EPIDEMIOLOGY OF PIERCE'S DISEASE IN THE COACHELLA VALLEY

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INTRODUCTION

The table grape industry in the Coachella Valley is represented by 10,465 acres of producing vines, which generated grapes valued at $108.5 million in 2001 (Riverside County Agricultural Commissioner, 2001). The glassy-winged sharpshooter was identified in the Coachella Valley in the early 1990's (Blua et al. 1999), and we have documented increases in the numbers of this efficient PD vector over the past 17 months. In July 2002, we confirmed the occurrence of *X. fastidiosa* (PD strain) in 13 vines from 2 adjacent vineyards in the southeastern part of the Valley. With this discovery, and the increasing numbers of GWSS, the CDFA Pierce's Disease Program in concert with the Riverside County Agricultural Commissioner's Office is developing an area-wide vector suppression program. The data gathered in our epidemiological studies provide fundamental information that are valuable for this program.

OBJECTIVES

The goal of our epidemiological studies in the Coachella Valley is to discover characteristics that are unique to geographic areas with and without PD, and to use this information to design management strategies to reduce disease spread.

Two objectives are pertinent to this report:
1. Determine the incidence and distribution of Pierce's disease (PD) in the Coachella Valley.
2. Describe the spatial and temporal abundance of GWSS in the Coachella Valley and determine site characteristics that contribute to GWSS abundance.

RESULTS AND CONCLUSIONS

***PD incidence and distribution*:**

For the past 2 grape growing seasons, we have surveyed the Coachella Valley in search for PD. In the summer of 2001, we visually inspected 300 plants in each of 25 vineyards and all vines in a 60-acre vineyard proximal to an area that had PD in 1985. We collected 233 suspected samples and analyzed them with ELISA. None of these plants were positive for *X. fastidiosa*. In 2002, we visually sampled 300 plants in each of 25 vineyards, and visually inspected 35,000 vines randomly distributed throughout the Valley. We analyzed (by ELISA) 268 plants from these surveys and found 13 vines with *X. fastidiosa*. Bacteria were confirmed in these plants with selective-media plating and PCR, amplifying for PD-specific DNA. These 13 vines were in 2 consecutive vineyards, located in the southeast part of the Coachella Valley. The vines were removed and the fields were treated with Admire. Several surrounding vineyards also were treated with Admire.

***Spatial and temporal abundance of GWSS*:**

We used yellow sticky traps distributed uniformly at one-mile intervals throughout the Coachella Valley to monitor the seasonal cycle of adult sharpshooter activity. GWSS catches rose into the summer of 2001, were depressed for 3 weeks in late July, peaked again in mid-August, and then declined into the fall (Figure 1). Numbers were extremely low until a period of increased activity, presumably by overwintering adults, in January and February, after which counts declined again until May 2002. Average counts in the summer of 2002 were higher than in 2001, suggesting a trend toward generally higher levels in the Valley.

Our project is particularly interested in the effect of the presence of citrus on sharpshooter numbers. Among the area-wide traps, those adjacent to citrus caught more GWSS than those not adjacent to citrus (Figure 2). However, the presence of citrus did not always result in elevated GWSS catches; fewer than 35 percent of the traps adjacent to citrus caught GWSS on any given week (Figure 3). This indicates that vector control strategies should be targeted at citrus, but all citrus groves in the Coachella Valley do not need treatment at this time. We also conducted extensive studies at 25 citrus/grape interface study sites. At each site, traps were placed in 4 plots: along the citrus border, within the vineyard adjacent to the citrus (designated "Grapes-Near," Figure 4), 500 ft from the citrus (Grapes-Medium), and 1000 ft from the citrus (Grapes-Far).

