

Case Study 1: Simon Mattsson, Marian

1

Multi-species intercrop trial within sugarcane

BACKGROUND

Simon Mattsson has a sugarcane farm on the north side of the Pioneer River at Marian. Sugarcane farmers in the Mackay region have been experiencing a decline in production over the last 15 years which Simon believes is due in part to declining soil health from the long-term sugarcane monoculture. This cropping system has led to declining levels of soil carbon and reduced diversity in the soil biology.

The idea for this trial came from Simon's Nuffield Scholarship trip to the United States where corn farmers in North Dakota have shown that growing a range and diversity of plant species within their corn crops has significantly improved the soil health. Plant and crop diversity also increased the spectrum of species within the soil biology populations, in turn increasing soil carbon and nitrogen fixation and increasing the uptake of all nutrients. This led to yield being maintained while significantly decreasing usage of chemical fertilisers.

TRIAL OVERVIEW

Simon has established a multi-species intercrop trial over four hectares. Within the trial, three treatments have been replicated four times. Eight species of plants are being used within these treatments and these include: radish, turnip, chickpea, soybean, common vetch, sunflowers, cereal rye and oats along with use of more biologically friendly fertilisers. Plant species are planted beside the sugarcane stool after harvest.

This trial seeks to determine if growing diverse plant species alongside the sugarcane can help to increase fixation of soil carbon and nitrogen, improve nutrient cycling and improve the spectrum and diversity of soil biology and therefore soil health.

The three treatments consist of:

1. A control which is the sugarcane monoculture with standard chemical fertilisers.
2. Sugarcane with 4 of the 8 multispecies (oats, cereal rye, turnip and common vetch) but using alternative fertilisers to supply the same amount of nutrients as the control.
3. All 8 of the multispecies with the same alternative fertiliser products.

This is the first year of the trial with the multispecies being planted in mid-July following harvest of the cane in late June. The multispecies were then sprayed out and crimp rolled in early October to speed up the biological break down and the release of stored nutrient back to the cane crop.

RESULTS

Result analysis is underway, with the first set of soil sampling recently taken by Dr Graham String, with further analyses to be done in December and again in February. Soil analyses will include soil biology, forms of soil carbon and macro and micro-nutrients. Sugarcane yields will also be measured from each of the replications.

The benefits of this cropping system are expected to be many and varied and will take time, possibly more than one growing season, to show. Anticipated benefits to be measured include improved nutrient cycling and uptake of nutrients, increased soil carbon levels, weed suppression, water retention in dry periods and improved drainage during heavy rainfall events.

In the longer term Simon hopes this will lead to longer rotation cycles through improved soil health, a more resilient and robust sugarcane crop and production benefits associated with significantly reduced inputs.

FOLLOW THE TRIAL

To follow the trial and keep up to date with Simon's results find Simon Mattsson on Facebook, or contact Reef Catchments: Peter Muller on 07 4968 4234 or E: peter.muller@reefcatchments.com



Opposite:

Simon's multi-species trial plot in the early stages and below, the trial flourished prior to crimping in early October.



Intercropping trial

Marian:

Simon's trial includes the intercropping of 8 varieties of plants to improve soil condition. Species include: radish, turnip, chickpea, soybean, common vetch, sunflowers, cereal rye and oats.

Trial site:

Three treatments have been replicated four times across the trial, including on a control trial treated with standard chemical fertilisers to provide a benchmark for comparison.

This trial is supported by Reef Catchments Sustainable Agriculture Program, through funding from the Australian Government's National Landcare Program. Simon's work is also supported through the Nuffield Agricultural Scholarship, with funding from Sugar Research Australia.