Sugar Research Australia™

Our quarterly magazine bringing research to the field

CaneConnection

Autumn 2017

EDITORIAL

Welcome to the Autumn 2017 edition of *Cane*Connection

Inside this edition you will find a copy of the Biosecurity Manual for Sugarcane producers (see story opposite page), an important document in relation to on-farm and industry-wide biosecurity, which we encourage you to read and keep on file.

SRA has also just released a new manual for weed control, which you can read more about through the eyes of Innisfail grower Damian Wirth (page 14), a relatively new entrant to sugarcane growing who has placed a very high priority on good weed control.

In this edition we also visit some innovative farmers in NSW who are adopting practices of the modern farming system and seeing positive results, and we also hear how advances in soybean breeding are enhancing the value of this important break crop and the role it plays in boosting soil health.

We also look at research projects using 'eyes in the sky' such as satellites and drones to help improve productivity and profitability. Another interesting yarn comes from Mulgrave's Paul Gregory, who is seeing an impressive productivity response to laser levelling to help get water off his paddocks (page 6-7).

This is also the time of year when industry events are in full swing. There are a range of great events occurring across many topics and regions over the next few months. For more detail, visit the events section of the SRA website, or the industry's events calendar at www.canecalendar.com.au.

As always, if you have any comments or suggestions about this magazine, please contact me on (07) 3331 3340 or bpfeffer@sugarresearch.com.au.

Brad Pfeffer

Executive Manager, Communications

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 Sugar Research Australia Limited acknowledges and thanks its funding providers, including levy payers (sugarcane growers and millers), the Commonwealth Government, and the Queensland Government (Department of Agriculture and Fisheries).

Farm Biosecurity Manual released for sugarcane producers

A new manual has been produced to assist sugarcane growers and the entire industry to be aware of biosecurity risks that could cost the industry millions of dollars in lost production.

Sugarcane producers have a new guide to farm biosecurity measures to reduce the risks of weeds, pests, and diseases impacting production following the release of the *Biosecurity Manual for Sugarcane Producers*.

The manual shows simple measures to minimise the risk of introducing and spreading weeds, pests, and diseases onto properties.

The *Biosecurity Manual for Sugarcane Producers* was developed by Plant Health Australia (PHA), in conjunction with CANEGROWERS, SRA, the Australian Sugar Milling Council, the Queensland Department of Agriculture and Fisheries, and the New South Wales Department of Primary industries. It was supported by funding from SRA.

PHA Program Manager, Dr Sharyn Taylor, said that the manual is new for the industry.

"PHA worked with experts in sugarcane production to provide information that will help growers prevent new pests from spreading onto a farm," Dr Taylor said.

"The guide gives specific advice on what producers need to be careful about, including choosing SRA-approved varieties of cane, cleaning equipment and vehicles and restricting movements of vehicles and people away from production areas.

Reporting new or unusual pest symptoms on your farm could minimise longer term impacts for your farm and the industry as a whole."

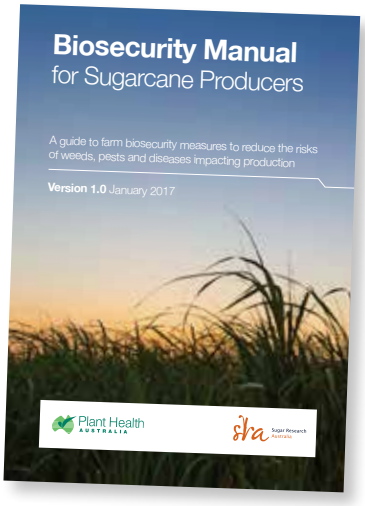
Cairns district sugarcane grower John Ferrando welcomed the new guide, saying biosecurity awareness is crucial for maintaining a productive crop, and for the long-term sustainability of the industry.

"Feral pigs do lots of damage to the cane here," Mr Ferrando said. "We also know that things can go horribly wrong when there is an incursion of an exotic pest or disease.

"It could take years for the industry get on top of the problem, or worse, there could be no chemical controls for a new pest – so it is far better that we be vigilant and keep things clean to begin with, which this manual can assist with."

SRA Key Focus Area Leader for Biosecurity, Dr Andrew Ward, said the guide also explained recent changes to biosecurity obligations in Queensland and NSW, which is important information for growers, millers and other industry stakeholders.

"The changes to the Biosecurity Acts in Queensland and NSW have increased the responsibility for everyone in reducing the risks posed by pests, diseases, and weeds," Dr Ward said.



"Further information on biosecurity obligations is available by contacting your respective State Government Department, productivity services office, or SRA."

The General Biosecurity Obligation in Queensland and the soon to be introduced General Biosecurity Duty in NSW both mandate precautions on farms and along supply chains.

An electronic copy is available on the Plant Health Australia website www.planthealthaustralia.com.au and SRA website www.sugarresearch.com.au.

Above: Cairns district sugarcane grower John Ferrando, who has been impacted by Yellow Canopy Syndrome in 2017, says that biosecurity vigilance is vital for the Australian sugarcane industry.

SRA Principal Researcher, Dr Jaya Basnayake.

Project details

Key Focus Area

Optimally adapted varieties, plant breeding and release

Project name

Improving early stage selection of SRA breeding program by indirect selection of plant vigour

Project number

2016/028

Chief investigator

Dr Jaya Basnayake

Eye in the sky to help modernise sugarcane plant breeding

It is hoped that the use of drones will be able to provide vital information on potential new varieties through the growing cycle, delivering benefits to new varieties that are bred for sugarcane growers and millers.

Cutting-edge technology is being used to assess how potential new sugarcane varieties perform through the growing cycle, with the aim of delivering better varieties sooner for the Australian sugarcane industry.

Currently, the main method of assessing the performance of a potential new sugarcane variety in the SRA breeding program comes at harvest time.

Just as growers and millers know the real test of a crop is when the harvester enters the paddock, the performance of potential new varieties is assessed the same way.

But can new technology, such as unmanned aerial vehicles (or drones), be used to capture data on how a variety is growing and performing through the season?

Drones are already being used by a small number of growers to assess their crops and minor weeds, and it is hoped that by combining these with other technologies they can be used to provide additional information to aid sugarcane breeding programmes.

At the moment, plant breeding works on very large numbers of clones with around 250,000 individual clones entering the first stage (Progeny Assessment Trials or PATs) of the breeding program, making manual data collection difficult.

But new technology called Phenotyping is being used in conjunction with drones to observe and measure differences in physiology, growth and other traits within a population of plants.

In effect, it provides a greater picture of the life cycle and could improve the efficiency of selecting potential new sugarcane varieties.

"It is like bringing up a child. Being able to look at the person all through their childhood helps you understand their potential, rather than just looking at them as an adult," explains SRA Principal Researcher for Trait Development, Dr Jaya Basnayake.

Phenotyping is a challenging area of plant breeding and can be labour intensive as it requires manually harvesting and assessing plants for particular criteria or visual ratings.

However, the use of drones fitted with a range of cameras and sensors and integrated software is hoped to enhance this process and make it much more feasible.

The rapid and dense growing nature of sugarcane means that having the ability to capture information from the air is valuable.

"The aerial platform allows us to take measurements in a short time. Within 15-17 minutes we can survey seven hectares of crop," Jaya said. "Our goal is to then provide that information to the plant breeders so they can better understand how those plants behave and incorporate that information into their normal breeding program."

Using the drone platform as a research tool is expected to provide a mass of information that would allow potential new varieties to be assessed at an earlier stage in the breeding trials.

This trial work is currently occurring in the Burdekin, where Jaya is based.

Two factors that will be measured include canopy temperature (a proxy for canopy conductance) and crop vigour which if measured at the correct time can be associated with yield.

The project aims to validate the use of canopy temperature and canopy conductance as a predictor of yield with clonal assessment trials within the breeding program.

"This is a new concept for breeding, especially for sugarcane. It has been done with corn and wheat, in which the knowledge of physiological parameters has been incorporated into the breeding program to increase the predictability in yield," Jaya said.

"But this is a first in sugarcane. We are responding to requests from industry to modernise the breeding program and find ways of further improving our trait selection.

"Most of this work is based on our experience and with other crops, but we know we are leading the way globally."

The work that is occurring now will use a mini Clonal Assessment Trial (CAT) to compare ground based measurements with observations from the drone.

It will use multiple layers of data to see how the progeny perform and assess which ones are growing quickly, or slowly, as well as high biomass at three and five months.

The technology is currently somewhat restricted by the capabilities of the cameras and sensors on board the drone. That is why it is currently assessing 'groups' of varieties via the CAT stage.

Jaya said that as the research advances and the technology improves, the long-term goal is to use this method to select individual plants within a trial.

It is also hoped that the technology will reduce the variability in observed physiological traits that are influenced by weather. Each year, potential new varieties may perform very differently depending on the weather conditions.

By providing assessments through the growing cycle, this research hopes to even out some of those issues, and ultimately deliver better varieties for Australian sugarcane growers and millers.

More information

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Below left: The drone is a powerful tool to assist the research.

Below right: Images captured from the drone.

Paul Gregory on farm earlier this year.

Levelling delivers major productivity boost in the Wet Tropics

Far North Queensland sugarcane grower Paul Gregory has seen an impressive productivity and profitability response by laser levelling and now says it will be part and parcel of his farming operation. ***By Brad Pfeffer***

Farming on what he describes as "the margin" only about 4.2 metres above sea level, Far North Queensland grower Paul Gregory has seen huge benefits to his operation from a recent laser levelling project at his farm.

