

CALIFORNIA CITRUS NURSERY BOARD

Final Grant Report November 2018

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Project Title: Annual citrus tristeza virus index at the University of California Lindcove Research & Extension Center.

Objectives:

Provide funds for the leaf collection, direct tissue blot testing, and PCR testing by LREC staff to detect CTV-positive trees at the Lindcove Research & Extension Center with tree removal to follow detection.

Report

To protect the Citrus Clonal Protection Program (CCPP) field plantings and other research programs from citrus tristeza virus infections (CTV), an annual index of all trees is conducted each year at the 175 acre University of California Lindcove Research & Extension Center (LREC). During the period of 1990-2006, an average of 3 CTV-positive infected trees were found and removed each year in the research blocks and for a 14 year period, no CTV-positive trees were found in the CCPP foundation blocks, demonstrating that infected tree removal at the Center provided protection of the foundation block from this disease (Fig. 1). This low level of CTV incidence at LREC and the lack of CTV in the foundation block allowed budwood to be released from the field trees in the foundation block 2-3 times/year. During 2007, 4 CTV-infected trees were found in the foundation blocks and 48 CTV-infected trees were found in the research blocks and in 2008 an additional 83 CTV-infected trees were found (8 in the foundation blocks and 75 in the research blocks). The epidemic of CTV at LREC had two consequences; it caused the CCPP program to stop releasing budwood from the foundation blocks and instead release budwood from the LREC screenhouses and the removal of many infected trees from research blocks affected research results, especially in scion and rootstock trials.

The sudden increase in the incidence of CTV-infected trees at the Lindcove REC is thought to be due to increased cotton aphid densities (weather-related) and the increasing percentage of CTV-infected trees surround the Center. There has been no CTV-infected tree removal in the commercial citrus orchards surrounding LREC since 1998. Surveys of the citrus orchards in the ½ mile surrounding LREC indicate that the incidence of CTV increased from an estimated 0.14% of trees in 1998 to 1.2% in 2007. Thus, there was a 10 fold increase number of CTV-infected trees surrounding LREC and it has likely increased significantly since then.

Since 2008, primarily the Tulare County Pest Control District (TCPCD), but also periodically other Pest Control Districts, have provided funding for pesticide treatments to control the aphid vector in a 1-2 mile radius around LREC. Citrus around LREC is being treated in the spring with an effective

foliar Assail (acetamiprid), Actara (thiamethoxam), Exirel (cyantraniliprole), or Sivanto (flupyradifurone) and in the fall with systemic Admire Pro or generic. Commercial pomegranates were treated in the fall for several years, but that acreage has declined and treatments have stopped except for plantings immediately adjacent to the Center. Citrus and pomegranates in backyards in the town of Lindcove are also treated with systemic imidacloprid in the fall. Treatments started in the fall of 2008 and with the latency period of CTV, we did not expect to see significant success in the form of reduced CTV infection of LREC tree immediately. In 2009, the number of infected trees dropped to 52 (Fig. 1). During 2010-2015 an average of 21 CTV positive trees were found and removed. In 2016 and 2017 only 4 and 11 trees needed to be removed, probably a combination of our excellent detection and removal program and weather conditions not being conducive to aphids. In 2018, there was a much higher number of CTV-infected trees (61 trees) concentrated in young orchards (Fields 66 and 53W) and orchard 24 that is untreated because it is part of the entomology program (Fig. 2). To mitigate this, we removed all the trees in Field 24 and we are surveying for aphids in the remaining orchards and spraying the young trees more frequently (2x in spring and fall).

The TCPCD provides funding for the CCTEA to sample trees using ELISA in a 0.5-1 mile radius around LREC to monitor for severe strains of CTV that respond positively to MCA13. During 2010-2018 there were 77 trees were found to be MCA13+ and growers voluntarily removed 100% of these trees (Fig. 2 & 3). Thus, the TCPCD and the growers around LREC are taking steps to reduce the incidence of severe CTV strains in this district and further protecting LREC. Funding from the CCNB to detect and remove the CTV-infected trees at LREC is providing critical protection of the research and foundations blocks and is an essential component of these collaborative effort among the agencies.

Dr. Grafton-Cardwell screens the efficacy of insecticides against aphids at LREC and as MRLs become established the list of foliar treatments for the spring aphid control program has increased from Assail to Actara, Sivanto and Exirel. This work is done to provide growers with more options and to potentially manage resistance by introducing alternatives to neonicotinoids.

Fig. 1. Number of CTV-infected trees removed at the Lindcove Research and Extension Center.

