

Project Catalyst Trial Report

Sub Surface Mill Mud Application and N Reduction

Grower Information

Grower Name:	Chris McClelland
Entity Name:	CJ & LB McClelland
Trial Farm No/Name:	5767
Mill Area:	Mossman
Total Farm Area ha:	180.01
No. Years Farming:	25+
Trial Subdistrict:	South
Area under Cane ha:	153.66

Trial Status

Complete

Background Information

Aim:

The aim is to trial whether applying mill mud subsurface has benefits to productivity and also water quality benefits. We will also be looking at the logistics of how this practice could work in a practical sense.

Background: (Rationale for why this might work)

Usual application of mill mud previously applied as broadcast and now as a zonal application, looking at taking this a step further placing the mud right where the growing plant can take up the nutrients. Often the benefits are not to the crop when the mud is applied but more benefit to the subsequent ratoons.

Potential Water Quality Benefit:

The potential water quality benefit comes from reduced losses from the mill mud itself by being underground and also we will be looking at lower rates of fertiliser.

Expected Outcome of Trial:

It is expected that the mill mud subsurface will yield better than no mill mud even with the lowered fertiliser rates.

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	Sept 2016	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	Nov 2016	Mark out trial site and form beds.
Stage 3	Nov 2016	Plant legumes
Stage 4	July 2017	Mark out rows, apply mud subsurface. Plant to cane. And topdress with appropriate fertiliser rates.
Stage 5	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 6	July 2019	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	July 2020	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 8	March 2021	Collate final information, final report.

Project Trial site details

Trial Crop:	Cane
Variety: Rat/Plt:	Q208
Trial Block No/Name:	10.1
Trial Block Size Ha:	3.26
Trial Block Position (GPS):	-16.501135, 145.435689
Soil Type:	Clifton

Block History, Trial Design:

	Treatment	N rate	Rows
Rep 1	No Mud	6ES	3
	No Mud	75% 6ES	3
	Mud	6ES	3
	Mud	75% 6ES	3
Rep 2	No Mud	6ES	3
	No Mud	75% 6ES	3
	Mud	6ES	3
	Mud	75% 6ES	3
Rep 3	No Mud	6ES	3
	No Mud	75% 6ES	3
	Mud	6ES	3
	Mud	75% 6ES	3

Treatments:

T1: no mud, 6ES fert rate

T2: no mud, 75% 6ES fert rate

T3: mud, 6ES fert rate

T4: mud, 75% 6ES fert rate

Results:

2018 Results (Plant):

			CCS	t/ha	ts/ha
T1	No Mud	6ES	15.5	87.7	13.6
T2	No Mud	75% 6ES	14.7	85.3	12.5
T3	Mud	6ES	14.5	91.7	13.3
T4	Mud	75% 6ES	13.7	100.5	13.8

2019 Results (1st Ratoon):

			CCS	t/ha	ts/ha
T1	No Mud	6ES	14.3	52.6	7.5
T2	No Mud	75% 6ES	14.5	53.1	7.7
T3	Mud	6ES	14.2	65.6	9.3
T4	Mud	75% 6ES	14.3	65.7	9.4

2020 Results (2nd Ratoon):

			CCS	t/ha	ts/ha
T1	No Mud	6ES	15.4	64.5	9.3
T2	No Mud	75% 6ES	15.4	60.7	9.3
T3	Mud	6ES	15.1	67.6	10.2
T4	Mud	75% 6ES	15.4	66.6	10.2

Conclusions and comments

The results of the first plant harvest show minimal differences between the treatments, other than T3 75% 6ES with no mud, the end tonnes of sugar per hectare, the cost difference between the treatments will be evident in the economics of the trial. The 1st ratoon harvest there are large differences between the CCS and tonnes cane per hectare, with the tonnes of sugar per hectare much lower for the treatments with no mud. The same trend continues into the 2nd ratoon harvest, with the no mud treatments, T1 and T2 yielding lowered tonnes of sugar per hectare.

Tich from DAF has run economics on the trial and these are his conclusions:

In summary, in terms of the gross margins:

- In the 1st ratoon (2019), the highest gross margin is for the 75% Fert + mill mud (T4) followed by the Full fert and mill mud (T3) then 75% Fert no mud (T2) and finally Full Fert no mud (T1) with the lowest gross margin.
- In the 2nd ratoon (2020), the highest gross margins followed the exact same trend as in the 1st ratoon, with T4 being the most profitable treatment, and with T1 being the least profitable in terms of gross margin.
- In the plant cane (2018) the highest gross margin was for the Full fert (T1) followed by 75% Fert no mud. These had positive gross margins
- In 2018 the two treatments with mud had negative gross margins mainly due to the added cost of the mill mud and land operations to apply it subsurface.
- For the combined gross margins over the two years, T4 had the highest gross margin followed by T1 then T2 and finally T3.

The no mud sections yielding lower could be attributed to the mud supplying a nutrient that the other section of the block has not received and is being limited by that particular nutrient found in mill mud.

In 2019 the block had normal fertiliser applied across the entire block – not at any reduced treatments; this was the growers decision as the no mud areas had yielded quite low. Although the normal fertiliser rate was applied, there continued to be the sustained differences between the treatments.

Advantages of this Practice Change:

The economics have shown that advantages are substantial when the correct deductions are made to the mill mud treatments. The trial was initially designed to see whether subsurface application of mill mud improved yield - the trial wasn't designed perfectly, the trial has not compared it to traditional surface application only comparing to no mill mud treatments. The practice of subsurface application has been proven to still be profitable – due to the economics results – but we don't know whether the results would be the same had the mud been applied on the row as usual practice.

Disadvantages of this Practice Change:

As mentioned above, we wont know whether applying subsurface will outweigh surface application – as this was not compared.

Will you be using this practice in the future:

If we are able to adapt the system to a more streamlined application of the mud then yes. The continued discount for the mud application will be taken into account.

% of farm you would be confident to use this practice:

Possibly in the future all blocks that receive mud prior to planting.