Subject: New England Grape Notes, Sept 13, 2017
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New England Grape Notes - Sept. 13, 2017

UMass Extension
CENTER FOR AGRICULTURE

September Update

Harvest is underway around the state for both table and wine grapes. Below are some relevant articles for understanding and assessing the pest and disease status of your crop at this time of year. See Timely Viticulture issue on Harvest Priorities for some good information on how to evaluate fruit maturity and determine readiness for harvest.

Insight for controlling sour rot in the vineyard

Tremain Hatch, Virginia Tech

Wine grapes grown in humid conditions can have sour rot around harvest time. Our colleagues at Cornell have been working to get a better handle what sour rot actually is, and how it can be managed. Check out this excellent update of their work: https://grapesandwine.cals.cornell.edu/sites/grapesandwine.cals.cornell.edu/files/shared/Research%20Focus%202017-3.pdf?utm_source=Appellation+Cornell+%2330+August+2017&utm_campaign=Appellation+Cornell+%2330&utm_medium=email

Here is a summary:

What is sour rot?

A combination of several elements:

1. Oxidized grape skins
2. Acetic acid
3. *Drosophilia* fruit flies

What are the organisms responsible for a sour rot infection of wine grapes?

1. Yeast
2. Acetic acid bacteria
3. *Drosophila* fruit flies

How can a grower manage sour rot in a wine grape vineyard?

Controlling the three organisms listed above will help control sour rot in the vineyard. The combination of an antimicrobial agent with an insecticide provides better control than either material on their own. For example, spraying a material with antimicrobial properties (i.e. Oxidate) in addition with an insecticide labeled for *Drosophila* (i.e. Mustang Maxx) provided more control than either material on their own.

Three important reminders if you choose to go with this approach of controlling sour rot:

1. Abide by the labeled Pre-Harvest Interval (PHI).
2. If using repeated applications of insecticides labeled for *Drosophila*, make sure to rotate between different modes of action.
3. Potassium metabisulfite (KMS) is not labeled for use in the vineyard.

Take the time to read through the article, there is great information including some insight on training system and sour rot.

Pathology Blog

Visit Dr. Nita's blog for more information about low PHI materials. http://grapepathology.blogspot.com/

(***Source**: Virginia Viticulture Notes, Sept. 11, 2017*)

Spotted Wing Drosophila Updates

Alice Wise, Faruque Zaman, Cornell University

Spotted wing drosophila (SWD) and its impact on wine grape production is a concern in both the US and Europe. Many fruit fly species are present in the vineyard during the ripening period and will feed on damaged fruit. However, SWD has the unique ability to lay eggs within intact fruit. CCESC entomologist Faruque Zaman is monitoring SWD populations in small fruit plantings and vineyards.

SWD population is low to moderate on Long Island this year, though there is some variation by crop and location. [**Editor's Note**: The Massachusetts SWD monitoring network suspended trapping after sustained captures were found in all locations (approx. mid July). However, traps in experimental locations in raspberries are showing high populations 100±/trap.] This past week, only 7.0 SWD/trap (up from 2/trap/week last year) were found in an eastern L.I. vineyard adjacent to a forest with many alternative hosts (pokeweed, wild cherry, bittersweet, nightshade etc.). Less than 4.0 SWD/trap was found in the Cornell-LIHREC vineyard which has no adjacent forest. We still believe (confirmed by Cornell University and CCE-SC Entomologists) that while raspberry, blackberry and blueberry are highly susceptible, grape is not a preferred host for SWD in our area. If periodic rain continues in the coming weeks, fruit fly populations may increase dramatically. Based on past observations, although many fruit flies may be trapped, the proportion of SWD will remain low in vineyards.

