

Agronomic requirements of a new semi-dwarf rye variety 2. nitrogen and phosphorus

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Cereal rye is an important crop for the control of erosion on marginal soil types. Results of a previous study (1) suggest that fertiliser nitrogen is required to realise the higher yield potential of a soon to be released semi-dwarf rye line (B88). This experiment was conducted to examine the responses of B88 and the current variety, S.A Commercial to nitrogen (N) at two levels of phosphorus (P). Triticale (cv Currency) and wheat (cv Halberd), which usually yield poorly on these light soil types were also included to compare their responses to higher levels of N and P.

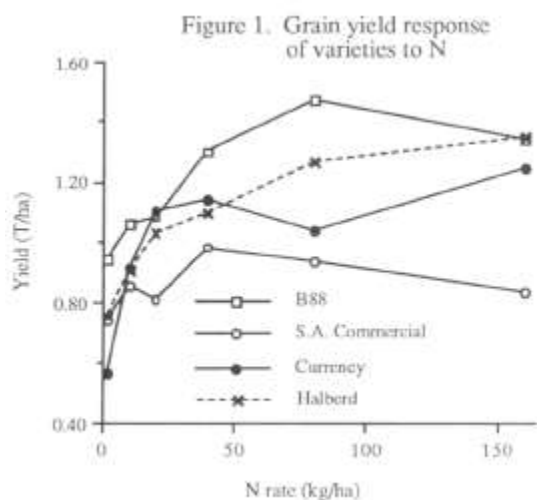
Methods

The trial was sown on June 14 1988 on the side of an eroded sand bank near Lameroo, S.A. and received a basal application of 2 kgCu, 5 kgZn and 20 kgK/ha. The seed was coated with MnSO₄(2). The June-November rainfall (210 mm) was 10% below average largely due to a dry spring. The experimental design was a split plot with varieties as main treatments and a factorial of 6 N by 2 P treatments as sub-plots. Phosphorus (10,40 kgP/ha) was applied with the seed as double superphosphate and N applications (0,10, 20,40,80,160 kgN/ha as ammonium nitrate) were split equally between sowing and 7 weeks post-sowing. Commercial sowing rates were used (40 kg/ha for the rye lines and 70 and 50kg/ha for Currency and Halberd respectively). Limited availability of seed of B88 restricted sowing to 3 replicates. Grain yield and yield components were measured at harvest.

Results and discussion

Grain yield responded significantly to N but not P. There were also significant variety x N effects (Figure 1). B88 outyielded S.A. Commercial at all rates and also had a higher optimum of 80 kgN/ha. The rye varieties had a lower optimum for N than the wheat and triticale varieties both of which responded to N applications up to the maximum rate.

The response to N was significant for all yield components but the only significant effect of P was to increase grain weight. The yield components also showed significant variety by differences. B88 had a high number of ears/m² at zero N and responded to further N almost solely through an increase in the number of functional tillers. Currency in contrast produced a higher number of spikelets/ear and grains/spikelet with N applications.



1. Dean G.J. and McDonald G.K. (1989), Proc. 5th Aust. Agron. Conf., Perth
2. McEvoy J., Ascher J.S., Graham R.D. and Hardy P. (1988), International Symposium on Manganese in Soils and Plants, Adelaide, S.A. p.77-79.