

# Managing citrus canker for the fresh fruit industry

By Mark Ritenour, Jim Graham and Jan Narciso

The establishment of citrus canker (caused by *Xanthomonas axonopodis* pv. *citri*) in Florida, the end of the eradication program in January 2006, the August 2006 interim canker rule, and the November 2007 final rule dramatically changed the way Florida's \$400 million fresh fruit industry grows, packs and ships fruit. The good news is that, while changes to canker regulations over the past three seasons resulted in early season scrambles to comply with new requirements, no such changes are in store this season. Canker regulations remain virtually unchanged since the November 2007 rule was published in the Federal register. Visit the USDA APHIS citrus canker Web site ([http://www.aphis.usda.gov/newsroom/hot\\_issues/citrus\\_canker/citrus\\_canker.shtml](http://www.aphis.usda.gov/newsroom/hot_issues/citrus_canker/citrus_canker.shtml)) for the complete rule. This rule:

- Applies only to domestic shipments
- Requires all citrus packers, repackers and distributors that pack or ship fruit out of Florida to enter into a compliance agreement with the USDA APHIS
- Discontinued the need for production blocks to be certified free of canker
- Relies on APHIS inspections in the packinghouses to assure no fruit with symptoms of canker are shipped domestically
- Continues to prohibit shipment of Florida citrus to citrus-producing states and territories, regardless if fruit show symptoms of canker or not
- Requires decontamination of fruit surfaces using chlorine, sodium-ophenylphenate, or peroxyacetic acid (PAA)
- Requires fruit to be packed only in APHIS-approved, properly labeled boxes or containers, and
- Shipped fruit must be accompanied by a Limited Permit.

Existing inventories of bags containing only the Limited Distribution Statement can still be used until Aug. 1, 2010. However, bag inserts with the Limited Permit are no longer allowed.

LIMITED PERMIT - USDA - APHIS - PPO  
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*

Instead, the full Limited Permit must be either printed directly on the bag, or on a label that is stapled, tied or applied as an adhesive to the bag. The approved use of PAA at 85 ppm for both fruit decontamination and packinghouse equipment sanitation was a welcome addition. It is important to note, however, that PAA at this concentration is not approved for decontamination of equipment outside the packinghouse (i.e., in the field), which is still regulated under section 11 (Approved Decontamination Products and Methods).

Shipments to various export markets are governed by their own regulations; for example, the EU still requires production blocks to be certified canker free via preharvest grove inspections (within 120 days of the start of harvest) in addition to postharvest handling treatments and other requirements. While fresh fruit Harvesting Permits (certifying a block free of canker) are no longer required for fruit destined for interstate movement, fruit Harvesting Permits continue to be required for EU shipments.

These regulations worked well last season. USDA inspections found symptomatic fruit in only 0.65 percent of about 38,000 lots of fresh Florida citrus. When canker was found, the lot had to be re-conditioned, diverted to sales within Florida, or sent for juice. Most importantly, there were no reports of fruit with canker being shipped out of Florida.

## MORE FLEXIBILITY

Removing the requirement that production blocks be free of canker gives Florida's fresh citrus growers and packers more flexibility in managing how they keep symptomatic fruit from being shipped. Now, even if a citrus block has some trees with citrus

canker, the grower and packer can work together to market the fruit domestically by employing various pre- and postharvest management techniques. For example, a grove that is virtually free of canker would not require as many packinghouse resources (e.g., graders) to assure a canker-free product, whereas a grove with more canker would require much greater packinghouse resources (e.g., more graders, slower line speeds, etc.) to remove all symptomatic fruit.



*Manual grading of grapefruit*

Preharvest self-inspection (to know the location and severity of canker infection within a block) and management practices (e.g., copper sprays, equipment decontamination, and inoculum removal) are still vitally important to minimize the amount of symptomatic fruit entering the packinghouse. If not managed effectively in the field, the amount of symptomatic fruit will become too great to effectively and/or economically remove in the packinghouse. Visit the University of Florida Postharvest Resources Web site (<http://postharvest.ifas.ufl.edu>) for a library of downloadable resources to train personnel in canker identification.

## CONTROL ON GRAPEFRUIT

To attain a high level of control on highly susceptible grapefruit, growers will need to develop an integrated program utilizing all available methods. Foremost, windbreaks will be required

to reduce the incidence and severity of canker due to windblown rain. Since windbreaks are not commonly used in Florida citrus, the only management tool currently available to limit canker on fresh fruit is bactericidal copper sprays. Research in Paraná State, Brazil, with moderately susceptible oranges demonstrates that copper sprayed at 21-day intervals is most effective for reducing incidence of canker on fruit, premature fruit drop and increasing yields. Copper sprays for grapefruit are recommended from spring flush until fruit become fully expanded in October. Therefore, 10 to 14 applications of copper are required to



*Copper application in a commercial grapefruit grove.*

protect fruit during this period. Several other alternative protective materials were tested in Brazilian trials, but all were found to be ineffective except the antibiotic, streptomycin.

The necessity for windbreaks in

Florida grapefruit groves on the east coast and in southwest Florida has been borne out in season-long copper spray trials in 2006-07 with unacceptably high incidence of infected fruit in wind-exposed plots. The extraordinary susceptibility of grapefruit compared to all other varieties and requirement for stringent control on fruit destined for the fresh market will require protection for blocks as small as 5-10 acres. For a full description of windbreaks, refer to the Citrus Research and Education Center Web site (<http://www.crec.ifas.ufl.edu/extension/windbreaks/index.htm>).

In addition to added cost, season-long use of copper increases the risk of phytotoxicity to the fruit rind and reduced packout due to darkening of blemishes on late season fruit when copper is sprayed in combination with petroleum oils. To address this risk, streptomycin has been demonstrated to control canker while reducing the severity of copper toxicity to grapefruit during vulnerable stages of fruit development. Field trials underway are designed to test a limited number of streptomycin applications as a replacement for copper or mixture with copper at lower rate with the goal of eventually obtaining a registration for use of streptomycin in canker management of grapefruit.

Another critical element of integrated canker management in grapefruit



*Leafminer injury with lesions from subsequent canker infection.*

is control of citrus leafminer (CLM) that feed on immature leaves and massively increase bacterial inoculum and severity of canker. Control of CLM on grapefruit trees that flush frequently is essential for bacterial inoculum control. For recommended insecticides for CLM, consult the 2008 Florida Citrus Pest Management Guide (<http://edis.ifas.ufl.edu/IN686>). For more details on the most up-to-date recommendations for canker management, see the canker section of the 2008 guide (<http://edis.ifas.ufl.edu/CG040>).

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