Grape Phylloxera

Although phylloxera leaf galls have not been reported so far this year, as your vines approach pre-bloom consider your management options. Especially be aware that Frontenac and Frontenac Gris are highly susceptible to phylloxera.

Grape growers of the variety Frontenac have likely been introduced to phylloxera. The insect pest forms unsightly galls on developing leaves and tendrils (Figure 1). These galls result in changes in vine physiology and can have a negative impact on grape quality. Much of the research on grape phylloxera has focused on the phylloxera form that infects grape roots. In Wisconsin, the phylloxera form that causes leaf galls are of greatest concern. However, you should become aware of both forms of phylloxera as many sub-types exist and the pest is always evolving.

Grape phylloxera *Daktulosphaira vitifoliae* (Fitch) (Homoptera: Phylloxeridae) is native to North America. Currently grape phylloxera is classified as a single species even though populations may infect different sites on the grape plant; namely roots or developing leaves. Grapes classified as *Vitis vinifera* are very susceptible to root galling by phylloxera. It was the importation of grapes from North America to France in the mid 1800’s that resulted in the collapse of the European grape industry. Some American grape species are resistant to phylloxera, including *Vitis rupestris*, *V. berlandieri*, and *V. riparia* whereas other American grape species (*V. labrusca*, *V. aestivalis*, and *V. vulpina*) are susceptible to phylloxera. Resistance is relative, as American grapes roots may be infested by phylloxera, but the roots wall off the site of invasion preventing gall formation. Root phylloxera alone can be detrimental to vine health, but research has shown that secondary pathogens in combination with phylloxera can cause significant damage.

Galls on leaves caused by phylloxera cause a reduction in photosynthesis. Photosynthesis can be reduced between 50 to 84% in galled leaves compared to uninfested leaves depending on the number of galls per leaf. Once phylloxera dies within the galls photosynthesis levels are not restored.
Phylloxera infested leaves also impact adjacent uninfested leaves by reducing photosynthesis. This suggests that galled leaves have both a direct and indirect effect on photosynthesis. Damage from leaf galls by phylloxera goes well beyond the cosmetic appearance.

Phylloxera has a life cycle that involves both the grape roots and leaves. During the full life cycle of phylloxera, up to four forms can occur: wingless-root feeding form, winged form, wingless sexual form, and a wingless leaf-galling form. American grape susceptible species have all four forms of phylloxera. Phylloxera eggs laid in the soil the previous season hatch and then migrate to young leaf tissues. Feeding begins and a gall is formed where 400 to 600 eggs are laid. After eggs hatch, crawlers will either retreat to the soil or migrate to developing leaves to form new galls. A number of generations can take place during the growing season with the last generation migrating into the soil, laying eggs that will hatch the following season. Interspecific grape hybrids with American *Vitis* genetic backgrounds are generally susceptible to the leaf galling strains of phylloxera. However, the ability of phylloxera to cause leaf galling is likely dependent on the phylloxera strain, the grape varieties genetic background, environmental condition, and the vines health.

Management of the foliar form of phylloxera is dependent on timing insecticide applications. It is very important that grape plants be scouted on a regular basis to determine when the first leaf galls appear. When scouting, look for galls on expanding leaves; phylloxera does not attack mature leaves. Once phylloxera leaf galls are present, the vineyard should be treated with an insecticide. The main objective of a phylloxera management program is to protect the grape leaves before leaves are severely galled. Grape varieties that are highly susceptible to phylloxera should be scouted more often than grape varieties that have moderate resistance to phylloxera. The grape varieties Frontenac and Frontenac Gris are the most susceptible to phylloxera. Other varieties like Foch seem to have moderate resistance to phylloxera. Be aware that once phylloxera becomes established in a vineyard, phylloxera will always be present.

A common practice for many growers is to apply Danitol at pre-bloom to manage phylloxera. Danitol will also control first generation grape berry moth at this application timing. Be aware that Danitol is a restricted use pesticide and the purchase and application requires you to be a certified applicator. There are other insecticide options for managing phylloxera, including Assail 30SG, Movento 2SC, and Voliam Flexi 40SG. In pesticide trials at Michigan State University in 2009, both Movento (6 oz/acre) and Assail (2.5 oz/acre) provided excellent control of phylloxera and the control was maintained through the following year. Movento is not a restricted use product.

**Further Reading**

Grape Flea Beetle

While grape growers in southern parts of the state have already experienced the grape flea beetle this season, in northern and cool areas along Lake Michigan the grape flea beetles appearance started late last week. *This should make you a believer in scouting for certain pests based on phenology.*

Grape flea beetles have made their presence known in the northern grape growing regions of Wisconsin this past week. Most grape varieties were at the swelled bud to bud-burst stage. Heavy feeding damage was reported on grape plants located on vineyard borders near grass/alfalfa or wooded area. Wild grapes were also under attack by the flea beetles. Damage on wild grapes was severe with the beetles consuming interveinal leaf tissue of newly expanded leaves.

Grape flea beetle on a swelled grape bud at Peninsular Agricultural Research Station on May 11, 2012.

Grape flea beetle eating its way into a swelled primary grape bud. May 11, 2012 at PARS.

Grape flea beetle damage to wild grape at PARS on May 11, 2012.

Grape flea beetle damage, the primary bud has been consumed from the inside by a grape flea beetle. May 11, 2012 at PARS.
Development of wine grapes in the grape variety trials at the Peninsular Agricultural Research Station (PARS) Sturgeon Bay, WI and West Madison Agricultural Research Station (WMARS), Madison, WI


Brianna at WMARS 5.15.2012
14 inch shoots

Foch at WMARS 5.15.2012
9 inch shoots

Frontenac at WMARS 5.15.2012
14 inch shoots
Development of wine grapes in the grape variety trials at the Peninsular Agricultural Research Station (PARS) Sturgeon Bay, WI and West Madison Agricultural Research Station (WMARS), Madison, WI

La Crescent at WMARS 5.15.12
12 inch shoots

La Crosse at WMARS 5.15.2012
6 inch shoots

Marquette at WMARS 5.15.2012
8 inch shoots
Development of wine grapes in the grape variety trials at the Peninsular Agricultural Research Station (PARS) Sturgeon Bay, WI. Notice some of these grape varieties have delayed bud-break compared to some of the more common cold hardy grape varieties.
Degree Day\(^1\) (base 50) Accumulation from April 1 to May 13, 2012 at Peninsular Agricultural Research Station in Sturgeon Bay, WI

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<th>Date</th>
<th>2012</th>
<th>2011</th>
<th>5 Year Average(^2)</th>
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<td>138</td>
<td>98</td>
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\(^1\)Modified method.
\(^2\)Average from 2007 to 2011.

Degree Day\(^1\) (base 50) Accumulation from April 1 to May 13, 2012 at West Madison

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<td>4/1 to 5/13</td>
<td>266</td>
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\(^1\)Modified method.
\(^2\)Average from 2007 to 2011.

Accumulated degree days\(^1\) (base 50) for the month of March in Sturgeon Bay and Madison, WI.

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\(^1\)Modified method.
\(^2\)Data from http://www.doa.state.wi.us/degreedays/

Please scout your vineyards on a regularly scheduled basis in an effort to manage problem pests. This report contains information on scouting reports from specific locations and may not reflect pest problems in your vineyard. If you would like more information on IPM in grapes, please contact Dean Volenberg at (920)746-2260 or dean.volenberg@ces.uwex.edu