Sugar Research Australia

Cane Matters

Winter 2023

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(Cover page) Principal Agronomist Dr Danielle Skocaj caught up with Santo and Leah Russo to discuss the implementation of their nutrient and soil management program at their new sugarcane growing site.

WELCOME TO
THE WINTER 2023EDITION OF
Cane Matters

It's a busy time for our industry with the harvest and crush now well underway across the regions.

SRA staff have been out and about with our growers and millers at on-farm activities, the regional milling research seminars, industry events and via online workshops.

The well-attended Meringa Field Day and Australian Society of Sugar Cane Technologists (ASSCT) conference was held in Cairns in April. SRA Board members and I had the privilege of attending both events and viewing first-hand the tangible and innovative technologies and solutions that our staff are developing for the sugarcane industry.

The success and interest surrounding *Harvest Mate* has been remarkable. The free portal and app has captured the attention of growers and harvesting contractors keen to improve their havest's productivity and profitability. SRA's free Online Sugarcane Nutrient Management (OSNM) training program has also hit the mark with more than 140 growers enrolled since it was launched in March.

At the ASSCT conference Australian Sugar Milling Council (ASMC) CEO, Rachele Sheard opened the event by exploring the challenges of Sugar Plus; our industry roadmap to unlock our bioeconomy opportunities. Dr Robert Speight, Director, Advanced Engineering Biology Future Science Platform, CSIRO also provided an enthusiastic keynote address about how the sugarcane industry might benefit from biofutures - now.

The 2023 conference provided an opportunity for SRA experts to present on a range of diverse research topics. I would like to acknowledge all staff for their contribution and congratulate those staff whose work was recognised with an ASSCT award. You can read a summary of the ASSCT highlights in this edition.

Improving customer and stakeholder engagement has been a focus for SRA in the first half of 2023, with a two-stage program involving millers and key industry stakeholders. The insights and research priorities identified through this program will contribute to SRA's research strategy and investment in the future.

This year's SRA/QUT Regional Milling Seminars have shown the progress that is being made by the mills in continuing trials of innovative technology which has raised interest and proved promising thanks to the initial research conducted under SRA's Small Milling Research Program investment fund.

Variety breeding and selection is the foundation of SRA's work to improve the productivity, sustainability, and competitiveness of Australia's sugarcane industry.

The publication of the six 2023-2024 Variety Guides is now underway with all levy payers to receive their copy in the coming weeks. I would personally like to thank the members of the Regional Variety Committees for their work in approving our new regional varieties for this season.

I hope you enjoy this edition of *Cane **Matters*** and hope the 2023 harvesting and crushing season proves to be bountiful during this period of record high sugar prices.

Roslyn Baker
Chief Executive Officer

Editorial contributions by Christine Walker, Helen Cook and Glenda Viner. Design by Eli Lin.

RESEARCH AWARDS AND SCHOLARSHIP FUNDING ROUNDS CLOSE 31 AUGUST

Applications for SRA's research awards and postgraduate scholarships are now open and will close on 31 August 2023.

Research Mission Manager Dr Tinashe Chiurugwi said the Research Awards enabled participants to undertake small projects which demonstrated clear benefits to the sugarcane industry. These projects could be used to develop research skills and/or explore innovative ideas about issues in the industry.

The Sugar Industry Postgraduate Research Scholarships enable qualified graduates to undertake Research Doctorate or Research Masters study and to facilitate research and training in areas of value to the Australian sugarcane industry. The scholarships are tenable at Australian universities and institutions for postgraduate research study.

Angela O'Keefe was a recipient of an SRA PhD scholarship in 2019. Now in the final year of her studies at the University of Queensland Angela says her PhD project 'aims to deliver information to assist plant breeders develop cane varieties that have good quality fibre characteristics and to remove the clones with poor fibre quality measurements early in the breeding program'.

"This will allow faster generation of new improved varieties to be delivered to the sugarcane industry," Angela said.

"Ultimately millers will benefit from the reliable development of varieties with improved fibre quality and an increase in mill efficiency from a guaranteed supply of varieties with good milling properties.

"The SRA operational grant and stipend top-up has allowed me to remain a full-time student devoted entirely to my research and to pay for experiment-associated expenses at the University of Queensland."

After her PhD Angela hopes to be an experimental scientist in sugarcane research.

Angela is pictured suited up to work in the UQ School of Earth and Environmental Sciences (SEES) Environmental Geochemistry Laboratory (EGL) Radiogenic Isotope Facility (RIF).

ASSCT CHALLENGES RESEARCHERS TO **UNLOCK THE SUGAR PLUS ROADMAP**

The 44th Australian Society of Sugar Cane Technologists conference (ASSCT) was held in Cairns in April and included the conference AG field day at SRA's Meringa station. More than 300 delegates were welcomed to the Cairns Convention Centre by ASSCT 2023 President and SRA Executive Manager Variety Development, Dr Jason Eglinton.

The opening session of the packed program began with an address from Australian Milling Council CEO, Rachele Sheard, followed by an expert panel Q&A discussing Sugar Plus, the industry roadmap, summarised here.

On the following pages we also talk to guest speaker, Dr Robert Speight, Director, Advanced Engineering Biology Future Science Platform, CSIRO talks about how the sugarcane industry can benefit from biofutures, now.

In July 2022 *Sugar Plus* – a roadmap for the Australian sugarcane industry - was launched by the industry. A plan with a vision to secure and grow value for future generations *Sugar Plus* acknowledges that strong united voices are needed to encourage exploration and new opportunities, and the critical role science and technology will play.

In April this year, Australian Sugar Milling Council CEO, Rachele Sheard opened the 44th Australian Society of Sugar Cane Technologist's (ASSCT) conference in Cairns with a presentation that explored the roadmap challenges with an analogy to LEGO, the 90 year old plastic construction toy.

"I loved LEGO growing up," Rachele said, after a sea of hands had responded to her opening question 'Hands up here who loves LEGO?'

"The way we use LEGO has changed since I was a young girl playing where a door with a hinge was a major LEGO innovation," she said.

"Nowadays, a trip around any LEGO superstore reveals the innovation and sophistication behind the twice named toy of the century. And a lot like LEGO, the sugar industry has changed, developed and become more sophisticated," she said.

"Already our industry is more than just sugar– we produce molasses, co-generated power and bio-ethanol. But as an industry we need to develop the next wave of innovation and development."

Australian Milling Council CEO, Rachele Sheard.

The ***Sugar Plus*** roadmap sets out a series of actions in the near, medium, and longer term, to strengthen and build the industry while charting a path to a bigger, bolder future, built on the foundation of raw sugar production.

While some parts of the roadmap are focused on better business-as-usual and adding value to current operations across the value chain, other parts are about the steps it is believed the industry needs to take to unlock the vast opportunities presented by the bioeconomy.

"The vision and roadmap are not designed to be disruptive to today's industry nor displace existing sugarcane and raw sugar production," Rachele said.

"The objective is to increase sugarcane value per hectare and make sugarcane the economic choice for those hectares that are available, increase mill revenue and ability to invest in the future, and maximise the incentive to expand sugarcane production substantially over the medium to long-term to meet emerging bioenergy and green energy demand.

"Science and technology will play a critical role in delivering the roadmap and vision and that requires securing our licence to operate through strong environmental, social and governance credentials while addressing the ever-present threat to our biosecurity," she said.

Image from left to right: Burn Ashburner, Dr Jason Eglinton, Roslyn Baker, Rachele Sheard, Stephen Ryan and Elton Miller.

Following the conference opening address, Rachele joined industry partners CANEGROWERS Senior Manager Industry, Burn Ashburner, SRA CEO Roslyn Baker, Australian Cane Farmers Association General Manager Stephen Ryan and Department of Agriculture and Fisheries Executive Director Elton Miller for a Q & A panel on the roadmap, chaired by SRA Executive Manager Variety Development and ASSCT President Dr Jason Eglinton.

Roslyn Baker responded to questions about sustainability and biosecurity.

"As an industry we fear sustainability, but we know what the threats are," Roslyn said.

"We need to prove, embrace and be world leaders in sustainable sugarcane production.

"With a changing climate and environment, new varieties are our future. Disease resistance is critical for crop protection. But while we chase our full potential, we shouldn't forget the fundamentals. The threat to biosecurity is our greatest concern. We mustn't take our eye off that ball, and we're not," she said.

So where to next?

"We need to be better than the best we have ever been to achieve our vision," Rachele said.

"Now is the right time because opportunity exits if we work together," Stephen Ryan added.

In Australia alone, domestic demand is 10 billion litres of sustainable aviation fuel and 3.5 billion kilograms of bioplastics.

"There is already a great deal of activity at the growing and milling levels individually and by region. You only need to look at the Mackay bio-energy hub to see this," Rachele said.

"But there is no path forward towards the industry vision without research, development, and engineering."

"Government will be a critical partner to make this happen and is already playing a positive role with investment in bio-energy hubs and the establishment of the Jet Zero Council, but industry collaboration and leadership at all levels will be the driving force."

Rachele concluded her presentation with a challenge for delegates at the conference; to identify the research and development, and extension and adoption, that is fit for the future of the industry; to unlock the Sugar Plus vision. A challenge that SRA's presenters at ASSCT are already rising to and reaching out for.

Sugar Plus

Our vision is to become a vibrant, transforming industry, sustainably producing sugar and bioproducts at the heart of regional communities.

Read more about the industry roadmap **Sugar Plus – Fuelling the Future of Food, Energy and Fabrication** on SRA's website.

Scan to vsit Industry Roadmap webpage.

LEGO® FACTS

LEGO® has been named "Toy of the Century" twice. Products have undergone extensive development over the years – but the foundation remains the traditional LEGO brick.

The interlocking principle with its tubes makes it unique and offers unlimited building possibilities. It's just a matter of getting the imagination going.

In 2012 a range of sustainable LEGO® elements made from plant-based plastic sourced from sugarcane were produced that included leaves, buses and trees (pictured).

THE SUGARCANE INDUSTRY'S BIOFUTURE IS BIONOW
SAYS DR ROBERT SPEIGHT

To most of the packed auditorium at the opening session of the ASSCT conference, the guest speaker following the Q&A panel on the Sugar Plus industry road map, was an unknown, with an outsider's perspective of the sugarcane industry.

So why was Dr Robert Speight presenting to a crowd of sugarcane industry technologists, practitioners and researchers?

"I love science and technology. I want to invent products and processes which help industries and the environment," Robert said.

"I am an engineering biologist; that means I'm working to transform how biology is engineered for better outcomes. With CSIRO's Advanced Engineering Biology Future Science Platform, our aim is to catalyse a step change in biotechnology development. Yes, my understanding of the sugarcane industry is second-hand, but I'm inspired by its diversification plans and excited about its biofutures goals," he said.

"The sugarcane industry already operates very efficient biorefineries. Its Sugar Plus vision and roadmap presents the exciting prospect of extending these products to bioplastics, biofuels, and new sources of food proteins.

"Working hand in hand with engineering biology we can look towards making a whole range of different and higher-value products. But to move forward, the Sugar Plus vision rightly recognises that Australia needs to develop comprehensive plans that address the needs of the sectors; in parallel with a national biomanufacturing plan with other areas of opportunity in the bioeconomy."

Robert explained to the conference crowd that the United States already has bold goals for biotechnology and biomanufacturing development, released earlier this year by The White House Office of Science and Technology Policy.

"One bold goal identified is an expansion of feedstock availability. That is, purpose-grown plants suitable for conversion to fuels.

"A second goal is to produce 3 billion gallons of sustainable aviation fuel in the next seven years, with a longer term goal (20 years) to develop technologies to replace 50 per cent of maritime fuel, off-road vehicle fuel and rail fuel, with low net greenhouse gas emission fuels.

With biobased chemicals such as bioplastics, biosolvents, biobased acids, biosurfactants, biolubricants and bioalcohols already a market worth an estimated US$70 billion. A key takeaway from Roberts's presentation was that 'the biofutures opportunity is really bionow'.

"Engineering biology is a rapidly moving field with a lot to offer," Robert said. "And we are working to develop improved processes that are faster and more predictable.

"The technologies required to deliver these products are already available, but not at the scale to meet the opportunity with biomanufacturing yet to really take off in Australia.

"Large-scale fermentation is required, but not impossible," Robert explained to the engaged crowd, pointing to worldwide production of 180 billion litres of beer in 2020 and recent developments internationally of new biomanufacturing plants based on new fermentation technology .

"The Mackay Future Foods BioHub, QUT pilot plant and new company Cauldron are great examples of what's already happening, but we can do more," he said.

So how do we, the sugarcane industry, address the 'bionow' in Australia?

"Australia needs to build biorefineries operating new, integrated high-productivity and profitable processes, using technologies from Australia or partnering with companies who already have processes running overseas.

"These biorefineries will create opportunities for jobs in construction, engineering and logistics.

"But most importantly for the ASSCT audience and their stakeholders, we will need a secure, large-scale sugar supply, to feed productive and profitable processes. The US is already on it, with the Bold Goals vision, and we want to see the Australian version," Robert said.

"Diversification is important, the Sugar Plus roadmap has identified that. Investment in manufacturing in Australia is emerging. The sugarcane industry has an exciting part to play in Australia's biofuture.

'What I do, with my team, as an engineering biologist underpins biofutures; we look to overcome barriers to engineering biology realising its value to society, environments and industry – and that's why I was excited to talk at ASSCT."

