Above: Chris Hesp

CHRIS HESP

BANDED MILL MUD

Property location: Mulgrave, Burdekin Haughton Water Supply Scheme (55 km west of Ayr)

Above: Auto flumes installed on Project Catalyst Banded Mill Mud trial

THE PROJECT

What's happening at this site?

Chris Hesp is hosting the Project Catalyst Mill Mud Application Trial that is looking at the water quality and economic outcomes of mill mud application in furrow irrigated systems.

FOCUS ON

- The results will give a better understanding of how to manage mill by-products to improve water quality while maintaining production measures such as yield, CCS and tonnes of sugar produced per hectare
- Identify the most sustainable method of management for mill by-products nitrogen and phosphorus movement off farm can be reduced while utilising this valuable resource

BACKGROUND

Chris completed his trade as a fitter and turner and spent time working at the Mulgrave Central Mill before moving onto the family farm in Gordonvale. In 1991, Chris and his wife Sonya made the move to Clare.

Originally from the Gordonvale district, the Hesp family was attracted by the opportunity to acquire affordable land when the Burdekin irrigation areas opened up, and purchased an undeveloped block and water allocation. The family enterprise now owns four adjoining farms in the Mulgrave area in the Burdekin Haughton Water Supply Scheme.

Moving from the wet to dry tropics was a steep learning curve for Chris and Sonya, but twenty five years on they have no regrets. "The shift has taken me out of my comfort zone and challenged me to adapt to new and very different surroundings," Chris said.

QUOTES FROM THE GROWER

"Funding stimulates growers to undertake change sooner and to try something new, or higher risk," said Chris.

"What works well in some districts does not always work well in others, however there is always a way to improve farming practices."

CHALLENGE

Chris could see the potential benefits of improved crop yields, soil health and water quality if mill mud application was viable; however it has not typically been economical to apply mill mud in the Mulgrave farming area because of its distance from the Invicta mill. This significantly increases the cost of transporting mud to the farm. To address this, the rate per hectare of mill mud needed to be reduced and an alternative method found for the furrow irrigated system.

Local mill mud contractors were engaged to source suitable machinery for strategic application. Delivery partner Farmacist field staff worked with Chris to identify nutrient rates and management practices for the new system to maintain yield.

TREATMENTS

T1	Conventional @ 200t/ha
T2	Broadcast @ 100t/ha
T3	Banded @ 65t/ha
T4	Control @ 0t/ha

WATER QUALITY MONITORING

The Burdekin-Bowen Integrated Floodplain Management Advisory Committee is monitoring the water quality of this trial. Runoff water is being measured using auto-flumes catching the first 10 runoff events from the trial areas. Both irrigation and rainfall are being monitored to track the loss of nutrients from the full set of treatments.

All samples are sent for analysis by the Queensland Government Department of Science, Information, Technology and Innovations laboratory to identify the rate of nitrogen released from applied fertiliser and flux of phosphorus from the varied application rates of mill mud.

ECONOMIC ANALYSIS

The economic analysis developed by delivery partner the Queensland Department of Agriculture and Fisheries will compare the profitability of various mill mud treatments on Chris's farm. Key factors examined include crop growing expenses such as fertiliser costs, mill mud expenses and machinery operation costs over a crop cycle. In addition, yields and commercial cane sugar will be examined to compare the overall profitability of each treatment.

Above: Banding mill mud in the Burdekin

OUTCOMES TO DATE

As the Hesp farm is located a considerable distance from the nearest mill, the cost to apply mill by-products (mud) conventionally at 200t/ha is substantial (cartage = $1,200/ha). In comparison, banding mud at 65t/ha is one-third of the cost ($390/ha). Because mud applications supply nitrogen and phosphorus to the soil, growers are able to make fertiliser cost savings by applying less of these nutrients as fertiliser. By adjusting fertiliser use over a whole crop cycle, Chris can save around $160/ha in fertiliser costs when banding mud at 65t/ha, or up to $460 when applying mud conventionally at 200t/ha. Also, the treatments have different cultivation requirements, which have some influence on relative growing costs. Figure 1 illustrates the average annual expense on mud, fertilising and cultivation over a crop cycle for each treatment.

