



RESEARCHERS ARE CONTINUING TO UNEARTH USEFUL INFORMATION ON THE MYSTERIOUS YELLOW CANOPY SYNDROME, MOVING THE INDUSTRY CLOSER TO A BETTER UNDERSTANDING OF THE PROBLEM AND MANAGEMENT SOLUTIONS.

Yellow canopy syndrome (YCS) was first observed in Far North Queensland in 2012, and since then it has been confirmed in all growing regions from Bundaberg to Far North Queensland.

The syndrome has appeared in blocks and regions in unpredictable patterns and its impacts can, at times, be severe.

Given its significance to the industry, the syndrome has been the focus of a major research investment by SRA, via projects led by SRA and University of Queensland, with support from Western Sydney University and CSIRO.

This integrated research program is narrowing in on important discoveries associated with YCS, including the assessment of a small number of possible causes and potential management options.

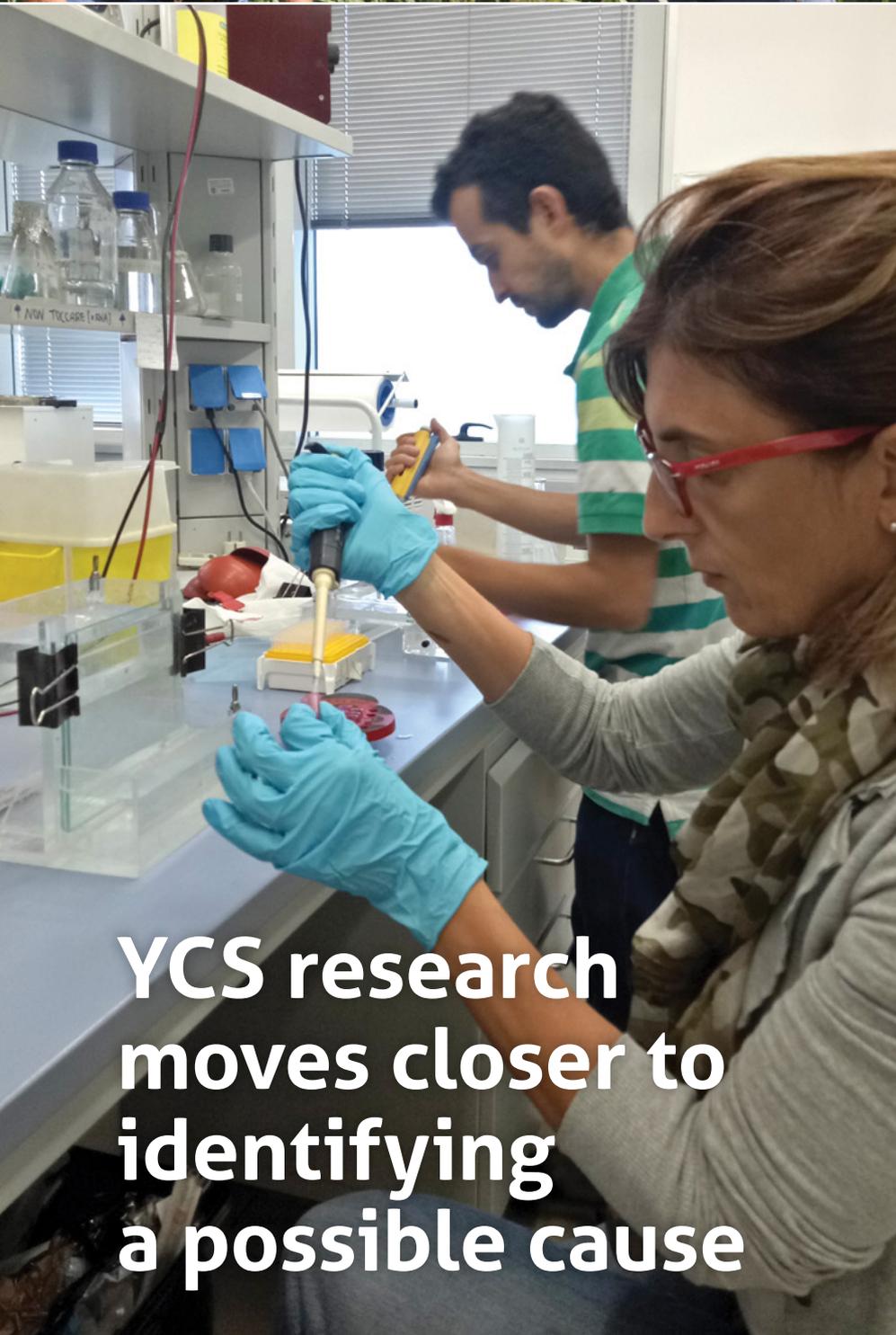
Across last year, and continuing this year, insects are an important focus via field trials in multiple regions, insect exclusion tests, and chemical treatment trials.

