

Comparison of CAN and urea for tillering nitrogen – West River

Summary of results

- ◆ Under good seasonal conditions on a highly responsive site, CAN was slightly better than urea as a post sowing nitrogen source.
- ◆ Nitrogen topdressed 10 weeks after sowing provided good yield and protein improvements providing highly profitable responses in this season.

Site Information	
Group	Ravensthorpe Agricultural Initiative Network (RAIN)
Trial location	West River, 18 km W from Ravensthorpe
Farmer	Rod and Tracey Ebert
Soil Type	loamy gravel
Organic Carbon	0.94% OC
Available N ppm	8 nitrate 3 ammonium
Actual annual rainfall	475 mm
Ave annual Growing Season Rainfall (GSR)	420 mm 279 mm (May-Oct) decile 7 season.
Ave GSR	263 mm
Yield Potential (t/ha)	4.7 t/ha
Yield Actual (t/ha)	1.3 – 2.4 t/ha
Paddock History	
2002	pasture 80% legume low growth
2001	barley
2000	wheat
Seeding Date	16 May 2003
Variety & Sowing Rate	Yitpi 65 kg/ha
Base Fertiliser	MAP 60 kg/ha

Aim

This trial aimed to investigate the response of wheat yield and protein to post sowing applications of nitrogen fertiliser. The nitrogen fertilisers urea and Calcium Ammonium Nitrate were compared.

Design

Seeder width plots 200metres long were marked out in a section of paddock across previous workings. A recommended rate of nitrogen was chosen from the Nitrogen Calculator based on paddock details and a target yield of 3 t/ha with 10.5% protein. 50 kg/ha of nitrogen as urea or CAN was applied as alternate control plots at tillering. Other rates of both products were applied between the control plots at the same time according to treatments.

What happened

The trial area was sown and managed as part of the whole paddock. The post sowing fertilisers were applied on 30th July. 19 mm of rain was recorded 3 days after application. The rates of fertiliser were evident during spring as greener and denser plots but no differences between the different fertilisers were observable.

Tiller counts and heads counts showed responses to increasing nitrogen rates but there was no difference between the fertiliser types for each rate of nitrogen.

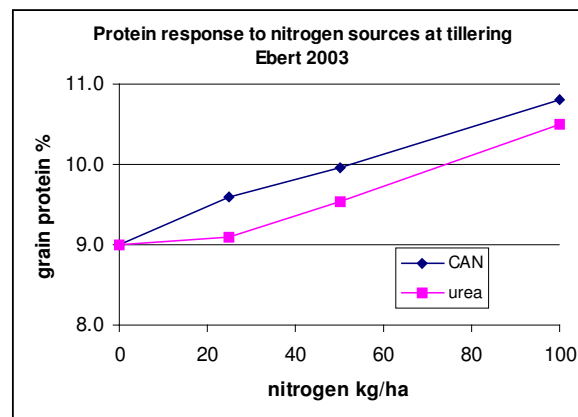
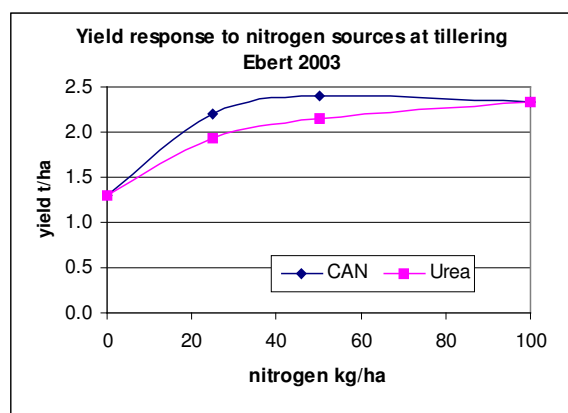
Grain yield was increased with all rates of both sources of nitrogen applied. The greatest yield increase was at 50 kgN/ha as CAN or 100 kgN/ha as urea. These rates corresponded with the best returns to fertiliser for the treatments applied.

treatment	nitrogen applied kg/ha	tillers /sqm	heads /sqm.	yield t/ha	protein %	nitrogen efficiency#	return to fertiliser over nil*
nil	0	287	207	1.29	9.0		
93kg/ha CAN	25	376	289	2.20	9.6	66%	\$119
185kg/ha CAN	50	396	303	2.40	10.0	43%	\$130
370kg/ha CAN	100	439	339	2.34	10.8	24%	\$60
54kg/ha Urea	25	376	264	1.94	9.1	42%	\$79
109kg/ha Urea	50	391	308	2.15	9.5	31%	\$101
217kg/ha Urea	100	435	361	2.33	10.5	23%	\$111
r ² line to CAN				0.92	0.92		
r ² line to urea				0.93	ns		

* returns based on plot yields for APW grades

nitrogen efficiency based on increased N in grain over nil.

Protein increased as nitrogen rates increased for both products with CAN providing higher protein for a given rate of nitrogen compared to urea. Nitrogen from CAN was recovered to grain more efficiently than from urea except at the highest rate of 100 kgN/ha where there was equivalent recovery from both products.



The best return to fertiliser expenditure of \$130/ha was from 185 kg/ha CAN. This was mainly due to increased yield and protein compared to urea despite the higher cost. The high price per unit of nitrogen as CAN reduces returns at higher rates.

Even at these lower than target yields, the results show that more nitrogen was required than indicated by the Nitrogen Calculator for target protein. The limited yield response to rates above 50 kg/ha indicate that nitrogen limited yield potential was probably reached, even though this was lower than the rainfall limited potential. Earlier application on this responsive site may not have improved the result. (see Ebert trial on times and rates of nitrogen application in this report.)

Another comparison of CAN and urea in a similar experiment showed no difference between CAN and urea on sandplain soil (see Agnew result in this report).