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2026–2029 Florida Citrus Production Guide: Tristeza Decline[1]

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Citrus tristeza virus (CTV) is a major cause of the decline and eventual death of trees on sour orange rootstocks. Initially, affected trees have small leaves and twig dieback. Diseased trees often produce small fruit, and the yield declines. Eventually, large limbs die back and the tree gradually declines. In extreme cases, trees may suffer from quick decline and wilt, dying in a matter of weeks. On sour orange rootstock, some isolates of CTV cause graft incompatibility at the bud union, which results in the loss of fibrous roots and reduced ability for water uptake. Bark flaps cut from across the graft union of declining trees often show pitting consisting of small holes (honeycombing) on the inside face of the bark flap from the rootstock side of the union. Quick-decline trees may only have a yellow-brown stain at the bud union and not show the honeycombing. Only trees on sour orange rootstock are affected by tristeza decline. Sweet oranges usually are more affected than grapefruit, whereas lemons on sour orange rootstock may not be affected. Losses from CTV-induced decline have been offset by the use of nonsusceptible rootstocks, primarily trifoliate hybrids. Because huanglongbing (HLB) is endemic in Florida, many trees are now mixed infected with CTV and HLB and may show more profound decline regardless of the rootstock used.

Citrus tristeza virus is transmitted by aphids. They acquire it within minutes of feeding on the plant and transmit the virus to healthy plants equally rapidly. The brown citrus aphid (*Toxoptera citricida*), which first appeared in Florida in 1995, is considered the most efficient vector of the virus. The cotton or melon aphid (*Aphis gossypii*) is a less efficient but still effective vector, whereas the green citrus or spirea aphid (*Aphis spiraecola*) and the black citrus aphid (*Toxoptera aurantii)* are considered to be less efficient vectors of CTV in Florida. The establishment of brown citrus aphid in Florida is believed to have resulted in a more rapid spread of decline-inducing isolates of tristeza.

Mild isolates, inducing no stem-pitting nor decline, have been widely disseminated in Florida by aphids and in infected budwood. The incidence of decline has been reduced due to the use of tolerant (non-sour orange) rootstocks such as Swingle citrumelo and Carrizo citrange. This also can be attributed to reduced brown citrus aphid populations and CTV reinfection rates probably due to recent, more aggressive pest management practices for Asian citrus psyllid in the groves. However, many of the trees on these tolerant rootstocks are shown to be infected with CTV decline isolates without showing symptoms. Therefore, there is still a high risk for reemergence of tristeza decline disease if the sour orange rootstock is used in Florida.

In some countries, certain CTV isolates also cause stem-pitting (see UF/IFAS publication PP-227, "Citrus Diseases Exotic to Florida: Citrus Tristeza Virus-Stem Pitting [CTV-SP]") in citrus scions including grapefruit and sweet orange, regardless of the rootstock used. Isolates that cause decline of sweet orange on sour orange also may cause stem-pitting in trees on other rootstocks, but many decline isolates produce no stem-pitting in grapefruit or oranges. Isolates that are genetically similar to severe stem-pitting isolates found in other countries have been found in Florida. Some of these isolates give a degree of stem-pitting on sweet orange, but it is difficult to assess whether they cause economic losses in field trees due to the widespread presence of HLB.

Virtually all isolates of CTV can be detected by graft inoculation onto sensitive biological indicators, such as Mexican lime. The virus can be detected in young leaves, or in psyllids nymphs feeding on the leaves. More modern and much faster techniques, such as molecular tests including reverse transcriptase (RT) polymerase chain reaction (PCR) or ELISA using polyclonal antisera, are nowadays preferred. The monoclonal antibody MCA-13 detects most CTV isolates that cause decline on sour orange rootstocks in Florida and also reacts with most stem-pitting isolates, but it does not react with mild Florida isolates. If an appropriate and reliable laboratory test for CTV is needed, contact your local Extension agents, Extension specialists, or FDACS-DPI (FDACS-DPI Helpline Number: 1-888-397-1517).

Budwood propagated for commercial distribution must be free of CTV. Most stem-pitting isolates are MCA-13-reactive, but not all. PCR-based methods can identify stem-

pitting isolates, but the only absolute means to detect stem-pitting isolates is by graft inoculation of grapefruit and sweet orange seedlings and examination of symptoms after 6–15 months (a.k.a. indexing).

Recommended Practices

1. Budwood propagated for commercial distribution must be free of CTV. Even in the presence of HLB, it is still recommended that growers avoid sour orange and use only decline-resistant rootstocks. The key to preventing problems with stem-pitting in Florida is to avoid introduction, propagation, and distribution of stem-pitting isolates.
2. Once tristeza-affected trees on sour orange rootstocks begin to decline, there is no treatment. The diseased trees should be replaced with certified trees on tolerant rootstocks as the yields of affected trees decline to uneconomical levels. Even though it may be hard to determine if decline results from CTV or HLB, these trees should nonetheless be replaced with a CTV-tolerant rootstock (See the Florida Citrus Rootstock Selection Guide).
3. In groves with trees on sour orange rootstock that are currently unaffected by tristeza decline, it may be possible to inarch trees with seedlings of a tolerant rootstock. Inarching is most effective with relatively young groves that are still actively growing, and in order to be effective, the inarches must be well established before trees become infected. Given the high cost of the practice, it is probably advisable only in the case of high-value crops in groves that are well separated from areas with severe strains of tristeza virus. It is more likely to be successful with younger than with older trees.
4. Keeping aphid populations in check in the grove may help reduce feeding damage and secondary spread of the virus onto resets (see chapter 24, "Soft-Bodied Insects Attacking Foliage and Fruit").
5. Cross protection, which is the practice of inoculating trees with mild virus strains to protect them from the effects of severe strains, has been effective in South Africa and Australia in reducing losses in grapefruit due to stem-pitting, and against losses in sweet orange in Brazil. Cross protection against tristeza decline on sour orange rootstock has not yet been developed as an effective control measure.

Web Addresses for Links

UF/IFAS publication PP-227, "Citrus Diseases Exotic to Florida: Citrus Tristeza Virus-Stem Pitting (CTV-SP)": https://edis.ifas.ufl.edu/publication/PP149

Florida Citrus Rootstock Selection Guide: https://ask.ifas.ufl.edu/publication/HS1260

UF/IFAS publication ENY-604, "Soft-Bodied Insects Attacking Foliage and Fruit": https://ask.ifas.ufl.edu/publication/CG004

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