OVERVIEW

Farm area

120 ha

Region

Burdekin Delta

Number of years farming

Frank has been growing sugarcane for twenty-five years in the Burdekin; twenty-one years in the BRIA and four in the Delta.

BURDEKIN

FRANK MUGICA

Banded mill mud

Frank has been growing sugarcane for twenty-five years in the Burdekin; twenty-one years in the BRIA and the last four in the Delta.

Frank currently farms 120 hectares and has been actively investigating zonal application of mill mud on his farm. Following on from these trials implemented in 2014, Frank has extended his mill mud management strategies to incorporate mud at planting with great success. He uses a purpose-built Gessner tine bar to vee out the planting furrow, followed by mill mud banded into the vee and bedformed over the top. Frank had extended this practice into mung bean planting and experienced great results cutting nearly 2 tonnes to the hectare in 2017.

Frank is always keen to try innovative ways to improve his farming and is also involved in wetland restoration projects with NQ Dry Tropics. Frank is also very active in community based activities.

FOCUS ON

- Using banded mill mud on the hill to replace mud applied in the furrow (conventional)
- Reducing the risk of nutrient loads leaving farm
- Productivity and profitability of banded treatments compared to conventional application.

STORY

Mill Mud is an excellent source of nutrient and organic carbon that is applied to cane fields to improve soil health, soil chemical and physical status and improve crop yields. However it can lead to nutrient loss problems when applied in to furrow irrigated farms in the Burdekin. Mill mud applied in furrows can lead to significant amounts of phosphorous leaving farms. To address this issue, Frank became involved in trials investigating the potential of banding the mud on top of the hill instead of banding the product in the furrow on a first ratoon crop following plant cane harvest. Not only could this practice have the potential to reduce the risk of nutrient runoff, it could also improve productivity and reduce application costs. This trial was one of four trials in the Burdekin examining the productivity and profitability of applying mill mud using various methods and application rates.

Traditionally, mill mud is banded into the furrows of ratoons at a rate of 200 wet tonnes per hectare (200 wt/ha). Frank's trial compared this rate to 100 wt/ha banded in the furrow, as well as 120 wt/ha banded on top of the hill. These three treatments were compared against a treatment that had no mill mud applied to determine production benefits. Nitrogen (N) and phosphorous (P) applications were reduced in line with the SIX EASY STEPS recommendation in the first year. The following second and third years had Mid N (liquid biodunder fertiliser) applied at 3.3 m3/ha (180 kg N/ha, 83 kg K/ha and 15 kg S/ha) across all treatments however, no mud was reapplied in these years. The liquid fertiliser was applied due to issues experienced in the first year where the fertiliser chutes on the stool-splitter blocked up with the mill mud when being applied to the banded treatment, which led to inadequate amounts of inorganic fertiliser being provided to the plant.

The four treatments were replicated and conducted in the same positions each year. The treatments were as follows;

T1	No Mud
T2	Mud banded in the furrow (200 wt/ha)
T3	Mud banded in furrow (100 wt/ha)
T4	Mud banded on hill (120 wt/ha)

If results showed that mud applied on the hill is comparable to the other mud treatments over time, this practice could be safely adopted by the industry to improve crop yields whilst reducing off-site impact of nutrient losses to the environment.

At harvest each year, Farmacist staff were present to ensure all trial plots were consigned separately to ensure correct weights and commercial cane sugar (CCS) analysis were collected from the mill data. All farm operations including irrigation and chemical application was consistent across the block.

KEY POINTS

Mud applied on top of the hill compared similarly to mill mud applied at higher rates in the furrow. Due to the mud, which has a high P content, not being applied in the furrow, the banded practice on top of the hill can potentially lead to a significant reduction in nutrient loads leaving blocks. These trials have led to a couple of Burdekin contractors modifying their trucks and equipment to enable mud to be banded on the hill, which has been actively adopted up by growers who can see the benefit of strategically applying the product for economic and environmental reasons. Care needs to be taken when applying fertiliser post mud application, placing the fertiliser before the mud application would be a better option in hindsight.

As a result of this work, Wilmar Sugar is currently working with DEHP looking at placement and rate of application of mill mud products in both the Burdekin and Herbert regions to assist in developing guidelines on how best to use these products.

OUTCOMES TO DATE

Results for the first ratoon crop (2015) showed no difference between the in-furrow mud treatments and the control, however the on the hill mud treatment produced lesser tonnes in comparison. This may have been due to blockages in the stool splitter chutes that were not identified until later in the year via satellite imagery from University of New England. The costs of mud purchased and applied, as well as fertiliser costs were taken into account when calculating the gross margin (economic outcome) in the first year.

In the second ratoon crop (2016) with the change of fertiliser delivery systems, all mud treatments performed better than the control. Interestingly, the banded mud treatment on the hill produced more cane than the conventionally furrow applied mud treatments, and all the mud treatments performed better than the control highlighting the benefits of mud in the cane production system. The banded treatment on the hill also delivered the highest average gross margin in 2016.

FROM THE LANDHOLDER

The success of the banded mill mud trial tested on my farm over the past 3 years has given me the confidence to adopt the practice across the entire farm on ratoon cane. Building on success of this trial, I am now applying the banded mill mud subsurface, bedforming and then planting cane or mung beans. There has been significant improvement to our profitability in both sugarcane and mung beans with reduced input costs and increased yield. The support offered by Farmacist has really improved my profitability and farming practices. Being involved in Project Catalyst and working with Farmacist, DAFF and NQ Dry tropics has been really good and I urge other growers to give it a go.

This trial focuses on:

- *Using banded mill mud on the hill to replace mud applied in the furrow (conventional).*
- *Reducing the risk of nutrient loads leaving farm.*
- *Productivity and profitability of banded treatments compared to conventional application.*

In the final year (3R Q183), all mud treatments produced more cane than the control indicating a long-term positive effect. Cane yield and CCS was suppressed due to the crop being cut early in June 2017 to facilitate wet weather harvesting. As this was going to be a plough-out block, Frank decided to cut this block first and allow a crop of mung beans to follow straight after. Results showed the on the hill mud treatment performed the same as the furrow applied mud treatments three years after application. The results from these trials provide confidence that applying the mud on top of the hill instead of in the water furrow was successful. This practice should not only maintain similar yields as conventionally applied mud, but also lead to improved water quality and environmental stewardship.

2015	Cane t/ha	Sugar t/ha	Gross margin $/ha
Control - No Mud	148.0	19.3	$2,532
Mud applied in furrow (200 wt/ha)	149.2	20.2	$2,553
Mud applied in furrow (100 wt/ha)	144.6	17.7	$1,778
Banded mud on hill (120 wt/ha)	128.2	17.5	$2,105

2016	Cane t/ha	Sugar t/ha	Gross margin $/ha
Control - No Mud	110.2	16.7	$2,384
Mud applied in furrow (200 wt/ha)	128.7	18.7	$2,777
Mud applied in furrow (100 wt/ha)	125.7	18.9	$2,869
Banded mud on hill (120 wt/ha)	135.5	19.8	$3,025

2017	Cane t/ha	Sugar t/ha	Gross margin $/ha
Control - No Mud	107.4	11.6	$612
Mud applied in furrow (200 wt/ha)	118.0	13.0	$926
Mud applied in furrow (100 wt/ha)	115.6	12.8	$904
Banded mud on hill (120 wt/ha)	116.6	12.6	$789

Economic analysis provided by Matt Thompson, Senior Agricultural Economist with the Department of Agriculture and Fisheries.