Oklahoma State University and Oklahoma Cooperative Extension Service

Le Vigneron

A newsletter for the grape growers and wine makers of Oklahoma

Volume 4, issue 4 October-December 2009

Co-editors:

- Eric T. Stafne
- William McGlynn

Inside this issue:

Concern About PD

Pierce's disease has struck again in our state. After so many years of not finding it, more grapes are being diagnosed with the disease — and this time in commercial vineyards. Have we finally reached a "critical mass" of grape vineyards so that the insect/disease complex has caught on? It is still early to say. If I were postulating on this situation, I would say that the disease has been here for some time, but the appropriate vector has not carried it to grapes. Recent benign winters may have lead to the over-winter survival of sharpshooters and leafhoppers that carry the disease. Now the chase is on. Who is carrying the disease and where is it headed next? If PD is isolated to just certain regions of our state (like in North Carolina) we can grow a wide variety of cultivars like we do now. If PD is just getting started and becomes prevalent in all areas, then we have a major problem. But right now, the issue we are faced with is how ubiquitous is this disease going to become? Will we keep finding more and more every year? Or will it be isolated in certain areas and infection minimized with good cultural and management practices? Texas has been facing this issue for quite some time now. There is even a PD research center that has been established to combat the disease. Read Dr. Damon Smith's article in this issue for more information on PD in Oklahoma.

2009 OSU Grape Management Short Course Update

Eric T. Stafne

It's hard to believe but another year of the Grape Management Short Course has come and gone. We provide a baseline education in grape management; so even though students learn a lot during our classes, they must continue to learn and apply past knowledge to future knowledge. The old saying goes, "Rome was not built in a day," and neither is a viticulture education. In the coming months I will be assessing things that worked (and didn't) during this past year and will upgrade the class appropriately. We should have a new text for next year and another round of enthusiastic students.

The Technical Tipple

William McGlynn

The wine being examined in this edition of *Le Vigneron* is from off the beaten trail. It is "Orange Wine Fermented with Chocolate Syrup" from Florida. No vintage year is given on the label. The label is rather fancifully decorated with a pastel beach scene that looks as if it might have come from a vintage Florida post card from the '30s. Not unattractive… This one is clearly a novelty wine, perhaps intended to appeal to the tourist trade. As such, it may serve as an effective marketing tool as well as a niche product.

On to the testing... Following are the objective test results we obtained:

Florida Orange-Chocolate Wine

pH: 4.00

Titratable acidity: 4.6 g/L as citric

Total SO_2: 30 ppm

Residual sugar: ~10.8%

Alcohol: 10.3% (Labeled as 10%)

The pH is a little higher than most grape wines. Not surprisingly, the titratable acidity is correspondingly at the lower end of the typical range. The residual sugar is in the range of a dessert wine. The measured alcohol content was very close to the labeled content, which at 10% is rather low for a dessert-type wine. The high pH, low titratable acidity high sugar content, and relatively low alcohol content might tend to make this wine unstable in storage. Still, it probably isn't intended to be cellared for any length of time.

The total SO_2 level was measured at 30 PPM. We were not able to measure the wine's free SO_2. However, even if all of the measured SO_2 was available as free SO_2, this would only translate to a molecular SO_2 concentration of about 0.2 mg/L (PPM)at a pH of 4.0 — this is well below the standard recommended baseline of 0.6 mg/L * molecular SO_2. It seems likely that the wine contains added sorbate to help prevent spoilage, but we were not able to test for that. Overall the fundamental chemistry suggests that this wine should be consumed quickly.

(* The recommended minimum concentration of molecular SO_2 was incorrectly identified as 0.6% instead of 0.6 mg/L or PPM in a previous column.)

The subjective impressions:

The clarity of the wine was very good; it was brilliant and translucent with a rich, deep amber color. In fact it was very attractive in the glass. The legs were nearly absent, likely a reflection of the relatively low alcohol content.

The aroma of the wine was also pleasant, if fairly simple. Citrus and chocolate/cocoa were the principal aroma notes. Interestingly, the citrus notes reminded one more of lemon and orange peel than of orange juice. There were also undertones of caramel and light floral and honey aromas. Altogether it was a reasonably well-balanced and interesting bouquet.

The Technical Tipple, cont.

