Shot berries, hen and chicks: Problem in some grape cultivars

Grape clusters that have berries that differ in size and maturity have appeared among some grape cultivars (Figure 1). This can result from poor fertilization at bloom, nutrient deficiencies or a virus infection. Shot berries in Vidal blanc are often the result of Tomato ringspot virus (Figure 2). Nutrient deficiency of boron which is needed in the synthesis of the growth hormone auxin can also result in shot berries. Boron uptake is dependent on water uptake by plant roots and boron uptake will be reduced under droughty soil conditions. Shot berries can also result when partial fertilization occurs during flowering. Partially fertilized berries do not develop seeds and these berries remain small and green.

If a nutrient deficiency such as Boron is suspected, a tissue analysis can be conducted to help determine a potential nutrient deficiency. When trying to determine if a nutrient deficiency is occurring, two samples need to be collected. One sample should be from vines that have normal or healthy fruit clusters. The other sample should be from vines that have clusters that have shot berries. Collect petioles from the most recently mature leaves which are leaves 5 to 7 from the shoot tip. A minimum of 50 petioles per sample are needed. Place the petioles in a paper bag and dry. Samples can be submitted to County Extension Centers.

University of Missouri Soil and Plant Testing Laboratory

- Plant analysis
- Available tests and fees
Vineyard Care after Harvest

Many vineyards experienced moderate to severe drought this growing season. Even vineyards that were irrigated the vines experienced heat stress as the roots could not keep up with water loss from transpiration. In dry-farmed vineyards, drought induced nutrient deficiencies have occurred. Nutrients were available in the upper soil profile, but dry soil conditions made these nutrients unavailable to the root system. With removal of fruit from the vines, the roots, trunk, and cordonsm become the sinks for stored carbohydrates. It is very important, to maintain vine health after harvest so the vines can store carbohydrates, acclimate to cool temperatures, and periderm can develop.

With August shaping up to be wet month for many areas in Missouri, irrigation or soil moisture may not be an issue in harvested vineyard blocks. The bigger concern likely will be downy mildew management. Downy mildew can defoliate a vine in a very short period of time if environmental conditions are favorable for disease development. Continue to monitor harvested vineyard blocks for disease development. Once fruit has been harvested from vineyard blocks, mancozeb could be applied if the maximum per acre, per season limit has not been applied. For example; a maximum of 25.6 lbs of Penncozeb 75DF may be applied per acre per season.

Remember that protectant fungicides such as mancozeb should to be applied prior to infection. Pay close attention to when the previous cover spray was applied prior to harvest. With rainfall events occurring on a weekly pattern so far in August, downy mildew remains a threat prior to and after harvest.

Berry Shriveling

A few grape growers have reported berry shriveling in Vignoles (Figure 3). In my visits to vineyards in the last 2-weeks, I have also noticed a lot of berry shriveling on Vignoles. The shriveling in all appearances does not resemble symptomology of Black rot (Guignardia bidwellii) (Figure 4). Shriveled berries had no pycnidia present. Also no Black rot leaf or shoot symptoms were apparent. Additionally the symptoms do not resemble sour rot (Figure 5). The clusters do not smell like acetic acid and fruit flies are not abundant near clusters. The shriveled berries are not dry and hard but semi moist and can be broken open between a thumb and forefinger. There are a number of shriveled berry disorders that may be playing a role in Vignoles this season.

Figure 3. Berry Shriveling on Vignoles. Submitted picture
In the absence of any disease, berry shrivel can also result from a number of disorders such as sunburn, prolonged dehydration, berry shrivel and bunch stem necrosis. These disorders often occur during berry ripening or when veraison begins. Another shrivel disorder named early-season bunch stem necrosis occurs prior to veraison. To learn more about these disorders and see pictures please see the reference below.