A consultation paper released in November 2015 'Queensland Biofutures 10-year road map' predicted by 2026, Queensland will have a $1 billion sustainable and export-oriented industrial biotechnology sector attracting international investment and creating thousands of regional, high value and knowledge intensive jobs.

In 2021 CSIRO released A National Synthetic Biology Roadmap that addressed how synthetic biology could unlock up to $27 billion in annual revenue and 44,000 new jobs for Australia by 2040.

Scan to view Australia's Synthetic Biology Roadmap

Sugar Plus – Fuelling the Future of Food, Energy and Fabrication, outlines a clear path for the Australian sugar industry to secure and grow its value for future generations, with the technologies required to deliver on the vision already available.

Earlier this year SRA Executive Manager Industry Services, Hywel Cook attended the Avalon 2023 International Air Show to take a seat at a roundtable for the Australian Jet Zero Council.

The roundtable bought together representatives from Australasian based airlines, international airline manufacturers, major oil refiners, airport operators, researchers, and government.

"It is important for the sugarcane industry to have had a seat at this table as a major producer of biomass in Australia.

"The meeting highlighted the strong interest across the whole value chain for sustainable aviation fuel (SAF) and how it is currently manufactured and used across the world," Hywel said.

"As Robert stated in his presentation, the biofuture is certainly now, and we are pleased to be able to show the potential role the Australian sugarcane industry could play in the supply of raw materials for the production of SAF," Hywel said.

Sugar can be converted into bioethanol, from which polyethylene (the largest type of plastic in use) can be made (other processes are possible)

1kg sucrose → 0.68L ethanol → 0.33kg plastic

Australian demand alone for heavy fuels and plastics is substantial

Feedstock for proteins will be modest as many can be sourced directly from plants (and meats are c. 70% water)	Aviation 10,000m	Packaging 1,100m
	Shipping 14,000m	Construction 525m
	Diesel 30,000m	Other 1,875m
<1m tonnes	**54,000 million litres**	**3,500 million kg**

Dr Robert Speight is Director of the Advanced Engineering Biology Future Science Platform at CSIRO, Australia's national science agency.

Robert is recognised in Australia and across the UK and Europe for his work in driving the development of an industrial biotechnology and engineering biology industry.

Dr Robert Speight (right) stopped by the SRA booth at ASSCT and chatted with SRA Executive Manager Industry Services, Hywel Cook.

'WORKING TOGETHER, GROWING TOGETHER'

The ASSCT Conference theme for 2023 was 'Working Together, Growing Together', one that SRA endorses and supports.

During the conference, SRA experts presented research papers and posters on a broad selection of topics, including new cane varieties, disease resistance, nutrient management, and constraints to productivity and profitability.

SRA is proud of all contributions made to the ASSCT conference from its experts and congratulates SRA staff who were awarded the following for their work presented at the conference:

The ASSCT 2023 President's Medal – Best Research Paper was awarded to SRA District Manager Northern and Agricultural Machinery Specialist, Phil-Anthony Patane for his paper: *Development of the decision-support tool 'Harvest Mate' agronomic algorithms.*

The ASSCT Best Poster Paper – Agricultural Section was awarded to SRA Entomology Leader, Dr Kevin Powell for his poster: *Exotic Moth Borers – Preparing for an Incursion.*

The ASSCT Mac Hogarth Agriculture Award for the Best Student Paper was awarded to SRA PhD student, Hang Xu (pictured), for his paper: *Characterising the potential association of invertebrates with Yellow Canopy Syndrome of sugarcane.*

GUIDING THE UPTAKE OF **NEWLY RELEASED VARIETIES**

New cane varieties form the foundation of SRA's work to improve the productivity, sustainability and competitiveness of Australia's sugarcane industry.

The SRA breeding program identifies and selects parents for crossing with traits that will enhance the progeny performance for a district's challenges. These parents come from the vast SRA germplasm collection of experimental clones, old and current varieties, as well as wild and foreign varieties.

"The parent mix is actively managed and is at an important stage of development," says SRA Executive Manager Variety Development, Jason Eglinton.

"The offspring of varieties such as Q253$^{\Phi}$ are beginning to feature in the advanced candidates being considered for release and the early performance of SRA9$^{\Phi}$ and SRA26$^{\Phi}$ as parents suggests the pipeline of future varieties is getting stronger."

A rigorous selection process

SRA plants around 100,000 new seedlings annually as potential varieties for the future. It then takes between 10 and 12 years for evaluation of the target traits and performance evaluation across crop classes and environments to produce the information required to consider the commercial potential of the small number of candidates that survive the selection process.

Approval for release

Every year new varieties are assessed for their suitability for local release by six Regional Variety Committees (RVCs). Each committee comprises voting members from the local grower representative organisations and milling companies, and release decisions require a unanimous vote. The committees are also supported by individual growers (particularly those that host SRA trials), technical staff from milling companies, private agronomists, productivity service organisations, and SRA staff.

At an annual RVC meeting, held early in the year, each committee is presented with detailed data from new candidates compared to the relevant commercial varieties of the region. The commercial merit of candidate varieties is considered against the local production constraints and challenges, as well as the strengths and weaknesses of the current variety mix.

Productivity is king so yield and CCS across crop classes and trial locations is a key focus. The weighting of TCH and CCS reflects the whole of industry relative economic value (rEGV) which is region specific and based on the local drivers of cost and profit. Other characteristics that affect the agronomic fit of varieties are also considered including lodging, arrowing, suckering, side shooting, germination behaviour, and early vigour.

"For a variety to be successful it not only needs to be profitable on farm, but it also needs to make it through the value chain to the final customer. A range of milling and sugar quality parameters are also considered in release decisions," Jason said.

Screened for disease resistance

Experimental clones advancing through the selection program are also screened for disease resistance to smut, Fiji leaf gall, leaf scald, mosaic and red rot, this is carried out at SRA's Woodford station; yellow spot, brown rust and orange rust at SRA's Meringa station; and Pachymetra root rot at SRA's Tully station. This means disease ratings are available before commercialisation decisions are made.

The Northern RVC met in Mulgrave in April.

SRA Northern Variety Officer Andrew Rigby (left) with Northern RVC Chair, Tully Sugar Limited's Greg Shannon and SRA Variety Development Manager North Dr Felicity Atkin.

Approved varieties

The RVCs also have a formal responsibility under the Sugarcane Industry Biosecurity Committee to maintain minimum disease standards. Once a variety is released it is added to the Approved variety list for the region. Importantly the use of an Approved variety is seen as meeting one aspect of every grower's General Biosecurity Obligation under the Queensland Biosecurity Act (2014). Cane supply agreements also commonly reference delivery of only Approved varieties.

Understanding what's best for your farm

Maximising profitability and minimising risk by adopting a balanced mix of varieties across a farm with different productivity constraints, disease pressures, and harvest timing can be a complex task. Good decision-making in variety adoption and management relies on good information about variety characteristics and performance.

Each year SRA publish Variety Guides for each region summarising productivity data, disease resistance profiles, agronomic characteristics, herbicide toxicity information, and increasingly maturity curves to support selection of varieties to propagate and evaluate on your farm.

Guides for the 2023/24 season for the Northern, Herbert and Burdekin districts are now available to download from SRA's website; and have been mailed to all levy payers in these districts.

Variety Guides for the 2023/24 season for the Central, Southern and NSW districts will be available online, and mailed to all levy payers in those districts in the coming weeks.

Variety Guides are available on SRA's website or by scanning the QR code.

Accessing new varieties

With new varieties continually entering the industry it is important that growers can access clean planting material.

There are several ways to access released varieties and it is important that this is done in a way that doesn't introduce new diseases to a farm. Clean cane can be easily sourced through local productivity service organisations and SRA's tissue culture program.

For more information on tissue culture contact:
SRA Tissue Culture Manager Clair Bolton
E cbolton@sugarresearch.com.au T 07 3331 3374

QCANESelect™

The web-based variety information tool QCANESelect™ was launched in 2008 and has provided variety performance information based on anonymised commercial productivity data provided by milling companies. The software platform for QCANESelect™ is no longer supported and cannot be maintained. A new reporting tool that will allow interrogation performance information from SRA trials as well as commercial production data is currently under development.

After consultation with RVC's in all districts SRA has deactivated QCANESelect™. Growers, millers and productivity services are now encouraged to go directly to the Varieties page on the SRA website to access the annually produced Variety Guide for their district and additional Fact Sheets and performance information.

sugarresearch.com.au/growers-and-millers/varieties/

If you have any questions about SRA's varieties please contact your District Variety Officer:

SRA Northern Variety Officer Andrew Rigby
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SRA Herbert Variety Officer Juan Briceno
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SRA Burdekin Variety Officer Catherine Kettle
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SRA Central Variety Officer Christopher Tom
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SRA Southern Variety Officer Clare Hogan
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SRA New South Wales Variety Officer Anthony Cattle
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SRA 2023 FIELD DAYS **BIGGER 'AND BETTER'**

SRA's annual field days have become 'must-attend' events in the diaries of attendees.

Feedback from this year's events has been overwhelmingly supportive as each District Manager has taken on board advice and suggestions from last year, to improve the event experience for all that give up their time to attend.

The event aim is to present close-up the latest research findings and technology to support a growers' business, and give growers the opportunity to discuss new ideas with SRA researchers and partner organisations.

SRA District Managers from Far North Queensland to Rocky Point also have the opportunity to share progress on work carried out under their District Productivity Plans and discuss new varieties for the year.

Field days were held in Meringa, Mackay, Ingham and Brandon, during April and May. Highlights from those events to encourage readers to attend a field day or other SRA event in their area and to subscribe to our fortnightly ***eNewsletter*** to hear about events and activities held throughout the year.

Bundaberg field day will be held on Thursday 20 July with a morning of presentations and demonstrations planned. Watch the SRA website for more details.

Visit sugarresearch.com.au or scan the QR code to subscribe to SRA's enewsletter.

MERINGA FIELD DAY WELCOMES BOARD MEMBERS, INTERNATIONAL GUESTS AND LOCALS

Meringa was the site of the AG field day for the 44th conference of Australian Society of Sugar Cane Technologists, giving the SRA team an opportunity to share their work with international visitors and experts: however local growers were always the priority audience.

A highlight of the day for many was a tour of the Station's Variety Development Program, including the Photoperiod facility, and the inspection of recently released northern cane varieties with Dr Felicity Atkin.

SRA's Entomology Leader Dr Kevin Powell also led an informative tour of the entomology facilities including demonstrating how his team is rearing greyback canegrubs to find alternatives to imidacloprid (see pages 32-33), and how SRA is tackling Australia's biosecurity threats through careful surveillance of endemic and exotic pests.

Smart tools for irrigation automation; the use of drones, sensors and artificial intelligence (AI) in variety development; and the recently launched Online Sugarcane Nutrient Management training program, were all demonstrated to engrossed groups by SRA experts. Harvest Mate, SRA's new web-based portal and app was launched at the event. (see page 15).

SRA Board Members and executive staff were also amongst the Meringa crowd.

"Field days across the state provide invaluable opportunities for face-to-face engagement and collaboration with our customers," SRA CEO Roslyn Baker said.

"These are events that are enjoyed by everyone who attends and made possible by the commitment and professionalism of SRA staff on the ground; and the relationships they have built with their local customers. I commend SRA staff for their work and thank everyone who attended and made these events a success."

MERINGA FIELD DAY

SRA District Manager Central Dylan Wedel welcomes attendees to the Field Day.

Project Manager Matt Schembri with Stephen Schembri and Gerard Ruane at the Field Day.

Alan Siddle, Greg Plath, John Werner, Kevin Werner, Herb Robke and Peter Gibson.

Entomologist Kevin Powell chats with a grower at the Field Day.

MACKAY FIELD DAY

(Photo credit: CANEGROWERS Mackay)

GROWERS OUT IN FORCE FOR THE MAPS/SRA FIELD DAY

A good crowd, in perfect weather, turned up in early May for the MAPS / SRA Field Day at Victoria Plains near Mackay.

Attendees were welcomed by MAPS CEO Anthony Schembri and SRA District Manager Central Dylan Wedel after a breakfast BBQ. SRA Variety Development Manager George Piperidis and Variety Officer Chris Tom were on hand to talk about new varieties available from the approved seed plot this year.

Growers took the opportunity to talk to SRA researchers at length about their work, the issues affecting their own farms and possible solutions.

The prototype onboard harvester sterilisation unit was on display which was discussed with growers by SRA Pathologist Dr Rob Magarey as just one part of an integrated on-farm management program for RSD.

Autoweed technology for precise robotic weed control was in Mackay for the first time and growers were keen to discuss the specific weeds on their farms such as Johnson grass which the technology could help eradicate. The team have commenced capturing imagery from the Central district to help develop the weed identification system.

Weed Scientist Emilie Fillols was available to talk to growers about the incidence of itch grass appearing at Habana near Mackay for the first time. Growers also asked for recommendations for controlling vine, balsam pear and siratro in the region. Manager Industry Services Operations Dr Heidi du Clou shared ideas with growers for rapid infield soil and leaf nutrient analysis on farm.

Entomology Leader Dr Kevin Powell discussed project work examining invertebrates as a possible cause of Yellow Canopy Syndrome (YCS) and investigating alternatives to imidacloprid for cane grub control.

Manager Translation Research, Dr Barry Salter was in the bottom of a soil pit where he was able to explain to growers what was happening in the soil layers beneath the surface, while pointing growers towards the Online Sugarcane Nutrient Management program for more details and videos.

