

Trial 8

Pivot Fertiliser Comparison Trial On Barley

Aim: to compare commercially available fertiliser on the performance of Schooner barley.

Fertiliser	Rate kg/ha	Yield t/ha	Protein %	Profit \$/ha
Control		2.76	10.1	
Superphosphate	159	2.90	9.8	-\$4.00
Double Super	83	2.91	10.2	\$1.70
Croplift MAP	64	3.10	9.7	\$36.40
Croplift DAP	70	3.13	9.6	\$40.30
Pivot 13-16-0-7	85	3.03	9.7	\$14.80
Pivot 15	108	3.22	10.1	\$43.40
Pivot 19-13-0-9	108	3.27	9.1	\$54.20
Pivot 23-14-0-1	100	3.39	10.4	\$76.10
Double Super Zinc 2.5%	89	2.81	8.9	-\$25.90
Mallee Mix 1	75	2.81	8.5	\$17.00
MAP + Urea predrilled	64 + 65	3.65	8.7	\$114.10
MAP + Urea topdressed	64 + 55	3.72	8.7	\$132.40

Note: 1. Profit = value of the extra grain produce less the cost of the fertiliser applied.

2. Barley valued at \$195 tonne farm gate, fertiliser prices landed on farm, bulk.

Interpretation

All fertilisers included in the trial increased the grain yield of the barley but to varying degrees. The response range was from 0.14t/ha to 0.96t/ha (3/4 bag/ac to 5 bags/ac) with those fertilisers containing nitrogen giving the greatest yield increases. Water use efficiency figures indicate the crop did not reach its full potential (70%) and therefore would have responded to still higher rates of fertiliser, particularly nitrogen.

Nitrogen was the main nutrient limiting crop growth at this site. The soil analysis results indicated this would be the case with only 36kg nitrogen/ha available in the top 60cms prior to sowing. Even after allowing for mineralisation during the growing season, the supply of nitrogen was not sufficient to meet the yield potential last year. On average every kilogram of nitrogen applied to the barley produced 20kg of grain. Looked at financially, every \$1 invested in nitrogen returned around \$4. This response is typical for cereal crops growing on nitrogen deficient soils.

Both urea treatments produced the best yields and the greatest return per hectare. The topdressed urea was applied at the end of July after sap nitrate tests at the 4 - 6 leaf stage revealed there was insufficient nitrogen to reach the target yield of 4.0t/ha. The decision to topdress 55kg urea/ha was made after running the readings (ave. 3300ppm nitrate) through the Pivot Sap Nitrate computer programme. Identifying nitrogen supply as insufficient to meet the target yield allowed a profitable strategy to be implemented.

The application of nitrogen to the barley had no detrimental effect on the protein level. This was due to the fact that the crop used all the available nitrogen to increase yield with little nitrogen left to lift protein.

At this particular site and under the seasonal conditions last year, the crop response to phosphorus was small. The profitability of using phosphorus in this situation was sensitive to the cost per unit of phosphorus and the benefits gained through interaction with other nutrients such as nitrogen. Without phosphorus the response to applied nitrogen may have been limited.

The application of sulphur or zinc did not appear to affect the performance of the crop. Typically sulphur responses in cereals are rare but the benefits tend to be gained in the following pasture phase of the rotation, particularly on the lighter soils of the Mallee. A zinc response would have been expected on this soil type, however, the very responsive

nature of the site to nitrogen may have over shadowed the need for zinc. Until the crops need for nitrogen was satisfied, a lack of other essential nutrients may have been masked.

Take home message

On light soils, nitrogen is generally the most important nutrient in achieving optimum cereal yields and maximising returns. In nitrogen responsive situations, every kg/ha of nitrogen applied should increase cereal yields by 20kg/ha. Identifying profitable situations for nitrogen application requires testing the soil to 60cms before sowing and monitoring the crop during the growing season. As a general guide, cereals on light soils in the mallee should have 25 - 35 kgN/ha applied before or at sowing and then be tested (sap nitrate/NIR) during July to pick up on economic topdressing opportunities particularly in wheat.

It is important to maintain a balanced approach to crop nutrition. All nutrients need to be in adequate supply if crop yields and profitability are to be optimised. Phosphorus and zinc (and sulphur) should be adequate to ensure the full potential of crops is reached.

In deficient sandy soils, nitrogen can be confidently applied to malting barley, particularly if applied early and to crops free of disease and weed competition. The risk with nitrogen is not an increase in grain protein but a failure to gain a yield response due to management factors.