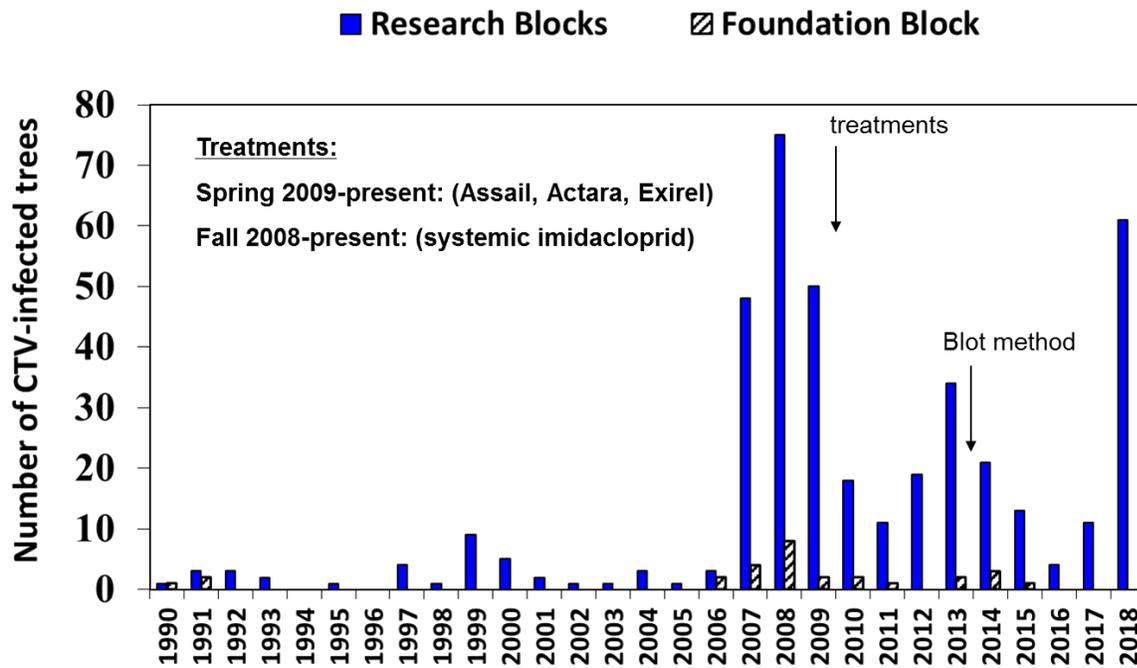


Fig. 2: The location of CTV-infected tree removals at LREC in 2018.

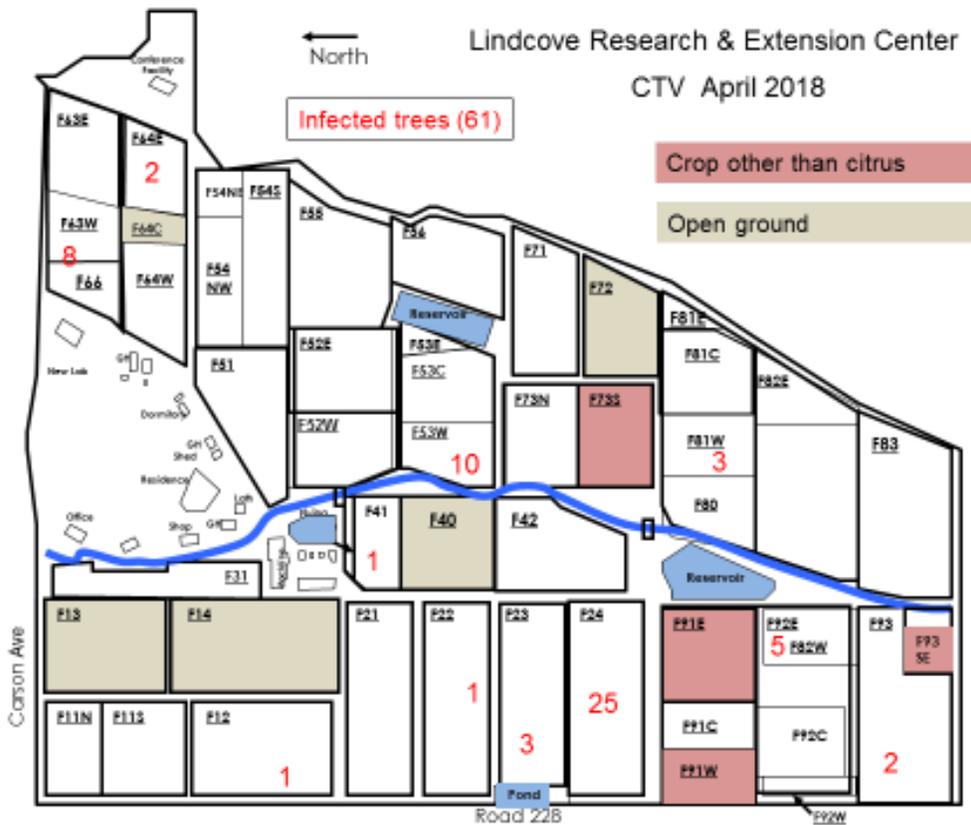


Fig. 3. The number of MCA13+ tree removals per year 2010-2018 in the 1 mile area around LREC.

**Number of MCA13 positive trees removed
in the 1 mile region around Lindcove Research and Extension Center**

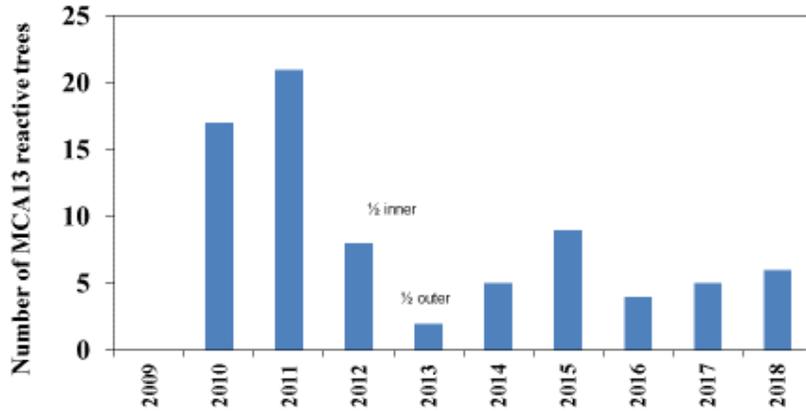


Fig. 4. The location and number per block of MCA13 positive CTV-infected trees that have been voluntarily removed in the 1 mile region (black square) around Lindcove REC since 2010-2018 (total of 77 trees).