So far this season, we have not seen typical signs of SWD egg-laying and fruit damage. As berries ripen, we will monitor the situation by keeping intact fruits in cages to encourage SWD emergence. Unlike other fruit fly species, SWD eggs develop a pair of characteristic white breathing tubes extending from within the intact berry, visible under high magnification. We will continue monitoring SWD in grapes until harvest. Bottom line: Based on trap catches and close examination of damaged clusters, SWD is currently not an economic threat for local vineyards. We are not recommending an insecticide application targeting spotted wing drosophila. However, with an increase in berry damage (cluster rot and/or bird pecks), fruit fly activity (mostly non-SWD) may increase. If cluster damage and accompanying fruit fly populations are high, the choices are to thin fruit, removing damaged clusters from the vineyard; harvest; and/or treat with insecticide. Insecticide options are Delegate (PHI -7d), Malathion (3d), Entrust (7d, OMRI approved), Mustang Max (1d), or Danitol (21d). These will control SWD as well as other fruit flies. A list of insecticides and detailed information for SWD control in grapes is available in the link: https://blogs.cornell.edu/newfruit/files/2016/11/treeFruitGrapeSWDinsecticidesJune2017-1gt2ztx.pdf. (Source: Long Island Fruit & Vegetable Update. No. 22 - Aug 31, 2017)

Cluster Rot Control

Alice Wise, Wayne Wilcox, Cornell University

A list of the Botrytis control options along with their PHI – preharvest interval. The last four materials list sour rot suppression or control on the label. Solid research results on sour rot control are lacking so proceed with caution.

Rovral: Due to resistance in years past, Rovral should not be the workhorse of your program. However, if you've been giving it a rest, it may be a useful when used on a limited basis. The use of an adjuvant improves control. Stylet Oil (assuming proximity to sulfur sprays is not an issue) is a good choice. Note: avoid application of oil on hot, humid days and/or to drought stressed vines. PHI = 7 days.

Vangard: Vangard is absorbed into the berries, so it's rainfast and has limited post-infection activity. There doesn't seem to be any data showing improved performance by adding an adjuvant. Vangard is highly prone to resistance development, so its use should be strictly minimized. The label allows a maximum of two applications per season, but keep it to a single spray each year unless you really get into a bind. Scala has the same chemistry and mode of action as Vangard, the two have performed similarly in a limited number of head-to-head tests. PHI = 7 days.

Elevate: Unrelated to any other on the market. There is a resistance risk, not as significant as that for Vangard. The label allows a maximum of three applications per season, but European guidelines recommend just one, in rotation with unrelated materials. PHI = 0 days.

Oxidate: Oxidate is formulated to stay on the outside of the waxy cuticle covering leaves and berries. In trials on Chardonnay at LIHREC, it burned out Botrytis sporulation. However, since the fungus is established in the flesh of the berry, new sporulation reappeared within a week. The temporary reduction in sporulation may help to reduce the spread of spores, particularly if repeat applications are used. Use of Oxidate in combination with or in addition to botrycides may be a better strategy but it is still unclear if the addition of Oxidate will enhance control. Sour rot is listed on the label. Oxidate 2.0 is OMRI approved. PHI = 0 days.

Double Nickel: The active ingredient (ai) is *Bacillus amyloliquefaciens* strain D747, a proprietary strain of common soil microorganism which produces secondary metabolites harmful to cell walls and membranes of fungi and bacteria. Labeled for Botrytis and sour rot. Wilcox results: in 2015, it did not provide good control of Botrytis bunch rot. OMRI certified. PHI = 0 days.

Fracture (Blad): The active ingredient (ai) - *Banda de Lupinus albus doce*, a polypeptide derived from germinating sweet lupine plants, it breaks down fungal cell walls. Labeled for Botrytis; has a 2ee for suppression of sour rot. Wilcox results: good control of Botrytis bunch rot in 2015; not yet tested for sour rot. Company is reportedly seeking OMRI approval. PHI = 1 day.

