Pest e-alerts

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Managing Pierce's Disease of Grape

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You are probably familiar with the discussions pertaining to Pierce's disease of grape and the confirmation of the disease in multiple counties in Oklahoma. During the 2009 growing season an extensive survey for Pierce's disease by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) 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, Pierce's disease has been identified at numerous vineyards in several counties around the state (Fig. 1). This has resulted in many questions from concerned growers about getting plants sampled for the presence of the bacterium, *Xylella fastidiosa*, which causes the disease, and how to manage it. Pierce's disease is spreading in the state and it appears that the bacterium can overwinter here. Growers throughout the vineyard production regions of Oklahoma should be on the lookout for symptoms of Pierce's disease. Remember, 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.

MANAGEMENT

If Pierce's disease is identified in a vineyard, affected vines should be removed and destroyed to limit spread of the pathogen to healthy plants. *Xylella fastidiosa* is typically transmitted plant-to-plant by insect vectors, especially leafhoppers (Purcell and Hopkins, 1996). Transmission of

the pathogen can occur mechanically, although the risk of this happening is considered low. The risk of spreading the bacterium through pruning practices is also considered low during the winter months when major dormant pruning practices occur. 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 to reduce the risk of spreading *X. fastidiosa*. If you insist on propagating your own planting stock, mother plants should be tested prior to propagation to ensure that the plants are free of *X. fastidiosa*. 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.

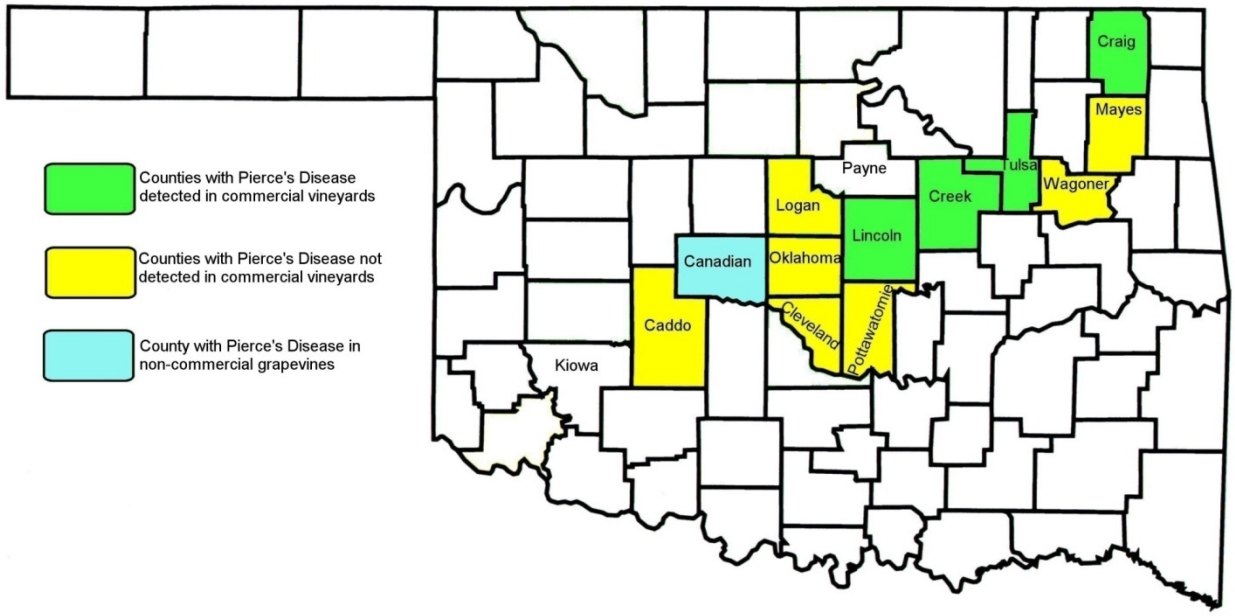

Fig 1. Oklahoma counties where vineyards were tested for Pierce's disease. Green indicates counties that had at least one commercial vineyard that tested positive for Pierce's disease. Yellow indicates counties that had commercial vineyards tested but were negative for Pierce's disease. Blue indicates the first county (non-commercial location) where Pierce's disease was detected ¬in Oklahoma.

Grape varieties vary in their response to Pierce's disease. It is generally accepted that European grape varieties (*Vitis vinifera*) will be more susceptible or intolerant to Pierce's disease. The bacterium that causes Pierce's disease is native to North America where there are native grape species. Therefore, grape cultivars that are not native to North America will typically have little or no resistance or tolerance to the disease. A portion of the American-type cultivars, or cultivars with large portions of their genetic background comprised of native American species, will typically be more resistant or tolerant to Pierce's disease. For example, in the High Plains of Texas, 'Black Spanish' is considered tolerant, meaning vines can be infected with the bacterium but remain symptomless or only slightly affected. Cultivars such as 'Chardonnay' and 'Viognier' are highly susceptible to Pierce's disease in the High Plains of Texas (David Appel, Texas A&M University, *personal communication*). Growers who have removed vines that have succumbed to Pierce's disease should consider replanting with resistant or tolerant cultivars.

