Catalyst Project Report

Grower Information	
Grower Name:	Steven Muscat
Entity Name:	Tacsum Industries ATF
Trial Farm No/Name:	MKY-04740A
Mill Area:	Mackay Sugar
Total Farm Area ha:	125
No. Years Farming:	8
Trial Subdistrict:	Homebush/Oakenden
Area under Cane ha:	120

Background Information

Aim: To assess the impact of deep ripping in ratoons after harvesting in wet conditions, causing compaction.

Background:
Traditionally paddocks were 'worked' to alleviate compaction issues. As machinery becomes heavier and better equipped to handle wet conditions, compaction issues have the potential to become more severe. Currently, the advice given to farmers is to minimise the amount of tillage operations that are carried out in the paddock to minimise disturbance to soil biology as well as decrease the likelihood of impacting soil structure.

It is thought that where severe compaction has occurred (i.e. harvesting in wet conditions), ripping will alleviate this and improve water infiltration, in turn improving crop growth.

In this situation, the grower tried to minimise compaction at harvest by only half filling the track transporter, however once irrigation was required, run off occurred. This led to the decision to centre rip half of the paddock once all herbicide and nutrient applications were made.

Potential Water Quality Benefit:
Increase in water infiltration, leading to less run off and increased plant uptake

Expected Outcome of Trial:
It is expected that the ripped treatment will improve infiltration

Service provider contact: Farmacist

Where did this idea come from: Grower – Steve Muscat

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**December 2017**	Harvested in very wet conditions
Stage 2	**January 2018**	Centre rip and install GDot (moisture sensor) for monitoring
Stage 3	**January – October 2018**	Conduct frequent assessments of soil moisture
Stage 4	**October 2018**	Harvest
Stage 5	**December 2018**	Install moisture probes and conduct site assessments
Stage 6	**October 2019**	Harvest

Project Trial site details

Trial Crop:	Sugar Cane
Variety: **Rat/Plt:**	3R Q208
Trial Block No/Name:	01-03
Trial Block Size Ha:	4.5ha
Trial Block Position (GPS):	-21.297844
Soil Type:	149.038437

Block History, Trial Design:

Tacsum Ripped Vs Non-Ripped Trial

Farm 4740
Block 1-3
Variety Q208
Stage 3 Ratoon

Figure 1 - Trial layout

As shown in Figure 1, this trial had a simple layout to demonstrate the impact of different practices. The treatments consisted of a ripped (to 30cm) and non-ripped section of the block.

Treatments:

1. Ripped to 30 cm
2. Non-ripped

Results:

In the first season after ripping, GDots were installed to monitor the moisture content of the soil. Consistently, the non-ripped treatments showed that there was more moisture present as shown in Figure 2. When combining this information with the harvest results (Figure 3) it was decided to investigate the site further and implement some more informative assessments.

Non-ripped	Ripped
	

Figure 2 - GDots indicating soil moisture. More dots showing indicates higher moisture content

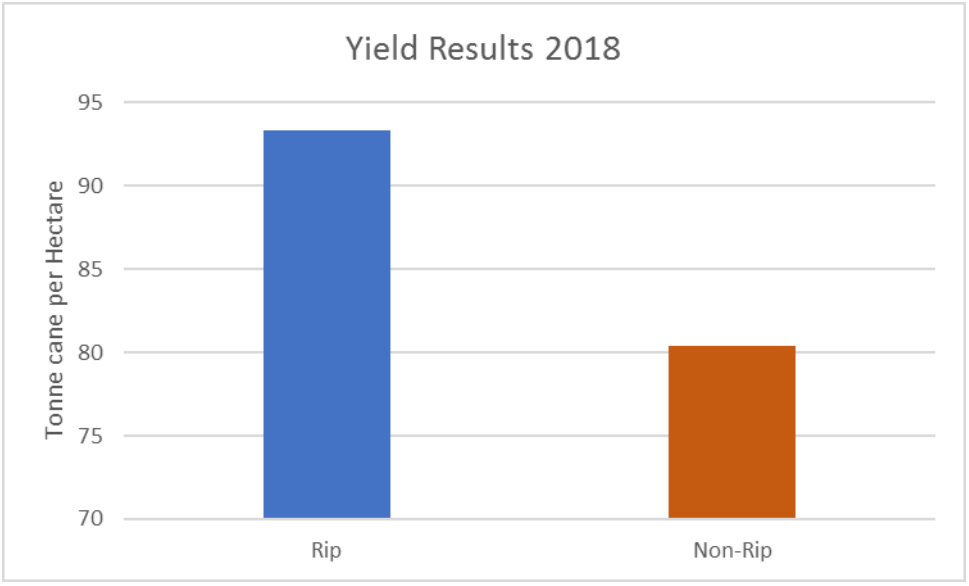


Figure 3 - Yield results from 2018 harvest

Figure 4 - Wireless moisture sensor

More advanced moisture sensors (Figure 4) were installed to measure moisture content every 10cm down to 80cm, that also had the capability to store the logged data. A reading was taken every half hour to asses the changes in moisture over time. To download the data an app is installed on a smart phone and when in close proximity to the sensor head unit it will download the data and upload to a website for viewing and interpretation.