Timorex Gold: The active ingredient (ai), tea tree oil, is a naturally occurring product that is found in various herbs, spices and fruits but is concentrated in the leaves and terminal branches of the tea tree, *Melaleuca alternifolia*. It degrades rapidly through volatilization with 90% gone within 24 hours so there is no forward protection. The label claims control of Botrytis and sour rot. There has been no testing in NY, proceed with caution. PHI = 2 days. (***Source**: Long Island Fruit & Vegetable Update, No. 25, 9/22/16)*

Red Leaves in the Vineyard - Diagnosis and Management

Hemant Gohil and Joe Fiola, University of Maryland Extension

It is not uncommon to walk a vineyard row and find some vines with red leaves somewhere in the canopy. Red leaves can appear at any time in the growing season and are caused by many biotic (viruses, bacteria and fungus) and abiotic (nutrient deficiencies, cold injury and damage to root systems, etc.) stresses. Anything that can cause blockage or stress in the vascular system, where water and nutrients are transported, can result in the development of red leaves. Because of the variability in timing and pattern of appearance and the overlapping of the symptoms, it may be difficult to identify the cause based solely on visual symptoms. The best strategy is to get the vines tested for accurate diagnosis as soon as possible. The following are examples of abiotic and biotic stresses thatare often associated with red leaves on grapevines.

Nutrient Deficiencies

Potassium (K) deficiency develops when vines receive less K than what is required for normal growth or with low soil pH levels that decrease availability.

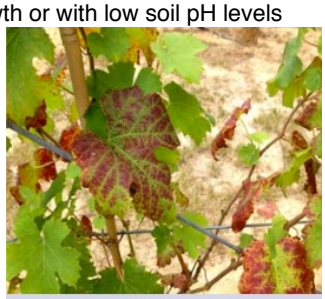


Figure 1. Potassium (K) deficiency Photo: Hemant Gohil

- Potassium is a mobile nutrient so when it is deficient the upper or younger leaves receive K at the expense of the lower/older leaves.
- Symptoms typically appear in early to late summer, and are often transient due to too much or too little water.
- Red grape varieties leaves turn red to purple between the veins starting from the edges (Figure 1). White grape varieties deficient leaves turn chlorotic (pale yellow or white).
- Monitor K with bloom petiole analysis and match with soil tests. In the unlikely case of a deficiency in soil and vines, first adjust soil pH to the correct range. Then apply potash (KOH) fertilizer either foliar or to the soil depending on the urgency.
- Be very conservative with K applications as they can influence fruit quality.

Magnesium (Mg) deficiency symptoms resemble K deficiency; the central portion of leaves remains green giving wedges of discoloration (Figure 2).

Figure 2. Magnesium (Mg) deficiency Photo: Hemant Gohil

- In red varieties, interveinal chlorosis becomes red to brown. In white varieties, the chlorosis remains yellowish.
- To correct the Mg deficiency, if your soil is acidic, apply dolomitic limestone (Mg containing limestone) as it will also raise the pH.
- Magnesium salt (MgSO4 - Epsom salts) can be applied to the foliage or soil if soil pH does not require adjustments.

Phosphorous (P) deficient leaves show interveinal reddening while white varieties show chlorosis.

Figure 3. Phosphorous (P) deficiency Photo: Gary Pavlis

- Initial chlorosis appears around leaf margins, which turn reddish in red varieties (Figure 3).
- As always, first adjust the soil pH if it is lower than the optimum to improve P uptake.
- Application timing of P is flexible as it is less mobile and does not leach readily.

Diseases

- **Viruses** of grapes such as leaf roll and red blotch can also cause red leaves and result in reduced vine vigor, poor fruit set, reduced fruit quality, and early decline of vines.
- Since there is no cure available for viruses once vines are infected, the only way to cure the infected vineyard is rogueing out of infected vines, and replanting with virus-tested planting materials from dependable nurseries.

Grapevine leafroll disease symptoms typically appear around (the onset of fruit ripening) and spread as the season progresses.

- In red varieties, red to purplish discoloration is observed on interveinal areas of the leaf, but the veins stay green (Figure 4).
- In white varieties, the interveinal area becomes pale green and veins turn yellowish.
- Typically leaves cup downward or curl from the edges (Figure 5).
- Leaf discoloration will often develop randomly within the vine canopy.
- In contrast to nutrient deficiencies there is no upward or downward movement of the discoloration.

Figure 4. Leafroll disease symptoms Photo: Mizuho Nita

Figure 5. Leafroll disease symptoms Photo: Mizuho Nita

Grapevine red blotch disease is a recently recognized virus disease that has existed for a long time.