Growers should also focus on a sound weed control program in the vineyard. There is circumstantial evidence in Texas that wide (100-300 ft) "buffer zones" of weed-free areas surrounding the vineyards substantially reduce the likelihood of initial infections within the vineyard (David Appel, Texas A&M University, *personal communication*). Also, maintaining herbicide strips around vines within the vineyard and using a cover crop such as cool-season grasses (ex. annual ryegrass) between rows may help to reduce spread of the pathogen via insect vectors.

In vineyards diagnosed with Pierce's disease, a systemic insecticide may be necessary to reduce secondary spread of the pathogen between vines. In Oklahoma, two systemic products are available to control insect pests in vineyards: Platinum® (thiamethoxam) and Assail® (acetamiprid). Both products are neonicotinoid insecticides (i.e., from the same chemical class), so for resistance management choose one and rotate with insecticides from other chemical classes that are used to control other pests. Platinum® can be applied at a rate of 8 to 17 fl. oz. per acre in several ways: surface banding on each side of the row; chemigation into the root zone; or hill drenching followed by irrigation. Higher rates are recommended for longer residual activity (i.e., season-long control). This product has a pre-harvest interval (PHI) of 60 days, so it needs to be applied at least 2 months prior to harvest. This restriction isn't a problem, however, because Platinum® should be applied early in the season just prior to early activity of potential insect vectors. Assail® has translaminar activity (i.e., absorbed into plant through leaf tissue) and is applied as a foliar spray at a rate of 2.5 oz. per acre. The PHI for this product is only 7 days, so timing of application is more flexible than for Platinum®. As always, carefully read the insecticide label to insure proper application methods, maximize effectiveness, and minimize environmental contamination.

PIERCE'S DISEASE TESTING

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, packaged, and mailed to the PDIDL. Be sure to include a completed sample form with your sample. Sample forms can be found at

http://entoplp.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.

References:

Purcell, A. H., and D. L. Hopkins. 1996. Fastidious xylem-limited bacterial plant pathogens. Annual Review of Phytopathology 34: 131-151.

Robacker, C. D., and C. J. Chang. 1992. Shoot-tip culture of muscadine grape to eliminate Pierce's disease bacteria. Horticultural Science 27: 449-450.

Scouting Canola for Diamondback Moth

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There are reports of diamondback moth infesting canola in several locations in southwest Oklahoma and Texas. Diamondback moth populations can build rapidly, and cause problems in canola when plants start to bloom. We do not currently have any research-based economic thresholds from Oklahoma for managing diamondback moth, so my suggestions are adapted from recommendations developed in spring canola in North Dakota.

Photo courtesy of Alton Sparks Jr., University of Georgia. Bugwood.org

Diamondback moth is a pest of many crucifer crops, including canola. This insect is found worldwide, and was introduced into the United States in 1854. The moth is a small, gray and brown moth that measures ½ inches. When resting, the wings are folded over the body in a roof like position. Male moths have three diamond-shaped markings on the forewings when they are folded together, which is how it got its name. Female moths lay oval flattened eggs measuring 0.44 mm in groups of 1-8 eggs which will hatch in 5-6 days. One female will lay an average of 150 eggs.

Newly hatched larvae are light green with a green head, and become progressively darker as they mature. They develop through four instars and when full grown, a larva measures about ½ inches long. One distinct feature of this caterpillar is that they will thrash violently back and

forth and drop from the plant on a silk strand. They create a loose, silken cocoon that they attach to the plant and pupate in. They can complete a lifecycle in about 32 days, depending on temperature. Typically a scout will find all life stages at the same time within a field.

Larvae are the damaging stage. When they first hatch, larvae feed by leaf mining. As they grow they begin to feed on the outside of the leaves. Small larvae chew small irregular windowpane areas on a leaf. As they get larger, they chew entire leaves leaving only the veins. Although leaf feeding looks bad, it doesn't result in much yield loss. Yield loss is associated with flower and seed pod injury. When larvae feed on flowers, they cause them to abort. When they feed on seed pods, the pods may fail to produce seed. Feeding associated with flowers and pods can also cause a delay in plant maturity.

Photo courtesy of Merle Shepard, G.R. Carne and P.A.C. Ooi. Bugwood.org

Scout for diamondback moth by pulling plants from a 1-square foot area, beet the collected plants into a white bucket and count larvae. Count larvae that are dangling on the plant from silk threads as well. Take counts in at least 5 locations to get an average number of larvae per square foot.

Thresholds are: 10-15 larvae per square foot during early flowering
20-30 per foot during pod stage.

One caution: Diamondback moths are notorious for developing resistance to insecticides, particularly pyrethroids, which are the primary registered insecticides for use in canola.