William McGlynn

On the tongue, the wine was quite full-bodied, no doubt due to the high sugar content. The sweetness was pronounced, but not too syrupy. The two powerfully predominant flavors were chocolate/cocoa and orange. The orange flavor was more Mandarin than the traditional Valencia. There were subtle honey and tropical fruit flavors and a buttery note as well. But they were mostly hidden by the chocolate and orange flavors. There was also a lingering and somewhat bitter aftertaste of orange peel.

Overall, the flavors were not unpleasant. But what had been merely intense in the nose became rather cloying on the tongue. Frankly, the wine lacked bite – more acid would have helped the wine's balance. Alternatively, more alcohol would have moved the wine more into the realm of a traditional dessert wine.

The final verdict:

This novelty wine is a bit of a disappointment, mainly because one feels that it could have been much more satisfying with a little more attention to the basics of its chemistry. As it is, it's attractive and it has a pleasant aroma, but the flavors disappoint. They are strong to the point of being almost overwhelming, yet they are also flat and candy-like. The wine lacks subtlety. As it was crafted, it is hard to visualize this wine's intended purpose other than as a simple novelty. It might serve as a tolerable aperitif.

Now some might argue that this wine serves its intended purpose well enough, and that may well be true. But another lesson we might draw is that winemakers should pay attention to the basics even when producing novel niche products. With a little more work, this wine might have been much more memorable. And surely that would help to boost repeat sales at least.

The Technical Tippler's ranking of a Florida Orange-Chocolate Wine: 4 out of 10 flasks.

The Technical Tippler welcomes suggestions for wines to evaluate and evaluations to conduct! Feel free to email suggestions to william.mcglynn@okstate.edu.

OGGWMA Grape Blog Update

Eric T. Stafne

I think the blog is a good way to have a little more informal discussion on certain viticulture topics. There are regular readers, I know that, but finding topics to write about everyday are not easy. Lately, I've been trying to post more photos, documents, and links make it a little easier on myself. One unfortunate aspect of the blog is that one must be a member of OGGWMA to read it. Not everyone wants to be a member; therefore, those folks don't have access to the blog. OGGWMA wants to provide their members a benefit and I understand that. I just wish more grape growers had access. With more access may come more feedback. At any rate, I will continue on, but probably with somewhat less frequency unless I start receiving more comments.

Viticulture Education Program for Grape Growers Administered by OSU

Eric T. Stafne

Viticulture Education Program

The program is a cooperative effort among Oklahoma State University – Stillwater (OSU-S), Oklahoma State University – Oklahoma City (OSU-OKC), Tulsa Community College (TCC), and the Oklahoma Grape Growers and Winemakers Association (OGGWMA). It is administered by OSU-S.

This is a two-tier professional education program. The Basic level provides college training in the fundamentals of horticultural science, plus applied training in viticulture and related techniques through OSU Cooperative Extension. The Advanced level provides further college training in horticultural science and related disciplines, plus further applied training through OSU Cooperative Extension. There is a five-year total time limit to complete the program. The Basic level would need to be completed in two years, and the Advanced level would need to be completed no more than three years after completing the Basic level.

The list of approved courses and workshops may change over time. Participants should obtain approval from OSU-S prior to enrollment in courses or workshops other than those specifically listed. Knowledge testing will be required at completion of short courses and Extension workshops. A grade of "C" or better will be required in all college-level courses. Participants who anticipate matriculating towards a college degree in horticulture at OSU-S, OSU-OKC, or TCC should contact an academic advisor at the appropriate institution for guidance in college course selection. Those intending to eventually pursue at B.S. in horticulture should contact Dr. Brian Kahn, Department Undergraduate Advising Coordinator at OSU-S.

OSU-S will collect a one-time program registration fee of $25. Any additional fees for courses, workshops, conferences, pesticide applicator testing, etc. will be paid directly by program participants to the appropriate entities. Participants are responsible for documenting attendance at events, and agree to provide transcripts for purposes of verifying satisfactory completion of required college courses. Participants completing each level of the Viticulture Education Program will be duly recognized with a framed certificate at the annual conference of the OGGWMA.

For more information, or to register for the program, participants may contact me, visit the website (http://www.hortla.okstate.edu/grapes/viticulture_education_program.html) or write to:

Viticulture Education Program

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What Are The Cultivar Options Post-PD?

