

## Final Progress Report

### USDA APHIS – Texas Pierce’s Disease Research and Education Program

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**Title of project:** Management of Pierce’s disease in Grape.

**Principal investigator:** Forrest Mitchell

**Major accomplishments to date** (April 1, 2005 through March 31, 2006):

**Statewide Survey** The statewide survey was implemented. APHIS personnel and collaborators collected yellow sticky traps from 45 vineyards around the state. Traps and collected insects were returned to Stephenville, where they were identified, counted and either removed from traps or stored. Nearly 6200 traps were examined in 2005 and 9,767 *Homalodisca coagulata* (the glassy-winged sharpshooter), 1,551 *Graphocephala versuta*, 833 *Clastopera* and 385 other xylem feeding insects were identified and archived.

**QRT-PCR of hoppers** In collaboration with Blake Bextine of UT-Tyler, selected samples of leafhoppers were removed from traps and examined with a sensitive technique known as Quantitative Real Time Polymerase Chain Reaction or QRT-PCR. The three main species mentioned above were all positive for *Xylella* bacteria. Initially, there was a higher percentage *G. versuta* hoppers presenting positive results than the other two. More detailed work has indicated that this species is not carrying a grape strain of PD, but rather a strain more related to an east coast tree and ornamental strain. The other two positive species however, were carrying a Pierce’s disease strain of the bacterium. Initial investigation has also demonstrated that early season glassy winged sharpshooters are not carrying *Xylella*, while late season populations present as much as 80% positive reactions.

**AFLP of GWSS** Movement of the glassy-winged sharpshooter has been an area of interest to the program. Samples of mid-summer and fall sharpshooters were examined by means of a genetic test called AFLP. The first samples have shown that the summer GWSS does not have the same genetic composition as the winter GWSS. The implications of this are still uncertain and many more samples need to be processed, but given the seasonal change of *Xylella* prevalence in the GWSS this may lead to the identification of a vector strain of the hopper.

**Training of APHIS trappers** Trap collectors for the Pierce’s disease program were trained in identification of GWSS. They are able to recognize and enter count data from traps for this species. This information will make its way rapidly to the APHIS website for transfer to growers.

**Supply of data and alpha test of APHIS website** The entire dataset from the entomology program has been transferred to APHIS for inclusion in the APHIS website database. Use of the database and data entry are being tested at the Stephenville Center in collaboration with APHIS.

**Increase field research capacity** The experimental grape test plots at Stephenville were expanded this year with both red and white grape. The total test site is now nearly 5 acres.

**Acquisition of high-throughput RT-PCR unit** A high throughput unit for QRT-PCR was acquired at Stephenville. The cost was shared by a grant from TAES (one third) and the Stephenville Center (two thirds). This will allow a distributed work load between Stephenville and UT-Tyler and prevent overload of the Tyler machine with field samples.

**Acquire management of Fredericksburg unit and set up accounting support** Accounting and HR support of the Fredericksburg facility was transferred to the Stephenville Center. Fredericksburg personnel now report to the Stephenville Center and are managed from that location. This removes the burden from the Entomology Department and provides closer ties to the Stephenville and Fredericksburg entomology programs revolving around Pierce’s disease.

**Goals achieved:**

The above accomplishments were all directed at goals identified for the program. Specifically, the execution of the statewide survey, the ability to assay leafhoppers for the presence of *Xylella* and then identify strains present and the establishment of research plots for insecticide and HPR studies have met goals of this program.

**Relevance to the USDA APHIS – Texas Pierce’s Disease Research and Education Program:** This program has worked closely with APHIS and other projects associated with the Pierce’s disease program. The objectives are taken from the 5 year plan assembled in collaboration with these colleagues. Future efforts will similarly be taken from the APHIS 5 year plan.

**Publications submitted/published; presentations/posters presented at national technical meetings/conferences:**

Lauzière, I. Mitchell, F. and B. Bextine. 2005. Xylem sap feeding Hemiptera of the Edwards Plateau, Texas: identification, abundance, seasonality, and disease vectoring potential. California Department of Agriculture Pierce’s Disease Research Symposium. San Diego. December 2005.

McDonald, D., Lauzière, I. and Mitchell, F. 2006. Statewide distribution and abundance of putative insect vectors of Pierce’s disease of grape. Meeting of the Southwestern Branch of the Entomological Society of America. Austin. February 2006. Also posted at <http://piercesdisease.tamu.edu/research/reports/>

Mitchell, F., Lauzière, I. and B. Bextine. Insect vectors of Pierce’s disease in Texas. PD feature. January 2006.

Bextine, B. and F. L. Mitchell. Occurrence of *Xylella fastidiosa* in Texas sharpshooter populations. Meeting of the Southwestern Branch of the Entomological Society of America. Austin. February 2006. Also posted at <http://piercesdisease.tamu.edu/research/reports/>

Online documentation (<http://piercesdisease.tamu.edu>) on full taxonomical identification, picture library for identification of 19 leafhoppers collected in Central Texas, and their respective importance. July 2005.

Online documentation (<http://piercesdisease.tamu.edu>) ‘Where’s the *Xylella*? Graphical representation of the distribution of disease symptoms and detectable bacteria in a seven year old grapevine. All tissues from root to leaf buds were examined. 2005.

Signature:

Date: April 14, 2006

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If prepared by someone other than the Principal Investigator, please provide name and contact information: