Sugar Research Australia

Cane Matters

Winter 2024

CONTENTS

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(Cover page) Mulgrave grower Andrew Greenwood (Right) and SRA District Manager Far North, Gavin Rodman (Left).

Editorial contributions by Sonia Campbell, Christine Walker, Alisa Cork and Mike Ebner. Design by Eli Lin.

Acknowledgements: *SRA acknowledges and thanks its investors, including levy payers (sugarcane growers and millers), the Commonwealth Government and the Queensland Government.*

Queensland Government

Australian Government
Department of Agriculture, Fisheries and Forestry

A MESSAGE *from our Interim Chief Executive Officer*

This is a time of exciting new developments for sugarcane growers and the sector as a whole.

I congratulate Dr Nathalie Piperidis, SRA's Cytogeneticist based at Mackay station, who is part of the collaborative team that has cracked the genetic code of a modern sugarcane cultivar called R570.

This is exciting news – the sequencing of the sugarcane genome is very significant, given its amazing complexity.

Research Showcase provides industry ownership of R&D plan

SRA held a Research Showcase in March to provide industry with an overview of the draft research and development plan for 2024-2034. This gave the sugarcane industry an opportunity to comment and provide feedback into the final R&D plan.

Participants included growers and millers, other stakeholder groups, state and federal Departments of Agriculture, the SRA Board and staff, and the SRA Research Funding Panel.

SRA invests in research on behalf of levy payers, growers and millers, the Commonwealth Government and in partnership with the Queensland Government.

Presentations summarising that research were given by SRA researchers and research managers, including the issues which the R&D plan sought to address. The highlights are outlined in this edition.

Discussions after each presentation were facilitated by members of the Research Funding Panel.

The Research Showcase was an initiative designed to facilitate industry participation and ownership of the Ten-Year Plan.

Final Independent Performance Review Report released

Last year SRA contracted professional services company, GHD, to conduct an Independent Performance Review of the organisation as required under the terms of SRA's Statutory Funding Agreement with the federal Department of Agriculture, Fisheries and Forestry.

The review identified 20 recommendations for improvement, covering areas such as stakeholder engagement, research investment, collaboration with partners, and governance.

SRA has sent an Executive Summary and copy of the full report to growers, milling company representatives and other industry stakeholders.

Over the coming weeks, SRA's senior management team will review and prepare a plan outlining actions we will undertake in response to the recommendations.

I thank industry stakeholders and staff who provided feedback to the review and encourage you to read the final report, which is now available on the SRA website: sugarresearch.com.au/independent-performance-review-report/

Shaun Coffey
Interim Chief Executive Officer

2024 DISTRICT PRODUCTIVITY PLANS

Sugar Research Australia's District Productivity Plans have been updated and are now available on-line.

Development of the plans has involved participants across the sugar industry supply chain to identify constraints impacting productivity and profitability at a local level.

Different sources of data have been used as inputs including grower ideas and contributions from past strategic workshops held with SRA, the ABARES Sugarcane Farm Business Survey, milling data, impact assessments (where applicable) and a variety of survey results.

The plans highlight region-specific issues with proposed solutions and action to address them. They are reviewed annually, and reporting on progress occurs every six months.

Copies of the plans for Southern, Central, Burdekin, Herbert, Tully, South Johnstone and Far North are available for download on SRA website: sugarresearch.com.au/resources-and-media/district-productivity-plans/

THE MISIDENTIFICATION OF SRA34Φ

In the week commencing 20 May, SRA established that the variety SRA34Φ was in fact, genetically identical to KQ228Φ and therefore the same variety.

This creates challenges for some productivity services organisations (PSOs) who now have more KQ228Φ in their Approved seed pipelines than planned, and results in some growers having on-farm propagations of KQ228Φ instead of what was supposed to be a new variety.

SRA immediately contacted the directly impacted PSOs and the four growers who ordered SRA34Φ tissue culture from SRA. We then began working with those directly impacted to understand the implications and to identify appropriate remedial actions.

The DNA fingerprinting procedure was reviewed, and the root cause of this unusual issue was identified. Two changes to the procedure have since been implemented to remove the risk of a similar issue happening again and to prevent a misidentification being perpetuated over time.

Status of SRA34Φ

SRA34Φ was approved for release by the NSW Regional Variety Committee (RVC) in 2021 and by the Southern and Burdekin RVCs in 2022. Performance information was included in the Variety Guides showing agronomic performance and productivity were competitive with KQ228Φ and the disease resistance profile was generally equivalent. The visual similarity of the two varieties has been a subject of significant discussion and is noted in the guides.

Approved seed of SRA34Φ has been supplied to growers by PSOs in the Condong, Rocky Point, Maryborough and Bundaberg mill areas. A total of 20,416 tissue culture plants have been delivered or were in the process of delivery to PSOs and individual growers including in the Burdekin. SRA34Φ has been propagated in Approved seed plots for commercial supply to growers for 2024 planting in the Burdekin, Southern region and NSW. The variety was in Final Assessment Trials in the Central and Northern regions and is at an earlier stage of testing in the Herbert.

Context

Cutting the wrong sample from field plots is a recognised risk in plant breeding and Approved seed production, and mix ups also happen on farm. A range of procedures are in place to minimise the risk and to identify when mistakes occur. Highest on the hierarchy of controls is DNA fingerprinting, which has successfully identified mistakes in the breeding pipeline and in Approved seed plots before impacting growers.

In 2023, there were 1,846 samples processed for DNA based variety identification. Some samples are from routine quality control, and many are triggered by concerns about identity, so the results are not an estimate of error rates across the industry. Last year, 10 percent of samples from growers and PSOs were not the expected variety, and five percent of samples from SRA identified a mistake in trial plots or propagations. DNA fingerprinting has been used for over 20 years and has proven to be a very useful tool.

Actions taken

Directly impacted PSOs and growers who ordered SRA34Φ tissue culture from SRA were immediately contacted and advised of the situation. All SRA34Φ in trials, propagations, distribution plots and commercial production will have its name changed to KQ228Φ. This material is valid for ongoing use and SRA is working with those that now have a problematic oversupply of KQ228Φ.

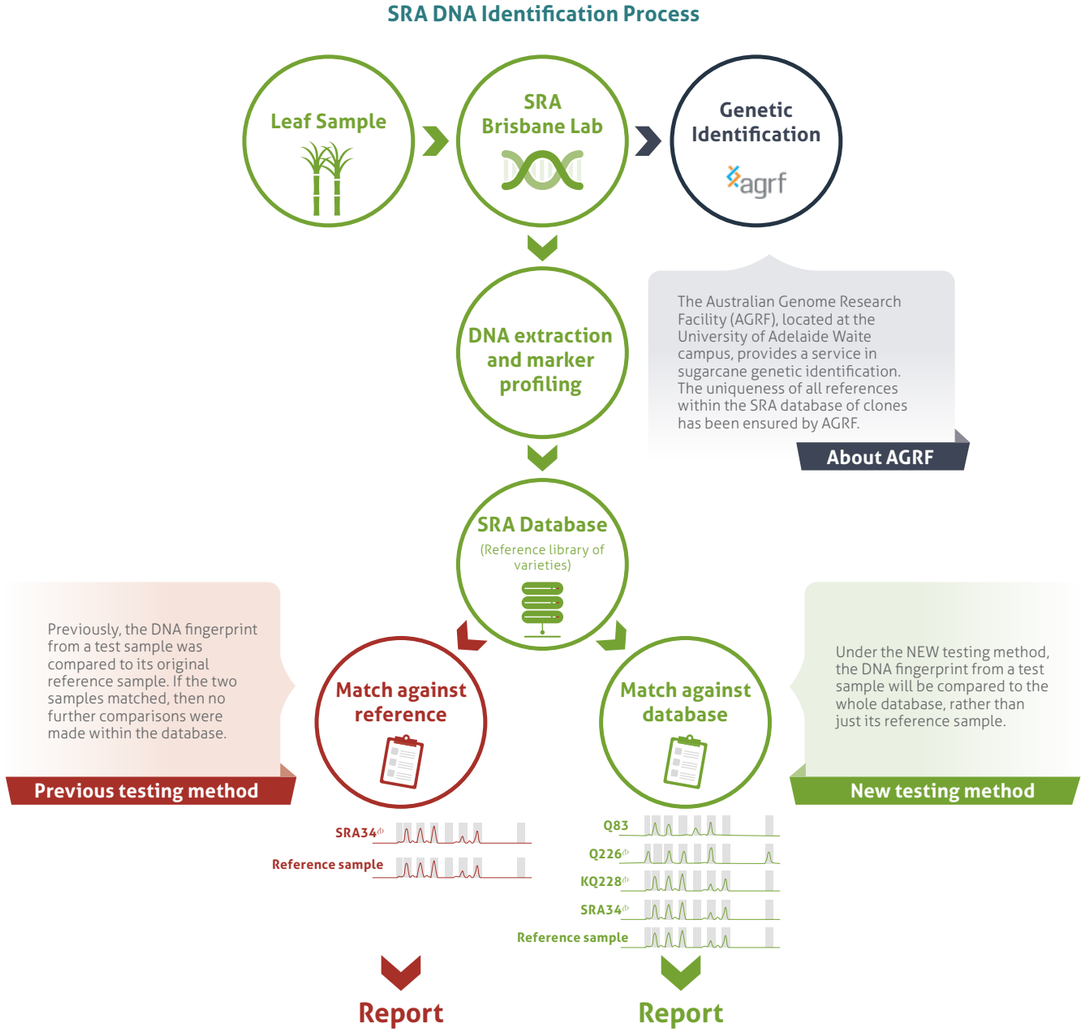
The SRA34Φ selection history, DNA test history, and the variety identification procedure were reviewed. SRA34Φ had been tested with DNA fingerprinting on 32 occasions and was never identified as a match to KQ228Φ.
Root cause analysis demonstrated the misidentification came from a unique mistake made in the analysis of the first reference sample by the Australian Genome Research Facility in 2018. The result returned to SRA was that clone QS09 -7888 (subsequently released as SRA34Φ) had a unique genetic fingerprint when compared to all other varieties and experimental clones in the database.

The experimental clone had been mistakenly replaced prior to 2013 by KQ228Φ and this test should have identified the mix up. In future, any sample that shows close similarity to an existing variety will trigger manual investigation and a meeting to discuss the results.

A second limitation was identified that allowed the misidentification of SRA34Φ to continue over time. The first step in the query structure was to determine if the sample matches to the reference for that variety. If there is a match, then the sample is identified, and the query goes no further. In the case of SRA34Φ the reference was mistakenly a sample of KQ228Φ. The query structure has been changed to now test the genetic fingerprint of the unknown sample against the entire database. If this had been in place previously, SRA34Φ would have been identified as KQ228Φ the second time it was tested rather than masquerading as a new variety for several years.

Two online meetings were held with members of the six Regional Variety Committees in the week of 27 May and a face-to-face meeting of the Southern Regional Variety Committee was held on 12 June. This consultation has supported a collective understanding of the issue, impacts and actions to be taken.

Direct communication with SRA members and publication in *Cane* ***Matters*** are aimed at providing information to the broader industry. Information is also being prepared to support SRA and PSO staff in explaining the revised DNA fingerprinting process for shed meetings and grower events.



For further queries or more information, contact your local Variety Officer:

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Head of Evaluation, Planning and Reporting Ben Simpson, Head of Internal Audit, Compliance & Risk Calli Silva and Company Secretary Assistant Breanne Lancey reviewing the Report from GHD.

RELEASE OF SRA INDEPENDENT PERFORMANCE REVIEW

Last year, SRA contracted professional services company, GHD, to conduct an Independent Performance Review as required under the terms of SRA's Statutory Funding Agreement with the Federal Department of Agriculture, Fisheries and Forestry (DAFF).

The aim of the review as agreed upon by SRA and the Department, was to:

- Evaluate SRA's performance against the requirements of SRA's Statutory Funding Agreement and the Australian Government priorities
- Evaluate SRA's performance against the Performance Principles that accompany the Guidelines for Statutory Funding Agreements for Rural Research and Development Corporations (RDCs)
- Assess the implementation of actions based on feedback and recommendations from previous reviews
- Engage with levy payers and stakeholders during the review process.

The review has now been completed and the Independent Performance Review Report is available on SRA's website.

The review identified 20 recommendations for improvement, covering areas such as stakeholder engagement, research investment, collaboration with partners, and governance.

Over the coming months, SRA will thoroughly review and prepare a plan that outlines the actions we will undertake in response to the recommendations. SRA will communicate this plan to industry and government stakeholders in August.

SRA wishes to formally thank all sugarcane growers, milling company representatives, industry representatives, government stakeholders, and research partners who provided feedback to the review.

The Final Independent Performance Review report is available for download from the SRA website: sugarresearch.com.au/sugar_files/2024/05/SRA-Independent-Performance-Review-2023-24-Final-Report.pdf

INSPIRING THE NEXT GENERATION OF SCIENTISTS

The next generation of researchers is being inspired to join the world of sugarcane industry science and technology by applying for SRA 2024/2025 Sugar Industry Research Awards and Sugar Industry Postgraduate Scholarships.

Both programs encourage innovative research projects and aim to enhance the research capability of the Australian sugarcane industry.

SRA Research Mission Manager, Dr Muyiwa Olayemi, said the Research Awards enabled participants to undertake small projects which demonstrate clear benefits to the sugarcane industry. These projects can then be used to develop research skills or to explore new and innovative ideas about issues affecting the industry.

In addition, Dr Olayemi said the Sugar Industry Postgraduate Research Scholarships (SPRS) enable qualified graduates to undertake Research Doctorate or Research Masters study to facilitate research and training in areas of value to the sugarcane industry.

"These programs encourage innovative thinking and allow participants to contribute positively to the Australian sugarcane industry," Dr Olayemi said.

"Through the Research Awards, projects may be used to develop research skills or explore new and innovative ideas. The objective of this program is to help provide a catalyst that could result in great potential R&D opportunities.

"We encourage existing or prospective sugarcane industry researchers to apply for these excellent opportunities to advance their career."

SRA invests significantly in industry capability with the ongoing future success of the sugar industry dependent upon improving the capability of new and existing industry employees.

Applications for the 2024 Sugar Industry Research Awards and 2024 Sugar Industry Postgraduate Research Scholarships (SPRS) are now open and will close 31 August 2024.

For more information contact Research Mission Manager, Dr Muyiwa Olayemi on 0477 327 534 or email molayemi@sugarresearch.com.au or visit SRA website:

sugarresearch.com.au/research/awards/

sugarresearch.com.au/research/postgraduate/

10TH ANNIVERSARY RESEARCH FUND

The 10th Anniversary Research Fund is now in its final stages.

The fund will provide $16 million over the next three to four years to foster greater collaboration across the whole research sector; build more engagement with and delivery to industry; and to increase research and development activity in the industry.

Research submissions that will go forward to Stage 2 of the Call (full proposals) have now been identified, with new projects expected to commence by September this year.

SRA DIRECTORS' SELECTION COMMITTEE SEEKS BOARD CANDIDATES WITH INDUSTRY EXPERIENCE

SRA is seeking to appoint a Chair and two non-executive directors to its Board at the Annual General Meeting planned for November.

Directors Selection Committee Chair, Dr Saranne Cooke, encouraged experienced individuals from the sugarcane industry to consider joining the Board of Directors.

"SRA is committed to driving innovation and excellence in the Australian sugarcane industry through strategic research and development initiatives," Dr Cooke said.

"The Board plays an integral role in shaping the future of this vital industry."

The SRA Director Selection Committee is seeking directors with expertise and knowledge in sugarcane processing; national and international research and development, technology/technology transfer, commercialisation and adoption; and/or administration, prioritisation, oversight, and monitoring of research and development.

Governed by a skills-based board of seven directors, the majority of whom are independent, SRA focuses on approving strategic and operating plans, reviewing company performance, and leveraging expert advice from the SRA Research Funding Panel for the contestable investment of the SRA Research Funding Pool.

Candidates for the role of Chair must also have an understanding of the agribusiness sector, and experience chairing a board of a corporation or governance body.

Once the recruitment process has been completed by the Director's Selection Committee, new directors will be voted in at SRA's Annual General Meeting, expected to be held in November.

