

NITROGEN FERTILIZER AND THE VALUE OF WHEAT STUBBLES FOR SHEEP

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The application of nitrogen fertilizer to improve grain yield and protein content of wheat is increasing in Australia and this may also increase the yield and protein content of the straw (O'Donovan 1983) and consequently benefit production of sheep grazing the stubbles. We examined this aspect in a trial conducted in the 400-500 mm annual rainfall region of the cereal-sheep zone.

The experiment consisted of a randomised block design with 3 replicates in which a durum wheat (cv. Yallaroi) was sown on 23 June 1993 in 0.25 ha plots with nitrogen (N) applied as urea at 0, 40, 80 and 120 kg N/ha at sowing. Immediately prior to grain harvest, whole plant samples were collected to determine morphological composition and the *in vitro* dry matter digestibility (DMD) and nitrogen content of plant components. After harvest, the 12 plots were grazed for 56 days by five 2-3 year old wethers (20/ha), randomly allocated to treatments within liveweight strata. The sheep were weighed and rumen fluid samples taken for ammonia analysis at fortnightly intervals.

Wheat grown with 0, 40, 80 and 120 kg N/ha yielded 0.87, 1.05, 1.25 and 1.41 t grain/ha (SEM = 0.092, $P < 0.05$) containing 10.1, 11.2, 12.0 and 13.7% protein (SEM = 0.31, $P < 0.001$). Plots treated with 0, 40, 80 and 120 kg N/ha yielded 1.11, 1.45, 1.73 and 1.86 t straw/ha (SEM = 0.112, $P < 0.05$) containing 0.38, 0.40, 0.46 and 0.55% N (SEM = 0.021, $P < 0.01$) and 43.3, 43.8, 44.2 and 44.7% DMD (SEM = 2.02, n.s.). Nitrogen fertilizer had no effect on the proportions of morphological components. The plots contained no green-pick during weeks 1-7.

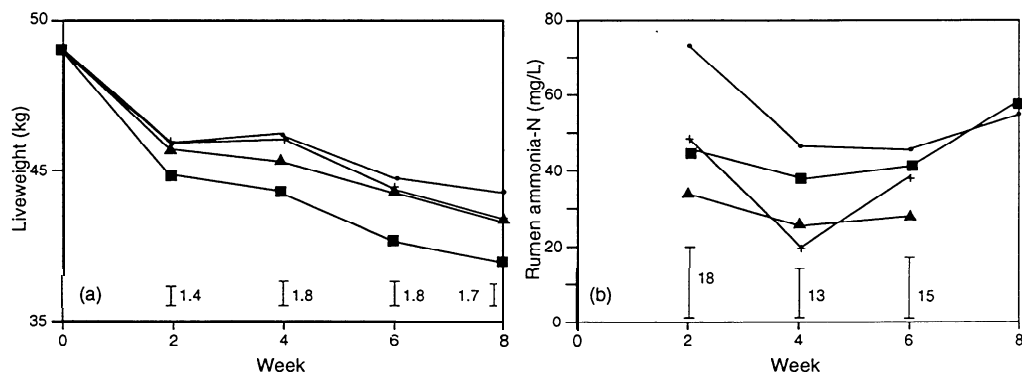


Figure 1. Liveweight change and rumen ammonia concentration of Merino wethers grazing the stubble of wheat fertilized with 0 (■), 40 (▲), 80 (+) and 120 (●) kg N/ha. Vertical bars indicate least differences required for significance at $P=0.05$

Sheep grazing the fertilized plots lost less liveweight (Figure 1) than other sheep (SEM = 0.66, $P < 0.01$). Liveweight response to higher rates of nitrogen fertilizer more closely reflected initial straw yield than straw nitrogen content. With the exception of week 2, rumen ammonia concentration (Figure 1) did not reflect differences in liveweight change between treatments and we conclude that dietary nitrogen was not the primary nutrient influencing the differences in liveweight change between treatments. This result may not apply to wheat stubbles containing lower concentrations of nitrogen than occurred in this experiment and further research into this aspect of nitrogen in cereal-sheep farming systems seems warranted.

The authors thank D.R. and S.J. Shannon, "Illawarra", Bagot Well via Kapunda for providing the site and other facilities. This research was supported in part by Pivot Fertilisers.

O'DONOVAN, P.B. (1983). *Nutr. Abstr. Rev.* 53: 441-55.