For Paul, productive cane growing is about moving water off paddocks, particularly as he has low-lying country where the drains can be influenced by the tide.

"Drainage is paramount," Mr Gregory said. "On the farm there are two streams, one on the border and another through the farm, and the banks of those streams are basically the highest point, meaning between the banks there is a lot of country that holds water. For a long time we have been trying to best manage our water and improve productivity."

His main concern had been the cost of levelling. So when the opportunity arose to take part in an SRA-funded project run by MSF Sugar on laser levelling, he saw that it was an opportunity to learn if the investment would be worthwhile.

After levelling in late 2014 and planting in 2015, the figures for the 2016 harvest are impressive.

The trial included 9.6ha lasered and 6.6ha non-lasered, with the lasered block yielding 19 tonnes of sugar per hectare (TSH) compared to 11 TSH for the non-lasered. The lasered section delivered an improvement in net return of $1700/ha.

"Getting a kick-start through this project was important, and it has categorically shown that levelling is an important tool in the farming process for us," he said.

"It is part and parcel of the farming program now, and I won't plant a stick of cane into ground that is not levelled if I can help it."

"At a rough cost for contracting of $250 per hour, and the work done at about an acre an hour, it is a big difference compared to $1700/ha return."

Driving around his paddocks in January this year, the benefits are also clear. The tail ends of the lasered sections are wet with water slowly draining out, after an extended period in January where the farm averaged over 25mm of rain every day.

"Every litre of water that drains out of there improves my productivity," Paul said, pointing to the difference between the two sections of the trial.

"The water may be in there for a week, while without the levelling it could have been two months."

Cane Supply Field Officer with Mulgrave Mill, Matt Hession, ran the project, which had been conducted on four farms in the region.

"Overall, the results were mixed with two of the demonstrations having a positive productivity response to the levelling work in all four of the main productivity benchmarks (TCH, TSH, CCS, net return). The third successfully harvested demonstration showed a positive response to the levelling in only the benchmark of CCS and net return was high in the non-lasered," Matt said.

The fourth site could not be harvested as part of the trial because of the problems associated with the very wet harvest.

"As a result of the performance from the demonstration, three of the growers are now undertaking additional levelling work at their own cost on further paddocks, and the other grower is looking to purchase their own unit," Matt said.

Back at Paul's farm, he is also introducing zonal tillage, and widening rows to 1.85 metres with controlled traffic and GPS guidance. Along with the levelling, this is hoped to create more productive ratoons.

"2016 was a difficult harvest and it was only the 75-90 percent harvest round where I was actually able to cut where I wanted to go," Paul said.

"Of the 23,500 tonne, everything was cut with a tracked harvester, including material for plants. But the first ratoon cane under the new system has no damage to the stool. There are ruts of course, but the stool is intact.

"My worries about loss of yield with the wide rows are gone and under this system the ratoons will be better.

"If I can get yield gains and four fewer fill-ups of my diesel tank in a season, I'm happy."

He has also been able to prepare country for planting much easier by not having to work the ground as often.

"We only had limited windows last year, but I was still able to get 43ha of ground ready, whereas before I would have only done about 16ha if I was lucky."

Part of Paul's improvements at the property are a result of a MSF Sugar venture called Project Uplift, which is working with growers to drive productivity outcomes.

As part of the venture, growers adopt modern farming system practices as part of a collaborative approach to boosting productivity.

He hopes that this will assist him to move to a fully controlled-traffic and lasered farm within the next five years.

"It is a generous scheme for the grower, and very beneficial to both of us (grower and miller) in increasing productivity."

More information

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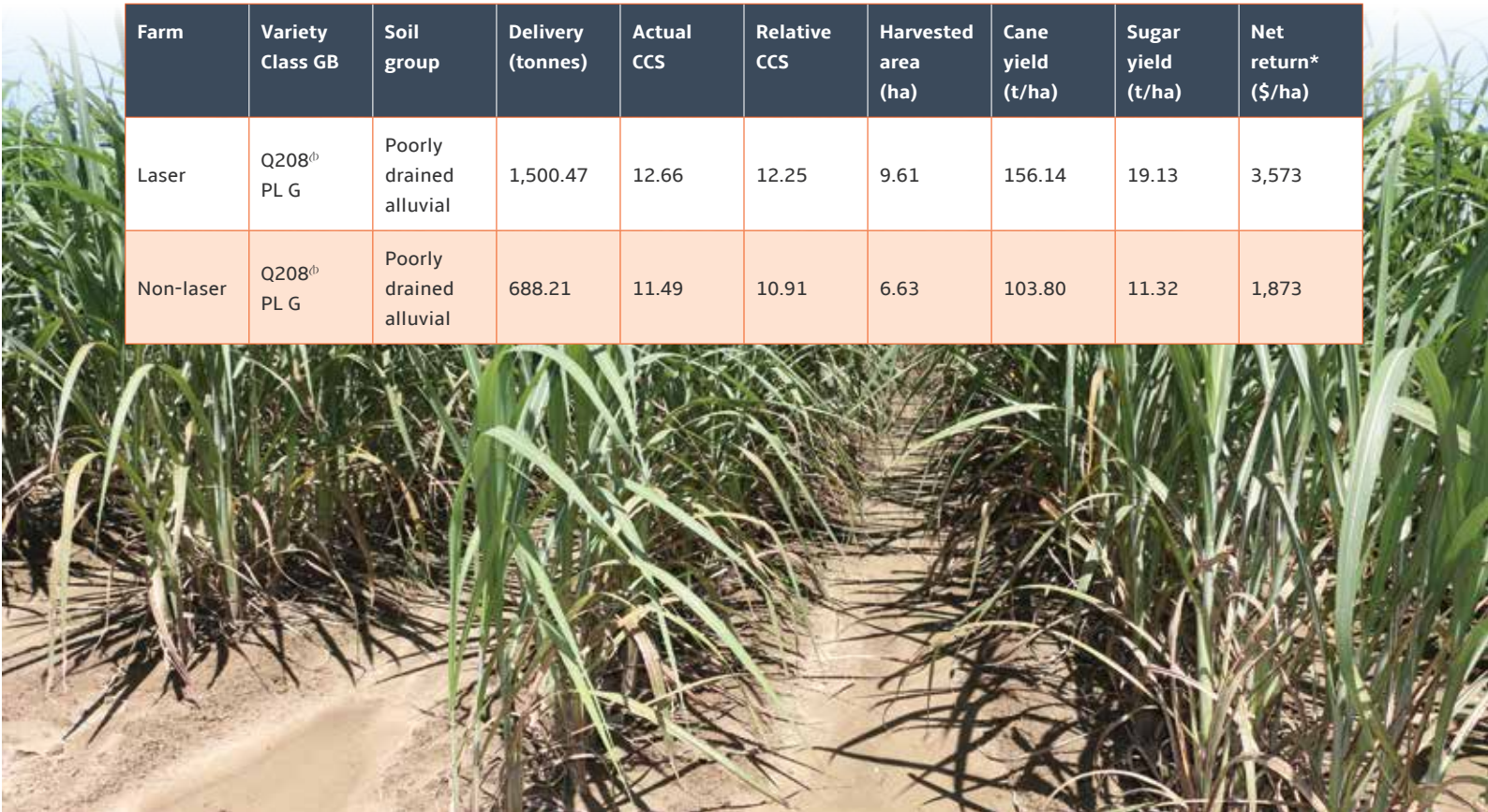
Below: Results of the levelling trial at Paul Gregory's farm, Redbank, in the Mulgrave Mill area.

Farm	Variety Class GB	Soil group	Delivery (tonnes)	Actual CCS	Relative CCS	Harvested area (ha)	Cane yield (t/ha)	Sugar yield (t/ha)	Net return* ($/ha)
Laser	Q208$^{\Phi}$ PL G	Poorly drained alluvial	1,500.47	12.66	12.25	9.61	156.14	19.13	3,573
Non-laser	Q208$^{\Phi}$ PL G	Poorly drained alluvial	688.21	11.49	10.91	6.63	103.80	11.32	1,873



SRA Adoption Officer, Gavin Rodman, discusses FertFinder with Mulgrave district grower Jeff Day.

Taking the legwork out of finding a fertiliser

SRA has developed a ready reckoner that will quickly and easily allow advisors and growers to determine which commercially available fertiliser blend is best suited to their crop's requirements.

By Gavin Rodman, Adoption Officer, Tully

There are times when calculating the right fertiliser blend becomes an arduous task, with hundreds of products on the market.

The current practice used to find a fertiliser that will meet your crop's nutrient requirements relies on experience, multiple calculations, plenty of time and sometimes a little bit of luck. Trawling through fertiliser product cards from your local suppliers can take time, particularly if your crop requires multiple nutrients (NPKS).

Finding a fertiliser blend that has each of these nutrients in an appropriate proportion can also be frustrating, as you may find something that meets your crop's nitrogen and potassium requirements, but not the phosphorus, for example.

SRA has done the hard work for you and developed a tool known as FertFinder.

This tool will make this task simpler by highlighting fertiliser blends that are available in your region and meet the nutrient requirements of your crop.

The SRA FertFinder is a tool that can be used in any region. The region selection buttons on the top of the tool allow you to select a list of fertiliser products/blends to choose from that is relevant to you.

The SRA FertFinder has been developed to allow you to enter the nutrient requirements of your crop, click up to three buttons and have a product/blend and rate recommendation that is appropriate for your crop's nutrient requirements.

This tool sits alongside the SIX EASY STEPS guidelines for calculating nutrient requirements and is available for download from the SRA website (www.sugarresearch.com.au).

