CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

hardware and software development

Proposal Title

Sensing system for symptomatic citrus greening infected leaves using polarized light

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/10/12	Citrus Research and Development Foundation	Pathogen/Disease Detection

REPORT UPDATE (500 words; summarize your accomplishments)

Single color light emitting diodes (LEDs) were decided to be used in the leaf measurement system instead of regular light source and band-pass filters for cameras. By using the LED-illumination, the problem with low transmission efficiency of band-pass filters was resolved. LEDs in 591 nm (target wavelength) and 400 nm (reference wavelength) as well as a LED driver were purchased and their responses were evaluated and confirmed using a mobile spectrometer. An electronic circuit was designed for LED illumination system which is able to switch between two wavelengths and also control the amount of light in each wavelength separately. In order to use the maximum light of LEDs, the angle of LEDs' light were narrowed down using proper lenses with a field of view of 24°. A box containing two cameras, LEDs, control circuit and also the imaging platform was design and created. As this box covers the leaf during the imaging and only the LED's light is illuminated on the platform, the effects of other light sources in the grove can be eliminated so that imaging during the day is also possible. Also the distance between cameras and leaf can be kept fixed during the imaging. A visible linear polarizing laminated film was purchased and cut to be placed in front of the cameras and LEDs. The polarizing film in front of the LEDs and one of the two cameras was set to be in the same direction, however a polarizing film was installed in a perpendicular direction in front of the second camera.

The frame grabber's software was customized so that it can capture two snapshots from two channels at the same time. The preliminarily evaluation of leaf measurement system was performed in the Lab with some citrus leaves in different conditions. Four images were captured from each leaf, two images at 591 nm with parallel and perpendicular polarizing directions with light source and also two images at 400 nm with the same directions. The visual evaluation of images confirmed that there are differences between the images from the same scene when they were captured with different situations. The leaf measurement system is now ready for an experiment in a citrus grove.

PI First Name Won Suk

PI Last Name Lee

Email wslee@ufl.edu

Phone 352-392-1864 Ext. 227

Organization University of Florida

Contract Number 11-124-423

Project Duration (years) 1 *Year of Project* 2

Total Funds (current year) $55,500.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.