Summit Ag
Agricultural Research

Independent Agronomy Advice & Cutting-Edge Research

Black Urea – Demonstration

December 2017

Cotton

Black Urea Demo

Summit Ag Agricultural Research

Black urea is a controlled release nitrogen product that is aimed to be a more efficient source of nitrogen in cotton production.

Key Points

The trial was placed on a commercial cotton farm near Narrandera, NSW. Black Urea was used as an upfront source of nitrogen for cotton with a long cotton rotation history. The rest of the field was treated with standard urea.

Soil and crop was monitored with soil and petiole tests during the cotton season. This was then coupled with yield and follow up soil tests.

Overall the Black Urea treatment had no yield disadvantage at reduced application rates in the cotton with both areas yielding well and some residual nitrogen in both treatments.

Background

Black Urea is urea that is coated in a natural carbon molecule that helps to stabilize the nitrogen molecules which in turn will help to reduce the amount of nitrogen that is lost to the environment through volatilization, leaching and runoff. Although the use of Black Urea won't necessarily increase crop yield, but the efficiency improvements can result in a higher return of investment as nitrogen inputs can be reduced.

This demonstration was done to compare the use of Black urea under commercial application to the standard grower nitrogen benefit to assess impact on the crop. A range of measures where used through the season to monitor the crop including pre-crop soil tests, petiole testing and yield.

Trial Details

Farm: Euroliebah

Growers: Larry, Ken and Justin Walsh

Field: C1

History: Developed (cotton previously)

Planting Date: 3/10/2017

Water up Date: 4/10/2017

Application Date: Spread pre-hill up in August

Application Details: Spread immediately prior to hill up

First Flower: 30th December

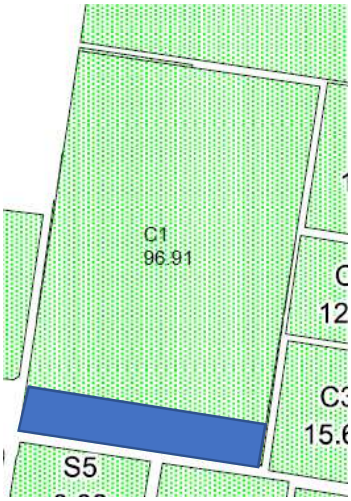
Final Irrigation: 13/03/2018

1st Defoliation Pass: 4/4/2018

Picking Date: 15/5/2018

Overall Field Yield: 10.50 bales/ha

Trial Data



The trial was placed in field "C1" at Euroliebah on the southern end of the block. A total of 5ha was treated at 400kg Black Urea spread prior to hilling up. The rest of the field had growers normal nitrogen management - 400kg drilled into the hills and then 2 x 50 units of nitrogen as urea water run, one in early December, one in early January.

			pH (1:5 CaCl2)	EC (1:5 H2O) dS/m	Chloride mg/kd	Nitrate N (NO3) mg/kg	Ammonium nitrogen (KCl) mg/kg	kg/N/ha	Phosphorus (Colwell) mg/kg	Phosphorus Buffer Index (PBI)
Desired Range			5.5-8	<3	<300	20-40		10 -20	20-40	<280
C1	8/09/2017	0	7	0.17	47	8.1	1.4	38	12	120
C1	8/09/2017	30				3.8	1.4	21		
								60		

The soil test above shows that there was a small out of residual nitrogen present.

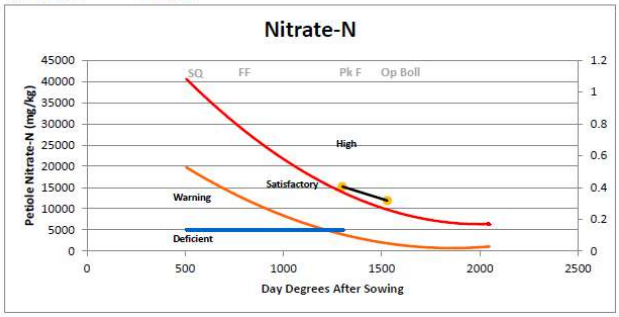
Petiole tests where then taken late January and early February when the highest boll load pressure was on the crop to assess if there is any difference in the nitrogen content in the two treatments as can be seen below.

