Project Catalyst FInal Report

Enhanced Efficiency Fertiliser Trial

Grower Information	
Grower Name:	Drew and Greg Watson
Entity Name:	Brie Brie Estate PTY LTD
Trial Farm No/Name:	Farm 5034 Block 2.1
Mill Area:	Mossman
Total Farm Area ha:	967.3
No. Years Farming:	25+
Trial Subdistrict:	South
Area under Cane ha:	608.18

Trial Status

Completed

Background Information

Aim:

The aim is to compare three products; Control Release, Entec and the standard practice fertiliser 140S.

Entec is a nitrification inhibitor, meaning that it holds the nitrogen in the ammonium form for longer – subsequently the nitrogen is subject to less loss pathways.

Control Release fertilisers use a sulphur and polymer coating on the urea granule, 25%, 50% or 75% blends can be ordered. In this trial 25% of the urea was coated.

Comparing these will help to gain a better understanding of how both the control release (25% coated) and Entec will perform in the wet tropics region of Mossman. All three products will be applied at two rates, a high rate and a low rate and each treatment will be replicated three times.

Background: (Rationale for why this might work)

In the Wet Tropics given the amount of heavy rainfall we receive much of the applied nitrogen is lost through pathways such as denitrification and leeching. It is important to reduce the amount of nitrogen lost in this crucial period after the crop is fertilised. There have been trials conducted in other regions on these fertiliser products so we would like to see how they perform first hand.

Potential Water Quality Benefit:

The water quality benefit from these trials will be reduced nitrogen runoff due to the increased nitrogen use efficiency. If the trials support the hypothesis of less nitrogen loss and higher yields then there will be increased uptake of these products and in turn the water quality coming off farms will be improved.

Expected Outcome of Trial:

Due to the weather we have had since the trials have been put out (late 2014 – early 2015), we predict that we will not see much difference between the treatments. There has been minimal large rainfall events after application in 2014 meaning that large nitrogen losses should not have occurred in the period of this trial.

Service provider contact:

Mossman Ag Services

Where did this idea come from:

Mossman Ag Services Agronomy Staff

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	June 2014	Plan out trial, rates of fertiliser to be used. Confirm site is appropriate. Install field equipment (equipment purchases to align with project application). Seek agronomic advice for trial design. Develop workplan for trials. Soil and product testing (if applicable). Set up trial sites.
Stage 2	December 2014	Set out trial with grower, apply treatments.
Stage 3	September 2014	Ongoing management of trial site: Monitor trials and keep accurate records of trial results, field operations, chemical and fertiliser inputs, crop yield and quality (as relevant to project), and provide to Terrain. Monitor trial. Facilitate site access for Terrain NRM staff to observe trial results.
Stage 4	July 2015	Harvest Trial, keeping records of strips cut, bin numbers in order to get bin weights and CCS samples from the mill. Site Access. Progress report.
Stage 5	September 2015	Retreat trial as per previous treatments.
Stage 6	August 2016	Harvest Trial, keeping records of strips cut, bin numbers in order to get bin weights and CCS samples from the mill. Site Access. Progress report.
Stage 7	October 2016	Retreat trial as per previous teatments.
Stage 8	July 2017	Harvest Trial, keeping records of strips cut, bin numbers in order to get bin weights and CCS samples from the mill. Site Access. Progress report.
Stage 9	October 2017	Retreat trial as per previous treatments.
Stage 10	July 2018	Harvest Trial, keeping records of strips cut, bin numbers in order to get bin weights and CCS samples from the mill. Site Access. Progress report.
Stage 11	October 2018	Trial complete.

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q208 1st ratoon when first applied
Trial Block No/Name:	2.1
Trial Block Size Ha:	21.59
Trial Block Position (GPS):	-16.5462417 145.47319444444446
Soil Type:	Clifton

Block History, Trial Design:

<- N	Product	N rate (kg/ha)	Rows
REP ONE	Entec	140	6
	CR	120	6
	140S	120	6
	CR	140	6
	140S	140	6
	Entec	120	6
REP TWO	CR	140	6
	Entec	140	6
	140S	120	6
	CR	120	6
	Entec	120	6
	140S	140	6
REP THREE	140S	140	6
	CR	120	6
	Entec	140	6
	CR	140	6
	140S	120	6
	Entec	120	6

