Our quarterly magazine bringing research to the field

CaneConnection
Spring 2015

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Welcome to the Spring edition of *CaneConnection*

This magazine continues to provide an update on SRA-funded research that is occurring both within SRA and via our external research partners.

SRA research is strongly focussed on delivering valued research solutions for sugarcane growers and millers, and this magazine is aimed at communicating this research.

This magazine also features extension articles from the SRA extension team.

In this issue you can read several articles about the importance of improving soil health.

As researcher Dr Graham Stirling explains on page 18, there is a need to increase carbon inputs and reduce carbon losses in the sugarcane farming system so that we can build a biological community that is capable of competing with pests and pathogens.

We also hear from SRA Principal Researcher for Biosecurity, Rob Magarey, on important work that is occurring to ensure that the industry is vigilantly prepared for any exotic pests and diseases that could make it to our shores.

Just as the industry was prepared for the smut incursion in 2006, SRA is working to ensure that the industry is prepared for a range of other possible threats.

This edition also takes a close look at the results from a survey that SRA conducted of about 400 growers in June this year.

The purpose of the survey was to help SRA understand its performance for its investors, as well as to gain a thorough understanding of the rate of practice change and research adoption in our industry.

Our aim is to continue this survey each year, which will help us track trends and provide the information that will help SRA to continue to provide valued research solutions for growers and millers. You can read more about the survey on page 14.

And with the forecast of an El Niño for the summer and water allocations having been reduced in some regions, this edition also looks at the importance of preparing for the season ahead in terms of thinking about timing of irrigation.

We also look at innovative Burdekin farmer Aaron Linton’s investment in trickle tape, which is producing significant water savings and higher yields. Aaron is pictured above.

As always, if you have thoughts on how you would like to improve this magazine, please call 07 3331 3340.

*Brad Pfeffer*
Communications Manager, SRA
Many growers who are experiencing or have experienced Yellow Canopy Syndrome (YCS) in their sugarcane may have noticed the syndrome appears to impact sugar levels. By Belinda Billing

Herbert Cane Productivity Services Limited (HCPSL) and Sugar Services Proserpine are monitoring YCS and sharing their findings with SRA. Information indicates that we are starting this year in much the same way as last year, and that is with low CCS early on.

There are many reasons for low CCS, particularly early in the harvest. Monitoring last year showed that CCS continued to improve as the season progressed and by the end of the season the issue of YCS and low CCS was no longer an issue.

Peter Sutherland of Sugar Services Proserpine is testing plots of cane every two weeks to gauge CCS.

In the worst affected plot the cane registered a CCS of 4 on Proserpine show weekend (June 16). Another two sites tested showed CCS of 12. Non-affected show cane tested at the same time had CCS of between 14 and 16.

Peter says the YCS impacted cane had improved by two points when tested two weeks later.

“The YCS cane appears to be gaining sugar at the same rate as non-affected cane, whether it is very low or only a few points lower,” said Peter.

This work will continue throughout the harvest and will be important in developing a full understanding of the relationship between YCS and sugar.

Lawrence Di Bella, HCPSL manager, began recording the CCS of YCS impacted sugarcane in the Herbert last harvest season and is continuing the work in 2015.

He said the Herbert was experiencing historically low CCS for the start of the season, some of which was due to YCS and some of which was due to other factors including late rain that has put the crop back into a vegetative phase.

The lowest CCS was 3.2 in a block of Q2000 and the region was still getting blocks under 9 at the end of July.

There have been allowances made to pay growers for CCS down to 5 due to these factors (normally growers are not paid if the crop is under 7).

“The CCS is starting to climb but we are starting from a low base. We have noticed that the CCS will increase as the season progresses.”

Productivity services staff are able to assist growers in making decisions on when to harvest YCS cane blocks. Mackay Area Productivity Services has been providing refractometers to growers to purchase to enable them to make this decision.

For more information contact Belinda Billing at SRA on 0475 954 437 or bbilling@sugarresearch.com.au or call your local productivity service.
Meeting the challenges of sugarcane breeding

Mike Cox’s interest in plant breeding was raised during work experience with Dekalb Shand’s plant breeding outfit in Tamworth. By Amy Claireton

Since then he contributed to the selection of improved crop varieties in the wheat, rice and sugarcane industries in a plant breeding career that spans almost 45 years, up to his retirement from SRA in August this year.

Starting with a scholarship to study agricultural science at the University of Queensland, Mike spent seven years with the Queensland Wheat Research Institute then travelled with his young family to undertake his PhD studies at University of California. On his return he led the Queensland Government’s rice breeding program in the Burdekin until 1989.

Mike took up a position with the then BSES as the leading plant breeder responsible for the southern region variety selection program. Working initially under the leadership of Dr Mac Hogarth until Mac’s retirement in 2002, Mike has contributed to many of the achievements of the plant breeding team. In 2002 Mike took on the responsibility of Manager Plant Breeding, in time to assist the industry with the rapid release of smut-resistant varieties following the outbreak in Queensland in June 2006.

Being prepared for such events is an important component of the industry’s breeding program. Mike is proud of the plant breeding and biosecurity team’s success in limiting the impact of potentially industry-destroying diseases such as Fiji disease, leaf scald, orange rust and sugarcane smut, all of which have been managed primarily through the release of resistant varieties. Estimates suggest that the investment in screening varieties for smut resistance and developing breeding strategies prior to the incursion saved the industry at least $200 million.

Over the 26 years he has worked in the sugarcane industry Mike has seen the plant breeding program embrace new technology and develop advancements that have greatly improved the effectiveness and efficiency of the selection process. There have also been huge advancements in the use of statistical analysis and experimental design to estimate the genetic effects of potential crosses and clones. Mike has championed and overseen the development of a plant breeding database, SPIDNet, which is unique in the world and greatly envied in sugarcane breeding circles. SPIDNet contains all manner of plant breeding data including pedigrees, trial design and raw and analysed data that breeders can interrogate to assist in breeding and selection.

Tissue culture has also assisted the management of foreign germplasm imported into Australian quarantine at SRA. Just one small pot of this important material can be used to quickly generate all the material required for the crossing and disease resistance screening processes.

Mike sees the next big challenge for the industry and their plant breeding team as the potential for sugarcane to meet increasing demands for biofuel. As breeding new varieties takes about twelve years, early planning for development of varieties with new traits, such as ligno-cellulosic conversion of fibre to biofuel, is critical.
SRA optimises sugarcane variety selection with QCANESelect™

Optimising sugarcane variety selection for different soil types, environments and management targets will maximise productivity and profit for growers and millers. By Roderick Fletcher and Brad Pfeffer

QCANESelect™, found on the SRA website at http://tools.sugarresearch.com.au/ QCANESelect, was developed to provide growers with interactive, up-to-date advice and information on varieties for their individual situations.

Growers can define the soil type, diseases of concern and management options and get recommendations for an individual block or for their whole farm. The system also provides variety information sheets that are linked to the SRA plant breeding database with live updates if new information is entered into the database.

QCANESelect™ provides reports in a range of formats on actual variety performance from mill statistics. On-going development has been facilitated by an SRA funded project led by SRA Principal Researcher Dr Joanne Stringer called Optimising productivity and variety recommendations through analysis of mill data. Recent developments from this project have improved the variety performance reports for Herbert, Burdekin, Plane Creek, Tully, Mackay, Mulgrave and South Johnstone mills. The new variety performance reports allow users to examine variety performance by sub-district, crop class and by soil type.

By examining actual performance, growers and advisors can make better recommendations and better farming decisions. QCANESelect™ is widely used by advisors and growers and has been heavily promoted by SRA.

An SRA survey of growers earlier this year found that 91 percent of growers have heard of QCANESelect™ and 66 percent are using it. This presents an opportunity for the one third of growers who are not using to make the most of this valuable tool.

Cairns grower Mark Savina uses QCANESelect™ usually in about April each year when he is determining which varieties to plant.

“The advice provided by the productivity boards is useful, but QCANESelect™ can provide more detail around how a variety may perform in relation to Pachymetra or ratoon stunting disease, which I need,” he said. “It provides not just information on tonnes per hectare, but a lot more intricacies on performance across a range of factors for your situation.”

