MONITORING AND CONTROL MEASURES FOR PIERCE'S DISEASE IN KERN COUNTY

Project Leader:
Jennifer Hashim
UC Cooperative Extension, Kern County
Bakersfield, CA 93307

Cooperators:
Alexander H. Purcell
Division of Insect Biology
University of California
Berkeley, CA

Barry Hill
California Department of Food and Agriculture
Plant Pest Diagnostics Branch
Sacramento, CA

Reporting period: The results reported here are from work conducted from April 2002 through December 2002.

INTRODUCTION

Pierce's disease (PD), caused by the bacterium *Xylella fastidiosa*, is a killer of grapevines. Significant vine loss from PD has occurred in southern California, north coast regions and portions of the southern San Joaquin Valley such as Tulare and Fresno counties over the last 100 years. Native sharpshooters, including the blue-green sharpshooter and the red-headed and green sharpshooters have been largely responsible for PD spread. With the arrival of the glassy-winged sharpshooter (GWSS), a more effective vector, the transmission of the bacterium and subsequent disease threatens Kern County, a major grape production area of the state with more than 87,000 bearing acres and a farm gate value of approximately $438 million dollars.

Approaches to disease management have changed in Kern County, due largely to an increase in the incidence of disease where PD had not known to exist prior to the introduction of GWSS. To date growers have tried to control the insect and the disease with a combination approach of using both soil-applied and foliar pesticides and roguing out vines expressing PD-like symptoms during the summer. However, there is no data to support whether these strategies will be successful to combat the spread of PD. Many management decisions are currently being made based on anecdotal evidence, testimony and projections. The county provides a unique environment in which to map the incidence of PD, track the spread of the disease over time and investigate the interaction between the insect and the disease, given that both inoculum and the insects are present. Such information would be useful to determine the economic impact of GWSS on California agriculture as well as provide fundamental data on epidemiological factors including but not limited to, host susceptibility to disease, GWSS presence, proximity to preferred hosts of GWSS, proximity to alternative hosts of *Xylella* and individual grower insecticide and disease management programs.

OBJECTIVES

1. Estimate the incidence of PD over time in both GWSS infested regions as defined by the Kern County Agricultural Commissioner's Office and detection efforts by the CDFA and USDA and in areas with no GWSS finds. Data will be collected by mapping case study vineyards for PD in order to determine the quantitative relationships of recorded variables to disease incidence over time.
2. Provide individual support to growers and pest control advisors to ensure that they are aware of the critical nature of PD in the presence of GWSS. The key to this objective is getting grower support to develop their own field monitoring programs and control strategies. This includes individual field meetings if there are questions regarding symptom identification, encouragement of tissue sampling, collecting and shipping samples to the CDFA diagnostic lab, communicating results, providing information on PD management and follow up support.

RESULTS AND CONCLUSIONS

This study focuses on vineyards in Kern County because of its importance as a major grape production area and its short history of GWSS infestation. This situation enables the project to follow the epidemiology and progression of the disease beginning with the arrival of the insect vector, particularly in the northern area of the county (Delano and Highway 65). A number of vineyard blocks throughout the county were selected as case studies for the project (Table 1.). The acreage surveyed within the project represents roughly 5% of the total bearing grape acreage in the county. A profile was created for each vineyard and the variables recorded include: GPS coordinates, cultivar, vine age/plant date, row x vine spacing, pruning and trellising system, weed index, proximity to other host crops of GWSS and *Xylella fastidiosa,* pesticide use information when available and presence and population levels of GWSS. Fifteen cultivars of varying ages were examined during the project and the levels of tolerance to PD are presented in Table 2. All data will be sent to the Center for the Assessment and Monitoring of Forest and Environmental Resources (CAMFER) at University of California at Berkeley under the direction of Barry Hill and Sandy Purcell. The center will compile the data and create a GIS based data set. The resulting data, maps, and information will be shared with collaborating plant pathologists, statistical analysts, agricultural economists, and other legitimate researchers to maximize the opportunity to understand the changed epidemiology of PD, to manage the disease,

and to generate projections for potential economic consequences and risk assessment. Information from this project will be useful in the future in those viticulture areas of the state where the GWSS may become established.

Table 1. Summary of the Pierce's disease survey effort in Kern County.

Areas surveyed for Pierce's disease	Total number of blocks surveyed	Total number of acres surveyed	Number of tissue samples collected	Number of PD + samples
General Beale Pilot Area	42	888.2	1976	908
North: Edison/Bena	7	234	145	109
South A: Arvin	22	314.4	39	6
South B: Arvin	28	259	84	9
Central: Arvin	2	32	0	0
West: Hwy 166	32	801	56	6
Hwy 65 and Delano	83	1586.8	In progress	In progress
Total	216	4115.4		

Table 2. Cultivars included in the study and their respective tolerances to Pierce's disease.

Cultivar		Vine susceptibility *Most susceptible=3* *Less Susceptible=2* *Most tolerant=1* *Resistant=0*
Green	Calmeria	3
	French Columbard	2
	Jade Seedless	3
	Muscat	N/A
	Perlette	N/A
	Thompson Seedless	1
	Superior Seedless	N/A
Red	Christmas Rose	N/A
	Crimson Seedless	2
	Flame Seedless	2
	Redglobe	3
	Ruby Seedless	2
Purple	Autumn Royal	N/A
	Black Emerald	N/A
	Fantasy Seedless	N/A

All *V. vinifera* cultivars are susceptible to Pierce's disease. Levels of tolerance were assigned based on the rate of spread of bacteria within the plant. Relative tolerances are adapted from Pierce's disease, UCANR Pub. 21600, Varela et al.

FUNDING AGENCIES
Funding for this project was provided by the University of California Pierce's Disease Grant Program.

Additional

Reports