

Varieties and plant breeding update

March 2016

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Kind season helps boost CCS levels



Bundaberg grower **John Bonaventura** recorded a peak CCS of 19 in 2015 in Q208^ϕ.

A dry harvest period for the last two years has helped Bundaberg farmer John Bonaventura achieve some of the best CCS levels that he has recorded in recent years.

Farming on the outskirts of town in the Alloway area, Mr Bonaventura recorded a peak CCS of 19.1, which according to Bundaberg Sugar was the highest for the season for the Millaquin mill area. He said he averaged about 15 over his farm with the highest levels being in the variety Q208^ϕ. He attributes the result to the weather rather than any specific management strategy, saying that the region had a mostly dry harvest.

Bundaberg Sugar said that for the 2015 season the crop had an average yield of 87.3 TCH and 14.71 CCS. According to SRA milling statistics, this compares to the 2014 season, where the average yield was 78.2 TCH and the average CCS was 14.82.

"The tonnage in 2015 was a good, average crop, and I hope that we can repeat it all again for this coming year," Mr Bonaventura said.

Mr Bonaventura plants a large amount of Q183^ϕ, which he said had performed well in the last few seasons, possibly because of the drier conditions. But he also said that Q208^ϕ was a staple variety that he felt was the "best all-rounder" in the area, and hence he would be looking to increase his area of Q208^ϕ.

He will also be planting small areas of SRA1^ϕ and SRA2^ϕ to bulk up for a reasonable planting in 2017.

"I really want to see how they perform on my conditions and my soils," he said.

Mr Bonaventura farms a mix of soils including red forest, grey forest and clay and has a strong emphasis on green cane harvesting and making sure he is on top of pests such as army worms.



SRA2^ϕ, Q252^ϕ and SRA1^ϕ on display at a Bundaberg field day last year. Mr Bonaventura said he plans to plant a small area to SRA1^ϕ and SRA2^ϕ in 2016.

New leadership for SRA breeding program

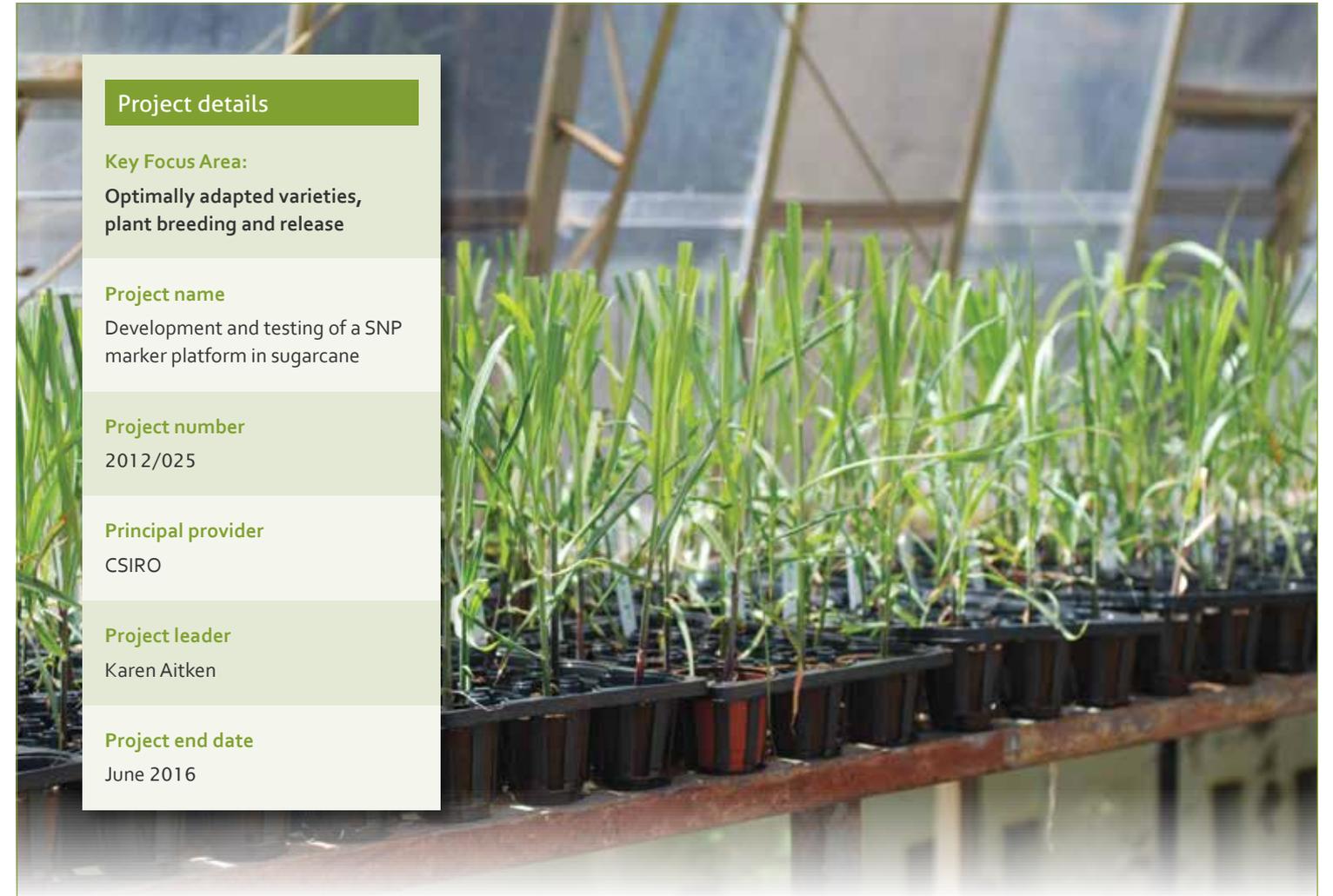
SRA has announced the appointment of Dr Bert Collard to lead the sugarcane industry's plant breeding program. He is based at SRA Meringa.

