Slow release nitrogen trial

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Purpose: To assess the use of banded slow release nitrogen in comparison to banded urea and best practice farmer practice.

Location: West Midlands Group Trial Site Regans Ford.

Soil Type: Yellow sand.

Rotation: 2011: Wheat, 2012: Pasture (Sub-Clover)

BACKGROUND SUMMARY

In the West Midlands area much of the soil types are sandy gravels with a matrix of sand or either deep sands. These soil types are coupled with a medium to high rainfall are very prone to applied nitrogen leaching. To try and minimize leaching farmer best practices have evolved to apply small more frequent N application and may result in three nitrogen N applications. A slow release granular nitrogen (44.1%N) product has been investigated by Landmark, to assess if an application of this product would be able to substitute 1 or 2 N applications with one upfront banded application, as well as improve N efficiency and yield.

TRIAL DESIGN

Plot size: 1.8m x 20m

Machinery use: Knife point & press wheel.

Repetitions: 3

Crop type and varieties used: Wheat (Mace)

Seeding rates and dates: 24, May, 2013

Fertilizer rates and dates: A Basal application was applied at seeding of Muriate of Potash top-dressed 70kg/Ha, Macropro Plus (Banded) 75kg/Ha and Super SR (Banded) 75kg/Ha.

This gave a basal application of nutrients that included.

N kg/Ha	P kg/Ha	K kg/Ha	S kg/Ha
7.5	17	41	13.5

Herbicide rates and dates:

- Farmer Knockdown prior to 24/05/2013
- 24/05/2013, Knockdown & Pre-em: Sakura 118g, Logran 35g, Treflan 2L/Ha, Sprayseed 2L/Ha.
- 28/06/2013, Crusader0.5L/Ha, Trojan 30ml/Ha.
- 04/07/2013, Z25 urea application.

TRIAL LAYOUT

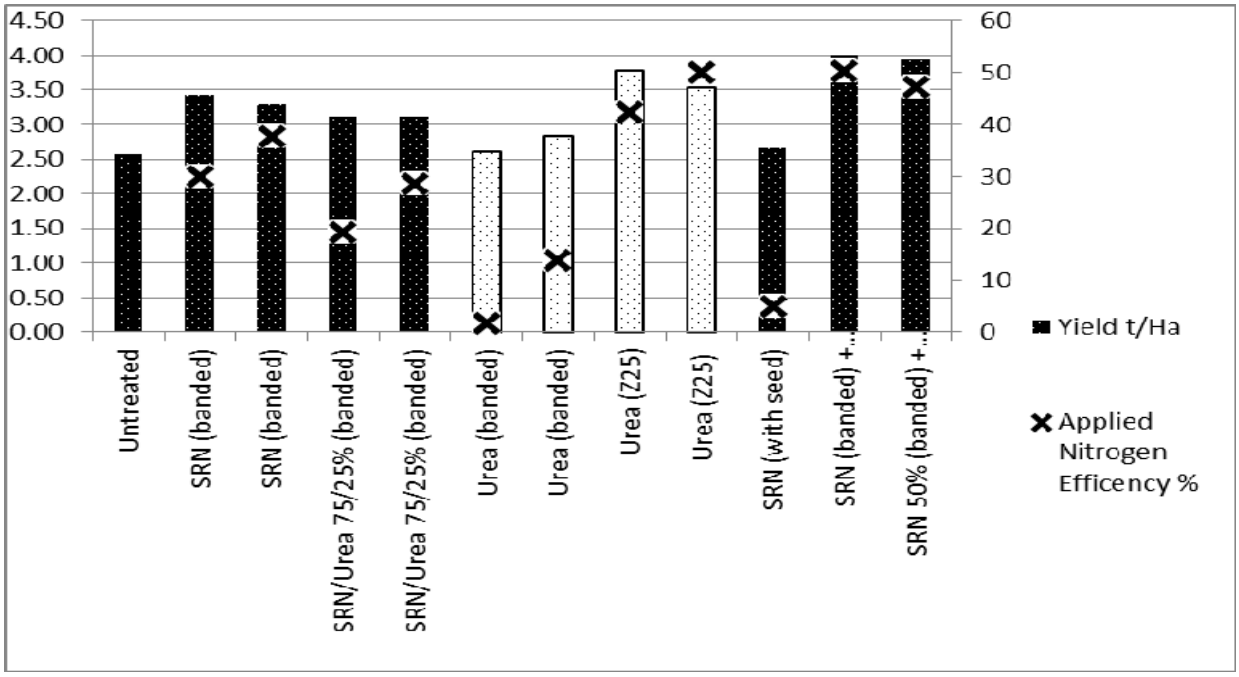
Table 1. List of treatments and total N applied / Ha.

