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)

Finding genes to control citrus greening

Proposal Title

Identify and deliver antibacterial peptides and/or proteins for the control of citrus greening (Huanglongbing or HLB)

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/5/12	Citrus Research and Development Foundation	Pathogen/Disease Detection

REPORT UPDATE (500 words; summarize your accomplishments)

This is a project to find an interim control measure to allow the citrus industry to survive until resistant or tolerant trees are available. We are approaching this problem in three ways. First, we are attempting to find products that will control the greening bacterium in citrus trees. We have chosen initially to focus on antibacterial peptides because they represent one of the few choices available for this time frame. We also are testing some possible anti-psyllid genes. Second, we are developing virus vectors based on CTV to effectively express the antibacterial genes in trees in the field as an interim measure until transgenic trees are available. With effective antibacterial or antipsyllid genes, this will allow protection of young trees for perhaps the first ten years with only pre-HLB control measures. Third, we are examining the possibility of using the CTV vector to express antibacterial peptides to treat trees in the field that are already infected with HLB. With effective anti-Las genes, the vector should be able to prevent further multiplication and spread of the bacterium in infected trees and allow them to recover.

We have completed several large screenings of antibacterial peptides against Las in sweet orange trees. About 50 different antibacterial constructs have been tested in trees. We have found two peptides that appear to effectively protect sweet orange trees from HLB. However, we and other labs continue screening for better genes that more effectively control HLB and can be approved for use in a food crop.

In the California lab, we developed methods to rapidly screen anti-bacterial peptides against Ca. L. psyllaurous in tobacco plants. Tobacco plants were either inoculated with Ca. L. psyllaurous by using the tomato psyllid (Bactericerca cockerelli) and challenged one week later with recombinant Tobacco mosaic virus (TMV) expressing the specific peptides, or the plants first were inoculated with recombinant TMV, followed one week later by using B. cockerelli to inoculate Ca. L. psyllaurous. These assays are being analyzed presently.

We also are improving the CTV-based vector to be able to produce multiple genes at the same time. This could allow expression of genes against HLB and canker or multiple of genes against HLB.

Another major goal is to do a field test of the CTV vector with antibacterial peptides, which is an initial step in obtaining EPA and FDA approval for use in the field. After some delays, we have received permission for USDA APHIS and are now establishing the field test.

In the last few months, we have continued to screen peptides. We have begun to use new CTV-based vectors that we hope will improve expression of peptides. Additionally, we have built new constructs to test more peptides.

PI First Name William

PI Last Name Dawson

Email wodtmv@ufl.edu

Phone 863-956-8714

Organization UF, IFAS, CREC

Contract Number 00088391

Project Duration (years) 3 *Year of Project* 2

Total Funds (current year) $309,194.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.