

*Caneco*NECTION

Summer 2020

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WELCOME TO THE SUMMER 2020 EDITION OF *CaneConnection*

With the season drawing to a close, and the focus turning to the crop for 2021, we have a number of articles looking at the crop ahead. This starts with another look inside the SIX EASY STEPS toolbox, including information on managing final ratoons and also late-season ratoons.

On a similar topic, we also meet with Edmonton grower Doug Hardwick, who has been involved in the Cane to Creek 2.0 project in the Far North. Doug shares his experience, through the project, on refining nutrient rates on final ratoons on page 6.

Staying in the north, we also visit a number of growers involved in the RP222C project: *Russell-Mulgrave Complete Nutrient Management Planning for Cane Farming*.

We also talk about work examining peanuts and sugarcane and stop by Proserpine for the latest on the *Myrtle Creek* project.

We also hope you enjoy the Sugar Snaps shed calendar, which will have arrived in the post alongside this edition of CaneConnection. Congratulations to everyone who submitted their photographs to the competition and, as you can see from the calendar, the judges had a tough job on their hands in choosing a winner. The calendar also includes a short farm management tip each month.

In the next edition, we will be talking in depth on ratoon stunting disease, including observations from growers in managing and avoiding RSD.

Brad Pfeffer

Executive Manager, Communications

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*(Cover page) Neil Maitland on farm at Alooomba.
Picture by: Brad Pfeffer*

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THE NUMBER OF PADDOCKS COVERED IN FNQ AS PART OF RP222C WITH SRA. **PAGE 10**



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THE NUMBER OF GROWERS INVOLVED IN THE RP222C PROJECT WITH SRA IN 2020. **PAGE 8**



\$110

THE POSITIVE DIFFERENCE IN GROSS MARGIN (PER HA) FOR DOUG HARDWICK IN A TRIAL THAT REFINED RATES ON FINAL RATOONS. **PAGE 6**



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\$3000

THE POTENTIAL GROSS MARGIN (PER HECTARE) OF PEANUTS IN A COMPLEMENTARY CROPPING SYSTEMS WITH CANE. **PAGE 18**

BY THE NUMBERS

INTRODUCING THE SIX EASY STEPS TOOLBOX



Scan the QR code left with your smart phone to go straight to the Toolbox.

SUGARCANE growers have access to a new online toolbox to help make nutrient management easier.

The SIX EASY STEPS toolbox is now available on the SRA website and is built on years of research into nutrient management in the Australian sugarcane industry by SRA and other industry service providers.

"The SIX EASY STEPS Toolbox packages this research into a suite of information products and interactive tools. It contains practical guidance for growers to refine nutrient management practices based on evidence from industry research projects," said Dr Barry Salter, SRA Executive Manager, Biosecurity and Production.

"These tools fit within STEPS 5 and 6 of the SIX EASY STEPS, and will assist growers and advisors to develop nutrient

management strategies that are specific to their farms."

By clicking online to visit the Toolbox, growers can also access tools that will help them with specific circumstances they face in their own districts and farms.

The Toolbox was developed with investment by SRA, the Queensland Government's Reef Water Quality Program and CANEGROWERS, and in collaboration with the University of Southern Queensland, University of Queensland and Farmacist.

The development was led by SRA Adoption Officer, Gavin Rodman, and Executive Manager for Biosecurity and Production, Barry Salter, with help from many other industry supporters.

Mr Rodman said that the Toolbox brought together trial data, case studies and

decision support tools for the refinement of nutrient rates for specific production system issues.

"It has been developed with widespread collaboration and consultation and we thank everyone for their time and assistance bringing this toolbox together. It will continue to be updated with new information and improvements over time.

CaneConnection will provide a snapshot of each of the tools over coming editions. In this edition we will introduce the tool for late season harvested ratoons and the tool for final ratoon crops, starting with the following two pages.

"We encourage growers, advisors and industry stakeholders to visit sugarresearch.com.au and visit the Toolbox, found directly under the 'Growers and Millers' tab of the home page." ■

SIX EASY STEPS[®]

Toolbox

MANAGING LATE SEASON RATOONS

By Gavin Rodman, Adoption Officer, Nutrient Management

Sugarcane crops ratooned late in the season may provide opportunities to refine nutrient rates, part of STEPS 5 and 6 of the SIX EASY STEPS. These opportunities may be available as a result of these crops being generally impacted by less favourable climatic conditions, often with the onset of the wet season shortly after harvest.

Due to these weather-related constraints, late harvested crops could potentially have reduced productivity, increased nutrient losses and a lower likelihood of responding to nutrient inputs than crops ratooned and fertilised earlier in the season.

The following information is a snapshot of the guidance provided in the Late Season Ratoons tool in the SIX EASY STEPS toolbox.

Crop condition:

The condition of a crop can provide an indication as to its ability to use applied nutrients efficiently.

Poor crop condition may be associated with several factors including harvest damage, pest or disease damage, loss of stools, high weed pressure and generally poor ratooning.

Reducing nutrient inputs for crops harvested late in the season is likely to have lower risk of productivity loss if these crops are also in poorer condition.

Soils and position in the landscape:

Soils located low in the landscape that are prone to waterlogging are at risk of losing nitrogen by denitrification. Waterlogging also reduces the ability of roots to function and take up nutrients.

Reductions in yield may be more pronounced, and the response to nutrients reduced, for crops harvested late in the season on soils in low lying positions, particularly during severe wet seasons.

Climate considerations:

Climate outlooks are an important tool to consider when determining an appropriate nutrient management strategy. By having an indication as to the likelihood of future weather events and seasonal climate outlook, suitable management decisions can be made.

In years experiencing excessive spring summer rainfall (typical of La-Niña events) and low solar radiation, crop growth and responsiveness to applied nitrogen may be reduced.

Guidance for nutrient application on crops harvested late in the season:

A reduction to fertiliser application rates of up to 20 percent could be tested on farm.

In the Burdekin, as crops age and are ratooned under less than ideal conditions late in the season, the likelihood of them responding to the higher N application rate based on a DYP of 180 t cane/ha decreases. In this case, adjusting to lower N rates based on a DYP of 150 t cane/ha could be considered.

It is recommended that any change in management is tested on-farm. This will build confidence in both the new nutrient rates but also the process of fine tuning a nutrient management program as part of steps 5 and 6 in the SIX EASY STEPS. A guideline for conducting on-farm trials is included in the SIX EASY STEPS toolbox. ■

To see the late season ratoons tool in its entirety and access more information please visit the **SIX EASY STEPS TOOLBOX** or scan the QR code to the right.





SIX EASY STEPS[®]

Toolbox

MANAGING FINAL RATOON CROPS

By Gavin Rodman, Adoption Officer, Nutrient Management

Sugarcane crops entering their final ratoon may provide opportunities to refine nutrient rates, part of **STEPS 5 and 6** of the **SIX EASY STEPS**. These opportunities may be available as a result of these crops being generally impacted by any number of constraining factors which affect their ability to respond to nutrient inputs

However, not all final ratoon crops are in the same condition, and should therefore not be managed the same.

The following information is a snapshot of the guidance provided in the Final Ratoons tool in the **SIX EASY STEPS** toolbox.

Final ratoon in good condition:

Some final ratoon crops may be highly productive.

This may be due to favourable growing conditions, good farm management, shorter crop cycles where younger ratoons (eg third ratoon) are ploughed out to maintain a particular block rotation strategy, or other factors.

These crops may show both productivity and economic responses to nutrients applied at **SIX EASY STEPS** recommended rates.

Final ratoons in poor condition:

Many blocks entering their final ratoon are poorer performing than other blocks on the farm.

Poor performance may result from disease, pest damage, harvest damage, weed infestation or weather-related impacts.