Mr Savina said it was also especially useful for his farming business, where he operates multiple farms in a business partnership. While he has 30 years of knowledge for his home farm on the northern outskirts of the city, he also operates nine lease farms with a business partner, where the historic knowledge and performance of these properties is much less and spans as little as four or five years.

“We have soil maps for these farms, so it is very helpful in that situation for example when matching a variety to a soil type,” Mr Savina said.

“I also find it useful being able to look at varieties that we don’t have and see how they perform in other regions.”
Sugarcane seed project looks at cane’s ‘weediness’

Most farmers spend little time thinking about whether the tiny seeds from sugarcane flowers actually germinate in their paddocks or the broader environment. By Brad Pfeffer

For most of the industry’s history, the issue is one that has not been significant to the farming system or worthy of much consideration and study.

But when it comes to the future research around new genetically modified (GM) sugarcane varieties, understanding this seed and its germination is crucially important for the industry and for regulators.

With this in mind, a project that has just been completed by CSIRO has looked at the issue of sugarcane seed production and the behaviour of seed in the environment.

This important research has completed the groundwork to ensure that the industry understands the behaviours of the sugarcane plant and that the industry can ensure that there is a smooth evidence-based path that could lead to the adoption of future GM traits.

Dr Graham Bonnett with CSIRO led the project and he said that it was important that any future GM traits did not increase the weediness of sugarcane, and introduce problems to the farming system and environment.

“Sugarcane doesn’t establish well outside of farmers’ fields, but some of the wild relatives of sugarcane are declared weeds, so we don’t want to turn our back on that risk,” he said.

This SRA-funded research is ensuring that the industry is on the front foot and has the information available that can help to guide any new GM varieties through to commercialisation more quickly for the industry.

Any GM varieties will need to go through a strict regulatory process that is run by the Office of the Gene Technology Regulator (OGTR), which will include proving that the new varieties aren’t increasing the risk of becoming weeds. The industry needs to be able to demonstrate that such GM traits do not pose a risk – and hence the need for this research.

The CSIRO research to date has suggested findings that may not surprise farmers – and that is that sugarcane seeds are ‘weaklings’ in the environment, especially when compared to the weeds they compete against.

In short, the sugarcane seeds are short lived in the soil seed bank and competition from weeds limits their establishment.

“The production of viable sugarcane seeds from Ingham to Mossman occurs at a time of the year that is rarely conducive to germination,” Dr Bonnett said. “Seeds are produced in winter when rainfall is low and temperatures are colder than the seeds want for good germination.”

So while this meant that seeds were unlikely to germinate during flowering times of the year, it also meant that the researchers needed to assess and understand how long the seeds might stay dormant in the soil.
Dr Bonnett said their experiments indicated that no seeds lived longer than six months when buried at 5-10 cm and nine months when buried at 30 cm. All this means that the research has found that sugarcane seed neither exhibits dormancy nor longevity, which all pointed toward low ‘weediness’. However, Dr Bonnett said that further research may be needed in the future, particularly if GM traits go down new pathways.

The first generation of GM sugarcane currently being developed is for herbicide tolerant traits. However, future generations of GM cane may look at a range of other stress tolerance traits that could include, for example, water use efficiency or water stress resistance.

If such GM traits are progressed they would be designed to improve sugarcane’s performance under currently sub-optimal conditions. The research has developed ways to measure any changes in the performance of sugarcane seed’s ability to survive under these conditions when compared to non-GM varieties.

Simply, researchers understand that current sugarcane seeds are generally not weedy, but the industry will also need to understand if any seeds from new GM traits are at risk of becoming more weedy. In such a case, this may need to be tested.

New MOU to strengthen sugarcane breeding in both Australia and Vietnam

Sugar Research Australia (SRA) and the Sugarcane Research Institute (SRI) of Vietnam have signed an historic Memorandum of Understanding (MOU) that will pave the way for exchange of genetic material between the two countries’ plant breeding programs.

The 10-year MOU is aimed to allow both countries to improve their sugarcane plant breeding and deliver improved outcomes for growers and millers.

This will be done by SRA and the SRI Vietnam working collaboratively to exchange sugarcane germplasm between their respective breeding programs, as well as working cooperatively on research on sugarcane diseases and pests of mutual interest, and other collaborative research ventures such as trait development, molecular biology and crop management.

SRA Chairman Mr Paul Wright AM said that expanding the genetic base within the SRA sugarcane breeding program was vital for SRA to be able to continue to develop new and improved sugarcane varieties for growers and millers.

“SRA already has variety exchange agreements in place with more than 15 countries around the world and this new MOU with Vietnam is expected to deliver new opportunities for growers and millers, by allowing us access to a greater pool of genetic diversity,” Mr Wright said.

“Bringing in overseas genetics to our breeding program allows us to improve the parent population in the program.”

Director General of the SRI Vietnam, Dr Nguyen Duc Quang, said that the MOU would benefit both countries’ industries, as breeding material often came from different sources.

Vietnam also has some important diseases and pests which are of biosecurity concern to Australia.

“Working together, we can help lessen their impact on the Vietnamese industry, as well as ensuring that the Australian industry is well prepared for any incursion,” Dr Nguyen Duc Quang said.
Earlier this year, thanks to an excellent scholarship opportunity through Sugar Research Australia, I had a chance to attend a game-changing course which is custom built to help give people who want to be part of that, but don’t know quite how to get there, a real shove in the right direction.

The program is called TRAILblazers and was put together by the well-respected Australian Rural Leadership Program.

It was a little like being part of the amazing race (TV series), but instead of competing against the other people on the course, you have to work really closely together to maximise the key strengths and abilities of everyone in the group to try and achieve the most successful outcome for the given scenario.

The format quickly exposed a broad range of deep-seated and longstanding leadership issues in each and every one of the participants; but even more impressively, provided a platform for each of us to really take on what we were learning. What made this course completely different was that it took all the usual theoretical based learning material and threw them into scenarios.

It was interesting to see how simple scenarios pushed each of us immediately to our fallback positions, where flaws in leadership rose to the surface quickly and the cracks in each of our leadership styles became so evident that we could not cover it over.

This type of format really seemed to penetrate even the most ingrained behaviors and help us to genuinely learn the hard lessons.

You might be the most results-driven person in the business, but without the means to create new and innovative solutions to tackle long-standing challenges, getting results can be a slog. This program can really help you cut to the core of the issues and walk away with a fresh perspective and the tools to manage issues (with a clear focus on results) well after you leave the course.

My passion project is about ensuring the Australian agricultural industry is renowned as a strong, respected and competitive industry – both here and abroad.

I care deeply about creating a strong respected brand Australia; deeply about creating a smart computer resource that farmers can use to really get the best out of their land, their resources and the world market; and care deeply about getting the representative structure of agriculture right so we can achieve all that. The course has helped me to start to plan how to become part of that.

If you want to be part of driving the course of Australian agriculture, but feel like you need more practical skills in leadership, this course is for you. I would absolutely encourage anyone serious about developing their leadership skills to consider this course.

I would also like to sincerely thank SRA for the sponsorship and commend them on offering the scholarship again this year.
Nitrogen – one piece of the puzzle

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

By Andrea Evers

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

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

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

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

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

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

By gaining a better understanding of the amount of nitrogen going into the farming system and determining the amount of nitrogen utilised by the crop, growers can develop a simple budget. This information, along with the results obtained from the strip trials, can be used to provide a more informed understanding of crop nitrogen requirements in the Burdekin.
General farm management practices such as crop establishment, weed control and irrigation management are also monitored at all trial sites to gain an understanding of their potential impacts on final yields.

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

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

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

‘For me, the success of this program can be attributed to two factors. Firstly, growers that were involved in the trial got to experience first-hand the potential benefits of modifying age-old practices—from both productivity and profitability perspectives. Secondly, successful collaboration between growers, industry and government who have collectively improved their understanding of nitrogen use efficiency and their willingness to maintain open minds. As we moved through the project and negotiated the challenges that arose, the growers’ willingness to move forward has been reassuring and encouraging.’

David Defranciscis, a third generation Burdekin grower, whose passion for his industry drove him to find a definitive answer to the question ‘how much fertiliser do we actually need to grow a profitable crop of cane’, has taken on a pivotal role in the project as Industry Liaison Representative. ‘It’s David’s passion and commitment to the project that has made the difference’, explains Dominic Henderson, principal Project Officer of EHP. Evan Shannon was also instrumental in setting up the trials. Evan worked with David to help secure funding and provided assistance in the early stages of the project to identify suitable trial sites using his extensive knowledge of the Burdekin.
David is convinced that the collaborative approach between EHP, SRA and the participating growers means that the final results of this trial will lead to positive, on-farm changes that will allow his industry to remain productive and enjoy a profitable future.