Trends of moisture content differed between sensor sites, however one of the non-ripped sites was consistently higher than the other sites as shown in Figure 5.

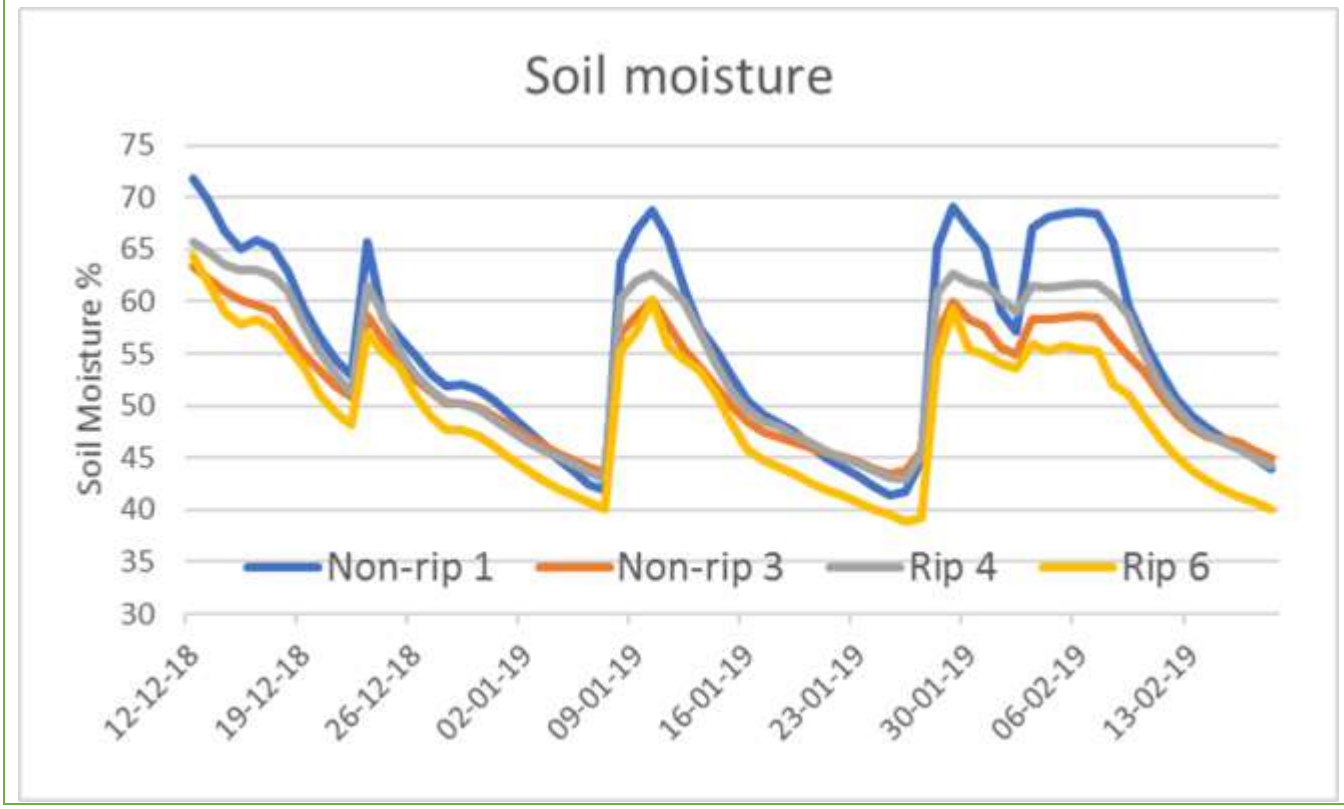


Figure 5 - Soil moisture content over time

To access the early impact on cane growth, growth measurements were taken throughout the season (shown in Figure 6). In the 2018-2019 season, in most circumstances the non-ripped is growing at a slightly faster rate than the ripped cane.

