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*	Other	7/9/09

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

TITLE and CONTACT INFORMATION

Proposal Title Combating symptom development in fruit from Huanglongbing-infected citrus trees: a sensory, metabolite and physiological approach

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Phone (863) 956-1151	*Project Duration (years)* 2 *Year of Project* 1
Organization UF/IFAS CREC	*Total Direct Funds (current year)* $179,153

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

Sensory impacts and flavor and aroma changes in HLB fruit: Two Valencia fruit samples (early April and late May), including symptomatic, asymptomatic and control fruit, were used. A fruit subsample was obtained for juicing. Juice was strained and half of each sample pasteurized, resulting in six test groups for each sampling date. Juice analysis included Brix, color and ratio determination. No significant differences were seen between pasteurized and fresh juice, or between juices collected in early April, while ratios from symptomatic fruit were significantly lower than asymptomatic or control juice collected in late May. Most pasteurized juices were analyzed using headspace SPME GC-MS. Ninety-eight volatile component peak areas were quantified using internal standards. All samples will be analyzed in triplicate and about 50 major volatiles will be identified and employed in the final data set for statistical evaluation. Consumer panel analysis of the corresponding juices will be conducted in summer 2009 and will evaluate hedonic ratings of overall acceptance, sweetness, fresh orange intensity and bitterness across each sample set for each harvest date. Difference testing will be performed on matched samples to determine if differences exist between pasteurized and non-pasteurized juices if stored frozen.

Phytohormone changes in HLB fruit: Fruit subsamples both harvest dates were used for ethylene, auxin (IAA) and abscisic acid (ABA) determination. Ethylene production was more than two times lower in symptomatic fruit as compared with healthy fruit. Asymptomatic fruit ethylene production was intermediate between healthy and symptomatic fruit. ACC content followed similar trends. Likewise, similar trends in fruit flavedo ACS1, ACS2, and ACO gene expression were found; ACS genes encode protein products that are key rate controlling steps in ethylene biosynthesis. Expression of ethylene perception genes is being determined. IAA content was twice as high in flavedo from symptomatic fruit when compared with healthy or asymptomatic fruit. No difference in IAA content was measured in juice vesicles from healthy, symptomatic or asymptomatic fruit. ABA content in flavedo and juice vesicle from symptomatic Valencia fruit were significantly higher than in healthy and asymptomatic tissues.

Yield, peel color, fruit size and seed abortion in HLB fruit: Fruit collected for yield and size determination were cut in half, and juice from half oranges was collected. Juice was analyzed for Brix, color and ratio determination. Ten HLB symptomatic trees and 10 healthy trees were harvested from four commercial citrus groves (2 Hamlin, 2 Valencia) to characterize and quantify yield changes (pieces of fruit, fresh weight and fruit size) due to HLB infection. Subsamples of fruit from each tree harvested were taken for standard juice analysis. HLB symptomatic trees have significantly smaller average fruit size and fewer fruit per tree than healthy trees. Juice analysis has indicated that only symptomatic fruit from infected trees have altered juice quality, asymptomatic fruit from infected trees have similar juice quality to fruit from healthy trees. Minolta color analysis indicated that symptomatic Valencia fruit had significantly lower a/b ratio (greener), weight and equatorial diameter compared to healthy and asymptomatic fruit. Seed abortion percentage was higher in symptomatic Valencia fruit (12%) than in healthy or asymptomatic fruit (3 and 5%, respectively).

Extension and education: Four PI's (Burns, Rouseff, Sims and Spann) will present work related to this funding at the 2009 International Citrus and Beverage Conference (ICBC) in September 2009. The ICBC generally has an audience of 375-425 technical and managerial personnel from major juice and beverage companies, and businesses that support them, and provides an excellent forum to disseminate information to the citrus industry. Spann, Oswalt, Schumann, Danyluk. 2009. Fruit Size, Yield and Quality in HLB Infected Trees. 2009 FL Citrus Growers Institute Greening Symposium, Bartow, FL