New England Grape Notes

June 9, 2009, Vol. 4, No. 6

Phenology: Grapes are in various stages of pre-bloom and the first steps in canopy management are important now. Good information about canopy management can be found at: http://ohioline.osu.edu/b919/0009.html and http://viticulture.hort.iastate.edu/info/pdf/prunecanopy.pdf. Once vines are in bloom, petiole sampling for tissue tests and fine tuning your fertilization programs is important. See more below.

Tissue Sampling for Adjusting Fertilizer Program

Joe Fiola, University of Maryland

Some early varieties in many vineyards are just starting to bloom. This is a critical time for taking tissue/petiole samples to assess the nutritional status of your vines. The following are some timely considerations.

- Grape petiole analysis is recommended along with soil samples and visual observations as part of a complete nutrient management program.
- A three year cycle of sampling all of the varieties in a vineyard is typically recommended.
- Tissue/petiole analyses reveal the actual nutrients in the vines.
- Tissue samples are needed when doing your mandatory Nutrient Management Plan.
- Spring tissue sampling is a good time to sample, as you can make nutrient adjustments to the vineyard that will influence this year's crop quality.
- Nitrogen status is best evaluated with tissue sampling not soil sampling.
- The time to take spring tissue samples is during full bloom of a particular variety.
- Bloom time samples may show more accurate levels of boron and zinc, but are less accurate indicators of potassium status. Where bloom-time analyses indicate borderline potassium nutrient levels, a second sampling is warranted in late summer (70-100 days post bloom).
- Some specifics on sampling:
  - Each sample should be less than 5 acres; less if there are major changes in soil or topography
  - Sample different varieties separately. Samples should represent plants that are planted on the same soil type and are of the same age, variety and rootstock.
  - Vines should represent that portion of a block that is maintained under the same cultural practices, i.e. fertilizer, irrigation and vigor control practices. For example, irrigation blocks are not to be combined with non-irrigated blocks even if they are on the same soil type.
  - Do not sample vines on the border of the block or near dusty roads.
  - For the bloom-sampling period, sample the petiole of the leaf petiole OPPOSITE the 1st blossom/cluster (see detail on fact sheet linked below).
  - About 50-75 petioles are needed from varieties with large petioles and about 75- 100 petioles are needed from varieties with small petioles.
  - Gently wash petioles with water and gentle detergent, pat dry and place in OPEN paper bag (lunch, #6 size) to dry for a few days.
  - There are many labs that can analyze tissue samples (see detail on fact sheet linked below). Call the laboratory to determine current pricing and submission information.

See Petiole Sampling draft fact sheet for more information:
www.westernmaryland.umd.edu/pages/PetioleSampleFSdraft070505.pdf
(***Source**: Maryland Timely Viticulture, Late May 2009*)

IN New England tissue samples can be sent to UMass Soil and Tissue Testing Lab. Go to http://www.umass.edu/soiltest/ for sampling instructions and prices.

Disease Management: The report below is from Michigan but contains some pertinent information for New England. To view the disease model predictions for southern New England go to http://www.hort.uconn.edu/ipm/grapes/htms/09diseaseriskupd.htm. Vermont's IPM Updates can be seen at http://pss.uvm.edu/grape/newsletters/. New York has some grape disease models available at http://newa.nrcc.cornell.edu/newaDisease/grape_dis.

Downy Mildew Sighted on Chancellor Grapes

Annemiek Schilder, Michigan State University

Downy mildew has gotten an early start this year due to the high levels of precipitation over the past two months. Beginning oilspots have been sighted on leaves of suckers of unsprayed "Chancellor" grapes. These leaves were near the ground, which is where the oospores overwinter. Systemically infected suckers that were partially necrotic with heavy sporulation on the undersides of downcurled leaves were also seen. Suckers can get infected as they grow through the soil and come in contact with germinatingoospores which overwinter in the soil. Often, infected suckers are covered with a layer of white spores and act as a disease source if not removed or killed by an herbicide. Leaves and clusters become infected by airborne sporangia which are released by germinating oospores on the ground and by newly produced sporangia on primary lesions.

Symptoms

Downy mildew is caused by the fungus Plasmopara viticolaand can seriously damage leaves and clusters of susceptible cultivars. Leaf infections may lead to premature defoliation, which can reduce winter hardiness and sugar accumulation in the fruit in severe cases. Cluster infections usually translate into direct losses, as the infected cluster stems and berries will become necrotic and fail to develop. First symptoms on the leaves may be light green or yellow spots that may have a greasy appearance (oil spots). Onolder leaves, lesions are smaller and more angular as they are delimited by leaf veins. White sporulation usually occurs on the underside of the leaf under moist conditions. This is in contrast to powdery mildew, where sporulation mostly occurs on the upper surface. Infected flower and fruit clusters also may be covered with a downy white growth.