Understanding the cause of poor crop performance will identify management strategies to improve productivity.

Final ratoon crops in poor condition are less likely to show a response to, or economic return from, nutrients applied at **SIX EASY STEPS** recommended rates.

Other factors to consider:

As final ratoon crops are harvested late in the season (Late season ratoons tool), assess which strategy is most suitable and fine tune the nutrient management program accordingly. The refinements of nutrient rates for these two tools should not be combined.

If circumstances change and the crop is ratooned for an additional season (after nutrient rates have already been reduced once), returning to the **SIX EASY STEPS** recommended rate would be appropriate.

Guidance for nutrient application on final ratoon crops:

For blocks entering the final ratoon that are still performing well or have the potential to respond to good growing conditions, the **SIX EASY STEPS** recommended rate should be maintained.

In poor performing final ratoon crops, a fertiliser rate reduction of up to 20% could be considered. Reducing all nutrients by a small amount under these circumstances is unlikely to affect crop performance.

Alternatively, a reduction of nitrogen rate alone of up to 20% could be tested if practical.

It is recommended that any change in management is tested on-farm. This will build confidence in both the new nutrient rates but also the process of fine tuning a nutrient management program as part of steps 5 and 6 in the **SIX EASY STEPS**. A guideline for conducting on-farm trials is included in the **SIX EASY STEPS** toolbox. ■

To see the final ratoon crops tool in its entirety and access more information please visit the **SIX EASY STEPS TOOLBOX** or scan the QR code to the right.





PRODUCTIVE, PROFITABLE, & SUSTAINABLE FARMING WITH CANE TO CREEK & SRA

In this article, SRA's Belinda Billing talks about refining rates in final ratoons with Doug Hardwick, who farms just under 250ha at Edmonton and Gordonvale.

Doug Hardwick has been working with SRA and the Cane to Creek project team to test opportunities to refine nutrient rates on final ratoon crops. Two demonstration trials on different soil types have been completed with Doug. These trials have produced positive productivity and economic outcomes.

The first demonstration site was located on a highly productive soil at Doug's Aloomba farm. The amount of fertiliser applied was reduced by 27% and this was compared to the SIX EASY STEPS guidelines based on soil test results (STEP 4). The site was harvested in 2019. There

was no difference in productivity but the gross margin was higher (\$110/ha) in the reduced fertiliser treatment.

Doug was happy with these results and wanted to test the same practice on a different soil type at his Edmonton farm. The Cane to Creek team thought this would benefit both Doug and other growers in the district who may be interested in the outcome of reducing nutrient rates in final ratoon crops.

The second demonstration was harvested earlier this year. Being a final ratoon crop, it was a good block to harvest during the

wet start to the 2020 season. Despite being cut earlier than normal, the results were again positive, with no difference in productivity and a small improvement in gross margin (\$76/ha higher).

When asked about these demonstrations Doug said, "I have a few fertiliser trials going, including the EEF60 project and Cane to Creek 2.0. The Cane to Creek work is focused on reducing the nutrient rate on the last ratoon before fallow or replant (and) seeing the effect on yield and gross margins. It is what I thought – we can cut the rate back without impacting productivity. We have done two trials



TRIAL 1 INNISFAIL SERIES (DERMOSOL) AT ALOOMBA, FOURTH RATOON Q208[Ⓛ]

Averaged results from four replicates of each treatment – results show no significant difference in yield, \$/ha improvement is based on fertiliser costs only

FERTILISER RATE	T/HA	CCS	TONNES SUGAR/HA	\$/HA
T1 SIX EASY STEPS Full Rate – N: 150kg/ha, K: 91kg/ha, S: 19kg/ha	92.8	11.1	10.3	Neutral cost
T2 13% rate reduction N: 130kg/ha, K 79kg/ha, S: 16 Kg/ha	97.2	11.1	10.2	Increase of + \$56.21/ha
T3 27% rate reduction N: 110kg/ha, K: 67kg/ha, S: 14kg/ha	102.5	11.0	11.3	Increase of + \$113.19/ha

TRIAL 2 – CLAY/LOAM AT EDMONTON, FOURTH RATOON Q208[Ⓛ]

Averaged results from four replicates of each treatment – results show no significant difference in yield, \$/ha improvement is based on fertiliser costs only

FERTILISER RATE	T/HA	CCS	TONNES SUGAR/HA	\$/HA GROSS MARGIN
T1 SIX EASY STEPS Full Rate -N: 140kg/ha, K: 101 kg/ha	92.3	10.1	9.3	Neutral cost
T2 20% rate reduction – N: 112kg/ha, K: 81 kg/ha	90.1	10.3	9.3	Improvement of \$76.10/ha

and both have given similar results. More nitrogen doesn't equal more cane in old ratoons."

The trials have helped Doug make better decisions about his farm nutrient management program as he endeavours to maximise crop responsiveness to applied nutrients and save money on fertiliser costs, especially in final ratoon crops.

"It gives me confidence to make decisions seeing it on my own farm. It helps save me money. I would rather use that fertiliser on plant cane or new ratoons, rather than old ratoons where half the stools are missing and cane has lost its vigour. More fertiliser doesn't help in that situation," he said.

Doug farms on productive land, with his plant cane and early ratoons averaging over 140 tonne/ha in 2020. His farm management strategy includes following most blocks after the fourth ratoon before returning them to the higher yielding components of the cane cycle. "While 90+ tonne/ha may not seem low, it is compared to what we can grow in earlier ratoons. This regime also helps with planning and managing the many jobs that need to be done across the farms."

The practice of refining fertiliser rates in poor performing final ratoons is something that can be considered in the

SIX EASY STEPS nutrient management program through STEPS 5 and 6. These blocks may be poorer performing due to a range of factors including pest and/or disease damage, weed infestation, harvest damage or unfavourable climatic conditions. If management strategies are unlikely to improve crop performance a reduction in nutrient rates to poor performing final ratoons could be tested on-farm as these crops may be less responsive to applied nutrients.

SRA Principal Researcher Dr Danielle Skocaj says research has demonstrated there is potential to refine on-farm nutrient (mostly nitrogen) rates in specific circumstances based on the SIX EASY STEPS nitrogen guidelines. "Refinements to nitrogen application rates should always be evaluated on-farm to ensure there is no adverse impact on productivity or profitability. Poor performing final ratoon crops provide a good opportunity to trial lower nitrogen application rates as they can be less responsive to nitrogen inputs."

The performance of these blocks is often constrained by other factors. Final ratoons also tend to be harvested late and are often fertilised closer to the onset of the wet season. During high rainfall years, crop growth and nutrient use efficiency is

restricted due to increased waterlogging and lower solar radiation. Refining fertiliser rates on final ratoons is one way growers can save dollars on fertiliser and help us all do our bit to look after local waterways and the Great Barrier Reef without losing productivity.

Through Cane to Creek 2.0 SRA is working with growers to demonstrate a range of practices linked to the SIX EASY STEPS Toolbox. These practices promote the importance of adopting the full SIX EASY STEPS approach to refine on-farm nutrient management practices in a productive and profitable way. ■

(Above left) Doug Hardwick has gathered insights on-farm into refining nutrient rates on final ratoons.

More information is contained in the SIX EASY STEPS Toolbox available on the SRA website.

Cane to Creek 2.0 is funded by a partnership between the Australian Government's Reef Trust, the Great Barrier Reef Foundation and support from SRA.

(Over top) SRA Adoption Officer, Gavin Rodman, talking nutrient management and farm planning with Paul Rossi. (Over bottom) Aloomba grower Paul Rossi is one of 38 growers in 2020 who have been involved in the "RP222C" project.

BRINGING EVERYTHING TOGETHER IN ONE PACKAGE

SRA is partnering with growers in the Russell-Mulgrave catchments of Far North Queensland on complete nutrient management planning. *By Brad Pfeffer*

When Aloomba grower Paul Rossi saw the opportunity to get involved in nutrient management planning with SRA, he jumped at the opportunity.

