

Producing and packing fresh citrus canker free

By M.A. Ritenour, L.W. Timmer and H.L. Chamberlain

The establishment of citrus canker (caused by *Xanthomonas axonopodis* pv. *citri*) in Florida, the end of the eradication program on Jan. 10, 2006, and the interim rule on Aug. 1, 2006 that quarantined the entire state of Florida for citrus canker have had a dramatic impact on fresh fruit shippers. Now, shipment of all citrus produced in Florida to citrus-producing states and territories is prohibited regardless of whether the fruit shows symptoms or not. Fruit shipped to non-citrus producing states and some major export markets (e.g., Europe) must satisfy numerous pre-and post-harvest requirements:

Fruit must:

- be obtained from groves inspected within 30 days of harvest and found free of canker,
- carry a fruit Harvesting Permit,
- be treated to kill possible canker bacteria on the fruit surface,
- be accompanied by a Limited Permit, and
- be traceable back to the block from which it was harvested.

In addition, all boxes or other containers in which fruit is packed are required to be clearly marked with the statement "Not for distribution in AZ, CA, HI, LA, TX and American Samoa, Guam, Northern Mariana Islands, Puerto Rico and Virgin Islands of the United States."

If canker is found in a block, no fruit from it can be moved interstate for the entire season.

If a canker-infected fruit is found in a packed carton, the fruit from that block is disqualified from these markets and must be re-run, re-inspected, and then can be shipped only to countries where canker is not a concern (e.g., Japan or Canada).

All fruit shipped outside of Florida, regardless of destination, is inspected by USDA to verify freedom from canker. The interstate movement of fresh citrus from Florida to domestic markets is currently governed by the Code of Federal Regulation, CFR 301.75 Subpart-Citrus Canker. Links to this and the interim rule can be found at the University of Florida Postharvest Resources Web site (<http://postharvest.ifas.ufl.edu>).

The international movement of fresh citrus from Florida to foreign markets is governed by the importing country's requirements and these vary from country to country.

Even shipments destined for countries where canker is not a concern must be

inspected and found free of canker, although the grove inspection, Harvesting Permit, and Limited Permit are not required. If canker is found in a packed carton destined for these markets, the fruit must be re-run and re-inspected before shipment. There are no limitations on citrus shipments within Florida.

In March 2006, the USDA published a pest risk assessment (PRA) stating that, as long as fruit showed no visible signs of canker, they posed no significant risk for spreading canker. The PRA was opened for public comment and remains the working scientific justification for allowing shipment of asymptomatic fruit to interstate markets.



A citrus packinghouse grading line. Photo from M.A. Ritenour, UF-IFAS, IRREC. Left, limited permit for shipping citrus. Photo from H.L. Chamberlain, UF-IFAS, CREC.

New regulations are being considered that would amend the canker regulations so that field inspections would no longer be required. USDA personnel would continue inspecting packed fruit in the packinghouse to ensure that canker-infected fruit was not shipped. Thus, asymptomatic fruit would be shipped to other states regardless of canker presence in the grove. The key goal is keeping symptomatic fruit out of the packed cartons, regardless of where the fruit originated. The new regulations hopefully will be in place by Oct. 1, 2007.

The continued ability to produce, pack, and ship canker-free fruit will require an integrated approach involving all steps of the following process.

