BCG
Precision Ag Trials

Paddock Demonstration: Starter fertiliser

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Although PA tools have been available to Australian grain growers for many years, and the benefits have been well documented, it is estimated that less than 1-% of grain growers utilise PA 'beyond guidance' in any form.

The objective of this GRDC / SPAA funded project is to increase the level of adoption of PA 'beyond guidance' by broadacre farmers. The project specifically aims to increase the level of adoption of variable rate (VR) by growers in the project to 30% by 2013. This goal will be achieved by demonstrating how to use PA tools to growers at a regional level and by increasing the skills of growers and industry in PA to a level where they can then use PA tools in their farming systems to achieve economic, environmental and social benefits.

Trials and demonstrations are conducted on growers' properties and are visited throughout the season using farm walks and workshops to discuss the advantages and disadvantages of PA techniques with the involvement of other regional growers.

This information sheet presents the outcomes of the SPAA trial **managed by BCG** from season 2010.

Aims:

- To compare the effects of starter fertiliser (ZincStar®) on wheat yield at Jil Jil in the southern Mallee

Background:

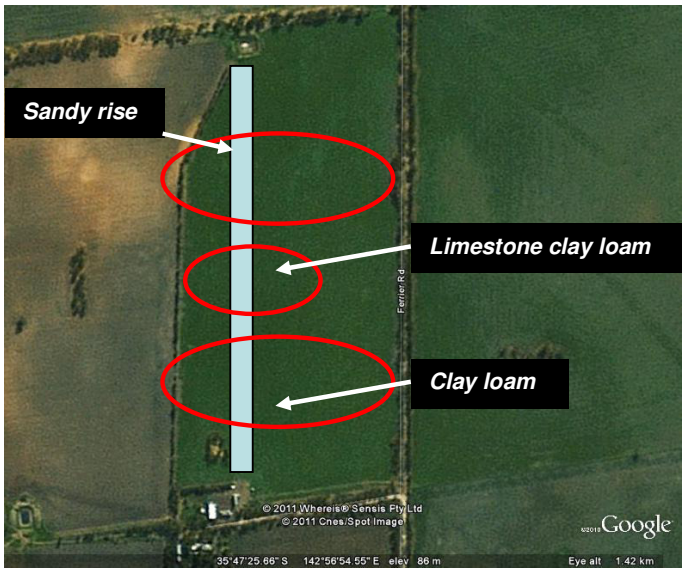
The Victorian Mallee has experienced more than a decade of below average rainfall (including 3 droughts). This has placed an enormous amount of financial pressure on the farm businesses. By reducing up-front expenditure on inputs such as fertiliser, provided there is no yield penalty, delayed applications can significantly reduce risk. Delayed applications also allow for rates/inputs to be refined to suit the season.

Phosphorus (P) is applied typically at sowing as mono-ammonium phosphate (MAP, N10:P22:Zn0:S1). Since 2007-8, when the MAP peaked at $1700/t, many farmers did not have the confidence to significantly reduce P rates. A study undertaken by the BCG during 2007-2009, showed soil tests can provide a good indication of P-responsiveness, however certain tests were more accurate.

If farmers are to adopt variable rate technology (VRT), the greatest return on investment is going to come from P more so than nitrogen (N). This trial will

compare the performance of wheat (c.v. Correll) to the application of ZincStar® (N10:P22:Zn2.5:S1) over 3 different soil types.

About the trial:
Correll wheat was sown into a medic fallow at 70kg/ha on 22 May 2010. A control strip of no fertiliser was compared to the blanket paddock application of ZincStar (N10:P22:S1:Zn2.5) at 27.5kg/ha (5kg P/ha). The strip was sown across three different zones/soil types within the paddock (red clay loam, sandy rise and limestone clay loam). Sulphate of Ammonia (24% S, 20% N) was top-dressed at 80kg/ha on the sandy rise only on 30 June. Soil samples at sowing, crop biomass at Z30 and grain yield were measured. The trial was harvested on the 27 December 2010.



Assessments:
- Soil Analysis at sowing
- Dry matter (end of tillering)
- Tissue analysis (end of tillering)
- Grain yield (maturity)

Results:
Soil analysis taken at sowing, compared the Colwell P, PBI and DGT values on each soil type (Table 1). The soil analysis suggests that all zones should be adequate for phosphorus (P) for grain yield, with the exception of the DGT for the limestone area being marginal. Using the thresholds from replicated trials, DGT suggests all zones would be responsive in dry matter.

Table 1. Soil analysis measured at sowing for the Jil Jil paddock.

Soil Type	Colwell P (mg/kg)	PBI	Critical Colwell P	DGT (C_{DGT})*	DGT P-status (grain)
Red clay loam	37	99	28	73	Adequate
Sandy rise	33	69	24	142	Adequate
Limestone clay loam	58	120	30	58	Marginal

* Grain yield threshold for DGT is 57, biomass threshold at GS30 is 260.

Visually, there was a response to fertiliser in each identified zones. This response was quantified by the biomass measurements at GS30 (Table 2). There was generally a 20-30% biomass loss from not applying fertiliser. Below average rainfall in May, June and July could have meant the crop relied more on the "applied" P than the residual P. Although with favourable spring conditions, exceptional yields were recorded. This would have allowed the early vegetative differences the ability to be translated in to yield. It was observed though that despite having a much greater difference at GS30, grain yields were within 10% on the sandy rise and limestone zones.

Table 2. Biomass and grain yields of the different soil types.

Soil type	Fertiliser treatment	Biomass (GS30)		Grain Yield	
		kg/ha	% relative yield	t/ha	% relative yield
Red Clay Loam	Nil	555	81%	5.3	84%
	ZincStar	682		6.3	
Sandy Rise	Nil	595	69%	5.2	91%
	ZincStar	864		5.7	
Limestone clay loam	Nil	358	71%	4.9	92%
	ZincStar	502		5.3	

Due to a delayed harvest, the yield map was unable to be create prior to this report being written. It will become available as soon as possible.

It is unclear exactly whether the response observed can be attributed to P alone as the product used (ZincStar) contains N and Zinc. Any benefit in early growth and establishment could have attributed to increased yield. Typically, in wet seasons it could be expected that more nutrients would come from "residual P" or the soil reserve through mineralisation. Below average winter rainfall would have increased the crop's dependence on fertiliser P, whereas in above average winters most of the P generally comes from the residual P. Subsequently, the favourable spring conditions enable the difference measured at GS30 to translate into yield. This may not always be the case, especially in drier seasons.

Who was involved?

The author would like to thank John and David Ferrier for hosting this trial.

Trials coordinator: Simon Craig (BCG Research Agronomist)

BCG managed the trial and data collection during the season.

Grower/Regional feedback:

The farmer group are yet to meet to discuss the findings of the trial

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For more information

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