

ABOUT YELLOW CANOPY SYNDROME

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.

YCS can impact cane in a number of ways. This can range from yellowing in one or two leaves to yellowing right through the canopy. Depending on the degree of symptoms, crop growth can be compromised with potential impacts on final yields. YCS symptoms may 'come and go' in waves through the season.

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

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



CURRENT RESEARCH

Experimental work does not support a single cause for YCS. There are a range of activities underway looking at a several possible options.

Entomology

- Insects are an important focus via field trials in multiple regions, insect exclusion tests, and chemical treatment trials.
- It is still unknown if – or in what way – an insect could be linked to YCS, but from work so far researchers have been able to prevent YCS symptom development and the yield losses associated with YCS by controlling insects.
- Researchers 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.

- SRA is also seeking to understand if phytoplasmas – which are a type of bacteria that affect plants and can be spread by insects – are part of the YCS question.

Varieties

- Growers have observed a range of variety responses to YCS.
- To validate and understand these observations, SRA is using drones equipped with hyperspectral cameras to look more closely at YCS response within 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.

Management

- For a management solution to be useful, this 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 be effective. Like many crop problems, treating the issue once you can see it usually means it is too late.

- SRA has 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.
- Researchers are working to ensure the prototype test is effective and user-friendly and then determine how it could complement a management strategy for YCS.
- This prototype diagnostic is possible thanks to years of research that has improved the understanding of the internal workings of the sugarcane plant.

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

GERARD SCALIA, PRINCIPAL TECHNICIAN, MOLECULAR GENETICS, SRA



YELLOW CANOPY SYNDROME: KEY POINTS

1. YCS can now be diagnosed with a high level of certainty.

There are many causes of leaf yellowing in sugarcane. YCS is a specific pattern of leaf yellowing accompanied by abnormal and lethal accumulation of sucrose and starch in leaves.

2. Additional magnesium application above levels recommended for good crop management has no effect on YCS expression.

Magnesium deficiency in sugarcane can lead to yellowing of leaves. Experiments now confirm that addition of magnesium does not prevent or alleviate YCS symptoms. Plants with YCS usually have adequate levels of magnesium so magnesium deficiency is not a cause of YCS.

3. The role of insects, phytoplasmas, other bacteria in combination with environmental triggers are being investigated.

Experimental work does not support a single cause of YCS. A number of factors need to be present for YCS to be expressed. Experimental work is focused on identifying the key factors so that management options can be progressed.

4. An indicator tool kit for SRA, productivity service organisations and industry advisors for identifying YCS is at an advanced stage of development.

This is a significant step as any approach, experimental or commercial, needs to correctly identify the problem so that researchers and industry can respond appropriately.

5. A chemical option is under investigation which in most cases prevents YCS symptoms expression under experimental conditions.

This is a vital step if researchers are to develop management options for industry. These trials have used a broad-spectrum insecticide at high doses as an experimental tool to confirm or eliminate the role of an insect in YCS. This is not a test of the suitability of these chemicals as a management option.

6. This option is enabling us to quantify the impact of YCS on yield and identify potential causes.

This means that researchers now have the capacity to manipulate YCS symptoms.

If you have questions in relation to the above, contact:

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