Texas AgriLife Extension

Texas PD Notes

AgriLIFE EXTENSION
Texas A&M System

JULY, 2009

VOLUME 5 ISSUE 2

Rootstock Effects on Onset of Pierce's Disease– *Mark Black*

Does grape rootstock choice alter the progression of Pierce's Disease (PD)? Trials underway in Gillespie (Stonewall) and Uvalde (Uvalde) Counties will help answer that question. Growers have been unable to grow susceptible *Vitis vinifera* scions long term at either location due to PD. This study asks whether we can delay PD onset and slow its progress through the use of specific rootstocks.

Perspective

Texas currently has eight recognized appellations but only approximately 3,200 acres of commercial vineyards. Currently, there is insufficient fruit production to supply the demand for Texas fruit by Texas Wineries because vine longevity is often short and fickle Texas weather can limit successful crop production or fruit maturity. Several thousand other acres were planted in the last two decades only to be abandoned or pulled out because of calamities including PD, cotton root rot, late spring freeze, vine cankers, foliar/fruit diseases, owner attrition, etc. Rootstock choice can probably help us manage the first three or four issues. PD is clearly affected by the choice of scion (fruiting) variety, sources of the *Xylella fastidiosa* bacterium and insect carriers, and climate/weather. Summer stresses that worsen PD include drought, insufficient weed control and heavy fruit load. Rootstocks solve serious physical and pest-related soil problems and affect yield, maturity, and fruit quality. Rootstocks with greater vigor reduce scion stress and therefore may decrease progression of PD. Because high vigor in wet years can be a problem, growers who use vigorous rootstock must adjust site selection, plant spacing, pruning, fruit load, irrigation management, groundcover plants, etc. to optimize quality fruit.

Hill Country Rootstock/Scion Experimental Planting

Experiment

A previous experiment conducted in Llano county identified significant differences in growth, PD symptoms, and survival among 12 rootstocks commonly employed in Texas wine grape growing regions. Three rootstocks ('Freedom,' '1103P,' 'Dog Ridge') and three scion varieties

TEXAS PD NOTES IS PRODUCED AND EDITED BY:

- **Jim Kamas, Extension Specialist– Pomology & Viticulture, Fredericksburg, TX**
- **Mark Black, Extension Specialist-Plant Pathology, Uvalde TX**

Additional Articles Contributed by Members of the Texas Pierce's Disease Research and Education Program

Inside this issue:

Texas AgriLife Extension

Texas PD Notes

VOLUME 5 ISSUE 2

Rootstock Effects on Pierce's Disease -cont.

('Chardonnay,' 'Merlot,' 'Cabernet Sauvignon') were chosen for their range of PD reactions (more to less susceptible). Grafts in all combinations (3x3) and own-rooted scions (3) were container-grown in 2008 for a total of 12 treatments.

The Stonewall commercial vineyard site (wire trellis for single arm, drip irrigation, pH 6.4 to 7.3) was planted in November 2008 with 'Malbec' on 1103P borders. Due to the April 2009 freeze, Freedom and 1103P treatments had more freeze losses than Dog Ridge while own-rooted treatments had very few losses. 'Chardonnay' treatments had higher vine mortality than either 'Merlot' or 'Cabernet Sauvignon.' The Uvalde site (T-post for head pruning, furrow irrigation, pH 8.2 to 8.3) was planted in spring/summer 2009 in the most severe drought in local history. Borders were double planted with own-rooted 'Chardonnay' (early mortality expected) and wild species (*Vitis mustangensis*, *V. cinerea* var. *helleri*, *V. monticola*) or PD-resistant rootstocks. Own-rooted and 'Freedom' treatments have the most symptoms of iron deficiency. No insecticides were used for vector management at either site. Ttreatments for PD (symptoms ratings and ELISA tests) at both sites in Fall 2009 and through at least 2011.

We also propose to investigate the impact of three PD tolerant rootstocks on the growth and productivity of standard tolerant/resistant cultivars 'Black Spanish', 'Blanc du Bois', and Norton. Although we intended to get this related project off the ground in 2009 propagation this past spring of grafted PD-tolerant scions did not go well. This work may help to improve yields and fruit quality for growers in PD prone areas of the state.

Uvalde is the site of the Sister Planting Evaluating the Effects of Rootstock on Scion Survival and Productivity

Tom Kurdyla and Cruz Torres from Appel's Lab Assist Hopkins in Preparing Bio-control Suspensions for Vine Inoculations

Pierce's Disease Bio-control Being Tested in Texas– *Jim Kamas*

Growers and researchers alike have long anticipated finding a way to protect vines of susceptible grape cultivars from the lethal effects of infection from *Xylella fastidiosa*. This was highlighted last spring at the Texas Pierce's Disease Research Symposium and we are now exploring such a potential control mechanism at two Texas vineyard locations. In a collaborative project with Dr. Dave Appel, Dr. Mark Black and Jim Kamas, Dr. Don Hopkins came to Texas this past spring to initiate a trial of a benign *X. fastidiosa* isolate that appears to protect vines from the lethal grape strains of the pathogen. This project is funded and supported by the Texas Pierce's Disease Research and Education Program, under a cooperative agreement with USDA/APHIS.