Cotton Petiole Report

Trading Name : Urea Trial
Farm Name : Urea Trial
Paddock Name : Black Urea

Date Generated : 16-02-2018 11:57 AM
Page 1 of 2

MET Station : Whitton



Barcode	SampleDate	Day Degree	Nitrate-N (mg/kg)	Phosphate-P (mg/kg)	Potassium (%)
70049459	22-Jan-18	1300	15200		
70048503	6-Feb-18	1529.2	11900		

Legend:
Low Deficient Warning Satisfactory High

Day Degree InCropN kg/ha

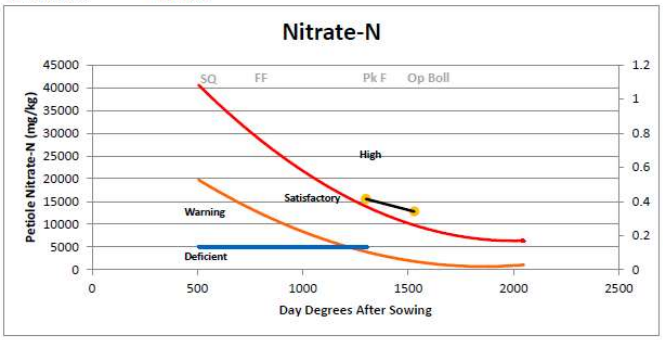
OVERALL TRENDS	STATUS	COMMENT
NO3-N	DECREASING	SATISFACTORY

Cotton Petiole Report

Trading Name : Urea Trial
Farm Name : Urea Trial
Paddock Name : Urea

Date Generated : 16-02-2018 11:59 AM
Page 1 of 2

MET Station : Whitton



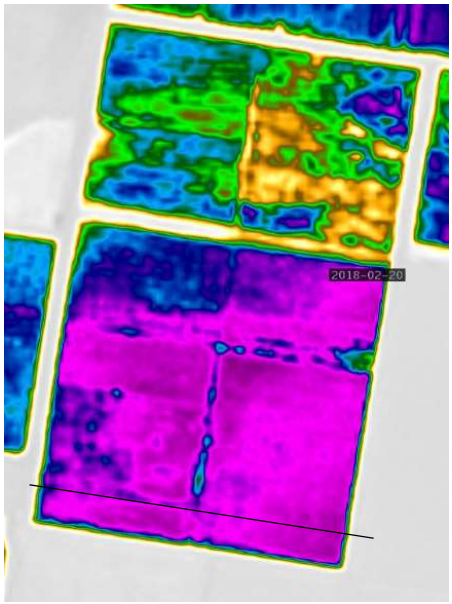
Barcode	SampleDate	Day Degree	Nitrate-N (mg/kg)	Phosphate-P (mg/kg)	Potassium (%)
70049460	22-Jan-18	1300	15545		
70049440	6-Feb-18	1529.2	12780		

Legend:
Low Deficient Warning Satisfactory High

Day Degree InCropN kg/ha

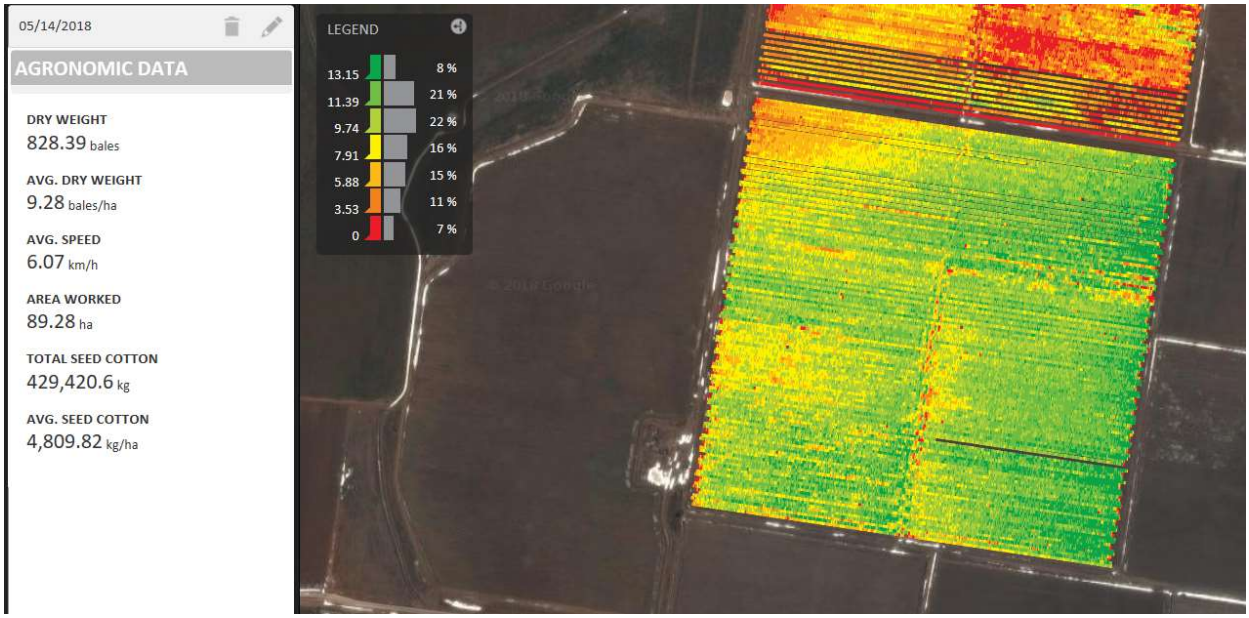
OVERALL TRENDS	STATUS	COMMENT
NO3-N	DECREASING	SATISFACTORY

From the above there is not much difference between the values in the two treatments and both treatments had the crop in the high – satisfactory range.