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

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

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

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

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

Ryan Matthews, SISL – Selkirk

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

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

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

Malcolm and Aaron Kelly – BRIA

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

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

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

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

Eric Barbagallo – Home Hill

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

Eric says that his involvement in the project has been really good for him. ‘We got into bad habits with the belief that if you put enough water and fertiliser on the crop, it’ll grow. Before the trials, I was applying around 290 kg per hectare of nitrogen because I used to think the more nitrogen I applied, the bigger the crop would grow.’

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

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

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

Eric has been impressed with how meticulously the trials have been monitored, which is why he believes that there’s no arguing with the results.
New longer residual canegrub control to benefit industry

Sugarcane growers dealing with canegrubs have a new tool at their disposal thanks to a long-term collaborative partnership between SRA and Crop Care Australia (CCA). By Brad Pfeffer

The chemical is a new formulation of suSCon called suSCon Maxi Intel®, which is a controlled release formulation of the active ingredient imidacloprid. The imidacloprid is released from granules over a number of years at levels toxic to canegrubs, while minimising the active ingredient loading in the soil at any time.

SRA Manager for Plant Health, Dr Andrew Ward, said the new formulation has a number of significant benefits over previous formulations, including a much longer residual.

“This is a significant project outcome following a long period of investment and it highlights SRA’s ability to form commercial relationships that lead to positive outcomes for the industry,” Dr Ward said.

The partnership sees SRA contribute with technical trialling capability including an understanding of canegrub biology and ecology, and the sugarcane farming system, with CCA managing the commercial release including formulation, marketing, and registration.

According to CCA, the product provides up to four-year control of canegrubs, dependent on species, which reduces growers’ labour, maintains higher cane-plant numbers, improves vigour and yield, and allows for stronger ratoons, as well as having potentially lower off-farm loss of the active ingredient.

Giru district grower Gary Lyons has SRA and CCA trials at his property, and he said that controlled-release canegrub control was vital for his farming business. He said that both the impact of grubs, and the value of treatment, could not be underestimated. He has been using the predecessor formulation of suSCon Maxi Intel®.

“We’ve always had canegrubs and we know that you don’t get rid of their numbers in one or two years, and that every time we plant we need to use suSCon otherwise the numbers build in the soil,” he said.

He estimated that while the losses from canegrubs could be in the order of 30 percent if untreated, the ripple effect was of course much higher as the impact carried through to future crops.

“If you have never had anything to do with grubs it may just look like a dry area in your paddock. And then the harvester goes through and the whole stool ends up in the bin, including dirt which brings your quality down. And then next year there is a big hole there and you wonder what is wrong when the harvester goes through a wet spot and makes a mess. It’s not salt or anything else – it is canegrubs.”

Mr Lyons farms about 230 ha under cane and he added that he was continuing to learn about use of chemical control. “The last time we planted we put the control further down the drill than we had ever before. We always thought it was poor soil, but it is pretty much the line of where I stopped putting suSCon on.”

SRA Development Officer Phil Ross said that imidacloprid was a vital chemical for the industry for canegrub control and that it needed to be used according to the label, with industry continuing to minimise runoff into waterways. “Growers should only treat blocks where canegrubs are a problem or are likely to become a problem,” Mr Ross said. “Do not blanket apply across the whole farm unless your advisor agrees it is necessary due to canegrub risk.”

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For more information about SRA’s work on canegrub control contact Dr Andrew Ward award@sugarresearch.com.au.

SRA, CANEGROWERS, and Mackay Area Productivity Services have developed several fact sheets on maximising canegrub control and minimising off-farm chemical loss, as well as information about pesticide thresholds in waterways, which can be accessed by emailing Phil Ross on pross@sugarresearch.com.au.
SRA grower survey reveals industry trends

During June, SRA commissioned a market research company to conduct a survey of 400 members, evenly spread across all cane growing regions in Queensland and New South Wales.

The survey has shown a strong rate of practice change in Australia’s sugarcane industry, with 58 percent of respondents adopting at least some form of new and innovative practice over the last two years.

The results will be used to help inform some of our activities and corporate reports, including the recently released Performance Report for 2014/2015, which is available on the SRA website.

1. The purpose of the survey was to help set a benchmark for current practices in the industry and also to understand how the investors in SRA perceive SRA’s performance.

2. The survey showed that members had adopted a range of practices including changing fertiliser application or management, better use of chemicals, changed to reduced tillage, or adopted controlled traffic farming.
The average age of respondents to the survey was 56 years old and average tonnes harvested being 11,900, with 71 percent of farms in a steady phase (33% because they are unable to expand, and 38% because they are where they want to be). Only 14% of respondents were in an expansion phase.

The survey also confirmed the unfortunate statistic that profitability for many farmers this year is lower than the average over the last five years. The survey revealed 61% of farms expect lower profit this year, while 16% expect higher profit, a reflection of the challenging conditions facing the industry.

While there were obvious trends across the regions, there were also some noticeable differences. For example, the average age of respondents was lowest in the Burdekin (52) but highest in the far north (59) and the Herbert and NSW (both 58). NSW respondents had the greatest number who expected greater profits than last year (37%), far more than any other region, and a reflection of a return to a good season after several bad years for NSW in recent years due to frost and flood.

The rate of practice change in the last two years was greatest in the Herbert, with 72% of respondents indicating change.

Not surprisingly, the main drivers that encouraged members to make changes to farming practices, techniques or methods were their neighbours, family and other growers and also their own experience and trials on farm. 29% of respondents mentioned SRA as providing the information that prompted or encouraged practice change, either in person or through the SRA website and other publications.

Varieties are always a topic that growers are interested in, and this survey was no different. When asked what SRA should focus on over the next 10 years, considering the resources available, 82% of respondents made mention of varieties. 93% of respondents said that they had planted a new variety that had been released over the last five years.

We also asked you to let us know how we could improve the information products and services that we provide to the industry.

This survey has helped to benchmark current practices and identify areas for improvement when it comes to research, development and extension. It also assists us in reporting the performance of SRA in relation to delivering valued research outcomes to SRA investors.

Thank you to those members who participated in the survey. We really appreciate your involvement.

It is encouraging that 68 percent of people who did the survey said they knew a fair amount or a considerable amount about SRA and its activities.

Our goal is to increase that number by continuing to deliver valued research, development and extension outcomes for Australian sugarcane growers and millers.

To discuss the survey contact Andrea Evers at aevers@sugarresearch.com.au or phone 07 3331 3308.
SRA scientists preparing to combat foreign threats

SRA scientists have recently received funding for research into exotic pest and disease threats in Indonesia and Papua New Guinea (PNG). By Rob Magarey

This research is essential for preparing our industry to deal with an incursion by the major pests and diseases that are present in neighbouring cane-growing countries. The incidence of Panama disease TR4 in the banana industry near Tully, and the previous incursion of sugarcane smut in 2006, both highlight our need to be prepared.

Our industry has developed good relationships with researchers in Indonesia and PNG and these collaborations will assist us to develop the tools we need to combat the threats, should they arrive.

Indonesian research, worth $850,000 over four years, will be addressing the viral disease Sugarcane Streak Mosaic (SCSMV) which is prevalent through much of the sugarcane industry in South East Asia, including countries such as China, Indonesia, Thailand and Vietnam.

The project aims to develop rapid diagnostic tools and resistance ratings for our varieties. It will also determine the yield losses caused by the disease, how the disease spreads and the most effective management strategies.

The project will include plant pathologists, entomologists and extension staff from Indonesia, Australia and France.

The PNG research follows on from a five year project that addressed management of the very important sugarcane moth borers, a major pest group which has been kept out of our industry through vigilance and strict quarantine.

Moth borers can devastate crops and are considered the major insect pests of sugarcane in most overseas countries. Screening of our commercial varieties for resistance to these pests and diseases will be one of the key outcomes from the work.

Other aspects of the project include the description of a new species of one of the downy mildew pathogens in PNG (significant on a world basis) and better characterisation of the Ramu stunt virus.

