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SONOMA COUNTY VITICULTURE NEWSLETTER

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Sonoma County Grape Day – Thursday, February 7, 2002

A registration form is included with this newsletter. Pre-registration is required and the form must be received by Monday, January 28, 2002. The topics to be presented include biology and control of vineyard mealybug and rodent pests, nematodes in the soil food web and the use of the composted mulch in managing sediment runoff in vineyards. Grape Day will be held at the Luther Burbank Center in Santa Rosa in the Concert Chamber.

Young Vine Decline Update

Young Vine Decline is a complex disease that is caused by five different fungi. Recently, "Petri disease" has become the accepted term among plant pathologists worldwide for the disease that is caused by just one of these fungi.

The names of these five fungi are similar and thus confusing. *Phaeomoniella chlamydospora* (Pc) causes Petri disease. There are four species of *Phaeoacremonium* that also cause young vines to decline. Of the four, two species are commonly found in vines in California (as well as Europe, Australia and South Africa): *Phaeoacremonium inflatipes (*Pi) and *Phaeoacremonium aleophilum* (Pa).

Pi and Pa have been associated with Petri disease but now are thought to be the fungi responsible for Black Measles in California. So, for the time being, researchers use the generic terms "young vine decline" or "grapevine declines" when discussing disease in new plantings caused by Pc, Pi and Pa.

Statewide, Pc is the fungus that is most commonly present in young vines that are diseased. In the North Coast, Pc is associated with Pi more often than with Pa. The other two species associated with grapevine declines are *Phaeoacremonium angustius* and *Phaeoacremonium vitus*. To date, the role that these 2 species play in the disease is not well understood. (In addition to these, there are also 2 or 3 other new and unnamed species that are not commonly associated with vines showing Petri disease or decline.)

Symptoms

The symptoms of Petri disease depend on what type of vine tissue is infected. The age of the vine also affects symptom expression. In general, symptoms in young vines include reduced shoot growth, shortened internodes, small leaves, chlorotic leaf blades, and reduced diameter of shoots and trunk. A severely diseased vine may die the year it is planted. However, if it is

repeatedly pruned back to two buds in successive winters it usually continues to grow poorly. When such a vine is eventually allowed to set a crop, vine collapse may occur. For severely diseased vines, management practices that minimize plant stress and maximize vegetative growth may not be sufficient to produce crop levels that are economically sustainable. These vines probably were infected in the nursery and would not do well under any circumstance.

Infection routes

Extension Plant Pathologist Doug Gubler believes that Pc, Pi and Pa are "endophytes" which means that they are extremely well adapted to living inside grapevines. Spores of these fungi can enter the vine through several different routes. Pi and Pa can infect the skin of berries prior to veraison or through pruning wounds or wounds in the roots. Inoculating green berries with Pi and Pa spores can reproduce the fruit symptoms of Black Measles.

Researchers in Gubler's lab have developed a DNA-based detection technique (nested PCR) that allows them to detect Pc and Phaeoacremonium species directly from infested soil and vines. They have also found a selective media that successfully isolates vine decline organisms from soil. Using these techniques, they have found that soil, collected in vineyards in different areas of the state, is a source of Pc and Phaeoacremonium species. Pi spores were detected in puddles of irrigation water under drip emitters. The spores most likely came from old prunings lying on the ground. Girdling wounds on the trunks of table grapevines have been shown to be infected with Pi. The spores were probably splashed into the wound during irrigation. Pi can successfully invade intact roots or root wounds. When it enters via root wounds, the fungus spreads inside the vascular tissues.

The Gubler lab has shown that all 3 pathogens (Pc, Pi and Pa) are capable of infecting pruning wounds and causing significantly reduced growth in shoots that emerge from diseased spurs. Spores were placed on the pruning wounds of grapevines pruned in February 2001, from February through June 2001. The spores germinated and infected the wood on all dates but the wounds became less susceptible over time. When inoculated early, the fungi were found in the vascular tissue and pith 8-9 cm away in six weeks. By August, the shoots that emerged from these infected spurs were significantly shorter and many had Black Measles symptoms.

There is no shortage of fungal spores that can cause Petri disease and grapevine declines. Spore traps placed in vineyards located in several growing regions statewide starting in winter 2000/2001 collected the spores of all three pathogens at different locations and periods of time. The traps were designed to catch spores from grapevine cordons. In Sonoma County, both Pc and Pi were collected in one trap and Pc was collected from several vineyards in Napa and Sonoma. These spores may re-infect vines.

New Plantings

In California, the pathogens Pc, Pi and Pa have all been shown to be wind borne and dispersed via water splash, thus all vines are most likely infected eventually. The good news: obviously most young vines do not become symptomatic. The bad news: the line between a vine being infected and it becoming symptomatic is very slim under some circumstances.

