A. Project Title: Improved Detection, Monitoring and Management of the Glassy-winged Sharpshooter

B. CDFA contract number: 00068753.

C. Time period covered: The results reported here are from work conducted from March-July 2008.

D. Principal Investigators: Russell F. Mizell, III, Professor of Entomology, NFREC-Quincy, 155 Research Rd, Quincy, FL rfmizell@ufl.edu, (850) 875-7156. **Co-Principal Investigator: Peter C. Andersen,** Professor of Horticultural Sciences**,** University of Florida, NFREC-Quincy, 155 Research Rd, Quincy, FL, pcand@ufl.edu, (850) 875-7122.

E. Objectives and activities:

General Objective: To determine the most efficient and cost effective trapping system to detect and monitor GWSS population dynamics and the potential to manage GWSS populations.

Obj. 1a: Evaluate and summarize previous sampling and trapping efforts for GWSS.

Obj. 1b: Trap configuration and number: Determine the potential and optimize the number of traps that are most efficient and cost effective in detecting and estimating GWSS populations.

Obj. 1c: Determine the effects of host plants in combination with traps: Determine the potential and optimize a combination of GWSS host plants in sentinel plots to detect, estimate and manage GWSS population dynamics.

F. Research accomplishments and results for each objective:

Obj. 1a: This reporting period covers the dormant season in our area so no field work was conducted until June. During dormant season we organized, gathering literature and summarized previous data concerning monitoring and detection of GWSS. This literature search is being finalized for publication; this effort will be reported in the final project report to reflect all published research available at that time.

Obj. 1b: Experiments are in the field are currently being conducting to gather data to meet this objective.

Obj. 1c: We are currently gathering data but have preliminary results have been results analyzed concerning this objective. Figures 1-4 below indicate how trap capture rate on yellow stick traps consisting of a 7.6 × 30 cm mailing tube placed 1 m above ground is affected by the proximity of crape myrtle host plants. The description of the experimental plots and the implications of their differences on GWSS flight and movement behavior are explained and interpreted in detail in Northfield et al. (2008a). In brief, the two plots contain 'Natchez' crape myrtle planted in concentric circles 20 m apart. The north circle has no vegetation on its border other than mowed grass for at least 100 m in all directions. In contrast, the south circle has adjacent vegetation consisting of a plot of cottonwood, peach and miscellaneous trees within 30 m of the crape myrtle. A 7 × 7 grid of 49 traps was placed in each plot 10 m apart such that the crape myrtle and part of the surrounding area outside the plantings were included. Captured GWSS were removed from the traps 2-3 times per week and recorded by sex from May to July. The distance of each trap from the nearest crape myrtle plant within the grid was also recorded. The relationship of trap capture rate to distance from the nearest plant was analyzed by sex using regression analysis for each of the two plots (Fig. 1-4). There was a significant relationship for both male and female GWSS to plant distance in the north plot, but not in the south plot. We attribute this plot difference to the effect of GWSS movement interacting with plot habitat factors, specifically the presence and absence of border vegetation (Northfield et al. 2008a). The data suggest that trap placement and the surrounding habitat characteristics can greatly influence trap efficiency (change in capture rate). GWSS trap capture rate increases with proximity to a host plant under specific habitat conditions (south plot), and shows no relationship under other conditions (north plot). Trap efficiency may be an extremely important variable in a regulatory environment. Additionally, in previous work we have shown that trap capture rate may be inversely related to GWSS population densities when preferred hosts such as crape myrtle offer optimum nutrient profiles for leafhopper feeding. Much different results were recently reported in citrus by Castle and Naranjo (2008) who found a significant relationship between trap densities and GWSS populations. Our findings merit additional research to better understand the behavioral mechanisms involved, and how to exploit them to improve detection and monitoring of GWSS.