"The SRA team at Meringa approached me and told me about a new project helping growers look at productivity issues through nutrient management planning, so I was keen to get involved," Paul said.

"It was an opportunity to get everything into one place and also make some improvements on the farm. I've been writing notes, in several places, and getting templates to put all my information in digital formats, but of course they can play up, or sometimes you can't find the information you need when you want it.

"This project is a chance to bring a lot of farm information together into one spot in a simple and understandable way. It has been easy to read and understand and great to have someone talk me through the process."

This work is occurring through a project called *RP222C – Russell-Mulgrave Complete Nutrient Management Planning for Cane Farming*, and is funded through the Queensland Government's Reef Water Quality Program and the Australian Government Reef Trust in partnership with SRA.

It follows the broad principles of similar funded projects in other areas, including in the Burdekin, Central and Herbert Regions via a range of delivery partners. In the Far North, SRA is one of the on-ground delivery partners, and thanks to

this external government investment SRA staff can deliver specific on-farm services for the growers involved in the project.

Paul Rossi farms at Behana Gorge, supplying the Mulgrave Mill. The family grows about 240 hectares of sugarcane each year and also plants peanuts on their drier parts of the farm, while their wetter areas have a more traditional legume fallow.

Through the RP222C project, Mr Rossi receives a range of information relating to on-farm productivity issues including the crop cycle, varieties, productivity, digital elevation models, soil types, soil testing results and more, flowing through to farm nutrient requirement recommendations.

Growers involved in the project also pay to be involved, which goes towards a range of activities determined by the farmer and the specialists from SRA. For example, it could include soil testing or assay testing for *Pachymetra*.

Paul Rossi said that package helped him make informed management decisions and to keep improving.

"Soil testing is nothing new. But through this process we have a plan that relates to a range of other things happening on the farm, and we can really stick to it.

"This makes sure we are bringing everything on the farm together and basing everything on all the information at hand. Grower experience is really important, but this brings it together with all the information." ■

The RP222C project began in early 2020 and runs until the end of 2021. For information on this project or similar projects in other regions contact:

HCPSSL (Herbert): 07 4776 5660

Farmacist Mackay: 07 4959 7075

Farmacist Burdekin: 07 4782 2300

Farmacist FNQ (Russell-Mulgrave): 0488 980 090

SRA FNQ (Russell-Mulgrave): 07 4056 4508

Key statistics on the SRA RP222C project in the Russell-Mulgrave catchments (as at October 2020):

- 38 growers
- 146 farms
- 3558 paddocks
- 50 management units
- 7037 hectares
- 680 soil samples
- 65 soil types



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PEANUTS HELP BOOST CANE CYCLE

Paul Rossi said peanuts had been a productive venture for the family since they started with them in 2004, with the exception of the 2010-11 La Nina summer, where their gear and seed sat in the shed waiting for a break in the weather that never came.

"We've had some other challenging times with them with the wet weather through the Cyclone Larry years, so I take some comfort that they can be fairly forgiving and that they offer a larger window than some other fallow crops we could look at here," he said.

"Peanuts also offer some extra income at a quiet time of year. It is integrated into our farm now and definitely part of our program."

He said the peanuts also improved the following sugarcane.

"In the early days, we still had replant areas on the farm, and that's when we really noticed the difference when comparing replant cane to cane after the peanuts. Even at third ratoon I reckon you could still see the difference – both driving around and in the results at the mill."

He added though that they required intensive management. "Humidity and rain are two big factors for us here in the Wet Tropics. We can require weekly sprays to keep on top of leaf disease, so it is not your traditional off-season, but in saying all that it is not too difficult once you get started."

** For information on peanut / sugarcane research, see our article on page 18 of this edition.*

(Below) Max Wilkins and family grow up to about 35,000 tonne of cane each year. (Below right) SRA Adoption Officer Gavin Rodman discusses farm planning with Max Wilkins.

LIFELONG INNOVATION CONTINUES IN FAR NORTH QUEENSLAND

By Brad Pfeffer

By anyone's standards, Far North Queensland grower Max Wilkins has a lot on his plate.

Together with brother Robert, the Wilkins family grow up to 35,000 tonnes of cane each year. On top of that, they run Miriwinni Lime, a business that employs more than 40 people and has trucks constantly running across Queensland.

At 76 years old, Max has no interest in slowing down, but that means he also has little spare time.

Farming in one of the wettest parts of the country, on the foothills of Mount Bartle Frere, the average rainfall is around four metres, but has gone as high as around seven metres. Therefore, the opportunities to get into the paddock have to be grabbed as soon as the sun is shining.

All of these were factors that encouraged Max to get involved in a new project called RP222C – Russell-Mulgrave Complete Nutrient Management Planning for Cane Farming. The SRA component of this project is being run in the region through the SRA team of Daryl Parker, Gavin Rodman, Paul Calcino, and Nader Sallam.

The project is funded through the Queensland Government's Reef Water Quality Program and the Australian Government Reef Trust in partnership with SRA.



For Max Wilkins, he said he was attracted to the opportunity for help to bring together all the farm's information in one place.

He was also keen to understand what improved nutrient planning could mean for his farm, as over the years he has made numerous changes and improvements to his farming system, across a farming career that started at the age of 14.

"The dirt is there to stand up the cane. The fertiliser is crucial to growing the cane, so we will see if we can make things better," Max said.

Over the years, through experience, he has identified a range of constraints that he has improved upon.

An example comes with their early work applying lime. They knew they had an acidity problem in one of their granite-country blocks, but it was only when the tractor driver slowed down more than he had planned – and they ended up applying 4 tonne/acre (10t/ha) – that they understood how bad the problem was.

Having previously also been users of aqua ammonia fertiliser, he said that over time they had shifted their pH from its worst at about 3, to generally in the 6 and 7 range.

"We were able to turn it from battery acid into growing good cane again," Max said.

Another major focus for the Wilkins family has been on ratoon stunting disease (RSD). The importance of keeping RSD out was something they saw firsthand many years ago after inadvertently bringing it back from another property via their harvester.

Since then, they have been very conscious of RSD and focussed strongly on machinery hygiene and clean seed. They have also tried their hand at growing tissue culture.

They were also early adopters of billet planting, which was another change spurred on by chance.

"We bought our first billet planter 47 years ago. I had fallen off the roof and broken my foot, which gave me a chance to have a couple of days off and go to a field day in the Burdekin," Max explained. "My father said it was a silly idea, but I managed to convince him. When we bought the machine out of the Burdekin, the first go was a failure, but we learnt quickly and after that it was a success."

Where the RP222C project steps in, is around helping bring all of this together. Through the project, the team involved meet regularly with the grower – Max, in this case – to talk about the various

factors and decisions on the farm that are working together. By learning more about these factors, the project offers a chance to give growers the information and confidence to implement the full SIX EASY STEPS nutrient management program.

Adoption Officer, Gavin Rodman, said that one of the big parts of the work was working together to identify constraints.

"Through the project we produce a range of maps around all the factors on the farm, and that helps to point things in the right direction. We can look at the lines of evidence and also identify what might not work," Gavin said.

"We know this year could present some challenges with the La Nina forecast, if the rain comes, so we'll be looking at things closely in relation to the season as well." ■



Australian Government



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TACKLING ON-FARM CONSTRAINTS HOLISTICALLY

A new project that commenced earlier this year is helping sugarcane growers in the Russell-Mulgrave catchments look at the complete on-farm picture when it comes to nutrient management.

This project, called *RP222C – Russell-Mulgrave Complete Nutrient Management Planning for Cane Farming*, has SRA staff working with 38 growers to delve into the range of productivity issues that impact nutrient use.

