

Nitrogen demonstration

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Aim

To evaluate the effects of different nitrogen rates over a two year period on a broadacre scale and to assess if lower N inputs depletes the soil of plant available nitrogen.

Background

It is important to discover the most profitable amount of nitrogen to apply.

As a result of increasing input pressures from high fertiliser costs, varying nitrogen rates and timing is generally considered a valuable strategy in keeping flexibility in the farming system and managing climate risk. Flexible use of nitrogen allows for the farmer to 'play the season' and only apply nitrogen when confidence in the season increases. While higher nitrogen application results in an increase in yield and quality, the return may not result in the greatest profit above application costs.

In 2010 the same trial was conducted on the same paddock. These results showed no statistically significant yield response, however, this is thought to be due to the low rainfall season in which the plants could not make the most of higher nitrogen availability. Therefore the Parkers decided to repeat the trial in 2011.

This demonstration was part of the Liebe Group's FarmReady project, funded by the Federal Department of Agriculture, Fisheries and Forestry and aims to help industry and primary producers develop skills and strategies to respond to climate change.

Trial Details

	2010	2011
Property	Wade Parker, Waddy Forest	
Plot size & replication	30m x 500m, non-replicated	
Soil type	Sandy loam over gravel	
Soil pH	5.0	
EC	0.04 dS/m	
Paddock rotation	2009 canola, 2010 wheat	
Variety	Wyalkatchem	Wyalkatchem
Seeding date	3/6/10	28/5/11
Seeding rate	70 kg/ha	65 kg/ha
Fertiliser	3/6/10: 80 kg/ha Agras Extra, 1.5 L/ha Cereal Plus, 0.3 L/ha Agriton, 30 L/ha Flexi –N Plus treatments	28/5/11: 70 kg/ha Mallee Plus see treatments under results
Herbicides	Jaguar at 0.7 L/ha Logran at 0.01 kg/ha	28/5/11: 1.5 L/ha Roundup, 1.5 L/ha Treflan, 25 g/ha Logran, 5 g/ha Glean. 18/7/11: 0.5 L/ha Polo, 1 L/ha Jaguar, 20 g/ha Logran
Growing Season Rainfall	155mm	317mm

Results

Table 1: Yield and quality of wheat sown at Waddy Forest in 2011.

Flexi-N rate (L/ha)	Yield t/ha	Protein (%)	Screenings (%)	Grade
0	2.82	10.3	1.47	APW2
10	3.28	10.5	2.08	APW2
20	3.12	10.8	1.06	APW2
30	3.28	10.3	1.70	APW2
40	2.99	10.2	2.05	APW2
60	2.90	10.1	3.03	APW2

Note: Graded APW2 pending falling numbers test.

The addition of 10 L/ha and 30 L/ha of Flexi-N were the highest yielding treatments with an increase of 0.46 t/ha above the zero treatment (not adding any post seeding fertiliser) (Table 1).

As can be seen in Table 1, protein levels were sufficient for APW2. Gross margin calculations in Figure 1 show the most profitable scenario is when Flexi N is applied at 10 L/ha (\$770/ha), with 30 L/ha marginally less at \$760/ha. The difference may in fact be larger than shown here, as other variable costs such as fuel, machinery maintenance and time were not taken into account for gross margin calculations.

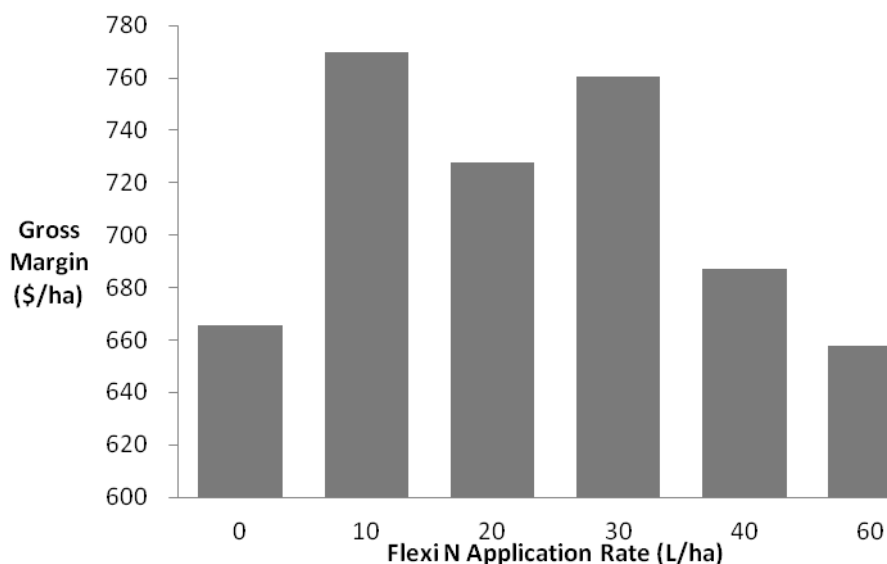


Figure 1: Gross margin calculations (\$/ha) of different post seeding nitrogen strategies at Waddy Forest 2011. Grain price \$236/t, cost of Flexi-N \$464/t.

Comments

Given the good season, the trial results do not follow the expected nitrogen response curve. Plot trials carried out by CSBP in 2012 showed exponential yield improvement as nitrogen application increased up to 100 L/ha. The yield differences here seem to be representative of paddock variation rather than the varied nitrogen rates.

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