SRA FINALISES R&D PLAN AFTER INDUSTRY CONSULTATION

SRA has finalised its Ten-Year Research and Development (R&D) Plan (2024-2034) following extensive consultation with industry and government stakeholders.

In March this year, SRA held a two-day forum designed to present the content of a draft R&D plan and gather feedback from industry. Representatives from grower associations, mills, research partners, and government agencies participated in the forum, offering valuable insights. Additionally, written submissions were received from stakeholders unable to attend.

"The genesis of our inaugural Research Showcase came from feedback from the industry that they didn't feel they had enough ownership of our research and development plan," said Interim CEO Shaun Coffey in the opening moments of the Showcase.

"The purpose of the showcase is to feed back to you what we've been hearing and some of the ideas that we've been gathering, to test that against your knowledge of the industry and the purpose of the industry to help us to shape a plan to guide us into the future. We need wide industry agreement on our research and development objectives for the plan."

Five SRA researchers on behalf of their teams gave presentations about the research done to date, the issues addressed and the priorities ahead. An industry discussion was held after each program session, facilitated by research funding panel members.

Feedback from the industry

A full summary of the feedback from industry after the two days is available on the SRA website.

"The plan has been put together by SRA researchers, grower, millers and government representatives," Mr Coffey said. "Things change and the Plan can be adjusted where necessary in the days ahead.

"SRA is committed to running a research forum on a yearly basis to close the consultation loop," he said. "The next event will be held in Townsville in March."

Accessing the R&D Plan

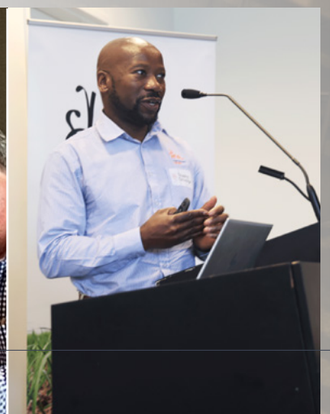
SRA's Ten-Year R&D Plan (2024-2034) is available for download from the SRA website: sugarresearch.com.au/sugar_files/2024/06/SRA-10-Year-RD-Plan-2024-2034.pdf

Full details of the future research directions for each program can be found in the plan.

Jeremy Burdon, Chair SRA Research Funding Panel, Xianming Wei, Variety Development Manager Burdekin, and Shaun Coffey, Interim CEO.

A diverse range of industry stakeholders participated at the inaugural Research Showcase in Brisbane.

Dr Tinashe Chiurugwi presents on behalf of the Research and Business Development team.



Varieties – Create the potential

SRA General Manager Variety Development, Dr Jason Eglinton gave an overview of the progress of SRA's breeding program from 2017-2024.

The presentation included data on seed sales for new varieties, and different technologies that have been developed to improve the performance of the breeding program including DNA-based selection for smut resistance; a tissue culture 'fast-track' strategy for special crosses which takes three years off the 'cross to release' pathway; and genotyping and genetic analysis which will ultimately become genomic selection.

The three priority areas for the breeding program going forward, outlined by Dr Eglinton, are:

Priority 1: New traits, tools and talent to support step change improvement in plant breeding

Priority 2: Creation of new varieties with improved production and processing performance

Priority 3: Support correct variety adoption decisions through performance information, grower engagement and availability of planting material.

Agronomy and farming systems – Achieve the potential

Manager of Translation Research at SRA, Research Agronomist, Dr Barry Salter, emphasised the importance soil condition has on farm performance and regional cane supply during his presentation.

Past SRA agronomy research has included work on farming systems, nutrient management, soil health and crop management e.g. controlled traffic, trash blankets, fallow crops, fertiliser application, and soil ameliorants including mill by-products.

In the past 10 to 15 years there has been a strong focus on nitrogen use and management. However, there is a need to refocus on other management issues. As an initial step, a new project looking at phosphorus management in alkaline soils has commenced.

An industry-wide leaf and soil survey was also undertaken to find out if the industry has hidden macro and micronutrient constraints that should be addressed.

The agronomy and farming systems section of the new R&D plan focuses on the large number of research issues that will help growers in terms of a one to five percent improvement. The priorities are:

Priority 1: Optimise agronomic inputs

Priority 2: Improve sugarcane soil condition

Priority 3: Integrate data, technology and innovation

Priority 4: Sustainable production.

Crop protection
– Safeguard the potential

Pests and disease cost the sugarcane industry between $25 and $80 million each year.

Speaking on behalf of the SRA crop protection research team, Weed Scientist Emilie Fillols explained the huge burden to the sugarcane industry and impressed the need to continue working hard to identify safeguarding measures.

Ms Fillols listed the canegrub and soldier fly as the top two insect pests, whilst the top troublesome weeds were grasses and vines. Pachymetra root rot and Ratoon Stunting Disease (RSD) were the top diseases.

"Current techniques to control pests such as insects and weeds are mainly chemical strategies, and they come with off-target impacts and regulation," Ms Fillols said.

"In contrast, diseases in sugarcane can be mitigated by a combination of tolerant sugarcane varieties and the implementation of robust integrated disease management practice."

Emilie outlined the priorities of the proposed SRA crop protection strategies in the R&D plan:

Priority 1: Sustainable management of pests

Priority 2: Sustainable management of weeds

Priority 3: Sustainable management of pathogens

Priority 4: Biosecurity preparedness

Priority 5: Data and emerging technology.

Milling and processing
– Deliver the potential

The milling sector has been under extreme financial pressure over the past 25 years, impacting annual investment in maintenance and capital needed to stay in business, said SRA General Manager Industry Services Hywel Cook.

"Inadequate investment eventually impacts on operational performance – higher lost time and a reduction in sugar recoveries," Mr Cook said.

"None of this is easy to turn around as capital investment requirements are high.

"It may seem like change in the industry is slow but the equipment we are installing now is different to what it was 30 years ago. It is designed, researched, developed, engineered and built in Australia and has not only been installed here, but overseas.

"Our R&D and knowledge is really good in this sector."

Priorities for the future are:

Priority 1: Optimised operations for enhanced milling efficiency

Priority 2: A highly skilled and professional workforce.

Priority 3: Opportunities for a diversified income.

Adoption
– Reach the potential

Terry Granshaw, District Manager, Burdekin, has had multiple experiences in adoption of practice change in a range of disciplines across the sugarcane industry.

He was a sugarcane grower for many years in the Burdekin where he adopted the Sugar Yield Decline Joint Venture 1 principles on the family farm, breaking the monoculture by introducing legume fallow cropping systems, reduced compaction by introducing control traffic and adopting green cane harvesting and minimum tillage.

"The holistic farming system approach is very successful," Mr Granshaw said.

"The principles are really quite simple. The economic benefit is huge."

Terry and his family were also harvesting contractors for several years.

"We converted our machinery following best practice, adopting control traffic and GPS guidance."

Terry also worked for six years as an extension officer for a local productivity services company where he was involved in helping extend good farming practices to growers.

"There's nothing better than helping growers apply knowledge from research to their businesses and creating profitable outcomes."

Terry said that as a district manager he was now able to formulate adoption strategies.

"When you talk to someone about adoption, they say it's something growers have got to do, but it's not. It's a concerted effort across the industry," Mr Granshaw said.

He outlined the program's priorities:

Priority 1: The right information

Priority 2: Regional approaches

Priority 3: Industry transformation.

TEN-YEAR R&D PLAN

Purpose: SRA assists the Australian sugarcane industry to be competitive, productive and sustainable through innovative research and development.

Vision: We deliver industry benefit - a trusted partner shaping the future prosperity of the Australian sugarcane industry and regional communities through innovation and ingenuity.

The R&D programs outline what we aim to deliver:

1. Varieties: Creating the potential
2. Agronomy and farming systems : Achieve the potential
3. Crop protection: Safeguard the potential
4. Milling and Processing: Deliver the potential
5. Adoption: Reach the potential

Five key principles guide our approach:

1. A focus on the long-term – consistent effort over 10 years
2. Promote adoption (R&D + E = A) – working together across the industry
3. Future ready – investing in data integration, emerging technologies and new bioproducts
4. Research capability – investing in world-leading researchers and infrastructure
5. Collaboration – combining expertise, approaches and resources.

"The whole reason for the breeding program is to improve the productivity and the profitability of the growers and the millers, because every sector of the industry needs to be profitable." **Dr Felicity Atkin, SRA Variety Development Manager North**

NEW VARIETIES **RELEASED IN 2024**

Three new varieties from Sugar Research Australia's plant breeding program were approved for commercial release in 2024 - in the districts of Herbert, Southern and New South Wales (NSW).

SRA43 (Herbert), SRA44 (Southern) and SRA45 (NSW) were all given the green light for commercial availability following Regional Variety Committee (RVC) meetings held in each growing region earlier this year. Additionally, SRA32$^{\phi}$ was approved for Central region and SRA40$^{\phi}$ was approved for NSW.

"Each region's RVC assesses the commercial merit of clones and checks if they meet their local biosecurity obligations," SRA Variety Development Manager North, Dr Felicity Atkin explained.

"Because it's everyone's responsibility to make sure the varieties that are grown commercially do not pose a disease risk to industry.

"However, at the same time, it's not just about the disease ratings that each RVC considers. It's also the productivity traits, agronomy traits that affect management decisions, harvestability and millability of each clone. Does the clone fill a current commercial gap?

"The whole reason for the breeding program is to improve the productivity and the profitability of the growers and the millers, because every sector of the industry needs to be profitable."

"By having grower and miller representatives involved, it's giving the sugar industry ownership and accountability over the variety release process, to make sure each variety will work for everyone."

Stringent selection process

SRA's breeding program is the cornerstone of SRA's extensive portfolio of research activities.

And while the industry - in particular those representatives involved in the RVCs - are familiar with the final stages of the selection process, there is at least 10 years of work that happens behind the scenes to get an elite clone to the point of where it is introduced to the RVCs.

This rigorous process includes selecting parents and making crosses, selecting seed to establish the first stage of the selection program, selecting high performing families and individuals to progress to the first clonal stage, and then onto the final stage where SRA establish trials on commercial farms across each region.

Throughout each selection stage, families and clones are assessed for productivity traits (cane yield, CCS, fibre content), agronomic traits visually, natural disease infection and ratoonability. They are also tested for disease resistance, fibre quality and sugar quality measurements.

At the same time a selection index is used to assess all the traits measured simultaneously to evaluate how productive and profitable a clone is relative to commercial standard varieties for each region.

"During the season we are busy collecting all the data we need to assess a clone, including productivity and pathology data. Plus, we are busy planting trials and propagations so the breeding process can continue," Dr Atkin said.

"Then, at the end of the season we are busy collating, analysing and critically reviewing the performance of the clones against our commercial benchmarks. The data is summarised and prepared in a way that we can communicate it to the RVCs, including the grower and miller representatives for voting.

"This is done in the most transparent way, so each RVC can make the most informed decision on whether these clones proceed through the variety progression towards commercial release or, for the most advanced clones, whether they are approved for commercial release."

Rigorous review process

Prior to the six RVC meetings held across the industry, SRA's breeding team gathers for an internal selection meeting where each clone is critically reviewed and 'pressure tested'. This review took place over three days in Bundaberg in March.

"We have a pre-RVC meeting to make sure we are doing the clones justice and we are not only being transparent with the information that we are providing, but we are giving the RVCs the most meaningful information," Dr Atkin said.

"The clones and varieties presented at each RVC vary in terms of how far away they are from commercial release. Everything from elite clones, where we are identifying whether we start the bulking up process towards commercial release hopefully in two years' time, through to clones which are on the launching pad ready for a release decision."

Pictured far left (L-R) SRA General Manager Variety Development, Dr Jason Eglinton, SRA Northern Variety Officer Andrew Rigby, SRA Variety Development Manager North, Dr Felicity Atkin and Cane Productivity and Development Manager, Tully Sugar Limited, Greg Shannon at the Northern RVC meeting.

(Left) The Northern RVC met in Mulgrave in April.

2024/25 SRA Variety Guides out now

Different varieties are chosen by growers to manage individual disease risks and challenges on their farms, while maximising their profitability.

Each year SRA publishes Variety Guides summarising the varieties recommended in each region, including each variety's productivity data, disease resistance profiles, agronomic characteristics, herbicide toxicity information, and maturity curve to support growers' selection of varieties to plant for future commercial production on their farms.

Most of the 2024/25 SRA Variety Guides have now been updated and are available online. Keep an eye on your mailboxes for your printed copy - if you haven't already received one.

Variety Guides are available on SRA's website: sugarresearch.com.au/growers-and-millers/varieties/.

SRA26$^{\phi}$ – THE NEW BENCHMARK IN NORTHERN SRA TRIALS

When SRA26$^{\phi}$ was first approved for commercial release in the North in 2019, and then the Herbert the following year, it was touted by SRA's plant breeding team as "one to watch".

There were high expectations for the variety right from experimental phase. It showed great promise as it progressed through the variety development pipeline as clone QN08-2282, including its debut in Final Assessment Trials (FATs) conducted in the North and Herbert in 2014.

Fast forward 10 years, we ask, has SRA26$^{\phi}$ lived up to expectations? Commercial observations and milling data would suggest yes. But ultimately, the figures speak for themselves.

Five years since its commercial release, SRA26$^{\phi}$ is now one of the most widely planted varieties across the Northern coastal cane growing regions. And, with its string of desirable agronomic characteristics, it's likely the strong market performer will continue to prosper.

Like any variety, SRA26$^{\phi}$ does have its weaknesses. SRA District Manager Herbert, Phil Patane says recent commercial observations of the variety have indicated that it does not perform as strong on low-lying and waterlogged blocks.

"Put in the right productivity environment – well-drained soil, blocks you know you are going to cut early to mid season (particularly if a wet end to the harvest season is predicted) - SRA26$^{\phi}$ can perform really well," Mr Patane explains.

"But, put in the wrong productivity environment, it can impact its performance."

Strong disease resistance

Where SRA26$^{\phi}$ excels is in its superior disease resistance profile. At the time QN08-2282 was progressing through its development phase as an experimental clone, Northern and Herbert growers had already lost a lot of their productive Pachymetra resistant varieties due to their susceptibility to smut.

SRA26$^{\phi}$ has since filled a significant void for growers looking to minimise their yield losses due to disease pressures. Not only is it resistant to all major diseases present in the Herbert and Northern coastal growing regions, it is also commercially competitive.

"Our three major diseases in the Herbert region (and the North), Pachymetra, smut and leaf scald, it is resistant to all three," Mr Patane said.

Strong productivity traits

SRA26$^{\phi}$ provides excellent canopy closure, even in wider rows for good weed control. It offers a combination of desirable productivity traits that results in higher sugar yields relative to Q208$^{\phi}$, another reason it has been a popular choice for sugarcane growers across the North.

In favourable weather conditions, initial maturity testing suggested SRA26$^{\phi}$ was best harvested mid-to-late in the season to maximise its CCS, similar to Q200. However, recent commercial data shows SRA26$^{\phi}$ can be harvested the whole season with commercial CCS results above mill average across the season if harvested at a minimum of 12 months of age, but avoiding late season harvest if experiencing wet, waterlogged conditions.

SRA26$^{\phi}$ does not arrow or sucker readily making it an option to harvest later in the season in years where conditions are conducive to heavy arrowing and/or suckering, or in seasons which are forecast to finish dry. It has exhibited similar ratooning ability to Q200 and Q208$^{\phi}$, but caution should be taken if an early onset wet season is forecast as cutting SRA26$^{\phi}$ last harvest round may impact its ratoonability especially in low-lying or waterlog-prone blocks.

Some harvesting challenges

SRA26$^{\phi}$ can have good presentation to the harvester but it has been known to lodge in very high yielding crops and its trash may pose slightly more challenges for harvesting than other varieties.

"It's a trashy variety. I'm not going to question that," Mr Patane said.

"However, the beauty of it being a trashy variety, is you've got very good ground coverage. And the benefit of that is it closes in early.

"I have had feedback that the plant crops are very large, people do have issues with harvesting, but at the end of the day I'd prefer a large crop in front of the machine."

The new benchmark

SRA Northern Variety Development Manager, Dr Felicity Atkin said SRA26$^{\phi}$ was now considered the new benchmark to beat in Northern SRA variety trials.