The SRA team working on the project consists of Daryl Parker, Gavin Rodman, Paul Calcino, and Nader Sallam. SRA Adoption Officer, Gavin Rodman, said that through the project, growers were looking at productivity issues including varieties, soil type, pests and disease, and others, and putting this together in a way that will help them implement the full SIX EASY STEPS nutrient management guidelines.

In 2020, with these growers, the team has worked on 146 farms covering over 3500 paddocks and 65 soil types.

Aloomba grower Neil Maitland is one of the growers involved in the project and he said there was benefit in bringing information together, not just to help with nutrient management, but also to make gradual improvements on the farm.

"This has been our first year, so we have been getting familiar with the process

of nutrient management planning," Neil explained. "We've also learnt together as a group, through online meetings that we have had this year because of COVID-19.

"I see this as the start of some big improvements, so I really hope there is a continuation of the project and this work into the future."

He said that the project offered the opportunity for face-to-face interaction as well to help the growers talk through potential changes and improvements."

Adoption Officer, Gavin Rodman, said that the project had a rapid start from March 2020, needing to deliver nutrient management plans for growers by the middle of the year.

"2020 has been about getting things started – both for SRA and the growers. In 2021 we will be looking for opportunities to take things further and to implement the full SIX EASY STEPS.

"Depending on the growers and their situation, we will be looking at things such as old ratoons that are in poor condition and if the rates could be refined. We can only start looking at those things with confidence after the foundation has been built in year one of the project."

He said there was a lot of potential to keep the momentum by tackling productivity constraints on farm.

"Through the project we have already identified numerous constraints on-farm. Instead of looking at nutrient management in isolation, we are working on improving the whole system. We have started the process on many farms to tackle these constraints to meet the productivity gains that we need, however many of these will not be an overnight fix," Mr Rodman said.

Not too far down the road at Mirriwini, the Destro family are also involved in the project, and are one of two growers involved in Stage 2 of the SRA project. Implementing the full SIX EASY STEPS and looking for potential refinements and improvements is a requirement of Stage 2. The Destros farm on about 320 hectares, half of which is owned, and half leased.

Paul Destro said an example of this included refining nutrients in the plant cane after their legume fallow as well as looking for opportunities to refine rates on blocks that are "on their last run".

"I'm all for it, if we can put something in place that lets us get reasonable productivity out of it, and save a few dollars, especially if the crop is on its last legs," he said.

He added that they were still learning with the legumes because of the extreme weather the Babinda district can experience.

“Sometimes we plant our legumes and get nothing from them as it will rain for months, but with the weather we had early this year we were able to grow a crop.”

“This year working with the project team, we did a biomass of a legume crop to estimate what nitrogen we may get from it. This has given us a bit of confidence to account for some of that nitrogen in the plant crop,” Paul said.

He said that working with SRA on the project helped reduce paperwork and create time to get in the paddock when work needed to be done.

Paul said that a big motivation for the family’s involvement in the project was to save costs.

“Our farms cover a whole range of different soil types, so we really need to get the right fertiliser mixture for the right area, and now we are in a spot to have those different rates thanks to the help of the guys in the project, Paul (Calcino) and Gavin (Rodman).”

He has also used the online tool, Cog Calibrator, on the SRA website to help with fertiliser box calibrations. This tool is available with the nutrient management section of the SRA website and assists with the important task of ensuring each year’s fertiliser blend flows at the correct rate.

It doesn’t remove the need to collect fertiliser in a bucket over a specified distance, but it does assist with the rate and cog configuration calculations. ■

(Over top) Mark Destro, Paul Destro and Steve Destro. (Top right) Neil Maitland on farm at Aloomba. (Right) Babinda grower Steve Calcagno talking through his plan with SRA Adoption Officer Paul Calcino.

The project is funded through the Queensland Government’s Reef Water Quality Program and the Australian Government Reef Trust in partnership with SRA.



Australian Government



Queensland Government



(Below) Mossman grower Brett Coulthard said building soil health is critical and is implementing a series of improvements with his cousin, Frank. (Over page) The investment in a minimum till planter has helped reduced cultivation and the number of passes for the Coulthards.



LESSONS IN SOIL HEALTH LEADING TO ON-FARM OUTCOMES

By Brad Pfeffer

It was about three years ago that Mossman grower Brett Coulthard attended a Soil Health Masterclass at Mourilyan.

At the time, he already had a keen interest in soil health and made a series of improvements to his farming system such as improving his fallow cropping. But he said that it was after that workshop that he realised the business needed to make greater changes.

“One of the key things I wanted to look at was cultivation,” Brett said. “At the workshop we saw how detrimental cultivation is to the soil structure and biology, and that every pass with an implement can damage the biology. We also saw that a shift to minimum till also reduces our operating costs.”

This led to investment in a single row minimum-till billet planter from Main engineering in Proserpine, which Brett said had the advantage of a more robust frame, complete with double-disc openers and then discs for covering at the rear. The new machine has also allowed him to use granular imidacloprid in his high-risk grub paddocks, as opposed to previously using a liquid formulation. All up, he said the results were several fewer machinery passes at the end of the crop cycle and getting the next crop in.

Mr Coulthard farms with his cousin, Frank, and they typically grow about 35,000 tonnes each year.

They usually aim to plant soybeans and cowpea as a fallow crop at the end of the crop cycle, which is another area that they are adjusting to improve soil health.

“In the heavier soil we would then spray them out, slash them, and use a bed former to go through it once, because the slasher throws the legume residue sideways, as we would prefer the residue to remain on the hilled up beds,” Brett said.

“In the lighter soil we are able to spray them out and run the bed former through and then plant after that, and this planter doesn't have any trouble with that.

“We're saving a lot of time and also wear and tear. We were good buyers of rotary hoe blades – but we haven't bought a blade this year.”

He is now two years into the minimum till planting system and said that the blocks were performing well, cutting fine, and all had a good strike.

“Building soil health takes time, so it is early days for us in terms of results. But it looks like the blocks have good ratoons in them and we are hoping that it is the start of the soil structure starting to improve.”

He said making improvements at every opportunity was an important step forward in challenging times for the industry.

“With green cane trash blanketing we improved weed control and moisture retention, but I don't think the industry saw the yield improvements we were hoping for. So we're looking to our soil health now for that, trying to get carbon back into the soil, even though we know that is very hard to do in the Wet Tropics.

“Sometimes it feels if we can just hold what we have there then it is a win.”

He has improved the legume system as well. Previously they were broad planting the cowpea, but the Coulthards are now planting them in hills, which helps them drain and also gives Brett and Frank confidence to plant them on the wetter parts of the farm.

The Coulthards cut their own cane with a John Deere CH570, as well doing some contracting work, with this side of the business run by Frank. They have adopted principles of harvesting optimisation and also put after-market chopper drums on their machine, which Brett said had made an improvement.

They also like to be involved in other trials, including the Cane to Creek 2.0 project run by SRA in the Wet tropics between Mossman and Tully.

This project is funded by a partnership between the Australian Government's Reef Trust, the Great Barrier Reef Foundation with support from SRA, and is working on the ground to build the understanding of various farming practices on both on-farm productivity, and on environmental sustainability. ■



(Below left) DAF technician, now UQ PhD student, Taleta Bailey with the micro-dialysis technology used in the first stage of novel formulation experiments. (Below right) The growth accelerator loaded with columns, with young sugar cane growing. Stainless steel mesh ensures all plants receive the same incident light. The robot specially designed for the project can be seen above. (Figure 1) Encapsulating nitrification inhibitors in bio-degradable polymers may extend their efficacy without having to increase the dose rate.

