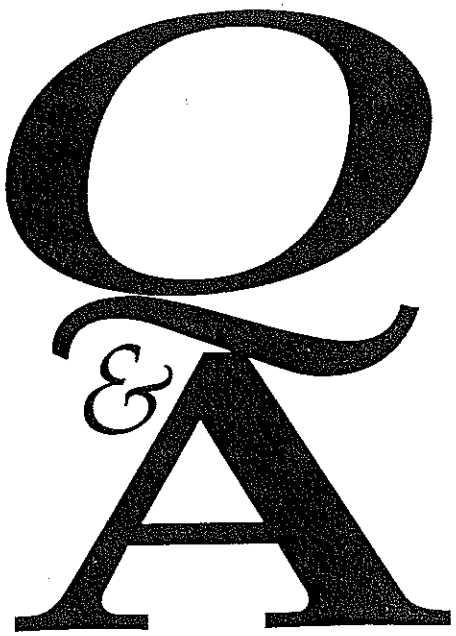
PART III:

Pierce's disease



(The following questions were received from PWV -readers in response to two reports on Pierce's disease in PWV , Part-I, March/ April'93, Part-II, May/June'93)

Q *How long can a vine survive chronic symptoms of Pierce's disease before dying?*

A: Climate and the vine's variety and age determine how long a vine with Pierce's disease (PD) can survive — or even more importantly — continue to produce a crop. Hot climates like the Central Valley in California accelerate PD symptoms due to moisture stress, even when there is more than adequate soil water.

Young vines (one to three-years-old) succumb more quickly to infection than older vines. The basis of resistance to PD appears to be related to how quickly the bacterium *Xylella fastidiosa* multiplies and spreads within the vine. One-year-old Pinot noir or Barbera vines can die the spring after infection, whereas chronically infected 10-year-old Chenin blanc or Ruby Cabernet can live for more than five years. Long before that, however, these chronically-infected vines will not have a crop.

Q *When replacing a vineyard affected by Pierce's disease and changing the variety, is it better to pull out all the vines in the block and replant new vines or graft the healthy vines and pull only the diseased vines?*

A: Consider more than Pierce's disease in your decision. Will you be using a different rootstock because of concerns about phylloxera?

Would you prefer to fumigate the block before replanting because of concerns that replants will be stunted by resident nematode populations?

If the answer to the above questions is 'yes' and the number of vines with PD in the block is high, you will want to replant the entire block.

If the foregoing are not major concerns, and only those vines near one edge of the block (typically next to a source of vectors) have a high incidence of PD, you probably would be better off replanting only that part of the block and individually replacing chronically diseased or missing vines elsewhere.

The first year that you confirm PD is present, it is a good idea to mark vines with symptoms and recheck them the following year. Remove all vines with PD symptoms the second year; they are chronically infected and unlikely to recover or continue to produce a significant crop.

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Q *Is there an economic threshold for the blue-green sharpshooter with regard to Pierce's disease?*

A: There are various localities that have had numerous blue-green sharpshooters but never have had Pierce's disease. If you live in such a situation, consider yourself lucky and hope that nothing changes. If you have Pierce's disease in your own or nearby vineyards, the question is not so much "What is the economic threshold?", but rather "How can I best prevent or minimize sharpshooter populations within a few hundred feet of my vineyard?"

Q *When removing blue-green sharp shooter habitat with herbicides or mechanically, is there a time of year that is preferable?*

A: Unfortunately there is no one time of year that is best because the various kinds of plants that have to be removed require different techniques. Herbicides may be best for annuals, while repeated cutting (more than once/year and for more than one year) or uprooting may be necessary for perennials such as blackberry and wild grape.

Another problem is: What do you replace the removed plants with? The blue-green sharpshooter can reproduce on a very wide range of plants if year-round soil moisture and shade allow succulent growth. Presently, we do not have any recommended substitute plantings — ones that would prevent populations of sharpshooters from building up and that would not harbor the PD bacterium. More research is needed, and we are working to discover plants that are neutral or even antagonistic to the PD bacterium.

Q *What do you think of a 'trap-crop' concept? Such as maintaining a green strip along the edge of a problem vineyard and treating this strip frequently with an insecticide? If this is possible, what would be some candidate plants?*

A: Trap crops for control of blue-green sharpshooter would have to be permanent (lots of dollars and hours) to be highly attractive to the vector. Their effectiveness has never been tested. Trap crops would seem to invite trouble in those years when extended cool and wet springs reduce the effectiveness of insecticidal control.