District Manager Central Dylan Wedel talked to growers about establishing low-cost irrigation management tools to increase the use of irrigation – one of the activities which are listed in the 2023 Central District Productivity Plan. (See more page 36)

District Delivery Officer Stephanie Duncan was also on hand displaying the Mobile Maturity trailer. Stephanie uses this to help growers select paddocks for the use of crop ripeners to improve their CCS, which is another priority of the Central District Productivity Plan. She selects samples from a paddock and processes them with the trailer to determine crop moisture to aid in decision making. SRA Mackay established three trial sites last year, and where the crop moisture was above 70 per cent, an increase in sugar content was achieved that more than paid for the chemical and its application.

(Left) *SRA Board Members travelled north for the Meringa field day and ASSCT conference, and included (left to right) Rowley Winten and Peter Russo.*

(Below Left) *SRA Variety Development North – Dr Felicity Atkin led popular tours of Meringa's variety development facilities.*

(Below Right) *Plant Breeding Senior Technician Vivien Dunne took engaged growers and millers through the plant breeding process.*

HEBERT FIELD DAY

A coffee and a chat got the day started in Ingham!

SRA Manager Biosecurity and Disease Screening, Dr Shamsul Bhuiyan (left) talked with growers about SMUT in the Herbert and was joined by PhD student Moutoshi Chakraborty (right) from Griffith University. With colleagues they are developing SugarPATH, a handheld device used for the detection of leaf scald disease and ratoon stunting disease.

SRA Plant Breeding Technician Herbert, Linda DiMaggio spoke with Herbert grower Paul Steine about the latest SRA varieties.

SRA's Dr Heidi du Clou and Steve Staunton demonstrate the hand held NIR tool.

A BEAUTIFUL DAY AND AN "EXCELLENT EVENT" IN INGHAM

There might have been a chill in the air, but the sky was brilliant blue for SRA's Herbert Field day. And with a warm welcome from SRA District Manager, Northern Phil Patane, the day got underway.

SRA experts had travelled from Brisbane, Meringa, Tully and Woodford stations to talk with growers about issues related to local and exotic pests, plant diseases and nutrient management. New technology was on display, including the NIR Cane Analysis System, Harvest Mate and SugarPATH, a handheld device for advancing sugarcane disease diagnostics.

The local plant breeding team led by Dr Fengduo Hu proudly shared their knowledge and experience in this important space, and distributed copies of the 2023/24 Variety Guide.

Paul Steine is a Herbert grower who regularly attends SRA activities. He said the Field Day was an 'excellent event'.

"The presentations were good, and we had time between presenters to be able to talk one-on-one to the experts.

"And importantly for me I was able to have my say and offer suggestions that were taken onboard," Paul said.

"I always enjoy discussing new varieties. SRA plant breeders have made great progress in recent years. It's pleasing to open the new Variety Guide and see all the ticks in relation to disease resistance.

"In some ways it was a shame the weather was so good. If it had been raining there would have been more growers there; and those that weren't, missed out."

"A GREAT DAY FOR AN INDUSTRY CATCH-UP" IN THE BURDEKIN

SRA's Brandon station held its 2023 field day on Wednesday 31 May.

SRA District Manager – Burdekin, Terry Granshaw says the feedback from the event was as he'd hoped.

"A lot of planning goes into these events; we need to be prepared for a large turn-out or a small gathering. The weather dictates that of course, growers are still planting and irrigating before the channel shutdowns occur. Its still important that we deliver an event that addresses the relevant topics to the district.

"And from the feedback I've received, the field day did that. One grower sent me a text as he left saying, well done and that 'the displays were very informative'. In his words it was a 'Great day for an industry catch up'.

"That's what it's all about. Events like these are an opportunity to share with growers the work that SRA is doing and gives growers the opportunity to speak directly with our researchers.

"But it's bigger than SRA. This event is for all those organisations in the district that also work closely with growers."

CANEGROWERS Burdekin Manager Greg Watson said the event was well run, with a great program of speakers. Greg also complemented Terry and his team and all the district's agronomic service providers who made themselves available to growers at the field day.

"Whilst we are living in the age of information technology where everything is at your fingertips, you just can't beat the good old 'stand and deliver format' that attending a field day provides."

"The SRA Burdekin Field Day was well received by the growers who gave up their time to do so," Greg said.

While attendance was good Terry said what excited him most about the day was the number of new faces in the crowd.

"I saw growers that I'd never seen at an SRA event before, or possibly in the last two decades," he said. "

"That was great to see. We're here, at all times not just events like the field day, for all growers in the district. I hope we'll see many more new faces walk through our doors in the future."

***(Top Left)** A bird's eye view of SRA's Brandon Station on the May field day.*

***(Top Right)** Steve Pilla, CANEGROWERS Burdekin Limited director and grower, talks with Michael Hewitt and Cherrie Stockham from Agritech Solutions.*

***(Below Left)** SRA Variety Development Manager, Burdekin Dr Xianming Wei presented his work on plant breeding, nematodes and the crossing program.*

***(Below Right)** SRA Principal Agronomist Dr Danielle Skocaj can often be found in a soil pit display and happy to talk about SRA's Online Sugarcane Nutrient Management Training.*

BURDEKIN FIELD DAY

The SRA team at last year's Bundaberg Field Day

DATE CLAIMER: BUNDABERG SOUTHERN FIELD DAY

When: Thursday 20 July, 8.00am – 1.00pm

Where: SRA Bundaberg Station, 314 Pashleys Road, Welcome Creek

Southern growers are invited to talk to SRA's researchers one-on-one and see up-close the latest research findings, new technology and activities developed through SRA's Southern District Productivity Plan.

Register today on TryBooking

HAVE YOU TAKEN UP YOUR FREE **MEMBERSHIP?**

Are you a member of Sugar Research Australia? If not, you could be missing out on the latest information about research developments and events in your area.

SRA's Executive Manager, Industry Services Hywel Cook said while payment of the sugarcane levy is mandatory for growers and millers under Australian legislation, SRA membership is voluntary, free and benefits all grower and miller levy payers.

"Under SRA's constitution, levy payers must opt in and register to become members. Membership is not automatic," Hywel said.

"By being a member, growers can play an active role in determining the future of their industry-owned organisation. Only members are eligible to vote in decision-making about SRA, which is why we encourage all levy payers to register to become a member.

"Membership also provides easier access to the latest information and updates from SRA and industry partners. These include invitations to SRA events in local districts, webinars, and online tools, with information on research that is being undertaken along with opportunities to meet with researchers and other specialists throughout the year."

Local Ingham sugarcane grower, Chris Bosworth said it was valuable to meet with staff and other growers at field days and information sessions.

"Getting together with other growers at these events provides me with a chance to ask questions about the latest varieties and other initiatives that I would like more information on," Chris said.

"The great thing about SRA events and meetings is that they are voluntary so you can attend only those that are of interest to you."

SRA members have the opportunity to vote at the Annual General Meeting, to be held this year on **27 October.** Members can also nominate for election to the Director Selection Committee and nominate or be nominated as the Delegate in each SRA district.

How do you join?

It's free to become a member – simply fill in the membership form and return it to SRA.

Visit sugarresearch.com.au or scan the QR code to apply for SRA's membership.

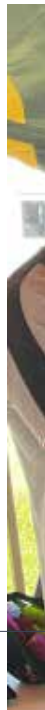
You can also email membership enquiries to sra@sugarresearch.com.au.

About SRA

SRA is Australia's specialist sugarcane research organisation. We invest in evidence-based research, development, and adoption activities on behalf of sugarcane growers and millers to meet industry challenges and opportunities.

SRA is an industry-owned company that invests in and manages a portfolio of research, development, and adoption projects that drive productivity, profitability and sustainability for the Australian sugarcane industry.

SRA is funded by a levy of 70 cents per tonne of cane, paid equally by growers (35c) and millers (35c). Co-investment is also provided by the Commonwealth Government and the Queensland Government.



INNOVATIVE APP TO **DRIVE IMPROVED SUGAR YIELD**

After extensive trials *Harvest Mate* is now helping growers and harvesting contractors make decisions about their harvester settings to increase yield from their paddocks.

The Harvest Mate web-based portal and App, has been developed through a collaboration between growers, harvesting contractors, Queensland's Department of Agriculture and Fisheries (DAF), and SRA.

SRA's District Manager Northern & Agricultural Machinery Specialist Phil Patane said the initial project aimed to understand the yield benefits and impact on harvesting costs when changing existing practices and to identify the levers that could be pulled to predict optimal harvester settings.

"We have learned through years of trials and engagement across the industry, that there are multiple factors that can influence the optimal harvester settings," he said.

"The tool can be tailored to a specific situation and uses growers' block and crop information, as well as harvester, haul-out, labour details and harvest conditions to inform the grower of optimal harvester settings.

"Ultimately, ***Harvest Mate*** is designed for growers to extract the greatest possible value out of their harvest.

"What we heard loud and clear from our growers and the contractors is that the tool needed to be user-friendly to be adopted by the industry," he said.

Harvest Mate has now been demonstrated to industry through 11 regional face-to-face workshops to showcase the benefits and to encourage growers and contractors to adopt the tool.

In the short period of time since the launch 3.2 million tonnes of cane have been registered by growers using ***Harvest Mate*** for the 2023 season.

Kennedy grower David Singh has been involved in trials of the decision-support tool for the past three years.

"When you are running any business it's important to understand what your costs are," he said.

"***Harvest Mate*** will tell us the blocks and varieties that are profitable and those that aren't. And that allows us to plan, to understand our parameters and to be more efficient with our time," he said.

SRA CEO, Roslyn Baker, said the development of ***Harvest Mate*** is a great example of collaboration between growers, DAF and SRA to apply the latest research findings with economic outcomes in mind.

"***Harvest Mate*** provides growers and contractors with an opportunity to increase cane and sugar yield," she said.

"Our growers continue to work hard on producing the best crop prior to harvest, and this new tool will help to reduce cane and sugar loss during the harvest."

Industry trial results showed an average of 5 per cent increase in yield with the potential to deliver an additional $116 per hectare to growers after paying both harvesting costs and levies.

"With an expected increase in productivity of approximately 5 per cent, ***Harvest Mate*** will also provide benefits to the mills and improve mill viability," Ros said.

Cane growers and harvesting contractors can register to use Harvest Mate by creating a user profile on the website harvestmate.au. Once registered, they can download the free app from the Google Play Store or Apple Store on their smartphones while working in the paddock.

Read more about Harvest Mate on SRA's website.

SRA acknowledges the invaluable research contribution by economists from the Queensland Department of Agriculture and Fisheries (DAF) for the development of this tool, as well as funding from DAF for its delivery.

Queensland Government

Pictured at SRA's Herbert Station Field Day (left to right) : Herbert grower Jeffrey Pace, DAF Senior Agricultural Economist Caleb Connolly, and SRA District Manager Northern, Phil Patane.

ROLL ARCING IS **ON THE WAY OUT**

In good news for the milling industry, significant steps have been taken towards an effective alternative to the conventional process of roll arcing, with both financial and health and safety benefits for the sector.

Why is this important?

Heavy rotating rollers are used in the mill to extract juice from sugarcane. The surface of the roll shells are covered with grooving to grip the sugarcane and drain the juice. The roll shells have traditionally been manufactured from grades of grey cast iron with a relatively rough surface, but to provide the necessary grip the surface must be further roughened. This has typically involved using chromium carbide hard surfacing electrodes which apply rough globules onto the roll surface. Flux cored wires are also widely used.

This is called roll arcing.

It is a labour-intensive process requiring regular re-application. On the most heavily loaded rolls, such as the top roller, the reapplication frequency ranges from daily to fortnightly. Roll arcing also ties up a large number of boiler makers who could otherwise be repairing other items of plant and improving plant reliability.

It is also a significant health, safety and environment (HSE) risk. The boiler makers must work on or near high energy, rotating machinery, often in the presence of very hot vapour.

Contaminants and ultraviolet radiation in the welding process are known carcinogens. Welders must wear breathing masks and mills must use exhausts to remove the fumes from the mill building. Arcing during the crushing also means water (juice) and electricity (welding arc) are in close proximity, with the risk of electrocution.

The need to eliminate roll arcing has been on the research agenda since the early 1990s.

Cost effective alternative

A project - *2019/007 Eliminating Roll Arcing* - funded by SRA and conducted by Chief Investigator, Queensland University of Technology's (QUT) Geoff Kent, with partners Mackay Sugar and Wilmar Sugar, have investigated the availability of alternative equipment and processes and conducted trials to find the most cost-effective approach to eliminating roll arcing. Also partnering on the project was Australia's national science agency, CSIRO, who developed the laser cladding technology.

Mackay Sugar's Mechanical Reliability Engineer (Weighing/ Feeding-Mills), Asset Services, Steve McLaughlin (left) and Farleigh Mill Maintenance Supervisor, Jason Howes, are pictured on top of the newly clad No. 6 roller at Farleigh Mill.

Farleigh Mill, Mackay.

Findings

1. Surface coating technology recommended for its service life and maintenance cost - the tungsten carbide technique.

"After a long incubation period, the tungsten carbide technique has now been taken up commercially in Australia," Geoff Kent said.

"The welding company, Specialised Welding Products (SWP) and Bundaberg Walkers Engineering (BWEL) have applied the coatings in the sugar industry."