Treatments:
Control/Standard Practice: (T1) 140S
High rate:
646kg/ha of 140S:
N: 150kg/ha P: 13kg/ha K: 113kg/ha S: 25kg/ha

Low Rate:
560kg/ha of 140S: N: 130kg/ha
P: 11kg/ha K: 98kg/ha S: 21kg/ha

(T2) Entec 140S
High rate:
646kg/ha of 140S: N: 150kg/ha
P: 13kg/ha K: 113kg/ha S: 25kg/ha

Low Rate:
560kg/ha of 140S: N: 130kg/ha
P: 11kg/ha K: 98kg/ha S: 21kg/ha

(T3) CR 140S 25% Coated
High rate:
646kg/ha of 140S: N: 150kg/ha
P: 13kg/ha
K: 113kg/ha
S: 25kg/ha

Low Rate:
560kg/ha of 140S: N: 130kg/ha
P: 11kg/ha K: 98kg/ha S: 21kg/ha

Results:

Table 1. 2015 Trial results for Brie Brie

Product	N rate (kg/ha)	t/ha
140S	140	
140S	120	85.4
Controlled Release 140S (25% Coated)	140	84.7
Controlled Release 140S (25% Coated)	120	83.2
Entec 140S	140	87.3
Entec 140S	120	87

Table 2. 2016 Trial results for Brie Brie

Product	N rate (kg/ha)	t/ha	ts/ha
140S	150	145.1	16.3
140S	120	130.5	14.5
Controlled Release 140S (25% Coated)	150	131.5	14.9
Controlled Release 140S (25% Coated)	120	127.3	14.2
Entec 140S	150	131.1	14.2
Entec 140S	120	130.1	14.1

Table 3. 2017 trial results for Brie Brie:

Product	N rate (kg/ha)	t/ha	ts/ha
140S	150	100.2	12.9
140S	120	97.9	12.2
Controlled Release 140S (25% Coated)	150	95.2	11.8
Controlled Release 140S (25% Coated)	120	97.4	11.9
Entec 140S	150	100.2	12.8

Entec 140S	120	97.9	12.2

Table 4. 2018 trial results for Brie Brie:

Product	N rate (kg/ha)	t/ha	ts/ha
140S	150	89.3	14.3
140S	120	86	13.6
Controlled Release 140S (25% Coated)	150	88.9	14
Controlled Release 140S (25% Coated)	120	83.8	13.4
Entec 140S	150	88.9	14.3
Entec 140S	120	89.5	14.2

Conclusions and comments

In 2015 we didn't obtain CCS data for any of the treatments, the results in table 1 show little difference between the three treatments and two rates – although Entec at the two rates had slightly higher yields. We did not obtain all the data that we were aiming to collect and due to this no solid conclusion can be drawn. The dry weather may have also meant that the nitrogen was not lost in any heavy rainfall events. Harvesting the trials went well in 2016 and we were able to obtain ccs samples for each treatment. Table 2 above shows the tonnes of cane per hectare and the tonnes of sugar per hectare for each trial and treatments within those trials. Looking at the last column, tonnes of sugar per hectare there are no notable differences in any of the treatments or trials. 140S at the higher rate does show a higher tonnes of cane per hectare but this is not significant and could have been due to a mix up with harvesting the trial. However, this data is still providing us with some useful information in suggesting which years we should be using these products.
We need to continue these trials to have them run over a variety of growing conditions; we have not run the trials in an especially wet year which is when we would expect some significant differences between these treatments. The trials have been re-established in 2017 and will be harvested in 2018.

In 2017 the trial was retreated on the 10th of October, 9 days later we received 6. 5inches of rain. With this event occurring soon after application there was the best chance for a runoff event to occur and for the nitrification inhibitor products to work. The results from 2018 harvest continue to show no differences in the products applied, or minimal differences not notable. The 140S straighr product and entec treated 140S both returned 14.3 tonnes of sugar per hectare.

Advantages of this Practice Change:
The advantages of this practice change would be potentially higher yields and better CCS as well as environmental benefits.
Given the results to date, it is advised in these conditions there are no advantages of this practice change.

Disadvantages of this Practice Change:
Cost more to apply and as seen in this trial won't produce results in every year – dependent on weather events.

Will you be using this practice in the future:
Continue to trial product and possibly use more of these products in the future. The use of this practice won't be continuing, these results have shown no benefit either economically or in terms of any yield advantage to use the product.

% of farm you would be confident to use this practice :
Only as small trial plots.