Biology of the fungus

The fungus overwinters as thick-walled spores (oospores) in fallen infected leaves on the ground below the vine. As the leaves break down, the oospores are released into the soil where they can survive for a long time. Only oospores at or near the soilsurface will germinate in the spring. Oospore germination is favored by moist soils and moderate temperatures (over 50ºF), and typically starts several weeks before bloom in this region. Oospores develop a second spore type (sporangia), which are splashedby rain or carried by wind to young leaf and shoot tissues. The sporangia release multiple zoospores (swimming spores) which need water (rain or dew) to infect the plant tissue. Under optimal conditions, the time from germination until penetration isless than 90 min. Lesions appear within 5-17 days after infection, depending on the temperature. Zoospores infect the plant exclusively through the stomates, which are mostly located on the underside of the leaf. Young tissues are particularly susceptible, but gain some degree of resistance as they age. Berries become less susceptible as they mature, but the rachis remains susceptible fora long time. The fungus will sporulate through the stomates of infected tissues under humid conditions (95-100% RH) at night. The optimal temperature for sporulation is 65-72ºF. Rain is the principal factor driving epidemics. Temperature plays a less important role by retarding or accelerating the development of the disease. The most serious epidemics occur when a wet winter is followedby a wet spring and a warm summer with cloudy days and intermittent rainstorms every 8-15 days. Since the generation time of the fungus can be as short as 4-5 days, this can lead to "explosive" disease development when the conditions are right.

Disease monitoring

Since downy mildew can spread rapidly under warm conditions with frequent rain or dew, disease monitoring is important. Scout several rows in various places in a vineyard. Visually scan leaves and clusters, and look particularly for symptoms on the lower leaves and shoots. If you see yellow lesions, turn the leaf over to look for white sporulation on the lower leaf surface. This would confirm that it is downy mildew. Occasionally, low-level paraquat herbicide injury may resemble downy mildew lesions. However, no sporulation will be present on the lower leaf surface in that case. Also, you'll see typical necrotic lesions associated with paraquat injury on the same or nearby leaves. If you are still not sure, remove several symptomatic leaves and place them in a plastic bag with a moist paper towel and store at room temperature (68-75F). If it is downy mildew, white sporulation should become visible on the underside of the leaf.

Control

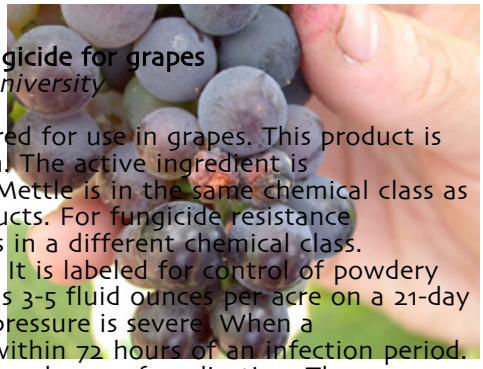
Fungicide sprays for downy mildew at this time are recommended for susceptible varieties, particularly the variety Chancellor, as flower clusters can be infected even before they open. Keeping the disease from defoliating vines may also be important after harvest to allow the vines to build up maximum reserves for the winter. Following are some characteristics of fungicides that may help you decide which ones are most appropriate:

1. Broad-spectrum protectants such as Mancozeb, Captan, Ziram, and fixed coppers are effective when sprayed on a preventative basis. Good coverage, especially on the undersides of leaves, is important. However, they tend wash off to varying degrees during rain events, and copper my be phytotoxic to some grape varieties. Also, some juice grape processors place restrictions on the use of mancozeb and captan. Mancozeb has a 66-day PHI, Ziram has a 21-day PHI, Captan has a 0-day PHI, and coppers have a 24-h REI.
2. The strobilurins generally provide better coverage and are more rainfast since they are locally systemic as well as translaminar (protect top and bottom of leaf). However, they have a limited amount of kick-back activity (up to 24 h), so they should be applied on a preventative basis. Strobilurins will also reduce sporulation in existing lesions, thus slowing the epidemic. Abound provides the best protection against downy mildew. Sovran is good, and Flint provides marginal control. Pristine (a new product) is very effective against downy mildew, but should not be used on Concord or Niagara vines due to possible phytotoxic effects. The strobilurins have a 14-day PHI.
3. Ridomil Gold MZ or Ridomil Gold Copper provides excellent control of downy mildew. It is a systemic material with curative and eradicant activity (i.e., it will stop development of lesions before and after symptoms start to show). It has at least 2-3 days of kick-back activity and up to 21 days forward action. Since it is truly systemic, it will move throughout the plant and even protect vegetation formed after the treatment. Ridomil also stops or reduces sporulation in developing and existing lesions. However, it has a 66-day PHI. Some juice grape processors also restrict the application of Ridomil Gold MZ to the pre-bloom because of the mancozeb component. Ridomild Gold MZ contains 64% mancozeb. Sprayed at full label rate (2.5 pounds/acre), you'd only be applying 1.6 pounds of mancozeb per acre.

