Project details

Key Focus Area: 3

Pest, disease and weed management

Project name

Pre-commercial evaluation of PCR diagnostic for RSD and development of a case for full implementation

Project number

2015/078

Principal provider

SRA

Project leader

Dr Nicole Thompson

Project end date

2017

SRA works to deliver improved RSD diagnosis

A new way of sampling and diagnosing Ratoon Stunting Disease is currently being evaluated by Sugar Research Australia.

The Australian sugarcane industry is a step closer to a more accurate and cost-effective way of sampling and diagnosing Ratoon Stunting Disease (RSD), thanks to new research projects funded by Sugar Research Australia.

The new project builds on existing recent research that has developed a new way of sampling and testing whether sugarcane fields are infected with RSD, and throughout this year the project will investigate whether this new method can meet the industry's requirements and whether it will be possible for SRA to implement on a large scale in the laboratory.

It is hoped that this could then see the new RSD sampling and testing method widely adopted for 2017.

This new project stemmed from the successful research of Dr Anthony Young (USQ) and Dr Catherine Nock (SCU), where the researchers implemented a new method of sampling for and diagnosing for RSD.

The new method is able to use samples of small punches from a sugarcane leaf-sheath, as opposed to the current method of removing whole stalks of cane from a particular field and then pumping xylem sap from them to create a sample. This means that a more representative sample from the field can be tested.

This change in practice, if implemented, would present a significant labour saving for productivity services organisations and others who are collecting the samples.

The new test is significantly more sensitive and it's hoped that it can detect RSD in sugarcane as young as two months old, whereas the current test in commercial use can only detect RSD at six to eight months old.

This improvement would help even-out the workflow of sample collection by spreading it over a longer time and it would also provide the benefit of being able to sample young cane – a far easier task than collecting samples from within mature paddocks.

Dr Nicole Thompson with SRA is leading the project in collaboration with Dr Anthony Young (USQ) and said that the next 12 months had four main objectives.

- To authenticate the results of the new testing method;
- To determine the sensitivity of the tests throughout the season;
- To determine and optimise the number of samples that can be processed each day in the laboratory; and
- To develop a business case for full implementation in 2017, if the trials are successful.

This work is being done with the support and involvement of productivity services organisations across the industry.

Dr Thompson said there was a challenge in that while the new test was well-suited to collection in the field, it was not yet an efficient high throughput process in the laboratory. The existing method can process a far greater of number of samples each day in the laboratory than the new method – although the project seeks to greatly improve that efficiency. However, one of the key advantages of the new method is that only a single sample is processed for each field, as opposed to many samples using the existing technique.

"We want to be able to provide better information about sampling, processing, and accurate costs," she said.

Dr Thompson said that employing management strategies for RSD was based solidly on diagnosing the presence of the disease, which emphasised the importance and the potential of this research.

Accurate detection of RSD allows growers and productivity services organisations to implement effective management solutions for RSD.

The simpler sample collection process for the new test is likely to stimulate greater testing and awareness of the disease and provide a more accurate picture of the extent and seriousness of the disease in all cane growing regions.

Dr Young, who was previously the Extension Officer at Harwood, NSW, has credited the enthusiasm of the Productivity Services Companies for helping to drive the project.

"Most of the Prod Boards have tried the new technique, and we've found RSD in some places that were thought to be free from the disease. Our team has had a lot of support from the end users who would be happy not to have to pump stalks in the future," Dr Young said.

The new test will not replace existing control measures of clean seed, fallow management and disinfecting planting and harvesting equipment, but it may help inform decisions about the future of RSD management.

This new SRA project is an acceleration of the existing project under Dr Young and Dr Nock, and is part of the SRA Board's emphasis on the priority Impact Area of Adoption.

The SRA Board has identified four priority Impact Areas for the Australian sugarcane industry, being Adoption, solving Yellow Canopy Syndrome, Harvest Losses, and conventional and genetically modified plant breeding.

For more information contact Dr Nicole Thompson by emailing nthompson@sugarresearch.com.au.

Ratoon Stunting Disease – what is it?

1

RSD is caused by a bacteria that is highly contagious. For example, it can spread for many metres down a row by any implement that cuts the stalk or contacts the freshly cut end of a billet or sett.

Above: Healthy stalk (top) compared to the red dots in nodes of RSD infected stalk (bottom).

2

RSD is generally present in fewer than 5 percent of fields in Australia, although in some districts RSD incidence is much higher.

3

Yield losses range from 5-60 percent depending on the susceptibility of the variety and the weather. The average loss is 15-20 percent.

4

The keys to controlling the disease are planting disease-free seed and preventing reinfection by disinfecting planting and harvesting equipment.

5

Some varieties (e.g. Q200$^{\phi}$ and Q208$^{\phi}$) have partial resistance to RSD.