2. Recommended roll shell material - SG iron

"A stronger, more durable and more weldable iron, SG iron, is now available on the market for a price not significantly different to grey cast iron," Geoff said.

3. Investigated application

"The tungsten carbide chip surface was applied as a cladding on the tips while both the roots and the flanks of the grooves have also been clad to reduce undercutting and wear of the roll surface," Geoff said.

"Undercutting is where the support for the tungsten carbide surface is weakened through wear over time and ultimately chunks of the grooves detach from the shell, leaving large cavities in the roll surface. Testing found that the amount of undercutting reduced using the SG iron shell material but the undercut region still needed to be repaired each season to avoid significant loss of roll diameter from the detachment of tooth sections.

"The roll diameter loss was similar to that expected from an arced, grey cast iron roll. However, because of the weldability of SG iron, the teeth could be readily rebuilt, using a low-cost steel welding consumable, and the tungsten carbide surface reapplied."

4. Investigated technology - laser cladding

"Laser cladding consists of a portable 2 kW to 4 kW diode laser system, a robot manipulating the laser beam and a metal powder feeding system. The process uses minimal heat for faster cooling rates and much finer and denser microstructures than those produced by conventional processes," Geoff said.

5. Recommended coatings and their expected life

Tip coating of mild steel containing tungsten carbide chips of particle size 16 to 20 mesh, applied by MIG welding

- **Life:** the single weld tip coating on the very tip of the grooves had to be replaced yearly for grip in the subsequent year and to restore the original outside diameter of the roll.

Flank coating of Tetra V420-G (a martensitic stainless steel, grade SAE 420), Robodur K600-G, a medium alloy martensitic steel with finely dispersed spherical carbides or Hardface HC-O, a high chromium cast iron deposit containing primary chromium carbides in an austenitic matrix, applied by MIG welding

- **Life:** two to three years.

Root coating of austenitic stainless steel such as Tetra S 309L-G or Chromecore 309

- **Life:** same as the life of the roll.

"The combination of an SG iron roll and coating the roll grooves with hard facing using tungsten carbide chips was estimated to reduce overall costs of maintaining mill rolls by more than $500,000 per year," Geoff said.

"Given this early stage of the technology's development and the difficulty in quantifying all of the benefits, the potential saving is much greater."

6. Recommended cost considerations

"Cladding technology was found to be more financially attractive than conventional arcing while MIG welding was more attractive than laser cladding," he said.

More research to be done

"The issue of the failure of the upper flanks, causing detachment of the groove tips, has not yet been adequately addressed," Geoff said. "Most surfaces last two to three seasons but then suffer tip detachment. Addressing this failure would significantly reduce refurbishment costs.

"Laser cladding is a promising technique as an alternative to MIG welding, allowing better controlled deposition of coatings with less heat, and expected to enhance the coating life. However, the technique requires much more development using higher powered lasers (20kW) to achieve more consistent deposition thickness on the inclined groove flanks and a much higher deposition rate.

Uptake by the mills

"The benefits of the cladding technology have been reasonably well established with a direct financial benefit which will increase when the likelihood of tip detachment is reduced. It is appropriate for application by all Australian sugar milling companies. So far, Tully Sugar, Wilmar Sugar Australia and Mackay Sugar have used the technology.

"Specialised Welding Products (SWP) now has considerable experience in the application of coatings, coating the trial rolls for Mackay Sugar and rolls for Wilmar Sugar Australia. SWP has established a workshop in Mackay.

"Bundaberg Walkers Engineering Ltd (BWEL) has also recently clad a new roll for Mackay Sugar in their Bundaberg workshop.

"The health, safety and environment (HSE) benefits have been quantified. While smaller than expected relative to other direct financial benefits, they are nonetheless attractive."

Project progress has been reported annually at the Regional Milling Research Seminars, together with two workshops held in Townsville.

Tully Sugar, Wilmar Sugar Australia, Mackay Sugar, SWP and CSIRO have shared their experiences so that each milling company can develop their own plans for use of the technology.

"Any interested milling company can talk to SWP and BWEL or contact me at QUT," Geoff said.

Erin Headon (left) sets up the SRA display at MSF Sugar's Careers Day in Mourilyan, watched by Trish Irvine.

SUGAR INDUSTRY CAREERS **ON SHOW**

In March this year, SRA welcomed the opportunity to participate in MSF Sugar's careers day held in CANEGROWERS' meeting rooms in Mourilyan. This was the second, now annual event, organised and facilitated by Laboratory Supervisor – South Johnstone Mill *Patricia (Trish) Irvine (above).*

"The day was planned as a way for Year 10-12 students and job seekers to talk about careers in the sugar industry and meet industry collaborators," Trish said.

"We had a great turnout by exhibitors and attendees. We've since been overwhelmed by kids who've looked at the career options and courses available to get into the industry, as well as enquiries about work experience," she said.

"Next year we're thinking we'll have to expand the event over two days to accommodate other schools that have contacted us to attend."

SRA's *Graduate Agronomist Erin Headon* (above left) joined participating organisations at the careers event to talk with students and job seekers about the diverse and exciting career options in the sugar industry.

*Cane **Matters*** spoke to Trish and Erin about their own career paths.

A GIRL FROM BEENLEIGH, SUGAR SCHOOL IN MACKAY AND MORE THAN 40 YEARS AT THE MILL

When Trish was at school industry careers days such as the March event she organised, didn't exist. She didn't even live in a sugarcane district, she told *Cane **Matters***, but there was 'Sugar School'.

"I finished Year 12 at Beenleigh High School, in Brisbane," Trish said.

"Originally, I was set on going to Teachers' College. Then I saw an advertisement in the paper for 'Sugar School' in Mackay. I applied; I can't tell you why. I didn't have any connections with the sugar industry, or farming – but that's where I went – in 1978."

Trish explained that the Mackay Sugar School was set up in conjunction with the local sugarcane industry, with teachers coming from all milling districts. The course she took was a four-year Diploma in Applied Science (Sugar Technology).

"The first year introduced us to cane testing and auditing and juice analysis. After that was study for six months and work in the industry for the rest of the year. I was the only person at the college that didn't have connections they could call on to get work," she said.

"Thankfully, the principal liked me and was friends with the Manager at Mourilyan Mill. So that's where I went. I remember getting on the bus in Brisbane, jumping off in Mourilyan and staying at the pub. I was 17.

"In those days the only females in the mills were in the office or the laboratory. I was the shift analyst in the lab. And that's what I did, working the seasons, in between having my kids. In 2002 I transferred to South Johnstone Mill. I was given the opportunity to become Laboratory Supervisor a few years later, serving Babinda and Mourilyan mills, as well as South Johnstone. And I'm still here."

Trish said after 40 years she still finds her job interesting and challenging.

"In a role like this, you know exactly what you're going to be doing. But there's always something that happens that's different. I work with the senior chemist and between us we conduct factory performance analysis, environmental monitoring and I oversee the shift

analysts and monitor cane payment. We look at all factory by-products, including the molasses we export, and we monitor that so that none of our waste affects the environment.

"I'm always looking at ways we can improve what we do and I'm now keen to pass on the skills and standards that I was taught when I first came into the industry.

"Having skilled, qualified people in lab positions is equally important for the mill and for our growers," Trish explains.

"Sugar School doesn't exist anymore, but the MSL30118 Certificate lll in Laboratory Skills is offered through TAFE and some universities," she said. Central Queensland University in Mackay offers an on-line course, which Trish has had input to.

"It's important that we encourage young people into our industry. I'm not planning on retiring just yet. I've worked with some good people and learned a lot from them. I want to pass on what I've learnt before I retire. If I'm not at the mill, hopefully I can be training and educating others," she said.

FROM THE ARTS TO AGRONOMY, ERIN IS HAPPY SHE MADE THE MOVE

Erin Headon may have grown up in the small agricultural town of Griffith, NSW, but she says she never expected to end up working in agriculture.

"At school I studied chemistry, maths, biology and English, so I was thinking about going into science but when I received the offer for an arts degree it was hard to say no," she said.

"I was surprised to find a love of agriculture a little bit later in life, and once I'd discovered that, I went back to Uni to do a graduate certificate in agriculture while I was working as a pest and disease scout with bananas. After that I started a Master of Science in Agriculture, which is what I'm working on now."

As a graduate agronomist, Erin says she likes to think she still has her training wheels on.

"Agricultural science is so rich and diverse and while a degree prepares you as well as it can, with technical knowledge and skills, it's not until you get out in the field and apply the science that you really learn," she said.

"Agronomy is interesting because it's multidisciplinary. You're solving problems all the time and you're working outside, with great people."

So what's next in your career?

"It's so hard to say where I see myself going because I didn't expect to see myself here five years ago. There's a lot happening in the digital agriculture space and I'm excited to see where that goes," she said.

"I like extension work. I enjoy talking to cane growers and communicating the research my more experienced colleagues are working on, and of course learning from them (researchers and growers). So, for the time being it's definitely sugarcane."

And what would you say to your 18-year-old self?

"I'd probably say, don't worry, you don't have to have it all figured out just yet.

"It's normal for people to change careers these days. So, if you don't know what you want to be just yet, that's ok. But if you can commit to the basics: chemistry, biology, English, maths, even physics, then you'll be well set up for studying science at any point in your life, and that can open so many exciting doors."

Feel inspired to look for a job in sugar? Keep an eye on SRA's website for Current Job Vacancies including seasonal work.

Erin (right) spoke with students from Innisfail State School about her role at SRA as a graduate agronomist.

OUR PEOPLE

Sugar Research Australia is a critical part of the Australian sugarcane industry but couldn't achieve any of its important research goals for the industry without attracting the right people.

Two new researchers have been welcomed by the SRA team this quarter - Research Entomologist Dr Chandrima Emtia and Leader Field Pathology Dr Seona Casonato. Both have travelled from overseas to work for SRA in Far North Queensland.

NEW EXPERT JOINS ENTOMOLOGY TEAM

Dr Chandrima Emtia graduated from Bangladesh Agriculture University. She has experience in research and academia in Bangladesh and Japan, and is now calling Australia home.

Appointed to the position of SRA Entomologist in May, Emtia will work with SRA Entomology Leader Dr Kevin Powell and his team based at SRA's Meringa Station, Far North Queensland.

"This is my first time in Australia," Emtia said. "And I love it already. The people have been so welcoming, and the landscape is so beautiful."

While this is all a bonus, Emtia says she was attracted to the role because of the work the team is doing.

"An entomologist friend in Australia sent me the link to the advertised job," she said.

"Reading SRA's website, I was excited by the work Dr Powell and his team are carrying out.

"SRA is balancing ways to combat local insects, species that are already established, while at the same time looking at biosecurity concerns. I believe this is the main target for the whole world," Emtia said.

"I knew this role was not only a great opportunity for me, but with my experience I could contribute to the work."

Before joining SRA, Emtia's post-doctoral research at Saga University, Japan was the *'Conservation and enhancement of natural enemies for the control of complex insect pests'*, This was followed by research on *'Core technology innovation of migratory insect pests,'* at the National Agriculture and Food Research Organisation (NARO), Japan.

"We need to understand how migratory insect pests might impact agriculture," she said.

"In addition we need to know how they occur, if they have an alternative host, any habitat manipulation strategies, and most importantly how we can control them."

Emtia's career began as a lecturer at Bangladesh Agricultural University. Promoted to Associate Professor in Entomology, her research mainly focused on integrated pest management of pulse beetles, work she continued in Japan: "studying the effect of insecticides on natural enemies which we knew to be toxic to both those beneficial insects and the ecosystem," she said. Emtia also researched hoverflies for biological control of aphids during her post graduate studies at the University of Miyazaki , Japan.

"Aphids cause all sorts of damage to crops," she said. "Until recently, lady beetles were thought to be the number one biological control method, in terms of predators. But we found that hoverflies are an earlier colonizer, and therefore, have a greater impact on aphids than the lady beetles.

"This turned the tables on research being carried out by entomologists who were looking to establish biocontrol using lady beetles," Emtia said. "It has also opened up new pathways for control of aphids."

"I hope with the knowledge and professional experience I have gathered in Bangladesh and Japan, I will be able to contribute to the work Dr Powell and his team are already doing at SRA. And I can learn from their experience and wealth of knowledge while contributing to the Australian sugarcane industry," she said.

The entomology team in Meringa (left to right) Hang Xu, Dr Samuel Bawa, Dr Dr Chandrima Emtia and Holly Farnan.

SRA Pathologist Dr Rob Magarey (left) will work closely with Seona until his retirement later this year.

... AND NEW LEADER FIELD PATHOLOGY

Pathologist, Dr Seona Casonato admits to having had a fascination with plants and fungi for as long as she can remember.

"I grew up in western Victoria. I would go mushroom collecting when I got the cows up from the back paddock," she said. "I remember when I first saw black spot on apple leaves, I was five years old."

Graduating with an applied science degree in horticulture (University of Melbourne – Burnley), Seona worked briefly on plant nutrition before returning on a scholarship to RMIT University to undertake honours followed by a PhD in weed biological control.

"That interest came about from working on flowers as part of my undergraduate studies," Seona said.

"I looked at fungicide resistance in one system. Then I delved into mycoparasitism - which is how to use fungi to control other fungi. I used some of this knowledge to employ a rust fungus to then kill plants, in this case, weeds. That then led me to my postgraduate work, a post doctorate, many years working in the horticultural industry and later in academia."

Seona explains plant pathology as the understanding of disease, which is symptom expression caused by organisms such as fungi, bacteria, viruses or phytoplasmas.

