Well grown lablab crop

CASE STUDY

BACKGROUND

Legume break crops grown in the sugarcane fallow period can produce significant quantities of nitrogen during their growing phase. Typically, when these crops are terminated, the legume crop breaks down rapidly due to its low carbon to nitrogen ratio, releasing mineral nitrogen to the soil. This nitrogen becomes quickly available in the soil for plant uptake. A plant crop of sugarcane which is planted following the termination of the break crop has a low requirement for nitrogen early in its development phase. The time delay in the demand for this nitrogen from the sugarcane crop puts a substantial portion of the mineral nitrogen in the soil at risk of loss to the environment should excessive rainfall events occur.

This trial was undertaken to evaluate if a cereal crop grown after the legume fallow could take up the mineral nitrogen from the soil and protect it from loss. This nitrogen would then become available to the developing plant cane crop after the cereal is terminated and begins to break down.

The trial is located in Koumala in a 1.5ha field.

FOCUS ON

- Reducing risk of nitrogen loss after a legume break crop

KEY POINTS

- Well managed legumes produce large amounts of nitrogen
- If this nitrogen is not lost, no other fertiliser nitrogen is needed for a following plant cane crop
- Oats worked as a nitrogen capture crop – more trial work to show how the nitrogen is returned to the soil and following cane crop in this environment would be useful.

"The lablab produced large amounts of nitrogen and much of this was taken up by the oats crop, which prevented it from being lost. We intend to expand this practice – we are even looking at introducing the cereal crop into the plant cane to allow earlier cane planting while still using the cereal to take up as much nitrogen as possible."

– Robert Sluggett, Landholder

National Landcare Program.

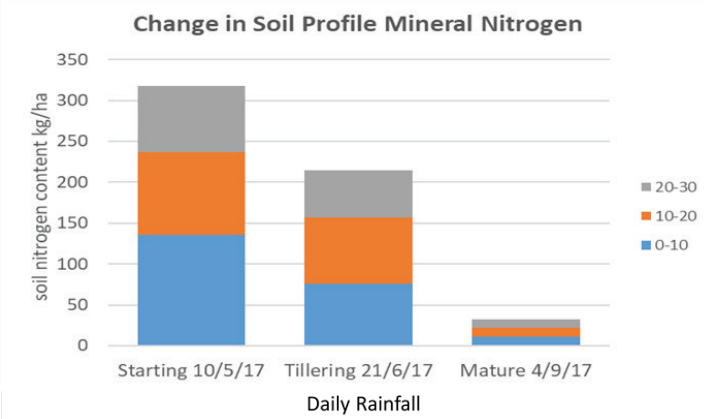
Rob Sluggett is the director and an agronomist at Farmacist, and has participated on his own property in sustainable agriculture trials with Reef Catchments since 2012, conducting mill mud nutrient trials.

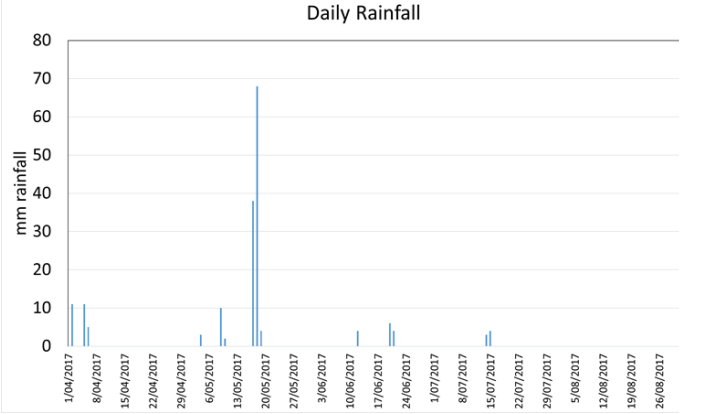
Rob purchased his first farm in 2006, and has been conducting trials and experimenting ever since. He has two farms with a total of 100ha, both in the Koumala area, one property is irrigated and the other is dry land. His farms utilise 1.85m row spacing with controlled traffic, and is all GPS run, which was funded by Reef Rescue 1. During Reef Rescue 2, he converted his sprayer to GPS control, and has been doing variable rate application of herbicide based on soil mapping. Rob was one of the first people to do this using "Balance Herbicide". With this, he reduced the amount of herbicide being used and the amount of potential run-off. Rob believes that if he didn't receive the Reef Rescue 2 funding, it would probably have taken many more years to afford this on his own.

Currently at this site there is lablab legume crop which was grown over the summer fallow period as a break crop for sugar cane. This lablab crop produced 160kg/ha of nitrogen in its above ground biomass, no attempt was made to measure the root system nitrogen content. The crop was sprayed out and worked into the ground prior to planting a crop of Aladdin variety oats.

As the oats crop developed, it progressively accessed the nitrogen from the soil. The mature oats crop was measured to have taken up 170kg/ha of nitrogen.

Soil mineral nitrogen changes are shown in the chart below.





OUTCOMES TO DATE

Sample results showed that there was just over 300kg/ha of mineral nitrogen in the soil profile to 30 centimetres depth at the start of the oats crop (10th May). At tillering (21st June), the soil profile nitrogen content had been reduced to just over 200kg/ha and by crop maturity (4th September), there was 33kg of mineral nitrogen remaining in the top 30cm of the soil profile. By crop maturity, sampling measured that 170kg/ha of nitrogen had been taken up by the oats crop, effectively protecting it from potential losses.

Only one substantial rainfall event occurred during the life of the oat crop on 17th and 18th May 2017. This event is likely to have contributed to some loss of soil nitrogen due to denitrification. The crop was regularly irrigated, particularly in the latter stages of development. Due to the excessively dry weather that prevailed during winter and spring, the grower cut and baled the crop for hay for his livestock, removing the opportunity to monitor the breakdown and release of the oat crop nitrogen back to the soil.

National Landcare Program.

National Landcare Program.

REEF CATCHMENTS (MACKAY WHITSUNDAY ISAAC) LIMITED

PH (07) 4968 4200
E info@reefcatchments.com

www.reefcatchments.com

Support for this project is provided by Reef Catchments, through funding from Australian Government National Landcare Program.