

Project Catalyst

Case study



Manual Muscat improves productivity and increases nitrogen use efficiency

Grower Name: Manuel Muscat
Entity Name: J & F Muscat and Sons
Mill Area: Plane Creek
Total Farm Area: 210ha
Area under Cane: 183ha
No. Years Farming: 35
Trial Subdistrict: Dawlish

THE CHALLENGE

In the Mackay region, analysis of soil properties indicated more than 20% of the soils have high sodium levels. Sodic soils have poor soil structure which affects water infiltration, percolation, and nutrient availability. High sodicity levels cause clay particles to swell excessively when wet to the point they separate and disperse. This results in structural collapse of the soil profile, and as the soil dries out, the dispersed soils reharden and block soil pores, which causes issues such as water logging, hard crust formation on the surface and a decrease in gaseous exchanges. Typical impacts of sodic soils on sugarcane crops include a reduction in plant population and poor crop yield, which decreases the overall economic viability of the farm.

In blocks with sodic soils, it can be hard to decide which cane variety to plant. Should a hardy variety such as Q138 be planted? This variety performs better in sodic areas but has a lower sugar yield than many other varieties. Alternatively, should a higher yielding variety such as Q183 be planted to take advantage of the non-sodic soil in the block, but sacrifice yield in the sodic areas? It is a problem facing many growers across the region.

This trial has now ended, and it was concluded that mixing Q138 and Q183



Manuel Muscat

together and planting this across the block, yielded the highest cane tonnage.

THE TRIAL

This trial assessed a paddock with distinct sodic (ESP 19.83) and non-sodic (ESP 3.84) areas, and planting varieties that suit accordingly.

The treatments were:

1. Plant Q138 Variety across the block, incorporating sodic and non-sodic areas
2. Plant Q183 Variety across the block, incorporating sodic and non-sodic areas
3. Plant Q138 in sodic area and swap to Q183 for the rest of the row
4. Mix Q138 and Q183 together and plant across the block

TRIAL DETAILS

Trial Crop: Sugar cane
Variety: Q183 & Q138
Trial Block: PCK-305A 12-02
Trial Block Size: 11.9 ha
Soil Type: Sodosol – sandy to loam topsoil over a grey/brown clay

The trial site was electromagnetically mapped with an EM38K mapper to determine the location of soil boundaries. High EM readings (blue & green) are often associated with soils that are heavier in texture, high levels of salt (such as sodium) and can have drainage issues, while lower (red & yellow) EM values often indicate lighter textured soils with better drainage properties. The dark blue zone in the trial paddock is sodic while the yellow is non sodic.

What it's about

Project Catalyst is a grower-led innovation project in sugar cane that was formed to explore and validate farm management practice change leading to improved water quality for the Great Barrier Reef. For more information on Project Catalyst please visit our website <https://www.projectcatalyst.net.au/> or phone Catchment Solutions on 07 4968 4216.

TRIAL STAGES

	Date	Activities
Stage 1	July 2016	EM map and soil sample to assess soil constraints
Stage 2	September 2016	Plant sugarcane according to trial plan
Stage 3	October 2017	Catalyst bus trip
Stage 4	October - November 2017	Harvest
Stage 5	November 2017	Fertilise crop according to 6 easy steps legal rate
Stage 6	January 2018	Canopy leaf cover analysis
Stage 7	September 2018	Trial harvest
Stage 8	October 2018	Fertilise crop according to 6 easy steps legal rate
Stage 9	September 2019	Final trial harvest

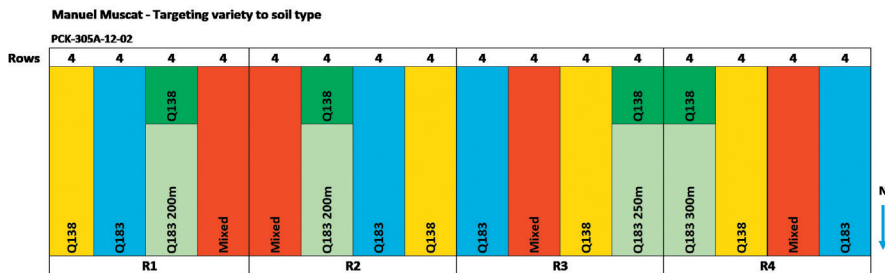
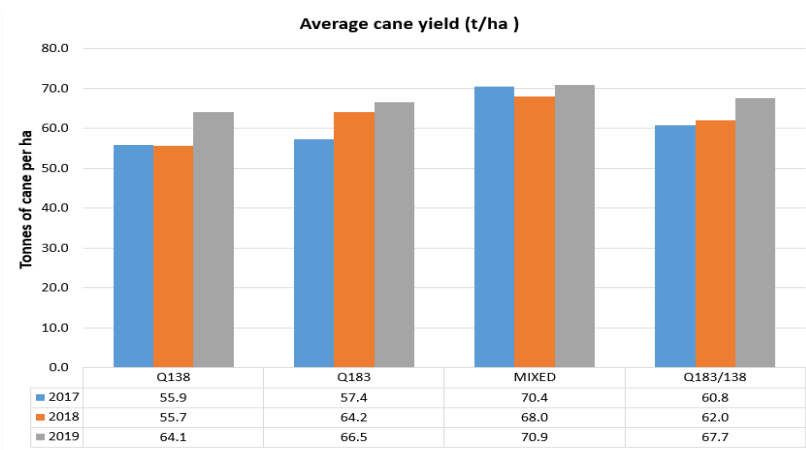
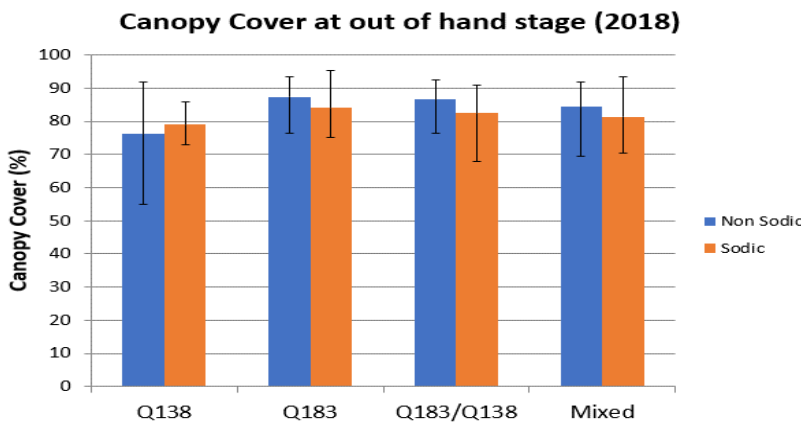


Figure 1 - Trial Design



Graph 1 - Average cane yield from 2017 -2019



Graph 2 - 2018 Canopy cover % at OOH

RESULTS

The past three years of cane harvest results indicated that mixing Q138 & Q183 billets together and planting the mix across the paddock, produced the highest yield. The targeted planting of Q138 in the sodic area's and Q183 in the non-sodic areas within rows, yielded more than planting straight Q183. The lowest yielding treatment was straight Q138, which yielded around 5 tC/ha less than the mixed variety treatment.

Vegetation data collected in January 2018 demonstrated that straight Q183 had the largest canopy cover, which is expected as this variety produces a larger biomass than Q138. Biomass was larger for all treatments in the non-sodic areas.

Manuel commented that he wasn't sure why the mixed variety performed as well as it did, however he has been planting other mixed variety paddocks and noted that certain varieties such as Q208, did not respond well to being mixed with another variety. More trials are required to better understand, the potential, mixed variety plantings have in overcoming certain yield constraints.