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The XX International Grassland Congress took place in Ireland and the UK in June-July 2005.

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In situ rumen degradability of perennial ryegrass cultivars differing in ploidy and heading date in Ireland

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Introduction Grazed grass is the predominant feed in Irish dairy and beef cattle production systems. Knowledge of the degradability characteristics of protein in Irish forages is necessary for the establishment of protein values (PDIE and PDIN values) for these. This knowledge would also facilitate more accurate formulation of supplements for grass diets with the potential to reduce nitrogen (N) excretion.

Materials and methods Perennial ryegrass (*Lolium perenne*) swards of 4 cultivars were established as monocultures at Moorepark Research Centre in 1998 and 2000. The cultivars differed in heading date and ploidy: Spelga (S) – intermediate (I) diploid (D), Napoleon (Nn) – I tetraploid (T), Portstewart (P) – late (L) D and Millennium (M) – L T. Manual grass cuts, representing herbage selected by grazing dairy cows, were taken daily 21–26 May and 9–14 July in 2001 and 13–18 May, 1–6 July, 12–17 August and 9–14 September in 2002. Grass samples were frozen, chopped, freeze-dried, milled through a 1 mm screen and pooled by sampling time. Two g of each sample ($n=24$) were incubated in nylon bags (5×10 cm; 50µm pore size) in each of 3 rumen cannulated Holstein Friesian steers, offered a diet of 75% grass silage and 25% concentrate. All samples were incubated together and 1 bag per sample was removed at 0, 2, 4, 8, 12, 24 and 48 h. After removal the samples were immersed in cold water, frozen and treated with 5 ml of buffer (4g of NH₃HCO₃ and 35g of NaHCO₃ per L of distilled water) per nylon bag, in a Seward Lab Blender. The samples were washed in a washing machine (3×10 min rinse cycle) and oven dried at 40°C for 48 h. Analysis of N was carried out using a Leco FP-528 N analyser. The rumen degradability parameters a (rapidly degradable), b (potentially degradable) and c (rate of degradation of b) of the degradability curves and the effective degradability (ED) of DM (ED-DM) and N (ED-N) for each grass were determined assuming a rumen outflow rate of 6%/h (Ørskov and McDonald 1979). Data were analysed using analysis of variance and the PROC GLM statement of SAS. The model for the analysis included year, time, heading date, ploidy and the interaction time × heading date × ploidy as sources of variation.

Results Average *in vitro* organic matter digestibility was 882 (S), 880 (Nn), 892 (P) and 889 (M) g/kg DM for the cultivars. Average crude protein content was 204 (S), 207 (Nn), 195 (P) and 204 (M) g/kg DM and varied similarly for the cultivars throughout the season. The a value was higher ($p<0.001$) and the b value lower ($p<0.001$) for ED-N in I compared to L cultivars. The ED-DM was higher ($p<0.05$) for L than I cultivars. There was a significant effect of time ($p<0.01$) on ED-DM for all cultivars where ED-DM was lower in August than in May or July. Neither heading date nor ploidy had a significant effect on ED-N.

Table 1 Effect of heading and ploidy on effective degradability of DM

	Heading date		Ploidy		SEM
	I	L	D	T	
a	53.5	54.2	53.4	54.2	0.34
b	42.8	42.8	43.4	42.2	0.49
c	0.09	0.09	0.09	0.09	0.01
ED	77.7 ^a	79.2 ^b	78.1	78.8	0.51

Table 2 Effect of heading and ploidy on effective degradability of N

	Heading date		Ploidy		SEM
	I	L	D	T	
a	58.4 ^a	54.9 ^b	56.5	56.8	0.48
b	39.7 ^a	43.5 ^b	41.7	41.5	0.58
c	0.12	0.14	0.13	0.13	0.01
ED	84.4	84.4	84.0	84.9	0.47

^{a,b} Means within rows, not sharing a superscript, differ significantly ($p<0.05$)

Conclusions Ploidy had no significant effect on ED-DM or ED-N in grass. Late heading cultivars had a significantly higher ED-DM but heading date did not influence ED-N. Given the similar ED-N for the four cultivars studied here it is unlikely that they would result in substantial differences in N excretion.

References

Ørskov and McDonald (1979). The estimation of protein degradability in the rumen from incubation measurements weighted according to rate of passage *Journal of Agricultural Science Cambridge*, 92, 499–503