Hv Male = 0. 13844 – 0.00337 (Distance in M)

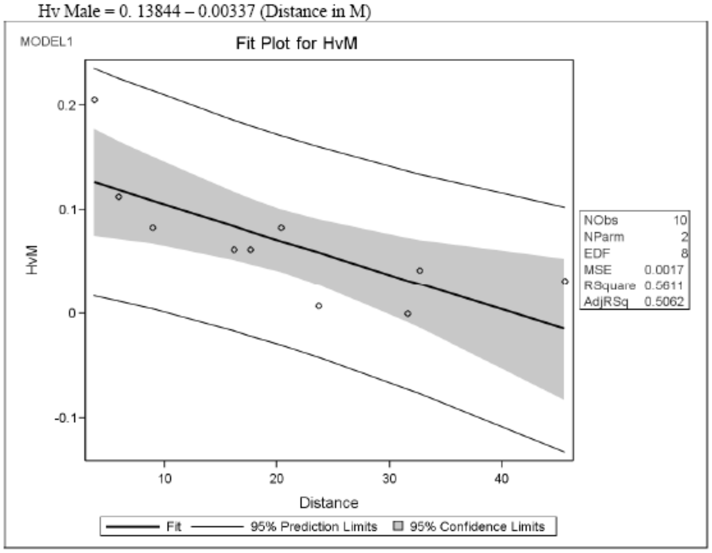

Figure 1: The effect of plant proximity (distance in m) on male GWSS response to yellow traps (north circle without borders for 100 m.

Hv Male = 0.31621 – 0.00291(Distance in M)

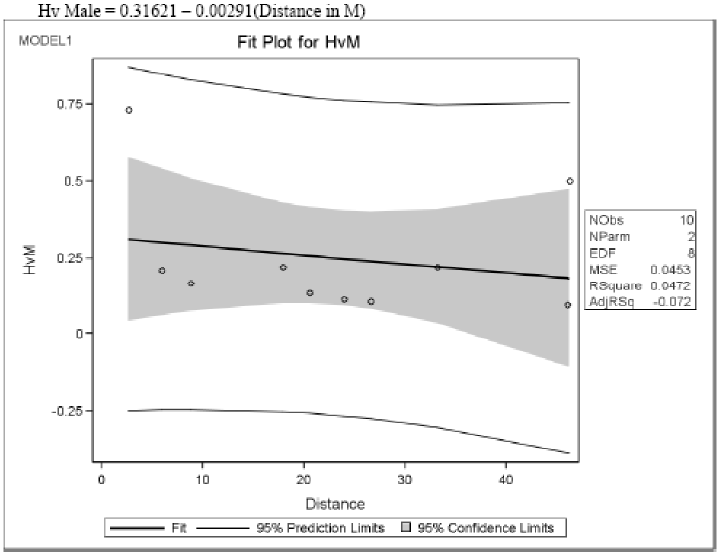

Figure 2: The effect of plant proximity(distance in m) on male GWSS response to yellow traps (south circle with borders of vegetation).

Hv Female = 0.24708 – 0.00500(Distance in Meters)

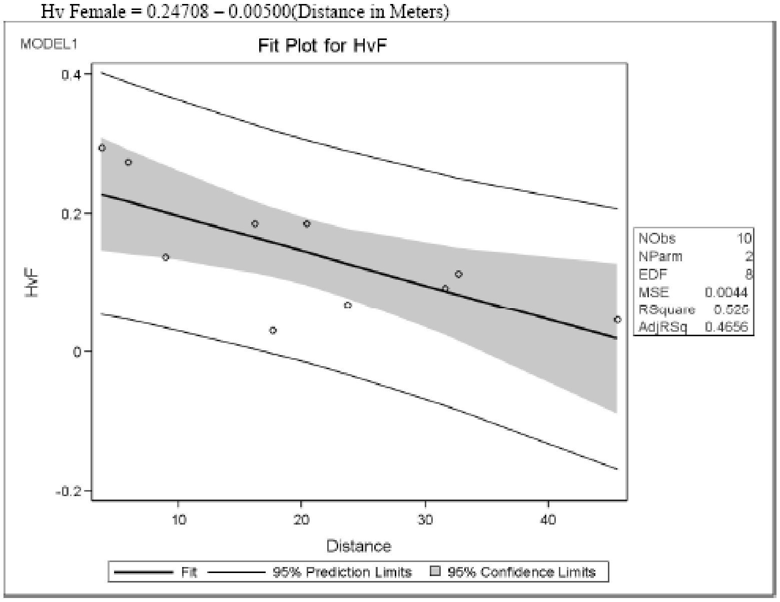

Figure 3: Effect of plant proximity (distance in m) on female GWSS response to yellow traps (north circle without vegetation in borders for 100 m).