"Initial commercial data of SRA26$^{\phi}$ is very impressive and we will be keeping a keen eye on its performance this year where we start to see large volumes of second ratoon commercial results. This will be its first big test," Dr Atkin said.

"While it might have some challenges with harvesting on occasion, it is more productive for all of the supply chain - the grower, the contractor and the miller. And its commercial data supports the yield advantages we continue to measure in our FATs.

"This is one of the reasons we are now using it as a commercial standard in our trials, and we have been since the 2022 Clonal Assessment Trials (CAT) and FAT series. It is setting a higher benchmark for us to beat in the breeding program compared to using Q208$^{\phi}$."

More info on SRA26$^{\phi}$?

If you would like more information on SRA26$^{\phi}$, the most up-to-date variety trial results are available in both the SRA26$^{\phi}$ Variety Factsheet and the Northern and Herbert Variety Guides. Mill productivity data can also be found in the Variety Guides.

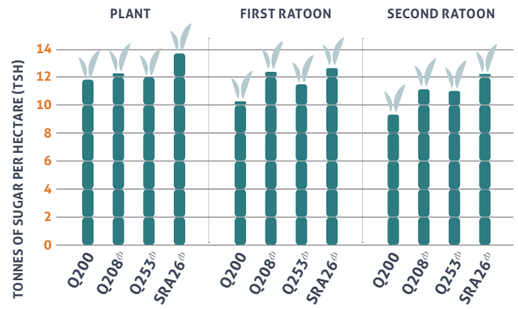


***Figure 1** - 2023 productivity results from MSF Sugar's Mulgrave mill which highlights SRA26$^{\phi}$'s sugar yield advantage over their three major varieties, Q200, Q208$^{\phi}$ and Q253$^{\phi}$, when considering individual crop class performance.*

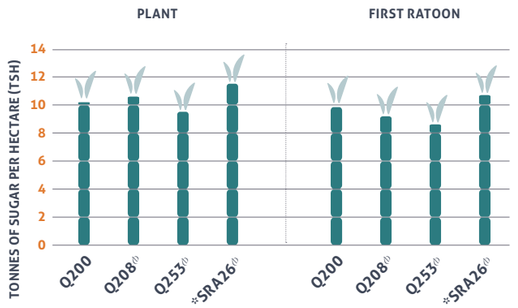


***Figure 2** - 2023 productivity results from MSF Sugar's South Johnstone mill which highlights SRA26$^{\phi}$'s sugar yield advantage over their three major varieties, Q200, Q208$^{\phi}$ and Q253$^{\phi}$, when considering individual crop class performance.*

**Only Plant and first Ratoon results shown here as there was less than 5,000 tonnes of SRA26$^{\phi}$ delivered as second Ratoon.*

Data supplied by MSF Sugar Limited.

THE WET A TEST FOR **SRA26$^{\phi}$**

For all crops - and all varieties - affected by the unprecedented and prolonged northern wet season, the past six months has presented some significant challenges.

And for a variety like SRA26$^{\phi}$, which commercial observations are proving does not favour wet, water-logged conditions, 2024 will be a test to see how it has fared, across its growing regions.

In Mulgrave and South Johnstone, SRA26$^{\phi}$ has had a proven sugar yield advantage over their three major varieties, Q200, Q208$^{\phi}$ and Q253$^{\phi}$ when considering variety performance across crop class for the 2023 harvest season. (See Table 1 & 2. on Page 15.)

For Herbert, 2024 will be its third harvest season for SRA26$^{\phi}$, and grower observations suggest this year's prolonged wet could impact performance measures.

Vince Russo - Ingham

Ingham sugarcane grower Vince Russo planted seed material of SRA26$^{\phi}$ in 2021, planting out 30 hectares of plant cane the following year.

He said the variety's first big harvest in 2023 produced excellent results in both yield and Commercial Cane Sugar (CCS), however first ratoon crops, on blocks harvested late in the season, have not ratooned as well.

"(In plant cane) we went for blocks that would not be inundated. We didn't go for heavy clay blocks, we put it into reasonably good soil, so, more alluvial soils, thinking it would do reasonably well," Mr Russo explained.

"The plant cane was very good last year. It was very high-yielding cane and delivered some very good CCS values. They were excellent results.

"But this year, probably because there was so much trash after harvest - and we've had a very prolonged wet period, it hasn't really stopped since December until last week - that has had a real impact on SRA26$^{\phi}$. More so than some of our other varieties.

"Where it was harvested early, (the first ratoon) has probably done fairly well.

"But, where we cut late in the season last year - because we couldn't get to it - it hasn't performed all that well in the ratoons, when I compare it to Q232$^{\phi}$ or Q253$^{\phi}$, which are both planted beside it. But bear in mind, this wet season has been out of the ordinary."

Mr Russo said his 2023 crop of SRA26$^{\phi}$ yielded anywhere between 115-120 tonnes per hectare, and CCS was "extremely good" for a large, lodged crop.

"We've also found that the large crop is difficult to harvest. The trash wraps around most things and the cane is difficult to separate. So that's one of the characteristics that everyone has noticed about SRA26$^{\phi}$. It is a difficult cane to harvest if it lodges.

"But, if it's standing it's fine. As it gets older in the ratoons, I don't expect it to be as big of a problem, as it is now in the bigger plant cane.

"But, I like the fact that it seems to have excellent CCS, given the size of the crop. So even in a situation where it is relatively lodged and a big crop of cane, it can still produce good CCS numbers. When you combine that with the tonnes, it can produce good tonnes of sugar per hectare."

Mr Russo has approximately 470ha under cane in the Herbert and has been farming on his Ingham property since 1995.

Compared to other varieties he's grown over the past 29 years, he said SRA26$^{\phi}$ had so far shown some strong agronomic qualities, if it's grown in the right conditions.

"In its plant cane, CCS values and tonnes of cane per hectare, are probably as good, if not better than most other canes we've had for that size crop.

"But bear in mind, we've only had one year of plant cane, so it'll be interesting to see how it goes moving forward."

For other growers considering planting SRA26$^{\phi}$, he said soil, location and harvest timing needed to be considered for optimal performance and profitability.

"I would tend to put it in your better soils and well-drained and free draining soils.

"I've put it in because I've put it into blocks that are reasonably good, so they're pretty forgiving. But you wouldn't put it into marginal country or heavier soil or poor soils with poor drainage."

"I will probably plant another five or six hectares this year, on a higher block that I can harvest mid-season or earlier. And I'll continue to monitor it, to see how it goes."

Vince Russo says thick trash build-up caused by severe localised flooding (pictured above), and a prolonged wet, has had a significant impact on the performance of SRA26$^{\phi}$ on his Ingham farm over the past year.

Vince Russo on a block of his SRA26$^{\phi}$.

SRA26$^{\phi}$ FACTS

Excellent disease resistance to the three major diseases in the North and Herbert and often has a clean green canopy.

Now considered the new benchmark to beat in Northern SRA trials.

Provides excellent canopy closure for good weed control even on wider rows.

Reliable germinator with a semi-prostrate early growth habit, often up to and including at fill-in stage.

The yield potential of SRA26$^{\phi}$ is not typically affected if tiller damage occurs when filling in as it is a moderate to high tillering variety.

It will continue to grow steadily throughout the autumn and winter months and is a very sparse arrowing variety which does not sucker readily.

SRA26$^{\phi}$ has internodes of even length and protected eyes making it an ideal variety for billet planting, but if whole-stalk planting SRA26$^{\phi}$ be wary, as it is very hairy.

Commercial observations indicate that SRA26$^{\phi}$'s productivity is not as strong on heavy clay, low-lying, water-logged blocks.

SRA Weed Scientist, Emilie Fillols, has conducted weed workshops at every sugarcane district and is calling on all sugarcane growers to participate in this important online weed distribution survey.

THE SRA WEED DISTRIBUTION **SURVEY PROJECT**

Growers from all sugarcane districts are encouraged to complete the online SRA Weed Distribution Survey to help our industry get a concise and current overview of major weeds across the sugar industry. This will assist SRA to better help growers by prioritising research to develop future weed management strategies for specific local weed challenges faced by growers.

SRA Weed scientist, Emilie Fillols, who many growers across the country have met in person at SRA's Weed Workshops said, "I am asking sugarcane growers to please do the survey because you are in the best place to know what weeds are present on your farms. To better help all sugarcane growers, we need this knowledge from all the sugarcane districts."

Why should growers complete the weed distribution survey?

This online weed distribution survey is very important as it will help us focus on the priority weeds by districts, better understand the weed/environment relationships and optimise control strategies to target the weeds on your farm more effectively.

Other reasons to do this survey?

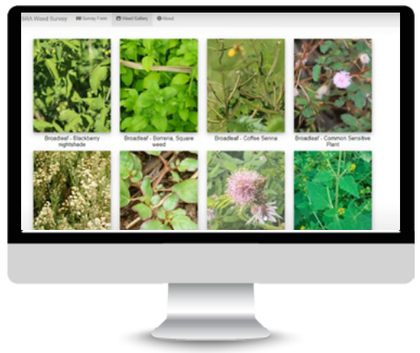
You could win a 20L drum of Nufarm DROPZONE. There are 50 drums to win. When you complete the weed distribution survey you will have an option to enter this giveaway. Thank you in advance for participating!

Any helpful tips for when I start the survey?

Watch the short 'How-to-video' before starting and do this survey on your computer, tablet or laptop as the wider screen is more helpful when you are using the map.

How do I start this survey?

See the page to the right (Page 19). It explains the easy steps and has the link and QR code to begin the survey. Thank you.



In the SRA Weed Distribution Survey growers match areas of their farm with the types of weeds they have identified on their property. Growers' details will be kept private and anonymous for the SRA Weed Survey.

Sugar Research Australia

STEPS FOR GROWERS TO COMPLETE THE SRA WEED DISTRIBUTION SURVEY

USE YOUR TABLET, LAPTOP OR COMPUTER

Step 1

It is recommended that this survey be completed on a tablet, laptop or computer.

Step 2

Go to the SRA Weed Survey web page on the SRA website. Here you will find all you need to get started. www.sugarresearch.com.au/research/sra-weed-survey

Step 3:

Watch the short video tutorial. Then click the 'Start Survey' link. This will take you to the online SRA Weed Survey for completion.

Complete the survey for your chance to **WIN a drum of** Nufarm DROPZONE

**See SRA website for Giveaway Terms and Conditions.*

www.sugarresearch.com.au/research/sra-weed-survey

SRA General Manager Industry Services Hywel Cook (left) presented 2024 ASSCT President Jay Venning with his President's name plate at this year's Townsville event. Mr Cook will serve as President for the 2025 ASSCT Conference, which will be held in Brisbane in late April 2025.

PLENTY OF INTEREST AT ASSCT CONFERENCE

The ASSCT Conference in April was an opportunity to hear the latest findings on cane farming and milling research projects all in one place.

Photo 1. This year's conference featured a number of SRA researchers including Project Manager Dr Matt Schembri[1] who looked at a variety of farming practices and products conventionally used in the Mackay region to find out if reductions in runoff of agricultural chemicals could be achieved.

Photo 2. A poster[2] written by District Delivery Officer Glen Park in the Herbert region looked at whether the application of a plant growth regulator would improve the sugar yield of standover cane.

Photo 3. Entomology Leader Dr Kevin Powell[3] presented a paper on behalf of the entomology research team which described some promising results on finding alternative agrochemical and biorational products for canegrub control. The paper won this year's President's Medal for the best research paper. He also presented a second paper on Soldier Fly research.

Photo 4. Manager of Translation Research Dr Barry Salter[4] established a new crop cycle in the long-term trash blanketing trial site at Mackay. The paper included an assessment of soil carbon in a burnt and green cane trash blanket (GCTB) system and differences between crops established with different levels of tillage.

Sunn hemp is a legume increasingly used as a green manure crop in rotation with sugarcane by farmers but there is limited information about its benefits for subsequent sugarcane crops.

QDAF Extension Officer Jack Robertson who has been working with SRA's Project Agronomist Julian Connellan presented a poster[5] with Aloomba grower Neil Maitland to show growers how to better tailor their nitrogen management and maximise productivity and profitability following a Sunn hemp green-manure crop. (See the full story at Page 28.)

Photo 5. A project [6] presented by Agronomist Erin Headon with Lead Agronomist Dr Danielle Skocaj and Agronomist Nancy Rincon provided growers with the appropriate adjustments to make to plant cane fertiliser nitrogen rates following a legume break crop using the SIX EASY STEPS® Toolbox.

Photo 6. Another project[7] led by Dr Danielle Skocaj at Tully looked at the effect of fertiliser application time for ratoon crops in the Wet Tropics established at different times of the harvest season (e.g. early and late harvest).

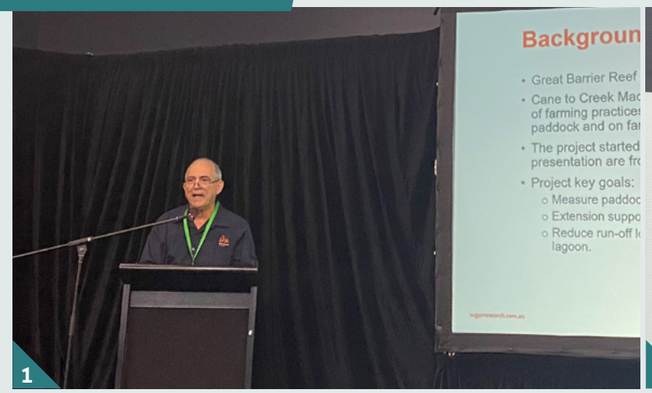
Photo 7. The knockdown herbicides that work best to control Balsam pear and other vine species and what restrictions apply to their use was presented by Weed Scientist, Emilie Fillols[8].

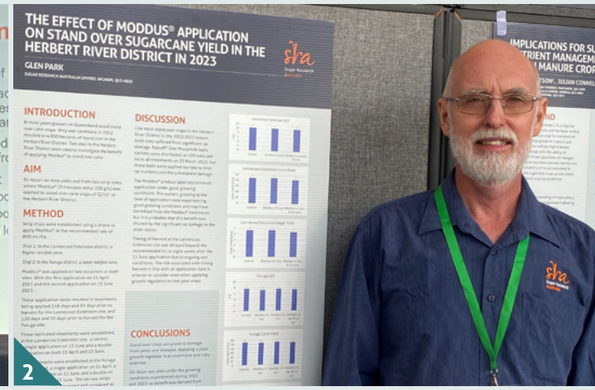
Integrated management strategies to prevent smut using a fungicide and varietal resistance was the subject of a presentation by Dr Shamsul Bhuiyan[9].

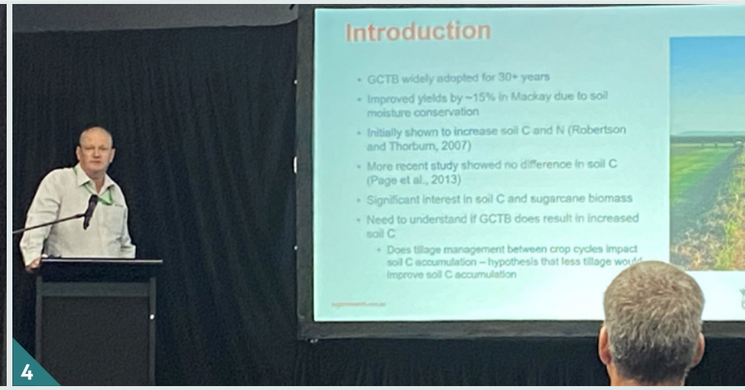
Next year's ASSCT Conference will be held in Brisbane.

