

Florida citrus growers, packers visit Argentina's fresh fruit operations



The participants visiting Argentina included nine growers/packers/shippers, two industry sponsors, and four UF/IFAS scientists. Here the group joins hosts at the experiment station in Tucumán.

By Mark Ritenour, Jim Graham, Ron Muraro and Harold Browning

The establishment of citrus canker (caused by *Xanthomonas axonopodis* pv. *citri*) in Florida, the end of the eradication program, the interim rule, and the proposed new rule are dramatically changing the way fresh citrus is grown, packed and shipped in Florida. While improving canker detection and management practices in the field are as important as ever, regulatory emphasis is focused on keeping all fruit with canker symptoms out of packed cartons.

In some areas of Argentina, citrus canker has been endemic since the late 1970s. However, the Argentine industry still developed a successful program shipping fresh citrus to the European Union (EU) that has prevented a single fruit from arriving with canker symptoms within the past two years.

To see how this is being accomplished, a group of 15 people representing UF/IFAS, service companies, growers and packers embarked on a one-week tour of Argentine citrus production and packing operations in April. The tour was organized by Jim Graham (UF/IFAS), with support provided by Syngenta and FMC, to see the procedures and practices of Argentina, and discern whether they have application to Florida's fresh citrus industry in shipping canker-free citrus to domestic and restrictive export markets (like the EU).

Fresh fruit markets for Argentine citrus include the EU (most profitable), Canada, Russia, Japan, Hong Kong and China. Many packinghouses only pack for the export market because of low domestic prices. The group visited Argentina's three main citrus production areas: 1) Entre Rios (mandarins and oranges), 2) Salta (grapefruit), and 3) Tucumán (lemons). In the Entre Rios and Salta regions, most mandarins and

grapefruit are grown for the fresh export market, whereas in Tucumán, most lemons go to the processing market.

Argentina's canker management program consists of production as well as postharvest practices. Production practices include installment of windbreaks, judicious use of copper sprays, frequent grove inspections, timely insect control (especially for leafminer), and the use of good field sanitation and pruning practices. Copper (primarily copper oxychloride) is applied to prevent fruit infection five to 10 times per year (the number depends on variety susceptibility). Some growers switch to night application when

daytime temperatures rise above 87°F to reduce the potential for spray injury.

Windbreaks are most extensively used in the Concordia area where canker has been endemic the longest. We saw Eucalyptus, Casuarina, sugarcane and even Ficus as windbreaks. Of note were some plantings of *Corymbia* (formerly *Eucalyptus*) *torelliana*, whose understory canopy does not thin after growing tall as does *Eucalyptus grandis*. In some cases, windbreaks were planted and established one to three years before introducing young citrus plantings. In the Concordia area there were often three or four rows of windbreak trees surrounding the perimeter of large blocks, with single-row windbreaks within the block to promote air movement.

The goal of windbreaks is to reduce canker spread by slowing wind speeds to below 20 mph. However, the group was cautioned that windbreaks must not be so intensive as to stop air circulation, which would block drainage of cold air during freezes and inhibit drying of dew and rain on the trees, which promotes oleocellosis (oil spot) and fungal diseases. The high sensitivity of lemons to such wet conditions is the reason why windbreaks are not used in the Tucumán area.



Windbreaks used to protect fresh citrus in Concordia, Argentina. Trees on the left and right are male and female *Casuarina cunninghamiana*, with four rows of *Eucalyptus grandis* in the background.

Defining a citrus "block" was determined by the grower with most blocks ranging in size from two to 15 acres. Besides regulatory inspections by SENASA (Servicio Nacional de Sanidad y Calidad Agroalimentaria), grove managers also engage in their own aggressive inspection programs whereby blocks are surveyed for canker as frequently as every month.

Whenever canker is found, the affected branches and fruit are quickly pruned and burned using good sanitary practices. Regular, annual pruning is



Manual grading of lemons on a pre-grade line in Tucumán.

undertaken only during the dry season. The most closely watched insect, in terms of canker, is leafminer. In some cases, growers contract with a service company to monitor leafminer populations and quickly apply insecticides by air when the pest populations reach a critical threshold.

For fresh fruit destined for the EU, SENASA inspects groves twice before harvest — once before the season starts to provisionally certify blocks as canker

free, and finally within about 15 days of harvest. Fruit not harvested within this time must be re-inspected. The total time allowed between inspection and fruit arriving in the EU is 60 days, with the extra 45 days needed to harvest, pack and ship all the fruit.

During fruit harvest (by clipping), pickers exercised some grading in the field, depositing damaged/diseased fruit into discard bins for later sanitary disposal. Most postharvest operations in Argentina have separate pre-grade and main packing-lines, often located in separate facilities. SENASA inspectors are at both lines inspecting fruit. On the pre-grade line, fruit are washed, decontaminated with chlorine or sodium-o-phenylphenate, electronically and manually graded, treated with a fungicide, and then placed back into bins for degreening or transport to the main packingline. Up to 2 percent of the fruit dumped on the pre-grade line may show canker symptoms, even if originating from a grove inspected and found free of canker. However, all fruit with canker must be removed through the pre-grade and packing process.

If more than 2 percent of the fruit dumped on the pre-grade line has canker symptoms, or a fruit with canker symptoms is found in a packed carton, then the originating block and buffer blocks are disqualified from further EU

shipments for the remainder of the season. In addition, any fruit at the port that has not yet received the final SENASA certification is disqualified and must be redirected to a non-restrictive market such as Canada or Russia. Fruit already certified from the block and shipped is not recalled. Fruit sent to non-restrictive markets may have canker symptoms in the packed carton and are only re-graded if the blemishes exceed grade tolerances.

Below the 2 percent infection rate that SENASA allows for fruit dumped on the pre-grade line, each operation decides how much is acceptable risk. For example, if fruit from a certified block arrive at the pre-grade with 1 percent of the fruit showing canker symptoms, the operation may decide to pack the fruit for a non-restrictive market like Canada or Russia, instead of risking a canker find in a packed carton that disqualifies the rest of the block and surrounding buffer blocks for EU shipment.

Good traceback systems and separation of fruit eligible

for the EU from other, non-canker-restrictive markets was also observed. Besides individual carton labels, a single bar-coded pallet label includes information on all cartons on the pallet with their associated traceback information including the



Traceback labels on the carton with one (left) for the entire pallet.

individual who packed the carton. Carton labels are often color-coded to further clarify shipping destination.

The Argentine experiences with citrus canker that continue to be shared with Florida's industry, researchers and regulatory personnel are a great asset in keeping Florida's fresh citrus industry profitable, while preventing spread of the disease to other areas. While adaptations of many of the practices observed in Argentina may benefit our fresh citrus industry, further research is needed to develop them for use under Florida conditions.

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