Each aspect of the project will deliver outcomes to the Australian sugarcane industry and ensure that if one of these threats reaches our shores, the industry will be in an excellent position to either eradicate, minimise the effects of, or to manage the issue with minimal disruption to commercial sugarcane crops.

SRA is working with industry, governments and our neighbouring countries to be prepared for possible future incursions of high risk pests and diseases.

We can’t afford to wait until an exotic pest or disease reaches our shores before we undertake the research necessary to diagnose the cause, identify appropriate management tools and to screen our varieties for resistance. The saying ‘a stitch in time saves nine’ is never more appropriate than with biosecurity issues facing the Australian industry.

A cooperative project with Plant Health Australia is updating the Sugarcane Industry Biosecurity Plan, which is a document that brings together all of the information needed for responding to an incursion of an exotic pest or disease.

The information provided by the overseas research will be captured in the Sugarcane Industry Biosecurity Plan and will guide the industry in the event of any future incursions.

The previous incursion of sugarcane smut in 2006 has demonstrated the value of the sugarcane industry being prepared for biosecurity threats.
Soil health requires everything to be right,” he said. “If you put microbes on and you have not got your soil moisture, soil mineralogy and other parameters right then you end up achieving very little. The ultimate aim is to increase the organic carbon content in your soils.”

He said that there were many steps that farmers could take to improve their soil’s health over time.

He said some farmers in the district have had very positive results from long-term application of mill mud and microbes, allowing them to consistently apply less nitrogen but continue to achieve high yields.

He also said other options include break crops, legume rotations, and controlled traffic, while adding it was also important to have a good bed profile to keep the soil aerobic.

SRA has funded several other grower group projects in other regions that have also looked at the role of microbes upon soil health and other inputs such as biochar. These projects are showing similar results to those found by BBIFMAC in the Burdekin. Some of this work is continuing but there have been initial indications that not all blocks and conditions are conducive to positive results from biological applications. Simply, growers need to provide an environment in which these microbes can survive in order to realise any positive benefits.

Mr McShane said that BBIFMAC has also worked with NQ Dry Tropics on an extension of this project to conduct a range of soils measurements by linking the research with NQ Dry Tropics’s soil health program.

This work will also continue and Mr McShane is hopeful that in the future it could lead to a practical measurement of soil health for growers.

“This was a grower driven project and it has delivered some important information for the industry regarding considerations for the application of microbes to improve soil health.”

A Burdekin grower group project is finding that applying microbes to soils is not enough by itself to improve soil health, and that when applying microbes you need to consider the entire soil environment.

By Brad Pfeffer
A look into the biology of sugarcane soils reveals lost yield potential

In addition, the research is revealing important details about how the current sugarcane farming system is affecting this living environment in the soil and having a negative knock-on impact on yields.

The SRA-funded research is being driven by Biological Crop Protection, and one component of the work is being done in partnership with the University of the Sunshine Coast.

Principal researcher Dr Graham Stirling has sampled a range of soils in different sugarcane farming systems and looked at specific issues such as soil carbon levels and how they affect the predators that attack nematode pests and therefore reduce their numbers.

The research is finding that serious yield potential could be regained if growers look at the whole picture of what is living in the soils beneath their cane.

In addition to considering pests such as nematodes, canegrubs and Pachymetra, Dr Stirling said growers need to recognise that there are also beneficial organisms in cane-growing soils.

Dr Stirling has looked closely at soil health in relation to tillage, trash blanketng, soil compaction, and nitrogen inputs.

“The clear message from this work is that when steps are taken to sequester carbon in the soil, natural enemies of nematode pests will increase, and they will help keep these pests under control,” Dr Stirling said.

Dr Stirling and his colleague (Dr David Walter from USC) are finding that having greater soil carbon levels increases the populations of small organisms called arthropods, some of which are predators of nematodes.

He said that tillage and compaction were a “disaster” for these arthropods. The disturbance associated with tillage kills many predators while compaction caused by farm machinery eliminates the spaces that they inhabit.

“Everything that we do in farming has a knock-on impact,” he said.

“And unfortunately the end result of many current practices is a soil health problem that is evident throughout the industry.”

Dr Stirling said that his research reinforced the need for growers to look at all their farming practices and recognise that many were detrimental to beneficial organisms.

He listed five top-tier practices that are the foundation for building a healthy, biologically-active soil.

Growers can take a number of steps to improve their soil health and see substantial benefits.

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**Project details**

**Key Focus Area:** 2

**Soil health and nutrient management**

**Project name**
Regenerating a soil food web capable of improving soil health and reducing losses from soilborne pests and pathogens of sugarcane

**Project number**
2014/004

**Principal provider**
Biological Crop Protection

**Project end date**
30 June 2017
These are:

- A diverse rotation sequence;
- Continuous inputs of organic matter;
- Permanent plant residue cover;
- Minimum tillage; and
- Avoidance of compaction through traffic control.

"Under the practices usually used to grow sugarcane, levels of soil organic matter have declined to the point where soils are conducive rather than suppressive to soilborne diseases. We need to increase carbon inputs and reduce carbon losses so that we begin to build a soil biological community capable of competing with pests and pathogens," he said.

"The data obtained from a field trial with organic amendments at Harwood, NSW, suggest that the increases in yield obtained with high rates of mill mud and compost were at least partly due to their effects on the soil biology. Two years after applying the amendments, these treatments had the highest levels of soil organic carbon and the lowest populations of lesion nematode."

Other work has shown that in the biologically-active soil just under the trash blanket, roots are healthy and carry relatively few pest nematodes. Roots further down the profile are in poor condition because low soil carbon levels at depth mean there are fewer natural enemies to keep pests and pathogens at bay.

Future research will also be looking at earthworms and how their presence – as well as the burrows they dig in the soil – affect predatory arthropods.

"We already know that we get better rainfall penetration when earthworms are present, but over the next two years we will be looking at whether the burrows made by earthworms are ‘highways’ that enable arthropods to move down the profile to regions where most pest nematodes are located."

Other research will be looking at the impact of canegrub pesticides on beneficial biology, as Dr Stirling said there is little point in using a chemical against one pest if it increases the population of another pest.

Dr Stirling says that modifying sugarcane farming systems to reduce disturbance, minimise compaction and increase soil carbon levels will provide many benefits over time. However, he added that while improving soil health was an important part of improving farm productivity and profitability, it takes time and patience for results to be seen.

For more information email graham.stirling@biolcrop.com.au.

New focus for breeding program to deliver optimum cane varieties into the future

An industry reference group has worked with Sugar Research Australia’s (SRA) sugarcane breeding program to ensure that future sugarcane varieties deliver characteristics that will improve grower and miller profitability.

The group of 12 people, appointed by the Australian Sugar Industry Alliance (ASA), has reviewed how individual traits of sugarcane varieties (such as CCS, tonnes of cane, disease resistance, and others) are weighted in the industry’s variety development program.

Selecting and delivering the best possible varieties are based on each of these traits having an economic value.

“Growers and millers have come together through this group to consider the weightings of traits for the breeding program, and this group has now told SRA what they want implemented as part of these changes," SRA Executive Manager for Development, Dr Peter Allsopp, said.

“This group has told us that the breeding program must maximise profitability for the entire industry and, with this as their focus, they have endorsed specific changes to the weightings of traits."

Notable changes to the weightings are the inclusion of a ratoonability index and more emphasis on cane yield.

“This reflects the different production environment to the early 2000s, where now many mills have excess capacity and it makes economic sense to utilise that capacity," Dr Allsopp said.

“The overall focus is on maximising profit to the industry."

The review considered a range of important issues and specific traits and the weightings have been tailored to the specific needs of local industry (Northern, Herbert, Burdekin, Central, and Southern Queensland, with northern NSW yet to be finalised). This information is being communicated with growers and millers throughout the second half of 2015.

The SRA plant breeding program continues to be a core component of SRA’s R&D investment and has the aim of delivering optimum economic outcomes for sugarcane growers and millers.
Trickle investment delivers water use efficiency

The investment in trickle-tape irrigation is yielding positive results for Burdekin farmer Aaron Linton.

By Brad Pfeffer

Mr Linton farms near Home Hill with his father Joe and over the last three years they have made an increased move to trickle tape irrigation strategically across their farms, with encouraging results. The technology may be far from common-place in the water abundant Burdekin region, but Aaron Linton said that the investment made sense for their farming operation.