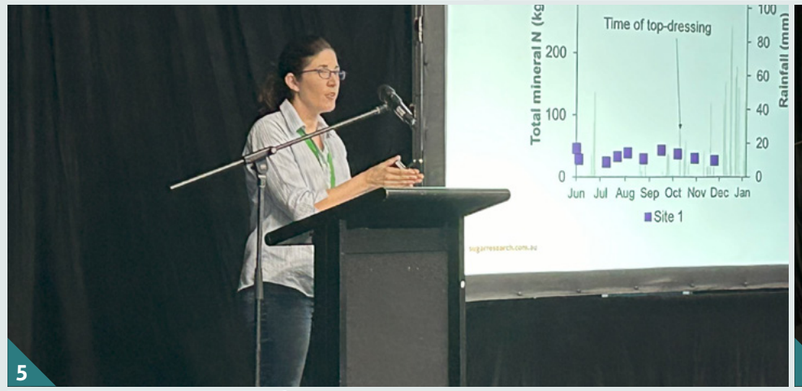
Australian Government | REEF TRUST | Great Barrier Reef Foundation | Queensland Government

ASSCT CONFERENCE









1. *Cane to Creek Mackay Whitsunday Project number 2020/802 is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation with support from Sugar Research Australia, Mackay Area Productivity Services and Plane Creek Productivity Services.*
2. *This project was funded by Sugar Research Australia.*
3. *Project 2022/004 Soldier fly diagnostics, distribution, and development of an artificial diet is funded by Sugar Research Australia and the Department of Agriculture and Fisheries.Project 2020/004 Beyond Imidacloprid – Chemical and Biorational Alternatives for Managing Canegrubs is funded by Sugar Research Australia and the Department of Agriculture and Fisheries.*
4. *SRA Project 2018/008 was funded by the Department of Agriculture and Fisheries and Sugar Research Australia.*
5. *This project is funded by the Department of Agriculture and Fisheries and Sugar Research Australia.*
6. *The study was conducted under the Mobilising the Murray project (Project 2021/804), which was funded by the Australian Government's Reef Trust and delivered by Terrain NRM in partnership with Sugar Research Australia.*
7. *This research was funded by Sugar Research Australia and the University of Southern Queensland under Project 2017/004.*

8,9. These projects were funded by Sugar Research Australia.

Artist impressions of what the project will look like on completion.

The visitors listen to a presentation given by Project Manager SunHQ, Lance Moody, about the project.

REFUELLING FACILITY TAKES EARLY STEPS IN CREATING QUEENSLAND'S GREEN HYDROGEN INDUSTRY

A visit to Sun Metals Corporation near Townsville was one of the highlights of an Australian Sugar Society of Cane Technologists (ASSCT) post conference tour in April.

The Sun to Metals zinc refinery at Stuart is owned by Korea Zinc Co. Ltd, a top ranking non-ferrous metal company and the world's largest refined zinc producer.

In addition to leading-edge metal processing, Korea Zinc is working to lead environmental performance globally and as a signatory to RE100[1] has committed to powering its operations from 100 percent renewable electricity by 2050.

In 2021 Korea Zinc established Ark Energy Corporation, an Australian company specialising in wind and solar energy generation, battery storage and green hydrogen.

A focus for Ark Energy is to facilitate the Korea Zinc group's decarbonisation, starting with Sun Metals, which has also committed to RE100 and sourcing 100 percent of its electricity from renewable sources by 2040.

Ark Energy's Technical Manager, Daniel Krosch, was a guest speaker at the ASSCT conference and talked about the company's remarkable renewable energy journey. Then at Sun Metals, conference delegates saw firsthand some of the latest developments in the renewable energy sector, including Ark Energy's first green hydrogen project also located in the precinct, called the SunHQ Hydrogen Hub.

The steps taken by Ark Energy to establish SunHQ, explained to visitors by project lead Lance Moody, outlined some of the challenges in decarbonising hard to abate industries and how the company is at the forefront of establishing Queensland's green hydrogen industry.

Sun Metals is a zinc refinery that has been in operation for more than 25 years. It produces 300,000 tonnes of zinc metal annually and is ranked as one of the top ten refiners globally.

Located near Townsville for proximity to mines and the port, 50 percent of the zinc ores come from north and western Queensland.

It is the second largest single user of electricity in Queensland. Zinc is second only to aluminium in the amount of electricity required to refine from ores (4.2 megawatt hours (MWh) of electricity is needed to make one tonne of zinc metal). At full production, Sun Metals uses up to 165 megawatts (MW) per hour.

Korea Zinc built the co-located Sun Metals Solar Farm, with 1.26 million modules and commissioned in 2018, to supply the refinery with a renewable power source. With a registered generation capacity of 121 MW AC it supplies around 25 percent of the refinery's electricity needs. At the time of commissioning it was the largest solar farm in Australia, although now there are gigawatt scale solar farms in development.

The remaining electricity required for the refinery is purchased directly from the market, and in turn zinc production rates are influenced by power prices. Electricity use can rise and fall again from 165 MW to less than 30 MW per hour within a five-minute timeframe.

When there is unused power from the solar farm it can be sent to the grid via an on-site substation to offset energy costs. Sun Metals can choose to consume the solar power in the refinery or export it to the grid.

Feed material, by-products and final product zinc ingots are transported to and from the refinery by a fleet of diesel road trains operated by sister company, Townsville Logistics.

SunHQ will decarbonise the refinery's heavy transport fleet as the refuelling facility for a fleet of new hydrogen powered fuel cell electric trucks (FCETs).

It will involve a polymer electrolyte membrane (PEM) electrolyser to convert water into hydrogen gas, that will be powered by a behind-the-meter connection to the solar farm. The potable water supply on site must be cleaned to ultra pure to be fed into the electrolyser which is vulnerable to impurities.

Phase 1 of SunHQ will involve an electrolyser capacity of 1 MW per hour. In the future it could potentially be expanded to up to 50 MW.

The hydrogen gas generated in the PEM electrolyser will be captured at 40 bar pressure and compressed on site to high pressure gas at 450 bar. The 1 MW electrolyser has capacity to produce about 150 tonnes of hydrogen annually, with storage facilities on site to hold 500 kg.

A dispensing facility will supply the hydrogen to produce electricity in fuel cells within the road trains and run a fleet of five 140 tonne rated FCETs – expected to be the largest of their type in the world. Production capacity will exceed the requirements for Sun Metals' FCETs, so Ark Energy will also have excess green hydrogen available for third party customers.

Construction of SunHQ is expected to be completed in October this year, with commissioning to follow soon afterwards.

SunHQ has received funding from the Queensland Government under the Hydrogen Industry Development Fund, and the Australian Government through the Australian Renewable Energy Agency and the Clean Energy Finance Corporation.

For more information visit **arkenergy.com.au** or **sunhq.com.au**.

1. *Climate Group RE100 is a global corporate renewable energy initiative bringing together large and ambitious businesses committed to 100 percent renewable electricity: RE100 (there100.org)*

SRA Entomology Technician Jennifer Parry pictured with Maryborough sugarcane grower Leo Groth who has participated in the soldier fly survey.

SURVEY TO UNCOVER UNIDENTIFIED SOLDIER FLY SPECIES

Sugar Research Australia entomologists are on a quest to determine if there are species of soldier fly impacting sugarcane crops that have never been formally identified.

Soldier flies are a root-feeding pest that cause productivity losses in a number of sugarcane growing regions, particularly in Central and Southern Queensland and the Atherton Tablelands.

To date, only two species of soldier fly have been confirmed in Australia – and four undescribed species are also known – however SRA Entomology Leader Dr Kevin Powell said a new SRA project aimed to establish if there were other populations of the native pest to assist in future management.

"The project intends to not only identify potential new species of soldier fly, but also define their locations and to what degree they are impacting sugarcane crops," Dr Powell said.

"Ultimately this will lead to improved management, because if one species is more damaging and requires different management to another species, we need to know that, because you want to be controlling the economically damaging species."

Work on the three-stage project began in 2023, and includes surveys, diagnostics and bioassay development. SRA's entomology team has begun contacting growers by phone to determine sites where soldier flies can be collected from. These properties will then be visited and soldier fly samples taken. Finally, each species will be examined and formally identified.

"We have to collect the soldier flies in the right life stage to identify them to species level so survey timing is critical," Dr Powell said.

"We want to reach as many growers as possible to be involved in this. The responses so far have been great and we've already identified a number of sites to collect samples from."

Dr Powell said developing effective control methods was the ultimate objective of the project.

"After the identification process, and after we have worked out which species are the most damaging, we will develop a laboratory bioassay where we can rapidly screen for potential control options, just like we've done with cane grubs.

"We've come up with a really good screening method for cane grubs, to test potential control options by using an artificial diet. That's exactly what we are hoping to do with soldier fly, but this will be challenging as no one has ever done this for sugarcane soldier flies before."

Growers across a number of milling areas have been involved in the project so far including Bundaberg, Isis, Maryborough, Mackay, Innisfail and Atherton Tablelands.

Brothers Leo and Tony Groth, who have been farming sugarcane on their mother Marie Groth's 32ha property at Maryborough for the past 12 years, have been active participants in SRA's soldier fly survey and collection efforts.

The pair have 12ha of their farm under cane production, and soldier flies have had a significant impact on their productivity over the past five years.

"We have soldier fly in two of our blocks. One of the bigger blocks where we found them, was a fairly big area that just didn't ratoon or ratooned poorly," Leo explained. "So, it does impact your crop. Both blocks that we have them in now, they'll be plough out blocks this year.

"The last couple of years have been wet years and everything grows pretty well, but in the drier years the damage is more obvious."

SRA Entomology Technician Jennifer Parry has been to Leo and Tony's farm on three occasions to collect soldier fly pupae and larvae samples from the property.

"The sampling involved scratching around on the surface of the soil and extracting by hand late larvae and pupae that were close to the surface," Ms Parry said.

"I also dug out some stools and took them back to the station, washing these out over a series of sieves to remove the larvae present within the soil and on the stool."

Leo and Tony also put out traps to attract adult flies, successfully collecting a number of the insects, despite the challenges of luring the flies in the adult stage.

"It's pretty hard to catch the adult fly because they only fly for about a week before they lay their eggs. The rest of the time they are in the soil as larvae. And after they lay their eggs, the female dies," Leo said.

"But we're very happy to be involved in anything that might find a solution to the soldier fly or lead to a way of controlling them."

This project is funded by the Department of Agriculture and Fisheries and Sugar Research Australia.

Soldier fly larvae inflict damage by feeding on the roots of both newly germinated setts and established stools.

There is currently no chemical or biological control available for soldier fly and the development of effective controls is limited by the lack of an artificial diet for rapid screening, which would allow scientists to breed selected species in a laboratory for study.

GAME CHANGER IN TISSUE CULTURE PRODUCTION

Sugar Research Australia (SRA) has partnered with a leading Australian biotechnology company, aiming to revolutionise the production of tissue culture plants in the sugar industry and deliver cost savings to growers.

Tissue culture is a crucial method for providing disease-free planting material to sugarcane growers and is essential for accelerated access to new cane varieties produced by SRA. However, traditional clonal propagation methods are both labour-intensive and costly.

The collaboration between SRA and NXT Bioscience aims to not only improve the overall efficiency of tissue culture production but also achieve significant cost savings by using a novel system incorporating automation technology developed by Lowes TC.

SRA's General Manager for Variety Development Dr Jason Eglinton said the Lowes' automated system, which uses a uniquely designed liquid media bioreactor and a robot for automation, allows for increased production of tissue culture plants, which could lead to increased adoption of new sugarcane varieties.

Currently the SRA tissue culture laboratory at Indooroopilly is optimising the methods and utilising the system as a standard bioreactor to assist with handling of very large orders of tissue culture plants in the final subculture on rooting media. SRA is looking forward to the development of the robot for use in the production of tissue culture plants, which would improve efficiencies and reduce costs in the tissue culture process.

"Initial commercial testing with ornamental plant species has proven the system's effectiveness and shows great promise for the sugar industry," Dr Eglinton said.

"The ability to increase the production of clean planting material, while reducing costs, would likely encourage wider uptake of tissue culture across the industry. Ideally, this would lead to improved disease management, and increased productivity and profitability," he said.

NXT Bioscience was founded by Daniel Mansfield in 2022, providing biotechnology solutions for the agricultural and bioenergy sectors globally and Australia-wide.

In 2023 the company bought out Lowes TC, a company founded by New South Wales-based plant tissue culture specialist Greg Lowe, inventor of the TC+ and AX technology platforms.

"NXT is pioneering automation in the plant tissue culture process to revolutionise global propagation supply chains, and bioenergy production through dedicated bioenergy crops," NXT Bioscience CEO Daniel Mansfield said.

"Our innovative AX technology streamlines the plant tissue culture process, establishing a new global standard for producing and distributing high-health, virus-free plant genetics.

"We're proud to be at the forefront of this innovation, demonstrating the vast potential of the AX technology to make a real difference in the agricultural sector.

"Stay tuned as we continue to advance our mission of bringing efficient, cost-effective solutions to sugarcane growers and the industry at large," he said.

The AX technology uses an automated system for the cutting process in plant tissue culture production. For AX to work, a liquid media bioreactor – the TC+ - allows full access to the plants, without impacting contamination rates and reduces labour costs by over 30 percent.

Mr Mansfield said the AX and TC+ technology was being used in collaboration with a number of different horticulture industries, with all showing significant prospects.

UNLOCKING SUGARCANE'S GENETIC CODE

Dr Nathalie Piperidis

SRA's sugarcane cytogeneticist[1], Dr Nathalie Piperidis, was part of the collaborative team of more than 30 researchers world-wide responsible for cracking the genetic code of sugarcane.

A paper about the breakthrough has been published in *Nature*, the world's leading multidisciplinary science journal.

"Ten years ago, an international research consortium which included SRA, national science agency CSIRO and the University of Queensland signed an agreement known as the Port Douglas Accord to work together to unravel a modern sugarcane cultivar with funding from the Joint Genome Institute and the US Department of Energy," Dr Piperidis said.

"The polyploid[2] hybrid, R570 was chosen because of the level of existing sequence data and allied genetic resources available for this variety," she said.

"All available sequencing techniques and technology had to be used to unscramble it.

"My part was in developing a new cytogenetic method called 'whole chromosome[3] painting' in 2018 to corroborate the genomic analysis.

"Using the new method, the accurate number of chromosomes of R570 could be determined by adding the exact copy number for each of the 10 basic chromosomes as well as determining the proportion of the two parent *Saccharum* species."

R570 has a staggering 10 billion bases[4] and 114 chromosomes. Its genome shows varying degrees of duplication, redundancy, and recombination (where chromosomes are a combination of the two parental species of *Saccharum*).

"With all this complexity, you can see why sugarcane was the last of 20 major crops grown in the world to have its genome sequenced," Dr Piperidis said.

She said more than 80 percent of the R570 genome is inherited from its domesticated *S. officinarum* ancestor (also called the noble cane as it contains sugar). The remainder of the genome can be traced back to the wild *S. spontaneum* progenitor for 10 percent (considered the tough resistant grass ancestor without any sugar) as well as 10 percent of recombined chromosomes between *S. officinarum* and *S. spontaneum*.

The assembly is now publicly available to breeders and researchers worldwide which could lead to further discoveries not just to improve sugarcane yields and disease resistance but also to make byproducts from it.

"Publishing in *Nature* is considered a pinnacle achievement for any researcher and everyone at SRA is very proud of Nathalie and her expertise, which we have the good fortune to have in our company," Interim CEO Shaun Coffey said.

"Nathalie has been diligently working at Mackay and not many people in the region would know that they have living in their community one of the world's most renowned sugarcane cytogeneticists."

Dr Piperidis has hosted a series of SRA webinars on subjects related to the sugarcane genetic breakthrough. These have been recorded and can be found on the SRA website:

February 2024 Webinar: *Accelerating Development of New Sugarcane Varieties with Genomics* with Professor Ben Hayes, The University of Queensland

April 2024 Webinar: *Engineering Sugarcane to replace fossil carbon* with Professor Robert Henry, The University of Queensland

May 2024 Webinar: *The Complex Polyploid1 Genome Architecture of Sugarcane* with Dr Adam Healy, Genome Sequencing Center at HudsonAlpha Institute of Biotechnology

May 2024 Webinar: *From Barley to Sugarcane – Challenges and Prospects* with Dr Jason Eglinton.

View the SRA Webinars at: sugarresearch.com.au/resources-and-media/media

1. Cytogeneticists study chromosome function, structure and behaviour within cells. They combine many techniques to enable chromosomes to be seen on microscopic slides for the study of chromosome inheritance, genetic abnormalities, chromosome variations and much more.

2. Polyploid refers to the fact that sugarcane's large genome contains more copies of chromosomes than a typical plant.

3. Chromosomes are microscopic threadlike structures made up essentially of DNA and proteins. They are found in most living cells and carry genetic information in the form of genes which encode specific traits or characteristics.