Dr. Don Hopkins is a professor in the Department of Plant Pathology and has been working on Pierce's disease (PD) at the University of Florida since 1969. In 1991, he began experimenting with numerous novel *X. fastidiosa* isolates from grape and other plants such as sycamore, elderberry, beauty berry and Virginia creeper in hopes of finding a naturally occurring bacterial agent that could provide cross protection against PD. Cross protection is the phenomenon in which plant tissues infected with one organism is protected to some degree from later infection by other more virulent forms of the pathogen.

It is believed that colonization by the protectant strain signals the vine to become more resistant to the virulent grape strain of *X. fastidiosa*. This approach is highly desirable because it utilizes naturally occurring organisms as opposed to numerous other strategies being investigated with genetic engineering. While genetically engineered organisms may indeed be entirely safe for the

Above, Vines Were Inoculated Using a Syringe to Deliver a Drop of EB 92-1 to the Xylem Tissue

Texas AgriLife Extension

Texas PD Notes

Volume 5 Issue 2

Page 3

Pierce's Disease Bio-control Being Tested in Texas–

environment and consumers, some organizations and markets have already put the scientific community on notice that genetically modified solutions are not a socially acceptable solution to PD.

Over the past ten years, Dr. Hopkins has evaluated several promising isolates of *X. fastidiosa* for their ability to protect grapevines from subsequent infection from virulent grape strain carried into the vineyard naturally by sharpshooters and other xylem feeders. Prior to 2009, trials were established in Florida, Georgia, South Carolina and in the Temecula region of California. These more recent studies have identified and further evaluated a select strain isolated from elderberry named EB 92-1 and this agent has been selected for Texas trials. Inoculations were originally scheduled for late April, but the April 7th freeze in the Texas Hill Country necessitated Dr. Hopkins return to Texas in early June to establish these trials. Two

vineyard locations are currently actively involved these evaluations- the PD Research Vineyard in Fredericksburg and a commercial vineyard located in the northern part of Austin County, Texas. The Fredericksburg location is considered a moderate risk site, but the Austin County location will be exposed to very high disease pressure. For the Austin County site, vines were grown in a greenhouse facility, inoculated in early June and planted into the field in July. The Fredericksburg facility offered second leaf vines of six varieties on a common rootstock for direct inoculation in the field.

Dr. Hopkins arrived this past June with cultured EB92-1 in petri dishes. At the Fredericksburg facility, vines were trained and any summer pruning that was needed was concluded prior to inoculation. Suspensions of the bio-control agent were prepared in the field and inoculations were made on individual vines on June 2nd of this year. Vines were inoculated using a hypodermic syringe in green vegetative tissue at the head of each trunk retained for the vine. Inoculation consisted of placing a droplet with EB92-1 on green stems and making a slight prick with the syringe that accesses the xylem tissue . Suction from vine transpiration draws the bacterial suspension into the tissue where the bio-control agent becomes established in the vine. In each of the one hundred vine varietal plots ('Syrah,' 'Tempranillo,' 'Sangiovese ,' 'Malbec,' 'Vermentino' and 'Semillion'), twenty vines were inoculated with the bio-control agent and twenty vines were inoculated with a buffer solution as a control. Border rows separate treated vines between varieties. Over the next few years, vines will be evaluated for PD symptoms, survival, growth and production.

In past experiments, inoculated vines have at times appeared symptomatic, but slight foliar symptoms may simply be something we must learn to live with. Growers of PD tolerant varieties such as 'Black Spanish' and 'Blanc du Bois' are well aware that with high crop loads or under hot, dry conditions, even these very tolerant varieties can exhibit typical foliar burn associated with *X. fastidiosa* infection.
It appears that the effectiveness of this bio-control agent is much more pronounced when introduced into young vines prior to challenges from virulent strains in the field. While inoculation of mature vines already infected with PD has shown some effectiveness in managing the disease, the effects are far less dramatic than those with clean young vines. If verified as effective, this procedure may well become a standard nursery procedure wherever PD is a threat by inoculating nursery stock before or shortly after being moved to the field. The University of Florida was issued a patent for the use of EB 92-1 for cross protection against Pierce's disease on March 17, 2009. The next step in commercialization is to find a company interested in obtaining a license from the University of Florida and willing to invest in cost of registration for development of EB92-1 as a commercial product. This control option may indeed be available commercially in a reasonably short period of time.

Don Hopkins and Mark Black Inoculate Vines at the Fredericksburg Research Vineyard