Mulgrave district grower, Jeff Day, said that he farmed on a diverse range of soils including red volcanic, heavy clay, and sandy clays, which also meant that he requires a range of fertiliser rates based on soil tests and use of the SIX EASY STEPS.

"Based on the soil tests, I then follow the recommendations for the required nutrients. Quite often I require a custom blend, so that does cause me to wonder if that impacts the price of my fertiliser," Mr Day said. "A tool like this would really help with that decision making in terms of choosing the right blend, and potentially checking the price."

How to use FertFinder

FertFinder is a Microsoft Excel tool and it is available for download on the SRA website – sugarresearch.com.au

The use of FertFinder will allow SIX EASY STEPS nutrient recommendations from soil tests to become a product and rate recommendation.

FertFinder will always display the best available product options, closest to the nutrient requirements of your crop.

The first step is to select a region – Northern and Herbert, Burdekin, Central, Southern and New South Wales. Each region has its own list of fertiliser products that are available.

Some fertiliser products will be available in all regions, while some are more common or easier to access in other regions.

After the region has been selected, the next step is to enter the nutrient requirements for your crop. FertFinder calculates its recommendations based on four nutrients – nitrogen (N), phosphorus (P), potassium (K) and sulfur (S).

The next step is to filter the list of products down to those that closely meet the nutrient requirements. This is done by clicking buttons for P, K and S. Nitrogen does not need to be filtered in FertFinder, as it is used to determine the product rate.

Once the product list has been filtered by each of the nutrients, a small list of available products will be displayed that will meet the crop's nutrient requirements.

Keep an eye on the SRA e-Newsletters for FertFinder updates. For more information contact Adoption Officer, Gavin Rodman, SRA Tully, (07) 4088 0701 or grodman@sugarresearch.com.au.

The Ingham field trial at Errol Cantamessa's property.

Project details

Key Focus Area

Farming systems and production management

Project name

Too wet to forget – reducing the impact of excessive rainfall on productivity

Project number

2014/028

Chief investigator

Dr Barry Salter

Putting varieties to the test with waterlogging

New research is hoping to better understand the impact of waterlogging upon different sugarcane varieties, with the aim of providing better information for growers and millers.

Dealing with big rainfall and the challenges of waterlogging are a familiar problem for Australian sugarcane growers and millers.

Since 2010 there has been multiple very wet years that have wreaked havoc on sugarcane production in all growing regions.

The numbers tell the story. From 2009 to 2013 the Australian crop was 30 million tonnes or less, dropping as low as 27.5 million tonne in 2010. It is only in recent years that yields have recovered from that severe impact, which compares starkly to the 36.5 million tonnes of 2016.

Understanding this challenge, SRA research is looking at the issue of waterlogging for the Australian sugarcane industry, with the aim of learning more about how different varieties respond to waterlogging.

The work won't be able to completely stop the impact that will come with extended rainfall, flooding, and cyclones, but it is hoping to provide valuable information to growers and the SRA breeding program in order to better understand how different varieties perform in wet environments.

As part of that research, a field trial was established in Ingham at Errol Cantamessa's farm in 2015 to assess a range of varieties with different waterlogging treatments.

"To establish this trial we needed a site with both clay soil and irrigation, where we could set up basically rice paddies to grow cane in waterlogging conditions," explained SRA Principal Technician, Glen Park, who is working on the project led by Dr Barry Salter.

"In this experiment we had eight different commercial varieties with three waterlogging treatments: a control treatment with no waterlogging; an early waterlogging treatment in December; and a later waterlogging treatment in January," Glen said.

"The same varieties were also included in a waterlogging experiment conducted in pots at SRA's Mackay research station. Our aim was to assess whether we would get the same variety response in pots that we observed in the field.

"That way we would not have to repeat the field experiment, which is difficult to establish and manage. It could potentially allow SRA to assess the waterlogging tolerance of new varieties via pot experiments."

The Ingham trial showed that there were significant differences in how the varieties responded to waterlogging. It assessed Q183$^{\phi}$, Q200$^{\phi}$, Q208$^{\phi}$, Q219$^{\phi}$, KQ228$^{\phi}$, Q232$^{\phi}$, MQ239$^{\phi}$, and Q247$^{\phi}$.

Lowest yields and net revenue resulted from the December waterlogging treatment, while the January waterlogging event did not significantly reduce the yields of Q219$^{\phi}$, Q232$^{\phi}$, MQ239$^{\phi}$, and Q247$^{\phi}$. This suggests these varieties may be more waterlogging tolerant, however further work is still required.

Q232$^{\phi}$ had the highest net revenue under the January treatment and Q200$^{\phi}$ had the highest revenue for the control, at this site.

Mr Park said the trial showed that there were significant interactions between varieties and waterlogging.

"This is all about being able to develop a low-cost technique for assessing waterlogging, and we want to be able to rank varieties as they are released."

"So far results from the pot experiments have not been consistent with what was found in the field, suggesting that the methods may need to be refined prior to this process being used on a regular basis prior to variety release."

Further pot experiments are currently underway and the field trial has been continued with waterlogging treatments implemented in the first ratoon crop.

This information will also be presented at a poster at the Australian Society of Sugarcane Technologists (ASSCT) conference in May in Cairns.

More information

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Below (inset): Measuring the outcomes of the trial in the field during the 2016 harvest season.

Below: The accompanying pot trial taking place at SRA's Mackay research station.

Phil Patane at the Case IH harvesting manufacturing plant in Piracicaba, Brazil.

Collaboration the key to ongoing improvement in harvest efficiency

*Excessive harvesting losses are not just an issue in Australia, but also in overseas industries. SRA Adoption Officer **Phil Patane** travelled to the Brazil and the US to learn more.*

The Australian sugar industry has been given a valuable insight into factors that drive the design decisions of the two major harvester manufacturers, via a recent trip to Brazil and the United States.

SRA Adoption Officer, Phil Patane, made the trip in 2016 as part of his extensive work with the Australian industry to optimise the harvest.

He visited the Case IH factories in Sorocaba and Piracicaba in Brazil and John Deere's main factory in Thibodaux in Louisiana.

Here are Phil's top five lessons

1. The Australian market for harvesting machinery is small. It represents less than 3 percent of harvesters sold in the world, meaning that if Australia seeks to influence design change, then it will be crucial to work with industries such as Brazil.
2. Better integration between research and the commercial manufacturers is required. Extensive Australian research over 20 years has shown the opportunities for improving harvesting efficiency, but there is potential to improve connections between that research and the manufacturers.
3. Excessive harvesting losses are a key issue not only within the Australian sugar industry but in Brazil and the US as well. Although ground speed and pour rates in the US and Brazil are significantly lower than those in the Australian industry, they continue to face the same challenges of matching row profile to basecutter setup.
4. The Brazilian harvesting market is predominantly dictated by fuel consumption and performance. Current and past research indicates that increased fan speed subsequently results in greater cane/juice loss, as well as an increase in fuel consumption. This is an area that SRA harvesting research will continue to address in next season's trials focusing on assessing cane/sugar loss and monitoring fuel consumption.
5. The Australian sugar industry needs to continue its high level of harvesting research to enable us to keep our competitive edge in the worldwide market. Focus needs to remain on doing the best possible job with current machines and retro-fittable improvements which are economically viable for the Australian industry. This includes working with aftermarket suppliers.

Next steps

Phil says that the trip has already strengthened ties between research and the overseas manufacturers, with both companies keen to collaborate in the future.

"Continued contact with Case IH and John Deere will allow Australian research to be trialled and, hopefully, adopted in the future," Phil said. "An example of this is that Case IH has started to investigate the potential benefits of optimising the feedtrain on the 8000/8800 series harvester.

"John Deere have reduced maximum fan speed setting to 970 RPM on the new model CH 570 that will be sold to the Australian market for 2017."

Other modifications include the removal of the "football rollers" back to standard individual rollers and an option of changing to an additional 100 cc pump to speed-up basecutters to 700 RPM. John Deere are also investigating the "shark finned spreader rollers" to be installed in future models.

"Although this is a step in the right direction, these are only minor improvements in regards to minimising cane loss and improving machine performance," he said.

"Other bigger issues, such as extractor loss and front-end design improvement need to be continuously communicated to the manufactures. It was the "feeding green cane" project in Australia that drove the development of the JD 3520."

On-going contact with the engineering and marketing divisions of Case IH and John Deere will also allow Australia to better understand future design change to adapt to this development.

Global Product Marketing Manager Case IH – Sugarcane, Billy Lawson, said the visit strengthened the global sugar industry.

"Overall, our industry's size is small, but we experience a diversity that is perhaps unmatched in the world cash-crop arena," Mr Lawson said.

"Visits from groups such as SRA foster an open exchange of ideas and cultural practices that are imperative for continued growth. Case IH was happy to host Phil and we remain ready to open our doors again to anyone from SRA."

The study tour was made possible through a Sugar Travel and Learning Award, through SRA's Research Funding Unit. The purpose of these awards is to provide career development opportunities for sugar industry professionals, and to also provide benefits to the Australian industry.

More information

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Below (clockwise from top left):

Phil with engineers from Case IH.

Phil is not the tallest man in the world – but that is still some very big cane at the Programa Cana do IAC in Ribeirão Preto - São Paulo.

Phil Patane with Case IH Global Product Marketing Manager, Billy Lawson.

