DEVELOPMENT OF EFFECTIVE MONITORING TECHNIQUES FOR SHARPSHOOTERS AND THEIR PARASITOIDS

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Reporting Period: This project is awaiting receipt of funding.

ABSTRACT
This project relates to ongoing efforts of the Pierce's Disease Control Program to assess the efficacy of the sharpshooter egg parasitoid biocontrol program. *Gonatocerus morgani*, *G. morrilli*, and *G. triguttatus* have been reared and released by the program at sites throughout southern California and the southern Central Valley since 2000. California Department of Food and Agricultiure (CDFA) reports, the most recent in 2007, have demonstrated the effectiveness of these efforts. However, current methods to assess released species populations, the extent of parasitism by native competitors, and host preferences of the parasitoids involved are limited. D. Cooksey conducts research in comparative and functional genomics of *Xylella fastidiosa (Xf)* to identify key virulence factors through construction of specific mutations in the bacterial genome. To facilitate this work, his laboratory has developed a multiplex PCR system for the simultaneous identification of *Xf* strains (Hernandez-Martinez *et al.*, 2006). D. Morgan, Supervisor of the release program, is thoroughly familiar with the biology, ecology, systematics, and identification of the host and parasitoid species targeted in the proposed study. The development of the proposed multiplex PCR system will greatly enhance the data acquisition of the CDFA parasitoid release biocontrol program.

LAYPERSON SUMMARY
The suppression of glassy-winged sharpshooter (GWSS) populations is accomplished in part by biological control agents. An accurate and rapid method for identification of the eggs of sharpshooter species, determining whether eggs are parasitized, and by which parasitoid species, is essential for estimating success. Current methods are flawed and expensive. Development of a single-step multiplex real-time PCR assay for sharpshooters and their parasitoids would allow for accurate reporting of GWSS occurrences and facilitate development of effective control agents.

OBJECTIVES
1. Develop primer pairs that can be used in a multiplex PCR system for each species of sharpshooter and parasitoid. Several genes have been partially sequenced for GWSS and smoketree sharpshooter and for a number of their parasitoids. These sequences will be analyzed for primer design.
2. Clone the target genes from those species of parasitoid for which there is no sequence data available. This will be accomplished through the use of published primers or the development of degenerate primers.
3. Determine the limits of detection of each species of sharpshooter and parasitoid. Based on other studies, we are confident we will be able to detect developing parasitoid embryos in sharpshooter eggs. We hope to be able to determine both the host and parasitoid species from sharpshooter egg cases from which the parasitoids have eclosed by amplifying the layer of cells which remain in the parasitoid egg (Oda and Akiyama-Oda, 2008).

REFERENCES CITED
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FUNDING AGENCIES
Funding for this project will be provided by the University of California Pierce's Disease Research Grants Program.