Field trial for resistance to Pierce's disease

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Objective and activities to achieve objectives

The field trial is intended to duplicate a commercial operation to determine how grapevines will fare in the presence of pressure from the sharpshooter leafhopper vectors that transmit the pathogen causing Pierce's disease. The specific objectives of the project are as follows:

1. Prepare the vineyard. Rogue out existing plants and prepare additional trellises as needed.
2. Transplant test grapevines to the experimental vineyard.
3. Maintain the grapevines exactly as handled by commercial vineyards.
4. Monitor for pests and diseases.
5. Dispose of plants at the end of trials.

In the Spring of 2010 the experimental plot at UC Riverside's Citrus Research Center and Agricultural Experiment Station was prepared for planting. The site has had successive crops of conventional grapevines fail due to high prevalence of *Xylella fastidiosa* transmitted by sharpshooters. The main reason for this high vector pressure is the proximity to extensive plantings of citrus, which are preferred overwintering hosts for the glassy-winged sharpshooter (*Homalodisca vitripennis*). To prepare the site vines from previous plantings were removed, the soil was tilled, and drip irrigation was set up. In May the first round of test varieties were planted – approximately 225 young vines of different genotypes from researchers at UC Davis. As vines matured they were trained on a vertical trellis.

We regularly monitored grapevines for any evidence of damage not associated with Pierce's disease. One application of wet sulfur was made in the middle of the summer to control a mild, yet widespread infestation of powdery mildew.

Beginning in June we monitored all vines regularly for insect pests and diseases. We deployed 8 yellow sticky cards, which were checked approximately weekly throughout the season to monitor for sharpshooters. Between Fall 2010 and Summer 2011 traps are being checked monthly. In addition, in July 2010 we visually inspected all grapevines. During this inspection we counted the number of sharpshooter egg masses or adults present on each vine.

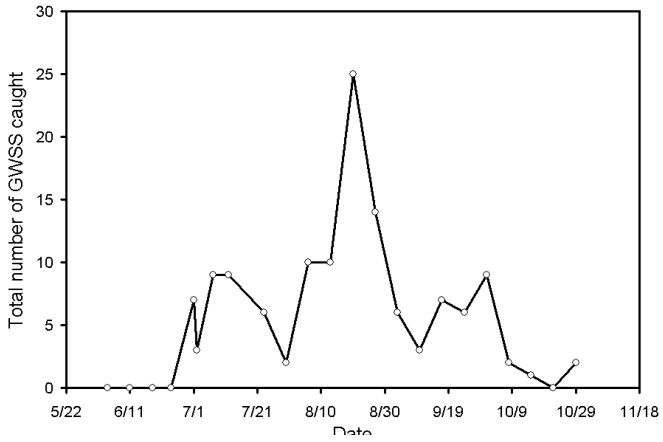

Figure 1. Glassy-winged sharpshooter trap catches in the research plot over the Summer of 2010.

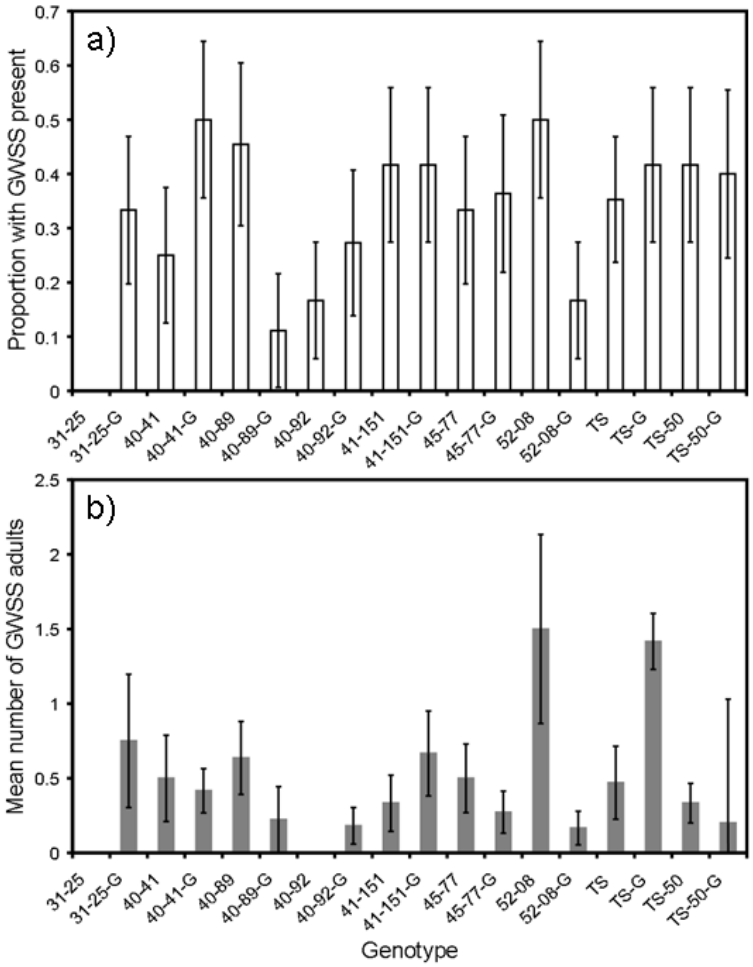

Figure 2. Proportion of vines with at least one sharpshooter (a) and number of sharpshooters on vines (b) among 18 different grapevine varieties.

Next Spring additional test grapevine varieties will be added to the experimental vineyards. We will continue to monitor pests and diseases in all vines for at least an additional two years.

Research accomplishments and results

Sharpshooter trap catches show typical seasonal dynamics, with a significant peak in August (Figure 1). No other insect pests were noted.

Results from the whole plant searches in July 2010 are shown in Figure 2. Few plants had any evidence of egg mass presence, whereas adults were far more commonly found – up to 10 on a single grapevine. There was substantial variability in the number of sharpshooters on vines, with overall more than 31% (70/225) of vines having at least one insect. All but one genotype had at least one plant one which sharpshooter egg masses or adults were present. Collectively, these results, for just a single day, suggest that there is a relatively high vector pressure on these grapevines.

The only clear disease symptoms were from a mild powdery mildew infection, which was controlled via treatment with sulfur in July. There was no obvious of evidence of widespread Pierce's disease in the experimental vineyard in this first season, though a handful of vines in the Fall showed mild leaf scorch that could represent early symptoms.

Publications or reports

N/A

Presentations

N/A

Research relevance

This project is providing support for a field trial of novel grapevine varieties that show promising reductions in their susceptibility to Pierce's disease. Over the past year we established and

maintained the research plot at UC Riverside's Citrus Research Center and Agricultural Experiment Station, which included censusing of sharpshooter leafhopper populations. Census data and whole plant inspections suggest that a high proportion of research plants are being exposed to sharpshooters, as is necessary to test the utility of these new grapevine varieties.

Lay summary

A major focus of Pierce's disease management includes attempts to develop grapevine varieties that are less susceptible to *Xylella fastidiosa*. We are providing support for field trials of newly developed grapevine varieties that show promising reductions in Pierce's disease severity. This year we planted the first group of test plants at UC Riverside's Citrus Research Center and Agricultural Experiment Station. Vines were trained to a vertical trellis, drip irrigation was set up, and we regularly monitored for pest and non-Pierce's disease damage.

Status of funds

The progress made to date on the project is in line with that of proposed timeline. We anticipate that remaining funds will be exhausted in the same timeframe as originally budgeted.

Intellectual property

N/A