Ongoing weed control battle to assist long-term productivity

As a new entrant to sugarcane farming, Damian Wirth has put a strong focus on Smartcane BMP and in particular farming practices such as weed and nutrient management to get himself started.
By Brad Pfeffer

Having recently purchased a sugarcane farm, Damian Wirth has taken to the fast adoption of technology and best practice so that he can get himself established.

Mr Wirth bought the property at Garadunga near Innisfail about two years ago and said that it was important that from day one he ensured that he had the latest information on productivity issues such as crop nutrition and weed control.

"Like everyone in the industry, the aim is to try and do everything to get the best return, and also to look after the land to ensure everything is done sustainably," he said.

"To start, we have done a lot of work with our weed control and reducing weed pressure, which began with learning what the weeds are and how to control them."

He also has set about ensuring optimum crop nutrition, and started this process last year through attending a SIX EASY STEPS workshop run by SRA and funded by Terrain NRM.

"We are making sure we are following programs such as SIX EASY STEPS, and for this last 12 months we have undertaken Smartcane BMP accreditation.

"It has been a steep learning curve, but it is something that I have enjoyed."

I've also had the chance to have SRA trials on my property through the weed researchers Emilie Fillols and Tim Staier based at Meringa, and had an industry field walk at my property that explained that research."

"That has been a fantastic way to learn about different types of weeds, how those weeds react with different chemicals, and the best way to manage them, whether that be mechanical or chemical."

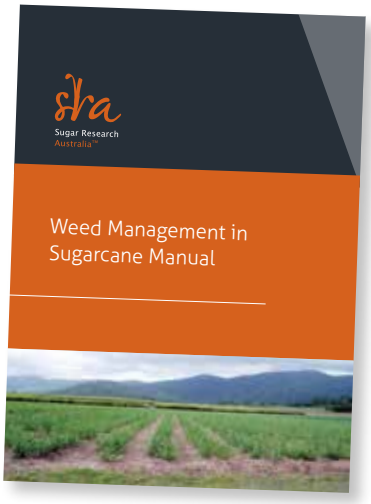
Part of Damian's work has been returning country to production after it has not grown cane for a long period.

This means that he is very conscious that it will be several years before he can reduce the weed pressure. Large rainfall events make that harder too, of course.

"We had over 805mm in early January, which put nearly 90 percent of the farm under water, with some of the water nearly six feet deep.

"From the drainage plans we have in place, the water was able to get away fairly quickly, and I estimate there was about 12 acres that was under water for more than three days.

"The crop there will be affected, but for the rest of it we have had showers since that have washed the mud off the cane, and I hope that it will now spring up and get growing."



He feels that this work and the other improved practices are already having an impact.

In 2016, he harvested 18 hectares, with just under 3ha for plants. For that 18ha, he harvested the same tonnage as he did in 2015 (his first year) from the total 21ha.

He has planted another 12ha of cane for this year and hopes that 2017 is another reasonable season.

Mr Wirth is pictured above with the new *Weed Management in Sugarcane Manual*, which has been produced by SRA.

The manual is available on request from SRA via Andrea Evers (aevers@sugarresearch.com.au or 07 3331 3308).

Using Remote Sensing to improve canegrub management in North Queensland cane fields

Project details

Key Focus Area

Pest, disease and weed management

Project name

Delivery of remote sensing technology to combat canegrubs in Queensland cane fields

Project number

2015/038

Research is hoping to use more affordable satellite imagery to bring cane grub mapping a step closer to being a viable tool for the sugarcane industry.

One main obstacle in the fight against canegrubs is the difficulty to predict future damage in order to strategically implement chemical control.

Remote sensing offers the opportunity to proactively deal with emerging grub damage on a regional level before the problem gets out of hand.

A previous remote sensing project demonstrated the high accuracy that can be achieved to identify damage using the high resolution GeoEye-1 imagery.

However, these images are expensive. Therefore, this current project is examining the feasibility of using the lower resolution Spot 6/7 imagery to produce reliable/more affordable risk maps.

If feasibility is demonstrated, then the potential to develop a commercialisation plan with the industry will be explored.

SRA's work showed that Spot6 imagery is a reliable method to detect damage with acceptable accuracy rates (81% - 91%). The images shows the difference in resolution between Spot 6 and GeoEye imagery. Despite the fact that the GeoEye-1 image produced maps with higher grub detection rates (97.73% - 100%), it tended to overestimate grub damage especially in areas with wind, rat, pig or cockatoo damage and/or sprawling.

SPOT-6 imagery resulted in fewer incorrect results due to a reduced likelihood of overestimating damage levels. SPOT-6 imagery, therefore, appears to have good potential as a cheaper alternative to the higher spatial resolution and costly GeoEye-1 imagery. A canegrub risk map can then be produced based on information generated from satellite image in conjunction with ground-truthing. Based on a survey conducted by SRA, growers preferred a digital map (accessible as a shape file) with exact areas of grub damage indicated on their farm.

Discussions are taking place with the aim of delivering this technology directly to cane growers through productivity services or other industry organisations.

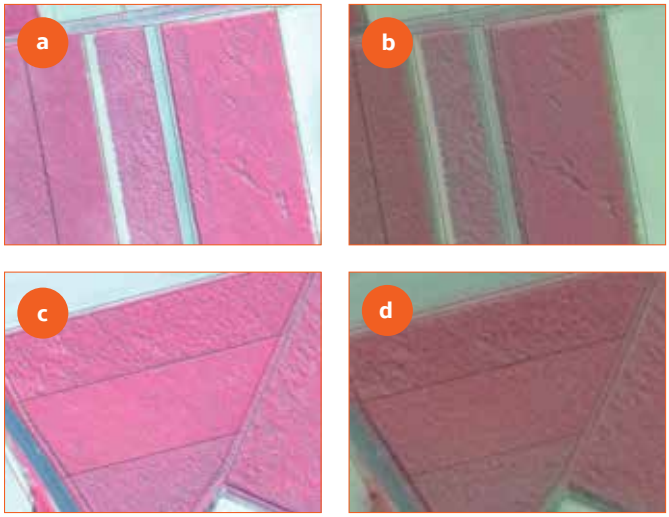


Figure 1: Figures (a) and (c) show sugarcane blocks with lodging in the higher spatial resolution GeoEye-1 imagery and subsets (b) and (d) show the corresponding areas in the SPOT-6 imagery.

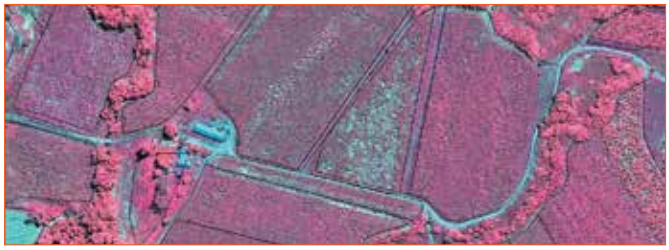


Figure 2: Grub damage as it appears using Satellite Imagery. Red colour reflects healthy cane while the green colour in this image indicates canegrub damage.

Figure 3: A canegrub risk map showing locations of grub damage in Mulgrave based on information generated from the satellite image and ground-truthing in the field.

Improved yield forecasting and N management through remote sensing

Advances in remote sensing technology – and research to apply it within the sugarcane industry – is hoped to deliver improvements to yield forecasting and nitrogen management for the Australian industry.

The Australian sugar industry could soon to take a big step forward in yield forecasting and access to derived crop vigour, yield and foliar concentration maps, thanks to research funded by Sugar Research Australia.

The research is looking at increasing the industry's access to remotely sensed data as well as establishing protocols that support its practical implementation into the sugarcane farming system.

Remote sensors, such as the images captured by satellites, provide a useful way of obtaining information about a cane crop even once it is difficult to physically access.

The technology is not new, but the research has worked on making it more practical and useful for the Australian sugarcane industry.

This project builds on previous research undertaken by the University of New England (UNE) and Farmacist, by developing remote sensing yield forecasting models that use historic growth trends as indicators of production in the future.

By taking snap shots of crop performance over a period of 15 years for example, this approach takes into account the direct crop response to many influences on seasonal production, including climatic variation.

"The benefit of this approach is you can collect an image in the early part of the year, and then use the model to receive a yield prediction in relation to variability within the region. This represents a big step forward compared to capturing just one single image to determine yield," Prof Robson said.

Coinciding with the improved yield forecasting models will be the automation of image processing and distribution of imagery products across the Australian sugar industry.

The project team, in conjunction with regional sugar mills, will focus on improving access of imagery data at the farm level. This information, provided monthly (depending on cloud) will provide growers with a greater understanding of crop variability.

This would support targeted agronomy and the adoption of precision agricultural practices. To assist with the interpretation of imagery products and its integration into a farming system, Farmacist is a project partner.

At a farm level, improved access to this information will assist growers and consultants to identify productivity constraints.

The benefits of this approach compared to harvester monitor yield data is that variations in crop performance can be identified during the growing season, therefore creating the opportunity to act and fix the issue.

Project details

Key Focus Area

Farming systems and production management

Project name (2016 project)

Sugar from Space: improved data access, yield forecasting and targeted nitrogen application for the Australian sugar industry

Project number

2016/062

Principal provider

University of New England / Farmacist

Project team

A/Prof Andrew Robson, Dr Moshiur Rahman and Jasmine Muir (UNE), Tony Crowley, Rob Sluggett and John Markley (Farmacist)

Regionally and nationally, the project offers benefit to millers and marketers through improved yield forecasting, supporting more accurate forward selling decisions. Additionally, the development of yield maps at the regional level will provide mills with a better understanding of the variability of crop performance, which would assist with harvest scheduling and the rapid identification of reduced performance across sub-regions.

