

Brazil, Portable detection for citrus greening

Since 2005, citrus greening has caused \$4.5 billion in economic damage in Florida, and has necessitated the eradication of 27 million trees in Brazil, accounting for approximately 5–15% of production costs.

Orange farmers traditionally detect citrus greening by visually inspecting their tree leaves. In Brazil a tractor carrying four leaf inspectors rolls up and down the rows of trees.

Visual inspection accurately identifies the disease 60% in the best cases and 30% on average. Unfortunately, diseased trees typically do not exhibit visible symptoms for more than a year, during which time they can spread the bacteria to other trees in a grove.

Jarbas Caiado de Castro Neto, an entrepreneur and professor at the Instituto de Física de São Carlos and his research team, spent one and a half years developing an inexpensive and portable way to detect citrus greening before the trees exhibit visible symptoms.

The end product, which is about the size of a credit card scanning machine, contains a laser, a spectrometer, and a processor to analyse the results.

It contains a battery that can power the equipment for a full day of leaf checking, and can report results in the field.

Diseased and healthy orange tree leaves emit different fluorescence spectra. Leaves affected by citrus greening emit more light in the middle of the visible spectrum, but have a lower peak—around 750 nm—associated with the degradation of chlorophyll in the leaves.

The spectrographic signature of citrus greening disease also appears almost immediately after a tree is infected, compared to the year or more it takes for visible symptoms to develop.

When Castro and his team tested their portable spectroscopic system in August 2014, it detected citrus greening with greater than 95% accuracy.

The fact that the device can identify diseased trees in the year before they exhibit visible symptoms is a huge advantage, Castro said, because it allows farmers to eradicate trees before they spread the disease to others.

The researchers estimate that this early identification could save Brazilian orange farmers billions of dollars by 2020 if widely adopted today.

The company Castro and his colleagues started, called Agricultural Optronics Systems (AgriOS), has an agreement to test their portable spectroscopic system with the largest producer of oranges in Brazil.

Castro noted that one of the challenges the company faces may be convincing farmers to eradicate trees that have no visible signs of disease.

He said this challenge might be overcome by marking trees that the spectroscopic analysis identifies as diseased, and then closely monitoring them. If farmers see the trees succumb to citrus greening, they may be more likely to trust the technology.

AgriOS plans to extend their use of optical techniques to detect diseases in other crops, and eventually to integrate the devices into comprehensive farm management systems.

Source: aip.org

Source : <http://www.freshplaza.com/article/128529/Brazil-Portable-detection-for-citrus-greening> (07/10/2014)