TRAP CROPS FOR REDUCING SPREAD OF PIERCE'S DISEASE

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Reporting Period: The results reported here are from work conducted from May 1999 to September 2002.

INTRODUCTION

Where the blue-green sharpshooter (BGSS), *Graphocephala atropunctata,* is the primary vector of *Xylella fastidiosa (Xf),* Pierce's disease (PD) generally occurs near the edges of vineyards. The distribution of diseased vines matches the springtime movement of sharpshooters from overwintering habitats into vineyards (Varela, Smith and Philips 2001). Attempts to manage PD often include late winter or early spring insecticide applications to the edge of the overwintering habitat in order to limit the springtime movement of sharpshooters. This practice may reduce PD incidence, but often fails due to limitations in available insecticides, difficulty in timing sprays to coincide with vector movement, differences in PD susceptibility due to variety (Purcell 1979) or vine age, and regulatory issues that prevent treatment of the overwintering habitat.

Another possible control strategy is growing a buffer of plants that are not damaged by *Xf* and treating them with persistent, systemic insecticides to impede the movement of BGSS vectors into the vineyard.

We initiated this project in 1999 to examine the effects of an insecticide-treated grapevine trap crop on the incidence of PD. We selected St. George rootstock (*Vitis rupestris*) for the trap crop because it buds out early in the spring, is attractive to BGSS and is not killed by PD. We planned to treat trap crop vines during fall or winter with soil-applied imidacloprid (Admire, Bayer Corporation). At the time, we believed that adult BGSSs feeding on treated trap crop vines would quickly acquire a lethal dose of imidacloprid.

OBJECTIVES

1. Determine if insecticide treated trap crops at the ends of rows can reduce the incidence of PD.

RESULTS AND CONCLUSIONS

We established two trap crop trials in 1999 on opposite sides of a large vineyard. Each side is bordered by riparian habitat and has a history of PD. One trial borders the Napa River, the other Milliken Creek. The entire vineyard was planted in 1999, so our trap crop vines developed at a similar pace to the producing vines.

In each trial, there are three replications of trap crop plantings and controls. Vine spacing is 9 feet between rows and 5 feet between vines. St. George vines are planted at the ends of adjacent rows to create the trap crop treatments. Each replicate trap crop planting includes the first 6 vines in 12 adjacent rows (approximately 30 feet deep by 108 feet wide). In the control treatments, Chardonnay or Pinot Noir vines extend to the end of the rows. Trap crop vines have been trained up into the trellis to produce large "hedges" in the vine row.

We selected St. George for the trap crop plantings in part because we believed it would begin to grow earlier in the spring than the rest of the vineyard. If it did, it would be a more effective trap crop because BGSS would likely move to it to feed while the other vines were still dormant or just budding out. In these trials, this has not been the case. The St. George vines initiate growth at about the same time as the rest of the vineyard, which is planted to Chardonnay and Pinot Noir – both early-growing varieties. The entire vineyard is pruned early each winter (December), which further hastens budbreak.

Admire was applied to trap crop vines in early November 2000. Subsequent studies showed that BGSS do not readily acquire lethal doses of imidacloprid from treated vines. In cage studies (Purcell 2000, unpublished), BGSS greatly reduced their feeding rate and lived for a considerable time period. There was no rapid kill. Therefore, our treated trap crops were not likely to kill insects landing upon them. We hypothesized that Admire-treated trap crops could actually increase dispersion of BGSS if after initial probing they flew away from that vine rather than continuing to feed. We therefore abandoned plans for further Admire treatments. In 2001 and 2002, trap crops vines were sprayed with imidacloprid (Provado, Bayer Corporation) in April and May, respectively. We recognize that foliar treatments are likely to have limited

effectiveness for a trap crop program because they are not fully systemic and actively growing vines will have untreated tissue much of the time.

BGSS activity was monitored from 2000-2002 using yellow sticky cards placed between the riparian habitat and the end vine of the vineyard. Two cards were used in each replicate and were monitored weekly from March-October. BGSS were present in all replicates each year.

PD incidence was determined by visual assessment in September or October 2000-2002. The first 30-40 vines in each row were rated on a 1-3 scale, with 3 being the highest severity. In control treatments, diseased vines in the first six positions are not considered, as these positions correlate to the trap crop vines. In the Milliken Creek trial, only 1 vine has displayed PD symptoms to date. In the Napa River trial, PD has appeared only in the third replicate, in both control and trap crop treatments. There were more PD vines in the control treatment (Table 1), however, that plot also had more BGSS, as determined by trap catches (Table 2).

Table 1: PD vines in Napa River trial (rep 3)

	2000	2001	2002
Trap Crop	0	1	6
Control	0	3	11

Table 2: BGSS trap counts* in Napa River trial (rep 3)

	2000	2001	2002
Trap Crop	3	6	1
Control	14	23	5

* March - June

Due to the small number of diseased vines, no conclusions can be drawn regarding the effectiveness of treated trap crops at this time. However, the lack of an effective systemic insecticide that will kill BGSS immediately upon feeding makes the outlook for this being a successful control strategy much less likely.

REFERENCES

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FUNDING AGENCIES

Funding for this project was provided by the American Vineyard Foundation (2000-2001) and the CDFA Pierce's Disease and Glassy-winged Sharpshooter Board (2002).