Over time, access to this data will provide an effective tool for identifying possible gradual declines in crop performance as a result of soil constraints or biosecurity outbreaks.

In addition to yield forecasting, the research is also looking at the value of using remote sensors as a tool for nitrogen mapping and as a research aid.

The potential to assess nitrogen uptake via images of the leaves has significant potential for the industry.

The current methods of assessing the N uptake of a crop are imprecise, expensive, time consuming and not always representative of the entire crop.

While there is significant research being conducted on the appropriate rates and form of applied Nitrogen, there has been little research developing protocols that assist growers in implementing the recommendations within blocks. This component of the project, conducted by Farmacist, will evaluate a range of commercially available vehicle mounted sensors and data collection processes that support the variable rate application of Nitrogen.

The success of the research over the last six years has led to a new SRA-funded project that commenced in 2016, which will see the research extended across the industry. There are currently 13 mill regions involved in the new project.

"We used multispectral satellite sensors as well as hyperspectral drone and field based sensors," A/Prof Robson said. "This evaluation included a number of growing seasons, varieties, ratoons and regions including Tully, the Burdekin, and Mackay.

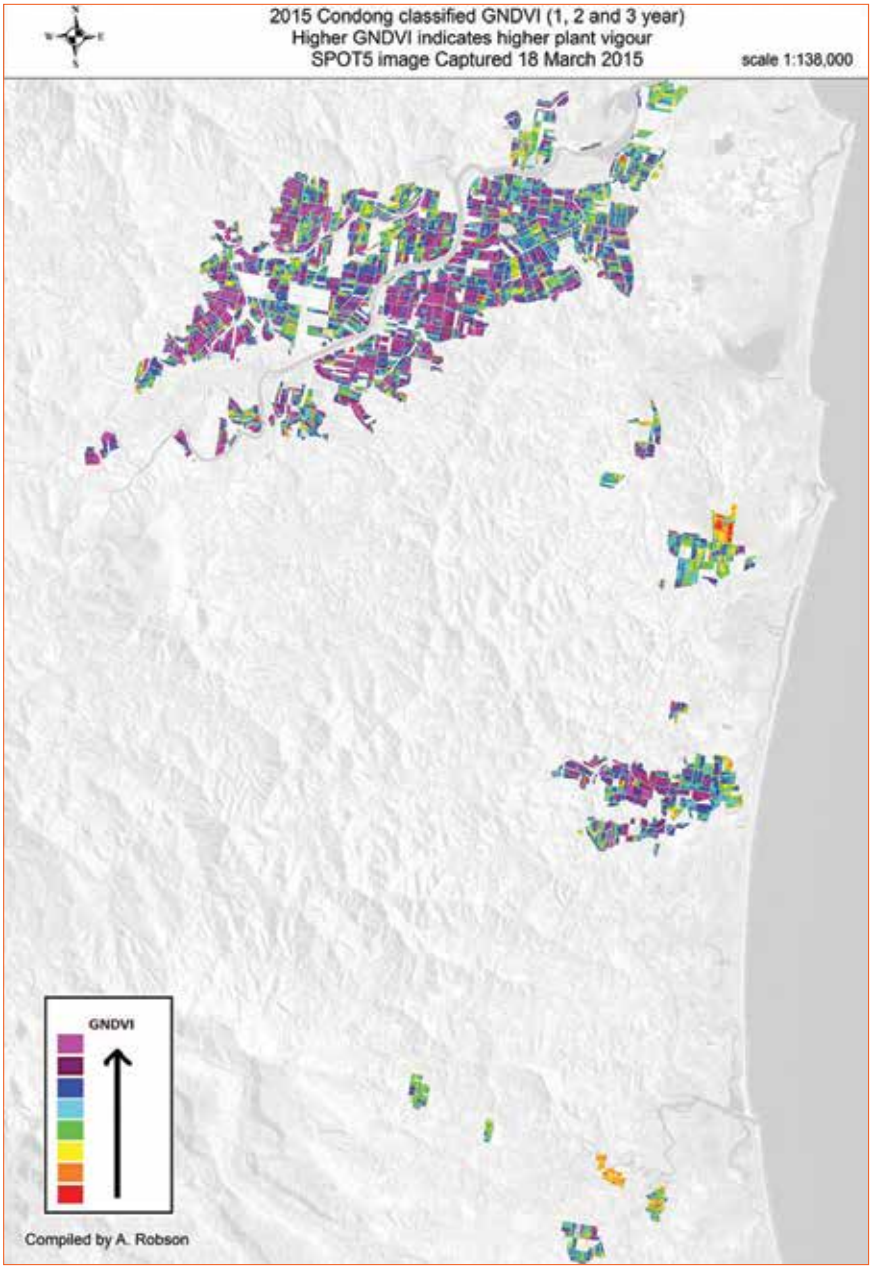
"The purpose of this was to determine if we could measure the foliar concentration of N, and determine which wavelengths of light we could use to discriminate from other changes such as pests, diseases, and biomass."

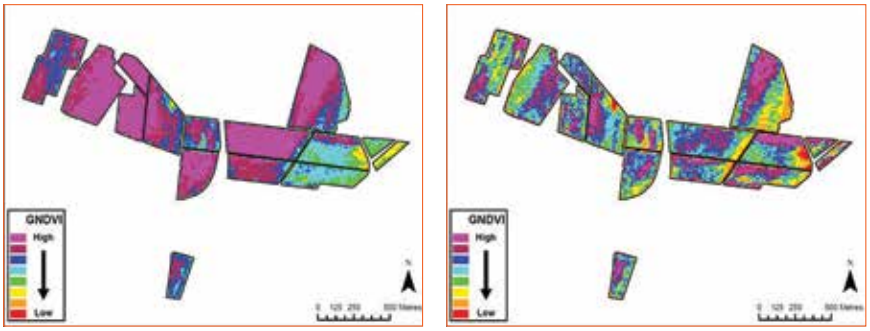
With the new project, Farmacist will be leading research to determine the best commercial sensor that could be fitted to a tractor, as well as protocols to follow when linking the information from the sensor back to variable rate fertiliser application.

"This would support more appropriate precision application of fertiliser and support tools such as SIX EASY STEPS. Rather than having guidelines for a region, we can confidently apply our information to within a block."

The new project will also be evaluating Sentinel satellite imagery which provides free imagery at 10 metre resolution and a current repeat time of around 20 days.

"Part of our research is to ensure that outputs are adoptable by industry. If Sentinel does prove to be useful, then this is a great step forward for the entire industry in terms of affordability'





Above: (Left) GNDVI classification of a sugarcane farm using the current approach i.e. 8 classes applied at the regional level. (Right) GNDVI classification of each individual block. SPOT 5 image (15th March 2015).

"Our next step is to automate the processing and distribution of imagery products: vigour maps of high, medium and low growth; a qualitative N map; and derived yield maps using the time series yield algorithms via the mills."

NSW farmer Danny Lickiss is introducing a number of practice changes at his Broadwater property.

From swinging a hammer to cutting cane

Young farmer Danny Lickiss is introducing changes such as a soybean rotation and wider rows to the farming system. ***By Brad Pfeffer***

Even though New South Wales farmer Danny Lickiss is a fifth generation sugarcane grower, he wasn't always sure whether he would end up growing cane.

A builder by trade, it was only in 2006 when he broke his arm playing football that led Danny to the final decision to become a full-time farmer at the family property between Broadwater and Woodburn.

As one of four siblings, and the only son in the family, he said there was always an expectation that he would become a farmer, along with hard work growing up on the property.

"I completed my trade and did at least 10 hours per week on the farm, which was a lot of work at the time," Danny said.

"Then, when I broke my arm, I was off work building for a few months, so I ended up on the farm every day and fell in love with it again.

"I enjoy the challenge, not just in providing for my family, but also contributing to the community through activities such as surf life saving."

Returning to be a full time farmer, he said it was important that he approached things in his own way.

He bought the 100 hectare property from his father, but he also knew that to be able to support a family and a mortgage he would need to expand beyond that.

Thus he is share-farming a significant area to the south near Woodburn and hopes that production most years should be in the range of 12-17,000 tonne.

Most of the crops are grown as two-year old, as is usual on the Richmond and Clarence Rivers.

In 2016, he was close to his target average of 145 tonnes per hectare and was also above the mill on sugar.

"You always have your better paddocks and your bad paddocks, but that is where I would like to be."

He is already making changes to the farming system. The improvement in chemicals over the last 10 years ago for weeds and pests means that there is much less working of the soil preparing the bed for the next cane crop.

"Each year I'm planting 35-45 hectares of cane per year plus soybeans, so there is not the time to be scuffling the ground every few weeks."

He has also introduced soybeans at the end of the crop cycle. "Some of the blocks had grown cane for 100 years, which is great that the ground was able to do that, but at the same time it is like everything and has benefited from a spell."

He is also looking to minimise the cost of machinery, and for example has bought a soybean planter in partnership with another farmer.

"It is an expensive piece of gear to have sit in the shed for 11 months of the year, and to get the best out of it you want it ready to go when you want.

"The soil here grows good crops, but there is only a small window when conditions are right for planting, which means we don't want to be relying on contractors."

After harvest this year, he will be widening row widths and moving to adopt a controlled-traffic farming system.

Rows will go from 1580mm out to 1800mm, and he is still deciding whether this will be dual or single rows of cane.

"Some of the share-farm country is on 1800mm and the speed at which I can get across that ground is phenomenal.

