Catalyst Project Final Report

Grower Information	
Grower Name:	Mark Savina
Entity Name:	MP JJ AF KP & NA Savina
Trial Farm No/Name:	F710
Mill Area:	Mulgrave Mill
Total Farm Area ha:	85
No. Years Farming:	40
Trial Subdistrict:	Freshwater
Area under Cane ha:	

Background Information

Aim: To evaluate the application of anaerobically fermented fungal and bacterial strains to reduce Nitrogen application rates.

Background: (Rationale for why this might work)

We are trying to use biology to break down the 10 – 15 t of organic matter (cane trash) that is left on the ground after harvest. We want to use the organic matter to help reduce the amount of synthetic inputs we put in the ground to grow the next crop of cane, with nitrogen as the initial focus.

We want to look at getting biology into the soil initially, the go to using targeted biological amendments to break down the trash. Application timing will be based on first maximising the trash as a weed mat and achieving a canopy (shading).

We additionaly want to look at growing a good cover crop to increase the organic matter and diversity in the soil in our fallow. We would also like to trial Biochar an see where it can fit in an economically rational sense.

Potential Water Quality Benefit:

Less synthetic nitrogen applied, leading to lower risk of denitrification and leaching, less sediment, increased infiltration of rainfall, and less chemical use.

Expected Outcome of Trial:

Application of anaerobically fermented fungal and bacterial strains can replace between 45% and 75% of the 6ES recommended N application without significan yield reduction.

Service provider contact: Charissa Rixon – T.R.A.P. Services

Additional support for this project has been provided by Derek Sparkes (DAFF), Gavin Kay and Willem Landman (Independent Consultant).

Where did this idea come from: Mark Savina has developed this idea in conjunction with Willem Landman.

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**Jan - Mar 2017**	Collect all existing information for Mark's Trial as this trial is already established and is being continued with the support of Project Catalyst.
Stage 2	**Sep – Dec 2017**	Harvest Trial Reapply treatments Collect and Analyse Trial Data Soil sample each treatment to measure soil nitrogen.
Stage 3	**Jan – May** **Ongoing**	Re-establish Biofermenters in consultation with Willem Landman. Apply biological treatments. Maintain a fully functional biofermenter
Stage 4	**Sep – Dec 2018**	Harvest Trial Reapply treatments Collect and Analyse Trial Data Soil sample each treatment to measure soil nitrogen
Stage 5	**Jan – May 2019**	Apply biological treatments
Stage 6	**Sep – Dec 2019**	Harvest Trial Collect and Analyse Trial Data Soil sample each treatment to measure soil nitrogen

