

# NITROGEN SOURCE AND PLACEMENT

Erin Cahill, CSBP Regional Agronomist, Moora



Grow to your full potential.

**AIM:** To investigate the effects of Nitrogen placement and timing in wheat.

## BACKGROUND

Until recently, most nitrogen was applied to crops as urea close to sowing. However, N-use efficiencies in WA are typically poor, mainly due to leaching of nitrate from our sandy soils during autumn and winter. CSBP and other trials have shown banding urea or Flexi-N can improve the efficiency of N uptake compared to topdressed applications. On average over 22 trials from 2000-2004 the N-use efficiency was increased by 4-8% when Flexi-N was banded on 22cm row spacings. Flexi-N is less toxic when placed close to the seed than urea, and has the added flexibility to act as a carrier for in-furrow fungicides and/or trace elements. The potential for N leaching can be reduced by applying several small applications as the season progresses rather than one large application at sowing, especially in wet seasons where yield potentials are high. Splitting N applications also allows the grower to re-assess the crop's yield potential and likely N demand during the year, thereby exploiting conditions in favourable seasons and saving costs on N in poor seasons.

## TRIAL DETAILS

<b>Property</b>	Hyde Park Farms, Liebe Main Trial Site, Dalwallinu
<b>Plot size &amp; replication</b>	2m x 20m x 3 reps
<b>Soil type</b>	Brown clay loam
<b>Sowing date</b>	13 <sup>th</sup> May 2005
<b>Seeding rate</b>	Calingiri Wheat @ 90 kg/ha
<b>Fertiliser (kg/ha)</b>	120 kg/ha Agstar Zn
<b>Paddock rotation</b>	2003 = Wheat, 2004 = Pasture
<b>Herbicides</b>	13 <sup>th</sup> May 2005: 0.8 L/ha Sprayseed & 1.5 L/ha Trifluralin. 15 <sup>th</sup> June 2005: 250 g/ha Achieve + 1% Supercharge + 700 mL/ha Hoegrass + 70mL Dimethoate 21 <sup>st</sup> June 2005: 7 g/ha Eclipse + oil, 200 mL/ha Sonic, 400 mL/ha Zinctrac
<b>Growing Season Rainfall</b>	258.5mm (April – October)

## SOIL ANALYSIS

Depth	pH	Salt	OC	N (Nit)	N (Amm)	P	Fe	K	S	PRI
0-10cm	5.6	0.082	1.10	15	2	19	395	499	8.9	28.3

	TREATMENTS Banded kg or L/ha	TD IBS kg or L/ha	5 WAS L/ha	9 WAS L/ha	*kg/ha		
					N	P	S
1	Basal Only	-	-	-	17	17	10
2	60 Flexi-N	-	-	-	42	17	10
3	55 Urea	-	-	-	42	17	10
4	-	60 Flexi-N	-	-	42	17	10
5	-	55 Urea	-	-	42	17	10
6	120 Flexi-N	-	-	-	67	17	10
7	110 Urea	-	-	-	67	17	10
8	-	120 Flexi-N	-	-	67	17	10
9	-	110 Urea	-	-	67	17	10
10	60 Flexi-N	-	60 Flexi-N	-	67	17	10
11	120 Flexi-N	-	60 Flexi-N	-	92	17	10
12	120 Flexi-N	-	60 Flexi-N	60 Flexi-N	117	17	10

## RESULTS:

	TREATMENTS Banded kg or L/ha	TD IBS kg or L/ha	5 WAS L/ha	9 WAS L/ha	Harvest Data					
					N	Yield t/ha	Protein %	Screen %	N Removal kg/ha	NUE %
1	Basal Only	-	-	-	17	1.547	9.1	2.19	27.4	
2	60 Flexi-N	-	-	-	42	1.573	10.3	3.33	31.5	16.39
3	55 Urea	-	-	-	42	1.573	10.4	2.97	31.8	17.70
4	-	60 Flexi-N	-	-	42	1.594	9.7	2.70	30.2	11.20
5	-	55 Urea	-	-	42	1.552	10.3	2.34	31.1	14.81
6	120 Flexi-N	-	-	-	67	1.578	9.3	2.22	28.7	2.70
7	110 Urea	-	-	-	67	1.484	12.3	3.31	35.5	16.22
8	-	120 Flexi-N	-	-	67	1.557	11.1	3.07	33.7	12.51
9	-	110 Urea	-	-	67	1.536	10.6	2.54	31.8	8.88
10	60 Flexi-N	-	50 Flexi-N	-	67	1.635	11.9	3.04	38.1	21.36
11	120 Flexi-N	-	50 Flexi-N	-	92	1.568	12	2.43	36.6	12.29
12	120 Flexi-N	-	50 Flexi-N	50 Flexi-N	117	1.542	12.3	4.42	37.2	9.77
					<b>LSD</b>	<b>nsd</b>	<b>1.1</b>	<b>1.15</b>	<b>2.9</b>	

## COMMENTS:

Unfortunately a number of factors throughout the season limited the value of the data produced from this trial. The seeder malfunctioned and treatment 6 (120 L/ha Flexi N banded) was not applied. Ryegrass became a problem early in the season and an aggressive herbicide mix was used to control it. This was successful, but as expected there were some harsh crop effects. Following recovery from the herbicide damage, the trial received further chemical damage from Sprayseed drift when the main trial site was being wicked.

There was no yield response to nitrogen source, rate or placement but grain protein increased significantly with N application. There was a trend for better nitrogen-use efficiency (NUE) with the banded treatments (excluding treatment 6). Splitting nitrogen at seeding and at 5 weeks after seeding gave the greatest N removal and NUE (21.36%). Overall NUE was very poor, probably because of the herbicide effects and low yields.

## SUMMARY:

- Technical difficulties limited the value of data collected from this trial.
- There was no yield response to Nitrogen rate, source or placement but protein increased with N rate.
- Nitrogen-use efficiency was in general poor across all treatments although banded treatments were slightly better than broadcast applications.

PAPER REVIEWED BY: DR STEPHEN LOSS