"We've used a lot of lime and chicken manure over the years, and I hope that in the future we will be able to get more benefit out of these by putting them out in sections rather than a broadcast application.

"I'm not trying to grow more tonnes, but am hoping that the soil health will improve."

His main variety is Q208$^{(f)}$, which he said was performing well with good sugar, average tonnes, and good ratoons. He said Q240$^{(f)}$ and Q232$^{(f)}$ were also going well, and this year these three varieties will be most of his crop.

He had previously grown more of the Broadwater variety 1394, he has some Q183$^{(f)}$, and he has also tried Q242$^{(f)}$ and Q254$^{(f)}$.

He said that it had been a good season for NSW in 2016 and there were hopes that this would continue this year and 2018, with the dry conditions during most of the harvest putting the ratoons in good shape for the 2018 harvest.

"It was the most tonnes that I'd ever cut, and of the four harvesting rounds, the last three were dry. Between the three mills we harvested just over two million tonnes, which is an excellent result."

At Broadwater, while some land is being lost to macadamia production and lifestyle change close to Ballina, there has also been expansion of the area toward Casino.

"The frost risk increases as you head west, and it is a high risk there, but so far the farmers there have been okay, which has helped got them on their feet, which has been a positive for the mill area."

Burdekin N trial fertiliser application.

RP20 – How one trial has changed a mindset

Collaborators in the RP20 project in the Burdekin speak in this article about the success of the project.
By Andrea Evers.

The RP20 project began with one goal in mind – to validate the SIX EASY STEPS method for calculating the amount of Nitrogen needed to grow a crop of cane across the major soil types in the Burdekin.

The project has been successful in delivering on this goal and has achieved a number of additional, unexpected outcomes as well.

The 23 grower collaborators of the project have reported benefits that they didn't expect when they first agreed to take part in the project.

"This project has changed me as a farmer. Before RP20, N losses didn't cross my mind. I just grew cane. I now have a better understanding of the entire farm management process and have learned how to identify losses and how to fix them," reported Eric Barbagallo.

A similar sentiment is expressed by the majority of collaborators involved in the project. These growers have shifted their thinking from 'if I apply enough Nitrogen and water, the crop will grow', to focussing on all areas of farm management.

By taking all factors into account, the growers manage all variables in order to maximise output and profit.

Steve Pilla, a collaborator since 2012, says: "If the crop is well managed, N will not make the difference. I now focus on what the conditions are that I can't do anything about and then suit the management style to get the best result possible."

The final report for the Burdekin Nitrogen Trials, with data covering five years across all major soil types and full crop cycles, will be presented at a technical forum in Townsville on 17th May. A full economic analysis will also be presented.

Grower updates will be held in Brandon, Home Hill and Clare on the 23rd and 24th May.

More details on these events will also be available on the SRA website www.sugarresearch.com.au

Above (inset): SRA Researcher Julian Connellan working on the trials.

Joe Trimarchi checks over third ratoon Q231Φ in January 2017.

Solid 2016 result at Tolga on the Tableland

Having grown a range of rotational crops in the past, Joe Trimarchi is looking beyond the traditional crops and vegetables that are subject to wild market variations to something he has not tried before.

Managing to avoid the worst of the wet weather problems during the 2016 harvest that hit most coastal sugarcane growers, Atherton Tableland farmer Joe Trimarchi said that 2016 ended up being a very good year for sugarcane production.

Producing about 11,000 tonne from his 80 hectare property at Tolga, he said that he was also able to average about one unit above the mill on CCS, supplying MSF Sugar's Tableland Mill.

He grows varieties including KQ228Φ, Q208Φ, and is also impressed with the first few years of the variety Q231Φ. Crops are all grown with the support of irrigation, including from one centre pivot and two lateral move irrigators supplied by groundwater.

A key part of Joe's farming system is ensuring a rotational crop is grown at the end of the sugarcane cycle.

In the past, this has included crops such as navy bean, potatoes, rice, grass seeds, peanuts, and maize.

Moving forward, he is in the process of investigating the role of industrial hemp as another option in the sugarcane cropping cycle.

This includes hemp that could be used for grain, or fibre, or both. Medicinal cannabis is also something that he is exploring with business partner, Shane Garozzo, under licence from the Queensland Government.

Industrial fibre crops have been researched within the industry in the past, including by SRA's predecessor organisations SRDC and BSES, because of their potential as another crop to break the sugarcane monoculture and improve the subsequent cane cycle.

One of the main barriers to growth of the crop has been the lack of a tropical variety, and a processing plant for the crop.

"Having a tropical variety is critical to ensure it will yield, and also so that it does not stress and its THC levels are affected, which impacts government control of the crop," Mr Garozzo said.

Mr Trimarchi and Mr Garozzo said they are in the process of breeding several new varieties to accommodate different markets, climates, and soils, and that they are also seeking to establish a group of growers looking to grow hemp as profitable rest crop for cane.

Cane grown under minimum till by John (pictured) and David Haynes at Woodburn, NSW.

Reduced tillage boosts soil health at Woodburn

A combination of strip tillage, soybeans and faba beans is delivering positive results for the Haynes brothers in the Broadwater mill area of northern NSW. ***By Brad Pfeffer***

A travel and learning trip to the United States has helped Woodburn, NSW, farmers John and David Haynes adopt a minimum till approach to sugarcane growing.

The Broadwater mill area farmers came across the strip tillage approach to cane growing as part of their involvement in the NSW farming systems group.

John's trip to the United States with the group saw him visit strip tillage in operation in US corn crops along with five other members of the group.

Based on that visit, and ongoing work of the group, the Haynes brothers have now implemented a controlled traffic and strip tillage operation that marries the fallow soybean crop to the next sugarcane crop.

The brothers farm about 500 hectares and grow all two-year-old cane. At the end of the crop cycle, which is usually two ratoons, they plant soybeans into three rows into beds, with their wheel tracks on two metres.

Faba beans follow as a manure crop, and then the dual cane rows are planted into the old gaps between the soybean rows at spring planting, thanks to the use of a strip tillage machine bought by one of the other members of the group, and a disc-opener cane planter.

"We saw that the strip tillage worked well within corn crops in the mid-west United States, so we were keen to adopt it here.

"If you keep it clean from weeds, it stays clean, and we believe our soil health has improved. Last year we had a dry period during spring planting, but it was probably our best plant ever."

The NSW Farming Systems group has done extensive work over many years on minimum and zero till planting. Through that work they found that direct drilling into soybean stubble saved costs and also reduced labour.

The group also reported improvements in soil health through reduced tillage and potential for reduced compaction. Research has also shown that cultivation of soil can reduce the number of beneficial soil micro-organism and also see the loss of nutrients that build up in the fallow.

The Haynes have also recently introduced faba beans to the fallow, to fill the gap between soybean harvest and cane planting in the spring.

With no market for the faba beans, the crop is grown to improve soil health for the subsequent cane. Even with minimal input, last year's crop grew very well and shaded out weeds.

They grow a wide range of sugarcane varieties, but have a large area of Q240$^{\Phi}$ and Q208$^{\Phi}$, as well as other varieties such as Q232$^{\Phi}$ and Q242$^{\Phi}$.

"For us we are looking for varieties that grow well for the two years and can withstand water as we are prone to flooding and have blocks that run from high to low and can sit wet," he said.

"We are also prone to frost here, so we are watching the work that SRA is doing on frost tolerance in varieties. Every year is different, but one of our worst years was in 2007 when we had a 100 percent wipe-out from frost."

Chair of the NSW Farming Systems Group, Nathan Ensbey, is a sugarcane grower and also works for the NSW DPI.

He said that the group had helped make some notable advances to the farming systems of NSW cane growers, and there had been a shift in recent years from conventional cultivation to reduced tillage operations. However, totally eliminating tillage has created some isuues.

"Growers usually harvest soybeans in May and then cane planting is in September, which presents a fair lag period," Mr Ensbey said.

"So that creates a risk of a dry spell hardening up the soil. So what is becoming more common is that farmers are adopting strategic tillage such as wavy coulters with press wheels to keep the soil friable.

"Some growers have imported this strip tillage machinery to run up those beds and cultivate a narrow section where the cane will be planted, either with dual rows or wide rows on a 1.8 metre bed."

The Farming Systems group has recently collaborated with SRA and Sunshine Sugar to assess a Hodge Bed Renovator for NSW. The machine works by first ploughing through the bed, ripping the growing area and then reforming the bed in one pass.

More information

John Haynes

0490 029 235

Below: John Haynes in his soybeans in January 2017.

NSW DPI Technical Officer, Nathan Ensbey, inspects variety trials as part of the Australian Soybean Breeding Program.

Soybean continues to boost NSW sugarcane production

Improvements in varieties and crop management are triggering an ongoing interest in soybean at the beginning of the sugarcane cropping cycle, and also delivering potential benefits to the subsequent cane crop.

The role of soybean crops in the sugarcane crop cycle is continuing to grow across the industry, with the legume crop's popularity particularly strong within the sugarcane growing regions of northern NSW.

Farming in the heart of Australia's largest production region of soybean, NSW cane growers have jumped in boots and all to a soybean fallow rotation, as have other production regions all the way along the coast.

Technical Officer with the NSW Department of Primary Industries, Nathan Ensbey, said that the growth had been driven by improvements in varieties and agronomy over the last 10 years, as well as a shift to soybean varieties that produced grain suitable for higher value human consumption markets.

At the NSW DPI research station at Grafton, Mr Ensbey works with team leader Dr Natalie Moore and Technical Assistant Sam Blanch.

