Florida Citrus Advanced Technology Program

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
● *Quarterly Report* ○ *Annual Report* ○ *Final*	Canker Pathology	9/30/09

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Fruit infected with canker not a pathway to spread disease results in proposed new federal marketing rule.

TITLE and CONTACT INFORMATION

Proposal Title The importance of legions of citrus canker on fruit.

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Phone 772-462-5883	*Project Duration (years)* 1 *Year of Project* 1
Organization USDA, ARS	*Total Direct Funds (current year)*

REPORT UPDATE (650 words; provide details about your headline)

To determine the effect of prewashing on Xcc survival on asymptomatic lemons, apparently healthy fruit were harvested from infected trees in an affected orchard in Tucumán, Argentina, and grapefruit from Florida. Replications of 5 fruit were harvested for each of the following treatments: 1) non-treated check, 2) chlorine for 2 min, 3) chlorine for 2 min followed by detergent (Neutro Deter N Sinner) for 20 seconds, 4) prewash with water followed by chlorine for 2 min, 5) prewash with water followed by chlorine for 2 min followed by detergent for 20 seconds. To determine the population of canker bacteria (Xcc) on fruit, the wash solution was assayed by injection-infiltration of the suspension into two immature leaves on greenhouse grown grapefruit seedlings via needle-less syringe into 8 sites on the surface of each leaf. The seedlings were returned to the greenhouse and the inoculated foliage covered with a plastic bag for 48h. At 14 days after inoculation, the total number lesions per leaf were counted from all injection sites. There were no significant differences among the treatments, but the lesion counts were low (maximum of 3) and the frequency of zero lesions relatively high across all treatments. Nonetheless, there was a trend suggesting that chlorine treatment slightly reduced the number of lesions recovered, and chlorine treatment after prewashing the fruit, with or without detergent was beneficial in reducing the number of Xcc recovered from the fruit. The effectiveness of prewashing fruit with detergent at the same time or immediately after chlorine appears to be beneficial. Results from the two prewash trials, showed that chlorine as a disinfestant alone did not greatly reduce surface bacterial populations. However when chlorine, detergent, or detergent plus chlorine was added as a prewash, followed by a wash usually with SOPP (a disinfestant with detergent activity), there was a reduction in surface bacterial populations. The effect of a prewash was most apparent when SOPP/detergent was included. Prewashing of the fruit, especially with detergent, effectively wets the surface by lowering surface tension, which in turn allows the chlorine greater access to surface Xcc, as well as removing debris such as dirt, sooty mold, and scale insects from the fruit surface that could tie up the chlorine and/or SOPP which potentially reduce the effectiveness of the disinfestation treatment. By removing surface contaminants, the fruit surface was more exposed and, therefore, more effectively disinfested by the chlorine and/or SOPP that followed in the subsequent fruit wash. Currently, in citrus packing lines, the normal procedure is to use a prewash of water, or water plus chlorine, followed by a second wash with SOPP. A simple and low-cost recommendation resulting from these studies would be to reverse the procedure and prewash the fruit with detergent (such as SOPP), and follow this by a wash of chlorine with approximately 45 second contact time on the fruit.

Based on the results of these experiments this process will more effectively reduce survival of Xcc and other contaminants on fruit after passing through the packing line. USDA APHIS developed a new Pest Risk Assessment based on this work, proposed a new rule for shipping fruit potentially infected Xcc. The rule has passed and will be implemented during the 2009-10 fruit season, greatly expanding markets for Florida citrus and other citrus infected areas worldwide.

Three additional months of data have been now been collected to compare the production of bacteria from foliage, stem and fruit lesions. Early in the season, all sources of inoculum (foliage and fruit) produced copious quantities of Xcc. However, interestingly fruit lesion bacterial populations appear to be declining as the season progress and the fruit mature; apparently substantiating further the reduced numbers of Xcc produced from mature fruit compared to immature. This information may help in the development of evidence needed to change international fruit shipping regulations and open additional markets for Florida fruit.