The in vitro digestibility of dead pasture grasses and their morphological components

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It is well established that the digestibility of pasture grasses declines as they mature. However, few comparisons of the digestibility of different species or cultivars of grasses in the dry, dead state have been undertaken. This study assessed the digestibility of a range of pasture grasses when dead and determined the contribution of the morphological components to the digestibility of the plant.

Methods

Eleven species or cultivars of grasses (Table 1) were grown at the Mt. Derrimut Field Station, Melbourne, and allowed to senesce and die in the summer of 1985. The culms of the plants, a culm being a main tiller following removal of the ear, were dissected into leaf blades, leaf sheaths and stems and the dry matter digestibility (DMD%) determined using a procedure similar to that of (1). Separate DMD measurements were made on the whole auxiliary tillers.

Results and discussion

The digestibility of the culms ranged from 25 to 45% showing that dead forages may vary widely in their nutritive value (Table 1). Variation in the digestibility of annual grasses was reported by (2). Generally the DMD of the leaf blades was higher than that of the leaf sheaths and the stems were always least digestible. This ranking is similar to that occurring in immature grasses as reported by (3).

As a proportion of the culm dry matter, the stems contributed most, followed by the sheaths and then the blades. Again this ranking is similar to that reported for immature plants by (4). Generally the contribution of the auxiliary tillers was small.

Thus, within species and cultivars the digestibility of the culm is largely dependent upon the stem, due to the high proportion of this component in the dry matter.

Table 1. The Zn vitro dry matter digestibility (DMD%) and percentage of dry matter (DM) of the culm contributed by the leaf blades, leaf sheaths, stems and auxilliary tillers of Lolium rigidum (AR), L. Perenne (PR), L. perenne x L. multiflorum cv.grasslands ariki (HA) and grasslands manawa (HM), L. multiflorum (IR), Dactylic glomerata (C), Phalaris aquatica (P), Festuca arundinacea (TF), Agropyron elongatum (TW), Paspalur 1ilatatum (PA), Puccinellia ciliata (PU)

Species	Culm	Blade		Sheath		Stem		Aux.tillers	
	DMD%	%DM	DMD%	%DM	DMD%	%DM	DMD%	%DM	DMD%
AR	33	9	61	23	53	64	22	4	34
PR	43	7	60	19	55	69	35	5	77
HA	43	11	62	22	54	55	28	12	77
HM	36	10	57	26	47	62	27	2	61
IR	45	9	59	25	51	56	35	10	69
C	25	4	56	20	45	76	18	0	-
P	36	7	61	18	44	75	31	0	-
TF	34	7	56	24	39	69	30	0	-
TW	31	11	39	23	33	66	29	0	-
PA	44	8	49	31	50	60	41	0	-
PU	45	4	62	26	47	70	44	0	-

1. McLeod, M.N. and Minson, D.J. 1978. Anim.Feed Sci. Technol. 3 277-287.
2. McIvor, J.G. and Smith, D.F. 1973. Aus.J.exp.Ag.Anim.Husb. 13 404-410.
3. Terry, R.A. and Tilley, J.M.A. 1964. J.Br. Grassld Soc. 19 363-372.
4. Davies, I. 1976 J. Agric Sci. Camb. 87 25-32