Proc. Nutr. Soc. Aust. (1979) 4:152

THE VOLUNTARY FOOD INTAKE, RUMINAL RETENTION TIME AND DIGESTIBILITY OF TWO TROPICAL GRASSES FED TO CATTLE AND SHEEP

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The differences in the voluntary food intake (VFI) and reticular-rumeno retention time (RT) (Minson 1966) of cattle and sheep were examined using two tropical grasses. Four mature steers (452-514 kg) and eight mature wethers (39-50 kg) were fed four samples (separated leaf and stem of 6 and 12 week regrowths) of Pangola grass (Digitaria decumbens) in three separate 4 x 4 latin square experiments. Subsequently four samples of Rhodes grass (Chloris gayana) were fed in three similar experiments. All animals had ruminal fistulas large enough to allow manual emptying and were kept in metabolism pens with hourly automatic feeders in rooms with constant light, temperature and background sound. The weight of the rumen contents was measured after manually emptying the rumen. The concentration of DM, OM, NDF, lignin and large particle (LP., > 1.18 mm) was estimated on ruminal samples and used to calculate the total ruminal content of each fraction. The results (Table 1) are calculated from the mean sample values for cattle and sheep.

Table 1: Food intake, ruminal volume, retention time and digestibility

		Cattle	Sheep	SE	Significance
Voluntary food intake	(g/kg $W^{1.0}$)	13.3	17.5	0.6	**
	(g/kg $W^{0.9}$)	24.7	25.8	0.9	NS
	(g/kg $W^{0.75}$)	62.3	46.0	2.26	**
Total ruminal contents	(g/kg $W^{1.0}$)	187.1	193.9	4.5	NS
	(g/kg $W^{0.9}$)	347.1	285.5	7.2	***
Retention time (h)	LP	18.2	11.4	0.7	***
	OM	38.9	28.9	0.8	***
	NDF	39.0	29.5	1.1	***
	DM	39.5	29.7	0.9	***
	Lignin	63.0	48.4	1.9	***
Digestibility	DM	0.539	0.506	0.004	***
	NDF	0.585	0.552	0.004	***

The voluntary food intakes were similar when expressed as g/kg $W^{0.9}$ but were different when expressed as g/kg$^{1.0}$. This result agrees with those of Bird (1974) and Playne (1978) and supports the recommendation of Graham (1972) that the 0.9 power of body weight should be used when comparing cattle and sheep.

Conversely, total ruminal contents were similar when expressed as g/kg $W^{1.0}$.

The ruminal retention times of various fractions of the grasses was 6.8 to 14.6 h longer when fed to cattle. The digestibility of both the grass DM and NDF were greater when fed to cattle presumably due to the longer time the grass was retained in the rumen.

There was a single linear relationship which applied to both cattle and sheep between VFI (g/kg $W^{1.0}$) and the reciprocal of DM retention time (k):

VFI = 0.4 + 497.3 (± 36.2)k. (R.S.D. = 0.88, r = 0.98)

Where the 0.9 power of body weight was used the regressions for cattle and sheep were different.

It appears there is no single coefficient of liveweight which is applicable to all studies of voluntary food intake by cattle and sheep.

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