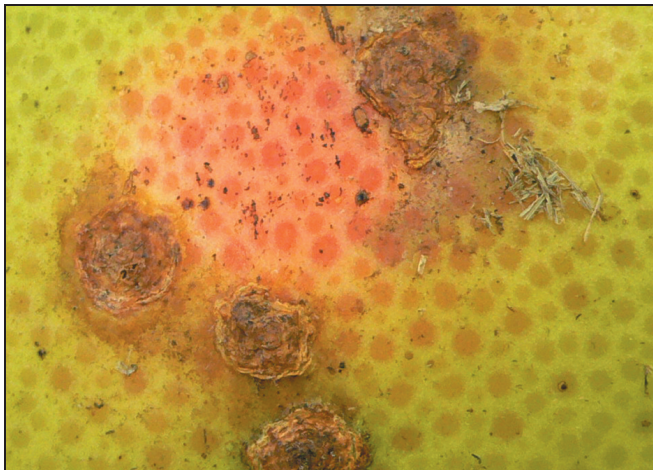
PREHARVEST

Growers must realize that attaining the goal of 100 percent canker-free fruit will be difficult. If the incidence of infected fruit in a block is greater than perhaps 5 percent, trying to pick fruit from that block for fresh market will be risky. Culling that much affected fruit is just too difficult. To attain that level of control, growers must have an integrated program utilizing all the methods available and programs for highly susceptible grapefruit will have to be particularly aggressive.

Grower self-surveys will become even more important to reduce the amount of canker-infected fruit delivered to the packinghouse, thus reducing the likelihood of canker-infected fruit making it through to the packed carton. Furthermore, knowing the status of canker in one's grove is critical for disease management and allows growers to make better economic decisions, such as whether to send the fruit to the packinghouse or straight to the processor.

LIMITED PERMIT - USDA - APHIS - PPQ
Federal Domestic Quarantine
NOT FOR DISTRIBUTION IN:
Am. Samoa, Arizona, California,
Guam, Hawaii, Louisiana, N. Mariana Islands,
Puerto Rico, Texas and U.S. Virgin Islands

Limited permit for shipping citrus. Photo from H.L. Chamberlain, UF-IFAS, CREC.



Citrus canker lesion on grapefruit.

Even “hot spots” in a particular block could be flagged and not harvested for the fresh market, but sent straight to the processor. In addition, knowing the amount of canker on the fruit allows packers to adjust line speeds and the number of graders to make sure canker-infected fruit is not packed for markets outside of Florida.

In the field, first and foremost, windbreaks will need to be established around every 5- to 10-acre block. Windbreaks provide protection horizontally for about 10 times the height of the windbreak. Windbreaks are probably most important for grapefruit and protection may be needed for each 5-acre block. Since tangerines are less susceptible, blocks of those varieties can be larger.

Strict decontamination and sanitary measures will be needed to prevent movement of canker from areas with canker to those that are still free. Limiting equipment and personnel movement in wet groves is key in preventing spread within blocks and between blocks. In some cases where canker is localized in the grove and there is little canker in the area, it may be beneficial to remove and burn infected trees and defoliate surrounding trees to reduce inoculum.

Application of copper products can be very helpful in preventing infection of fruit and should be applied in all groves with canker. Copper applications are most useful from the time fruit reaches three-quarter inch to 1 inch in diameter through mid-July when fruit becomes somewhat more resistant. Application of copper to young leaves provides protection for a very short period — perhaps three to five days. However, copper products are ineffective in preventing spread of the disease and thus are not recommended where canker is not present in the grove.

None of the non-copper products are very useful in reducing spread or infection by citrus canker. Only copper products are recommended by IFAS for control of canker. See the 2007 Florida Citrus Pest Management Guide for specific recommendations for control of canker on different varieties of citrus (<http://edis.ifas.ufl.edu/CG040>).

Articles in earlier issues of *Citrus Industry* magazine in 2007 also have complete information on management of canker in the field.

PACKINGHOUSE

Florida citrus packers have been very successful at eliminating fruit with citrus canker during the packing process. However, even closer attention will be needed by packinghouse graders if the disease spreads in the field or field inspections decline. Resources for training graders for canker identification on fruit can be found at <http://postharvest.ifas.ufl.edu>

Postharvest research being conducted by UF/IFAS, USDA and FDACS/ DPI scientists to mitigate canker's impact on the industry includes development and evaluation of technology for electronic detection/elimination of canker-infected fruit, improved fruit decontamination methods, and better understanding the biology of canker bacterium on the fruit.

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