The trickle tape is used over about 35 percent of his farm, installed at depth of 250 mm and able to apply water at as much as 7.5 mm per day, which allows ample capacity to maintain water to the crop each day. The trickle tape has been used to positive effect at parts of the farm where there was significant water run-off, reducing this run-off entirely.

A recycle pit captures water runoff from traditional fluming irrigation and reuses it in the trickle tape, meaning a very efficient use of water and a more even crop overall.

And while Aaron said it is difficult to estimate the yield advantage, he estimates that he could be 25-30 tonne per hectare better off under the trickle tape, based on a harvest of the plant cane and the first ratoon in 2013 and 2014 respectively.

With Burdekin water allocations having been reduced in 2015, the system has also reduced concerns about water supplies looking ahead to the summer.

"However the electricity price is the biggest challenge. Because it requires a higher pressure, it is a higher cost per megalitre," he said. "But I also use fewer megalitres. That’s why this year I am doing trials to compare the drip to fluming irrigation to see how the numbers stack up."

There are also a range of considerations that enter into the equation, including labour.

"As I can fertigate through it, I have had crops where the harvester has gone through and the next piece of machinery in the paddock is the harvester the next year. The fertiliser went out with the tape and with no rain when the cane was small there was no need for me to go into the paddock to control weeds."

He is also able to operate the system from anywhere over the Internet.

In addition, he added that while maintenance was important, the total workload was less than that of usual irrigation.

"I run hydrogen peroxide through it to stop algae growing inside the tape as well as flushing out extraneous matter. If there is a rat in there or a rat hole I need to fix that, but it hasn’t been much of an issue and it has been a lot quicker to fix those issues than laying the fluming just once."
Dry forecast prompts need to develop an irrigation plan

With an El Niño weather pattern in place over winter and the forecast for an increased likelihood of lower rainfall for the coming summer, cane farmers with irrigation supplies are being reminded of the opportunities that can come with planning ahead with their irrigation scheduling.

A number of cane growing regions experienced dry conditions over the 2014/2015 summer, and according to the Queensland Government’s Long Paddock website, most of Queensland has “an increased probability of below median July to September rainfall, with a similar outlook for the coming summer (November to March 2015/2016)”.

“The high probability of the current El Niño event developing further over winter and spring, and with it the threat of another dry summer for some regions, poses a risk of current drought conditions becoming more protracted. This risk should be factored into decision making and allocation of resources. In this context, the long-lead outlook for summer rainfall should be taken into consideration,” the Long Paddock website stated.

With the seasonal forecast being reassessed each month from August until November, growers and millers are urged to check the website for updates (www.longpaddock.qld.gov.au).

The NSW Department of Primary Industries has forecast more neutral conditions and updates are available via http://www.dpi.nsw.gov.au/agriculture/emergencyseasonal-conditions/.

Water in storage is varied across the industry, although at the time of writing there had been a cut in allocations in the Burdekin, where SunWater has announced that irrigators face a 63 percent allocation as of July 1, 2015 (although with 160,000 megalitres carried over from the previous water year).

Sugar Research Australia has prepared a number of fact sheets on irrigation scheduling, crop water use and soil moisture holding capacity, available via its website at http://www.sugarresearch.com.au/page/Growing_cane/Irrigation/. This site also includes a range of other materials including Cane Clip videos, research papers, and links.

Burdekin Productivity Services has also recently distributed an information sheet to growers on options for managing limited irrigation water.

These tips include prioritising irrigation requirements, not over-irrigating young plant and ratoons, managing irrigation volumes and frequency, alternating row irrigation, minimising losses, recycling water, and using a mix of groundwater and surface water.

The situation in one farming system and region may not work the same in other areas due to differences in soil type, the environment, water availability, and other factors, with growers urged to seek their own specific advice.

However, despite the dry seasonal forecast, the Bureau of Meteorology has reminded growers and millers that an El Niño does not necessarily mean drought conditions everywhere and for everyone.

“While El Niño increases the risk of drought, it does not guarantee it; of the 26 El Niño events since 1900, 17 have resulted in widespread drought,” the BOM’s Neil Plummer said earlier this year.

Mr Plummer noted that while the El Niño is forecast to strengthen during winter, the strength of an El Niño does not necessarily correspond with its impact on Australian rainfall.

Australia experienced widespread drought during a weak El Niño in 2006–07, while stronger events such as the El Niño event in 1997–98 had only a modest impact on Australian rainfall.
Nuffield scholar looks at Brazil planting system

When Joe Muscat set out on his Nuffield Scholarship he had three main objectives regarding fibre crops, but along the way he discovered something else. By Belinda Billing

Farmer profile – Joe Muscat, Nuffield Scholar 2014

Farm focus
Improve soil health parameters to drive increase in production and reduce environmental impact of farming business

Joe’s three objectives
1. To investigate pathways to commercialisation of fibre crops
2. To develop a better understanding of the processing and marketing systems for these crops
3. To assess whether fibre crops add value to the Australian sugar industry.

Joe’s standard farming system
• Green cane trash blanket
• 1.8m row-width with controlled traffic and minimum tillage
• Fallow cropping, mung beans, soybeans, peanuts (harvested), sunn hemp
• Herbicides/pesticides applied as required, based on monitoring
• Nutrition applied based on SIX EASY STEPS™ calculation with consideration to crop stage, soil requirements and long term known yield potential
• Overhead low pressure irrigation
• Banded mill ash and mill mud at 100 tonne/ha on the bed pre-planting
While visiting the Brazilian sugar growing area of the Sao Martinho milling area, he discovered the agmusa planting system. Agmusa is a holistic planting system that brings together many elements that hold interest for Joe, including an integrated break crop and the promise of improved production along with environmental outcomes.

“I believe that this system focuses on improving the health of our soils and that it will allow us to increase production while addressing environmental issues such as poor water quality leaving our farms by improving the capacity of our soils to support a good crop with an overall reduction in chemical inputs and a reduction in losses,” explained Joe.

The system has been used in Sao Martinho for over a decade and, according to Joe’s Brazilian sources, has led to an increase in plant cane production for the milling region of more than 10 to 15 percent. Joe is now investigating whether the system can do the same for Australia and is running a trial on his Oakenden farm.

Understanding the concept and why it delivers an increase in production is crucial to be able to replicate the benefits in the Australian sugar industry.

Agmusa brings together a set of practices that have the potential to address issues affecting yield decline; an ultra-clean planting source, fallow cropping, deep application of a soil ameliorant (compost), and understanding soil requirements. Joe said the system is best described as follows:

- Harvest block April-July
- Prepare block for planting (cultivation)
- Plant compost utilising GPS guidance, 15 t/ha across the whole paddock (subsurface applied compost, prescription compost prepared for block requirement)
- Plant cane in two rows leaving the next six or eight rows fallow. The plant source is either one-eye setts or tissue culture (clean plant source)
- Plant a legume in the 6 or 8 rows (legume selection is relative to the organic carbon level of the field, with a high organic carbon level >2 percent they would select peanuts, < 2 percent they would select soybeans, <1.6 percent they would select sunn hemp (Crotalaria juncea))

- The field would be managed for weeds/pests. Depending on the legume (if it was peanuts or soybeans) these would be taken through to harvest. If sunn hemp was selected then this would be incorporated for the bio-mass and the nitrogen value (300 + kg/ha).

The inter-rows (six or eight rows) would be prepared for planting March/April the following year, the two rows planted with the one eye setts or tissue culture would then be used as the plant source for the six or eight rows.

The plant source (two rows one-eye setts or tissue culture) would be harvested straight into the planter eliminating any extra handling causing damage to the plant source. The majority of the planting is billet planting with the two-row planter.

The agmusa system will be compared to Joe’s standard farming system. The trial work is being funded by the Federal Government’s National Landcare Program, with support from Reef Catchments and Farmacist.

Joe’s Nuffield Scholarship is supported by SRA.
Ameliorants such as gypsum, lime and organic matter have long been used to improve the physical, chemical and biological condition of the top soil in agriculture. Now, an emerging body of work looking into addressing subsoil constraints through similar practices is gaining attention throughout the industry.