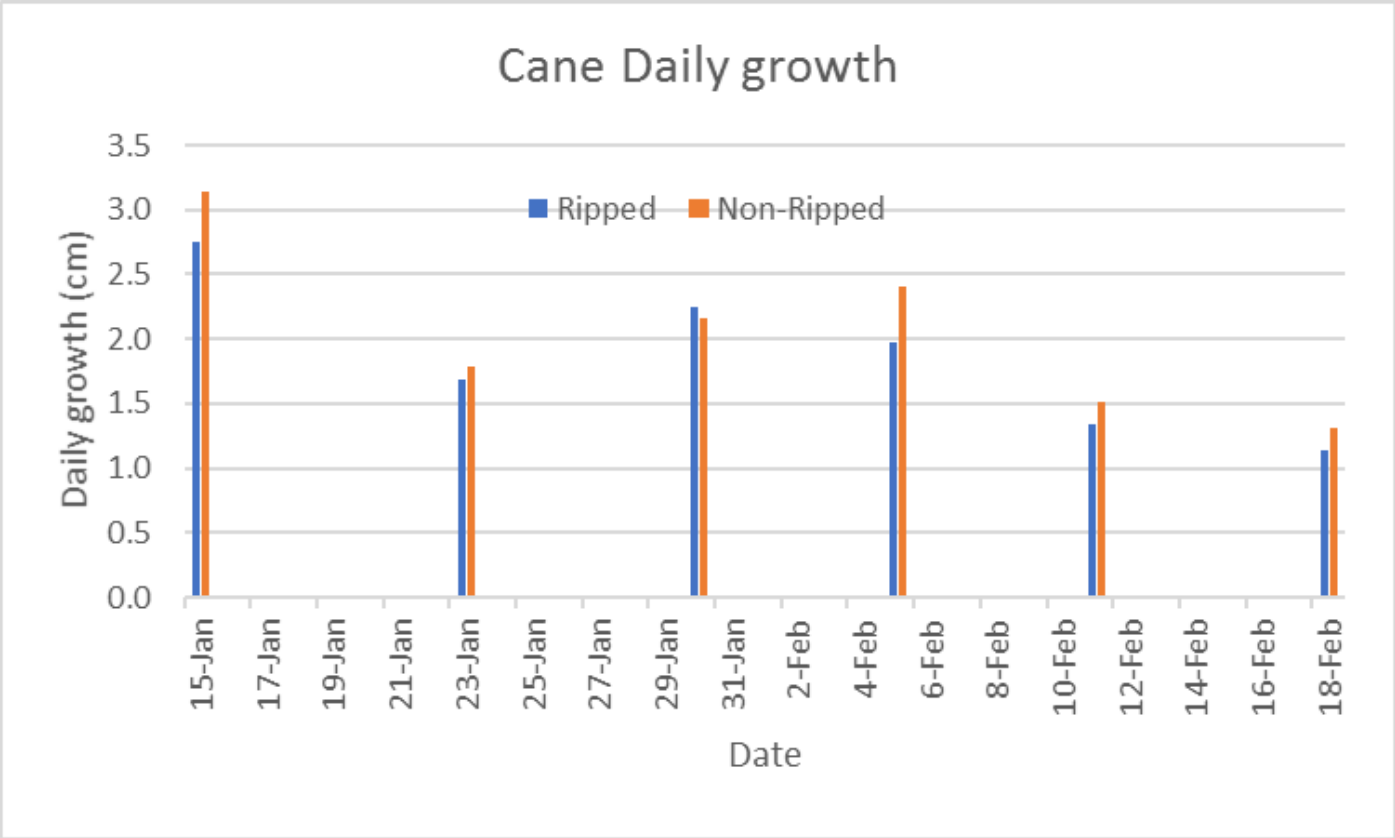


Figure 6 - Cane growth measurements

Soil bulk density was measured in the ripped and non-ripped sections to assess the longer term impact on the soil compaction. As Figure 7 shows, the bulk density of the soil changed with the depth, however the non-ripped soil generally had a higher bulk density than the ripped soil.

