

**NEW UNIVERSITY OF CALIFORNIA PUBLICATION****Now Available: Integrated Pest Management for Citrus—Third Edition.****Statewide Integrated Pest Management Program.****University of California—Agriculture and Natural Resources.****Publication 3303. 2012.**For ordering information contact [anrcatalog@ucdavis.edu](mailto:anrcatalog@ucdavis.edu) orvisit the website at <http://anrcatalog.ucdavis.edu>.***Destroy that Illegal San Joaquin Valley Citrus Tree Now Before the Rush!***

Everyone involved with the citrus industry should be aware by now that a citrus tree in the L.A. area, and an associated Asian citrus psyllid, were found to be infected with Huanglongbing, a tree-deadly bacterial disease of citrus and related plants. Parts of this diseased tree appear to have been propagated from material not legally-certified to be used to produce new citrus trees. Huanglongbing disease is present in many other citrus growing areas of the world such as Florida, Asia and Mexico.

When Huanglongbing infects a tree, bacteria, eventually, are found throughout the tree including shoots and buds. Bringing in an illegal bud and propagating a new branch or tree of a favorite pummelo from a country in Asia, no matter how sweet the fruit; or a lime from Mexico, no matter how much it reminds one of home or a fun vacation; or possibly even a citron from an arboretum in Europe, no matter how good the fruit smells; puts the entire California citrus industry at extreme risk.

Budwood can be brought into this country legally but will require permits and protocols from a number of government agencies starting with the United States Department of Agriculture, and in California will eventually involve the California Department of Food and Agriculture and the California Citrus Clonal Protection Program ([www.ccpp.ucr.edu](http://www.ccpp.ucr.edu)). While it may seem harsh, any tree that was created from budwood illegally brought into California should be killed immediately in advance of the arrival of the Asian citrus psyllid vector of this disease into the San Joaquin Valley. Cutting the tree down at ground level may not be enough (but it is a good start). New suckers from the stump will still harbor the disease. Monitor the stump, and destroy suckers immediately until nothing new regrows. It is probably not a bad idea to disinfect tools after use on the infected tree. Always use and follow all safety features, guidelines and instructions when using hand or power tools such as axes, handsaws, chainsaws, clippers, loppers, grinders and chippers.

## ***Sour orange rootstock and Citrus Tristeza Virus***

I have heard rumors that some growers, again, are planting sour orange rootstock. As was my intent in the article on Macrophylla (Alemow) rootstock in my last edition of this newsletter, the purpose of this article is simply to caution those that may have heard that sour orange is the new rootstock of choice for the San Joaquin Valley. You should know the pros and considerable cons before planting sour orange in Kern County.

Citrus Tristeza Virus (CTV) also called Quick Decline disease, killed approximately 3 million citrus trees on sour orange rootstock in southern California during the 1940s and 1950s. CTV, like the common cold that plagues humanity, is a virus that comes in many strain of varying strength. A strain that is mild in one variety may be quite severe on another. The effect on the tree of infection by several strains may be quite different than the effect of any single strain. The severity of the disease also varies with rootstock. CTV-infected grapefruit, mandarins and oranges, which may rapidly decline on sour orange rootstock, are tolerant of most California CTV strains if grown on commonly used citrange (i.e. Troyer, Carrizo, C-35, etc), trifoliate and lemon-type rootstocks.

The Citrus Tristeza Agency was formed in California in 1963, to eradicate CTV. While CTV is still with us, the activities of the Citrus Tristeza Agency have resulted in a very low level of CTV in Kern County, thanks in large part to the continued financial support of this agency by the citrus industry (i.e. citrus growers) in this county. All of which leads to the point of this article.

