



Nitrogen – one piece of the puzzle

The Burdekin is well-known for its cane fields, mango trees and idyllic fishing spots. It is also home to RP20, a collaborative research project funded by the Department of Environment and Heritage Protection.
By Andrea Evers

Project details

Key Focus Area: 2

Soil health and nutrient management

Project name

Nitrogen fertiliser requirements for representative soils of the Lower Burdekin cane growing district

Project number

RP20/14C

Funding body

Department of Environment and Heritage Protection

Project leader

Julian Connellan

Project end date

June 2017

Julian Connellan, SRA researcher and project leader, has been active across the 23 trial sites in the Burdekin, which have been part of the project over the last 4 years.

The collaborators allow Julian to set up strip trials on their farms, while maintaining their usual farm management practices.

A low, medium and high nitrogen rate is applied to the strip trials on each of the collaborators' farms. These rates are calculated according to the SIX EASY STEPS™ guidelines and may therefore vary from one farm to another.

Trials are currently being harvested with Julian and/or Johan Deutschenbaur (SRA technician) attending each harvest to make sure the work is conducted in a way that ensures data integrity.

This often means being in the paddock on weekends to oversee the harvest, for which they have gained respect from the farmers involved in the trials.

Apart from capturing yield and CCS data at harvest, another important area of investigation is to gain a better understanding of how much nitrogen is being captured and used by sugarcane crops. To do this, small sections of selected blocks are harvested at key times during the season to determine how much nitrogen has been taken up by the crop and by their root systems. Soil sampling is also used throughout the various stages of crop development to monitor soil nitrogen levels along with regular testing of irrigation water for nitrates to determine how much nitrogen, if any, is being added with each irrigation event.

By gaining a better understanding of the amount of nitrogen going into the farming system and determining the amount of nitrogen utilised by the crop, growers can develop a simple budget. This information, along with the results obtained from the strip trials, can be used to provide a more informed understanding of crop nitrogen requirements in the Burdekin.



A fertiliser box has been specifically developed for this project. It includes load cells that allow Julian to monitor the amount of fertiliser which has been applied to each strip. This piece of machinery is a stool splitter and side dresser. It is not common place to use a commercial size piece of equipment to undertake research. This is yet another factor that makes this project unique.

General farm management practices such as crop establishment, weed control and irrigation management are also monitored at all trial sites to gain an understanding of their potential impacts on final yields.

While there is still another season of trials and data to collect before the project is finalised in 2017, indications so far are that the SIX EASY STEPS™ recommendations provide enough nitrogen fertiliser to allow crops in the Burdekin to reach maximum yield. The preliminary results appear to indicate that the highest net revenue outcomes were achieved with the nitrogen application rate determined by using the SIX EASY STEPS™ method.



To gain a better understanding of irrigation management practices employed by farmers, soil moisture monitoring devices have been placed in all existing trial sites. These devices monitor soil moisture at various depths throughout the soil profile. The probes take regular readings, which are then downloaded and analysed. This information is invaluable in gaining a better understanding of the irrigation management practices employed by farmers involved in the trials and the impact this may have on final yields at each farm.

The RP20 project is being described as a success story for a number of reasons, perhaps most importantly because of the collaborative approach used to develop and implement the project. Scott Robinson, Director of Reef Water Quality within the Department of Environment and Heritage Protection, attributes the success of this project to a number of factors.

'For me, the success of this program can be attributed to two factors. Firstly, growers that were involved in the trial got to experience first-hand the potential benefits of

modifying age-old practices—from both productivity and profitability perspectives. Secondly, successful collaboration between growers, industry and government who have collectively improved their understanding of nitrogen use efficiency and their willingness to maintain open minds. As we moved through the project and negotiated the challenges that arose, the growers' willingness to move forward has been reassuring and encouraging.'

David Defranciscis, a third generation Burdekin grower, whose passion for his industry drove him

to find a definitive answer to the question 'how much fertiliser do we actually need to grow a profitable crop of cane', has taken on a pivotal role in the project as Industry Liaison Representative. 'It's David's passion and commitment to the project that has made the difference', explains Dominic Henderson, principal Project Officer of EHP. Evan Shannon was also instrumental in setting up the trials. Evan worked with David to help secure funding and provided assistance in the early stages of the project to identify suitable trial sites using his extensive knowledge of the Burdekin.