TARGETING IMPROVED NUE IN THE SUGAR INDUSTRY

By Marguerite White, More Profit from
Nitrogen Science Coordinator

Sugarcane research into improved Nitrogen Use Efficiency (NUE), and options for improved profitable use of Nitrogen (N), have been the focus of three research projects of the **More Profit from Nitrogen (MPfN) Program**.

The research effort has seen ten projects across the sectors of sugar, dairy, cotton and horticulture collaboratively generate greater knowledge and understanding of the interplay of factors that affect optimal N formulation, rate and timing, the contribution of soil mineralised N to the budget of a crop, and how enhanced efficiency fertiliser (EEF) formulations can better match crop N demand.

In this edition of CaneConnection, we feature the third cane industry project, *MPfN: New technologies and managements-transforming NUE in cane production*, led by the Queensland Department of Agriculture and Fisheries, in partnership with The University of Queensland (UQ) and field research partners in the Herbert (HCPSL) and Burdekin (Farmacist) regions.

Dr Matt Redding has led the novel product research effort since 2016. The aim of the project was to develop more targeted N formulations to better match N release to cane crop uptake demands, throughout seasons, by controlling N transformations and solubility, and combating “leakiness” to the environment.

Investigations have required the research team to take a multi-pronged look into the characteristics and dynamics of both nitrification inhibitors (NI) and bio-degradable fertiliser encapsulant and coating technologies, to better control delivery (rate and timing) to the crop. During the research period, the urgency of research into bio-degradable solutions was also elevated when the European Union banned the use of microplastic products.



"While urea is widely used by the sugar industry, due to logistical limitations it is applied at the beginning of the growing season. Consequently, N availability to the plant is highest in the early growth stages when plant demand is low, resulting in poor NUE," Dr Redding said. "There are a broad range of EEF formulations available world-wide that may have potential to better match N release to crop N demand dynamics, by controlling N transformations and solubility, however coating and encapsulation costs for these products can be relatively high."

Encapsulation of NI, a new approach, has been investigated by the project because the technology is more cost-effective than other products on the market. Particular attention has been focussed on tailoring bio-degradable polymer encapsulation of NI's to better synchronise N availability with crop demand (Fig. 1).

"The work on encapsulants and coating is about defeating the break-down of NI's and taking control of when and how delivery to the soil happens. UQ has been integral in the material design and engineering work, investigating how the NI is mobilised from biopolymers and the mechanisms that control the release rate," added Dr Redding.

A PhD study, undertaken by Ian Levett of UQ, has investigated a number of biodegradable options, including polyhydroxy acid (PHA), which is now becoming widely used in the medical and orthopaedic sectors, and amorphous polylactic acid (amPLA) based materials. PHA is a class of biodegradable, biobased polymer that occurs in nature. Bacteria use them to store energy when they lack enough nutrients to reproduce but they are now drawing unprecedented interest as a fertiliser encapsulant that can "disappear" from the environment altogether - the

difficulty is in making this happen in a slow, controlled manner as biological degradation in the soil has been found to accelerate release.

To explore EEF possibilities, the team designed cutting-edge equipment and methodologies to rapidly test approaches to optimise NI delivery in a controlled, cost effective environment before taking their research into the field.

"Some of our methods are more likely seen in a medical laboratory or robotic car manufacturing facility rather than DAF's Toowoomba research station," said Dr Redding. "These include automated micro-dialysis techniques, previously used to measure brain fluid chemistry, to forensically monitor EEF movement in the soil profile to identify N loss pathways."

The project has also conducted a separate stream of work to investigate the possibilities of intercepting N runoff losses closer to cane field sources. This work particularly investigated mitigation approaches, including sorbent technologies, and used a specially designed rainfall simulator to test the outcome on N transformations across soil type and climatic conditions of cane growing regions.

After narrowing the selection of EEFs via laboratory work, certain NI products were used in rapid growth pot trials, using mechatronic technologies to carefully control the environment of the experiments, with robotics being used to schedule and apply water while taking 3D images to measure growth rates and N soil and plant content. The selection was then narrowed again before undertaking small-scale field trials, until finally two novel products that demonstrated the most promise were established as treatments in a two-year field trial on commercial cane crops in the Herbert and Burdekin.

Each of the field trials have nine treatments (4 replicates, plus a control) to measure the yield, N uptake and leaching dynamics of:

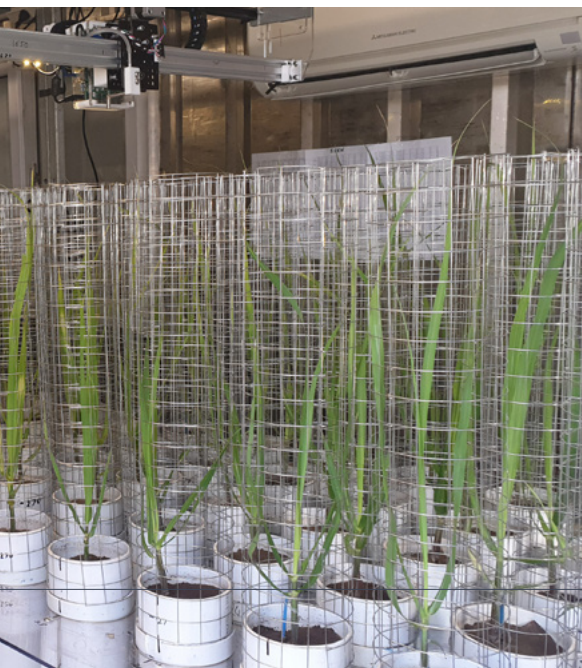
- 1 polymer NI + 50% SIX EASY STEPS recommended rate (100% & 200% standard NI application rate);
- 1 hydrophobic NI + 50% SIX EASY STEPS recommended rate (100% & 200% standard NI application rate);
- Urea + DMPP + NI at 50% and 75% SIX EASY STEPS recommended rate; and
- Urea at 50%, 75% and 100% SIX EASY STEPS recommended rate.

Initial results demonstrate a benefit in 12% yield from DMPP, and this is improved by up to 5% with encapsulated NI additions.

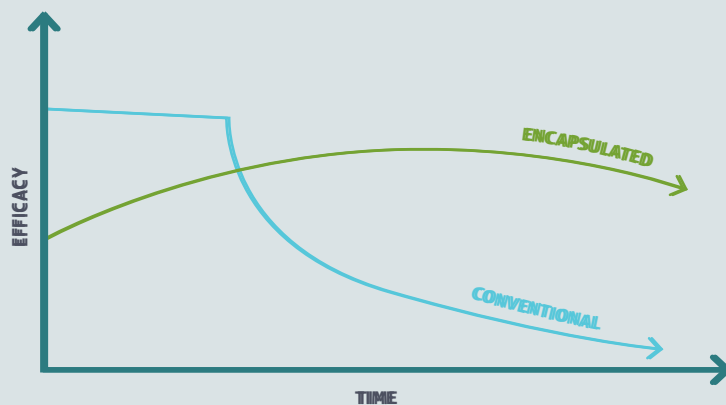
Three quarters through the project, there are promising signs that through use and manipulation of encapsulants formulation, N supply can be better matched to plant uptake and may result in increased yield and decreased loss to the environment.

It is a little early for this project to communicate recommendations as the field trials are still underway, however, the project will report its final findings in September 2021. ■

This project is supported by funding from the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program, Queensland Government (Department of Agriculture and Fisheries) and Sugar Research Australia. It is also supported by research collaborators, University of Queensland, Farmacist Pty Ltd and HCPSL.



F.1



COULD PEANUTS HIT THE SWEET SPOT FOR QUEENSLAND SUGAR CANE GROWERS?

Queensland sugarcane growers are keen to see how peanuts compare to other legumes in bringing nutrient and economic benefits. *By Rebecca Thyer*

With one comparison, Neil Halpin had Queensland sugarcane growers leaning in closer.