Their work covers the NSW component of the Australian Soybean Breeding Program, where they evaluate potential new varieties, as well as conduct other research such as crop agronomy.

This is a co-investment between NSW DPI, the Grains Research and Development Corporation, and CSIRO.

The big factors in their variety assessments include weathering tolerance (as the NSW harvest coincides with the wet season), rust resistance, yield, protein, and other issues such as lodging and pest resistance.

"We have seen a shift over the last five years, where the aim of soybean crops in the cane growing cycle has moved towards getting the agronomy precise, selecting the right variety, and building relationships with processors," Mr Ensbey said.

"We are also seeing new varieties that present more options for cane growers. For example, the late-season variety Hayman has high yield and high protein, so it allows growers to plant in January and receive a viable crop, which has been well received by cane growers.

"We know that if you keep your soybean crop clean, with no weeds, and grow it well then it can reduce host nematodes. We've also had up to 90 kg of nitrogen per hectare left in the soil from a well grown crop, although a poor crop may be half of that.

"So it is a great opportunity to keep weeds out and boost nitrogen."

As a cane grower himself, Nathan knows of course that there is still much work required to follow it up with a successful crop of cane.

At the research station, the agronomy work is looking at factors including nutrition, plant population, and time of sowing. Mr Ensbey is also working on a Grower Solutions program that works with local growers and agronomists on solving locally relevant issues.

This program is co-funded by NSW DPI, GRDC and QDAF and includes issues such as raised beds, controlled traffic, and even work looking at mill mud and ash within raised beds to improve grain production.

For example, one of the recent successes of this Grower Solutions program came with an on-farm demonstration comparing the variety Richmond to the familiar variety Asgrow A6785.

In the demonstration, at Tim McMahon's property, Richmond yielded 7% higher than Asgrow A6785 (4.2 t/ha compared to 3.9t/ha), with potential for a premium price as well. In the premium pricing scenario, the improved gross margin was up to $397 higher for Richmond.

A short way north of the research station, Lawrence sugarcane farmer Bob Ensbey supplies the Harwood mill and says that he has seen a massive shift in the way farmers approach their soybean crop, shifting from simply a break crop to a cash crop in its own right.

"The soybean varieties are improving, with better standability and increased production per hectare," he said. "They stand on their own two feet as a crop to grow with cane, particularly as we can get into the human consumption market with new varieties.

"Until 1990 we were a dairy farm here and basically grew soybeans for cow feed and round bale silage, but that has shifted now to a cash crop, with the side benefit being they are magnificent for the soil and the cane after it."

More information

Nathan Ensbey

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Left: "We are seeing varieties that present more options for cane growers," says Nathan Ensbey.

Below: The research trials at the NSW DPI Grafton Research Station.

Sugar Research Australia continues to service the research, development and adoption needs of the Southern region through the purchase of a new property at Welcome Creek.

SRA continues long-term research in the Southern Region

SRA will have a new research farm in the Southern growing region with the purchase of a new property at Welcome Creek, on the northern side of Bundaberg.

This will see SRA able to focus its research activities to one site and will allow the transition from the previous research facility at Ashfield Road at Kalkie.

In 2016, SRA sold its land at Ashfield Road, which was a vital step in ensuring that SRA was able to continue to provide ongoing research, development and adoption services for the Southern growing region.

"The land at Ashfield Road was sold as it has become increasingly difficult to fully utilise the site for research purposes due to its close proximity to nearby residential encroachment, with increasing complaints from the neighbours about dust, noise and the use of agricultural chemicals," SRA CEO Mr Neil Fisher said.

"When this was coupled with the recent re-zoning of the land as 'emerging communities', it meant that it would have been increasingly difficult to conduct research and farming activities on this site. Because of these issues, SRA's work has been occurring on a leased property, while SRA worked on a long-term solution."

SRA has now purchased a new 56 hectare property on the northern side of Bundaberg at Welcome Creek, which will be the new home of SRA research in the region.

"This new site is away from urban encroachment and will mean that SRA can efficiently resume research over the long-term for the region," Mr Fisher said.

"Our long-term plan is to cement our presence in the Southern region so that we can continue important activities on behalf of sugarcane growers and millers. "Our staff at Bundaberg conduct important activities including plant breeding and development of new varieties, soil health, farming systems, soldier fly and cane grub research, adoption, and a range of other activities."

Grower and Bundaberg CANEGROWERS Chairman Mr Allan Dingle said that he welcomed SRA's commitment to research in the Southern region.

"There has been a change in the Southern region over the last two decades where some of the best soil has shifted from cane production into other agricultural uses, and this means that sugarcane production has expanded into a wide range of soils," Mr Dingle said.

"The new site is representative of those issues facing the industry in the Southern region, and the range of soil types on which cane is grown here."

More information

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News from SRA

We update you on recent activities occurring within your industry-owned company for research, development and adoption

SRA appoints Executive Manager, Technology

SRA has announced the appointment of Dr Frikkie Botha to lead its research division, filling the pivotal role of Executive Manager, Technology. Dr Botha comes to the role with an extensive Australian and international career in sugarcane research, including more than 35 years' experience in academic, corporate and entrepreneurial R&D. Dr Botha had previously been SRA's Executive Manager, Strategic Initiatives, and he has held previous roles in the Australian sugarcane industry. He is also a former Managing Director of the South African Sugarcane Research Institute, a Director of the Institute for Plant Biotechnology, and Professor of Plant Biotechnology at the Universities of Kwa-Zulu Natal and Stellenbosch. He is currently an honorary Professor at the University of Queensland and executive member of the International Society of Sugarcane Technologists. Dr Botha also oversees the SRA Yellow Canopy Syndrome research program.

Nick Hill, Adoption Officer – Farming Systems

Nick Hill is a recent addition to both Mackay and the SRA Adoption team, having moved to Queensland from the NSW Central West. Prior to this appointment to the SRA Adoption team he worked for the NSW Department of Primary Industries Southern Cropping Systems in a Technical Agronomic capacity.

"As a member of the SRA Adoption team, I have the role of farming systems and I am keen to work with members of the sugarcane industry to enhance the profitability, productivity and sustainability of the industry," Nick said. He can be contacted on: 0477 316 503.

SRA welcomes new engineer to harvest efficiency team

SRA has added new engineering expertise to its team that is working with the Australian sugarcane industry to improve the efficiency of the harvest.

SRA has welcomed mechanical engineer Mr Joseph Bonassi to its team of research and adoption staff, where he will work on this major focus area of research. Joseph is based at SRA's Ingham research station alongside SRA Adoption Officer, Mr Phil Patane, and the pair will conduct vital research and adoption activities across the industry.

This includes activities as part of a significant investment into sugarcane harvest efficiency through the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit programme, where SRA is leading a major integrated research and adoption program.
Mr Bonassi has a Bachelor of Engineering through James Cook University.

Total Research Investment

Project Title	Project Number	Principal R&D Provider	Chief Investigator	End Date
Key Focus Area 1 (Optimally-adapted varieties, plant breeding and release)				
Improving the accuracy of selection in sugarcane breeding trials through accounting for site variability	2012/351	SRA	Xianming Wei	01/05/2018
Exploiting introgression for the development of productive and regionally adapted varieties for NSW	2013/022	Sunshine Sugar	Roy Parfitt	01/05/2020
Sugarcane for future climates	2013/029	CSIRO	Chris Stokes	01/06/2017
Applying the genome sequence for variety improvement: validation and implementation	2013/030	CSIRO	Karen Aitken	01/08/2018
Developing cytogenetic and molecular tools to improve selection for soil-borne pathogen resistance in wild hybrids	2013/358	SRA	Nathalie Piperidis	01/04/2017
Phase 1: advancing yield, disease resistance and ratooning by exploiting new sources of genetic variability from wild relatives of sugarcane	2014/053	SRA	George Piperidis	30/06/2017
Field assessment and further development of high-sucrose sugarcane	2014/069	UQ	Luguang Wu	31/10/2017
Sugarcane root systems for increased productivity; development and application of a root health assay	2015/002	CSIRO	Anne Rae	01/07/2018
Impact of stool architecture on ratooning ability	2015/004	CSIRO	Anne Rae	01/07/2018
Leaf sucrose: the link to diseases such as YCS and enhancement of sugarcane productivity	2015/016	SRA	Gerard Scalia	30/06/2018
Generation of a high throughput SNP marker chip for introgression of resistance genes from wild germplasm into sugarcane, targeting smut, pachymetra and nematodes, to generate more resistant varieties faster	2015/025	CSIRO	Karen Aitken	30/06/2018
Selecting high value chromosomes from wild introgression material to deliver more resistant varieties faster	2015/026	CSIRO	Karen Aitken	01/08/2018
The Sugarcane Hub, development of a interface between the sugarcane genome sequence and sugarcane genetic data to allow researchers to identify genes that underpin important agronomic traits	2015/027	CSIRO	Karen Aitken	01/08/2017
Improving early stage selection of SRA breeding program by indirect selection of plant vigour	2016/028	SRA	Jaya Basnayake	01/07/2019
Optimising productivity, variety recommendations and mill operations through analysis of mill data	2016/032	SRA	Jo Stringer	01/02/2021
New approaches to identify and integrate Pachymetra resistance genes from Erianthus into SRA breeding program	2016/039	SRA	Nathalie Piperidis	31/12/2019
Licence to Farm: Nitrogen use efficient varieties to meet the future environmental targets	2016/044	SRA	Prakash Lakshmanan	01/07/2019

Sugar Research Australia aims to invest in projects that will deliver real benefits on key issues for its investors.