Traps near citrus consistently caught more GWSS than traps within the vineyards, and there were significant differences in GWSS catches among the plots on 27 of the 42 trapping dates ($P<0.05$, Tukey-Kramer). During each of the 6 weeks of GWSS catches in January/February (data not shown), traps along the citrus border caught significantly more GWSS than did those within the vineyards, and there were no significant differences in catches among the traps within the vineyard ($P>0.05$, Tukey-Kramer). In the most recent 7 trapping dates, GWSS catches in citrus were significantly higher than catches on the Medium and Far vineyard traps, however there were no differences between catches within citrus and catches on the Near vineyard traps ($P<0.05$, Tukey-Kramer). The effect on PD epidemiology of these decreases in GWSS with distance from citrus are not clear, but practices to reduce vector pressure should be focussed on the citrus and the grapes immediately adjacent to the citrus. Our data suggest that area-wide insecticide applications in vineyards that are not close to citrus are unwarranted. We shall continue to monitor this relationship to get a clearer picture of GWSS activity in the vicinity of its reproductive hosts.

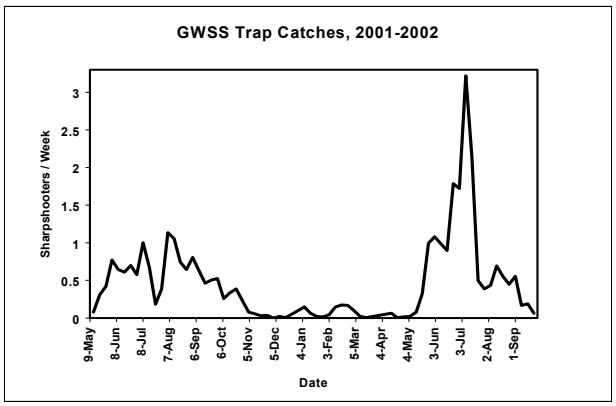

Figure 1.

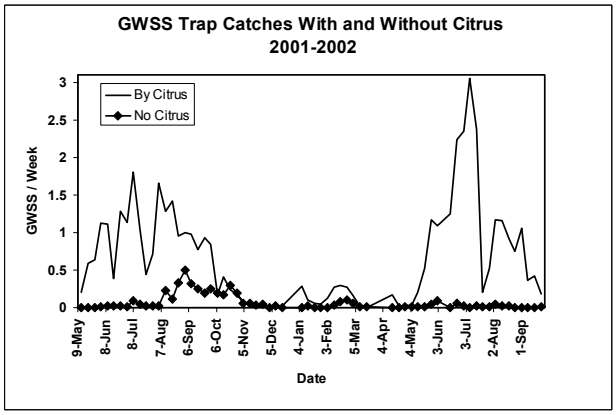

Figure 2.

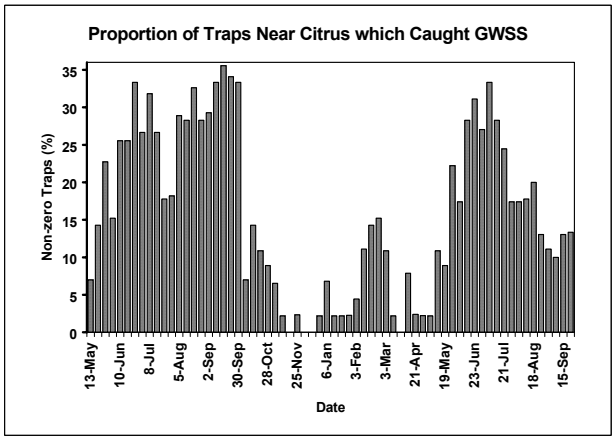

Figure 3.

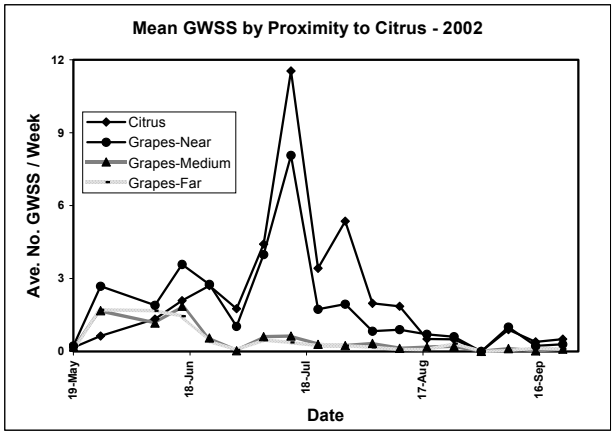

Figure 4.

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