Eric T. Stafne

With the new found evidence of established Pierce's Disease in Oklahoma, we might start to think about cultivar options. The only way to control PD is through genetic resistance. This genetic resistance is most profound in Muscadinia, but other Vitaceae species also exhibit resistance. Unfortunately, there are no sprays, rootstocks or cultural methods that will stop the disease, and once a vine contracts the disease it will die. It may take one season or it may take ten, but rest assured it will not survive. Some *Vitis vinifera* cultivars are highly susceptible, like 'Chardonnay' and 'Cabernet Sauvignon'. PD-resistant cultivars are available and represent a way to continue successful bunch grape production. A publication from Texas (McEachern, Stein, and Kamas, 1997) goes over some PD-resistant cultivars. I have edited the descriptions some for clarity.

'Blanc du Bois' is a white wine grape. It is a vigorous vine which seldom requires a rootstock. The clusters are medium-sized. The vines can reportedly bear up to 5 tons per acre. It is resistant to Pierce's Disease and downy mildew, but susceptible to black Rot and anthracnose; therefore a regular fungicide protection program is necessary. The roots do not do well in poorly drained soil with a high pH.

'Orlando Seedless' is a white table grape that is very vigorous and produces long clusters of small, light green berries. The vine requires cluster thinning and perhaps cluster pruning in order increase fruit size for table grape production. Other methods of manipulation such as vine girdling and application of gibberellic acid (GA) may also be needed to achieve commercially acceptable size. The flavor of the berries is reportedly excellent. The vines can bear up to 6 tons per acre. Cane pruning is recommended for this cultivar. It is resistant to Pierce's Disease, downy mildew and powdery mildew, but susceptible to black Rot and anthracnose.

'Black Spanish' (aka 'Le Noir') is a red skinned cultivar that has produced well in PD hot zones for over 100 years. Wine made from this cultivar is very tannic and acidic which is most suitable for port wines. The cluster size is large and compact with small berries. The juice from the berry is red rather than clear in color. The vine can be cordon pruned or cane pruned depending on site. It is resistant to Pierce's Disease, but susceptible to black rot and downy mildew. Leaf pulling may be necessary to help prevent fungus diseases. The vine is moderately vigorous and occasionally shows iron chlorosis on high pH soils, especially those that are poorly drained.

'Champanel' is a red cultivar mainly used for jelly. The cluster is small with large berries which are very acidic until fully ripe. The vine is extremely vigorous and grows well in a wide range of soils; however, it shows iron chlorosis problems on poorly-drained, high pH soils. The vine responds best to cordon or curtain pruning. It is resistant to most diseases, including Pierce's Disease, black rot, downy mildew, anthracnose, and powdery mildew. It is also resistant to many insects except the Grape Leaffolder which is a minor pest.

'Favorite' is a seedling of 'Black Spanish'. It is very similar to its parent, but has higher quality fruit. Unfortunately, it is hard to find commercially. 'Favorite' is managed the same as 'Black Spanish'.

'Roucaneuf' is a French x American hybrid cultivar that is resistant to Pierce's Disease. It is only moderately vigorous. The clusters are small, but long, and produce small, pink berries. It is used for white wine or can be eaten fresh as a table grape.

Other Pierce's Disease resistant cultivars include 'Mid South', 'Miss Blue', 'Miss Blanc', 'Daytona', 'Suwannee', 'Conquistador', 'Lake Emerald', 'Stover', 'Norris', and 'Herbemont'. 'Cynthiana'/'Norton' can also be included as a somewhat tolerant cultivar. Research has shown that 'Cynthiana' does not show typical symptoms of PD, but will decline with infection.

It is quite evident that selection is limited; however that does not mean a total loss. I suspect our industry will continue on as it currently is in the near future. Until we know more there is no need to rush out and purchase PD-resistant vines (unless you want to). OSU has not tested 'Blanc du Bois', 'Black Spanish' or 'Roucaneuf' (or any of the others except 'Cynthiana'), so we cannot make concrete recommendations at this point.

Pierce's Disease of Grape — A Growing Concern in Oklahoma

Damon L. Smith and Jennifer Dominiak-Olson

You will likely remember that we wrote last season about the first report of Pierce's disease of grape in Oklahoma. You will remember that in that case, 'Concord' grape samples exhibiting symptoms of disease were submitted to the Oklahoma State University Plant Disease and Insect Diagnostic Laboratory (PDIDL). These samples were taken from four grapevines found in a home gardener's backyard in Canadian county. Our tests confirmed the presence of the Pierce's disease strain of the bacterium, *Xylella fastidiosa.* The plants were removed and destroyed after confirmation of this finding.