"You go to a pathologist, and you get a blood test and they have a look at it under a microscope, then tell you what's wrong. I would say that we are just the same, but we're detectives of plants; of what causes diseases and why the plant isn't flourishing."

Seona has spent most of the past 21 years in New Zealand, and yes, she worked on kiwifruit.

"So, I've done a lot of work with growers across a lot of different horticultural crops. I worked on a terrible disease that wiped out crops of kiwifruit. I've also worked on apples, tamarillos, persimmons, onions, and grapes. And then arable crops, like wheat and barley. I've worked on nematodes but mainly fungi; a lot of bacterial work," she said.

"Yes, I've worked on a lot of different projects but helping my farmers and my growers to be more successful is why I do what I do.

"My research is applied, to help people make a difference in their lives; and because we all need plants to eat and live and keep the earth functioning as best as it possibly can," Seona said.

Before taking up her new role as SRA's Leader Field Pathology, based at Tully station, Seona admits that all she knew about sugarcane was that it was susceptible to a lot of different diseases.

"Working in sugarcane really appealed to me," she said. "I wanted to broaden my depth of knowledge of the plant and its associated fungi and bacteria.

"Sugarcane is also a grass which is quite different to work with; and it's a perennial crop which is unusual. It's quite a different system to woody plants that predominate in horticulture."

And quite the challenge?

"Yes, I like a challenge. I hope with my past knowledge, I might be able to implement some things that will help growers here in Tully and Queensland.

"I believe to be successful in my role I need to be empathetic and a good listener.

"An agricultural plant pathologist must listen to what the farmer sees, to understand and gather the information, to then make a diagnosis.

"And when you're working with farmers, and an industry that has such tight margins, every incremental change should make a difference to each farmer's livelihood, and that's what I'm aiming to do and looking forward to achieving," she said.

ACHIEVING GENDER EQUITY

- DIVERSITY AND INCLUSIVENESS AT SRA

A not-for-profit company called Science in Australia Gender Equity (SAGE) incorporated in 2019 set as its goal the embedding of genuine and sustainable gender equity, diversity and inclusion across the Australian tertiary education and research sector.

The organisation is supported by the Australian Government's Department of Industry, Science and Resources and has two founding members – the Australian Academy of Science and the Australian Academy of Technology and Engineering.

SAGE research has consistently shown that equitable, diverse and inclusive workplaces are more productive, innovative and achieve better outcomes.

In Bundaberg in May, SRA District Manager Southern Lisa Devereaux explained to the women attending this year's Women in Sugar Australia's (WISA) annual conference that many educational and research organisations in Australia endorse SAGE's commitment: advocating the need to advance a policy of sustainable gender equity and diversion inclusion for these positive outcomes in their own workplaces.

Lisa looked at how closely SRA aligns with SAGE's key recommendations and guidelines.

"Women currently provide 20 per cent of the science and research workforce in Australia. SRA's Strategic Plan lists a goal of 50 per cent female leaders and researchers. As at 31 December last year we had reached a figure of 44 per cent," Lisa said.

"While the gender percentage between males and females has remained consistent in the past 12-18 months, there will be an increase in men transitioning to retirement in coming years, providing further opportunities to increase our diversity profile.

"When it comes to recruitment, our selection process for 26 job advertisements between

SRA District Manager Southern Lisa Devereaux outlined to the women at the WISA Conference in Bundaberg how SRA is working to embed genuine and sustainable gender equity, diversity and inclusion within the organisation.

Lisa and Cathy receive a presenters' gift pack from Krystal Golchert, President, Women in Sugar Bundaberg.

Women from farms in sugarcane regions throughout Queensland are passionate members of WISA including these ladies from Bundaberg, Burdekin, Herbert and Mackay regions who attended the conference this year.

1 April and 31 December last year included a 100 per cent gender balance in the shortlisting process and 95 per cent in the panel interview process."

The policy also includes close monitoring of all relevant legislation which last year included family and domestic violence leave provisions and the Fair Work Amendment Bill. SRA policies are updated to reflect this legislation which includes gender equality policies and clauses, anti-discrimination special measures, sexual harassment at work measures, fixed-term contract limitations, flexible work obligations and a review of pay secrecy clauses.

Lisa described SRA's diversity profile to the WISA women which was compiled from a voluntary survey in January last year. She said that:

Thirty-eight per cent of SRA employees were born outside of Australia in 20 different countries. Three people each respectively come from India, Colombia and South Africa.

Twenty-one people in the company or 16 per cent speak a language other than English at home while one person in the senior leadership (1 per cent) identify as indigenous.

Turning to inclusiveness Lisa said that:

- 3.5 per cent of employees were recognised as disabled or neurodivergent
- 43 per cent of employees have carer responsibilities for children under 18, disabled or elderly relatives
- Eighty-four per cent, or 72 people, have tertiary qualifications with 18.5 per cent (16 people) having doctoral degrees.

SRA Research Mission Manager Cathy Mylrea joined Lisa on stage to describe how SRA's research investment unit was working collaboratively with the industry to improve gender diversity.

This included the number and diversity of industry and research partners involved in establishing SRA's research and development (R&D) goals and strategies, and the number of capability and capacity building programs and participation rates including diversity of participation.

Women from across the sugar industry annually attend the Women in Sugar Conference to discuss a range of topics. This year the theme was Women of Worth. SRA was a gold sponsor.

POSITIVE STEP FORWARD IN CONTROLLING SUCROSE DEGRADATION

Degradation of sucrose during its manufacture directly reduces sugar yield and the sugar sales revenue. Where acidic compounds are produced, it can also cause corrosion in the factory, running up maintenance costs.

As part of an investigation of juice degradation in sugar manufacturing processes (*Cane **Matters***, Autumn, 2022 p. 32), SRA funded a PhD student, Chalani Marasinghege, who worked with Chief Investigator QUT's Dr Darryn Rackemann on the project.

Chalani was able to complete additional work on the problem as part of her thesis, using juice samples collected from Rocky Point/Condong Mills in the 2022 season which were tested at QUT.

The problem she tackled was the loss of sucrose during raw sugar manufacturing, which happens when the juice degrades during evaporation and the release of various impurities.

"The rate at which sucrose degrades speeds up when the pH of sugar juice decreases. The juice's capacity to maintain pH, which is influenced by the concentration of organic acids, plays a significant role in this variation," Chalani said.

Degradation of sucrose directly reduces sugar yield and therefore the sugar sales revenue. Where acidic compounds are produced in the process it can also cause corrosion in the factory, running up maintenance costs.

Millers add a small amount of alkaline agent (i.e. lime) to sugarcane juice in the factory to increase the pH level in order to reduce sucrose degradation during processing. The lime also reacts with phosphates in the juice to improve juice clarity. It leaves the factory in the mud from the clarifier.

"However, degradation also occurs exponentially with temperature rise and the length of time the juice sits in the evaporators. This is largely dictated by current milling equipment and cannot be improved on," Chalani said.

Nevertheless, Chalani found out that not only pH but also juice composition can be controlled to a certain extent to minimise sugar degradation.

"Natural impurities in sugarcane juice include invert sugars. This is a mixture of glucose and fructose which occurs naturally in the sugarcane as well as due to microbial degradation and low pH during harvesting and transport to the factory, and processing within the factory," she said.

"Others are flavonoids, minerals, organic acids, proteins, amino acids, phenolics, polysaccharides and bagacillo, a minute portion of bagasse."

An experimental test program looked at the impacts of various impurities individually and in combinations using synthetic juice solutions compared with factory evaporator supply juice (ESJ) which is the clear or clarified juice produced in the mill.

Chemicals were spiked into the factory solutions at concentrations five times their normal amount to find out how sucrose degraded under static thermal conditions, in an oven set at more than 120 degrees Centigrade for 75 minutes.

"Invert sugars, flavonoids and minerals were found to increase sucrose degradation and caused a higher juice pH drop," Chalani said.

"Organic acids helped minimise sucrose degradation due to their natural pH buffering capacity.

"Other juice constituents showed minimal impact."

The research work found that by changing the liming agent used in the mill from lime to soda ash, dolomite or caustic soda, sucrose losses could be measurably reduced.

"However, because juice constituents are involved in such complex interactions with each other, further research is necessary to provide other solutions," Chalani said.

Chalani Marasinghege's findings were presented at the International Society of Sugarcane Technologists Congress and a summary was provided at this year's SRA/QUT Regional Milling Research Seminars.

PhD student Chalani Marasignhege pictured during her research work at Condong Mill.

PURGE SENSOR FINDINGS CONFIRMED AT MILLAQUIN MILL

An SRA-funded project in 2021 season investigated the use of a purge sensor to improve the performance of batch centrifugals used in mills to separate molasses from sugar crystals. The research was funded by SRA under the Small Milling Research Program investment scheme.

Interest from the milling sector in using the purge sensor to improve the management of the centrifugal station led to further investigations in the 2022 season.

Batch centrifugals spin at high speed to separate the layer of coloured molasses, known as mother molasses, from the sugar crystals. Hot water is sprayed onto the crystal bed to help remove the mother molasses and achieve the required crystal quality. This washing step is ideally conducted without dissolving an excessive amount of sugar because dissolved sugar and the spun off molasses must be recrystallised.

Currently the fugal station operator must rely on their own vision and hearing to judge the time and centrifugal speed at which the wash should be applied in order to minimise the dissolution of sugar. The purge sensor gives the operator a good indication of when the molasses and water flows from the crystal bed and so identifies the optimum time (or speed) to apply the wash water.

The purge sensor supplied by Neltec Denmark in the 2021 season investigated B massecuites, at Millaquin Mill.

It was mounted on the outside of the centrifugal casing and detected the impact of molasses and wash water leaving the crystal bed and hitting the inside wall of the casing.

The following year the industry sought to investigate the sensor when fugalling A massecuites, an earlier stage in the crystallisation process.

In the 2022 season, Millaquin Mill installed the sensor and a one-week investigation followed, funded by QUT and facilitated by Factory Manager Millaquin, Robert Zahn and QUT Chief Investigator Ross Broadfoot.

"The results showed similar conclusions to the two main outcomes of the original project – 1) the sensor can consistently determine the optimum time (speed) to add the wash water and 2) the purging qualities of the massecuites can be defined qualitatively by the speed that the molasses is purged," Ross Broadfoot said.

"Millaquin Mill has been the first mill to order a purge sensor for each fugal on their station," said Ross.

"I hope more research will be done at other mills in future to demonstrate the effects and benefits more widely."

Through investigating new technology such as this the milling sector is making positive steps towards greater efficiencies in the production process while achieving the sugar quality demanded by the world market.

Assistant Production Chemist Ravneel Deo left and Production Chemist Salesh Kumar check the control box for the purge sensor project at Milliquin Mill.

The Small Milling Research Program investment scheme was developed to deliver investment for relatively low cost, short-term, industry-identified and led research projects.

The results of the purge sensor project were presented to millers at this year's SRA/QUT Regional Milling Research Seminars held at five locations between Gordonvale and Rocky Point Mill. A paper was also presented at the ASSCT Conference showing results from both seasons.

Weed scientist Emilie Fillols presents at the Rocky Point weed management workshop.

UNDERSTANDING HERBICIDE FAILURES **IN WEED CONTROL**

Yield loss from weed competition and the cost of weed control in sugarcane are estimated to cost the Australian sugar industry $70 million annually (McMahon et al, 2000).

SRA Weed Scientist Emilie Fillols has been holding Advanced Weed Management Workshops this year to give sugarcane growers an increased understanding of the possible causes of herbicide failures in weed control and herbicide damage to cane. She has been assisted by Nufarm and Croplands' representatives. More workshops are planned.

The workshops have aimed to optimise herbicide control of weeds and growers' spend on weed control by increasing knowledge about the correct:

- adjuvant, where required
- droplet size (spray quality)
- weather conditions to avoid spraydrift, and
- speed and pressure rates.

Emilie described the different modes of action used by herbicides to kill plants.

"Herbicides target specific metabolic functions in plant cells – most target the enzymes in the leaves or in the growing points of the plant," Emilie said.

"Some herbicides mimic hormones and disrupt various processes in the plant.

"Some plants are less affected by herbicide than others because the different features of plants restrict the way the herbicide can get into the plant to reach its target site.

"For example, the thicker the wax is on the 'skin' of the plant, the harder it's going to be for the herbicide to get in.

"When the plant gets stressed, e.g. through moisture stress, that wax becomes more dense. The plant metabolism also slows down.

"It's just the plant's normal physiological response but that's why we always recommend that you don't spray stressed weeds," she said.

Some targeted weeds require an adjuvant or oil to improve herbicide penetration through thick wax, and/or on leaves that are hairy, very thin and/or erect.

"The choice of adjuvant should be done in consideration with the herbicide's properties while following label directions," Emilie said. "But using it is also likely to enhance penetration through the wax on your cane, so the herbicide is also more likely to get into your crop."

Another consideration is the location of the growing point in the plant.

Broadleaf plants have the growing point at the top of the plant in the leaf. However, in grasses the growing point is located at the bottom.