4. A base pair is the genetic material that form the 'rungs' in the structure of the DNA ladder and is responsible for the transmission of traits from parents to offspring.

FINE-TUNING NITROGEN FERTILISER APPLICATIONS **FOLLOWING A GREEN MANURE CROP OF SUNN HEMP**

The benefits of planting Sunn hemp as a green-manure cover crop has garnered increased interest within the sugarcane industry over recent time.

And if you ask Aloomba sugarcane grower Neil Maitland, the legume's ability to produce large amounts of biomass, providing significant amounts of nitrogen (N) for the following cane crop, and its potential to build organic matter levels in the soil, are widely under-estimated.

Mr Maitland has been experimenting with Sunn hemp as a fallow crop on his 86ha property in tropical North Queensland for the past five years. He believes it holds enormous potential as a green manure crop.

"Most things happen by accident. I planted a mixed species fallow crop five years ago and because the Sunn hemp seed are very small, it left a lot of seeds in the planter, so I decided to run them out and it grew astronomically," Mr Maitland said.

Trialling the green-manure cover crop

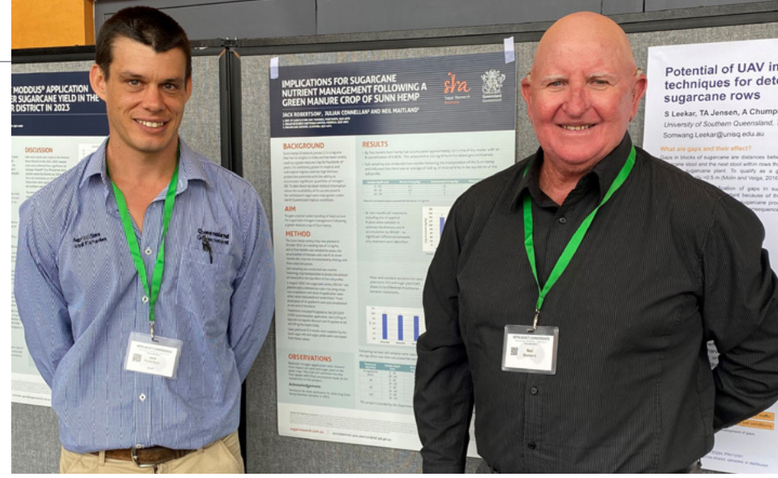
Sugar Research Australia (SRA) Senior Agronomist Julian Connellan has been working with Mr Maitland, alongside Department of Agriculture and Fisheries (DAF) extension officer Jack Robertson, to better understand the implications for sugarcane nitrogen management implications following a Sunn hemp green-manure crop.

Mr Connellan said while Sunn hemp was grown in tropical and subtropical regions, there was limited information about the availability of its accumulated N for subsequent sugarcane crops grown under North Queensland conditions.

"This trial aims to develop a better understanding of how we manage N inputs following a Sunn hemp green manure crop to maximise sugarcane productivity and profitability," Mr Connellan said.

Mr Maitland has been farming sugarcane in the Far North for more than 40 years and has generally favoured legumes as a fallow crop.

SRA Senior Agronomist Julian Connellan (left) pictured with Mulgrave sugarcane grower Neil Maitland inspecting one of the Sunn hemp green-manure cover crops being trialed on his Aloomba farm.



Queensland Department of Agriculture and Fisheries (QDAF) extension officer Jack Robertson (pictured left) with Aloomba cane grower Neil Maitland at ASSCT where they presented a poster on the benefits of Sunn Hemp as a green-manure crop.

So far, the trial has demonstrated on Mr Maitland's farm that a Sunn hemp crop can provide more than 100 kg N/ha for the subsequent cane crop.

"It is an enormous amount of Nitrogen," Mr Maitland said. "I just thought wow, that is an incredible crop."

"Because we are all looking to make extra money, and this has allowed me to reduce my fertiliser rates by a considerable amount.

"I just look at it and I think, even if I just put it (the Sunn hemp) back into the ground, the benefits I've achieved from reducing nitrogen (applications) and improving the soil health, it just out-weighs everything else. It's a win-win."

Economic analysis of the trial

As part of the research project, DAF economist, Preyanat Posuk, undertook an initial economic assessment of the trial.

At this early stage the economic analysis indicates that lowering nitrogen application rates following a Sunn hemp green manure crop provides the highest net return for the grower. These findings support Mr Maitland's decision to reduce his N application rate in his sugarcane plant crop.

Economic and agronomic analyses will be carried out after first ratoon and second ratoon of the trial. All data will be released at the completion of the project.

Added benefits

Mr Maitland said not having to harvest Sunn hemp was an additional benefit for growers in the Far North, where harvesting of other fallow crops was often impacted by the region's wet season.

"There are a lot of growers in the district that have tried to grow other crops in their fallow blocks, but what happens is – a lot of the time – you don't get to harvest it because of our weather.

"This (Sunn hemp) crop we are standing in front of here, it went completely underwater four days after it was planted, and there is not another legume that would grow like this after being underwater for that long, it wouldn't be here.

"For the cost of growing the crop - it pretty much grows by itself - it needs sunshine and rain, which is why it thrives in the tropics."

The versatile crop can also be used as a high protein stock feed for livestock, it suppresses weeds and is reported to reduce nematode populations.

This project is funded by the Department of Agriculture and Fisheries and Sugar Research Australia.

Queensland Government

Sugar Research Australia

"For the cost of growing the crop - it pretty much grows by itself - it needs sunshine and rain, which is why it thrives in the tropics." **Aloomba sugarcane grower Neil Maitland**

AUTOMATED HARVESTER **STERILISATION TRIAL**

An SRA-driven project to develop an on-board, automated sterilisation system for commercial harvesters, to limit transmission of Ratoon Stunting Disease (RSD), will be laboratory tested in 2024.

The project, which began with an initial prototype in late-2022, has been led by SRA District Manager Herbert Phil Patane, along with District Manager Central Dylan Wedel and District Manager Burdekin Terry Granshaw as part of their District Productivity Plans.

Using high-pressure fire suppression nozzle technology, the original prototype was developed in partnership with a fire protection services company and trialed in the Mackay district in 2022. After undergoing modifications it was trialed again in both Mackay and South Johnstone in 2023.

"We had significant industry interest in investigating the opportunity to automate sterilisation on a sugarcane harvester," Mr Patane said.

"We know that it is of major concern in each district, so we considered if there was any possible way that we can install some sort of sterilisation unit on the harvester to attempt sterilising the machine."

SRA's Lead Field Pathologist Dr Seona Casonato has also been involved in the project and will assist in testing the efficacy of the units throughout the 2024 harvesting season.

Each harvester is fitted with a 70 litre fully-enclosed cylinder, attached to high-pressure nozzles. The spray jets are mounted strategically to the major components of the machine to attain maximum sterilisation coverage.

"It's not sterilising the whole machine, but what it is sterilising is the main cutting components of that machine which come in contact with the stool and expressed juice.

"The nozzles have a fair bit of pressure behind them; to fully drain the tank it takes approximately four minutes and 30 seconds, we found a fair bit of coverage occurs after one minute.

"My main concern was cane coming in contact with the nozzles and breaking off. But we've modified the units over time and we are confident that we've developed a robust system that has the potential to assist in RSD control."

Validating through scientific testing

The project has broadened to involve multiple districts including the North and Burdekin. Trials will be conducted in five locations across these regions during the 2024 harvest including Mackay, Burdekin, Herbert, Tully and South Johnstone.

"We're now entering the final stage of the project. We are happy with the sterilisation coverage, and we are happy with the robustness of the technology. The next stage is to establish if we are actually removing RSD off the harvester. And, if there is RSD DNA on there, is the DNA dead or alive," Mr Patane said.

"So that's where Dr Seona Casonato comes in with her expertise and her knowledge, to swab the harvester, after we have sterilised that machine, and identify if RSD is present or not."

Mourilyan cane farmer Daniel Marano trialed the automated sterilisation unit on his harvester late in the 2023 season and will take part in further trials in 2024.

The fourth generation grower, whose family farm has approximately 300ha under cane, said the system offered a promising, time-saving option to manual sterilisation.

"We're always trying to clean down (the harvester) between farms, but now we'll try to clean down between paddocks, to see if we can isolate those areas where we've had positive testing for RSD," Mr Marano said. "So, we're feeling better about going between paddocks, and we are trying to do what we can (to limit the spread of RSD).

"And for someone who is really stretched for time - they might get to their last round and they're still on 100-plus bins a day, they might be at three or four farms on their last round.

"Having the sterilisation process automated is valuable time-saving, especially if you have to shift farms twice a day."

Laboratory testing will be conducted by Dr Casonato throughout the trial during the 2024 season. It's hoped that the field trials can validate the system's success within a 12-month timeframe.

Mourilyan cane farmer Daniel Marano (pictured below left) with SRA District Manager Phil Patane has been trialling the automated sterilisation unit.

Mourilyan cane farmer Daniel Marano inspects the automated sterilisation unit he has been trialling as part of the SRA-driven project.

The on-board automated sterilisation unit being trialled sterilises the main cutting components of the harvester which come into contact with the stool and expressed juice.

1

2

3

4

1. *The tank is mounted on the upper rear platform on the left hand side of the machine – ideally to be the field of view of the wing mirror and a fair height from the ground for refilling purposes.*
2. *Jets here are located above the throat of the machine, ahead of the choppers.*
3. *These nozzles are located on the boot of the elevator for spraying back into the choppers and up into the primary extractor when the elevator is laid down fully.*
4. *There are two nozzles spraying back down the carry side of the elevator and one up into the secondary extractor.*

Growers at the Mulgrave CCS Improvement Project meeting on 24 May.

SRA District Manager Far North, Gavin Rodman (pictured left) with Gordonvale cane grower Andrew Greenwood who is one of 10 growers involved in the Mulgrave CCS Improvement Project.

IMPROVING CCS OUTCOMES **IN MULGRAVE**

Members of the Mulgrave CCS Improvement Project met at SRA's Meringa Station on 24 May to discuss the next steps in the program, including engaging more growers to bring about improved CCS outcomes.

The project was established in 2022 under the SRA Far North District Plan to address concerns about CCS in Mulgrave.

It's not the first project to focus on CCS in the area, with reviews dating back to the early 1970s in the region. The most recent of these projects was delivered in 2017 by CSIRO who identified that approximately 70 percent of CCS variation was driven by climatic factors, while the remaining 30 percent was driven by management practices. However, the research did not specify what those management practices might be.

SRA District Manager Far North Gavin Rodman said the Mulgrave CCS Improvement Project began to try and establish the composition of the 30 percent, by identifying productivity data trends and on-farm practices that may have influenced CCS from 2010-2021.

"The project initially involved 10 farms here in Mulgrave, to identify trends and practices from 2010 to 2021. So, we were looking at a bit of a longer period without getting too far into the past," Mr Rodman said.

"Beyond the deep dive into productivity and practices for these 10 farms, data from more than 140,000 deliveries of cane to the mill were used to gain a broader understanding of trends and impacts in the area. And it has been a major work in our program and as part of the District Plan.

"The Mulgrave CCS Improvement Project's aim is to identify those opportunities to improve CCS, while also supporting productivity and profitability outcomes. It's important that we focus on that as a whole, because there are things that we can use to improve CCS, but it doesn't necessarily support profitability outcomes."

To date, the project has involved growers, CANEGROWERS Cairns region representatives, MSF Sugar representatives and SRA. Over the past two years, the project has conducted farm practice surveys, district-wide Pachymetra root rot and row profile surveys, sugarcane maturity trials and tactical management strategy development with growth regulators. Further investigations are planned for the project.

Elements from the initiative have been presented at different times to the local industry through meetings and SRA's Meringa Field Day. Several information sheets were also shared throughout 2023 to growers supplying Mulgrave Mill.

The project group is keen to share learnings from project to other Mulgrave growers. If you are interested in knowing more please contact Gavin Rodman at **grodman@sugarresearch.com.au** or phone 0476 807 355.

CROP MATURITY **BOOSTS CCS**

One of the key drivers of CCS that can be managed on-farm is crop maturity.

SRA District Manager Far North Gavin Rodman says crop maturity has been a focus in the Mulgrave CCS Improvement Project, with over 20 field trials set up in 2022 and 2023 across the Mulgrave region to measure the maturation process over time.

"These trials indicated that crops across the area were reaching optimum maturity between 12 and 13 months of age," Mr Rodman said. "These results lined up well with research previously conducted locally into sugarcane maturity.

"We also saw significant benefits for both CCS and yield in the commercial data over a long period of time for those crops that reached 12 months of age, compared to those harvested at less than 11 months of age.

"Unfortunately, approximately 18 percent of the cane supply during the period investigated wasn't getting beyond 11 months of age."

Andrew Greenwood is a third-generation sugarcane grower who has been working his farm for 44 years and is one of 10 growers who have been involved in the Mulgrave CCS Improvement Project since it began in 2022.

"From the project, one of the main take home points is that we've been moving away from cutting 12-month-old cane, and that's having a detrimental effect (on CCS)," Mr Greenwood said. "It's probably one of the easiest and most important things that we can do, but over time I've gone away from it on the farms I'm leasing."

From practice surveys conducted throughout the CCS Improvement Project, it was confirmed that growers were prioritising the maturity of plant cane crops and young ratoons over older crop classes. However it was also found that the time of planting had crept later by more than a month since 2010.

"You've got to really time your farm with what your harvesting rotation is, and it is much easier to get it right when you are planting after a fallow," Mr Greenwood said.

"I think I'm maximising the return by having 100 percent under cane on some farms, though I think I'll have to review that and get back to fallowing. There are hidden costs with ploughout replant for sure."

Mr Greenwood said weather also played a part in preventing early planting, with many paddocks still inaccessible.

"If we had good weather leading up to now, I'd probably have 60 percent planted instead of probably 12 percent," he said.

"By planting early, it gives me the option to harvest plant cane earlier in the season at 12 months old and then move into first, second, third ratoon, and finish with the crop to be fallowed. It's just something to keep in mind.

"While I have farms where ploughout replant is working well, I think I need to find more opportunities to get away from that, to be able to plant early. It's all about getting your harvest schedule right so you have got 12-month-old cane to cut throughout the season."

Pictured with the control panel for the microwave transducer are (L to R): Senior Technologist, Mackay Sugar Bryan Lavarack with Assistant Pan Boilers, Lisa Den Elzen and Guy Watson at Farleigh Mill.

FIRST STEPS TO ACHIEVING IMPROVED **CONTROL OF PAN BOILING**

A Small Milling Research Fund project funded by SRA, with in-kind support from QUT and Mackay Sugar, has looked at improving the control of massecuite[1] concentration during pan boiling at Australian sugar mills. The aim is to provide a more consistent operation and so as to reduce the amount of checking required by the pan stage operators.

The research team led by Senior Technologist, Mackay Sugar, Dr Bryan Lavarack and Research Fellow, Centre for Agriculture and the Bioeconomy, QUT, Dr Gabriel Fraga, worked with Mackay Sugar staff on the project during the 2023 crushing season.

Most Australian sugar mills use massecuite conductivity as the process variable which controls the feed rate of syrup and molasses to the boiling pans. This process is inexpensive and works well. However, the conductivity value changes with variations in impurities in the cane supply. Consequently, pan operators must pay on-going close attention by manually assessing the massecuite conditions in the pans, and may have to change the control setpoints to maintain high throughput and sugar quality.

An alternative method for measuring the massecuite concentration (massecuite dry substance[2], DS) uses a microwave transducer. As in the conductivity method, an electrical signal from the transducer is provided to the control system for the pan.

Microwave technology is used overseas, particularly in factories and refineries in the sugar beet industry. Dry substance measurement has the advantage over conductivity in that it tends to be less affected by external factors such as impurities. However, the massecuite's high viscosity can slow the response of the signal to changes within the pan. Also, its sensitivity is less than with conductivity.

Dr Lavarack said the project assessed the accuracy of the data obtained from the microwave transducer and compared its signal with that achieved by conductivity, to prove the new process is effective and, if superior, to consider introducing it.

The tight control could also be expected to result in steam savings.