Figure 2 compares the average gross margin of each treatment in Chris's second ratoon crop based on 2014-15 production results from the trial. The gross margin was calculated by subtracting growing costs (including mud cartage costs) from gross revenue. Each blue column (mud treatments) in the graph has three different components. Together, the shaded and cross-sectioned areas of each column represent the gross margin, while the cross-sectioned area alone denotes the proportion of mud cartage costs that have so far been recovered via yield improvements and cost savings (mostly fertiliser). The area represented by the dashed line (and arrow) identifies the improvement needed for each treatment to breakeven with the control (no mud) treatment over the rest of the crop cycle.

The results show that all the mud treatments need gross margin improvements during later ratoon crops to recover the whole sum of the mud cartage costs. The total cane yield improvement needed by each treatment to breakeven with the control has also been calculated. The results indicate that the conventionally applied mud treatments, at 200t/ha and 100t/ha, and the banded treatment require cane yield improvements of approximately 14.6, 4.8 and 7.3 tonnes of cane per hectare, respectively (assuming a constant CCS). In this case, the banded mud treatment needs a larger yield improvement than the 100t/ha treatment because it attains less fertiliser cost savings over the crop cycle.

Moving forward, the inclusion of additional trial data from subsequent ratoons will determine if the obtained yield improvements are enough for each treatment to break-even with the control treatment.

KEY POINTS

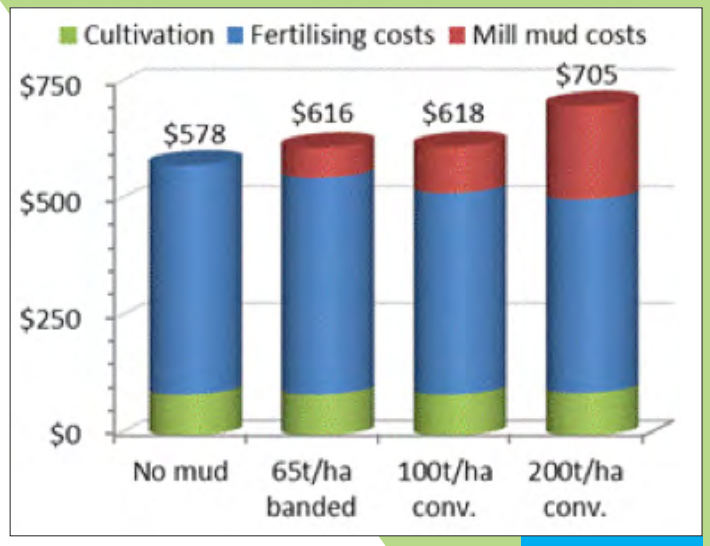
Banded Mill Mud trial

Aim - Compare the profitability and water quality gains for varying mill mud treatments

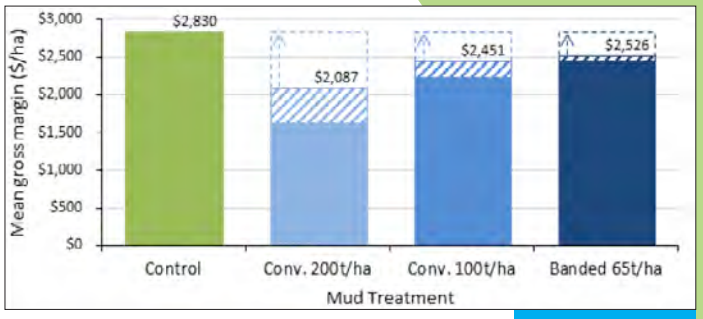
Factors

- Crop growing expenses
- Cane Yield and CCS
- Distance from Mill (cartage costs)
- Soil types
- Mill mud application methods
- Capital cost for contractor applicator conversion
- Mill mud quality variability
- Water quality monitoring: Auto flumes

The results will identify the most profitable treatment of mill mud and additionally the treatment with the best water quality gain. This information will allow the primary producer to make an informed decision on potential economic savings, soil health benefits and improvements in water quality leaving the farm when applying mill mud.



Above: Figure 1



Above: Figure 1