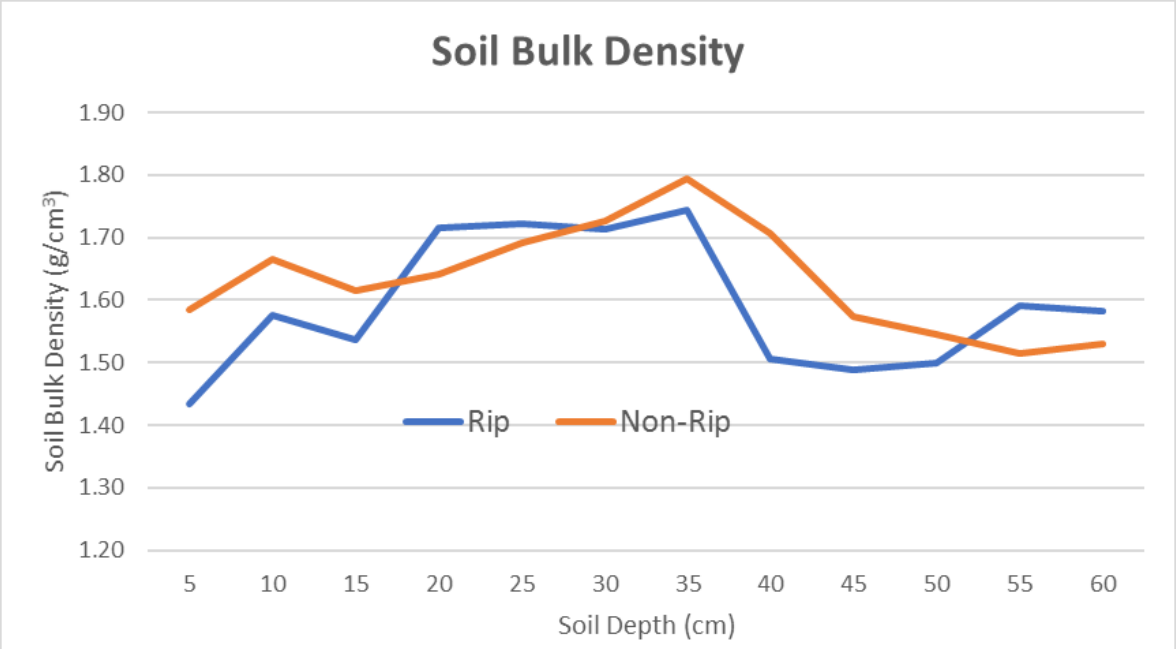
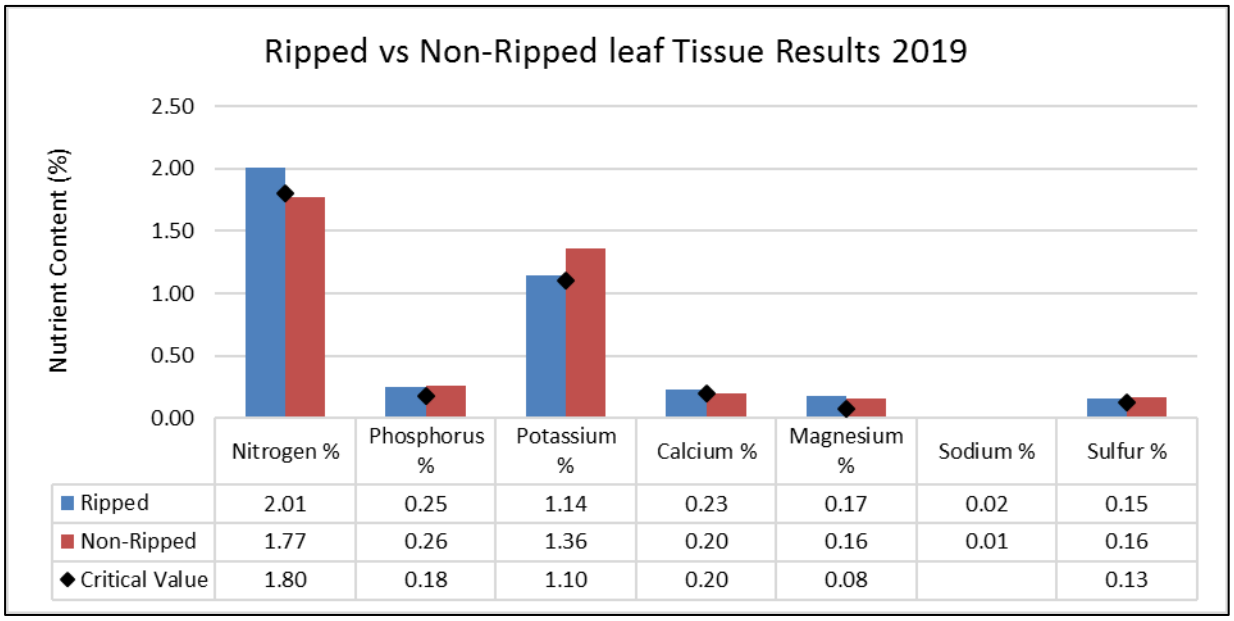


Figure 7 - Soil bulk density from 5 to 60cm.

Leaf Sample Results 2019

Leaf samples were taken in March 2019 to assess the difference between nutrient content of the cane in the ripped vs non-ripped treatments. Aside from nitrogen, all nutrients were above the critical value for both treatments. Nitrogen content in the ripped treatment was higher than the non-ripped treatment, however the potassium was opposite.



	Nitrogen %	Phosphorus %	Potassium %	Calcium %	Magnesium %	Sodium %	Sulfur %
Ripped	2.01	0.25	1.14	0.23	0.17	0.02	0.15
Non-Ripped	1.77	0.26	1.36	0.20	0.16	0.01	0.16
Critical Value	1.80	0.18	1.10	0.20	0.08		0.13

Conclusions and comments

Advantages of this Practice Change:
Disadvantages of this Practice Change:
Will you be using this practice in the future:
% of farm you would be confident to use this practice :