab}	3.32 ^b	3.43 ^{ab}	0.749	*
Body weight change (kg/day)	-1.28	-1.28	-1.40	-1.21	0.171	NS
TDMI (kg/cow/day)	17.4 ^a	15.7 ^b	16.6 ^{ab}	16.3 ^b	0.51	*
Grazing Time (mins/day)	540 ^a	431 ^b	349 ^c	425 ^b	22.2	***

NS=Non significant, ***= $P < 0.001$, *= $P < 0.05$. * values in the same row not sharing a common superscript are significantly different
TDMI—Total Dry Matter Intake