This season, more extensive surveying for Pierce's disease by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF), has resulted in an array of vineyards being tested for the disease and a large number of grapevine samples being submitted to the OSU-PDIDL. From these samples, Pierces disease has again been identified, this time in two vineyards in the State. Testing is on-going, so there may be additional finds. The two vineyards have mostly *Vitis vinifera* cultivars planted. Oklahoma State University extension specialists have visited both vineyards after the initial positive confirmation of Pierce's disease, and have determined that the disease is widespread in both locations. The vineyards are located in Tulsa and Creek counties. These locations seem a bit unusual for identifying Pierce's disease because traditional dogma suggested that locations which experienced freeze events were not conducive for the survival of the pathogen. However, given the widespread nature of the infestation in both vineyards, survival has obviously occurred.

Recent research in North Carolina and Georgia examined the low-temperature thresholds as they related to risk of Pierce's disease in grapevines. From those multi-year/multi-site studies they concluded that winter-time temperatures at or below 10 °F for two to three (2-3) days were required for a vineyard to be considered at low-risk for Pierce's disease. Otherwise, vineyards were considered at medium to high-risk based on other temperature thresholds (Anas et al., 2008).

We investigated the winter-time temperatures for Craig, Tulsa, Payne, Lincoln, and Kiowa counties for the past 10 years using our Oklahoma Mesonet weather stations. We specifically investigated the numbers of days for which surface air temperatures were at or below 10 °F. Only Craig Co. met the required thresholds to be considered a "low-risk" county in all but one year (Figure 1). In other counties, thresholds were not met in many of the years, or thresholds barely reached the absolute minimum of two days with temperatures ≤ 10 °F. In 2007, temperature data indicate that vineyards in all counties examined were at moderate-risk for Pierce's disease (Figure 1). Considering this information, Craig county and surrounding areas are likely at relatively low-risk for developing Pierce's disease. I would consider the other counties examined (Tulsa, Payne, Lincoln, and Kiowa) to be at moderate-risk for the development of Pierce's disease when we consider winter-temperature duration and possible survival of *X. fastidiosa.*

Pierce's disease is spreading in the State and it appears that the bacterium can over-winter. Growers throughout the vineyard production regions of Oklahoma should be on the lookout for symptoms of Pierce's disease. The symptoms are perennial and will appear late in the summer when weather conditions are predominately hot and dry, or when plants are under drought stress. Plants will exhibit stress, with wilting of shoots, and premature defoliation typically occurring (Figure 2). Plants will also yield no fruit or have limited fruit production with poor quality. Chlorosis and green fading colors will develop at the edges of leaves, which dry and turn brown (Figure 3). Some vines will have a 'matchstick' symptom where the leaves have dropped from the plant, but petioles remain attached (Figure 4). Marginal browning can take on an undulating appearance as it moves toward the veins of the leaf. A yellow to red-brown band may be present between the green and scorched areas of the leaves (Figures 3 and 5). Leaf symptoms of Pierce's disease can look very similar to drought stress symptoms, however, the yellow or red-brown band between green and scorched areas will be absent in vines suffering from drought stress.

Pierce's Disease, Continued

Damon L. Smith and Jennifer Dominiak-Olson

Xylella fastidiosa is typically transmitted from plant to plant by an insect vector (Purcell and Hopkins, 1996). The bacterium is primarily transmitted through xylem-feeding insects; including spittle bugs (Cercopidae), sharpshooters (Cicadellidae: Cicadellinae), cicadas (Cicadidae), and tube-building spittlebugs (Machaerotidae) (Almeida et al., 2005). Transmission of the pathogen can occur mechanically, although the risk of this happening is considered low. However, recent studies have shown that inoculation of trees by needle injection is possible (Sanderlin, 2005). The risk of spreading the bacterium through pruning practices is also considered low during the winter months when major dormant pruning practices are occurring. The risk is much higher when pruning practices occur during periods of active vine growth. Regardless of the timing of pruning, it is recommended that pruning equipment be "sanitized" after working on each vine. This will help reduce the risk of mechanical transmission from infected vines to healthy vines. A 10% solution of household bleach is sufficient for killing the bacterium. Maintain a set of pruners in a bucket containing the bleach solution while you use another set of pruners. The set in the bucket will be "sanitizing" while you work. When you move to the next vine, simply switch to the set of pruners that have been "sanitized". This will not only reduce the risk of spreading *X. fastidiosa,* but also reduce the risk of transmitting other types of pathogens that can cause disease in grapevines.

