

Effect of sward type on intake rate parameters during progressive defoliation by lambs

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As a canopy is grazed down progressive changes in the quality, composition, height and bulk density affect daily intake through rate of intake during grazing or grazing time each day. These changes constrain the modelling of daily intake on the basis of initial canopy structure and grazing duration. Definition of how contrasting canopy structures affect ingestion is necessary to optimise the balance between maintaining a high rate of intake and efficiently utilising the forage by grazing. The aim of this work was to characterise attributes of selected forage species that affect the rate of intake during progressive defoliation.

Eight-month-old lambs (40-50 kg liveweight), confined in metabolism crates, were offered trays of each of 6 plant species ; ryegrass (*Lolium perenne*), white clover (*Trifolium repens*) and plantain (*Plantago lanceolata*) representing prostrate grass, legume and herb species, respectively, and prairie grass (*Bromus willdenowii*), lucerne (*Medicago sativa*) and chicory (*Chicorium intybus*), representing erect grass, legume and herb species, respectively. Visual observation during grazing and detailed measurements on swards before and after each grazing interval were used to estimate biting rate, bite mass, and bite depth area and volume. This procedure was repeated as animals defoliated successive vertical strata, until canopies were 50 mm or less in height. Before grazing each stratum, canopies were trimmed to an even surface height based

on depth of biting in the previous stratum. Results were analysed by ANOVA and meaned across strata for presentation.

For herb and legume species, intake rate was higher for prostrate examples, than for the erect examples. In contrast, intake rate of the erect grass was greater than that of the prostrate grass (plant form x type interaction, $P = 0.0001$). Within the prostrate group, the higher intake rate of the legume and herb than of the grass, based on a greater bite mass, is consistent with a previous comparison of grasses and legumes (Gong *et al*, 1993, Proc XVII Intl Grassld Congr, 1, 726-728). However, within the erect group the similar intake rate of grass, herb and legume indicates that a general conclusion on the greater intake rate of legumes than that of grasses does not apply when contrasting plant types are compared. These data are based on the mean rate of intake for the entire defoliation, as compared with previous grass and legume comparisons based on the intake rate which animals are able to achieve from canopies at the start of defoliation (Gong *et al*, 1993).

To explain differences in animal performance across a range of plant species, based on ingestive behaviour, it is important to record the entire defoliation process, not just the high instantaneous values possible at the start of defoliation.

Item	Prostrate			Erect			Statistical significance		
	Grass	Herb	Legume	Grass	Herb	Legume	Form	Type	Form x Type
								P-value	
Intake rate (g DM/min) ¹	3.9	7.2	7.0	5.4	5.4	5.4	0.03	0.0001	0.0001
Bite mass (mg/bite)	108	220	200	189	252	188	0.006	0.0001	0.009
Biting rate (bites/min)	42	37	39	37	31	32	0.0001	0.006	NS ²
Bite depth (cm)	4.1	3.6	5.0	7.5	7.8	7.1	0.0001	NS	0.0001
Bite area (cm ²)	11.5	13.3	19.5	21.4	20.1	18.1	0.0001	0.02	0.0002
Bite volume (cm ³)	55.8	54.4	116.8	217.9	213.5	178.5	0.0001	NS	0.0003

¹ Intake rate is based on the mean of individual bite mass and biting rate and does equate to the product of mean bite mass and biting rate ; ² NS = not significant