

DIGESTIBILITY, INTAKE AND FAECAL MOISTURE CONTENT IN SHEEP FED PELLETTED DIETS DIFFERING IN LUPIN GRAIN TO CEREAL GRAIN RATIO

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Lupin grain is regarded as a comparatively safe feed for sheep and is often included in pelleted diets fed to export sheep during sea shipment. The effects of substituting lupin for cereal grain in pelleted diets and of the duration of introductory feeding on intake and digestion was examined.

In a split-plot randomized block design with four replicates, 48 two year old Merino wethers (46.1±2.2 kg) not previously fed grain, were individually penned indoors and harnessed for faeces collection. The wethers were randomly allocated to treatments within liveweight strata and changed over three, five or seven days from 1200 g/day of hay to 900 g/day of one of four experimental pelleted diets. The diets consisted of 60% grain with 0, 13, 26 or 39% lupin in place of 2:1 wheat:barley, 35% oat hull and 5% molasses-minerals with 0.8% urea:sulphur (20:1) included in the 0% lupin diet. The diets respectively contained 10.6, 10.9, 13.2 and 15.6% crude protein. Equal daily incremental changes of 300, 180 and 129g pellets and 400, 240 and 170 g hay were timed so that all sheep started the pellet only diets on the same day. The wethers were then fed 900 g pellets/day for 21 days followed by 14 days of *ad libitum* feeding. Dry matter digestibility (DMD) and faecal DM% were recorded on days 10 to 21 of restrictive feeding.

Two wethers fed the 13% lupin diet, in the three and seven day adaptation groups, became recumbent and died despite treatment. Two other sheep, fed the 0% and 39% lupin diets, ate poorly but were included in the analyses. *Ad libitum* pellet DMI was not affected by diet ($P>0.10$) though it tended to reflect the pattern of a significant quadratic response of early pellet intake (days one to five of restrictive feeding) to diet ($P<0.05$). Faecal DM% showed a significant non-linear response to the level of lupin in pellets (Table 1). Lupin content had no effect on DMD%. Contrary to expectations, longer adaptation time had no significant main or interaction effects on feed intake or liveweight gain.

Table 1. Mean pellet dry matter intake (DMI) on days one to five of restrictive feeding and on days 8 to 14 of *ad libitum* feeding, apparent DMD, faecal DM content and incidence of wet faeces (DM<20%) over the whole experimental period (FDM) and fasted liveweight gain during the 14 days of *ad libitum* feeding

	DMI days 1-5 (g/day)	<i>Ad lib.</i> DMI (g/day)	DMD (%)	Faeces DM (%)	FDM< 20% (sheep days)	LW gain (g/day)
Diet (%lupin)						
0	439 ^{ba}	1235	68.8	41.2 ^b	33	244 ^{ab}
13	586 ^a	1406	67.7	41.1 ^b	33	330 ^a
26	542 ^{ab}	1394	69.4	43.0 ^{ab}	8	235 ^b
39	516 ^{ab}	1345	67.1	46.2 ^a	4	232 ^b
s.e.d.	53.3	142.7	1.24	2.24		42.1
Adaptation (days)						
3	492	1331	67.2	44.0	37	233
5	519	1420	68.2	41.1	26	295
7	551	1298	69.3	43.6	15	253
s.e.d.	46.2	123.6	1.07	1.95		36.5

^ANo values within columns differ significantly at $P<0.05$. Different letters indicate significance at $P<0.07$.

Liveweight gain in sheep fed the 13% lupin diet was higher ($P<0.07$) and had a coefficient of variation 2 to 3.5 times lower than sheep on the other diets. This response was not apparently related to dietary protein. By contrast, growth rate in young lambs may increase linearly with the stepwise replacement of 100% oats with lupin grain (Kenney 1980) while in older lambs, response declines markedly as lupins replace more than 50% of oats in high grain diets (Suiter and Croker 1980).

KENNEY, P.A. (1980). *Proc. Aust. Soc. Anim. Prod.* **13**, 253-6.

SUITER, R.J. and CROKER, K.P. (1980). *J. Agric. W. Aust.* **21**, 26-28.