(Top) *Croplands' National Sales Manager, Jeremy Rennick, demonstrates the spray quality from a number of different nozzles at the weed management workshop in Mackay.*

(Bottom Left) *You don't want this 'toothpaste' in your spray tank: Jeremy Rennick demonstrates what happens when you mix two seriously incompatible herbicides.*

(Bottom Right) *Beware: Jeremy shows that mixing two incompatible herbicides such as glyphosate potassium salt and Amicide 625 (left test tube) will create a chemical reaction precipitating salt crystals that will wreak havoc on your pump and block your nozzles.*

"Some herbicides do not work well on grasses because they cannot easily move - translocate - from the leaves at the top of the plant down to the bottom where the growing point is," Emilie explained.

"Some herbicides are selective to some plants – either weeds or crops, which means they can be applied on these plants without triggering significant damage.

"In most cases, the herbicide still gets into the plant via the leaf. However, once in, these plants are able to break down the herbicide before it reaches its target site.

"An example is *Blazer®*, which is used to kill broadleaf weeds but is ineffective on soybean which can detoxify or break down the herbicide's molecules.

"In the same way, sugarcane has the capacity to metabolize 2,4-D before it can destroy critical functions in the plant.

"Sugarcane is particularly susceptible to herbicide damage when it's at the four to six leaf stage in young plant cane," Emilie said.

"Why? We believe that's the time when the emerging cane is using all its energy to build its own root system, rather than relying on the sett roots, and it has fewer resources to break down the herbicide," she said.

To be selective to the crop, herbicides must only be used following label directions.

"The label must be read carefully. A maximum dose might be 4kg/ha. That means at 5kg/ha or 6kg/ha, the spray may affect your crop. There's a tipping point where the plant no longer has the resources to break down the herbicide."

The 2,4-D group which includes *fluroxypyr, picloram, dicamba* and others, targets hormones in the plant. Emilie warned that spraying weeds in sugarcane during the crop's rapid growth period say, in December or January, could see damage in the form of side shooting, arrows and other strange growths.

"You could use a less selective herbicide in cane so long as you only touched the stems and not the leaves of the crop," she said. "For this reason, droppers and a directed spray technique such as spot spraying are safest."

Croplands' National Sales Manager, Jeremy Rennick, spoke at the workshops about spray drift, describing it as financial loss.

"If you're not putting the herbicide where you want it you've wasted your money."

Jeremy said that the concept of spray quality had dramatically simplified the process of selecting the right nozzle for a job.

"The Australian Pesticides and Veterinary Medicines Authority (APVMA) created an Australian standard based on the British Crop Protection Council's - 572.1.

"All droplet sizes are now in microns and nozzles are classified by size, from fine to coarse with very fine and ultra coarse added recently."

Jeremy spoke about 'driftable fines' which are all droplets under 150 microns in size.

"The smaller the droplets you are using, the bigger the risk you have they will be moved off target by the wind or inversions – where a warm layer of air has trapped your spray between layers of colder air."

It is now a simple process for growers to look up a spray quality chart for the nozzle the operator is using and match it to the label requirements.

"That doesn't mean to say that if you're spraying with a coarse spray quality you won't get any drift," Jeremy said.

"There's no such thing as no drift. Even an Airmix nozzle at 3 bar, where the spray quality is coarse, will produce just under 10 per cent drift. At the other end of the spectrum are the XRs, with 45-50 per cent drift at 3 bar pressure."

Jeremy warned that the regulatory authorities had tackled off target movement of pesticides such as 2,4-D by changing the nozzle requirement from coarse up to very coarse to cut the risk of driftable fines in half.

"Spray quality will change if speed and pressure are increased," he said.

"So at 3 bar your spray quality might be coarse, but if the pressure is increased to 4 bar the result will be medium spray quality. If you have an automatic rate controller and increase your speed, the ARC will increase the pressure and result in more drift risk.

Jeremy gave some rules of thumb when working out which nozzle was needed.

What's the target? The bigger the target the coarser the spray quality should be.

What's the type of chemistry you're using? For systemic action, use bigger spray droplets. For a contact herbicide like *paraquat* – choose a finer spray quality to increase coverage.

As the risk of spraydrift increases so should your spray quality get coarser.

Pressure: The higher the pressure, the more spraydrift will be created.

Boom height: the higher the release height of the nozzle, the higher the risk of spraydrift.

Weather: spray in unstable air conditions with a regular breeze of about 11 km/hr - the warm rising air will mix with the cold air in the atmosphere. The riskiest time to spray is in still conditions in the early morning at sunrise when inversion layers occur.

Check your nozzle's spray coverage with UV dyes or by using water sensitive paper.

SIX EASY STEPS®
HAS GONE ONLINE

- PRACTICAL eLEARNING AT YOUR FINGERTIPS

Based on the SIX EASY STEPS® workshops, SRA's new Online Sugarcane Nutrient Management program is designed for sugarcane growers who want to refresh or up-skill their knowledge of nutrient management - for sustainable sugarcane production on their farms.

To login to the program visit the SRA website eLearning page:
sugarresearch.com.au/resources-and-media/elearning-introduced-for-the-sugar-industry

You don't have to finish the program in one go. You can login and logoff when you like, returning again and again at your convenience. You will not lose any of the progress you have made or the data you have input.

Visit the SRA website for more details.

More information:
Lisa Devereaux, Southern District Manager
E: ldevereaux@sugarresearch.com.au
T: 0456 590 497

Why not login today?

A grower who successfully completes this training program can be considered an Appropriate Person under the definition of the Queensland Government's Reef protection regulations. They will be able to develop and verify their own farm's nitrogen and phosphorus budget (N&P budget) without needing to seek outside agronomic assistance.

The online program's development was funded through the Queensland Government's Queensland Reef Water Quality Program and SRA.

Sugar Research Australia

Queensland Government

GROWERS EMBRACE NUTRIENT MANAGEMENT ONLINE

At latest count, 60 growers have graduated from SRA's free Online Sugarcane Nutrient Management (OSNM) training program since it was launched in March 2023. More than 140 growers have enrolled in the program.

Based on the SIX EASY STEPS® workshops, the OSNM program was developed for sugarcane growers who want to refresh or up-skill their knowledge of nutrient management for sustainable sugarcane production.

A hybrid workshop which combined face-to-face learning of nutrient management principles, practical demonstrations, and support for growers to get started on their online journey was held by SRA Principal Agronomist Dr Danielle Skocaj and District Delivery Officer Glen Park in Ingham on 9 March 2023.

A series of workshops followed in Mackay, Bundaberg, Mossman and Tully.

Among attendees at the Herbert hybrid workshop was grower, CANEGROWERS Herbert River Director and Lower Herbert Major Grants Project Officer, Leah Russo who farms with husband Santo, on 140 hectares in the Ingham Line area of the Herbert.

The couple recently purchased a new farm and Leah applied the new knowledge gained as a graduate of the OSNM program on the farm. Collecting their own soil samples, Leah reviewed the results before seeking further expert advice from Danielle.

Danielle takes up the story:

"Leah and Santo followed our best practice soil sampling guidelines, collecting their sample at the start of the fallow period and sending it to a reputable soil testing laboratory well before planting their new sugarcane crop," Danielle said.

"As a result of completing the training program, Leah was able to interpret the soil test results, identify soil constraints and select the most appropriate fertiliser products to meet the crop's nutritional requirements. Leah then reached out to SRA for additional support.

"The new block is low in phosphorus, potassium, sulphur and zinc. The soil is also severely sodic.

"Together, Leah and I are working on the most effective soil amelioration strategy."

Leah says she enjoyed completing the OSNM program and has recommended it to others, including a farmer new to sugarcane growing in the district.

She had this to say about the online training program's value for growers:

"Being a relatively new grower, I gained a lot of knowledge from the program regarding soil health and how to apply the SIX EASY STEPS® into my farming practice.

"Because I had completed the program, I felt confident to check my soil test recommendations and to ask for help from Danielle when I needed extra expert advice.

"I urge all growers to undertake the program even if you have completed SIX EASY STEPS® workshops previously. The extra added benefit of becoming an appropriate person to produce your own farms' Nitrogen and Phosphorus budget (N&P budget) is great, with new legislation requiring all growers to have an up to date N&P budget each season."

Growers wanting to participate in a hybrid workshop and receive support in their OSNM journey should express their interest to their SRA district manager.

Growers can sign up for the program by visiting the SRA website or using the QR code here

ACKNOWLEDGEMENT:

The development of the SIX EASY STEPS Sugarcane Nutrient Management Program commenced as part of the CRC for Sustainable Sugarcane Production. Its development and ongoing improvement has involved a multiorganisational collaboration led by Prof. Bernard Schroeder and included Dr Andrew Wood and various SRA staff.

The online program's development was funded through the Queensland Government's Queensland Reef Water Quality Program and SRA.

Queensland Government

A grower who successfully completes the Online Sugarcane Nutrient Management training program can be considered an Appropriate Person under the definition of the Queensland Government's Reef protection regulations. They will be able to develop and verify their own farm's nitrogen and phosphorus budget (N&P budget) without needing to seek outside agronomic assistance.

Leah attended the first hybrid OSNM workshop in Ingham in March.

HIGH RETURN ON INVESTMENT FOR GROWERS AND MILLERS

SRA's research portfolio is targeted towards delivering tangible solutions that deliver real impacts for sugarcane growers, milling companies, and other industry stakeholders.

Each year, SRA and partners engage independent consultants to measure the economic, environmental, and social impact of previous research investments. This evaluation is essential to SRA's efforts to improve the performance of new research investments and their products, and report the return on investment (ROI) made by levy payers and research investment partners.

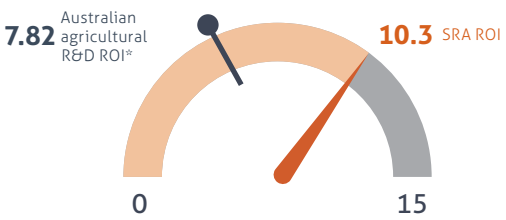
Here are findings from two recent evaluations of SRA's industry services including pathology and near Infra-red spectroscopy (NIR).

Independent company, ACIL Allen, completed the evaluation in April 2023.

VALUE
$10.3 to $1

SRA's long term return on investment. That is, SRA has delivered $10.3 of value to the industry for every $1 invested in RD&A activities by SRA.

119% on prior year



*A recent report by the Australian Bureau of Agriculture and Resource Economics and Sciences indicates an aggregate return on investment (ROI) of $7.82 to $1 for R&D expenditure for the period of 2011 to 2021.

SRA PATHOLOGY LABORATORY SERVICE

The problem

Ratoon Stunting Disease (RSD) is a bacterial disease that significantly reduces both the productivity and profitability of the Australian sugarcane industry.

The disease is problematic because it has no external symptoms and is easily spread in planting material and by mechanical cutting equipment. If planting material is diseased, then potentially the next four to five harvested crops arising from that individual planting will also be affected.

If a crop is infected, yield losses are estimated to be between 10-20 per cent for plant crops and between 15-35 per cent for ratoon crops in Queensland[1].

This results in reduced productivity for growers and downstream impacts to harvesting contractors and milling companies, who are impacted by production and profitability.

The solution

For more than 30 years SRA has invested in research and testing to provide a solution for RSD via its pathology service. The subsidised service provides growers with a rapid assessment of the potential presence of RSD in plant material. If a positive result is detected, growers receive disease-free planting material and support from their local productivity services organisation to manage the disease.

1. Magarey, R. C., et al. "Incidence and economic effects of ratoon stunting disease on the Queensland sugarcane industry: ASSCT peer-reviewed paper." (2021).

SRA Pathologist Dr Rob Magarey (pictured top) discusses plant diseases with local growers at SRA's Tully station

SRA NEAR INFRA-RED SPECTROSCOPY (NIR)

SRA applies NIR technology to analyse characteristics of clones in breeding new varieties and is researching NIR applications for sugarcane disease detection and rapid, in-field soil and nutrient monitoring.

The problem

Australian milling companies are highly efficient at producing premium quality raw sugar for refining. Despite this, in an increasingly global competitive environment, companies are constantly seeking new technologies to reduce costs and maximise sugar retention.

Near Infra-Red Spectroscopy (NIR) is one such technology that offers a solution to reduce costs and increase productivity. NIR enables companies to undertake rapid analysis of the quality and characteristics of crushed sugarcane and to automate cane payments. In addition, NIR technology is used to improve maceration control, sucrose extraction, bagasse moisture content and to monitor mill mud constituents.

The solution

SRA invests in the provision of an NIR service to milling companies and completes research to extend the application of this technology. The service provides companies with an automated Cane Analysis System (CAS) that utilises SRA technology and an online NIR instrument to measure brix, pol, fibre, commercial cane sugar (CCS) and other parameters, every 10 seconds. The service automates this process for companies who would otherwise need to employ staff to manually perform this work. Moreover, it provides real time information that enables management of cane feedstocks and the fine tuning of milling processes.

SRA also invests in NIR research which is focused on maintaining the performance of the monitoring systems, expanding the application of the technology, and producing results that can inform both farming and milling practice improvement for productivity gains.

The impact

A benefit-cost analysis estimates SRA's NIR service and research delivers both wage cost savings and productivity gains valued at $965,000 and $2.6 million per year, respectively*.

For the total evaluation period of 2013-14 to 2022-23, the investment has delivered an estimated $45.6 million in net present value (60 and 40 per cent millers and growers) and a return on investment of 11.3 to 1 based on wage cost savings and productivity gains for levy payers.