The blue-green sharpshooter is more attracted to succulent growth than to particular species of plants. The lists of plants that are either preferred hosts of the sharpshooter or the bacterium *Xylella fastidiosa* is a long one. If you can, remove attractive plants like blackberry, elderberry, ivy, and so on, and replace them with grasses. This will reduce the available habitat where the blue-green sharpshooter lives.

If you choose to replace attractive plants with grasses, this alternative cover must be maintained in order to discourage growth of other plants that the blue-green sharpshooter prefers. This can be done by mowing and selective weed control. Insecticidal control of the vector can be used to supplement habitat management.

Q *You stated that "The effects of low winter temperatures on bacterial survival are probably indirect because bacterial cultures survive freezing very well in the lab." What is the mechanism of vine recovery for those vines that were infected later in the growing season?*

A: My best guess is that dryness, not cold, causes the PD bacterium to die in dormant vines during winter. The colder the winter, the drier the xylem seems to become in dormant grapevines. The earlier the vine is infected, the larger the number of bacteria present in the vine by autumn. More importantly, the bacteria have a longer time to spread throughout the vine. Both of these factors would favor the survival of the bacterium over the dormant period.

Q *What is the most effective early season Dimethoate application strategy, with regard to timing or stage of development, to control the over-wintering adults as well as the newly emerging next generation?*

A: The ideal time to treat vegetation alongside vineyards is as soon as warm weather causes increased foraging activity by the blue-green sharpshooter, but before bud break in grape vines. This is usually possible only when warm weather precedes bud break, so in practice, most applications will be made after bud break.

Remember that the blue-green sharpshooter has only one generation per year. Effective insecticidal control of adults entering vineyards will prevent eggs being laid during the spring. Treating during or just before cool weather is ineffective because the sharpshooters do not move around and feed sufficiently to be affected by the insecticide. Sticky trap monitoring is the key to determining the best time to treat and how effective treatments were.

Q *How long does Dimethoate persist systemically in plants at control level concentrations?*

A: In the lab, insecticidal activity against sharpshooters persists for about three to four weeks. In the field, persistence will depend on plant vigor, temperature, and rainfall. We don't have enough data to be precise. This is why monitoring for sharpshooter activity *after* treatment is important.

Q Does mass-trapping of the sharp shooter vector have any potential for significant control? For example, are the newly available rolls of yellow sticky tape that are stapled along the vine row of any value?

A: My *guess* is that sticky tape would not trap enough blue-green sharpshooters to reduce their populations enough to see a corresponding drop in PD, but I'm not aware of any data on this point. For insect pests generally, trapping is effective if the trap is extremely attractive and the pest to be controlled can be tolerated in low numbers. I doubt that either is true for the blue-green sharpshooter.

However, sticky tape should be useful in locating where the greatest concentrations of blue-green sharpshooter enter a vineyard from surrounding vegetation. Simply stretch out the tape along natural vegetation adjacent to your vineyard and notice which portions of the tape capture the greatest numbers of sharpshooters. Note that grass-feeding sharpshooters in the Central Valley of California are **not** attracted to yellow traps.

Q Many growers are now planting a few prune trees along the edge of vineyards to provide habitat and overwintering prey for the Anagrus wasp that parasitizes the grape leafhopper. Do you think this practice would encourage or discourage the bluegreen sharpshooter?

A: It will not discourage it. Whether or not prunes support the blue-green sharpshooter will depend upon the condition in which they are grown. If the trees are located in drier areas away from habitats attractive to the blue-green sharpshooter, they should not be a factor for populations of that insect. Remember also that plums have been shown to be excellent hosts of the PD-bacterium, *Xylella fastidiosa.*

Prune trees should not be hosts of the grass-feeding sharpshooter vectors, but I have seen high populations of sharpshooters on the cover of grasses (chiefly Bermuda grass) that develop under repeated flood irrigation of plum orchards in California's Central Valley.

Q Are permanent cover crops likely to increase the incidence of PD in vineyards which are located in/near favorable habitats for the blue-green sharpshooter?

A: Not as long as these cover crops are mostly grasses from spring through summer in coastal vineyards. The blue-green sharpshooter can be found on wild mustard, chicory, and other common vineyard winter weeds, but these plants are typically disced in at or before budbreak. Mowing can also keep cover crops in a condition that is not attractive to the blue-green sharpshooter. Avoid permanent cover crops with Bermuda grass or water grass in areas where the grass-feeding sharpshooters (green sharpshooter or red-headed sharpshooter, for example) may be significant. ■