

Effects of forage species and stage of maturity on *in situ* disappearance of organic matter and fibre fractions

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Introduction Nutrient utilisation by ruminants is altered by the forage species and its maturity. Maturity is the major factor affecting forage morphology and quality. Forage quality is reduced with maturity due to a decrease in the leaf:stem ratio and an increase in fibre components (Ugheerughe, 1986). Improving forage utilisation by ruminants depends on accurate measurements of their nutritive value by using *in vitro* and *in situ* methods. The objective of this study was to assess the nutritive value (i.e., extent of *in situ* disappearance of organic matter [OM], neutral detergent fibre [NDF], and acid detergent fibre [ADF]) of four grass species that were grown under the same conditions and were harvested at two stages of maturity.

Materials and methods Two ruminally-cannulated steers were used and had *ad libitum* access to lucerne/grass hay for 28 d before and during the experiment. The substrates were four grass hays (bromegrass [BG; *Bromus inermis*], cocksfoot [CK; *Dactylis glomerata*], ryegrass [RG; *Lolium perenne*], and tall fescue [TF; *Festuca arundinacea*]) that were harvested at the vegetative (pre-head) and mature (early head) stages. A total of 200 Dacron polyester bags (6 cm × 12 cm; 20- to 70-µm pore size) containing ground (1 mm) substrates (4 g dry matter [DM]) or blanks (empty bags to correct for weight change due to ruminal incubation) were used with 6 bags being assigned to each substrate, steer, and incubation time (24 or 48 h). Methods of incubation, residue preparation, and analysis of substrates and residues were according to Hussein et al. (1995). The data were analysed as a completely randomised design experiment by the general linear models procedure of SAS (2001).

Results With regard to the chemical analysis (NDF, ADF, and crude protein, respectively) of substrates (on DM basis), vegetative BG had 57.5, 33.8, and 19.8%, mature BG had 60.8, 36.1, and 13.5%, vegetative CK had 57.2, 33.5, and 15.7%, mature CK had 60.4, 35.6, and 12.2%, vegetative RG had 57.5, 32.6, and 18.1%, mature RG had 66.1, 35.9, and 13.8%, vegetative TF had 57.8, 35.6, and 15.5%, and finally mature TF had 61.4, 36.5, and 12.1%. The steer effect was not significant ($p>0.05$). Because the interactions also were not significant, effects of the main factors are presented in Table 1. Forage species did not affect disappearance of OM or ADF. Extent of NDF disappearance, however, was lower for TF than for the remaining forages. Maturity decreased extent of disappearance by 8.4, 9.1, and 6.1 percentage units for OM, NDF, and ADF, respectively.

Table 1 Extent of *in situ* disappearance (%) of substrate OM, NDF and ADF

Item	Forage species					Stage of maturity		
	BG	CK	RG	TF	s.e.m.	Vegetative	Mature	s.e.m.
OM	68.5	69.5	67.7	63.8	1.8	71.6 ^a	63.2 ^b	1.3
NDF	56.3 ^a	57.5 ^a	55.9 ^a	48.9 ^b	2.1	59.2 ^a	50.1 ^b	1.5
ADF	51.0	52.2	50.3	47.2	2.3	53.2 ^a	47.1 ^b	1.6

^{a,b} Means in the same row and under the same factor with different superscripts differ ($p<0.05$)

Conclusions The results support the widely found decline in nutritive value with increasing grass maturity, but in the condition of this experiment there appeared to be little differences among the four species examined.

References

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