Treatment	Rate kg/Ha	kgN/Ha
Untreated	0	0
SRN (banded)	150	66.2
SRN (banded)	100	44.1
SRN/Urea 75/25% (banded)	148	66.2
SRN/Urea 75/25% (banded)	99	44.2
Urea (banded)	144	66.2
Urea (banded)	96	44.2
Urea (Z25)	144	66.2
Urea (Z25)	96	44.2
SRN (with seed)	100	44.1
SRN (banded) + Urea (Z25)	100 + 48	66.2
SRN 50% (banded) + Urea 50% (Z25)	75 + 73	66.2

RESULTS/STATISTICS

From graph 1 the best yielding treatments were form the delayed urea applications at Z25 and the highest yielding treatments was when the slow release nitrogen (SRN) was banded and a follow up Z25 urea application was made.

Graph 1: Yield t/Ha & N efficiency of applied N.



LSD 0.05: 0.32t/Ha

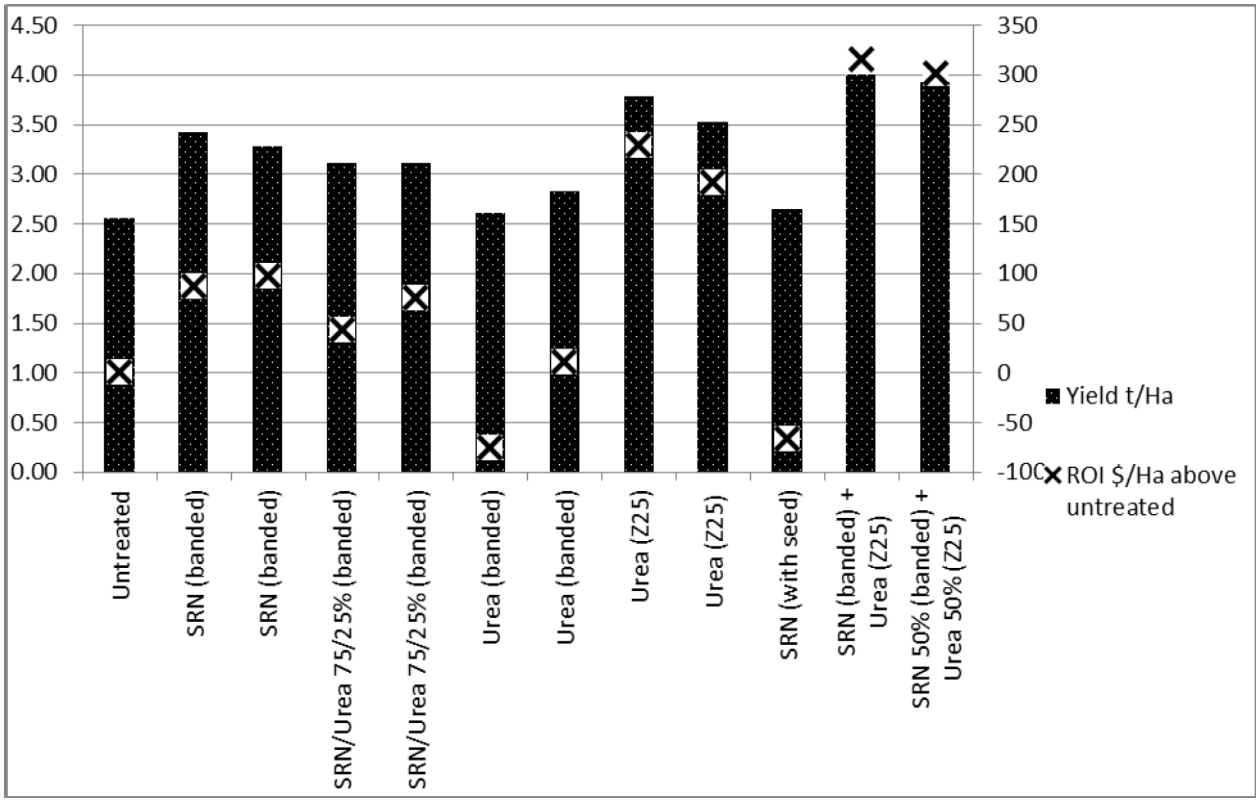
Coefficient of variation 5.8.