Mr Halpin, a principal agronomist and coastal farming systems team leader with the Queensland Department of Agriculture and Fisheries, was telling cane growers about peanuts' potential economic benefits. His latest field trial work had highlighted that peanuts could yield a gross margin of \$3000 a hectare, compared to soybeans at \$700/ha.

As more cane growers introduce legumes to their rotations, Mr Halpin, who leads projects with both the Grains Research and Development Corporation and SRA, has the ability to collaboratively work across both industries.

He says showing Burdekin growers the potential possibilities with peanuts at a field day in November 2019 attracted their interest. It led some Burdekin growers to attend a joint field day further south in Bundaberg in early March.

Growing legumes in the Burdekin in rotation with cane is a relatively new pursuit. Many started growing mungbeans about five years ago and, with the drought boosting soybean prices, have embraced those legumes too.

Mr Halpin says the move to including legumes within rotations has occurred

as part of an SRA project to improve soil health, profitability and productivity. With regulations in place to protect the reef, legumes also offer a way to inject nutrients into the soil, while reducing nutrient run off.

Although growers could achieve some of their nutrient needs by growing soybeans as a green manure crop, Neil says it is preferable to remove as much grain as possible. For this to occur successfully in the Burdekin region, trials and agronomic help are being deployed.

Burdekin history

"Peanuts have a limited history in the Burdekin. Some growers gave them a go about 15-20 years ago, but most have grown predominately sugarcane since the mid-1980s," he said.

Sharing data from Bundaberg-based trials was a way to bring peanuts back into focus for these growers.

"In a way I can act as the bridge between what we are doing in Bundaberg, what could be done in the Burdekin and what the Peanut Company of Australia (PCA) would like in terms of production. PCA parent company Bega wants to expand Australian peanut production. It means we need to address growers' issues from the past and work through them."

Mr Halpin says that although peanuts offer a greater gross margin potential, they are a riskier crop to grow than other legumes.

"Our core focus in sugarcane work has been on best management practice, but there is real opportunity to do next level research, which includes incorporating peanuts into rotations."

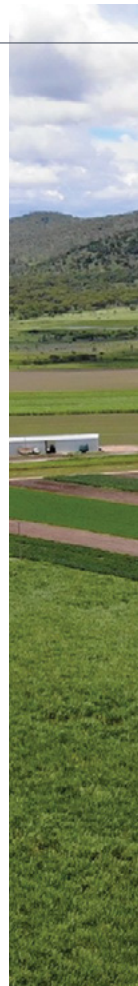
The key to delivering that is via top-quality trial work, something Mr Halpin believes will be helped by new recruit Dayle Fresser.

Mr Fresser has been a peanut research technician for more than 25 years. Since the late 1990s he has worked in Australia's peanut capital – Kingaroy – with breeders Graeme Wright and Alan Cruickshank on various breeding trials.

Taking this experience north, one of Mr Fresser's new roles includes overseeing a 9ha replicated strip trial planted near Home Hill.

It has four replicates of peanuts, soybeans, and bare fallow and aims to better understand peanuts' nitrogen contribution to the soil.

The research team will also consider spatial tools to help in explaining peanut/sugarcane productivity, work which Mr Fresser will also run.





Being able to collect spatial data for finer scale management is a real opportunity to support or tweak practices. Applying the right amount of fertiliser in the right form, at the right time and placement, should enable producers to maximise profit and minimise adverse outcomes.

“Legumes fit in with improving soil health,” Mr Halpin says. “Industry research has demonstrated a 20 percent yield improvement in cane following legumes compared to monoculture. Because legumes fix atmospheric N, there are opportunities to reduce fertiliser N in the plant cane crop. With legumes, sustainability and profitability go hand in hand – we want to quantify that.”

Bundaberg harvest losses

Further south in Bundaberg, Mr Halpin’s peanut and cane work will concentrate on reducing harvest losses.

A recent paddock survey found losses as high as 0.7t/ha. “That’s about \$580/ha left on the ground. If we take some of the worst examples out, it is probably closer to \$400t/ha. We want to improve that.”

Peanuts are different to a lot of other crops, Mr Halpin says, which has its challenges, and harvest losses can occur at any of the three-stage harvest processes.

“They are an indeterminate crop, which means when they are 75% mature, they are harvested.”

Stage one includes digging them out and turning them over, where they stay for 7-10 days. Stage two includes fluffing them up, shaking the dirt from them and breaking any remaining seals with the ground. The final stage is where the thresher comes through to harvest them.

In the Bundaberg area peanuts are treated as a high input and irrigated broadacre crop. They are planted in two rows on a 1m bed, used to improve drainage.

Mr Halpin says the ongoing research will consider these row spacings and investigate wider planting widths of 65cm, 75cm and 85cm.

“We want to know – are the peanut pegs – the budding ovaries that enlarge and grow down and away from the plant – being driven over and impacting on yield? We have observed the pegs being run over so want to see what happens when these variables are changed.”

As such, the team will also test narrower tyres on the tractors.

Mr Halpin says the peanut industry in coastal Queensland is a transplant of what is done in the US state of Georgia.

“It means we may need to rethink aspects to better suit the Australian coastal cane and peanut farming system.”

However, he says peanuts and cane could be a perfect match. “There are definite synergies with sugar. Both crops are similar in that they need specialised equipment and treatment.” ■

(Above) The peanut trial in the Burdekin aims to help quantify legumes’ sustainability and profitability. Photo by Marcus Bulstrode.

This article was supplied courtesy of the Grains Research and Development Corporation.



SCLEROTIAL SETT ROT DISEASE

Introduction

Sclerotial sett rot (SSR) was first identified in 2016 at the SRA Woodford Pathology Farm on sugarcane setts sent for disease resistance screening trials. Up until now, it has not been reported anywhere else in the world. SSR affects sett germination and kills young plants (Bhuiyan et al. 2019). It is unclear whether SSR is present in commercial sugarcane farming systems in Australia.

Causal organism

SSR is caused by a soilborne fungus *Athelia rolfsii* (commonly known as *Sclerotium rolfsii*).

Symptoms

The external surface of the setts can exhibit reddish patchy lesions. Internal tissues are discoloured pale-red to red-and-white mycelial growth is common in the pithy tissues and on the cut end of the setts. Infection spreads through the vascular bundles, central pithy tissue and can extend through the nodes. This disease can be confused with two soilborne diseases of sugarcane, pineapple sett rot (*Ceratocystis paradoxa*) and fusarium sett rot (*Fusarium moniliforme*), as some of the symptoms such as reddening of internal tissue and discolouration of external internode surfaces are in common in those two diseases. The presence of white mycelium or sclerotia on and around the affected area and soil surface can be an indication of SSR infection.



Fig.1 External symptoms on sett: (A) red patchy lesions shown on the exterior of infected sugarcane setts (top) compared to healthy setts with no similar lesions (bottom), (B) a healthy sett, and (C) an infected sett



Fig 2: Internal symptoms of SSR. Arrows on the photo (right) indicate the presence of white mycelium of the pathogen

White mycelial growth can be seen on the soil surface adjacent to diseased setts. The fungal mycelia possess a distinctive coarse cobweb-like appearance. Small whitish to brown sclerotia (grain-like structures) may be present within the mycelial mat. Symptoms on young plants include water-soaked to light brown lesions on the base of the plant, production of sclerotia (grain-like structures) and white mycelia in and around the lesions and on dead young plants.

Yield loss

SSR causes germination failure and death of young plants. In experiments conducted at SRA Woodford, germination of healthy cane was five-fold higher than in SSR inoculated setts.