In Maryborough, Andrew Dougall, Group Agronomist from MSF, and local growers Darryl, Lester, and Brad Cronau have undertaken practical trials to assess the effect of deep soil ameliorant application on sugarcane crops that are limited by subsoil constraints.

Such conditions are common in Maryborough with up to 40 percent of the agricultural production area located on a sodic duplex soil type. Compaction, poor aeration, reduced water-holding capacity, stunted root growth, increase of plant available aluminium and manganese are among the sub soil constraints which limit yield in the region.

The Cronaus’ philosophy is to look for management options which improve yield and profitability, while adopting good soil health practices.

Darryl Cronau considers the implementation of improved soil health management an integral part of their long term farm plan and essential for profitability in the future.

This led to the exploration of the use of subsurface applied compost in 2012. In these practical trials, compost was incorporated at a rate of 10-15 t/ha into the subsoil by deep ripping with a compost applied through a tube attached to the back of a tyne.

The results were rewarding with yield increases of 6-10 percent attributed to improved subsoil aggregation, increased water holding capacity and better soil biological activity.

However, the application was labour intensive and not commercially viable in a system where yield averages are 80 t/ha.

But through adversity comes innovation and the Cronaus could see the benefits were there, if they could make their concept practical and economical. Thus the idea for a mechanical sub soil applicator was conceived.

The Cronaus, working as the DAG grower group, received partial funding and support through an SRA Grower Group Innovation Project and a Reef Rescue Water Quality Improvement Grant, which allowed them to work on their ideal machine.

There were no blueprints to work from, just a few chalk drawings on the cement floor of the shed and the rest was in Darryl’s head.
Dr Joseph Foley and a team of National Centre for Engineering in Agriculture (NCEA) researchers have started working with 16 R&D partners and up to 19 farmer-managed learning sites in a $3.7 million Federal Government funded Rural R&D for Profit programme to improve the profit of each individual irrigator enterprise across the cotton, dairy, sugar and other agricultural sectors by $20,000-$40,000 per annum.

This project is being led by the Cotton Research and Development Corporation (CRDC) in conjunction with three others RDCs; Sugar Research Australia, Dairy Australia, and the Rural Industries Research and Development Corporation (RIRDC).

“This is a large-scale, ambitious project designed to achieve a 10-20 percent improvement in water productivity, efficiency and farmer profitability, while also improving cross-sector industry research collaboration,” said Bruce Finney, Cotton Research Development Corporation Executive Director.

“It is designed to increase on-farm profitability by integrating new irrigation scheduling and delivery technologies into good irrigation practice.

“It will build on previous research to drive additional improvements in cotton and rice, and will transfer learnings from the cropping industries to dairy.

“Our aim is to increase on-farm profit through the adoption of automated and precision application technologies across all industries.”

Above image: MSF Group Agronomist Andrew Dougall.

Left image: Highlighted in the red circle is where the compost was originally placed in 2012. You can see the higher density of root mass in this area ‘opening a window’ for root growth in the surrounding sub-soil; ideally increasing the available moisture and nutrient uptake.

NCEA receives funding for smarter irrigation

The mechanical sub-soil applicator works exceptionally well and a larger feed belt is the only modification that the Cronaus would alter in a re-design.

Andrew, who has supported the project, explained that the process opens a window into the subsoil allowing for healthy root growth.

“The compost window improves root penetration, nutrient uptake and moisture availability,” he said. “The applicator gives us the capacity to apply compost to sub soil layers at depths of up to 40cm conveniently and cost effectively meaning we can increase the area treated, assess the most beneficial application rate and determine the economic viability of the treatment,” he added.

In subsoils where aeration, soil water-holding capacity and root growth are impeded, amelioration applications such as compost may assist in the prevention of waterlogging through enabling drainage to the deeper soil profile.

SRA’s Dr Barry Salter is currently leading a project to determine the varying response rates in treatments that are applied to different soil types and to determine the long-term feasibility of subsoil ameliorant applications.

Interest in this field is growing with a number of other projects underway throughout the industry and our knowledge of farming on marginal soils steadily improving.
SRA Performance Report sets a benchmark in accountability

_Sugar Research Australia (SRA) has developed and released its first Performance Report for the period ending 30 June 2015, which details the achievements and progress of the Australian sugarcane industry’s corporation for research, development and extension._

SRA CEO Neil Fisher said that the SRA Performance Report had been developed in consultation with industry representative bodies and SRA investors and it came as a response to their requests for a document that tracked SRA performance against a range of transparent and repeatable measures.

“This is a comprehensive report that has been developed to address the needs of sugarcane growers, millers and the industry as investors and stakeholders in SRA,” Mr Fisher said.

“It provides a clear and accountable way of measuring our performance for our investors, and follows a traffic light principle of reporting our progress against key measures.

“SRA’s performance is measured in green for work that is on track; yellow for activities that are facing some hurdles; and red for research and activity that needs more attention.

“We believe this is a tangible demonstration of our commitment to being accountable to our investors.

“It is the nature of scientific research that the results do not always turn out as expected or may take longer to achieve than first anticipated. SRA’s investors have asked for this document to help them understand the investment we continue to make on their behalf.”

The first Performance Report has been informed by a range of sources, including independent reports and surveys.

It will be further refined in consultation with our industry representative bodies each year so that SRA investors can continue to track SRA’s progress.

It will be enhanced by documents such as SRA’s independent annual grower survey and the forthcoming ABARES survey of sugarcane growers.

The Executive Summary of the Performance Report for 2014/2015 has been emailed to all SRA investors, and the Executive Summary and the Full Report can be located on the SRA website www.sugarresearch.com.au.
Sugar innovation expo a success

The Brandon Sugar Research Australia (SRA) station welcomed about 70 growers and sugar extension providers to the Sugar Innovation Expo recently. By Belinda Billing

The event was a collaboration between SRA, Department of Agriculture and Fisheries (DAF), Burdekin Productivity Services (BPS), Farmacist, and Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC) with a focus on innovation, weed and fallow management.

Presentations on the day included a demonstration of the DAF dual herbicide spray rig, with a night time viewing of spray patterns under UV light, a spray nozzle display, demonstration of BBIFMAC’s Real Time Water Quality Monitoring Trailers, a presentation on fallow management from Mike Hanks from DAF, and an information session on using shielded sprayers with knock-down chemicals.

The shielded sprayer session included a talk from Dr Aaron Davis of James Cook University on the water quality benefits of using shielded sprayers for application of knock-down chemicals and banded application of residual chemicals and demonstration of two spray rigs built by local Burdekin growers Mark Vass and Denis Pozzebon.

Terry Granshaw of BPS presented on the use of shields and commented that the way these two growers had built their own rigs was innovation in action.

“These spray rigs show two ends of the spectrum. Denis’s is high-end with full GPS set-up while Mark’s is a more basic version with limited electronic technology, however they both get the job done and demonstrate application of farmer ingenuity and innovation,” he said.

All attendees received a copy of SRA’s latest publication Precision Agriculture for the Australian Sugar Industry.

This guide provides information on implementing precision agriculture on farm, from utilising soil and yield maps to variable rate technology and GPS for guidance.

For more information please contact Belinda Billing on bbilling@sugarresearch.com.au or Kate Daly on kdaly@sugarresearch.com.au.
# Total Research Investment

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<td>Maximising the rate of parental improvement in the Australian sugarcane breeding program</td>
<td>2008/319</td>
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<td>Optimising productivity and variety recommendations through analysis of mill data</td>
<td>2014/054</td>
<td>SRA</td>
<td>Joanne Stringer</td>
<td>01/08/2016</td>
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<tr>
<td>Field assessment and further development of high-sucrose sugarcane</td>
<td>2014/069</td>
<td>UQ</td>
<td>Luguang Wu</td>
<td>31/10/2017</td>
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<tr>
<td>Sugarcane root systems for increased productivity; development and application of a root health assay</td>
<td>2015/002</td>
<td>CSIRO</td>
<td>Anne Rae</td>
<td>01/07/2018</td>
</tr>
<tr>
<td>Impact of stool architecture on ratooning ability</td>
<td>2015/004</td>
<td>CSIRO</td>
<td>Anne Rae</td>
<td>01/07/2018</td>
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<tr>
<td>Leaf sucrose: the link to diseases such as YCS and enhancement of sugarcane productivity</td>
<td>2015/016</td>
<td>SRA</td>
<td>Frikkie Botha</td>
<td>30/06/2018</td>
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<tr>
<td>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</td>
<td>2015/025</td>
<td>CSIRO</td>
<td>Karen Aitken</td>
<td>30/06/2018</td>
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<tr>
<td>Selecting high value chromosomes from wild introgression material to deliver more resistant varieties faster</td>
<td>2015/026</td>
<td>CSIRO</td>
<td>Karen Aitken</td>
<td>30/06/2018</td>
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<tr>
<td>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</td>
<td>2015/027</td>
<td>CSIRO</td>
<td>Karen Aitken</td>
<td>30/06/2017</td>
</tr>
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</table>
Sugar Research Australia aims to invest in projects that will deliver real benefits on key issues for its investors.