A lot of research has been conducted on these disorders, but to date a smoking gun that is the causal agent has not been found. Some new research out of Australia is beginning to add to the knowledge base of berry shrivel (See reference below). A potential explanation to berry shrivel when the rachis remains healthy is cell death within the berry. The fleshy pulp surrounding the seeds or mesocarp has been shown to be susceptible to cell death. Cell death occurs when oxygen becomes limiting during respiration and this results in ethanol accumulation within the mesocarp. Oxygen enters berries through lenticels located on the pedicel. Grape berries use the oxygen during cellular respiration to breakdown malate or glucose. In the absence of oxygen, glucose or malate are used as substrates to produce ethanol and CO₂. Low oxygen levels correlate with cell death in the mesocarp. Respiration requirements for oxygen are higher when ripening berries experience high temperatures. In other words respiration increases as temperatures increase and this results in the need for more oxygen.

This season’s high temperatures and drought conditions are likely playing a role in berry shrivel.

Reference

Gall of interest

This week, a picture of a grape gall was sent to me via email and the grower was wondering if this gall was the result of the grape gall girdler. The gall appears to be a grape filbert gall (Figure 6). I first came across the grape filbert gall in 2009 on wild grapes (Figure 7).

There are a number of insects that cause galls on grape foliage. The most common gall that many grape growers are familiar with is the leaf-form of grape phylloxera, caused by an aphid-type insect. There are a number of various shaped galls that can occur on grapevines caused by the attack of small midge flies (family: Cecidomyiidae).

Gall formation in many instances is initiated by egg laying (oviposition) by the adult form of an insect or by feeding of early larval stages. Feeding by certain gall making insects results in the release of salivary fluids that may contain plant growth regulating substances (Auxins, IAA) and plant digesting enzymes, pectinases, proteases, and cellulases. The growth regulating substances released by feeding insects work in concert with the grapevines’ response to insect attack. The grapevines’ response to mechanical or chemical irritation is to isolate the toxins or invasion, resulting in a tumorous mass of tissue or gall. Galls may look destructive, but galls seldom injure the plant.

Once galls are apparent, there is no chemical control method that will eliminate the galls. Grapevines can support a large number of galls and still grow and reproduce normally. Grapevine tissues that are galled can be removed or pruned out and destroyed to reduce the number of future gall insects. Severe galling of newly established plants may lengthen the time to productivity, for example severe galling by phylloxera. However, most galls that infect the soft tissue (leaves, tendrils, shoots) of grapevine are of little economic importance.
Another gall you may come across is the Grape Cane Gallmaker (Figure 8). These galls are caused by a small (1/8-inch long) reddish-brown beetle (*Ampeloglypter sesostris*) in the family Curculionidae. The beetles are in fact a weevil or “snout beetle”. The adult beetles overwinter in wooded areas or fence-rows near vineyards. In late May or early June the beetles emerge from hibernation and females seek grape shoots to lay eggs. The female beetles use her snout to make a row of holes along the length of the shoot. Often these holes are directly above a leaf node. The female deposits a single egg in each hole. A reddish gall forms and the larva feeds within the gall. The larva pupates within the gall and adults emerge in August and seek overwintering sites. Only one generation per year.

Seldom does the grape cane gallmaker become an economic problem in the vineyard. Often the galls are on shoot nodes beyond the fruiting nodes and thereby fruit production is not severely impacted. Galled shoots may be pruned from the vine and destroyed to reduce future pest problems. Infected shoots should be removed from the vineyard prior to mid-July before adult beetle emergence.

*Figure 8. Grape Cane Gallmaker galls on the grape cultivar La Crosse.* Photo credit: D. Volenberg.
Cumulative Growing Degree Days for the Seven Grape Growing Regions of Missouri from April 1 to 20 August, 2018.

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<th>Region</th>
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<sup>1</sup>Growing degree days at base 50 from April 1 to August 20, 2018. Data compiled from Useful and Useable at https://mygeohub.org/groups/u2u/tools. Click on link below to determine growing degree days in your area.

To determine the number of growing degree days accumulated in your area since April 1. Use this tool.

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 573-882-0476 or volenbergd@missouri.edu.