- As the name suggests blotches of red pigment appear randomly on leaves of infected vines.
- It can be detected at any stage of vine growth and in any part of vine.
- It can easily be mistaken for potassium deficiency or leaf roll virus especially when leaves cup or roll (Figure 7).
- There is little known of mechanism of how (or if) it spreads in vineyards.
- For the two viruses mentioned above, and any other viruses, the infected vines will be infected for the rest of their lives and must be rogued.
- As always, it is recommended to obtain virus-tested materials from reputable nurseries when establishing a vineyard.

Figure 7. Red Blotch disease symptoms Photo: Prashant Swami

Crown Gall is caused by a bacterium (Agrobacterium)

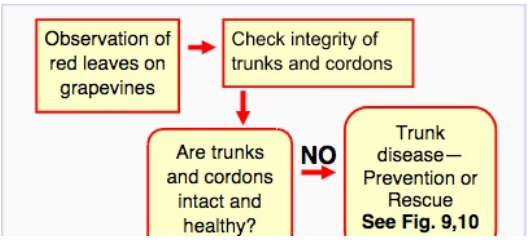
- Severe winters or early spring temperature fluctuations can damage bark and vascular tissues and allow infection.
- Other wounding events, such as physical damage to the trunk can also encourage the infection.
- Typical symptoms are formation of galls on the trunk (Figure 9); these can be very small, and may be formed under the bark. Therefore, crown gall could be mistakenly identified as a nutrient deficiency, as red leaves result from the stressed vascular system are readily visible (Figure 10).
- Symptoms often appear when water, heat, and fruit load stress is high in August.
- Train new uninfected canes to replace infected canes.
- Training multiple trunks and hilling up to prevent graft union damage are other preventative strategies.

Figure 9. A series of small crown gall formed under the bark. Photo: Mizuho Nita

Figure 10. Red foliar discoloration caused by crown gall. Photo: Mizuho Nita

Canker diseases (Botrysphaeria; Eutypa) colonize mature wood (trunks; cordons) and constrict flow of nutrients and water.

- As the disease progresses in the wood, it can result in reduced vigor, decline, and death of vines.
- When diagnosed early, management is similar to crown gall; train uninfected canes to replace infected wood.
- Treating large pruning wounds is the best preventative.



Assessment of suspicious vines

- The cause of red leaves can be very difficult to accurately identify; see "triage"/troubleshooting flowchart (Figure 11).
- First inspect trunks for integrity.
- Then perform petiole analysis.
- If trunk diseases and nutrient deficiencies are ruled out, send out samples for virus testing (for leafroll, red blotch, and others); as this can be expensive save for last.

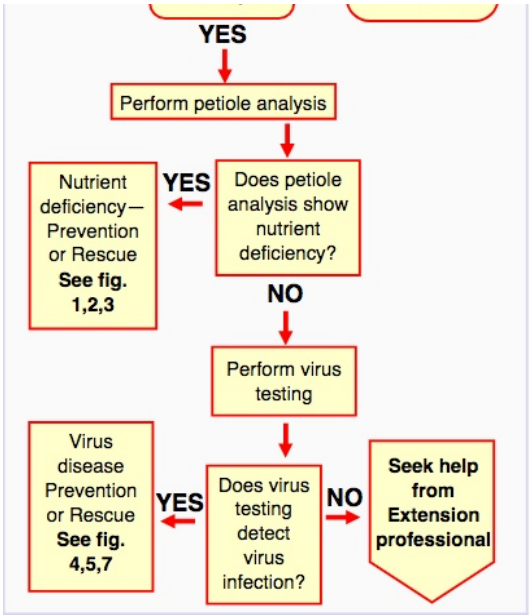


Figure 11. Red Leaf troubleshooting protocol

Testing Laboratories

Go to htts://go.umd.edu/testinglabs to obtain the list of grapevine tissue, soil, nematode, virus and disease testing laboratories. Communicate directly with several of them as each company has different pricing.

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