

Project details

Key Focus Area: 3

Pest, disease and weed management

Project name

Rapid detection of ratoon stunting disease

Project number

2013/001

Principal provider

CSIRO

Project end date

June 2016



Sniffing out ratoon stunting disease

While it may not be quite as cute as a beagle, 'e-nose' technology is proving to be effective at sniffing out things that shouldn't be there. In this case it's ratoon stunting disease (RSD) in sugarcane.

Developed in the 1980s, e-nose (electronic nose) technology is already used for environmental monitoring in the medical and food industries. Researchers from CSIRO are investigating if it can sniff out the potentially costly RSD disease.

CSIRO researcher Dr Amalia Berna said that her team is testing the accuracy and cost-effectiveness of technology which will allow growers to identify the disease within minutes. Found in all cane-growing districts, RSD can be hard to detect and control. It affects less than five percent of crops, however, when the disease does occur it can cause yield losses of up to 60 percent.

Amalia explained that an e-nose is a device that can sense a change in the odour profile and potentially identify if a plant is healthy or infected. "Traditional diagnosis of RSD is slow and logistically difficult – it may take days to confirm a diagnosis," Amalia said.

"We're hopeful that this technology will be able to accurately identify contaminated cane within minutes."

The results from the research already seem promising. "We know that some species of bacteria can be characterised by the chemicals they produce," Amalia said.

"Ratoon stunting disease is caused by bacterium called *Leifsonia xyli*. We started by looking for the tell-tale identifying organic compound produced by *Leifsonia xyli*," she said.

"Our first step was to understand the particular chemical compounds that are characteristic of an RSD-infected plant. We then tested how reliably and accurately we could detect the presence of these compounds."

"Using the knowledge of the compounds found above the surface of sugar sap we were able to correctly classify 95 percent of cane samples as either healthy or RSD-infected."

"We are now training the e-noses to identify those compounds and if possible predict the presence of RSD in sugar sap," she said.

The project team's next step will be to take the e-nose to the field or to the labs, where samples can be analysed with more convenience than current ELISA methods.

"We are trialling three different e-noses to work out which is the most accurate, and which sensor takes the least time to test a sugar sap sample."

"If the technology delivers the results we are anticipating, the third year of our research will focus on developing a smaller device that can achieve similar acceptable levels of classification," Amalia said.

"Once we have proven this technology with RSD, there is potential for it to be used to detect a range of other diseases affecting sugarcane," Amalia said.

Researchers are trialling three different 'e-noses' as part of this SRA-funded research project to help detect ratoon stunting disease. It is hoped that one day, one of them will be able to diagnose RSD in-field in minutes.