David is convinced that the collaborative approach between EHP, SRA and the participating growers means that the final results of this trial will lead to positive, on-farm changes that will allow his industry to remain productive and enjoy a profitable future.

'SRA was the perfect fit as far as the science goes. I trusted that SRA would act impartially and knew their scientific methods would stand up anywhere in the world. Nitrogen is an important issue for farmers. We need to care for our environment but at the same time be given the opportunity to run profitable businesses.'

David also believes that the farmers who are participating in the trials (collaborators) are benefiting and experiencing a shift in thinking around nitrogen application, as he did. 'I wouldn't have believed the results unless I saw them on my own land. The trials are being conducted over a full crop cycle on all the major soil types in the Burdekin. To date we have established and harvested 23 trial sites, however I still think everyone needs to test the SIX EASY STEPS™ recommendations on their own farm.'

The trials have highlighted to David the importance of farming practices.

'Historically we've always thought that nitrogen is the answer. However, the trials have shown that good farming practices are essential for maximising crop potential. Regardless of how much nitrogen you apply, if your crop establishment, pest control or irrigation management are lacking you cannot achieve maximum productivity. Good practices along with adequate fertiliser will give farmers the best opportunity to maximise their yields.'

David's sentiments are echoed by a number of other collaborators.

Ryan Matthews, SISL – Selkirk

Ryan Matthews, farm manager at SISL, has been involved in the project for the past 18 months and says the trials are set up in a way that have minimal impact or disruption. The initial angst that he felt about being involved quickly dissipated. 'The trials are a breeze', he said. 'They are harvester and farmer friendly.'

The first harvest of the trial site occurred earlier this year, the results of which were made available to Ryan, as they are to all collaborators involved in the project. Ryan says that these results gave him the confidence to know that he was on the right track and to reduce his nitrogen application on other blocks. 'The information Julian provided has allowed me to build a knowledge base that I will continue to work with each block across the farm.'

Something else that is clear to Ryan is that nitrogen is only one part of the picture. He believes all practices need to be carried out effectively. There is no need to compensate with a high nitrogen rate when other practices on farm, such as irrigation, weed management and crop establishment, are carried out effectively.

Malcolm and Aaron Kelly – BRIA

This is the second year that Malcolm and Aaron Kelly are collaborators in the project. They initially became involved because they wanted to gain a better understanding of nitrogen rates and other factors that may influence yield. They had also just planted a new variety and wanted to see how it would perform using the SIX EASY STEPS™ rate.

The results from their trials so far have seen a slight shift in their views around nitrogen application. 'We now understand that more is not always best and nitrogen wasn't necessarily driving yield, but is one piece of the puzzle', says Aaron.

Both Malcolm and Aaron believe that the results that they get from their second trial block next year will give them information that they think will be suitable for 50-75 percent of their farm.

Being involved in the trial has meant an investment of some extra time but Malcolm and Aaron have been happy to be involved given the outcomes. Aaron explains, 'the bit of extra time that we've invested in the trials has been worthwhile for us. After all, saving on fertiliser means saving money.'

Eric Barbagallo – Home Hill

Eric is one of the original collaborators in the project, beginning in 2011.

Eric says that his involvement in the project has been really good for him.

'We got into bad habits with the belief that if you put enough water and fertiliser on the crop, it'll grow. Before the trials, I was applying around 290 kg per hectare of nitrogen because I used to think the more nitrogen I applied, the bigger the crop would grow.'

Eric is yet another collaborator who, through participation in the project, has experienced a shift in thinking.

He now also believes that nitrogen is only one piece of the whole farm management system.

'I'm now convinced that with a well-managed crop, the SIX EASY STEPS™ rate is ample to grow a profitable crop. There is no doubt in my mind.'

Eric has been impressed with how meticulously the trials have been monitored, which is why he believes that there's no arguing with the results.