Project Title	Project Number	Principal R&D Provider	Chief Investigator	End Date
Key Focus Area 2 (Soil health and nutrient management)				
Strategies to manage soil-borne fungi and mitigate sugarcane yield decline	2013/101	CSIRO	Paul Harvey	01/08/2017
Regenerating a soil food web capable of improving soil health and reducing losses from soil-borne pests and pathogens of sugarcane	2014/004	Biological Crop Protection	Graham Stirling	01/07/2017
Role of controlled release fertiliser in Australian sugarcane systems	2014/011	CSIRO	Kirsten Verburg	01/08/2017
Boosting N-use efficiency in sugarcane through temporal and spatial management options	2014/045	USQ	Bernard Schroeder	01/10/2017
Assessment of new management strategies for marginal soils	2015/007	SRA	Barry Salter	31/12/2019
Improving NUE for sugarcane crops with constrained yield potential	2015/065	SRA	Danielle Skocaj	30/06/2019
Decision support for informed nitrogen management: soil nitrogen mineralisation test and the assessment of soil crop N contribution to crop N requirements	2015/069	DSITI	Phillip Moody	30/06/2018
Spatially explicit estimation of Achievable Yield Potential – an improved basis for fertiliser management	2015/070	CSIRO	Rob Bramley	01/07/2017
Improving management practices of legume crop residues to maximise economic and environmental benefits	2015/074	DSITI	Weijin Wang	30/06/2018
How much N will that crop need? Incorporating climate forecasting into nitrogen management in the Wet Tropics	2015/075	JCU	Yvette Everingham	01/05/2018
More profit from nutrients	2015/907	CRDC	–	30/06/2020
Master classes in soil health and soil biology for the sugar industry	2016/025	SRA	Andrea Evers	30/07/2018
Molecular assay of major soil-borne pathogens for better exploitation of commercial varieties	2016/047	SRA	Rob Magarey	30/07/2018
Key Focus Area 3 (Pest, disease and weed management)				
Innovative approaches to identifying the cause of chlorotic streak and new management strategies	2013/357	SRA	Kathy Braithwaite	01/06/2017
Solving Yellow Canopy Syndrome	2014/049	SRA	Dave Olsen	30/06/2017
Developing an alternative herbicide management strategy to replace PSII herbicides in the Wet Tropics area	2014/050	SRA	Emilie Fillols	01/01/2018
A Novel Polyphasic Framework to resolve Yellow Canopy Syndrome Paradox	2014/082	UWS	Brajesh Singh	01/05/2017
Validation of LSB-PCR diagnostic for ratoon stunting disease and characterisation of non-Lxx strains of Leifsonia associated with sugarcane	2014/086	USQ	Anthony Young	30/06/2017
Review of the sugarcane Industry Biosecurity Plan (IBP) and development of a Grower Biosecurity Manual (GBM)	2014/088	PHA	Rodney Turner	01/10/2016
Delivery of remote sensing technology to combat canegrubs in Queensland cane fields	2015/038	SRA	–	01/01/2018
Securing Australia from PNG biosecurity threats	2015/046	SRA	Rob Magarey	02/08/2017
Identifying new-generation insecticides for canegrub control as contingency for loss of amenity with the existing product	2016/003	SRA	Andrew Ward	01/01/2020
You can't manage what you can't identify – Managing threat from exotic moth borers through accurate identification	2016/041	SRA	–	30/08/2018
Molecular assay of major soil-borne pathogens for better exploitation of commercial varieties	2016/047	SRA	Rob Magarey	01/07/2018
Investigation of biotic causes of Yellow Canopy Syndrome	2016/064	UQ	Andrew Geering	01/12/2019

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Key Focus Area 4 (Farming systems and production management)				
Product and profit – delivering precision to users of precision agriculture in the Australian sugar industry – yield monitoring	2014/028	USQ	Troy Jensen	01/02/2017
A non-pneumatic cane cleaning system with no cane loss	2014/035	QUT	Floren Plaza	01/12/2017
Too wet to forget – reducing the impact of excessive rainfall on productivity	2014/046	SRA	Barry Salter	01/07/2017
Increased harvest recovery: reducing sugar loss and stool damage	2014/048	SRA	Joseph Bonassi	01/07/2017
Modernisation of furrow irrigation in the sugar industry	2014/079	USQ	Malcom Gillies	01/07/2017
Demonstration of GPS-guided laser levelling and its associated productivity response	2014/094	Mulgrave Central Mill	Matt Hession	01/02/2018
Bio-prospecting for beneficial endophytes of sugarcane	2015/051	AgResearch	Stuart Card	01/01/2019
Cropping solutions for the sugarcane farming systems of the Burdekin (extension of 2011/922)	2015/077	SRA	Barry Salter	01/01/2017
Sensors for improved harvesting feedback: a feasibility study	2015/080	SRA	Eloise Keefe	14/02/2017
Seasonal forecasting to increase farmer profitability	2015/904	RIRDC	–	30/06/2018
Opening the data highway: Access to remotely sensed spatial and temporal data for the Australia sugar industry to assist with yield forecasting and nitrogen management	2016/062	UNE	Andrew Robson	01/01/2020
Key Focus Area 5 (Milling efficiency and technology)				
Determine the optimum tube dimensions for Robert evaporators through experimental investigations and CFD modelling	2012/054	QUT	Ross Broadfoot	01/05/2017
Improved modelling of wet scrubbers	2012/055	QUT	Anthony Mann	01/05/2017
A retrofit to a mill to reduce its operational and maintenance costs	2013/059	QUT	Geoff Kent	02/08/2017
Reducing the maintenance costs of mill rolls	2013/060	QUT	Geoff Kent	01/08/2019
Real time harvest and transport system	2014/037	QUT	Geoff Kent	01/09/2017
Improving mill efficiency through rapid analysis methodologies	2014/051	SRA	Eloise Keeffe	01/08/2017
Managing aspects of raw sugar quality in the Australian sugar industry	2014/052	SRA	Eloise Keeffe	01/08/2017
Investigation into modifying pan boiling techniques to improve sugar quality	2015/013	QUT	David Moller	01/06/2017
Increasing capacity to undertake cane preparation research through modelling and experimentation	2015/018	QUT	Geoff Kent	01/05/2018
Develop a blueprint for the introduction of new processing technologies for Australian factories	2015/043	QUT	Ross Broadfoot	01/09/2017
A boiler simulator for improved operator training	2016/001	QUT	David Moller	01/07/2018
Online analysis systems to measure the available nutrients in mill mud	2016/019	SRA	Eloise Keeffe	01/04/2020
Reducing boiler maintenance costs and deferring capital expenditure through improved technology	2016/020	QUT	Floren Plaza	01/07/2019

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Key Focus Area 7 (Knowledge and technology transfer and adoption)				
Increasing farm business intelligence within the sugar industry	2014/001	AgProfit	Matthew Bryant	30/06/2017
Measuring the profitability and environmental implications when growers transition to Best Management Practice (as defined by the new Canegrowers Smartcane BMP)	2014/015	DAF	Mark Poggio	02/05/2018
Improving industry returns through harvest best practice	2014/091	Sunshine Sugar	Ian McBean	30/06/2017
Understanding the impact of harvester speed on subsequent ratoon performance in the Burdekin	2014/092	BPS	Robert Milla	30/06/2017
Sugar industry productivity and data recording spatial data hub for research and extension	2015/045	Agtrix	Robert Crossley	28/02/2018
Protecting our chemicals for the future through accelerated adoption of best management practice	2016/002	SRA	Belinda Billing	01/08/2019
Master classes in soil health/soil biology for the sugar industry	2016/025	SRA	Andrea Evers	30/07/2018
Key Focus Area 8 (Capability development, attraction and retention)				
Enhancing sugarcane for decreased water content and increased sugar content at harvest	2011/072	QUT	Anthony Brinnin Mark Kinkema	01/05/2017
Production of furanics and chemicals from bagasse and molasses	2012/074	QUT	Joshua Howard William Doherty	01/06/2017
Investigating the utility of mill mud for soil health conditioning and nutrient use efficiency on sodic soils within the Burdekin	2013/077	USQ	John Bennett	01/09/2016
Effect of organic nutrients on sugarcane growth, microbial activity and greenhouse gas emissions	2013/078	UQ	Susanne Schmidt	01/05/2017
Sugarcane for water limited environments: characterization of a selected sugarcane germplasm for transpiration efficiency and high biomass production for the sugarcane growing regions in Australia	2014/102	UQ	Sijesh Natarajan Shu Fukai	01/06/2017
Exploiting soil microbe associations with sugarcane roots for resistance to canegrubs	2014/104	UWS	Andrew Frew	14/09/2016
Investigation of genetic control of sugar accumulation within the sugarcane culm (stalk)	2014/107	UQ	Patrick Mason	01/06/2018
Soil nitrogen dynamics – a microdialysis approach to quantify nitrogen cycling in sugarcane soils	2014/108	UQ	Scott Buckley	01/07/2018
Statistical data mining algorithms for optimising analysis of spectroscopic data from on-line NIR mill systems: improving system calibrations for quality measures and variety discrimination	2014/109	JCU	Justin Sexton	30/05/2018
Reduction of post-harvest deterioration of sugarcane	2014/401	SRA	Anthony O' Connell	01/08/2016
Enhancing sugarcane growth and yield by biocontrol agents/biofertillizers	2014/402	QUT	Jan Zhang	01/12/2016
A boiler simulator for improved operator training	2016/001	QUT	Anthony Mann	01/07/2018

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