Experimental work does not support a single cause for YCS. It is still unknown if – or in what way – an insect could be linked to YCS, but from work so far the researchers have been able to prevent YCS symptom development and the yield losses associated with YCS by controlling insects.

In their search, they have also identified several different types of insects that the industry is generally not familiar with. It is not yet known if any of these insects are associated with YCS.

These entomological studies could lead to opportunities for management options.

However, for a management solution to be useful, this also requires a good understanding of whether a field is going to develop YCS well before it turns yellow so that any treatment has time to



YCS research moves closer to identifying a possible cause

be effective. Like most crop problems, treating the issue once you can see it usually means it is too late.

With this in mind, SRA Researcher Mr Gerard Scalia and his team at SRA's Indooroopilly laboratory have developed a prototype in-field test for diagnosing YCS. It is hoped that this test will be a useful tool for researchers and productivity services organisations to better understand YCS, and understand if a paddock has YCS *before* it turns yellow.

They are currently working to ensure the prototype test is effective and user-friendly and then determine how it could complement a management strategy for YCS.

"Early detection is one of the holy grails of our research," explained Mr Scalia. "It could help industry with potential cost savings, and would be vital to making an assessment on potential control options, once they are understood.

"At the moment, the key advice for YCS management is to continue to follow best practice farming to reduce stress on the crop which in turn should minimise the incidence and severity of YCS."

This prototype diagnostic is possible thanks to years of research that has improved the understanding of the internal workings of the sugarcane plant. Gerard and his team now have key knowledge on the internal systems of sugarcane, and the disruption to metabolic and gene expression changes that occur when export of sucrose from the leaf to the stalk is compromised, triggering the development of YCS.

Even with the diagnostic test and some new information on insects, there are other possibilities being explored.

Recently, SRA Researcher Dr Priya Joyce has consulted with world-leading laboratories in Europe on phytoplasma

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detection and analysis. Phytoplasmas are a type of bacteria that affect plants and can be spread by insects.

Through this work, Dr Joyce will apply this knowledge for the current YCS season to understand if phytoplasmas are part of the YCS question.

At the same time, SRA is also continuing to investigate variety responses to YCS. We already believe from grower observations that there is a range of variety responses to YCS, but there is a need to validate and understand these observations. SRA Researchers Dr Jaya Basnayake and Mr Sijesh Natarajan are using drones equipped with hyperspectral cameras to look more closely at YCS response for more than 30 different varieties.

This could lead to information on different varieties' yield response to YCS, and the severity of impact for different varieties.

All of this research has drawn on Australian and international expertise on topics including entomology, pathology, agronomy, plant genomics, and many others. The research teams

have continued to consult with other industries and leading global research institutions to ensure that their research is using the best available science and understanding, and that we are learning the lessons from other industries.

SRA Executive Manager, Strategic Initiatives, Dr Frikkie Botha, said that through SRA investment, the industry was moving closer to understanding the true impact of YCS, as well as identifying the cause and developing management strategies.

"SRA is uniquely placed to deliver these outcomes, with continued collaboration with leading research institutions. We have a strong team with expertise in pest management including insect vectors, as well as molecular biology and agronomy," Dr Botha said.

"We thank the industry for their patience as we persevere with this significant challenge, and look forward to refining our information for the industry as we progress this research." ■

KEY POINTS

- We are working toward a useful control for YCS
- This control has the potential to be supported by a diagnostic test that is in development
- We are investigating a number of likely biological entities together with physiological disruptions as potential causes of YCS
- We have a much better understanding of the yield impact of YCS

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

(Over page top) Ms Orna Tippett is based in the Burdekin and is working on YCS field trials, taking over locally from Mr Davey Olsen, who is pursuing his research career overseas. Dr Andrew Ward is now managing this project. (Over page bottom) SRA has recently learnt important information on phytoplasma detection and analysis from researchers at the University of Bologna, including Samanta Paltrineiri (pictured, front).