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Project Number</th>
<th>Principal R&amp;D Provider</th>
<th>Chief Investigator</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigating the role of microbes, carbon in soil-plant interaction in Burdekin sugarcane soils</td>
<td>2013/068</td>
<td>Advanced Burdekin Collective Research</td>
<td>Tom McShane</td>
<td>01/12/2015</td>
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<tr>
<td>Quantifying the effects of microbial additions to sugarcane soils on crop productivity</td>
<td>2013/069</td>
<td>Bio Active</td>
<td>Jayson Dowie</td>
<td>01/05/2016</td>
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<tr>
<td>Ameliorating clay sub soils to improve crop yields</td>
<td>2013/072</td>
<td>DAG</td>
<td>Glen Grohn</td>
<td>01/01/2016</td>
</tr>
<tr>
<td>Strategies to manage soil-borne fungi and mitigate sugarcane yield decline</td>
<td>2013/101</td>
<td>CSIRO</td>
<td>Paul Harvey</td>
<td>31/07/2017</td>
</tr>
<tr>
<td>Regenerating a soil food web capable of improving soil health and reducing losses from soil-borne pests and pathogens of sugarcane</td>
<td>2014/004</td>
<td>Biological Crop Protection</td>
<td>Graham Stirling</td>
<td>30/06/2017</td>
</tr>
<tr>
<td>Role of controlled release fertiliser in Australian sugarcane systems</td>
<td>2014/011</td>
<td>CSIRO</td>
<td>Kirsten Verburg</td>
<td>15/07/2017</td>
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<tr>
<td>Modelling extreme yields in the wet tropics to improve nitrogen use efficiency</td>
<td>2014/024</td>
<td>JCU</td>
<td>Yvette Everingham</td>
<td>01/08/2015</td>
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<tr>
<td>Boosting N-use efficiency in sugarcane through temporal and spatial management options</td>
<td>2014/045</td>
<td>SRA</td>
<td>Bernard Schroeder</td>
<td>01/10/2017</td>
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<tr>
<td>Assessment of new management strategies for marginal soils</td>
<td>2015/007</td>
<td>SRA</td>
<td>Barry Salter</td>
<td>31/12/2019</td>
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<tr>
<td>Improving NUE for sugarcane crops with constrained yield potential</td>
<td>2015/065</td>
<td>SRA</td>
<td>Danielle Skocaj</td>
<td>30/06/2019</td>
</tr>
<tr>
<td>Decision support for informed nitrogen management: soil nitrogen mineralisation test and the assessment of soil crop N contribution to crop N requirements</td>
<td>2015/069</td>
<td>DSITI</td>
<td>Phillip Moody</td>
<td>30/06/2018</td>
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<tr>
<td>Spatially explicit estimation of Achievable Yield Potential – an improved basis for fertiliser management</td>
<td>2015/070</td>
<td>CSIRO</td>
<td>Rob Bramley</td>
<td>01/07/2017</td>
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<tr>
<td>Improving management practices of legume crop residues to maximise economic and environmental benefits</td>
<td>2015/074</td>
<td>DSITI</td>
<td>Weijin Wang</td>
<td>30/06/2018</td>
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<tr>
<td>How much N will that crop need? Incorporating climate forecasting into nitrogen management in the Wet Tropics</td>
<td>2015/075</td>
<td>JCU</td>
<td>Yvette Everingham</td>
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</table>

**Key Focus Area 3 (Pest, disease and weed management)**

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Project Number</th>
<th>Principal R&amp;D Provider</th>
<th>Chief Investigator</th>
<th>End Date</th>
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<tbody>
<tr>
<td>Rapid detection of ratoon stunting disease</td>
<td>2013/001</td>
<td>CSIRO</td>
<td>Amalia Berna</td>
<td>01/06/2016</td>
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<tr>
<td>Mass production of the Adelina disease to better manage greyback canegrubs</td>
<td>2013/356</td>
<td>SRA</td>
<td>Nader Sallam</td>
<td>30/06/2016</td>
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<tr>
<td>Innovative approaches to identifying the cause of chlorotic streak and new management strategies</td>
<td>2013/357</td>
<td>SRA</td>
<td>Barry Croft</td>
<td>01/06/2016</td>
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<tr>
<td>Development of controlled-release formulations of imidacloprid for canegrub control</td>
<td>2014/006</td>
<td>SRA</td>
<td>Andrew Ward</td>
<td>01/04/2016</td>
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<tr>
<td>Solving Yellow Canopy Syndrome</td>
<td>2014/049</td>
<td>SRA</td>
<td>Dave Olsen</td>
<td>30/06/2017</td>
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<tr>
<td>Developing an alternative herbicide management strategy to replace PSII herbicides in the Wet Tropics area</td>
<td>2014/050</td>
<td>SRA</td>
<td>Emilie Fillols</td>
<td>01/01/2018</td>
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<tr>
<td>A Novel Polyphasic Framework to resolve Yellow Canopy Syndrome Paradox</td>
<td>2014/082</td>
<td>UWS</td>
<td>Brajesh Singh</td>
<td>30/06/2016</td>
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<tr>
<td>Validation of LSB-PCR diagnostic for ratoon stunting disease and characterisation of non-Lxx strains of Leifsonia associated with sugarcane</td>
<td>2014/086</td>
<td>NSW Sugar</td>
<td>Anthony Young</td>
<td>30/06/2017</td>
</tr>
<tr>
<td>Review of the sugarcane Industry Biosecurity Plan (IBP) and development of a Grower Biosecurity Manual (GBM)</td>
<td>2014/088</td>
<td>PHA</td>
<td>Rodney Turner</td>
<td>01/03/2016</td>
</tr>
<tr>
<td>Delivery of remote sensing technology to combat canegrubs in Queensland cane fields</td>
<td>2015/038</td>
<td>SRA</td>
<td>Nader Sallam</td>
<td>01/07/2018</td>
</tr>
<tr>
<td>Sugar industry productivity and data recording spatial data hub for research and extension</td>
<td>2015/045</td>
<td>Agtrix Pty Ltd</td>
<td>Robert Crossley</td>
<td>28/02/2018</td>
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<tr>
<td>Securing Australia from PNG biosecurity threats</td>
<td>2015/046</td>
<td>SRA</td>
<td>Rob Magarey</td>
<td>02/08/2017</td>
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### Key Focus Area 4 (Farming systems and production management)

<table>
<thead>
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<th>Project Title</th>
<th>Project Number</th>
<th>Principal R&amp;D Provider</th>
<th>Chief Investigator</th>
<th>End Date</th>
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<tbody>
<tr>
<td>Implementing a framework for farmers to engage in the use of precision technologies</td>
<td>2012/013</td>
<td>USQ</td>
<td>Troy Jensen</td>
<td>01/09/2015</td>
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<tr>
<td>Developing targeted, seamless weather/climate forecasting systems for critical early season harvest periods</td>
<td>2013/004</td>
<td>USQ</td>
<td>Roger Stone</td>
<td>01/06/2016</td>
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<tr>
<td>Developing remote sensing as an industry wide yield forecasting, nitrogen mapping and research aide</td>
<td>2013/025</td>
<td>UNE</td>
<td>Andrew Robson</td>
<td>01/10/2016</td>
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<tr>
<td>A non-pneumatic cane cleaning system with no cane loss</td>
<td>2014/035</td>
<td>QUT</td>
<td>Neil McKenzie</td>
<td>30/06/2016</td>
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<tr>
<td>Too wet to forget – reducing the impact of excessive rainfall on productivity</td>
<td>2014/046</td>
<td>SRA</td>
<td>Barry Salter</td>
<td>01/07/2017</td>
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<tr>
<td>Increased harvest recovery: reducing sugar loss and stool damage</td>
<td>2014/048</td>
<td>SRA</td>
<td>Cameron Whiteing</td>
<td>01/07/2017</td>
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<tr>
<td>Modernisation of furrow irrigation in the sugar industry</td>
<td>2014/079</td>
<td>USQ</td>
<td>Malcom Gillies</td>
<td>01/07/2017</td>
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<tr>
<td>Demonstration of GPS-guided laser levelling and its associated productivity response</td>
<td>2014/094</td>
<td>Mulgrave Central Mill</td>
<td>Matt Hession</td>
<td>01/02/2018</td>
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<tr>
<td>Review of precision agriculture in sugarcane in Australia</td>
<td>2014/303</td>
<td>Massey University</td>
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<td>01/08/2015</td>
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<tr>
<td>Bio-prospecting for beneficial endophytes of sugarcane</td>
<td>2015/051</td>
<td>AgResearch</td>
<td>Stuart Card</td>
<td>01/07/2018</td>
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### Key Focus Area 5 (Milling efficiency and technology)