The bacterium can also be transmitted through use of infected propagation material taken from infected grape vines (Robacker and Chang, 1992). Spread of the disease through the use of contaminated propagation material presents many challenges for Oklahoma growers. Many rely on propagating their own plants from cuttings, however, we suggest that this practice be avoided in order reduce the risk of spreading the bacterium that causes Pierce's disease. If you insist on propagating your own planting stock from mother plants, the mother plants should be tested for the bacterium prior to propagation to ensure that the plants are free of *X. fastidiosa*.

The source of the infection of the grapevines in Oklahoma is not currently known. Contaminated propagation material could be to blame and investigation into the origin of the grape vines is on-going. Various insects from the sites have also been collected in an effort to test for the presence of *X. fastidiosa* associated with potential vectors. These analyses will be completed in the future.

Unfortunately, there is no chemical control or cure for Pierce's disease. If Pierce's disease is identified in a vineyard setting, affected vines should be removed and destroyed to limit spread of the pathogen to healthy plants. Propagation of grape plant material should be avoided. Grape growers should purchase plants from reliable viticulture suppliers and resist the temptation to root cuttings received from friends and neighbors. By purchasing clean stock from a reliable source, the likelihood of introducing *X. fastidiosa* into the vineyard is greatly reduced. The only way to confirm whether a vine is infected by the pathogen that causes Pierce's disease is to submit samples to the Plant Disease and Insect Diagnostic Laboratory (PDIDL). The sample should include a cane with several symptomatic leaves attached. The leaves should be placed within a ziptop bag with no added moisture and mailed to the PDIDL. Be sure to include a completed sample form with your sample. Sample forms can be found at http://www.ento.okstate.edu/pddl/pdidl-form.pdf. The cost of the Pierce's disease test is $50 for polymerase chain reaction (PCR; highly sensitive). If multiple samples are submitted at one time, the cost is reduced. Please call the PDIDL at 405-744-9961 if you need additional information regarding sampling or testing. Any pertinent digital pictures should be sent to jen.olson@okstate.edu. Results for the Pierce's disease test are generally available in 3-5 business days.

Pierce's Disease Continued

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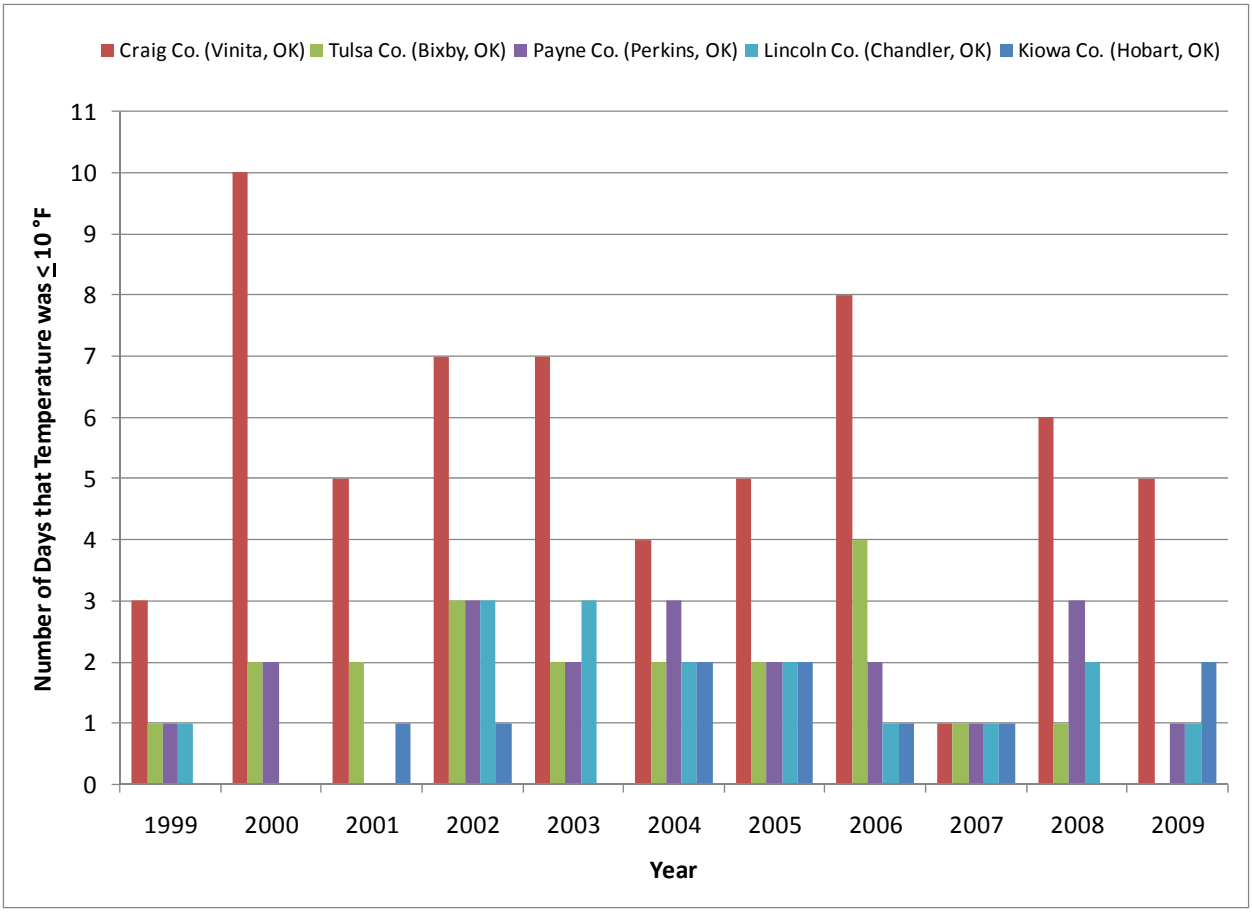

