Tristeza Threatens Florida’s Budwood Supply

By Phil Stansly, Bob Rouse, Richard E. Lee and Michael C. Kesinger

Florida’s citrus industry could be headed for a critical shortage of registered budwood due to citrus tristeza virus (CTV). High incidence has already resulted in a moratorium on budwood cutting from the foundation grove in Immokalee. It is likely that the same fate awaits all outdoor registered budwood source trees in the state within the next few years, especially in areas where CTV is prevalent.

Partly in anticipation of the aphid’s arrival, nurserymen approved a mandatory certification program in 1997 that requires all budwood sources to be tested annually for strains of CTV causing decline on sour orange (CTV-D). The virus is spread by movement of infected trees or budwood and by aphids, especially the brown citrus aphid (BCA) Toxoptera citricida. BCA was first detected in Dade and Broward counties in the fall of 1995 and is now present throughout the state. Insecticidal control of aphids would provide insufficient protection to guarantee CTV-free budwood, so screenhouse or greenhouse facilities would be required. Screenhouses for aphid exclusion could also protect against other vector-borne pathogens such as CVC and greening that may someday occur in Florida.

Less than one million buds are currently provided annually from screenhouses in private and public hands. More screenhouse space dedicated to budwood production is urgently needed to supply the present demand of six million nursery trees and/or grapefruit, regardless of rootstock. Trees become weak with poor fruit set and small fruit. Damage cannot be controlled by use of tolerant rootstocks because the scion is affected. Some strains of CTV are mild (CTV-M) and cause no noticeable effects on citrus, or may even prevent expression of symptoms from CTV-SP or CTV-D.

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HISTORY OF CTV IN FLORIDA

CTV-D was first reported in Florida in 1982 after surveys were spurred by news of devastation in Brazil and Argentina. However, few outbreaks of CTV decline were reported during the 1950s and 1960s, although incidence increased steadily. Lacking a discriminating test for CTV-D and fearing a budwood shortage, the Florida budwood program discontinued removal of CTV-infected trees from registered status. High demand during the expansion years of the 1960s and freeze years of the 1980s was often met with sub-standard budwood. A third of registered budwood source trees surveyed in 1984 were found infected with CTV-D.

CTV decline spread by movement of infected nursery stock and aphids then present in Florida became increasingly frequent. Propagation on sour orange was largely discontinued by 1986, although an estimated 20 percent of citrus trees in the state are still on this rootstock. New regulations in 1990 allowed use of high density increase blocks of one- or two-year old trees grown expressly for rapid production of budwood. With onset of mandatory registration, all budwood used legally in the state must come from sources tested regularly.

NATURE OF CTV

CTV occurs in many strains that produce a multitude of effects to citrus. CTV-D results in decline and death of trees on sour orange rootstock by causing girdling at the bud union. The most severe strains (CTV-SP) cause stem-pitting on sweet orange annually, plus an expected 20 million over the next five years to replace losses from quick decline. A severe freeze could raise annual demand as high as 20 million trees.

Quick decline caused by CTV-D is expected to kill 20 million trees on sour orange rootstock in Florida over the next five years.

Screenhouses can exclude aphids and protect valuable budwood sources from CTV and other vector-borne diseases.
for graft transmissible pathogens.

Sharp increases in quick decline were noted last year during the stress periods of late spring and early summer, especially in southern and coastal regions. Warm winters favor BCA survival in these areas, and incidence of decline strains was already 20 percent or more in trees sampled at random in 1994 by the state’s Division of Plant Industry (DPI). Widespread losses might be anticipated this year, and ultimately, all citrus on sour orange in the state is expected to die.

WHY WORRY?

Stem pitting poses an even worse long-term threat to the industry than quick decline. CTV-SP could become common within 10-15 years as it did in the wake of BCA in South Africa, Australia and Latin America unless movement of infected budwood is controlled. CTV-SP strains appear to be rare in Florida but may be masked by mild strains. An infected budwood tree could spread CTV-SP inadvertently throughout the citrus growing region. The mandatory budwood registration program attempts to reduce this risk by requiring all commercial budwood sources to test free of severe CTV annually. Unfortunately, the current MCA-13 ELISA test does not differentiate between CTV-D and CTV-SP strains and may not catch all stem-pitters. However, most outdoor budwood sources will probably test out the program before CTV-SP becomes prevalent.

BUDWOOD PRODUCTION

The current demand of six million buds depends on source trees maintained by commercial nurseries and, to a lesser extent, state agencies. Most are field trees (68 percent) or outdoor increase blocks (25 percent) and subject to inoculation of CTV by aphid feeding. Although some increase blocks are propagated from screenhouse-grown trees, approximately six percent of the budwood being used for new nursery trees is protected from aphids in screenhouses.

It is illegal to propagate from any tree found positive to the annual MCA-13 test to restrict the entry of severe strains of CTV into the budwood supply. Therefore, movement of CTV by BCA could soon render most of the field budwood source trees unusable. The challenge is to find a suitable means to supply present and future budwood needs without scrapping the current program or encouraging indiscriminate use of questionable budwood sources.

OPTIONS AND ALTERNATIVES

One solution to the budwood dilemma might be to develop and/or adopt other new tests that screen for only stem-pitting CTV since we are no longer trying to save trees on sour orange. Such a test would need to be inexpensive, rapid and catch all stem-pitting CTV. Improved tests are being developed but should never be judged 100 percent reliable.

Another resolution would require all source budwood to be CTV-free. Source trees would be maintained in screenhouses and tested regularly to verify absence of all CTV, the simplest of all tests. The problem is insufficient greenhouse capacity, presently about two acres among five commercial nurseries and two agencies (DPI & the Foundation in Immokalee). Existing sources could generate about two million buds annually, assuming 5,000 buds per mature tree per year, 105 ft2/tree and 50 percent space devoted to high use trees. This scenario would leave us four million buds short in a low demand year and eight million buds short of expected demand to replace trees lost to quick decline. Furthermore, it would take eight to 10 years to produce even two million buds since most of these screenhouses are presently occupied with young trees.

A modification of this plan might be to augment screenhouse production from mature trees with screened increase blocks. The 1997-98 annual report of the Bureau of Citrus Budwood Registration cites 18 buds and 67 buds being cut the first and second year, respectively, from increase block trees. An acre of screenhouse could potentially produce 1.5 million buds within two years. The existing budwood rule does not allow use of screenhouse increase trees to establish additional increase block trees. The rule could be amended to produce nursery trees from a secondary increase block or the trees propagated from the secondary increase block could only be sold as "validated." With this scenario and additional screenhouses, supplies of CTV-free budwood could be normalized within the next few years.

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