Dr Gabriel Fraga described how the microwave transducer works.

"Given a microwave source we generate a reference signal which has an amplitude (wave height) and a phase (length of time)," Dr Fraga said.

"The microwave measurement system generates microwaves which interact with the water molecules in the massecuite. This interaction causes a decrease of the microwave energy, which can be detected and measured as two variables to determine the dry substance of the massecuite.

"About 10 accurate measurements can be processed in just three seconds."

The instrument was installed at Pan 9 at Farleigh mill, a 190-tonne stirred pan with a new honeycomb calandria which processes high grade seed and massecuites.

A control box sits next to the instrument where the data for the calibration is entered.

After the instrument was set up, a sampling port was installed to enable samples of massecuite to be taken and analysed in the laboratory for massecuite dry substance.

The test program took place during August, September and November in the 2023 season.

Massecuite samples were obtained at different stages in the pan cycle and from different stages throughout the season so that there was a good range to calibrate the instrument.

The dry substance values compared well with samples collected from the pan and measured in the laboratory.

"Comparing the response of conductivity and dry substance, we found the transducer delivers the expected trend in results. Since the range of dry substance from start to end of the pan cycle is relatively small (less than three units of dry substance), it is important to develop a strong calibration," said Dr Fraga.

"Late in the season (November) there were different impurities in the cane supply. When conductivity was used, the values changed with these impurities so that the set points on the pan had to change, requiring manual adjustment by the operator," Dr Lavarack said. "The variations were so small using the microwave transducer that no such adjustment would be required. That's how you want to run your pan – with very little variation."

1. *Massecuite is the suspension of sugar crystals in syrup produced in a sugar mill.*
2. *Dry substance is a measure of the total solids obtained from evaporating massecuite under vacuum to dryness.*

Senior Technologist, Mackay Sugar Bryan Lavarack, with Research Fellow, Centre for Agriculture and the Bioeconomy, QUT, Dr Gabriel Fraga.

MILLING RESEARCH SEMINARS ATTRACT SUPPORT

The annual Regional Sugar Milling Research Seminars earlier this year were well supported by milling companies and their staff throughout the industry.

Each year, in partnership with the Queensland University of Technology (QUT), SRA hosts a series of milling research seminars to present the highlights of current research projects.

This year milling companies and their staff attended RSMS seminars in Mackay, Townsville, Gordonvale, Rocky Point (with a video link to NSW milling staff) and Bundaberg.

SRA staff – Head of Research Strategy and Investment, Jane Trindall; Manager Research Missions Dr Stephen Mudge; and Head of Partnerships and Project Management Bronwyn Venus – provided an overview of SRA's strategic plan.

The highlights of this year's District Productivity Plans were also presented by District Manager Central, Dylan Wedel; District Manager Far North, Gavin Rodman; and District Manager Burdekin, Terry Granshaw (also presenting on behalf of District Manager Northern and Agricultural Machinery Specialist, Phil Patane).

QUT was represented by Associate Professor Geoff Kent, Deputy Director, and Research Fellow, Dr Gabrielle Fraga, at the Centre for Agriculture and the Bioeconomy in the Faculty of Engineering.

1. *A discussion at the Regional Sugar Milling Seminar (RSMS) at Mulgrave.*
2. *Presenters at the RSMS at Mulgrave were: (L to R) QUT Associate Professor Geoff Kent and Research Fellow Dr Gabriel Fraga with SRA Research Mission Manager Stephen Mudge and District Manager Northern Gavin Rodman.*
3. *SRA Research Mission Manager Stephen Mudge (L) chats with Rocky Point Mill Manager Bruce Tyson.*
4. *(L to R) Wilmar staff Cameron Hofer, Jon Gilberd, Damien Kelly, Trevor Forde and Dr Steven Venturato at the RSMS in Townsville.*
5. *SRA District Manager Central Dylan Wedel chats with Graduate Process Engineer Plane Creek Mill, Katja Biggs.*
6. *Head of Partnerships and Project Management, Bronwyn Venus discusses milling research priorities at the RSMS at Millaquin Mill.*
7. *SRA District Manager Burdekin Terry Granshaw comments during a panel discussion in Townsville.*
8. *A panel discussion between Dr Geoff Kent, QUT Research Fellow Dr Gabriel Fraga and District Manager Central Dylan Wedel at Mackay RSMS.*
9. *Geoff Kent addresses milling staff at the Millaquin RSMS.*

Research topics included:

- Eliminating roll arcing (Project 2019/007)
- Strategies to minimise impacts of processing existing soft cane varieties and industry cost/benefit analysis (Project 2019/005)
- Bagasse fly ash system performance benchmarking (Project 2023/201 SRA Small Milling Research Project 2023)
- Australian Sugar Industry Training – Development of factory training modules Phase 3 (Project 2022/014)
- Modelling the harvester's front end to reduce billet and stool damage
- Cane bin tracking and electronic consignment of cane
- Use of machine learning to determine the extraneous matter and billet length in cane consignments (Project 2022/012)*
- Use of dry substance as the process variable to control massecuite concentration during pan boiling – (Project 2023/202 -SRA Small Milling Research Project 2023)- see full story on Page 34
- Guidelines for cost-effectively improving sugar recovery from C massecuite cooling crystallisers
- Building industry engagement capability for a diversified and adaptable Australian sugarcane industry (Project 2022/018)
- Research capacity building, and
- Sugar industry training.

**Project 2022/012 is funded by Sugar Research Australia and the Department of Agriculture and Fisheries.*

Queensland Government

MILLING RESEARCH SEMINARS

STANDARDISED CARBON FOOTPRINT SOLUTION FOR SUGARCANE INDUSTRY

Knowing the level of carbon emissions from your sugarcane farming business is becoming more important in modern markets according to SRA Interim CEO Shaun Coffey.

"The last thing sugarcane growers want to hear is that they will be required to keep complicated and time-consuming records," Mr Coffey said.

"The good news is that SRA has joined eight other Australian rural Research and Development Corporations (RDCs) to simplify carbon accounting through the development of a standardised carbon calculation engine."

The AIA Environmental Accounting Platform (AIA EAP) is a definitive carbon calculation engine for Australian agriculture, fisheries and forestry. It enables the calculation of a carbon footprint at a commodity, enterprise and whole of business level. This means it is suitable for both sugarcane farms and mixed farming enterprises which run livestock or horticultural crops as part of their income stream.

It is supported by an expert Technical Advisory Panel, which ensures that calculation models align with the latest science and are consistent with the relevant Australian standards and protocols.

"The AIA EAP will enable growers to fully understand the carbon footprint of their business, which can aid their decision-making to reduce emissions and capture new business opportunities," Mr Coffey said.

"The fact is that major parts of the sugar industry have already geared up to provide their carbon footprint as a routine business requirement. Australian sugar milling refineries, for example, have been asked for these records by their customers, suppliers and financiers as part of these organisations' commitments to zero emissions by 2030.

"Farms are a fundamental part of the Australian sugar industry's supply chain and will no doubt be required to provide these records formally in the years ahead too, to prove their sustainability is bona fide - if they haven't already by the banking sector.

"Carbon accounting has in the past consisted of spreadsheets which take time and expertise to complete. But thanks to this cross-sectoral project, growers will be able to easily calculate their business's carbon footprint."

Peak body, Queensland CANEGROWERS has welcomed the announcement of the carbon calculator.

"Our enthusiasm for the AIA EAP is based on its scientific backing and its standardised methodology for emission calculations from Australian farms. The latter is already recognised by all our stakeholders, both within the supply chain and in other sectors such as finance and government. It is our solution of choice," said Senior Manager, Environment and Sustainability, Mick Quirk.

"Through the Smartcane Best Management Practice (BMP) program, we want to provide a ready means of calculating a farm's emissions intensity so that growers can fully demonstrate their sustainability credentials to the supply chain and the finance sector, amongst others."

AIA will be launching the platform this month. Calculations will be available for sugar, cotton, grains, beef, sheep, goats, feedlot, and pork on launch, with dairy, eggs, poultry, horticulture, rice, fisheries, aquaculture, wine, and other commodities to follow.

Once launched, growers will be able to access the AIA EAP directly via the SRA website and through participation in the Smartcane BMP program.

Website link:
www.aiaeap.com

FIVE-YEAR PBRI PLAN CONTINUES PLANT BIOSECURITY COLLABORATION

The Plant Biosecurity Research Initiative (PBRI) launched its new five-year strategy in April, aimed at facilitating collaborative research investments to minimise biosecurity threats to Australian plant industries.

The PBRI is a cross-sectoral collaboration, comprising all seven plant Research and Development Corporations (RDCs) – including Sugar Research Australia (SRA) – fostering research and extension activities for better biosecurity outcomes.

SRA has been an active member of the PBRI since its inception in 2017, renewing its commitment to the initiative by signing on to Phase 3 of the program in June last year.

SRA Research Mission Manager Dr Stephen Mudge represents SRA on the national initiative and assisted in the development of both the new five-year PBRI Strategy and the Annual Investment Priorities for 2024, identifying immediate R&D priorities.

"The PBRI is unique, in that the seven plant RDCs have pooled their funding to collectively invest millions into biosecurity research, development and extension," Dr Mudge said.

"It's a co-ordinated approach that ensures our broader national goals are aligned, and is a very good model to develop technologies that are going to be broadly applicable, with increased efficiencies and less duplication of effort."

From 2018-2019, the RDCs involved in the PBRI invested $118 million towards the program.

The new five-year strategy has four key focus areas, including early warning and risk, diagnostics and surveillance, resilient crop protection systems, and readiness and recovery. Collectively the Strategy aims to support plant industries – including sugarcane – to be better prepared for the arrival of new biosecurity threats, and ensure industry is equipped to detect and diagnose new threats for a rapid response and recovery.

"It is common knowledge that plant biosecurity risks are growing due to rising global trade and travel, increased agricultural expansion and intensification, rising urbanisation close to farmlands, and other factors such as climate variability," Dr Mudge said.

"Australia's biosecurity systems must remain strong and focussed to tackle future challenges. Our research plays a critical role in this."

Dr Mudge's work on the PBRI is part of SRA's Research Mission 2 which places significant emphasis on biosecurity when it comes to plant health in sugarcane.

As well as partnering with Australia's seven RDCs, the PBRI also works collaboratively with Plant Health Australia and the Department of Agriculture, Fisheries and Forestry. The PBRI also supports capability building through its Biosecurity Extension Community and the PBRI Plant Health Student Network.

The other big event on the PBRI calendar is the biannual PBRI Symposium, which this year was held in Cairns from 8-9 May. SRA Research Mission Manager Stephen Mudge's involvement as a member of the technical organising committee of the 2024 symposium ensured that the sugarcane industry and SRA were well represented at the event. The program included presentations by SRA's General Manager for Variety Development Dr Jason Eglinton (pictured below right) and SRA PhD student Hang Zu (pictured below left). Dr Mudge also chaired one of the panel sessions (pictured below centre), and Tully Sugar's Cane Productivity and Development Manager Greg Shannon represented industry on an industry panel.

SRA Principal Agronomist Dr Danielle Skocaj took growers through a hybrid OSNM/SIX EASY STEPS workshop at South Johnstone in May.

GROWER FEEDBACK FROM THE OSNM TRAINING PROGRAM

"I've been farming with my father for the past five years, so it's been good to gain a better understanding of each chemical and how they affect the process of the cane growth."

"The course was good, lots of information."

"The course was well organised and contained maximum information."

"The (SIX EASY STEPS) program was extensively covered very well. I appreciated it."

MILESTONE FOR **ONLINE NUTRIENT MANAGEMENT PROGRAM**

SRA's Online Sugar Nutrient Management (OSNM) training program recently reached a major milestone, celebrating its 100th graduate.

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

SRA District Manager Southern Lisa Devereaux said surpassing the 100th graduate mark was a significant achievement for the program, which was launched in March 2023.

"I suppose what has been most rewarding is there has been consistent uptake of the program, month on month," Ms Devereaux said.

"It's encouraging and the feedback we've received from growers who have undertaken the training has been positive.

"The course is available free to all levy payers, it's easily accessible on-line and growers can log on and off, and finish the course at any time."

As part of the OSNM training program, a series of hybrid workshops have been held from Bundaberg to Mossman, to assist growers to complete their online training.

Almost 20 growers attended a hybrid workshop at CANEGROWERS, South Johnstone in May, presented by SRA's Principal Agronomist Dr Danielle Skocaj.

Dr Skocaj took growers through the SIX EASY STEPS to improved nutrient management including: understanding sugarcane soils - properties, processes and nutrient loss pathways; the importance of balanced nutrition; how to collect soil and leaf samples; interpreting test results; identifying nutrient requirements; and, nutrient management plans, and nitrogen and phosphorus budgets.

Growers can sign up for the OSNM program by visiting the SRA website: sugarresearch.talentlms.com/index

The South Johnstone workshop was funded by Cassowary Coast Reef Smart Farming through the partnership between the Australian Government's Reef Trust and the Great Barrer Reef Foundation and Sugar Research Australia in partnership with UniSQ through funding from the Australian Government's National Landcare Program.

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

STUDENTS LEARN THE STEPS **IN DIAGNOSING SUGARCANE DISEASE**

Sugarcane disease identification was the subject which drew 20 students, tutors, and staff together at Woodford for two days at the end of February this year.

SRA Woodford Station is well known for its work in screening new varieties of sugarcane for resistance to:

- Fiji leaf gall
- Ratoon Stunting Disease (RSD)
- Leaf scald
- Sugarcane mosaic
- Red rot
- Smut
- Nematodes
- Chlorotic streak (research only).

Its large farm features a multitude of blocks growing various cane varieties which have been inoculated with different diseases and is therefore an ideal location to teach the basics about sugarcane disease identification.

Every two years the station hosts two days of intensive training for sugar industry participants which this year included productivity services staff, commercial agronomists, Department of Agriculture and Fisheries extension personnel, SRA staff, cane farm managers for milling companies, students, and growers.

The workshop is not only a chance for SRA researchers to talk about the basic symptoms and diagnostics for the major sugarcane diseases but also to discuss updates in current research in disease management, and new detection tools.

This year's workshop also featured a guest speaker - Christine Horlock, Principal Scientist, Plant Health, at Queensland Biosecurity who talked about the key points to know about sugar biosecurity and the responsibilities of on-farm biosecurity.

Manager Biosecurity and Disease Screening at Woodford, Dr Shamsul Bhuiyan warmly thanked SRA's researchers who had travelled to Woodford for the workshop including: Dr Seona Casonato, Leader Field Pathology, based in Tully; Dr Chuong Ngo, Molecular Plant Pathologist, based at Indooroopilly; Elizabeth Wilson, Quarantine Senor Technician based at Indooroopilly; and Woodford staff, Andrew Greet, Field Operations Leader; Kylie Sheering, Chandra Patel and Anuroop Manandhar, Pathology Senior Technicians; Annette Rapmund, Pathology Technician; and Roger Houghton, Farm Technician.

Some of the key teachings about disease diagnosis included:

- The need to observe as much background detail as possible since the symptoms may be the result of disease, pest, nutrition, environment, weather, genes, chemicals, and/or physical damage.
- The need to record the main problem or symptom:
  - Detailing the parts of the plant affected
  - Knowing the variety and whether it is susceptible to a particular disease
  - Recording where the problem is (locality or region) and if a common disease exists there
- How the symptoms are distributed in the block e.g. whether there is a scattering of individual plants; a whole block affected; certain rows affected with adjacent rows healthy; a short length of a row affected mixed with healthy plants; in a well-defined patch.
- What the soil type is and its geography.
- What the current or previous seasonal conditions are.
- Whether the problem might be caused by a farming practice e.g. cultivation, herbicide, fertiliser, irrigation, harvest and/or planting.
- Where the plants were sourced.
- Whether insect damage rather than disease could be the culprit.

One of the most important pieces of advice the students received was to seek assistance if needed by sending specimens and photographs to an SRA pathologist for further investigation or confirmation of diagnosis.

Class discussion about pachymetra with Dr Seona Casonato.

MERINGA FIELD DAY

Grey skies may have loomed for most of the day, but it didn't stop a strong turnout of growers attending the Meringa Station's Field Day on 30 April.