Looking forward, SRA has invested in extending the CAS system calibration suite for potential RSD monitoring. Current development alongside the RSD in the mill project shows promise that the NIR can be calibrated against the loop-mediated isothermal amplification (LAMP) detection of RSD in mill juice from trials carried out at South Johnstone. SRA is also investing in portable MicroNIR technology for rapid, in-field application. The NIR team are currently developing starter calibrations for on-the-ground soil nutrient monitoring, sugarcane leaf nutrient estimation and non-destructive cane maturity evaluation.

**This estimate was calculated based on wage cost savings and productivity gains. For growers, productivity benefits arise from the accuracy and efficiency of NIR analysis and reduced cost to develop new cane varieties. For millers, benefits arise from wage cost savings and from faster analysis of fibre content of feedstock, which enables time to be allocated towards moisture testing thereby reducing energy costs.*

Manager Industry Services Operations, Dr Heidi du Clou (pictured right) demonstrates the handheld NIR at the recent Meringa Field Day.

For more information contact SRA's NIR team on (07) 4088 0707 or email hduclou@sugarresearch.com.au.

Use of disease-free planting material is one of the main strategies for managing RSD together with: sanitation of cutting equipment with a suitable sterilant, termination of diseased crops (as appropriate from a financial perspective), and elimination of volunteer diseased cane in fallow land.

In 2022, SRA's pathology service assayed more than 13,000 samples for RSD resulting in a mean incidence ranging from 1 to 25 per cent of samples diseased. Despite this, currently, only 40 per cent of growers use the service, and survey results suggest 69 and 52 per cent of growers and millers, respectively, are familiar with it.

The impact

A benefit-cost analysis estimates the service delivers a productivity gain of 5.3 per cent in avoided production losses from RSD. This equates to $15 million and $10 million to growers and milling companies, respectively, in annual economic benefits.

For the total evaluation period of 2013-14 to 2022-23, the service has delivered an estimated $328 million in net present value (58 and 42 per cent growers and millers) and a return on investment of 68 to 1 for levy payers. The analysis also identified environmental benefits from managing RSD including longer ratoon cycles, resulting in an increased time before replanting with less cultivation.

This estimate was derived from a comparison of yield with and without RSD based on a sample of regions. It calculated the cost of RSD in terms of production losses under the counterfactual scenario of no SRA service and the additional plant area infected, and current adoption of management practices.

Contact SRA's pathology service on (07) 4088 0707 or email Dr Rob Magarey on rmagarey@sugarresearch.com.au

REARING GREYBACK BEETLES

- TO EXPLORE ALTERNATIVE CANE GRUB CONTROL

A popular activity at SRA's recent Meringa Field Day was a tour of the entomology facilities to see ongoing research close-up.

Entomology Leader Dr Kevin Powell and Entomology Research Technician Dr Samuel Bawa treated visitors to the joys and challenges of tackling Greyback canegrub control.

Background

- Canegrubs attack sugarcane worldwide
- In Australia there are 19 native species of canegrub
- Canegrubs are the most economically important insect pest - costing the sugar industry an estimated $32 million to $59 million a year
- Greyback is the most common species and is found in several canegrowing districts.

Current control

- Since 2001 imidacloprid, a systemic insecticide belonging to a class of chemicals called neonicotinoids, has been highly effective
- Neonicotinoids are the only actives registered for use against canegrubs in Australia
- Neonicotinoids are under review by the Australian Pesticides and Veterinary Medicines Authority (APVMA)
- Future control alternative pesticide control options are being explored by SRA in collaboration with three agrochemical companies.

In November last year SRA put out a call for cane beetles – alive and active! Thank you, you delivered.

Methods

Screening of alternative pesticides (both chemical and biorational) to imidacloprid is done as follows:

YEAR 1-2

Laboratory pre-screening is done targeting Greyback canegrub larvae using three methods:

- Potted plants – to examine any systemic activity via the root system
- Carrot diet – to look at pesticide ingestion and contact effects
- Artificial diet (based on sugarcane root chemistry) - to look at pesticide ingestion and contact effects.

The laboratory screening determines (i) which pesticides to select for field trials and (ii) the optimal rate of application required.

YEAR 3-4

Field trials to determine:

- Efficacy of alternatives in the field and optimal field application rate and timing – compared to imidacloprid
- Product persistence in the soil on fig leaves
- Run-off properties.

STAGE 1

Healthy adult Greyback beetles collected from trees are kept alive and dispatched to the laboratories at SRA Meringa.

STAGE 2

The adults are placed in breeding cages. They are fed, examined to determine if they are male or female, allowed to mate and the eggs they produce collected. For laboratory trials several hundred eggs are needed.

STAGE 3

The eggs are incubated in hatching chambers under ideal conditions until they hatch into larvae. The larvae are then separated and incubated.

STAGE 4

Once the larvae are large enough they are placed in feeding chambers and reared on carrots. Because grubs are cannibalistic they have to be reared in individual chambers, otherwise they will eat each other!

STAGE 5

When grubs get to the right life-stage (called second instar) they are used in pesticide screening bioassays which can be on either carrot, artificial diet or in potted plants.

STAGE 6

Each treatment is carefully labelled and weekly measurements are made to see if the grubs are killed by the treatment.

STAGE 7

Sometimes treatment affects the grub size and weight so this is also assessed. These grubs are the same age. The grub on the left was treated with pesticide and is smaller than the grub on the right (which was only treated with water).

NEXT STAGE

Once all the treatments have been tested rigorously in the laboratory those that are reducing grub survival and development will be selected for field trial assessment.

RESULTS & CONCLUSIONS

- Pot and carrot trials are ongoing but some products are already showing promise with similar efficacy to imidacloprid.
- Some products reduce survival, food intake, activity and grub development.
- Once all laboratory trials have been completed and fully analysed, field trials will be established.
- The project will provide data to support potential registration of alternative products.

Australian Government
Department of Agriculture, Fisheries and Forestry

This project is being conducted in collaboration with a range of agrochemical companies.

INVESTIGATING LOW-COST IRRIGATION TOOLS

- CENTRAL DISTRICT PRODUCTIVITY PLAN

Finding and promoting low-cost irrigation management tools is one of the activities aimed at increasing the use of irrigation as part of the Central District Productivity Plan this year.

With an engineering degree under his belt, Central District Manager Dylan Wedel is well qualified and keen to assist growers with their irrigation systems and help them make more money with their water.

"With the help of District Delivery Officer Stephanie Duncan, I've been able to solve some irrigation problems for local growers with simple tools that are low cost and available off the shelf at their local hardware store, for example," Dylan said.

"We've also got Chameleon soil moisture probes available at SRA Mackay for growers to try before they buy," he said.

Wifi pump controller

"The home automation market has provided a range of simple devices that can easily be adapted to farming challenges.

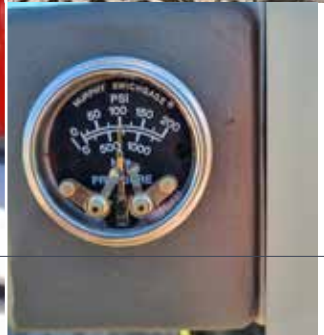
"These devices all communicate back through the GridConnect smartphone or tablet app which enables automation of the system," Dylan said.

"For example, in one trial, we used a four-button smart light switch to control a set

Wifi pump controller using a four-button smart light switch.

A mounted battery multi-purpose smart sensor.

An end of row sensor.



Murphy Switch pressure gauge.

of contactors that were then wired into the control circuit of an electric pump.

"Using GridConnect on a smartphone we could then activate the On and Off buttons, and even bypass the pressure switch and timer at start up to allow for a complete handsfree operation to run a pump. GridConnect also removes the need for a manual timer because a countdown timer can be set through the app to turn the pump off."

Battery powered multipurpose wifi sensor

"We've found a door/window alarm sensor which has the ability to be attached to any type of switch-based sensor e.g. to limit switches, float valves and auxiliary contactors in a pump starter," Dylan said.

"This provides a notification back to a smartphone when any of these are triggered. We've used one of these as an end of row sensor with a float switch that we could link to automation using the GridConnect app, turning the pump off when activated.

"This is also our main method of monitoring when a pump is started and stopped. A notification is received when an irrigation set is complete or if there has been an issue. We're also working on combining this with a frequency counter and rotary encoder to provide updates to a smartphone showing how quickly an irrigator is moving through the paddock."

Pressure switch gauge

"When I mentioned pressure switch gauges to growers at the MAPS/SRA Field Day in May, they would describe a big red Murphy switch, but these are becoming harder to come by and are relatively expensive. Digital alternatives have a similar cost. However, there are 50mm diameter gauges with a range of switch configurations and voltages available for around $200," Dylan said.

"These gauges when set correctly provide peace of mind that, if a pipe, rubber seal or hose burst, the pump will shut off and you won't end up with a flood.

"When it comes to the remote control of pumps, having a Murphy switch saves you from having to report pressure back to your phone. While your pump is running, it will only operate if the pressure is in an acceptable range. Currently, live pressure monitoring isn't conveniently available off the shelf at your local hardware store."

Chameleon soil moisture probe

"For less than $300, you can monitor soil moisture at three different depths as well as temperature, with readings being uploaded to a website every two hours," Dylan said.

"Having this information live at your fingertips allows for more timely irrigation to maximise growth before the crop is stressed. We've deployed a number of these across the district in different soil types. Daily stalk growth measurements have shown the optimum time for irrigation based on the data that the soil moisture probe displays.

"The crop draws down the moisture in the soil at an incredible rate - at one site it took only five days for the crop to draw the available water out of the top 75cm of soil after an irrigation."

Dylan Wedel with a Wifi extender, a solar-powered Wifi base station built for one of SRA's irrigation demonstration sites.

SRA Mackay has a Chameleon soil moisture probe (pictured) that growers can borrow on a 'try before you buy' basis.

NSW grower, Brendan Nash checks out the new RSD management booklet for Southern growers.

RSD EXTENSION PACKAGE FOR SOUTHERN GROWERS

Late last year, CANEGROWERS Rocky Point acted on the established priorities of SRA's Southern District Productivity Plan and undertook a Pest and Disease Management survey of commercial crops in the Rocky Point Mill area.

The particular focus of the survey was to determine the incidence of Ratoon Stunting Disease (RSD).

"The survey was important for Rocky Point growers to determine the true extent of RSD across sugarcane growing areas in the region. It was conducted by Morrisey Ag's John Panitz," District Manager Southern, Lisa Devereaux said.

John Panitz commented that the survey of commercial blocks of cane across the Rocky Point district comprised 16 varieties from all crop classes – plant through to old ratoon.

"In total 264 RSD samples were collected for this survey. Analysis of these samples showed that 27 per cent of the samples were positive for RSD."

SRA Pathologist Dr Rob Magarey evaluated the RSD results and its significant economic impact on productivity and profitability in a final report.

One of his key recommendations was to extend key RSD management information to the industry.

"This is essential if disease spread is to be limited and the economic outcomes to be mitigated," Dr Magarey said.

"Being so highly infectious, RSD requires a focused farm management strategy involving a number of concurrent strategies."

Dr Magarey advised that SRA had previously produced extension material for northern districts of the Australian sugarcane industry. These were specific regionally-based booklets describing the nature of the pathogen, transmission, management and economic effects.

As a result, *the Southern Region Ratoon Stunting Disease Extension Package for Growers and Contractors* booklet was produced for the 2023 season and was launched at the Rocky Point Productivity Day on 16 May.

The booklet emphasises disease-free planting material, strict sanitation and sterilisation, termination of heavily diseased crops and volunteer-free fallows.

Download a copy by visiting the SRA website's Ratoon Stunting Disease page or by scanning the QR Code.

DISTRICT PRODUCTIVITY PLANS - CURRENT PRIORITIES

INITIATIVE	COLLABORATORS	PROPOSED OUTCOME	STATUS – June 2023
Far North District Manager: Gavin Rodman grodman@sugarresearch.com.au 0476 807 355.			
Mulgrave and Mossman CCS Improvement Projects	CANEGROWERS Cairns Region, MSF Sugar and Mulgrave growers. CANEGROWERS Mossman, Far Northern Milling Pty Ltd, Mossman Agricultural Services and Mossman growers.	Improve CCS through monitoring and measuring crop indicators. Development of new datasets. Identification of management strategies. Identify the impact of current practices on CCS, including those impacting upon extraneous matter.	Mulgrave on-farm review complete. Pachymetra survey complete. Row profile sampling in Mulgrave and data review ongoing. Mossman project commenced in February.
Development of application parameters for ripeners	MSF Sugar, Far Northern growers.	Develop in-field parameters to support successful applications of sugarcane ripeners to improve profitability.	Year 1 results shared with Far Northern industry at SRA March update events. 2023 sites selected, treatments applied and monitoring ongoing. Strong linkages to CCS improvement projects.
Strategies for emerging weeds	Nufarm, Queensland Department of Agriculture and Fisheries, Federation University and Far Northern growers.	Investigate efficacy of herbicides registered for vine control and aerial application. Identify and develop germination protocols for itch grass to support pot trials. Develop management strategies for post-emergence of balsam pear, itch grass and navua sedge.	Year 1 results shared with Far Northern industry at SRA March update events. Balsam pear trial #3 complete. Other vine species trial complete. Navua sedge monitoring ongoing at two sites. Collection of itch grass seeds for germination protocol development underway.
North District Manager: Phil Patane ppatane@sugarresearch.com.au 0431 818 482			
Local Expert Analysis (LEA) South Johnstone	Innisfail Babinda Cane Productivity Services, Innisfail CANEGROWERS, local growers, MSF Sugar, Cassowary Coast Reef Smart Farming Project and local industry organisations.	A lift in productivity through improved management of Pachymetra root rot, RSD, plant nutrition (including Calcium, Silicon) and increased adoption and exploitation of higher yielding resistant varieties.	Constraints/opportunities identified through the LEA are currently being implemented through on ground activities in collaboration with growers, MSF, Innisfail CANEGROWERS and Innisfail Babinda Cane Productivity Services. Meeting to update on current progress with the core LEA group held in May.
Local Expert Analysis (LEA) Tully	Tully Cane Productivity Services Ltd, Tully CANEGROWERS, Tully Sugar.	Improved profitability through balanced crop nutrition, targeted use of mill by-products, automated mill alerts for poor yielding crops, better disease management, improved use of NIR to indicate crop status, and validation of Harvest Mate for optimising harvesting economic outcomes.	Currently conducting stakeholder engagement meetings to review Tully Productivity Plan.