The SRA breeding program is the single biggest area of research investment that SRA makes on behalf of SRA investors, delivering new and improved varieties that are suited to local regions and that meet the requirements of growers and millers.

Dr Collard fills the leadership role in this Key Focus Area following the retirement of Dr Mike Cox in 2015.

Dr Collard's PhD involved plant breeding, pathology and genetics and he completed his Bachelor of Science majoring in Biotechnology and Botany at the University of Melbourne. Prior to taking on this role with SRA, he was a Senior Scientist in the Plant Breeding, Genetics and Biotechnology (PBGB) area at the International Rice Research Institute (IRRI), Los Banos in the Philippines. He formerly held the position of durum wheat breeder/program leader in the NSW DPI.

A full profile on Dr Collard will be published in the winter plant breeding and varieties update.



Project details

Key Focus Area:

Optimally adapted varieties,
plant breeding and release

Project name

Development and testing of a SNP
marker platform in sugarcane

Project number

2012/025

Principal provider

CSIRO

Project leader

Karen Aitken

Project end date

June 2016

Markers could open the door for enhanced sugarcane breeding

Sugarcane plant breeders could soon have access to new tools that help target better and more efficient outcomes for producing new sugarcane varieties.

These new tools have been developed as part of a large project funded by SRA and undertaken by the CSIRO in partnership with SRA and Syngenta to look inside at the genetics of the sugarcane plant.

The purpose of the research has been to look at the sugarcane genome and identify particular parts of it that are different from one clone to another clone.

These are called 'markers' and if these markers are used in the best way by sugarcane breeders, they could allow for positive outcomes in the sugarcane breeding program, which ultimately would lead to improved varieties for growers and millers.

The process is like looking at a blueprint of a particular variety and identifying which parts produce tonnes or which produce sugar or which might allow for resistance to diseases.

The researchers hope that these markers will allow sugarcane breeders at SRA to have faster and more accurate access to ways of enhancing varieties. It could lead to significant gains for the breeding program by moving some activities from the field to the laboratory.

Dr Karen Aitken with CSIRO in Brisbane is the lead investigator of the project and said that one of the areas for gain could come with using the markers as a tool to help increase disease resistance.

"Nobody in the world is using markers for sugarcane breeding, but all industries are interested in starting," she said. "Sugarcane is an extremely complex crop genetically, so at this point, we really want to determine how we will use this research in the breeding program."

At the time of writing, the final data from the project was being collected and analysed, which will allow the scientists to discuss the next steps forward.

Sugarcane breeders and other researchers will be meeting in late March 2016 to discuss the next steps and the options for the best use of markers in the breeding program.

"That discussion will be the pointy end of determining if we can use markers," she said. "I think it is a very exciting time for sugarcane breeding."

- Future editions of *CaneConnection* will inform investors of the results and next steps.
- For more information contact Karen Aitken (Karen.Aitken@csiro.au).

SRA acknowledges the funding contribution from the Queensland Department of Agriculture and Fisheries towards this research activity.



Farming a mostly two-year crop cycle, **Mark Gittoes** estimated his yields averaged between 148t and 160t per hectare in 2015.

Long road to recovery for two-year crop cycle

Until 2015, northern NSW grower Mark Gittoes had his doubts about the ability of some varieties bred for the southern end of the Australian sugarcane industry and whether they were suitable to the temperate conditions and two-year cropping cycle.