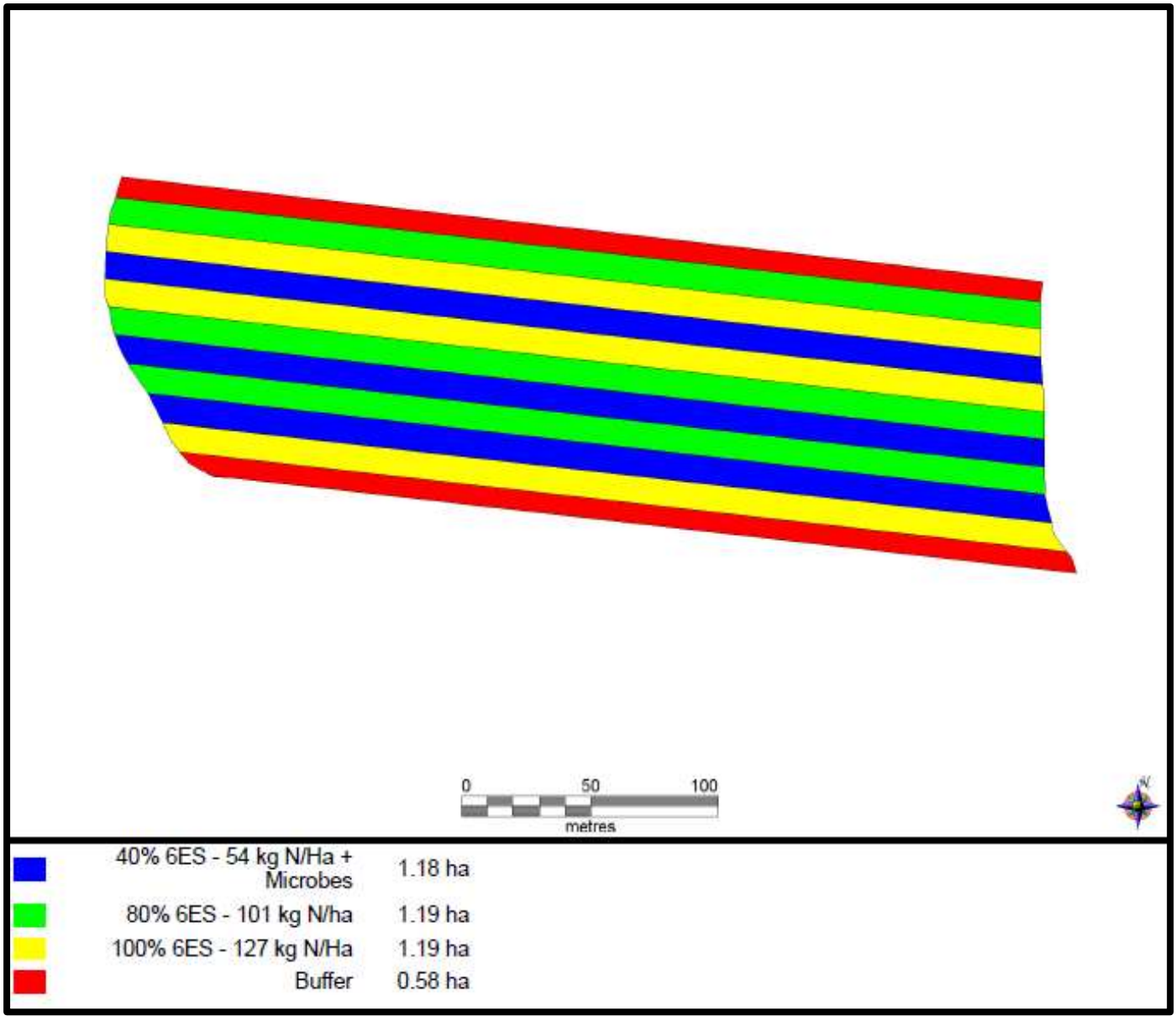
Project Trial site details

Trial Crop:	Sugarcane
Variety: Rat/Plt:	Q208 1st Ratoon Onwards
Trial Block No/Name:	Block 3
Trial Block Size Ha:	4 Ha
Trial Block Position (GPS):	16.8972˚S 145.6965˚E
Soil Type:	Well Drained Recent Alluvium – Innisfail soil series

Block History, Trial Design:

This is an older farm and this block has been used for cane production for many years and many crop cycles.

This trial was established as a 3 treatment, 3 replicate trial with large scale strips that are approximately 0.4 ha in area, in a RCB design.



Treatments:

1. **100% 6ES – 127 kg N/Ha**
2. **80% 6ES – 101 kg N/Ha**
3. **40% 6ES – 54 kg N/ha**

Results:

2015 Harvest – 1st Ratoon

Treatment		tc/ha		CCS		ts/ha	
1	100% 6ES – 127 kg N/ha	98.18	-	12.72	-	12.47	-
2	80% 6ES – 101 kg N/ha	96.45	-	13.01	-	12.52	-
3	40% 6ES – 54 kg N/ha + Microbes	92.29	-	13.53	-	12.46	-
p-value (p=0.05)		0.4281		0.0744		0.9869	
LSD (p = 0.05)		N/A		N/A		N/A	

2016 Harvest – 2nd Ratoon

Treatment		tc/ha		CCS		ts/ha	
1	100% 6ES – 127 kg N/ha	101.45	-	11.81	-	11.95	-
2	80% 6ES – 101 kg N/ha	74.27	-	12.29	-	9.12	-
3	40% 6ES – 54 kg N/ha + Microbes	89.42	-	12.45	-	11.13	-
p-value		0.1838		0.2373		0.2272	
LSD (p = 0.05)		N/A		N/A		N/A	

2017 Harvest – 3rd Ratoon

Treatment		tc/ha		CCS		ts/ha	
1	100% 6ES – 127 kg N/ha	69.64	-	13.47	-	9.37	a
2	80% 6ES – 101 kg N/ha	62.02	-	13.79	-	8.55	b
3	40% 6ES – 54 kg N/ha + Microbes	63.59	-	13.60	-	8.65	b
p-value		0.0623		0.4397		0.0292	
LSD (p = 0.05)		N/A		N/A		0.568	

2018 Harvest – 4th Ratoon

Treatment		tc/ha		CCS		ts/ha	
1	100% 6ES – 127 kg N/ha	65.2	-	15.50	b	10.09	-
2	80% 6ES – 101 kg N/ha	56.87	-	15.26	c	8.67	-
3	40% 6ES – 54 kg N/ha + Microbes	60.64	-	15.73	a	9.55	-
p-value		0.1685		0.0117		0.1168	
LSD (p = 0.05)		N/A		0.226		N/A	

2015 -2018 Harvest Summary

Treatment		tc/ha		CCS		ts/ha	
1	100% 6ES – 127 kg N/ha	83.62	-	13.37	-	10.97	-
2	80% 6ES – 101 kg N/ha	72.40	-	13.59	-	9.72	-
3	40% 6ES – 54 kg N/ha + Microbes	76.48	-	13.82	-	10.45	-
p-value		0.3022		0.7155		0.2204	
LSD (p = 0.05)		N/A		N/A		N/A	

Conclusions and comments

Treatment 1 with 127 kg N/ha is trending towards having a higher yield, but a lower CCS compared to the other treatments, however the differences are not statistically significant, and tonnes of sugar per hectare is generally trending to be greater but not statistically different to the other 2 treatments.

Treatment 3 with 54 kg N/ha plus the additional use of microbes to assist with the breakdown and incorporation of the trash blanket, over the last 4 ratoons has generally been higher yielding than treatment 2, although not statistically significant, and has not shown any statistically significant loss in sugar or cane yield or CCS compared to treatment 1.

Advantages of this Practice Change:

Significant improvements in water quality and soil health in addition to a reduction (in the longer term) to input costs.

Disadvantages of this Practice Change:

Significant requirement of technical expertise that is not currently available in quantity or at an affordable price without subsidy.

Will you be using this practice in the future:

Yes – I am trialling 115 units of N on my entire farm this year down from 140 units of N. I think I can go further but first I want to test 115 unit of N.

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

50%