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Effect of winter closing date and spring opening date on the DM yield of perennial ryegrass cultivars

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Key words: winter growth, cultivar, closing date, opening date, DM production

Introduction Grazed grass is continually being proven to be the cheapest feed available (Shalloo et al., 2004). Therefore, increasing its proportion in the diet is one of the key objectives of Irish dairy production. However, due to climatic variation grass growth in Ireland is extremely seasonal thus cultivars with improved winter growth, such as those presently used in New Zealand, would be extremely beneficial in any extended grazing system as they would allow sufficient herbage availability for early turnout to pasture of cows in spring. The objective of this study was to investigate the effect of winter closing date and spring opening date on the DM production of ten different cultivars.

Materials and methods One hundred and forty four plots [1.5m x 5m] were sown in August 2006. The study was a randomised block design with a 2 (closing dates; CD) × 2 (opening dates; OD) factorial arrangement of treatments. The 10 perennial ryegrass cultivars used were: Alto (Ao; intermediate (I) diploid (D); heading date (HD) 15 May), Arrow (Aw; ID; HD 22 May), Bealey (Be; late (L) tetraploid (T); HD 1 June), Dunloy (Dy; LT; HD), Dunluce (De; IT; HD 31 May), Glencar (Gr; LT; HD 2 June), Greengold (Gd; IT; HD 28 May), Lismore (Le; IT; HD 27 May), Navan (Nn; LT; HD 6 June) and Tyrella (Ty; LD; HD 5 June). Three of the cultivars used (Alto, Arrow and Bealey) were imported from New Zealand (NZ) for this study, the other 7 cultivars are available in Ireland. Seventy-two plots were defoliated on 9 October (CD1) while the remaining 72 plots were defoliated on 13 November (CD2). Half of the CD1 plots (n=36) and half of the CD2 plots (n=36) were defoliated on 14 February (OD1); the remaining 72 plots were defoliated on 16 March (OD2). All plots received the same quantity of nitrogen. Plots were harvested with a motor Agria (Etesia) scythe; all the mown herbage from each plot was collected and weighed. Approximately 0.1 kg of the herbage was dried for 48 h at 40 °C to determine the DM content. DM yields were determined from the weight of herbage harvested from the plots. The data were analysed using analysis of variance in SAS. Cultivar, closing date, opening date and their interactions were included in the model.

Results and discussion There was an interaction between opening date and closing date as plots with a late winter CD and an early spring OD had significantly lower (P<0.01) DM yields than all other treatments. As expected having an earlier winter closing date significantly (P<0.001) increased DM yields in February (+676 kg DM/ha) and March (+803 kg DM/ha). Similarly, delaying spring opening date resulted in greater DM yields (P<0.001; +750 kg DM/ha). Typical Irish varieties had an average growth rate of 4.4 kg DM/day while the New Zealand bred cultivars (Alto, Arrow and Bealey) had a higher daily growth rate (+4.9 kg/day). Cumulative DM yields (Feb to April) ranged from 1,926 kg DM/ha (Dunloy) to 2,942 kg DM/ha (Bealey) indicating a vast range in over winter growth potential of different varieties.

Conclusions From this study it is evident that there is large variation in the winter growth capabilities of perennial ryegrass cultivars. Thus, for dairy production systems with a high demand for herbage in early spring greater cognisance of the varieties sown should be taken.

Table 1 Effect of Cultivar on Winter Growth and Spring DM Production.

	Ao	Aw	Be	Dy	De	Gr	Gd	Le	Nn	Ty	Rse	Var	Open	Close	O ^o C
DM Yield Feb (kg)	1055	1005	1114	524	532	480	667	369	569	566	68.36	***	***	***	**
WG Feb (kg/day)	9.2	8.8	9.8	4.3	4.5	4.1	5.5	3.2	4.7	4.8	0.481	***	***	***	**
DM Yield Mar (kg)	1822	1843	1954	1181	1304	1306	1226	1206	1214	1262	68.36	***	***	***	**
WG Mar (kg/day)	12.9	12.9	13.8	8.1	9.0	9.1	9.2	8.5	8.3	8.8	0.481	***	***	***	**
DM Yield April (kg)	1452	1462	1407	1074	1208	1172	1194	1157	1043	1266	129.2	***	***	***	0.07
Cum DM Yield (kg)	2891	2887	2942	1926	2126	2065	2140	1945	1935	2181	218.37	***	***	NS	NS

*** = P<0.001, ** = P<0.01. WG = Winter growth; O^oC = opening date x closing date interaction; Cum yield = Cumulative DM yield from Feb to April

References

Shalloo, L., Dillon, P., O'Loughlin, J., Rath, M., and Wallace, M. (2004). Comparison of a pasture-based system of milk production on a high rainfall, heavy-clay soil with that on a lower rainfall, free-draining soil. *Grass and Forage Science* 59, 157-168.