3.4.3 Different sowing and topdressing nitrogen options in wheat - Inverleigh, Vic

Location: Inverleigh Research Site.

Funding:
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Background/Aim:
Evaluate Nitrogen Efficiencies of various nitrogenous fertilisers on wheat

Summary of findings:
- There were adequate levels of nitrogen in the soil profile which limited response to any applied fertiliser
- There was significant yield increases from enhanced efficiency products such as Entec at sowing.

Trial information:
The trial initiated on the 2nd of July 2010. The soil analysis results from the site are presented in Table 1. The plots were sown with wheat (*cv. Beaufort)* at 60kg/Ha and various sowing starter and top dress fertilisers as indicated in Table 2.

The fertiliser treatments were determined using two different rates, either 20 or 40 kg/Ha of applied Nitrogen. A basal application of TSP was applied at 20.7kg P/ha to ensure that P was not limiting.

Table 1: Initial Soil test results summary

Soil Test Analyte	Result
Sample Depth To	0-10cm
Annual Rainfall	600mm
pH (1:5 Water)	4.8
pH (1:5 CaCl2)	4.3
Elec. Cond. (Sat. Ext.) dS/m	0.21
Chloride (mg/kg)	40
Nitrate Nitrogen (NO3) mg/kg	85
Ammonium Nitrogen (KCl) mg/kg	1.8
Phosphorus (Colwell)	84
Phosphorus Buffer Index (PBI-Col)	91
Available Potassium (mg/kg)	220
Calcium (Amm-acet.) Meq/100g	3
Calcium/Magnesium Ratio	1.9
Cation Exch. Cap. Meq/100g	6.05
Sodium % of Cations (ESP) mg/kg	4.6
Aluminium Saturation %	9.9
Copper (DTPA) mg/kg	0.5
Iron (DTPA) mg/kg	440
Manganese (DTPA) mg/kg	8.1
Zinc (DTPA) mg/kg	0.76
Boron (Hot CaCl2) mg/kg	1.2
Sulfate Sulfur (KCl40) mg/kg	27
Organic Carbon (OC) %	2.2
Soil Colour	Brown
Soil Texture	Clay Loam
Disp. Index, Loveday/Pyle	2
Slaking 2Hrs	Partial

Table 2: Treatments and nutrients rates (kg/Ha)

Treatment	Product	N%	Nsowing	NDC15	NDC31-33	Product rate kg/ha
1	Control	0	0			0
2	Urea	46	40			87.0
3	Urea	46	20			87.0
4	Entec Urea	46	40			87.0
5	Entec Urea	46	20			87.0
6	Easy N	32	40			125.0
7	Easy N	32	20			125.0
8	Urea + evaluation inhibitor	46	40			87.0
9	Urea + evaluation inhibitor	46	20			87.0
10	Urea + organic amendment	46	40			87.0
11	Urea + organic amendment	46	20			87.0
12	Entec Gran am	21	40			190.5
13	Entec Gran am	21	20			190.5
14	Gran am	21	40			190.5
15	Gran am	21	20			190.5
16	Control	0		0	0	0.0
17	Urea	46		40		87.0
18	Urea	46			40	87.0
19	Urea + solvent	46		40		87.0
20	Urea + solvent	46			40	87.0
21	Easy N	32		40		125.0
22	Easy N	32			40	125.0
23	Easy N + Agrotain	32		40		125.0
24	Easy N + Agrotain	32			40	125.0
25	Green Urea 14	46		40		87.0
26	Green Urea 14	46			40	87.0
27	Green Urea 7	46		40		87.0
28	Green Urea 7	46			40	87.0
29	Urea + evaluation inhibitor	46		40		87.0
30	Urea + evaluation inhibitor	46			40	87.0

Results and discussion

In the nitrogen at sowing trial, statistically significant yield responses were reported for two of the inhibitor treatments despite the high initial soil N level. These results are confounding however, as similar responses were not observed with other similar treatments suggesting other factors may have affected yield more. No signficant yield responses were observed in the topdress trial despite yield responses of up to 0.8 t/ha from the application of 40 kgN/ha. These results may highlight the risks of topdressing late sown wheat crops or may simply be attributed to the different weather conditions experienced in 2010.

Table 3: Results

At sowing N trial			Grain Yield	Grain Protein	Grain fert N efficiency	Screenings	Test weight
Name	**N rate kg/ha**	**Growth Stage**	**t/ha**	**%**	**%**	**%**	
Control	0		3.56	8.96		1.89	54.4
Urea	20	Sowing	3.90	9.1	31.4%	1.57	56.1
Entec Urea	20	Sowing	3.86	8.9	21.5%	1.37	60
Easy N	20	Sowing	3.50	9	-3.5%	1.93	57.1
Urea + evaluation inhibitor	20	Sowing	4.31	9.3	71.6%	1.91	55.6
Urea + organic amendment	20	Sowing	3.81	9.06	22.9%	1.53	56.6
Entec Gran am	20	Sowing	3.87	9.01	26.0%	1.56	57.3
Gran am	20	Sowing	3.78	8.96	17.2%	1.77	56.4
Urea	40	Sowing	4.18	9.2	28.7%	1.76	55.3
Entec Urea	40	Sowing	4.34	9.2	35.1%	1.61	55.9
Easy N	40	Sowing	4.22	9.4	34.0%	1.28	54.2
Urea + evaluation inhibitor	40	Sowing	4.16	9.1	26.1%	1.6	55.5
Urea + organic amendment	40	Sowing	4.19	9.3	30.9%	1.3	57.3
Entec Gran am	40	Sowing	4.11	9.4	29.5%	1.81	54.9
Gran am	40	Sowing	3.94	9.2	19.0%	1.6	57.9
		CV	**10.10**	**2.09**		**13.8**	**5.9**
		LSD	**0.68**	**0.32**		**0.38**	**5.6**
Topdress N trial							
Control	0		3.57	9.3		2.011	56.2
Urea	40	Sowing	4.06	9.3	19.9%	2.2	55.6
Urea + solvent	40	DC15	4.40	9.35	34.7%	2.06	59.4
Easy N	40	DC15	4.05	9.4	21.3%	2.2	54.1
Easy N + Agrotain	40	DC15	3.81	9.3	9.8%	2.54	56.8
Green Urea 14	40	DC15	4.20	9.2	23.8%	2.1	53.4
Green Urea 7	40	DC15	3.99	9	11.9%	1.8	60.5
Urea + evaluation inhibitor	40	DC15	3.85	9.1	8.0%	2.2	55.1
Urea	40	DC15	3.95	9.4	17.2%	2.1	56.5
Urea + solvent	40	DC 31-33	3.86	9.3	11.8%	2.15	57.3
Easy N	40	DC 31-33	3.77	9.4	9.8%	2.1	55.5
Easy N + Agrotain	40	DC 31-33	4.08	9.7	27.9%	2.2	55.2
Green Urea 14	40	DC 31-33	3.47	9.5	-1.0%	2.7	55
Green Urea 7	40	DC 31-33	4.05	9.5	23.1%	1.5	57.8
Urea + evaluation inhibitor	40	DC 31-33	3.98	9.4	18.4%	1.98	55.6
		CV	**13.90**	**2.2**		**22.2**	**5.9**
		LSD	**0.92**	**0.35**		**0.79**	**5.6**

Summary:
The trial demonstrated the usefulness of soil testing in identifying your relevant nutrient starting position and devising effective nutrient programs. The absence of this information could lead to the application of unnecessary nutrients or the failure to realise potential. There was a suggestion that inhibitors could be beneficial under wet conditions, however the results may be be affected by other factors.