The worldwide research community now seems to agree that predisposition stress will result in vines becoming symptomatic in vineyards. Some growers have noted that their farming practices haven't changed; yet the disease incidence in some new vineyards has become unacceptably high. This then calls into question why new vines are infected upon arrival from the nursery.

At this time, nurseries cannot guarantee that the vines they deliver to customers are free of all fungal pathogens. As discussed, vines are susceptible to infection both above and belowground and the pathogens responsible for Petri disease have wind borne spores.

In addition, at this time, nurseries cannot guarantee that their rootstock mother vines are free of all fungal pathogens and neither can the Foundation Plant Materials Service at UC Davis, which is the principle source of the nursery industry's mother vines. The good news is that preliminary findings indicate that one-year old cuttings taken from rootstock mother vines are not commonly infected with the fungi that cause vine declines.

When new mother vines are generated that are known to be free from grapevine decline fungi, at this time there is no guarantee that re-infection by these pathogens will not occur. Benomyl, a material that was used for many years by growers to prevent infection of pruning wounds, is no longer being manufactured. UC Davis researchers have been evaluating materials that are long-lived wound protectants and significant progress has been made toward the development of a commercially available product.

Take Home Message
This message hasn't changed for growers who are establishing new vineyards: plant apparently disease-free vines at the time of the year that allows you to farm them to encourage vine growth. Do not set a crop on vines that are too small in girth. Be on the look out for signs of disease in your new vines for at least the first 3 years. Remove and replace severely symptomatic vines. When an effective fungicide for pruning wounds becomes available, protect all pruning wounds in all vines every year.

CDFA Pierce's Disease Control Program Research Symposium

The California Department of Food and Agriculture (CDFA) held a symposium in San Diego on December 5-7, 2001 that consisted of 58 presentations by researchers from the University of California, US Department of Agriculture, University of Florida, California State University, University of Missouri, University of New York, Indiana University Southeast and CDFA. About $10 million from 17 funding agencies is supporting research on Pierce's disease, *Xylella fastidiosa*, the bacterium that causes the disease, and Glassy-Winged Sharpshooter (GWSS), the insect vector that has dramatically increased the incidence of Pierce's disease (PD) in California.

In areas where GWSS is established, the effectiveness of spray programs to reduce the population and to prevent the movement of the insect is being evaluated in urban and commercial areas. The effectiveness of area wide insect management programs in citrus and grapes in Temecula and in multiple crops in Kern County's General Beale Road Project were discussed.

Citrus is a preferred host of GWSS thus population studies and trapping techniques are being conducted in treated and untreated orchards. One project's results indicated that there are 3-4,000 insects per tree in one untreated area. In Kern County, it was found that while one application of Admire would result in the reduction of GWSS for six months, a foliar application of a non-selective insecticide was required shortly before harvest in order to prevent adult insects from being shipped in harvest bins to citrus packinghouses in non-infested portions of Tulare County. Late-season applications reduced the natural enemies of red scale in citrus the following spring. In addition, Admire is toxic to the vedalia beetle, which is a predator of the cottony cushion scale that has been a major component in citrus IPM for decades. Thus citrus growers treating for GWSS may eventually experience cottony cushion scale outbreaks.

The harsh reality is that chemical and biological control of GWSS can only do so much to reduce the incidence of Pierce's disease. No one doubts that long-term control of PD lies in managing *Xylella fastidiosa* (*Xf*) itself. Genetic sequencing of the PD strain of *Xf* was accomplished this year. Research projects are underway that are looking for ways to disarm the PD strain of *Xf* , i.e. reduce its pathogenicity. One such project is researching ways to disrupt the method the bacterium uses to anchor itself to the inside of the xylem vessels as well as prevent the cell-to-cell communication that occurs after a small number of cells have established a foothold. Another project is studying the biosynthesis of the xanthum gum-like material that *Xf* produces. The gum is one of the materials that clog the xylem. These projects and others involve identifying and locating the genes that control these processes and then modifying them so that bacteria function differently.

Publications

- **How to distinguish glassy-winged sharpshooter from its '"look-a-likes"** is a reprint of an article written by Lucia Varela, North Coast Area IPM Advisor, and is included in this newsletter. It is taken from the July-August 2001 issue of California Agriculture. Please post it in a location that will allow your employees to see it. The pictures will allow you to clearly see the physical characteristics of the GWSS and the insects it is most commonly confused with.

- **Vineyard Site Assessment Guide** is a booklet that was written June 2001 to assist the prospective vineyard owner and manager navigate the regulations that have resulted from the environmental laws that impact agricultural land use activities. Written principally by David Lewis, UC Cooperative Extension Sonoma County Watershed Advisor in conjunction with local resource and regulatory agency people. It is available free from my office while supplies last.

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