Diagnosis

SSR can be diagnosed by white mycelial growth both inside, and at the cut ends of the billets. The presence of coarse white mycelia, along with sclerotia on the soil surface or on dead plant tissue, is also a common feature. ■



Fig 3: White, coarse mycelial growth on agar plates (top left) and in trays on potting media (top right). Orange arrows indicate grain-like sclerotia, inset: sclerotia (grain-like structures) within mycelial web. Infected young plants in the field (bottom); young plant covered with white mycelia (left), lesions and sclerotia are indicated by the arrows, inset: white sclerotia at base of the young plant.

Further information

Information is currently being sought on whether SSR has been observed in commercial sugarcane crops in the Australian sugar industry.

If you observe SSR like symptoms, please email Shamsul Bhuiyan or Prakash Adhikari via the contact details listed below.

Contact information

Shamsul Bhuiyan
E sbhuiyan@sugarresearch.com.au
M 0400 771 304

Prakash Adhikari
E padhikari@sugarresearch.com.au
M 0459 862 165

Further reading

Bhuiyan SA, Wickramasinghe P, Mudge SR, Adhikari P and Magarey RC (2019) *Athelia rolfsii* causes sett rots and germination failure in sugarcane (*Saccharum hybrid*): pathogenicity and symptomatology. *Australasian Plant Pathology*, 48:473–483

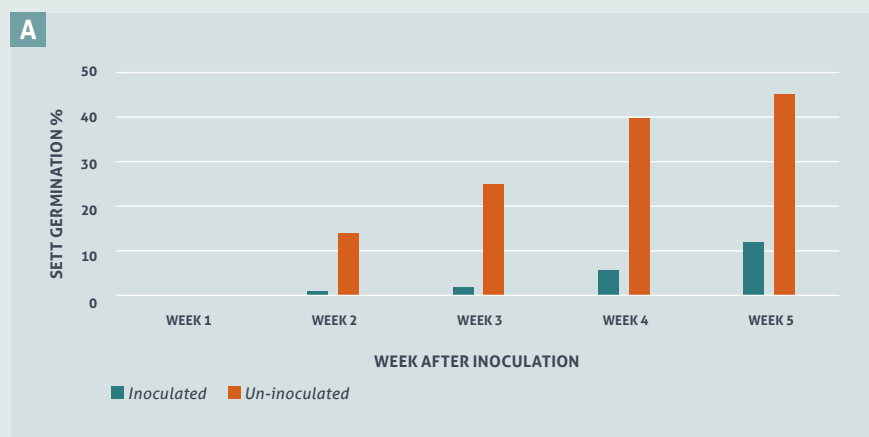


Fig 4. (A) Germination of fungal inoculated and non-inoculated setts (B) germination and growth of uninoculated field grown cane (left) compared to inoculated SSR infected seed cane (right, orange rectangle), (C) a dead young plant with sclerotia.

LESSONS IN THE Paddock LEADING TO PRODUCTIVITY AND SUSTAINABILITY OUTCOMES

The Pathways to Water Quality Improvement in the Myrtle Creek Sub-catchment Project has been investigating water quality outcomes from a range of grower-led demonstration trials in this sub-catchment within the Proserpine mill area.

Funded through the Queensland Government's Reef Water Quality Program and delivered by SRA in partnership with Sugar Services Proserpine, the project works with several growers across the catchment to look at how specific farming practices influence water quality, and then shares these lessons across the region.

The project is led on the ground by SRA Adoption Officer, Molly O'Dea, who said the project is focussed on farmers being able to see the results for themselves.

The project began late 2018, with four sites, followed by four different sites in 2019. This season is the final year of the project, which will end in June 2021.

Last season trials, included comparing different forms of imidacloprid, band vs blanket spraying, enhanced efficiency fertilisers and new herbicides.

Cane grower Justin Blair has been trialling the herbicide practice of band spraying. Band spraying is a type of application where herbicide is sprayed only over the cane row, not on the bare interrow space.

Approximately half the area is sprayed. Generally, more expensive pre-emergent herbicides (such hexazinone, imazapic and amicarbazone) which are often of higher environmental risk, are applied this way.

By restricting the higher environmental risk and more expensive herbicides to bands, the grower's pre-emergent herbicide usage can be significantly reduced.

Cheaper, knockdown chemicals can be applied in the interrow, where selective herbicides are not required.

Run-off water quality was analysed from a demonstration trial at Justin's property, comparing band vs blanket sprayed Bobcat i-MAXX® (hexazinone and imazapic).

Approximately half the amount of chemical was lost from the band spray treatment than the blanket spray treatment. This follows the principle of "less on = less off". Weed counts showed no observable difference in weed populations in this case.

This year the project worked with DAF Coastal Farming Systems team members, Allan Blair, Jack Robinson and Daniel Gonzalez, to hold a range of additional activities, including:

- A pesticide workshop for members of Proserpine Young Farmers, which covered different types of pesticides, modes of action and how they work, spray drift, herbicide resistance, nozzles, regulation, labels and safety. Participants also were able to see different nozzle spray patterns using UV light at dark.
- Spray rig checks for growers which included checking nozzle pressure, type and flow rate, and spray distribution with a patternator to ensure herbicide is being applied correctly. A patternator is a tool which allows visualisation of the spray pattern. One of these checks included running UV dye through the sprayer with a range of nozzle types, to allow attendees to visualise nozzle spray patterns.
- Growers met at Steven Cantamessa's farm to discuss making herbicide decisions, considering restrictions such as buffer zones and no spray windows.

This season, one site has six water samplers positioned on a joint SRA-DAF Dual Herbicide Sprayer trial in the Myrtle Creek Sub-catchment. This trial is investigating the use of a range of

knock-down chemicals in the inter-row on weed suppression, and crop yield. This will allow the project to investigate knockdown herbicides in run-off. Previous sites have focused on residual herbicides and have not been tested for knockdown products like glyphosate or paraquat.

"We have strong interest from growers inside and outside of the monitoring sites for additional water samples being taken in the Myrtle Creek itself," Molly said.

"We even have growers collecting their own water quality samples for testing to see what – if any – herbicides or nutrients are in the water coming from their own farms."

"The project has a strong focus on getting growers more involved and finding the facts around different practices and water quality," she said. ■

(Over top left) Spraying UV dye with a range of different nozzle types to view size and distribution differences under UV light. (Top right) Viewing different nozzle droplet sizes and distribution under UV light, after spraying with UV dye. (Middle left) Jack Robertson (DAF) and Daniel Gonzalez (DAF) with DAF's patternator, showing variation in spray output. (Middle right) Molly O'Dea (SRA) using a nozzle pressure gauge and flow tester to calibrate a boom. (Bottom left) Molly O'Dea (SRA), Jack Robertson (DAF), Justin Blair, Daniel Gonzalez (DAF) after undertaking a check of Justin's spray rig. (Middle right) Patternator being used to test for spray variation.

The Pathways to Water Quality Improvement in the Myrtle Creek sub-catchment project is funded by the Queensland Government's Reef Water Quality Program and delivered by Sugar Research Australia and Sugar Services Proserpine.



**Queensland
Government**





WORKING WITH GROWERS ON PRODUCTIVITY & SUSTAINABILITY SOLUTIONS

By Matt Schembri, Adoption Officer, Central

Installation works have commenced of paddock scale, water quality samplers as part of the Mackay-Whitsunday Cane to Creek project. The samplers will collect run-off water to be measured for nutrients and pesticides. The run-off from several inter rows is directed into a flume where flow rate is recorded and water samples collected at pre-determined intervals. Flumes were recently installed at the demonstration site in the Rocky Creek Dam catchment. The water samplers will be added to the site later. In the interim any run-off water through irrigation or rainfall will

need to be manually sampled. In the next month flumes will be installed at the other demonstration/trial sites in the Alligator Creek and Pioneer Main channel catchments. Information and data from the demonstration site will provide growers with a clearer understanding of the complex relationship between farming systems and water quality. The Mackay-Whitsunday Cane to Creek project is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation (GBRF), with support from SRA.