As has become customary, the day allowed the station to showcase the significant research activities conducted by SRA, aimed at meeting industry challenges and opportunities.

SRA's Northern Variety Development Manager Dr Felicity Atkin conducted tours of the station's Variety Development Program, including the Photoperiod facility, and gave an update on northern cane varieties.

Senior meteorologists from the Bureau of Meteorology were also on hand to discuss weather and forecasting models, including forecast insights, and understanding how weather forecasts are produced.

Growers, millers and other industry partners took the opportunity to talk to SRA researchers and senior field-staff one-on-one, discussing issues affecting their own farms and potential solutions.

SRA Weed Specialist, Emilie Fillols, was on hand to discuss emerging weeds, including balsam pear, and also encouraged growers to take part in the current industry weed survey. Read more about the survey on Pages 18-19.

SRA Manager Industry Services Operations, Dr Heidi du Clou, updated and demonstrated to growers opportunities for the handheld MicroNIR instrument being developed by SRA. The device has the potential to be used in the paddock to predict nutrient parameters for mill mud and soil, and maturity for in-field crops.

Vivien Dunne and Andrew Rigby from SRA's Variety Development team engaged with growers and millers taking them through the plant breeding process. While District Manager Burdekin, Terry Granshaw, was also on hand to discuss the latest smart irrigation practices and technologies, bringing major benefits to growers in the Burdekin.

SRA District Manager Far North, Gavin Rodman, said drone technology, soil health, Sunn hemp trials, and the Mulgrave CCS Improvement Project (CANEGROWERS Cairns region), were some of the other engaging presentations on show.

"The day is intended to give our growers, millers and other stakeholders a first-hand insight into the research projects and adoption activities that are happening here at Meringa to solve industry challenges and ensure a bright future for growers and industry Australia-wide," Mr Rodman said.

"We employ some of the leading sugar researchers in the world, and as an industry-funded organisation, it's important that industry gets to engage with the faces behind our various projects, and for us as an organisation to show industry where their investments are being spent.

"We received a lot of great feedback from the day and positive interest in the activities we are investing in, as well as other activities contained within our District Productivity Improvement Plans.

"We always have a great turnout of growers for SRA field days and this year was no exception, which is good to see."

Other organisations with displays included the Queensland Department of Agriculture and Fisheries, and the Wet Tropics Management Authority.

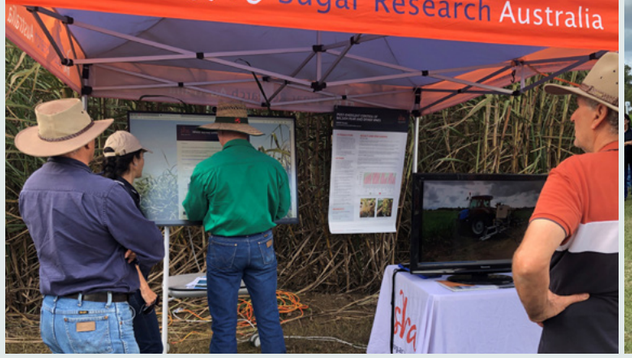
MERINGA FIELD DAY

The Field Day was an interactive day for participants, pictured here with SRA Plant Breeding Technician, Variety Development, Ryan Smith (right).

Cane growers pictured at the Meringa Field Day (L-R) Joe Cabassi, Rico Cabassi, Vince Cabassi and Luke Cabassi.

SRA Variety Officer, North, Andrew Rigby (left) discussing the differences between recently released northern cane varieties with Gordonvale cane grower Michael Porta.

SRA's Northern Variety Development Manager Dr Felicity Atkin takes Field Day participants through the photoperiod facility at the Meringa Station.



Growers watch the process of completing a weed distribution survey with Weed Scientist Emilie Fillols on hand to assist.

SRA District Manager Central Dylan Wedel and MAPS CEO Anthony Schembri welcome the crowd.

Entomologist Technician Jennifer Parry from Bundaberg talks to growers about farm surveys of soldier fly populations.

SRA Manager Translation Research Barry Salter talks to grower Danny Swift from Proserpine about building healthy soil on his farm.

Dylan Wedel talks to a grower about automated irrigation.

MACKAY FIELD DAY

GOOD CROWD FOR MAPS/SRA COMBINED FIELD DAY EFFORT

The move from early morning to a lunchtime start seemed to appeal to growers who turned up in greater numbers for this year's MAPS/SRA field day.

An estimated 180 people visited the field day throughout the event with showers conveniently holding off until late afternoon.

Among the highlights was MAPS CEO Anthony Schembri's variety walk with SRA Variety Manager Dr George Piperidis on hand to provide growers with the finer details of the cane varieties in view on the Victoria Plains seed plot farm.

Project Manager Dr Matt Schembri spoke to growers about the results of the Cane to Creek Mackay Whitsunday water quality project he has worked on over the past few seasons which is now concluding.

Weed scientist Emilie Fillols was on hand to show growers the Autoweed sprayer technology for precise weed control saving herbicide costs. She also encouraged them to take the weed distribution survey with her, on the spot.

It was an opportunity for SRA District Manager Central Dylan Wedel to talk to growers about the advantages of automating their irrigation systems with the help of District Delivery Officer Kerryn Davison.

In town for the field day was Entomology Technician Jennifer Parry based at SRA Bundaberg, who spoke to growers about the soldier fly surveys she is conducting on farms and encouraging them to get involved.

Research Agronomist Dr Barry Salter talked about his project work regarding soil constraints and asked growers about their own concerns relating to agronomic matters on their farm.

Variety Officer Chris Toms held a variety competition to find out which growers really knew their cane.

In the afternoon participants from CANEGROWERS' inaugural Sugar Cubed Conference arrived in a tour bus to inspect the booths and network with growers, MAPS and SRA staff alike.

CCRSF project leader Debra Telford (pictured) gave an update on the Reef Smart program at the South Johnstone Showcase.

SRA's on-board automated harvester sterilisation unit was on display for Showcase attendees.

The Showcase was also an interactive day with weed and plant breeding displays for growers to view and discuss.

SOUTH JOHNSTONE SHOWCASE

SHOWCASING SRA AND REEF SMART FARMING IN SOUTH JOHNSTONE

Around 30 sugarcane growers attended the South Johnstone Showcase at Innisfail on 16 May, a joint event hosted by Sugar Research Australia (SRA) and Cassowary Coast Reef Smart Farming (CCRSF).

SRA District Manager Herbert, Phil Patane, began the day with an outline of South Johnstone's productivity goals, as well as other major objectives contained within the area's District Plan.

The day received broad positive feedback from growers in attendance, listening to presentations from SRA researchers on latest project activities including the Northern Breeding Program, the Beyond Imidacloprid and Soldier Fly projects, and a region-specific weed management update on balsam pear and nuava sedge.

"It's been a very positive day in the sense that we've had about 30 growers attend today and it's great to be able to show them some of the SRA research that is happening on the ground in the South Johnstone District, and also research that we are doing on a grander scale," Mr Patane said.

"It was also valuable to see the great work that the Cassowary Coast Reef Smart Farming Project is doing with Deb (Telford) and her team because a lot of that work is on-ground, and it complements SRA's research on a practical scale."

The CCRSF Project is managed by CANEGROWERS Innisfail. CCRSF project leader, Debra Telford, gave an update on the program and how its extension activities were supporting SRA in implementing emerging research at ground level.

"We've really been working as a team with SRA and other advisors operating in our backyard," Debra said.

"What we've been focusing on is what more we can do when it comes to improving reef water quality and that involves improving our productivity to reduce the nitrogen surplus.

"One of the first things we did was an assessment of the nutrition and disease status of our crops by sampling 100 blocks. By understanding constraints, we can prioritise what we are managing and then implement practice improvement."

CCRSF Extension Officer Peter Becke presented local productivity data for Pachymetra-resistant sugarcane varieties, while project partner Professor Bernard Schroeder from the University of Southern Queensland gave a captivating presentation on soil-specific agronomy.

The showcase also included displays of a purpose-built bed former, as well as an automated harvester sterilisation system being trialled by SRA, to limit transmission of Ratoon Stunting Disease (RSD) - read more about this project on Pages 30-31.

Australian Government | REEF TRUST | Great Barrier Reef Foundation

Cassowary Coast Reef Smart Farming is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.

SRA ON SHOW AT NQ ROTARY FIELD DAY

The Burdekin and Herbert Districts were flying the SRA flag at the NQ Rotary Field Day held in Townsville on 4-5 April.

Despite hot, humid conditions, cane growers from across the north turned out, with many popping in to say hello at the SRA stand.

A host of SRA's project activities were on display over the two-day event, including drone research, automated irrigation technology, soil nutrition guidelines, Harvest Mate, Variety Guides and canegrub management.

SRA District Manager Burdekin Terry Granshaw said it was great to see so many growers visiting the SRA display, with lots of interest shown in various research activities.

"It's always good to see growers at these events. The feedback was very positive, and growers were happy that we were there."

NQ ROTARY FIELD DAY

It was a family affair for Charlie Papale (pictured) who took along his grandchildren Nate Quagliata, William Searle and Chad Quagliata to the SRA display, pictured with Terry Granshaw.

Angelo Turiano (left) and Joseph Di Bartolo, popped into the SRA stand.

Ingham cane grower Alan Robina (left) with SRA District Delivery Officer Glen Park at the Field Day.

PRACTICING WHAT WE PREACH

SRA has a strong track record of delivering research and extension activities that are tailored towards improved water quality outcomes, and staff are also leading by example.

SRA's Herbert Field Operations Leader Vince Blanco (*pictured*) was recently recognised by the Great Barrier Reef Foundation (GBRF) after enlisting the Herbert Station into the GBRF's Lower Herbert Water Quality Program two years ago.

Under the program, Vince established a nitrogen and phosphorous budget, which was calculated to have prevented more than 125 tonnes of dissolved inorganic nitrogen (DIN) from entering the GBR lagoon each year.

SRA General Manager Variety Development, Dr Jason Eglinton, commended Vince for the achievement, noting that while SRA does important research work in the water quality area, it was important as an organisation to implement best practice as well.

Vince was presented with a certificate of appreciation and a personalised letter of acknowledgement from the GBRF, which also included recognition of SRA's participation in Best Management Practice (BMP).

"The (GBRF) letter is addressed to me, but as I see it, it's SRA's contribution to improving water quality and the Great Barrier Reef as well," Vince said.

WATER AND WEATHER **ON THE TABLE IN TULLY**

Growers in the Tully region attended an SRA-hosted workshop to talk all things water and weather on 1 May.

More than 20 growers and industry partners were provided with an update on local water quality results from Tully waterways collected over the past three years. The updates were presented by Terrain Water Quality Monitoring Leader Alicia Buckle, JCU TropWATER principal research officer Aaron Davis, and CSIRO research agronomist Tony Webster.

Growers heard about nutrient, sediment and pesticide levels in local waterways, and the results of a study into the effectiveness of a vegetated drain in Lower Tully at removing nitrogen from the water. They were also presented with data that showed areas where water quality has improved, and where improvements can still be made.

The workshop also heard from Bureau of Meteorology senior meteorologists Jonathan How and Claire Yeo, who presented an overview of weather and forecasting models used by the Bureau, and how weather forecasts are produced.

The pair also explained climate drivers, anomalies and models, and how growers and agronomists could use the Bureau's products to benefit their specific locations and seasonal timeframes.

A Q&A session followed the presentation, where growers explained the significance of anomalies in forecasting predictions and how it impacted their farming businesses.

The workshop was organised by Tully-based SRA agronomists Nancy Rincon and Erin Headon, and SRA Manager Research Missions Cathy Mylrea. It was also supported by the Cassowary Coast Reef Smart Farming project.

"It was great to have Terrain and the Bureau of Meteorology here in Tully and we hope to have them here again in future," SRA agronomist Nancy Rincon said.

"The growers came to learn about the latest climate and weather forecasting tools, and hear local water quality results. These tools can help growers make more informed management decisions by providing insight into seasonal conditions that affect productivity."

Australian Government | Reef Trust | Great Barrier Reef Foundation

Queensland Government

The Cassowary Coast Reef Smart Funding project is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation. The Water Quality Monitoring is also supported by the Queensland Government office of the Great Barrier Reef and World Heritage.

BUREAU OF METEOROLOGY WORKSHOPS

The Tully water and weather workshop (read above) was the last stop on a tour of sugarcane growing areas for the Bureau of Meteorology earlier this year.

Bureau of Meteorology senior meteorologists Jonathan How and Claire Yeo presented to growers at four workshops, starting at Mackay on 15 March, Ballina and Isis in April, and two presentations at the Meringa Field Day on 30 April.

At each workshop Mr How and Ms Yeo delivered an overview of the Bureau's weather and forecasting models, how weather forecasts are produced, and how growers and agronomists could use the Bureau's products to benefit their specific locations and season timeframes. Each session included Q&A sessions where growers could discuss climate drivers, Bureau models, and anomalies, including how anomalies impact farming businesses.

Bureau of Meteorology senior meteorologists Claire Yeo (front left) and Jonathan How presented workshops for sugarcane growers at Mackay, Ballina, Isis, Tully and Meringa earlier this year.

WOMEN IN SUGAR

SRA's Principal Agronomist Dr Danielle Skocaj (pictured right) with Women in Sugar Herbert president Leah Russo at the Women in Sugar Australia Conference in Ingham where Dr Skocaj was a guest speaker.

'Women Powering Agriculture' was the theme celebrated at the 2024 Women in Sugar Australia (WISA) conference held in Ingham from 28-30 April.

More than 100 women (pictured below) gathered for the annual event, hearing from a range of speakers across agriculture and business, and networking over the three days.

SRA's Principal Agronomist Dr Danielle Skocaj was among a strong line-up of presenters, and spoke about the key qualities of a trusted advisor working in the sugar industry.

Referencing the Queensland Extension Model of Practice (Williams, 2020) Dr Skocaj said trusted agricultural advisors, such as extension officers and agronomists, played a critical role in supporting farmers, and helping to ensure the success of their farming operations.

"Trusted agricultural advisors develop respectful and trusting relationships with their growers," Dr Skocaj said.

"The farmer needs to always feel reassured they feel listened to and heard. Their values, needs and priorities must be well understood, and the advisor considers these when working alongside the farmer to develop solutions and strategies specific to their individual needs.

"How we work alongside our farmer is what makes the difference. Not how much we know, or the experience we have, it's the working relationship we build with them."

Dr Skocaj said extension officers required a certain level of experience and technical knowledge to enable them to give the best possible advice and recommendations.

However, farming is not "a recipe", therefore understanding best management principles, and the practices and strategies to get there needed to be developed in conjunction with the grower and tailored to their specific circumstances.

"Knowledge should inform decisions (and) evidenced-based insights should always support the advice received on farm," she said.

"Empathy is also a critical component of building these relationships with our farmers. This includes being understanding of the conditions they face and also considerate of their individual circumstances when tailoring your advice."

Dr Skocaj spoke about her own farming background living on her family's sugarcane property in Tully and leasing a sugarcane farm with her husband David - an experience she credits with allowing her to become a better advisor in her current role with SRA.

"(My first-hand experiences) have helped me understand the challenges farmers face day-to-day. This really hit home in 2018 when my dad experienced a horrific on-farm accident resulting in the loss of his left foot. He endured many surgeries, a long hospital stay and lengthy rehabilitation program all while doing his best to run the farm remotely.

"So, my husband, my family and I maintained our full-time (work) roles while also managing a 10,000 tonne cane farm, and harvesting a watermelon crop. It was a relief to have Dad join us back on the farm determined to operate machinery and see out the end of the 2018 season despite his amputation."

The annual WISA conference recognises the significant role women play in the sugar industry and the contributions they make across industry and supply chain. WISA has active members in the Herbert, Burdekin, Mackay and Bundaberg regions and have regular meetings to network and provide each other with support.