In good years, the Broadwater mill which he supplies would crush over one million tonnes of cane. But in the six years to 2014, the mill had crushed crops closer to 600,000 tonnes and as low as 378,000t in 2012. A series of bad years of frosts, wet weather and floods had meant that the two-year cropping cycle never had a chance to recover.

But that changed in 2015. The mill crushed almost 850,000t for the season and Mr Gittoes estimates that his own yields averaged between 148t and 160t per hectare. He estimates that he crushed about 12,000t for the season, about 90 percent of which was two-year-old cane.

"And the sugar has been exceptionally good, with the home farm probably one unit above the mill average," he said.

"I think it was the case that we didn't have the ideal conditions to assess the performance of many of the varieties until now."

He plants the majority of his properties to Q208[®] and believes that this year this variety has shown its potential as a two-year cane. He also says his Q200[®] performed well and had good sugar content.

"I also like the look of some of the new varieties that I have not yet had a chance to see reach two-years-old yet, including Q240[®] and Q232[®]," he said.

"The Q232[®] may have some issues with arrowing and be better suited to year-old conditions, but in saying that it really grows and has some cane on it. For me I feel it has potential for certain paddocks that are a bit poorer and might need vigorous varieties, and I have planted a fair bit where I am looking to replace old varieties that are susceptible to smut like Esk, 3120 and 3347."

The NSW Ag Services Committee has an objective of eradicating all highly susceptible smut varieties by 2017, including BN88-3108, BN88-3347, Q157, Esk and Q193[®].

Mr Gittoes also says he will try the new variety SRA1[®] when it becomes available. "I feel it is important to try all the varieties if they look suitable, as the best way to tell is to test them for yourself."

The main challenge for the 2015 season has been near-constant wet weather during harvest. "We are on four rounds of 25 percent and all of them have been wet, and pretty much everyone has been in the same boat," he said.

- Growers looking to plant their variety selection for their farm are encouraged to visit the online tool QCANESelect™ on the SRA website, or contact their local productivity services organisation.

Plant breeding team profile with Richard Cervellin



Richard Cervellin from SRA Bundaberg.

What is your role within the plant breeding team at SRA?

I am the early stages technician for the southern program, based in Bundaberg. I am responsible for the germination of seed, the conduct of our stage one (family) trials and the first clonal variety trials. I am currently working with suppliers to develop a GPS-guided planter for precision planting of variety trials.

Day to day my job varies quite a lot which is one of the enjoyable parts of working for SRA. The biggest part of my job is checking that everything is correct. Whether it be ensuring

the glasshouse is working correctly, to making sure the data we have collected is correct. Constant checking is essential to ensuring we get the best possible results, which carries through as the best possible varieties for the industry.

During the season my job consists of sampling trials for CCS and weighing the trials.

What are the major challenges associated with your job?

The biggest challenges I face are the size of my trials. A stage two (CAT) trial can contain 2200-2500 varieties. Lots of work goes into making sure that I know where every clone is planted and when I go to assess the trial that I make sure that I am collecting the correct data for the correct clone. Because of the scale of the trials and the number of clones, we are constantly searching for improved techniques to plant and sample the trials in a timely and cost effective way.

Where are the main opportunities and areas of interest for growers from the breeding program for the years ahead?

The biggest advantage SRA has over other plant breeding systems is the efficiency of our plant breeding system.

SRA is set apart from other research organisations because of our ability to select the best parents for crossing and progress the best varieties through our selection program, and then release these to the industry.

SRA has been investing in GPS systems for not only farm operations but also harvesting. This investment will help SRA develop varieties with greater precision. SRA already has extensive use of barcoding and digital capture of information. GPS guided planters and harvesters are the next step in using the latest technology to deliver the best varieties to industry.



SRA plant breeders visit sugarcane breeding facilities in China as part of the trip.

Chinese visit to drive future collaboration

Sugar Research Australia plant breeders George Piperidis, Rhylee Pendrigh, Fengduo Hu and Roy Parfitt were invited to visit the Sugarcane Research Center, Chinese Academy of Agricultural Sciences at Guangxi Academy of Agricultural Sciences (GXAAS) in November 2015. All expenses associated with the trip were borne by GXAAS.

The main purpose of the trip was to discuss crossing/ photoperiod processes and techniques, and possible collaboration in germplasm (seed and clones) exchange, and sugarcane breeding for drought and cold tolerance. It was a successful trip, with both parties learning from each other and keen to collaborate. A draft MOU has circulated to ensure continuation of the relationship and work started.