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<th>End Date</th>
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</thead>
<tbody>
<tr>
<td>Implement supervisory/advisory control of pan and fugal stations</td>
<td>2010/038</td>
<td>QUT</td>
<td>Ross Broadfoot</td>
<td>01/12/2015</td>
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<tr>
<td>Determine the optimum tube dimensions for Robert evaporators through experimental investigations and CFD modelling</td>
<td>2012/054</td>
<td>QUT</td>
<td>Ross Broadfoot</td>
<td>01/09/2016</td>
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<tr>
<td>Improved modelling of wet scrubbers</td>
<td>2012/055</td>
<td>QUT</td>
<td>Anthony Mann</td>
<td>01/05/2017</td>
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<tr>
<td>Determination of factory processing procedures to better manage sugar quality issues</td>
<td>2012/057</td>
<td>QUT</td>
<td>Ross Broadfoot</td>
<td>01/09/2015</td>
</tr>
<tr>
<td>A retrofit to a mill to reduce its operational and maintenance costs</td>
<td>2013/059</td>
<td>QUT</td>
<td>Geoff Kent</td>
<td>01/09/2016</td>
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<tr>
<td>Reducing the maintenance costs of mill rolls</td>
<td>2013/060</td>
<td>QUT</td>
<td>Geoff Kent</td>
<td>01/08/2018</td>
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<tr>
<td>Real time harvest and transport system (under contract)</td>
<td>2014/037</td>
<td>QUT</td>
<td>Geoff Kent</td>
<td>01/09/2017</td>
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<tr>
<td>Improving mill efficiency through rapid analysis methodologies</td>
<td>2014/051</td>
<td>SRA</td>
<td>Eloise Keeffe</td>
<td>01/08/2017</td>
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<tr>
<td>Managing aspects of raw sugar quality in the Australian sugar industry</td>
<td>2014/052</td>
<td>SRA</td>
<td>Eloise Keeffe</td>
<td>01/08/2017</td>
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<tr>
<td>Investigation into modifying pan boiling techniques to improve sugar quality</td>
<td>2015/013</td>
<td>QUT</td>
<td>David Moller</td>
<td>01/06/2017</td>
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<tr>
<td>Increasing capacity to undertake cane preparation research through modelling and experimentation</td>
<td>2015/018</td>
<td>QUT</td>
<td>Geoff Kent</td>
<td>01/05/2019</td>
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<tr>
<td>Develop a blueprint for the introduction of new processing technologies for Australian factories</td>
<td>2015/043</td>
<td>QUT</td>
<td>Ross Broadfoot</td>
<td>01/09/2017</td>
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### Key Focus Area 6 (Product diversification and value addition)

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<th>Principal R&amp;D Provider</th>
<th>Chief Investigator</th>
<th>End Date</th>
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<tbody>
<tr>
<td>Process for making bagasse paper pulp</td>
<td>2012/053</td>
<td>QUT</td>
<td>Thomas Rainey</td>
<td>01/05/2016</td>
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<tr>
<td>A profitable future for Australian agriculture: biorefineries for higher-value animal feeds, chemicals and fuels</td>
<td>2015/902</td>
<td>QUT</td>
<td>Ian O’Hara</td>
<td>30/06/2018</td>
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<tr>
<td>Project Title</td>
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<td>Principal R&amp;D Provider</td>
<td>Chief Investigator</td>
<td>End Date</td>
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<tr>
<td>Pachymetra awareness project for Condong mill area</td>
<td>2012/064</td>
<td>CANEGROWERS</td>
<td>Doug Irby</td>
<td>01/12/2015</td>
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<tr>
<td>Increasing farm business intelligence within the sugar industry</td>
<td>2014/001</td>
<td>AgProfit</td>
<td>Matthew Bryant</td>
<td>30/06/2017</td>
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<tr>
<td>Measuring the profitability and environmental implications when growers transition to Best Management Practice (as defined by the new Canegrowers Smartcane BMP)</td>
<td>2014/015</td>
<td>DAF</td>
<td>Mark Poggio</td>
<td>30/05/2017</td>
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<tr>
<td>Improving industry returns through harvest best practice</td>
<td>2014/091</td>
<td>NSW Sugar</td>
<td>Ian McBean</td>
<td>30/06/2017</td>
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<tr>
<td>Understanding the impact of harvester speed on subsequent ratoon performance in the Burdekin</td>
<td>2014/092</td>
<td>BPS</td>
<td>Robert Milla</td>
<td>30/06/2017</td>
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<tr>
<td>Tissue culture – managing impediments to adoption in Tully</td>
<td>2014/093</td>
<td>TCPSL</td>
<td>Graham Cripps</td>
<td>01/01/2017</td>
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<tr>
<td>Sugar industry productivity and data recording spatial data hub for research and extension</td>
<td>2015/045</td>
<td>Agtrix</td>
<td>Robert Crossley</td>
<td>28/02/2018</td>
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<table>
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<tr>
<th>Key Focus Area 7 (Knowledge and technology transfer and adoption)</th>
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<tbody>
<tr>
<td>Modification of lignin biosynthesis in sugarcane for the production of cellulosic ethanol</td>
<td>2010/068</td>
<td>QUT</td>
<td>Patrick Bewg Heather Coleman</td>
<td>01/05/2016</td>
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<tr>
<td>Climate forecasting to improve sugarcane nitrogen management in the wet tropics</td>
<td>2011/062</td>
<td>SRA</td>
<td>Danielle Skocaj</td>
<td>01/06/2016</td>
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<tr>
<td>Biodegradable polymer nanocomposites derived from natural fibre and starch</td>
<td>2011/071</td>
<td>QUT</td>
<td>William Gilfillan William Doherty</td>
<td>01/07/2015</td>
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<tr>
<td>Enhancing sugarcane for decreased water content and increased sugar content at harvest</td>
<td>2011/072</td>
<td>QUT</td>
<td>Anthony Brinnin Mark Kinkema</td>
<td>01/05/2016</td>
</tr>
<tr>
<td>Production of furanics and chemicals from bagasse and molasses</td>
<td>2012/074</td>
<td>QUT</td>
<td>Joshua Howard William Doherty</td>
<td>01/04/2016</td>
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<tr>
<td>Identifying and overcoming limitations in crop models with respect to drought tolerance and climate change</td>
<td>2013/076</td>
<td>JCU</td>
<td>Yvette Everingham</td>
<td>01/10/2015</td>
</tr>
<tr>
<td>Investigating the utility of mill mud for soil health conditioning and nutrient use efficiency on sodic soils within the Burdekin</td>
<td>2013/077</td>
<td>USQ</td>
<td>John Bennett</td>
<td>01/09/2016</td>
</tr>
<tr>
<td>Effect of organic nutrients on sugarcane growth, microbial activity and greenhouse gas emissions</td>
<td>2013/078</td>
<td>UQ</td>
<td>Susanne Schmidt</td>
<td>01/09/2016</td>
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<tr>
<td>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</td>
<td>2014/102</td>
<td>UQ</td>
<td>Sijesh Natarajan Shu Fukai</td>
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<tr>
<th>Key Focus Area 8 (Capability development, attraction and retention)</th>
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