(Above) Installing paddock-scale monitoring equipment as part of the project in the Central region.


RESEARCH PROJECT INVESTMENT

PROJECT TITLE	PROJECT NUMBER	R&D PROVIDER(S)	CHIEF INVESTIGATOR	END DATE
🌱 Key Focus Area 1 (Variety Development)				
Implementing and validating genomic selection in SRA breeding programs to accelerate improvements in yield, commercial cane sugar, and other key traits	2017/002	UQ	Ben Hayes	01/07/2022
Validating root system traits for enhanced nutrient capture in challenging environments	2018/002	CSIRO	Anne Rae	01/09/2021
Genetic analysis and marker delivery for sugarcane breeding	2018/005	CSIRO	Karen Aitken	30/06/2022
Validating high-throughput phenomics technologies for sugarcane clonal selection	2019/002	SRA	Sijesh Natarajan	30/09/2022


🌿 Key Focus Area 2 (Soil health, nutrient management and environmental sustainability)				
More profit from N: enhancing the nutrient use efficiency of intensive cropping and pasture systems	2015/907	CRDC	Multiple	30/06/2020
SIX EASY STEPS - continuing perspectives in time and space	2017/004	USQ	Bernard Schroeder	01/02/2022
Measuring soil health, setting benchmarks and driving practice change in the sugar industry	2017/005	SRA	Danielle Skocaj	01/08/2022
Seeing is believing: managing soil variability, improving crop yield and minimising off-site impacts in sugarcane using digital soil mapping	2017/014	UNSW	John Triantafylis	01/1/2021
Implementation of root system diagnostics to deliver a field-based measure for root health	2018/003	CSIRO	Anne Rae	01/08/2021
Establishing sugarcane farming systems to improve soil health	2018/008	SRA	Barry Salter	01/03/2023
Development of commercial molecular biological assays for improved sugarcane soil health and productivity	2018/009	SRA	Rob Magarey	30/06/2021
Complete nutrient management planning for cane farming	2016/804/RP161	SRA/Farmacist	Jayson Dowie	30/12/2020
Improved water quality outcomes from on-farm N management	2016/805/UQ_NESP	SRA	Danielle Skocaj	10/12/2020
Cane farmer trials of enhanced efficiency fertiliser in the catchments of the Great Barrier Reef	2016/807	CANEGROWERS / SRA	Barry Salter	31/12/2021
Australian sugar industry soil health benchmarking in the Central region of Qld - increasing profit and transforming soil health practices through cooperative industry research, extension and adoption	2019/903	Various	Phil Ross	31/10/2021
Australian sugar industry soil health benchmarking in the Wet Tropics region of Qld - increasing profit and transforming soil health practices through cooperative industry research, extension and adoption	2019/904	Various	Marguerite White	31/10/2021

🌿 Key Focus Area 3 (Pest, disease and weed management)				
Modern diagnostics for a safer Australian Sugar Industry	2017/809	SRA	Nicole Thompson	01/06/2022
Solving Yellow Canopy Syndrome	2014/049	SRA	Gerard Scalia	31/12/2020
Keeping our chemicals in their place - in the field	2017/008	SRA	Emilie Fillois	01/07/2021
Moth Borers – how are we going to manage them when they arrive?	2018/010	SRA	Kevin Powell	03/01/2023
RSD detection at the sugar factory – disease detection blueprint	2019/003	SRA	Rob Magarey	30/06/2022
Boosting Diagnostic Capacity for Plant Production Industries R&D Providers: Led by GRDC with multiple partners	2019/905	Various	Multiple	04/08/2022

PROJECT TITLE	PROJECT NUMBER	R&D PROVIDER(S)	CHIEF INVESTIGATOR	END DATE
 Key Focus Area 4 (Farming systems and harvesting)				
Southern Sugar Solutions	2017/012	DAF	Neil Halpin	01/01/2021
Development of commercial molecular biological assays for improved sugarcane soil health and productivity	2018/009	SRA	Rob Magarey	01/06/2021
Smarter Irrigation for Profit Phase 2	2019/901	Cotton Research and Development Corporation	Multiple	20/06/2022
Harvester losses assessment by real-time Machine Vision Systems	2019/004	University of Southern Queensland	Cheryl McCarthy	01/01/2022
Adoption of practices to mitigate harvest losses - Phase 2	2019/951	SRA	Phil Patane	01/05/2020

 Key Focus Area 5 (Milling efficiency and technology)				
Reducing boiler maintenance costs and deferring capital expenditure through improved technology	2016/020	QUT	Floren Plaza	01/06/2021
Investigations to mitigate the effects of juice degradation in factory evaporators on sugar recovery and quality, corrosion and effluent organic loading	2017/007	QUT	Darryn Rackemann	01/03/2022
Pan design and operational changes to suit Australian pan stages operating on low pressure vapour	2018/012	QUT	Ross Broadfoot	01/11/2022
Australian Sugar Industry Training – Development of factory training modules – Phase 2	2019/006	QUT	David Moller	30/06/2022
Strategies to minimise impacts of processing existing soft cane varieties, and industry cost/benefit analysis	2019/005	QUT	Floren Plaza	01/05/2021

 Key Focus Area 6 (Product diversification and value addition)				
Biorefineries for Profit – Phase 2 (R&D for Profit Round 4)	2019/902	QUT	Ian O'Hara	30/03/2021

 Key Focus Area 7 (Knowledge and technology transfer and adoption)				
Pathways to water quality improvements in the Myrtle Creek sub catchment (Funding provider: Queensland Government Department of Environment and Science)	2017/810/EHP17066	SRA	Phil Ross	17/05/2020
Cane to Creek 2.0. Funding provider: Partnership between Australian Government Reef Trust, Great Barrier Reef Foundation with support from SRA.	2018/803	SRA	Belinda Billing	31/03/2021
Optimising productivity, variety recommendations and mill operations through analysis of mill data	2016/032	SRA	Jo Stringer	01/02/2021
Complete Nutrient Management Planning for the Russell-Mulgrave and Lower Barron catchments	RP222C	SRA	Daryl Parker	31/10/2021

PROJECT TITLE	PROJECT NUMBER	R&D PROVIDER(S)	CHIEF INVESTIGATOR	END DATE
 Key Focus Area 8 (Collaboration and capability development)				
Re-evaluating the biology of the sugarcane root system: new knowledge allows for assessment of production impacts and implications for yield decline	2017/101	Southern Cross University	Anders Claassens	01/09/2021
Microwave sensors for sugarcane sugar analysis	2017/102	UQ	Scott Thomason	01/09/2021
Characterising N use efficiency in sugarcane	2018/102	UQ	Anoma Ranagalage	01/06/2022
Sugar milling R&D capability development program	2018/015	QUT	N/A	30/09/2023
Building a sugar industry economic model to quantify and prioritise global trade policy and market access initiatives for the Australian sugar industry	2018/501	SRA	Harjeet Khanna	0/06/2023
PhD Scholarship - Genetic solutions for determining fibre quality traits in sugarcane	2019/102	UQ	Angela O'Keeffe	30/06/2023
A new high throughput method for screening for root-knot and root-lesion nematode resistance in sugarcane	2019/401	CSIRO	Karen Aitken	1/03/2021
Enhancing the resilience of sugarcane with photoactive carbon nanodots	2019402	Griffith University	Qin Li	1/01/2021



Sugar Research Australia Limited

ABN 16 163 670 068

Brisbane Office 50 Meiers Road Indooroopilly QLD 4068 Australia

Postal Address PO Box 86 Indooroopilly QLD 4068 Australia

T 07 3331 3333

E sra@sugarresearch.com.au

sugarresearch.com.au

