

CALIFORNIA CITRUS NURSERY BOARD

Grant Report December 2010

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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 by LREC staff and ELISA testing by the Central California Tristeza Eradication Agency 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 (not part of the CCPP) has been conducted on the 175 acre University of California Lindcove Research & Extension Center (LREC) since the early 1990s. This survey and ELISA testing is supported by yearly funding from the California Citrus Nursery Board. 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 tree removal at the Center was providing protection of the foundation block from this disease (Fig. 1). This low level of CTV incidence at the field station and 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 2006, 2 CTV-infected trees were found in the foundation blocks, which halted release of budwood from the foundation block.

During 2007, the CTV epidemic began with 48 infected trees in the research blocks and 4 infected trees in the foundation blocks. During 2008, 75 CTV-infected trees were found in the research blocks and 8 CTV-infected trees were found in the foundation blocks. All of the infected trees were removed in the year that they were found to be infected. The sudden increase in the incidence of CTV-infected trees at the field station is thought to be due to several factors. First, 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 has increased from an estimated 0.14% of trees in 1998 to 1.2% in 2007. Thus, there are many more CTV-infected trees surrounding the station. Secondly, a number of growers have planted pomegranates among the citrus orchards within ½ mile of the field station and these orchards produce heavy populations of winged

cotton aphids in the spring, the primary vector of CTV. The presence of more aphids during the spring when virus titer is high increases the likelihood of transmission of the virus. Finally, weather conditions have favored aphid survival and lengthened the time that the flush, that is attractive to aphids, is present on the trees. Our conclusion was that the research plots and foundation blocks that are vital to the citrus industry were experiencing an epidemic of CTV. Since that time, budwood has been collected and released only from the screenhouse trees and the foundation trees have been used for evaluating true-to-type characteristics of the trees.

In 2008, the Tulare County Pest Control District voted to provide funding to initiate a program of 2 aphid treatments per year for citrus and pomegranates in a 2-3 mile radius around LREC, applied during periods of flushing and aphid activity. This management program is designed to protect the integrity of the foundation blocks and research blocks. Since the fall of 2008, Admire (systemic imidacloprid) has been applied to both commercial citrus and pomegranates by the growers and to backyard citrus and pomegranate trees by RESCOM, a private pest control company. Additional treatments of Assail (acetamiprid) were applied to the same citrus orchards in the spring of 2009. These treatments are being undertaken to reduce the number of aphids and so reduce the spread of virus from the neighboring orchards to LREC trees. Because it takes 1-2 years for titer to be detected in an infected tree it was expected that it would take 1-2 years to determine if these pesticide treatments reduce aphid transmission of CTV.

In 2009, the number of CTV positive trees declined to 52 trees and in 2010 declined further to 20 trees. This decline suggests that pesticide treatments initiated in the fall of 2008 and applied 2x per year since then have been successful in reducing aphids and the incidence of the disease at LREC. Because of this success, the TCPCD, Kern Pest Control District, S. Tulare Pest Control District and Central Valley Pest Control District have voted to continue providing funding for aphid control in the 1 mile radius around LREC. In addition, the TCPCD funded testing in a 1 mile radius around LREC for severe strains of CTV that respond positively to MCA13. During 2010, 8 trees NW of LREC responded positively to MCA13 and the growers voluntarily removed the trees. Thus, the TCPCD is taking steps to reduce the incidence of severe CTV strains in its 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.

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