Figure 1. Number of days that surface air temperatures were ≤ 10 °F for five Oklahoma Counties from 1999-2009. Winter-time temperatures ≤ 10 °F for two to three (2-3) days are required for a vineyard to be considered at low-risk for Pierce's disease. Temperature data were retrieved from Oklahoma Mesonet Stations located in each county.

Pierce's Disease Continued

Figure 2. Wilting and premature defoliation symptoms of grapevines, indicative of Pierce's disease.

Figure 3. Dry, brown scorch symptoms of grape leaves infected with *Xylella fastidiosa.* Note the presence of the yellow border between green and brown tissue.

Figure 4. 'Matchstick' symptom of Pierce's disease, where the leaves have dropped from the plant and petioles remain attached.

Cultivar Spotlight: Ruby Cabernet

Eric T. Stafne

In past Cultivar Spotlight sections I have introduced interspecific hybrid grape cultivars. Another type of hybrid is the intraspecific hybrid, in this case a *Vitis vinifera* x *Vitis vinifera* cross. While common, they are not talked about much. One such hybrid has pleasantly surprised me in our trial at the Cimarron Valley Research Station at Perkins.

'Ruby Cabernet' was derived from a cross of 'Carignane' and 'Cabernet Sauvignon'. Dr. Harold Olmo from UC-Davis made the cross in 1936 and it was released in 1948. Vines tend to have high vigor on clay and loamy soils and low or moderate on coarse sandy soils. Since the vines are vigorous they should be spaced 7 to 8 feet apart for best growth. The vine is very drought tolerant and seems to tolerate Oklahoma winds better than some other cultivars. It is susceptible to black rot and powdery mildew, so those (and other) diseases must be controlled. The wine is often used in blends or to add color, but potential exists for this to be a worthwhile varietal in some areas of Oklahoma.

I am still leery of actually recommending any *Vitis vinifera* grape. What we know about them in our environment is still just a drop in the bucket. I have no doubt that a freeze event like we had in 1996 (-18 °F in Stillwater in February) would kill them outright. 'Ruby Cabernet' also has an image problem — the name is not recognizable to most wine drinkers and wineries. Of course it doesn't need to be that way. Dr. McGlynn at the OSU enology lab plans to make wine from the 2009 fruit so that we can see what kind of wine it makes. As we learn more we will keep you updated.

Viticulture & Enology
Oklahoma State University

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We welcome feedback and suggestions. Any responses can be mailed or emailed to the addresses on the left. We will strive to provide useful, pertinent, and timely information.

Initially this newsletter will be published 4 times per year in January, April, July, and October. If warranted the timing can be amended to better serve the grape growers and wine makers of Oklahoma.

'Vigneron' is the French word for someone who grows grapes for use in wine making.

Pierce's Disease, Continued

Figure 5. Symptoms of grape leaves with Pierce's disease, photographed in late August. Note green tissue separated from brown tissue by yellow borders.