



# New discovery on chlorotic streak to lead to better management

**The new scientific discovery on chlorotic streak is leading to improved information on varietal resistance to the disease, and also management options through development of a diagnostic tool.**

**Tom Harney knows that the potential industry losses from chlorotic streak disease (CSD) are huge.**

At the same time, having seen the impact on his own farm, he also knows that the true losses from this disease are difficult to precisely quantify.

"I've seen blocks that look good before we start cutting, but then we get in and there are unexplained reasons why the CCS is down," he said. "The reason is usually because it had chlorotic streak at an earlier stage. The crop may grow out of it, but the plant is so backwards in producing sucrose that it never really catches up."

Previous research in the Australian industry has shown yield losses from CSD as high as 40 percent of sugar yield in susceptible varieties, with an estimated cost to industry of \$8-\$10 million annually, making it one of the most costly diseases facing the industry.

For Tom, who farms at Tully, he knows he is in a risk zone for chlorotic streak, which is a disease that spreads through wet soil, drainage water, and floods.

When CaneConnection visited on a rainy day in April, following what had already been a very wet 2018, he was able to

point out many symptomatic leaves, as well as noting that the symptoms can be erratic, which makes the true extent of the problem hard to estimate.

With all this in mind, he is heartened by the news that SRA researchers have discovered and named the organism responsible for causing CSD.

SRA Researchers have just published two papers on CSD and its cause in the journal *Phytopathology*, which is considered one of the premier international journals for plant diseases.

In these papers, the researchers including Dr Kathy Braithwaite and Dr Chuong Ngo identified the organism as a type of Cercozoa, which are single-cell organisms.

The Cercozoa responsible for CSD is new to science and was given the name *Phytocercomonas venanatanis*. The name means "swims in the veins" and refers to its method of movement and its home in the xylem vessels. It is about 10 micrometres in length, or about 0.01 millimetres.

The search for the culprit behind CSD dates back to 1929 when the disease was first identified, almost simultaneously in Australia, Indonesia, and Hawaii.

Almost 90 years later, thanks to modern DNA technologies such as polymerase chain-reaction (PCR) and high throughput sequencing, SRA researchers have discovered the causal organism and developed a diagnostic test for CSD. Pinpointing the organism is a critical step in improving its management and reducing the disease's impact on the industry.

As outlined in the publications, the researchers have identified, isolated and cultured the organism and infected clean plants to successfully prove the cause of the disease was this organism.

This work is leading to future possibilities for improved understanding and management of chlorotic streak, already underway via a new project led by Dr Braithwaite.

The project is developing a variety resistance screening method for CSD and working to incorporate this into the SRA plant breeding program, so that industry is provided with more useful data on CSD susceptibility as new varieties are considered for approval.

The project is also working on further developing a diagnostic test and service, which would be integrated with SRA's current diagnostic service for ratoon



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(Above left) At about 0.01 millimetres, *Phytocercomonas venanatanans* gets its name from "swims in the veins". (Above right) Symptoms of CSD.

## Vigilance helps mitigate CSD impact

stunting disease (RSD). The PCR test already exists as a research tool and is hoped to be extended beyond the research phase and used to assist productivity services organisations in delivering clean plant source material.

"Now that techniques are available to visualise, isolate and quantify the organism experimentally, we can begin to address questions such as how the organism infects naturally through the roots, how it lives within the plant and causes disease, how cells are released back into the soil and how the organism survives for extended periods outside the plant," the researchers said in their paper.

Tom Harney said he is hopeful it will lead to practical outcomes on the ground.

"Now that SRA has identified the cause of CSD, there should be better management practices for it: how to prevent it, and how not to get it in the first place.

"There is also an information gap with varieties, and I hope that this discovery improves that." ■

**For Tom Harney, CSD is something that requires ongoing vigilance. To manage it, he says it is vital to maintain a clean seed source, knowing that CSD is a disease controlled by hot water treatment.**

He is also very careful in choosing where varieties are propagated on his farm, and particularly avoids the wettest areas.

After those steps to help avoid it spreading, he also said variety selection is important to minimise the impact and further stop its spread.

"CSD is a consideration when I look at a new variety and if a variety is known to be hit badly with chlorotic streak then that variety probably isn't suitable for me."

He also relies on information such as the SRA Variety Guides and local support for that information through the Tully Variety Management Group.

"Farmers are increasingly getting more information about varieties and that is really informing how we choose varieties," he said. "Gone are the days where a farmer might trial 20 or 30 acres of a variety and 'give it a go'.

"We are still putting out smaller areas to experiment, but that information is helping reduce the need for experimentation." ■

**"...variety selection is important to minimise the impact and further stop its spread."**