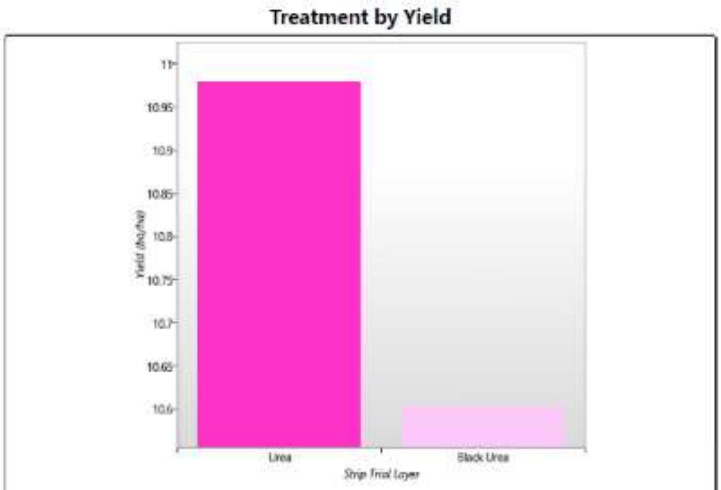


NDVI where taken using satamap. This NDVI was taken on the 20/02/2018 showing the field “C1” with the Black Urea Vs Urea demo at the southern end. There is a line placed on the image to show the approximate location of the split between the two treatments with nothing obvious showing up on in the image.

The crop was then picked with a commercial picker with the data then sent to PCT for processing. Below is the raw data from the picker showing no obvious difference between the two treatments.

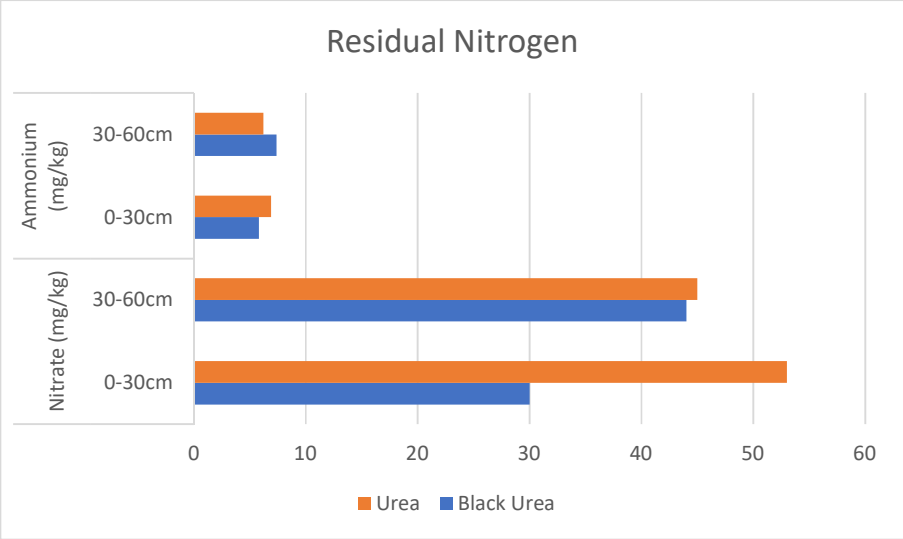


Visually from the raw yield data there was no difference between the treatments. Post ginning the yields were normalised post ginning to remove any variation due to moisture etc. in the modules. From the data after normalizing there was not much difference between the two treatments.



Analysis	Area	Min	Mean	Max	Std Dev	CV
Urea	3.26ha	1.28	10.98	18.68	1.71	0.16
Black Urea	3.26ha	0.23	10.60	19.54	2.12	0.20

The yields post normalizing shows that there was 0.38 bales/ha difference between the 2 treatments but there was also 20% variation in yield on the Black Urea treatments. This isn't replicated trial so statistics aren't possible but due to the variation it is unlikely there would be enough difference between the zones to be considered significant.



Post-harvest a soil test was taken for the two treatments areas to assess the residual nitrogen levels. From these results it can be seen that there are more residual nitrates in the 0-30cm of the urea compared to the black urea which isn't surprising due to the way the Black Urea works. At depth there wasn't much difference between the two treatments. There is not a lot of difference between the levels of ammonium at either sample depths.

In conclusion there was no real difference between the two treatments and no negative effects from the use of Black Urea in the cotton production system. This demonstration has showed that Black Urea applied at 75% of the rate of standard urea in one application can produce the same yield and quality.

Being able to apply Black Urea via spreader is a positive and cost effective management tool in these cropping situations. As the alternative practice of applying standard urea via tillage, pre-planting at a deeper depth to reduce nitrogen loss on the 1st and 2nd watering of the crop is a more costly and time consuming method of application.

We see Black Urea being a good option for growers in application methods and placement, their nitrogen use efficiency management and has the opportunity to offer economic benefits in high production cropping.