Sour orange rootstock could be a good rootstock for Kern County. We have our share of calcareous, salty, poorly drained soils and our share of cold winter temperatures, and sour orange rootstock is fairly tolerant of these compared to other available rootstocks. Sour orange also produces a good tasting piece of fruit. However, its susceptibility to CTV should make growers especially cautious about planting this rootstock. So in light of the previously described citrus death and destruction, why may some growers be planting sour orange again? While I am just guessing, perhaps the rumors are untrue. Perhaps growers are using sour orange as a lemon rootstock. Perhaps someone has discovered that certain varieties of mandarin are not as highly susceptible to CTV on sour orange as most other mandarins, oranges or grapefruit. Perhaps prospective growers are counting on a continued low population of CTV-infected trees in the county and that the brown citrus aphid won't show up in the San Joaquin Valley to spread CTV more effectively. One advantage of sour orange rootstock with many existing mandarin, orange and grapefruit varieties is that you won't have to wonder for long if you orchard has a high level of CTV infection. The quickly collapsing trees will let you know. The bad news is that while an infected tree dies suddenly once it reaches a 'threshold' value of infection, it is still a source of infection until that point is reached.

The recent research showing an interaction between dry rot and CTV should not be surprising (see Citrograph article, *Current knowledge on Fusarium dry rot of citrus*, Nov/Dec. 2011). Dry rot is thought of by most plant pathologists working on a variety of California crops as a secondary pest that enters after a primary pest has provided a wound or weakened the tree. Dry rot is not the real culprit in recent outbreaks in old stands of citrus on sour orange rootstock. Even if dry rot goes away, CTV won't. The primary agent attacking the trees were various strains of CTV, now endemic in areas of the citrus belt in the San Joaquin Valley, and although relative mild compared to much more severe strains, are eventually deadly to many varieties on sour orange rootstock. A weakened tree is always much more susceptible to dry rot organisms, such as *Fusarium solani*, which is a common soil and root-

inhabiting fungus. This organism is associated with the roots, stem and bark of healthy as well as diseased citrus trees. The ability of the fungus to become a pathogen is associated with stress factors, such as root damage caused by *Phytophthora*, over-watering, poor soil drainage, excess fertilizer, heat stress (especially under dark-colored trunk wraps on young citrus trees), freeze damage (especially to lemons) and root injury due to gophers, meadow mice, plowing, or herbicides. The recent outbreak of CTV in sour orange trees is most likely the result of the slow spread of CTV by the cotton aphid, and not anything new in the *Fusarium solani* organism.

### ***Speaking of disease – How about Verticillium Wilt and Olives for Oil in Kern County***

Although not well known (or well advertised), I am also the olive advisor for UCCE in Kern County. Recently, there has been increased interest in planting olives primarily for their oil. Varieties of olive trees are available that have a high content of quality oil. However, recent research in Spain (see <http://cesonoma.ucdavis.edu/files/27504.pdf>) has shown that when the number of defoliating strain microsclerotia per gram of soil exceeds 3.33, the disease incidence can be 50% or greater after 2.5 years, and can kill 40-100% of the susceptible olive cultivar trees. Any level above 1.0 microsclerotia per gram of soil is considered too risky for olives. It has also been observed that higher initial inoculum densities lead to more disease. There has been some effort to rate various olive cultivars in their resistance to Verticillium wilt, but in the final analysis, at levels of inoculum usually occurring in Kern County, all cultivars should be considered susceptible.

I frequently receive inquiries from prospective growers wondering how olives would do in Kern County. The short answer is that we have several contributing problems growing olives in Kern County. Foremost of the problems is Verticillium wilt, which just about ruined the pistachio industry in the southern San Joaquin Valley until a resistant rootstock was found. No such resistant rootstock has been found, to date, in olive. What is particularly difficult about this problem is the length of time it takes for symptoms of Verticillium wilt to show up in a new planting. The first symptoms may not show up for years as the roots slowly encounter microsclerotia, which in turn, take time to germinate and infect the plant. High densities of microsclerotia in the soil should be sufficient reason not to plant olives, and, unfortunately, low densities won't guarantee Verticillium wilt won't be a problem. Even when a crop is planted in previously virgin ground, Verticillium wilt can still be present.

The other problem is that olives are a subtropical crop. Much of the available acreage in Kern County where the winter temperatures are most suitable for olives has already been planted to citrus. Moving out on the valley floor where the cold air pools, can be on the cold side for a subtropical crop. Drought years are particular hard on a subtropical crop, where lack of fog and low winter atmospheric dew points results in sudden drops in temperature of long duration. These low-lying areas are also susceptible to late freezes which can freeze the bloom and result in loss of the crop.

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