

The effect of various p and n fertilisers and lime on the establishment of direct drilled pasture

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Current fertiliser recommendations for pasture resowing in south-western Victoria are derived largely from work by Newman (1) in the 1950's. Since that time soil fertility levels, types of fertiliser and sowing Methods have, in many cases changed. Two replicated small plot trials were established in the Warrnambool district in autumn 1991 to investigate a number of fertiliser treatments for direct drilling pasture.

Methods

Two contrasting soil types were selected. The first was a strongly acid basalt clay loam (Olsen P 8.0 pg/g, pH(H₂O)5.4); the second, a more fertile, strongly acid sandy loam coastal plains soil (Olsen P 22.0 pg/g, pH(H₂O)5.1). A seed mix of perennial ryegrass, *Lolium perenne* cv Ellett. and subterranean clover, *Trifolium subterraneum* cv Karridale was direct drilled into old glyphosate-treated pasture using a cone seeder fitted with "Caldow" points. A range of fertilisers viz. nil, single superphosphate (8.8%P, 11.0%S), triple superphosphate (20.7%P, 1.5%S), super-lime (5.7%P, 7.8%S), Gold-phos 10 (18.6%P, 10%S), di-ammonium phosphate (18%N, 20.2%P, 1.5%S) and mono-ammonium phosphate (10%N, 22%P, 1.5%S) were drilled with the seed at a constant 20 kg/ha of available P. Ammonium nitrate (34%N) was broadcast on selected P treatments four weeks after sowing at a rate of 30 kg N/ha.

Results and discussion

Highly significant ($P < 0.001$) responses to applied P occurred on the basalt soil. Seedling weights at six weeks post-sowing were over twice that of the control for all the P treatments. The form of the P fertiliser and the rate and type of S had no effect on the density, size or phenological development of either ryegrass or clover seedlings. On the higher fertility coastal plains site, no significant response to P fertiliser was recorded. No response to lime was recorded on the basalt soil. On the more acidic coastal plains soil, significant responses in clover seedling density ($P < 0.05$) and seedling weight and height ($P < 0.05$) were recorded with lime application. Drilling the seed with N significantly increased seedling weight ($P < 0.001$) and leaf number ($P < 0.05$) of both ryegrass and clover seedlings on the more fertile coastal site only. Seedling density was not affected. Broadcast N boosted winter-early spring herbage yields on the low and high soil phosphorus sites by 24% and 38% respectively, due mainly to increased ryegrass growth.

It is concluded that the major nutrient required for direct drilling the basalt soil was a heavy application of P. On the higher P coastal soil, drilling with lime and N was also beneficial. Broadcast N post sowing at the rate applied, boosted early pasture growth without detrimental effect.

References

1. Newman, R.J. 1983. Technical Report Series No 75. Dept. of Agric. Vic.