Therefore, I suggest that the high end of any rates should be considered to eliminate the possibility of not obtaining adequate control. Current recommendations for control of diamondback moths in canola are listed in **CR-7667**, "Management of Insect and Mite Pests in Canola" which can be obtained online at:
http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-3045/CR-7667web2009.pdf

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Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist

Oklahoma: Wheat has grown greatly over the last week in Oklahoma. On trips last week to McAlester (southeastern OK) and Clinton (southwestern OK) and then here at Stillwater, I found wheat mostly at GS 6-7 (one or two nodes present on lower stems) depending on planting date last fall. Fields I examined last week were predominately clean of foliar diseases although scattered pustules of leaf rust and occasionally powdery mildew could be found. This is consistent with reports from other extension personnel with only a few exceptions such as around the Fairview area where Roger Gribble (Area Extension Agronomist – NW Oklahoma) observed heavy powdery mildew. The other significant observation was the presence of stripe rust on Jagalene in Dr. Brett Carver's (OSU Wheat Breeder) plots here at Stillwater. This stripe rust was on lower leaves in Jagalene border rows. Severity on individual leaves was in the 65-80S range, but the incidence has scattered. No stripe rust could be found in any other plots, even of other fairly susceptible varieties.

Texas: Here is an excerpt from a report from Rex Herrington (Research Associate, Texas A&M – College Station) that was received on 28-Mar-2010.

"I went to Castroville (a little ways west of San Antonio) yesterday with two grad students. The nursery looks outstanding, and has a high yield potential. Stripe rust is present across the nursery, but it is drying up, and I don't think it will do much with the warmer temperatures. I found very few active sporulating infection sites. The big wheat field on Melcher Rd. to the north, just off Hwy 90 has a lot of yellow leaves from stripe rust. Also, the farmer's field on the west side showed prior evidence of stripe rust. Leaf

rust is present in the spreader rows and in Jagger and Jagalene (15-20S on lower leaves). No wheat stem rust was found. Powdery mildew is heavy, and yellowing leaves on susceptibles.

Here is an excerpt from Dr. Amir Ibrahim (Wheat Breeder, Texas A&M) received on 04-Apr.

"Stripe rust has moved to the flag leaf in susceptible entries at this South Texas hot spot (College Station, TX). 'Jagalene' and 'Jagger' are 70S and 80S, respectively. TX05A001822 which ranked top in the 2009 SRPN and UVT is 100S and completely covered with rust. 'Fannin' and 'TAM 111' remain symptomless with an R rating."

Here is an excerpt from a report sent out on 02-April by James Swart (Entomologist) and Dr. Curtis Jones (Agronomist), both of Texas AgriLife Extension at Texas A&M-Commerce.

"Most of the area wheat is in Feekes 7 – 8 (two nodes above ground to beginning of flag leaf emergence). Plants in most fields are reasonably well tillered, and yield potential is fair to good. Most plants are shallow rooted, as they have grown in saturated soils throughout the fall and winter months. Everything has been top dressed and we have now had adequate rainfall to move the nitrogen into the soil profile. Low levels of stripe rust were observed last week in the lower canopy in susceptible varieties (Patton SRWW in our Royse City location). We have not seen any leaf rust yet, but expect it to be present in susceptible varieties as temperatures begin to increase. There have been reports of a race change in stripe rust but we have not yet observed it here."

Louisiana: Finally, here is a report from Dr. Stephen Harrison (Oat & Wheat Breeder, Louisiana State University) received on 02-Apr.

"Stripe rust has continued to spread in Louisiana and growers are applying fungicides for control in a number of fields. Some previously resistant varieties are showing some infection while others have remained resistant. Plots at Winnsboro in Northeast Louisiana on April 1 had relatively light but active infections. Some grower fields in the Winnsboro area are at threshold level for spraying with large (10 – 30') active infection centers in fields that can be seen from a distance. Stripe rust is widely present across South Louisiana and is being sprayed with fungicides. The highest severity in variety trial plots at Crowley (southwest) was 25% on March 23rd, but that has probably doubled in the past week, as occurred at Baton Rouge. Stripe rust at Baton Rouge has doubled in severity over the past 10 days with intensities as high as 60% in the variety trials on March 30. Approximately 40% of 2,000 observation yield plots in the wheat breeding program have been discarded due to stripe rust, a reflection of the fact that we have not seen stripe rust of any consequence in several years. Most of Louisiana has been windy and relatively dry which has probably limited spread somewhat since temperatures have been favorable for development. Rain is forecast over much of Louisiana tonight and temperatures will remain favorable in north Louisiana for continued development over the next 10 days

(forecast lows of 47 to 62 F). I suspect stripe rust incidence will increase substantially in southern and central Arkansas over the next 10 days.

Leaf rust incidence is relatively low and I am not aware of any commercial fields having been sprayed for leaf rust control. Active leaf rust is present at Baton Rouge and Winnsboro, and conditions are favorable for increase assuming we have rainfall this weekend and winds subside at night. I suspect that leaf rust will increase in severity over the next two weeks.

I have not observed any oat crown rust, wheat stem rust, or oat stem rust. The wheat crop is about 10 – 14 days behind normal development due to the cold winter. The average heading date across varieties and years for entries in the official wheat variety trials in Baton Rouge is about March 30. As of yesterday none of the trials had headed, although some will head by early next week."

Dr. Richard Grantham
Director, Plant Disease and Insect Diagnostic Laboratory

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