Hv Female = 0.37877 – 0.00607(Distance in M)

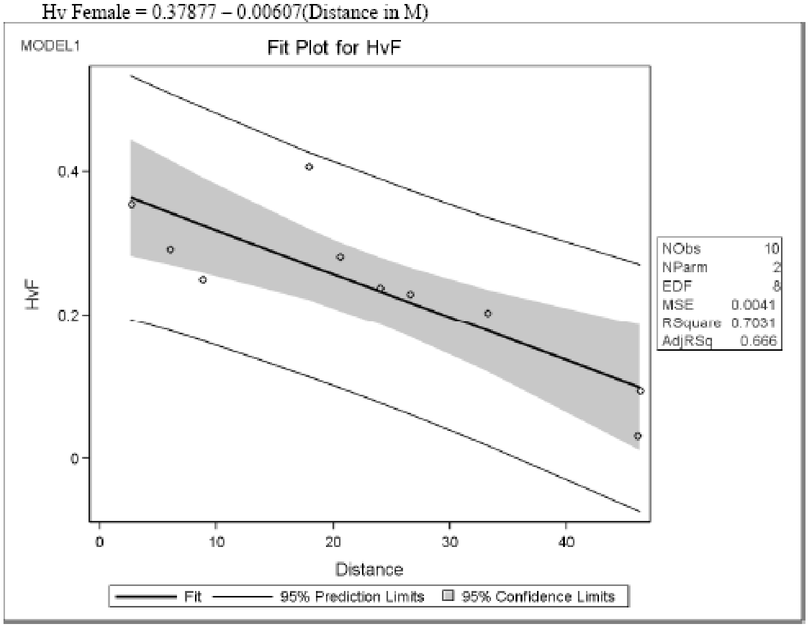

Figure 4: The effect of plant proximity (distance in m) on female GWSS response to yellow traps (south circle with borders of vegetation).

G. Publications:

Andersen, P., R. Mizell and B. Brodbeck. 2008. Abundance and feeding rate of *Homalodisca vitripennis* Germar on *Prunus persica* and *Prunus salicina*. J. Entomol. Sci. (In press).

Mizell, R. F., C. Tipping, P. C. Andersen, B. V. Brodbeck, T. Northfield and W. Hunter. 2008. Behavioral model for the glassy-winged sharpshooter, *Homalodisca vitripennis*: optimization of host plant utilization in a risky environment and the management implications. Environ. Entomol. Forum (In press).

Northfield, T., R. Mizell, T. Riddle, P. Andersen and B. Brodbeck. 2008a. Dispersal, patch leaving and aggregation of the glassy-winged sharpshooter, *Homalodisca vitripennis* (Hemiptera: Cicadellidae). Environ. Entomol. (In press).

Northfield, T. R. F. Mizell, T. C. Riddle and P. C. Andersen. 2008b. Landscape level geospatial distribution of glassy-winged sharpshooter *Homalodisca vitripennis* (Hemiptera: Cicadellidae) in north Florida. J. Appl. Ecol. (submitted).

H. Research relevance statement, describing how this research will contribute towards solving the PD/GWSS problem in California:

The glassy-winged sharpshooter, *Homalodisca vitripennis* (Germar), as a vector of *Xylella fastidiosa*, remains a threat to grapes, almonds, stone fruit and oleander and impacts citrus and nursery crops throughout much of California. It remains an important quarantine pest for the Napa and Sonoma Valleys and other uninfested areas. Highly accurate and precise methods for detection of new colony infestations and for monitoring GWSS population dynamics on a temporal and spatial basis are lacking. Due to the unique biology and phenology of the xylophagous GWSS which is driven by plant xylem chemistry and nutrition, conventional detection and monitoring approaches will not provide the necessary statistical precision needed by the regulatory and producer community for management decisions. This proposal provides an approach that will address the detection and monitoring needs as well as develop a new strategic approach to management of GWSS.

I. Summary in lay terms of the specific accomplishments of the research project:

The required field and laboratory research is in progress and will result in new more efficient ways to detect and suppress GWSS. To date we have determined that proximity of traps to host plants affects trap capture rate. We have begun synthesizing the available research toward developing a document on the current status and limitations of the monitoring and detection of GWSS.

J. Summary and status of intellectual property produced during this research project:
None.

K. References cited:

Castle, S. and S. Naranjo. 2008. Comparison of sampling methods determining relative densities of *Homalodisca viitripennis* (HemipteraL Cicadellidae) on citrus. J. Econ. Entomol. 101:226-235.