



Dear Les

SRA continues to invest in research to understand yellow canopy syndrome (YCS) through an integrated research program. This email presents some of the latest findings.

1.

YCS identification.

There are many causes of leaf yellowing in sugarcane. YCS affects leaves in the mid-canopy and has a specific pattern of leaf yellowing and progression. Yellowing occurs when levels of sucrose and starch accumulate past a lethal upper threshold.

After a successful trial in Bundaberg, a [YCS in-field midrib test kit](#) will undergo regional validation across the industry during 2019/20. SRA is also developing a unique YCS biomarker, investigating six genes of interest.

2.

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

The most recent experimental work does not support a single cause of YCS. Phytoplasmas and other bacteria are intermittently detectable and only measurable at very low concentrations. A broad-spectrum insecticide has been effective in suppressing YCS expression but the identity and role of a

specific insect, if any, is yet to be determined. Environmental stress response expressed through gene expression, products of metabolism and protein levels is consistently represented across all samples sets.

Therefore, several factors need to be present to trigger YCS expression. Experimental work is focused on identifying the key factors so that management options can be progressed.

3.

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

Insecticide trials indicate removal of insects in general does suppress YCS symptom development by preventing the accumulation of sugar in the leaf. These trials have used a broad-spectrum insecticide (not Imidacloprid and not registered for commercial application above ground in sugarcane) at high doses as an experimental tool to confirm or eliminate the role of an insect in YCS. Please note, this is not a test of the suitability of this chemical as a management option. Insecticide trials will be conducted at six locations across the industry in 2019/20. The outcome of these trials will be pivotal to any YCS management program surrounding a chemical option for industry.

4.

A chemical option is enabling SRA to quantify the impact of YCS on yield and identify potential causes.

In contrast to last year, this year's harvest results from a small chemical trial indicated no significant difference in yield (tonnes of cane

per hectare and tonnes of sugar per hectare) between the insecticide treated plots and the untreated control. In this trial there was also no significant correlation between symptom expression and yield loss. Whether a correlation exists between yield and YCS severity (number of yellow leaves during the peak growing period or “YCS season”) as a proportion of the overall canopy throughout the life of the crop is currently being investigated.

5.

YCS impact on CCS.

Analysis of commercial cane sugar (CCS) shows there is no penalty associated with YCS. This is consistent with all results from past trials and sampling across the regions.

6.

Recommended management options.

Research indicates that when a healthy balance between leaf sucrose export (supply) and crop growth (demand) exists, plants have more vigor. However, when supply exceeds demand, sugars will begin to accumulate in the leaf. Once an irreversible upper threshold is breached, cell death and leaf yellowing occur. Therefore, whenever possible, use all available resources together with best practice farming to ensure plant growth does not slow. High plant vigor will enable the crop to better cope with stress (environmental and biological) to reduce the incidence and severity of leaf yellowing.

If you have any questions in relation to the above, do not hesitate to contact the SRA YCS Program Leader, Dr Frikkie Botha at FBotha@sugarresearch.com.au.

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