

## Precision agriculture demonstrations on variable rate applications of nitrogen fertiliser at *Green Park, Rand*

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### Key points

- Precision agriculture can be used to apply variable rates of nitrogen fertiliser; generating fertiliser savings and optimising yields throughout the paddock.
- Optimising applied nitrogen fertiliser results in optimum yields and gross margin.

**Location:** *Green Park, Rand, NSW*

#### Rainfall:

**Annual:** 672mm (avg 520mm)

**GSR:** 226mm (avg 320mm)

#### Soil:

**Type:** Red Kurosol, Red Chromosol

**pH (H<sub>2</sub>O):** 6.2

**pH (CaCl<sub>2</sub>):** 5.5

#### Sowing information:

**Variety:** Lincoln, wheat

**Sowing date:** 18 May 2011

**Sowing rate:** 65kg/ha

**Fertiliser:** 60kg/ha MAP

**Herbicides at sowing:** Glyphosate and Boxer Gold

**Sowing equipment:** DBS parallelogram seeder, 12.3m with press wheels, Goldacres sprayer, Matador spreader spreading 36m and AutoFarm and Trimble guidance equipment.

#### Treatments:

- A nitrogen-rich strip of 80kg/ha of nitrogen (160kg/ha urea) was applied during late June across the site.
- Rates of urea from 0–160kg/ha (0–80kg/ha of nitrogen) were applied during mid-August just before GS31.

**Row spacing:** 31cm

#### Paddock history:

**2010** — canola

**Plot size:** 640m x 24.6m

**Replicates:** nil

### Aims

- To assess the effect of using variable nitrogen rates on crop yields.
- To determine if nitrogen-rich strips can be used to better determine the need for in-crop nitrogen.

### Method

A demonstration trial was established at Rand, NSW to assess the usefulness of precision agriculture (PA) methods for determining in-crop nitrogen requirement. An EM survey was completed during 2009 to identify three management zones for the 2011 crop.

An EM survey was completed during 2009. A soil analysis (0–10cm) was done within each zone during 2009 and used to determine the location of the demonstration. The plan was to determine the optimum rate of urea for each zone within the paddock and to determine if nitrogen-rich strips could be used to assess the variable nitrogen needs of the paddock.

Nitrogen was applied at rates of 0–80kg/ha across all zones during mid August (just before GS31). A nitrogen rich strip of 80kg/ha of nitrogen was applied across the zones during late June.

Zonal deep soil nitrogen soil tests (0–60cm) were completed during July 2011. The results indicated that phosphorus in all zones was high and that deep soil nitrogen was moderate to high in all plots. During 2012 the site will again be tested for nitrogen.

**TABLE 1 Yield response to variable nitrogen application rates**

	Nitrogen application rates (kg/ha)			
	0	20	40	80
	Yield (t/ha)			
	2.9	2.8	3.1	3
	Nitrogen-rich strip (additional 80kg/ha)			
	Yield (t/ha)			
	2.9	2.6	3.2	2.9
Zonal response	Nil	Nil	Nil	Nil
Grain quality	ASW	ASW	ASW	H2

Note: All results are subject to confirmation after the yield maps are fully analysed



## Results

There was no visual or yield response to applying nitrogen (see Table 1). The nitrogen-rich strips were not obvious at the time the nitrogen was applied to the plots. This may have been a result of the moderate level of nitrogen in all zones, the dry spring and the time of application.

The quality of the wheat produced was low (ASW due to low protein) in all strips except the high nitrogen strip indicating that insufficient nitrogen was applied. Given the lack of yield response to additional nitrogen, some other factor may have impacted on yield. The economic analysis showed that the addition of nitrogen was unprofitable.

The nitrogen-rich strips were a useful guide to assessing that there would be no response to applying additional nitrogen but not for assessing differing responses in different zones.

## SPONSORS

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