Grower trials CITRUS GREENING SURVEY SYSTEMS

By Tim Hurner

n the 2 1/2 years since citrus greening disease (HLB) has been identified in Florida, growers have developed citrus greening survey systems and techniques that have a lot in common. Companies have been formed that do custom surveys for growers and other growers have put in place crews that do their own surveys.

The growers and companies that do greening surveys have been very open in sharing ideas on how to be most effective and efficient in surveying. Yet the systems in place are dynamic and are regularly evolving to be more effective as more is known about the disease.

This article is designed to give an overview of how surveying is being done. It was developed by interviews with several growers who do their own surveys and several companies that offer survey services.

SURVEY EQUIPMENT AND PROCEDURES

Citrus greening surveying is commonly done by a crew of people who see every tree in every row more than once per year. Most surveying is done in mature groves by a team with a main vehicle that travels in a row with an ATV or UTV vehicle that travels in tandem down the rows on each side of the main vehicle.

The main survey vehicle is equipped with a platform that provides seating with two seats on each side. One seat places the inspector's eye level at approximately 4 to 5 feet above the ground. The other seat is elevated with the inspector's eye level at 16 to 20 feet above the ground. All seats are equipped with safety mechanisms to prevent the inspector from being ejected from the vehicle or otherwise injured. The main vehicle may be a modified four-wheel drive pick-up truck or a modified tractor or loader. The upper inspector's seating usually can be adjusted to accommodate varying tree sizes, terrain-related stability difficulties, transport between groves, or turning at the end of a row.

The main vehicle has four inspectors plus a driver accompanied by two inspectors in an ATV or UTV that will travel in tandem down the adjacent row. In bedded groves, the main vehicle usually travels down the top of the bed while the UTV or ATV travels down the swale. The team is followed by a senior inspector in a UTV who also serves as the team supervisor.

When one of the inspectors observes the "yellow dragon" or other greening symptom, the vehicle stops, the team verifies the visual symptom, and tags the tree and the limb where the symptom was observed. The team is followed up with a senior inspector who will confirm the symptom found as that of citrus greening, record the location of the tree using a grove map or satellite GPS, and keep a log on the symptoms observed, etc. In companies where PCR testing is required, the senior inspector will pull leaf samples from a pre-determined number of trees with visual symptoms and send them to a lab for confirmation of greening.

The survey team travels down the row at approximately 3–5 MPH (miles per hour) depending on the level of disease pressure. An experienced team can cover 40 to 50 acres per day in low disease pressure.

In young tree blocks, inspectors will walk or travel in UTVs or ATVs with two people in each row or two inspectors in the center and one person in tandem on the row on each side observing all sides of the tree.

Growers who are surveying their groves are doing so two to six times per year.

LABELING SYMPTOMATIC AND CONFIRMED TREES

Colored surveyor tape is used to identify visually positive trees. A long piece of colored tape is placed on a tree that has been found to have visual symptoms with a small piece of tape also tied on the stem where the symptom was found. When greening has been confirmed by the senior inspector, a second tape is added to the tree. In some operations, tape is placed on the end of the row indicating the number of visually-identified and confirmed trees in that row.

HURDLES TO EFFECTIVE SURVEYING FOR GREENING

Grove maintenance has a big influence on the accuracy and effectiveness of surveying. Tree nutrition, irrigation and weed management all affect the surveying process. Recently mowed groves allow the crew to move at a normal speed. Tall weeds make navigation difficult and will in some cases block the ability to see foliage. Trees exhibiting nutritional deficiency symptoms make it difficult for inspectors to distinguish greening symptoms



A pickup truck outfitted with four seats, including two elevated seats, for grove scouting. Smoak Groves constructed the scouting platforms.

from nutritional symptoms. Trees showing water stress also make it hard to see symptoms. Post harvest stress makes it difficult to identify greening until the tree recovers.

Recent hedging can make the inspection difficult due to broken limbs and twigs where the foliage will be light colored and appear yellow. Hedging is usually followed by a flush of foliage and this new flush is usually light green in color, making it hard to see the greening symptoms.

Application of an oil spray causes the leaf to be shiny, which will mask the symptoms of greening for several days after treatment, making it difficult to detect symptoms.

GROVE HAZARDS IN SURVEYING

Surveying crews encounter hazards that impede the surveying of groves for citrus greening disease. The biggest hazard is grove spraying for psyllid and other pests and the resulting re-entry intervals (REIs). Crews often find that blocks scheduled for survey have either recently been sprayed or are being sprayed, and the re-entry interval has not expired. This results in the survey crew having to skip that block and come back to survey at a later time. Skipping blocks interrupts the continuity of the survey and adds to the cost of surveying.

Grove harvesting can also impede surveying. Frequently, harvesting schedules change on a daily basis. Greening surveyors in a grove being harvested face the hazard of other equipment moving in the block, harvesting bins blocking access, etc. Sometimes it may be only one block in a large grove; other times it could be several blocks being harvested.

TIMING CONSIDERATIONS

Most greening survey personnel feel that the optimum time of year to survey for greening is June-July through March-April. Post-bloom flush foliage color makes identification more difficult. Frequent flushes in young tree blocks also make it hard to see HLB symptoms.

SURVEY OBSERVATIONS

According to greening survey professionals, citrus greening seems to be more heavily concentrated in "hotspots" within a grove, along the perimeter of a grove, in areas with poor soils that may tend to stress a tree, and near water.

Growers with moderate or higher infection usually remove symptomatic trees soon after surveying using visual confirmation, rather than waiting for lab confirmation.

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