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*	Management	7/13/09

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

Progress in Biological Control of Asian citrus psyllid in Florida

TITLE and CONTACT INFORMATION

Proposal Title Enhanced Biological Control of Asian Citrus Psyllid in Florida through Introduction and Mass Rearing of Natural Enemies

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Phone (239) 658 3400	*Project Duration (years)* 2 *Year of Project* 2
Organization SWFREC - IFAS - University of Florida	*Total Direct Funds (current year)* $153,062.00

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

This is a continuing project for which funding was released this year on 13 April. For our first objective, we obtained 3 new colonies of Tamarixia radiata, a species specific parasitoid, from south China, North Vietnam and Pakistan last year and now have secured approval from USDA-APHIS-PPQ to release these into the environment. Also, one of us (RN) made another trip to a different part of China although no new colonies were obtained. For our second objective, we have completed a study with the help of Dr. Norman Barr, USDA-ARS Mission TX, to characterize these and other strains genetically so that they can be tracked in the environment. The study confirmed that the different colonies shared the same internal transcribed spacer (ITS) region of nuclear ribosomal DNA, showing that the collections represent a single species. This together with a host range study conducted by Ru Nguyen in quarantine was used to obtain the release permit. The mitochondrial cytochrome c oxidase I (COI) marker was used distinguished the northern Vietnam and Pakistan colonies from each other and from the other colonies. Comparison of COI sequences from field collected populations of Puerto Rico, Guadeloupe, and Texas indicated that Florida is not a likely source of the introduced T. radiata in Puerto Rico but is a likely source of the introduction into Texas. We had already begun to ramp up our colonies of psyllid and the strain of Tamarixia radiata (Objective 1) in preparation for release and evaluation this spring and summer (objective 2). We have over 200 Murraya paniculata plants in our new screen house for this purpose, a new air-conditioned glasshouse for the psyllid colony and another for the parasitoid colony with a backup in a climate-controlled insectary. Parasitoids are being produced at the rate of 600-800 per week. So far this year, 7,050 of these wasps have been released in both conventional and organic commercial citrus groves in Florida. We are also providing information and starter colonies to assist a commercial grove in Florida to mass rear the parasitoid for their use. Parasitism rates are being monitored by rearing field collected nymphs of D. citri and exposing infested sentinel plants in the field to compare with published studies (see below). Nymphs recovered on sentinel plants in the conventional grove were 52% parasitized by T. radiata. Diaphorencyrtus aligarhensis (Hymenoptera: Encyrtidae), an endoparasitoid of D. citri from southern China is also being reared and released throughout the state. A total of 2400, 1325, and 3550 wasps were released during 2007, 2008, and 2009, respectively, in conventional and organic citrus groves and dooryard orange jasmine (Muraya paniculata). A parasitism rate of 6-19% was calculated based on adult emergence from nymphs reared from M. paniculata in May 2008. For objective 3, we released over 0.5 million predatory mites (Amblyseius swirskii) on mature orange trees in a 20 acre organic grove in Lake Wales, FL and are monitoring the populations of mites and psyllids in the grove. Thus, substantial progress was made on all objectives this quarter.

Publications (Objective 4)

1. Barr, N.B., D.G. Hall, A. Weathersbee, R. Nguyen, P. A. Stansly, J. A. Qureshi, and D. Flores. 2009. Comparison of laboratory colonies and field populations of Tamarixia radiata, an ecto-parasitoid of the Asian Citrus Psyllid, using ITS and COI DNA sequences. Journal of Economic Entomology (submitted).
2. Qureshi, J. A., M. E. Rogers, D. G. Hall, and P. A. Stansly. 2009. Incidence of invasive Diaphorina citri (Hemiptera: Psyllidae) and its introduced parasitoid Tamarixia radiata (Hymenoptera: Eulophidae) in Florida citrus. Journal of Economic Entomology. 102: 247-256.
3. Qureshi, J.A., and Stansly P.A. 2009. Exclusion techniques reveal significant biotic mortality suffered by Asian citrus psyllid Diaphorina citri (Hemiptera: Psyllidae) populations in Florida citrus. Biological Control 50: 129–136.