4.2 INVESTIGATION OF THE BENEFITS OF SPECIALTY NITROGEN PRODUCTS AND LIQUID NITROGEN OPTIONS IN CEREALS (INVERLEIGH, VIC)

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Location: SFS Inverleigh Research site

Acknowledgements:
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GSR: (Apr – Nov) 350 mm

Summary:
Urea applied at 200 kgN / ha recorded significant yield increases over all treatments.

Applications of straight urea at DC61 and or DC65 were unable to significantly increase grain protein when compared to specialty products.

Background:
Research in recent years has demonstrated improvements in nitrogen use efficiency through manipulation of nitrogen fertiliser placement and timing in crops. While such tactical manipulation has provided significant improvements in crop yield and quality, it is often difficult to manage logistically. This project sets out to investigate whether combinations of timing and placement combined with new product technology has the potential to further improve nitrogen fertiliser efficiency whilst easing the logistical complexities of tactical management.

Objectives:
- Assess the effect of nitrogen timing on crop response.
- Assess the effect of nitrogen placement on crop response.
- Compare a range of liquid nitrogen fertilisers with granular urea.
- Assess the effectiveness of numerous products aimed at controlling the release of nitrogen.

Methodology:
Completely randomised split plot block design with 4 replicates. Plots were 20m x 2m.

Table 4-5: Site Details

Variety	Chara
Sowing date	4/07/2005
Sowing rate	85 kg/ha
Roundup Powermax	2 l/ha
Dual Gold	500 ml/ha
Granulock CuZn	175 kg/ha
Basal N	50 kg/ha
PH (1:5 water) 0-10 cm	6.5
Phosphorus Colwell P	90
Triflur @ 1.2L/ha	IBS 4/7/06
Hussar @ 200g/ha + 1% Hasten	26/8/06
Opus @ 250ml/ha	14/10/05
Topdress	17/10/05

Table 4-6: Nutrient Management Initiative Treatments, Grain Yield And Protein %

Product	Timing	App method	ON	25N	50N	100N	200N
Urea	Sowing	Deep Banded	2.29 (8.1)	3.05 (8.0)	3.97 (8.6)	4.83 (8.9)	5.71 (11.4)
Entec urea				3.10 (7.9)	3.73 (8.4)	5.09 (9.0)	
Easy N (UAN)					3.53 (8.4)		
Urea		MRB			3.92 (8.7)		
Urea		IBS			3.31 (8.2)		
Urea		PS			3.39 (8.3)		
Urea	Z0:59	DB:TD			2.86 (8.2)		
Urea	Z0:59:65	DB:TD			2.78 (8.6)		
Urea	Z59	TD			2.26 (8.5)		
Green Urea 14		TD			2.52 (11.0)		
Easy N		TD			2.29 (11.0)		

	F pr.	LSD	CV %
Yield	<0.001	0.529	11.3
Protein	<0.001	0.78	6.2

DB = Deep Banded, PS = Pre Sown, MRB = Mid Row Banding, TD = Top dress

Results and Discussion

The site was highly nitrogen responsive due to low residual nitrogen (50 kgN/ha) prior to sowing. Each increase in urea banded at sowing gave a significant yield increase over the lower rate (Table 4-6) while 200 kg N/ha as urea gave significant yield increase over all other treatments. Urea banded at sowing (DB or MRB) significantly out yielded the same rate of urea broad cast and incorporated by sowing.

No significant differences were observed between other deep banded treatments applied at sowing which is not surprising - in such nitrogen deficient situations crops will require timely nitrogen applications. Further, conditions were such that leaching losses were unlikely.

Topdressing (which was followed by 14 dry days) occurred too late to salvage much yield although the two low volatile nitrogen sources (Easy N and Green Urea 14) provided strongly significant protein increases compared with both the control and urea top dressed at the same time. This suggests that a significant volatilisation loss occurred from urea while Green Urea 14 and Easy N were able to economically limit nitrogen losses.