FINANCIAL ANALYSIS OF RESULTS

Below is a figure of the final yield t/Ha when correlated with the return on investment above the untreated. Banded urea and placing SRN with the seed resulted in a negative paddock gross margin

while later applied Z25 applications. From appendix 1 the end protein has had an effect with treatments 11 and 12 having grain protein greater than 11.5% which has meant that these treatments made AH2 affecting the price of the grain.

Graph 2. Yield and return on investment $/Ha above untreated.



Assumptions: $260/t APW and $275/t H2.

OBSERVATION/ DISCUSSION/ MEASUREMENTS

The trial as a result of cockatoo damage experienced patchy emergence and has contributed to a higher LSD from the trial. While there is a larger LSD some conclusion can be drawn from the trial. It must also be noted that the price of the SRN has been assumed to be 1.5x greater than the cost of urea at $608/t. This assumption is only for comparison reasons only and is only an estimate.

This trial has demonstrated that SRN in leaching sands can be used as a banded product to improve N efficiency and improve yields. From graph 1 the N efficiency of the applied nitrogen N applications has been calculated. As expected the banded urea had the poorest N efficiency ranging from between 1.6-<14%. SRN and urea mixes banded had an N efficiency improvement over the banded urea, with top-dressed urea at Z25 ranging from between 42 and 50% nitrogen efficiency.
SRN and top-dressed nitrogen had the best N efficiency ranging between 47 and 50%. In the WMG area this year the dry June while not welcome did help to improve N efficiency, with N efficiency >50% rarely heard of on the gravel matrix sand and deep sands in medium/high rainfall years. So while the area experienced a relatively low N leaching year the SRN has still enabled a greater $ROI/Ha for each plot.

PEER REVIEW

David Hurst

ACKNOWLEDGEMENTS/ THANKS

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Peter Negus

Appendix 1. Treatment, yield t/Ha, grain protein and return on investment $/Ha above untreated.

Treatment	Yield t/Ha	Protein	ROI $/Ha above untreated
Untreated	2.57	10	0
SRN (banded)	3.43	10.5	86.94
SRN (banded)	3.29	10.6	96.54
SRN/Urea 75/25% (banded)	3.12	10.2	43.11
SRN/Urea 75/25% (banded)	3.12	10.4	75.09
Urea (banded)	2.61	10.4	-75.42
Urea (banded)	2.83	10.5	10.68
Urea (Z25)	3.79	10.9	229.23
Urea (Z25)	3.53	11	191.85
SRN (with seed)	2.66	10.5	-66.71
SRN (banded) + Urea (Z25)	4.01	11.5	315.35
SRN 50% (banded) + Urea 50% (Z25)	3.93	11.6	301.16

Assumptions: $260/t APW and $275/t H2.