INITIATIVE	COLLABORATORS	PROPOSED OUTCOME	STATUS – June 2023
Variety observation plot and CCS maturity profiling	SRA Plant Breeding.	Variety demonstration plot and CCS maturity profiling.	Completion of CCS maturity curve data analysis for standard varieties, newly released varieties, and accelerated clones for 2022 season. Data was presented at the 2023 Regional Variety Committee meeting, Herbert Field Day and published in the Herbert Variety Guide 2023/2024. Continuation of the CCS maturity curve sampling to be conducted during the 2023 season. First samples were collected during May.
Sterilisation unit for harvesting	Fire Suppression Services QLD PTY LTD.	Prototype automatic spray unit to clean a commercial harvester to minimise RSD transmission.	Unit installed and tested during the 2022 harvest season. Modifications currently being scoped and if successful a second unit will be installed to be tested in 2023.
Refining nutrient recommendations for ratoon crops following application of surface banded mill by-products to manage the effect on yield and CCS	Wilmar Sugar Australia.	Improved understanding of nitrogen requirements to manage CCS following application of mill by-products.	One trial implemented at the Orient - mud/ash was subsurface banded in fallow at 80 wet t/ha and then planted. Sampling of this trial to be conducted in June. Second trial to be implemented 2023 harvest season, banded application on ratoon cane.
Herbert temporal nitrogen trial	University of Southern Queensland.	Generating cane yield and nitrogen uptake response curves for different enhanced efficiency fertiliser (EEF) products.	Data compiled and presented during the off-season. Additional information was presented at the Herbert Field Day.
Burdekin District Manager Terry Granshaw tgranshaw@sugarresearch.com.au 0457 650 181			
Burdekin Irrigation Project (BIP)	Burdekin Productivity Service (BPS), Agritech Solutions, Farmacist, Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC), James Cook University, Department of Agriculture and Fisheries, North Queensland Dry Tropics, Wilmar and growers. In-kind from Sunwater.	Reduce energy costs, improve water costs and irrigation efficiencies. Measure water quality benefits. Modernisation of farming systems e.g. smart farming technology. Improve productivity/profitability which has a direct effect on environmental outcomes.	Burdekin Irrigation Field Day was held in April. Two of the sites visited were Burdekin Irrigation Project (BIP) demonstration sites. Presented preliminary results from one of the n sites to the grower. Presentations on the BIP were delivered at Mareeba and Mulgrave in February and Darwin at the Northern Australian Food Futures Conference in May.
Reducing herbicide usage on farm with precise weed control	Autoweed, James Cook Univeristy, Queensland Department of Agriculture and Fisheries.	Reduce herbicide use by comparing efficacy of weed control and evaluate economic savings.	A new trial site has been established to trial the equipment on two different herbicides. The new site has had initial data imagery collected. Department of Agriculture and Fisheries economics team have begun a case study on the Robotic Spot Sprayer to evaluate economic savings.
Burdekin phosphorous response trial	Wilmar and Burdekin Productivity Services.	Investigate P management for sugarcane crops growing in alkaline soils.	A second trial site has been established in the BRIA area. Site has had soil samples taken; nutrients applied subsurface preplant by way of a prescription application. Cane has been planted and has established well.
Mill mud/ash trials in outer regions of the district	Queensland Department of Agriculture and Fisheries	Measuring economic impact of applying low rates of mill mud/ash.	Trial plan developed, growers engaged, and mill mud ash pads established. No mud has been applied due to weather conditions and unavailability of spreading equipment.
Central District Manager Dylan Wedel dwedel@sugarresearch.com.au 0490 029 387			
Increasing irrigation utilisation	Productivity services companies, growers, Mackay Sugar, local water boards, government bodies.	Increase utilisation of irrigation to increase profitability and productivity. Note: Seeking more growers to work with in the irrigation space.	Demonstration sites have been established using low-cost scheduling and system control tools. Continuing to offer growers with system assessments/benchmarking using CaneCalcs, providing advice on irrigation system design/operation and ongoing support with irrigation scheduling. Working with stakeholders to develop a major irrigation utilisation project in the region.
Supporting complementary fallow cropping	Productivity services companies and growers.	Improve productivity by breaking the monoculture and profitability with a complementary cash crop.	The SRA soybean planter has been returned to service and is available to growers to trial complementary fallow crops. Several paddocks have been successfully planted to date – through trash, ratoon drills and cultivated beds. Two growers who used the planter have successfully taken their crop through to grain profitably.
Improving Early CCS: Variety observations	SRA Variety Development	Improve knowledge of varieties, particularly regarding early CCS and the impact of soil moisture on CCS.	Plots have been selected, soil moisture monitoring has been installed and fortnightly sampling has commenced targeting a suite of upcoming clones in SRA Variety Development's Final Assessment Trial program.
Improving Early CCS: Crop Ripener	Productivity services companies and growers.	Improve CCS when cane is harvested earlier in the season.	Assisting local growers to assess paddocks for the application of crop ripener to improve CCS. Samples from paddocks are collected and processed with the Mobile Maturity trailer to determine crop moisture to aid in decision making.
Southern District Manager Lisa Devereaux ldevereaux@sugarresearch.com.au 0456 590 497			
Local Expert Analysis (LEA) Bundaberg/Wide Bay	Productivity boards and mills.	Identification of unrealised industry constraints.	Initial phase is underway. Working with stakeholders to obtain nutrient management data. Soil and Leaf survey samples were obtained and waiting results.
Rocky Point Pest and Disease Management Surveys	Rocky Point Canegrowers.	Reduced impact of RSD and Pachymetra on farm. Further, extend and promote benefits of clean seed scheme and farm hygiene.	Rocky Point Productivity Workshop held - results of RSD and Pachymetra surveys presented to industry. The Southern RSD Management Plan launched.
NSW multi-year productivity program	NSW Agricultural Services NSW Sunshine Sugar	Improved profitability and productivity through various projects including harvesting 2yr cane to 1yr cane.	Discussions with NSW Sunshine Sugar on a productivity improvement program. Initial project scopes under negotiation.
Six Easy Steps Online Sugarcane Nutrient Management Program	DES Canegrowers	Enable all Australian sugarcane growers' access to nutrient management training that will improve the efficiency and productivity of their farms if applied.	Online training has been launched to all Australian sugarcane growers. Registration access available via SRA website.

RESEARCH PROJECT INVESTMENTS

PROJECT IDENTIFIER	TITLE	CHIEF INVESTIGATOR	RESEARCH AGENCY	END DATE
Research Mission 1: Continuous improvement in farming and milling profitability				
2017/002	Implementing and validating genomic selection in SRA breeding programs to accelerate improvements in yield, commercial cane sugar, and other key traits	Ben Hayes	The University of Queensland	1/10/2023
2018/005	Genetic analysis and marker delivery for sugarcane breeding	Karen Aitken	Commonwealth Scientific and Industrial Research Organisation	1/05/2023
2018/012	Pan design and operational changes to suit Australian pan stages operating on low pressure vapour	Ross Broadfoot	Queensland University of Technology	1/05/2023
2019/005	Improved strategies to process soft canes	Floren Plaza	Queensland University of Technology	1/05/2023
2019/007	Eliminating roll arcing	Geoff Kent	Queensland University of Technology	1/02/2023
2020/003	Maximising cane recovery through the development of a harvesting decision-support tool	Phil-Anthony Patane	Sugar Research Australia	1/06/2023
2022/201	Feasibility study of using mill waste streams by a 5 ha micro-algae facility for supplemental income	Craig Wood	Isis Central Sugar Mill Co Ltd	16/06/2023
2022/202	Optimising milling train extraction through added water control using online NIR cane and bagasse data	John Edwards	Tully Sugar Limited	1/06/2023
Research Mission 2: Position the industry to stay ahead of climate, environmental and biosecurity threats				
2017/809	Modern diagnostics for a safer Australian Sugar Industry	Chuong Ngo	Sugar Research Australia	1/02/2023
2017/901	Rural RnD4Profit - Forewarned is forearmed: managing the impacts of extreme climate events	Tom Davidson	Meat & Livestock Australia	29/04/2023
2018/010	Moth Borers - how are we going to manage them when they arrive?	Kevin Powell	Sugar Research Australia	2/01/2023
2020/002	Developing an integrated device for on-farm detection of sugarcane diseases	Muhammad Shiddiky	Griffith University	21/03/2024
2020/004	Beyond Imidacloprid - Chemical and Biorational Alternatives for Managing Canegrubs	Kevin Powell	Sugar Research Australia	31/01/2024
2020/007	Environmental DNA Technologies and Predictive Modelling for Rapid Detection and Identification of Sugarcane Priority Pests and Diseases	Andrew Weeks	EnviroDNA Pty Ltd.	1/06/2024
2020/008	Transformational crop protection – Innovative RNAi biopesticides for management of sugarcane root feeding pests	Neena Mitter	The University of Queensland	30/06/2024
2021/401	Research Award - Risk assessment for the newly discovered parasitic nematode *Pratylenchus parazeae* in the Australian sugarcane industry	Shamsul Bhuiyan	Sugar Research Australia	31/03/2023
2021/402	Towards more sustainable pest control strategies through a metagenomic survey of viral entomopathogens in canegrubs populations	Kayvan Etebari	The University of Queensland	1/05/2023
2022/002	Updating the Sugarcane Industry Biosecurity Plan	Stuart Kearns	Plant Health Australia	1/06/2027
2022/901	Agri-climate outlook	Danielle Skocaj	Agricultural Innovation Australia Limited	30/12/2024
Research Mission 3: Capitalise on changing consumer preferences, and the growing bio and green economies to develop diversification opportunities				
2020/101	Engineering bacterial enzyme secretion for cellulose utilisation	Madeline Smith	Queensland University of Technology	31/01/2023

PROJECT IDENTIFIER	TITLE	CHIEF INVESTIGATOR	RESEARCH AGENCY	END DATE
Research Mission 4: Position the Australian sugarcane industry as leaders in profitability, environmental sustainability and resource-use efficiency				
2020/001	Environmental Risk Assessment & Life Cycle Assessment of the Raw Sugar Manufacturing	Stephen Wiedemann	Integrity Ag & Environment Pty Ltd	28/02/2023
2020/017	A Common Approach to Sector-Level GHG Accounting for Australian Agriculture	Michelle Ford	Agricultural Innovation Australia Limited	27/02/2023
2020/802	Mackay Whitsunday Cane to Creek	Simon Clarke	Sugar Research Australia	31/10/2023
2020/804	Reducing herbicide usage on sugarcane farms in reef catchment areas with precise robotic weed control	Emilie Fillols	Sugar Research Australia	30/06/2024
2020/805	Increasing Industry Productivity and Profitability Through Transformational, Whole of Systems Sugarcane Approaches that Deliver Water Quality Benefits	Simon Clarke	Sugar Research Australia	30/06/2024
2021/008	Develop a Sustainability Framework for Australian Sugarcane and Sustainability Report in collaboration with stakeholders	Ingrid Roth	Roth Rural Pty Ltd	1/05/2024
2021/804	Mobilising the Murray	Simon Clarke	Sugar Research Australia	30/06/2023
2021/805	Soil specific management for sugarcane production in the Wet Tropics	Danielle Skocaj	Sugar Research Australia	23/04/2024
2021/806	DES122685 Sugarcane Nutrient Management Training	Lisa Devereaux	Sugar Research Australia	30/06/2023
Research Mission 5: Support the development of an adaptable, professional, commercial and entrepreneurial industry and research community				
2018/015	Sugar Milling R & D Capability Building Program	Geoff Kent	Queensland University of Technology	30/09/2023
2019/102	PhD Scholarship - Genetic solutions for determining fibre quality traits in sugarcane	Angela O'Keeffe	The University of Queensland	30/06/2023
2019/806	Advancing techniques for diagnosis of yellow canopy syndrome	Kevin Powell	Sugar Research Australia	25/06/2023
2021/101	Optimising mill mud and ash applications for soil improvement and carbon sequestration	Hannah Green	James Cook University	30/04/2025
2021/102	Systems biology for sustainable agriculture: evaluation of plant growth-promoting bacteria to produce high-performing biofertilisers	Ian Petersen	The University of Queensland	30/04/2025
2022/101	A novel biosensor device for on-farm sugarcane disease diagnosis	Simon Strachan	Griffith University	29/02/2024
2022/401	Harnessing the SynBio potential of Australia's stingless bees, the first step.	Natasha Hungerford	The University of Queensland	14/03/2024
2022/402	Genomic prediction of ratoon yield robustness	Eric Dinglasan	The University of Queensland	14/03/2024

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