DISTRICT PRODUCTIVITY PLANS - CURRENT PRIORITIES

INITIATIVE	COLLABORATORS	PROPOSED OUTCOME	STATUS – June 2024
Far North District Manager: Gavin Rodman E: grodman@sugarresearch.com.au M: 0476 807 355.			
Mulgrave CCS Improvement Project	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.	The Mulgrave CCS Improvement Project has recently shared with the industry in the Mulgrave and Babinda areas initial insights on potential CCS impacts. These include; crop age at harvest, increasing ash %, timing of planting and harvest scheduling, use of growth regulators/ripeners, topping practices, row profile and crop presentation, and Pachymetra root rot. The project has developed a suckering estimation tool and also produced templates to support appropriate row profiles. As an extension of the findings of the project, Pachymetra and row profile surveys have been completed for Mossman. A row profile survey has been completed for the Tableland, with a Pachymetra survey planned for late-2024.
Development of maturity calibration for MicroNIR	Far Northern growers.	Develop a calibration for the MicroNIR unit to support rapid infield maturity measurements.	A preliminary calibration has been developed for sugarcane maturity, with further sampling and calibration planned for 2024.
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.	Balsam pear post-emergent trial results have been shared with industry. Initial balsam pear pre-emergent trials have recently concluded. Additional navua sedge field trials have been established to further investigate control strategies. Collection of itch grass seeds for germination protocol development for pot trials is ongoing.
North District Manager: Phil Patane E: ppatane@sugarresearch.com.au M: 0431 818 482			
Local Expert Analysis (LEA) South Johnstone	Innisfail Babinda Cane Productivity Services, CANEGROWERS Innisfail, local growers, MSF Sugar, Cassowary Coast Reef Smart Farming Project and local industry organisations.	In mid-2021 a Local Expert Analysis (LEA) was initiated in the South Johnstone District. A general LEA industry reference group was formed for the area which included local industry scientists from agronomy, pathology, machinery, variety development and Near Infrared (NIR). The group objectively considered local constraints influencing yield and milling operations. The LEA is embedded in the South Johnstone District Productivity Plan.	The initial LEA analysis suggested that the most significant constraints affecting productivity were poor nutrition in older ratoon crops, severe Pachymetra root rot, widespread incidence of RSD, low uptake of Pachymetra resistant varieties, poor adoption of highly productive new varieties, less than ideal extension materials and insufficient quantities of approved seed. There is also opportunity to adopt tools, such as Harvest Mate, to optimise economic returns for industry. Targeted actions have now been assembled to address the known constraints. Recent activities have included reviewing the results of a district wide soil and leaf survey (which has been supported by the Cassowary Coast Reef Smart Farming project), increasing the availability of Pachymetra resistant varieties through tissue culture, implementation of a Regional Variety Trial (assessing clones, standard varieties, and newly released varieties on marginal soil) and the installation of RSD sterilisation a prototype unit on a commercial harvester. SRA and CCRSF delivered a successful South Johnstone showcase event to present and demonstrate research and extension activities targeting local productivity constraints.
Local Expert Analysis (LEA) Tully	Tully Cane Productivity Services Ltd (TCPSL), Tully CANEGROWERS, COFCO Tully Sugar Limited.	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.	The initial LEA analysis suggested the most significant constraints affecting profitability. Current projects including a new project led by TCPSL (funded by the Office of the Great Barrier Reef) are providing tailored advice on achieving balanced nutrition, identifying and managing some of the productivity constraints identified through the Tully LEA.
Variety observation plot and CCS maturity profiling	SRA Plant Breeding.	Variety demonstration plot and CCS maturity profiling.	Completion of CCS curves for the 2023 season data analysed and added to the 2022 season dataset. Results will be presented to local industry and added to the Herbert Variety Guide. Sample collection for the 2024 CCS curves has begun.
Sterilisation unit for harvesting	Fire Suppression Services Qld Pty Ltd.	Prototype automatic spray unit to clean a commercial harvester to minimise RSD transmission.	From the improvements made to the original units commissioned, additional units have been installed during the 2024 offseason in the Burdekin, Herbert and Tully regions. The installations have targeted different harvester brands and models.
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, Reinaudo Farming Company.	Improved understanding of nutrient requirements following application of surface banded mill mud to manage effects on yield and CCS.	Two trials implemented. Both sites are located in the Orient - mill mud was surface banded at 80 t/ha on first ratoon cane.
Rat Management Program	Animal Control Technologies Australia, Herbert Cane Productivity Services Limited, CANEGROWERS Queensland, CANEGROWERS Herbert River, QCAR and ACFA.	Management of increase in ground rat population.	Permit obtained to allow emergency use of a registered agvet product for control of Australian native ground rats in ratooning sugarcane crops. Five trial sites to assess five different types of attractants on sachets of RATOFF® product were established. Statistical analysis of bait acceptance rates identified suitable attractants. Permit for approval from APVMA to use attractants has not been granted.

INITIATIVE	COLLABORATORS	PROPOSED OUTCOME	STATUS – June 2024
Burdekin District Manager Terry Granshaw E: tgranshaw@sugarresearch.com.au M: 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 Sugar 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.	BIP Demonstration Site 1 treatment increased volume and end of row sensor detection. BIP Demonstration Site 2 treatment increased volumes and end of row sensor detection. BIP Demonstration Site 3 now uses surge irrigation to match water holding capacity and maintain lateral soakage. BIP participants showcase their irrigation practices at the recent ASSCT ag tour. XXXX project legume demonstration site planted to an experimental soybean variety. Irrigation treatments as per previous crop, sensors installed. Harvesting of the crop soon.
Reducing herbicide usage on farm with precise weed control	Autoweed, James Cook University, Queensland Department of Agriculture and Fisheries.	Reduce herbicide use by comparing efficacy of weed control and evaluate economic savings.	Spray trial 10, 11 and 12 have been conducted on three commercial paddocks using Autoweed. Castor oil bush was sprayed in a soybean crop with Blazer® at night using LED lighting. A green on brown trial was set up measuring blanket spray vs spot spray in a fallow paddock. Feathertop Rhodes grass and other smaller grasses were targeted using a blanket spray compared with a spot spray. Spray trial 12 was a 36ha paddock where nutgrass was sprayed in plant cane with Sempra®. This trial resulted in 90% less sprayed herbicide in the spot treatments compared to the blanket. The Autoweed spray rig was demonstrated at the autonomous vehicle field day and ASSCT ag tour.
Burdekin phosphorous response trial	Wilmar and Burdekin Productivity Services.	Investigate phosphorous management for sugarcane crops growing in alkaline soils.	Site 1 ratoon field experiment in the BRIA has had plant sampling and soil sampling completed. Site 2 in the BRIA and Site 3 in the Delta have had electromagnetic soil surveys, soil sampling and establishment of new field experiments. Establishment of first pot experiment has begun.
Sterilization unit for harvesting	Fire Suppression Services Qld Pty Ltd	Prototype automatic spray unit to clean a commercial harvester to minimise RSD transmission.	Unit has been installed on a commercial harvester in the Burdekin ready for the 2024 season.
Imidacloprid trials	Burdekin Productivity Services	Investigate liquid vs granular imidacloprid in early plant cane	Two sites in high grub pressure zones that have been early planted have been earmarked as potential trial areas.
Central District Manager Dylan Wedel E: dwedel@sugarresearch.com.au M: 0490 029 387			
Increasing irrigation utilisation	Sugar Services Proserpine, Plane Creek Productivity Services Ltd, Mackay Area Productivity Services, Eton Irrigation, Greater Whitsunday Alliance (GWA), in Agriculture Working Group and growers.	Increase utilisation of irrigation to increase profitability and productivity. Note: Seeking more growers to work with on irrigation trials.	Field walks at our demonstration sites are underway showcasing low-cost scheduling and system control tools in action. These provide interested growers with the opportunity to try the Chameleon Soil Moisture probes to access live soil moisture data on their phones. This assists growers with the adoption of low cost irrigation tools to make their irrigation systems less labour intensive e.g. remote pump starting and auto shutoff, monitoring dam levels – there is a solution to most challenges!
Supporting complementary fallow cropping	Productivity services companies and growers.	Improve productivity and profitability by breaking the monoculture with a complementary cash crop.	The SRA soybean planter has been returned to service and is available to growers to trial complementary fallow crops. Earlier this year several paddocks were successfully planted – 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: Crop Ripener	Productivity services companies and growers.	Improve CCS when cane is harvested earlier in the season.	Several growers have taken advantage of crop ripeners this season with positive responses. Local growers are encouraged to contact SRA if they would like us 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 E: ldevereaux@sugarresearch.com.au M: 0456 590 497			
Bundaberg/Wide Bay	Bundaberg Sugar Services, Isis Productivity Ltd, CANEGROWERS Maryborough	Identification of industry constraints.	Bundaberg and Maryborough Soil Data reports analysed. Discussion points for further work plan to be addressed early 2024. Soil and leaf survey samples waiting results. Soldier Fly project (2022/004) project commenced. Document brief and communication plan shared with industry. The pilot Bundaberg Researcher in Residence program with Dr Seona Casonato is scheduled for November. Tender successful for Queensland Department of Environment and Science (DES) Sugarcane Practice Change program for the Burnett Mary River region with IPL and CANEGROWERS Maryborough.
Rocky Point Pest and Disease Management Surveys	CANEGROWERS Rocky Point	To deliver district-based activities that improve productivity, profitability and sustainability outcomes for the Rocky Point district.	The Service Agreement was renewed between Rocky Point and SRA for a further two years to support collaborative projects that will assist the productivity of the local industry. A 2024 Strategic planning day was completed on review of the previous 12 months and direction set for the following year. New projects considered include an observation trial of mineral mulch; updated pest management plan with linkages with university collaboration and research input and the irradiation of fire ants when harvesting. Waiting results from the nematode project sampling.
NSW multi-year productivity program	NSW Agricultural Services NSW Sunshine Sugar	Improved profitability and productivity through various projects including the development of an economic model for farmers to determine whether to harvest one or two year cane.	The Service Agreement was renewed between NSW and SRA for a further two years to support collaborative projects that will assist the productivity of the industry. Project commenced August 2023. The initial phase is to understand the criteria, trends and drivers suited for growing one year old cane in the Harwood and Broadwater areas.
SIX EASY STEPS® Online Sugarcane Nutrient Management Program	Department of Environment and Science, CANEGROWERS	Enable all Australian sugarcane growers to access nutrient management training that will improve the efficiency and productivity of their farms if applied.	The program receives new registrations weekly through wider promotional activities. Participants who finish the program receive a certificate of completion.

RESEARCH PROJECT INVESTMENTS

PROJECT IDENTIFIER	TITLE	CHIEF INVESTIGATOR	RESEARCH AGENCY	END DATE
Research Mission 1: Profitable and Productive				
2020/003	Maximising cane recovery through the development of a harvesting decision-support tool	Phil-Anthony Patane	Sugar Research Australia	1/12/2023
2022/012	Use of machine learning to determine the extraneous matter and billet length in cane consignments	Geoff Kent	Queensland University of Technology	1/02/2027
2022/014	Australian Sugar Industry – Development of factory training modules – Phase 3	Bruce King	Sugar Research Institute	1/03/2027
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	6/10/2023
2023/201	Bagasse fly ash system performance benchmarking	Jonathon Gilberd	Wilmar Sugar Australia Limited	30/06/2024
2023/202	Evaluating the suitability of measuring massecuite dry substance for control on Australian pan stages	Bryan Lavarack	Mackay Sugar Limited	1/07/2024
2023/203	Billet Quality Assessment	Barton Wixted	Grifith University	30/06/2024
Research Mission 2: Resilient and Enduring				
2018/010	Moth borers - how are we going to manage them when they arrive?	Kevin Powell	Sugar Research Australia	1/06/2025
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	1/03/2025
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
2022/002	Updating the Sugarcane Industry Biosecurity Plan	Stuart Kearns	Plant Health Australia	1/06/2027
2022/003	Fiji Leaf Gall (FLG) Eradication Strategy: Peri-urban surveillance for area freedom	Seona Casonato	Sugar Research Australia	1/06/2024
2022/004	Soldier fly diagnostics, distribution, and development of an artificial diet	Kevin Powell	Sugar Research Australia	1/05/2025
2022/005	Assess weed impact/distribution for prioritisation	Emilie Fillols	Sugar Research Australia	30/06/2024
2022/006	Development of a resistance screening method for chlorotic streak	Chuong Ngo	Sugar Research Australia	1/06/2026
2022/007	Delivery of a pest and disease diagnostic step change for the sugarcane industry (RSD - NIR)	Seona Casonato and Steve Staunton	Sugar Research Australia	1/12/2025
2022/015	Delivery of a pest and disease diagnostic step change for the sugarcane industry (RSD-LAMP)	Jimmy Botella	The University of Queensland	1/05/2026
2022/016	Viruses to aid biological control of major root-feeding pests of sugarcane	Michael Furlong and Kayvan Etebari	The University of Queensland	1/08/2027
2022/901	Agri-climate outlooks	Danielle Skocaj	Agricultural Innovation Australia Limited	11/06/2024
Research Mission 3: Diversified and Adaptable				
2022/018	Building industry engagement capability for a diversified and adaptable Australian sugarcane industry	Madeline Smith	Queensland University of Technology	30/06/2024

The contact email address is sraresearchinvestments@sugarresearch.com.au

PROJECT IDENTIFIER	TITLE	CHIEF INVESTIGATOR	RESEARCH AGENCY	END DATE
Research Mission 4: Sustainable and Efficient				
2020/802	Mackay Whitsunday Cane to Creek	Matt Schembri	Sugar Research Australia	30/06/2024
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 sugar and sustainability report in collaboration with stakeholders	Ingrid Roth	Roth Rural Pty Ltd	1/11/2024
2021/804	Mobilising the Murray	Simon Clarke	Sugar Research Australia	31/12/2023
2021/805	Soil specific management for sugarcane production in the Wet Tropics	Danielle Skocaj	Sugar Research Australia	13/06/2024
2022/010	Industry-wide leaf and soil survey to detect hidden macro and micronutrient constraints	Barry Salter	Sugar Research Australia	30/06/2024
2022/011	Understanding phosphorous requirements for sugarcane crops growing in alkaline soils	Danielle Skocaj	Sugar Research Australia	13/12/2027
2022/801	XXXX Lower Burdekin Smart Irrigation Project	Simon Clarke	Sugar Research Australia	1/05/2025
2022/802	Lower Burdekin Cane Major Grants Project	Simon Clarke	Sugar Research Australia	1/05/2024
2022/8803	Cassowary Coast Reef Smart Farming - Tully	Simon Clarke	Sugar Research Australia	17/05/2024
2023/901	Know and Show Your Carbon Footprint - Build 1	Bronwyn Venus	Sugar Research Australia	30/09/2024
Research Mission 5: Resourced and Skilled				
2018/015	Sugar Milling R & D Capability Building Program	Geoff Kent	Queensland University of Technology	31/03/2027
2019/102	PhD Scholarship - Genetic solutions for determining fibre quality traits in sugarcane	Angela O'Keeffe	The University of Queensland	31/03/2024
2021/101	PhD Scholarship - Optimising mill mud and ash applications for soil improvement and carbon sequestration	Hannah Green	James Cook University	30/04/2025
2021/102	PhD Scholarship - 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
2021/401	Research Award - Risk assessment for the newly discovered parasitic nematode *Pratylenchus parazeae* in the Australian sugarcane industry	Shamsul Bhuiyan	Sugar Research Australia	1/04/2024
2022/101	PhD Scholarship - A novel biosensor device for on-farm sugarcane disease diagnosis	Simon Strachan	Griffith University	29/02/2024
2022/401	Research Award - Harnessing the SynBio potential of Australia's stingless bees, the first step	Natasha Hungerford	The University of Queensland	31/03/2025
2022/402	Research Award - Genomic prediction of ratoon yield robustness	Eric Dinglasan	The University of Queensland	14/05/2024
2023/101	Development of an automated system to perform localised in-crop replanting of sugarcane gaps	Bruen Smith	University of Southern Queensland	19/03/2027
2023/103	PhD Scholarship – An economic and agronomic assessment of Nitrogen Use Efficiency and the factors influencing it	Kristopher Woodrow-Smith	The University of Queensland	31/12/2025
2023/801	DES 1231311 Sugarcane practice change program - Herbert	Phil-Anthony Patane	Sugar Research Australia	31/08/2026
2023/802	DES 1231311 Sugarcane practice change program - Southern	Lisa Devereaux	Sugar Research Australia	31/08/2026

Sugar Research Australia

CALLING ALL SUGARCANE GROWERS IN EVERY DISTRICT

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