THE EFFECT OF ZINC DEFICIENCY ON WOOL GROWTH

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Zinc-responsive conditions have been reported in grazing ruminants (Masters 1984) but little is known of the zinc requirements for wool growth. This study was conducted to define a dose-response curve relating rate of wool growth to Zn intake and to determine whether wool growth responses to Zn are mediated via changes in the rate of division of the follicle bulb cells.

Twenty-five, 12 months old Merino wethers (liveweight 25-30 kg) were fed a semi-purified diet (10 ppm Zn) supplemented with varying levels of ZnO to create diets containing 10,27,50,89 and 1917 ppm Zn. The diet of wheat straw (55%), starch (40%), urea (1%) and minerals (4% on a dry matter basis) was pelleted and fed ad libitum for 8 weeks. Wool growth was measured using tattooed patches, and bulb cell mitotic activity as outlined by Hynd et al. (1986). Results for clean wool growth rate are presented in the Table.

	Dietary Zn concentration (ppm)				
	10	27	50	89	1917
Time (days)	Clean wool growth rate† (mg/cm²/day)				
27	0.65	0.71	0.61	0.70	0.59
47	0.44	0.52	0.42	0.47	0.33
60	0.42	0.40	0.49	0.40	0.43

† adjusted for pretreatment covariance

Wool growth of all sheep declined with time with no significant difference between treatments. There was some suggestion that the highest Zn level depressed wool growth in line with a decrease in the intake of feed by these sheep. Bulb cell mitotic rate also declined with time but was not affected by Zn level. As anticipated by Masters (1984) the likelihood of Zn deficiency occurring appears to be dependent on other factors in the diet, such as protein. The crude protein content of the diet was 7.3% (due to the difficulty of obtaining a source of protein low in Zn) which probably accounted for the decline in wool growth and also the inability to achieve a decline related to low zinc content. This agrees with the recent results of Reid et al. (1987) who found that a dietary Zn intake of less than the recommended levels (30-48 ppm for a sheep; Anon 1980) still met the Zn requirements of sheep. A level of Zn generally thought to be marginal for ruminants (10 ppm) was found to be adequate in the present experiment, hence the inability to establish Zn intake-wool growth response curves or to determine whether Zn has a role in the rate of follicle bulb cell division.

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