4. Phosphorous acid(phosphite or phosphonate) products, such as ProPhyt and Phostrol, are new products which work similarly to Aliette. They are truly systemic and highly mobile within the plant. They have at least three days of kick-back activity and about 7-10 days of forward action. These products do not eradicate active lesions, but it reduce further spore production. Research in New York has shown good to excellent disease control on a 14-day schedule, except on highly susceptible varieties, which may require more frequent sprays. Phosphite products are relatively inexpensive and have a favorable toxicological profile and therefore have a 0-day pre-harvest interval. Some varieties may be vulnerable to burning symptoms, so test out these products on a small scale first. ProPhyt and Phostrol have a 0-day PHI.
5. New fungicides like Presidio, Tanos, and Revus are also labeled for downy mildew control and have worked well in research trials.

If downy mildew has been found in your vineyard, don't allow the disease to develop to epic proportions before taking action. Use best materials now (Ridomil would be my choice given precipitation patterns of the last few weeks but Abound, Pristine, or phosphorous acid products would also work well).

(***Source**: Weekly Vineyard IPM Scouting Summary, June 8, 2009*)

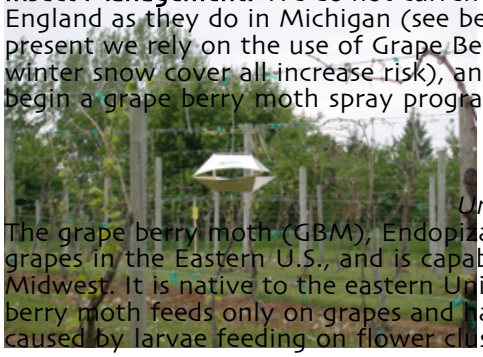


Fungicide Update: Mettle 125 ME - a new fungicide for grapes

Annemiek Schilder, Michigan State University

Mettle (no, not what your mother-in-law does) recently got registered for use in grapes. This product is manufactured by Isagro, Inc., and is formulated as a micro emulsion. The active ingredient is tetraconazole, which is a sterol inhibitor (triazole) fungicide. Since Mettle is in the same chemical class as Nova and Elite, it should not be tank-mixed with any of these products. For fungicide resistance management purposes, tank-mix or alternate Mettle with fungicides in a different chemical class. Mettle is a systemic fungicide with protectant and curative activity. It is labeled for control of powdery mildew and black rot in grapes. The recommended application rate is 3-5 fluid ounces per acre on a 21-day schedule. A spray interval of 14 days is recommended when disease pressure is severe. When a post-infection application is used for black rot, it is recommended within 72 hours of an infection period. Mettle is absorbed quickly into the plant tissue and is rainfast within 2 hours of application. The pre-harvest interval (PHI) is 14 days and the restricted entry interval (REI) is 12 hours. Do not make more than two applications of Mettle 125 ME to grapes per year. The maximum amount of Mettle allowed per season is 10 fluid ounces and there must be at least 14 days between applications. Do not apply Mettle through any kind of irrigation system. Mettle is currently being evaluated for disease control efficacy in grapes in Michigan. (***Source**: Weekly Vineyard IPM Scouting Summary, June 8, 2009*)

Insect Management: We do not currently have a degree day model for Grape Berry Moth available in New England as they do in Michigan (see below), but we hope to be able to provide this for you next year. At present we rely on the use of Grape Berry Moth Risk Assessment (past history of damage, border of woods, winter snow cover all increase risk), and the use of sentinel pheromone traps to alert growers when to begin a grape berry moth spray program. See below for more information.



Grape Berry Moth

University of Minnesota IPM Staff

The grape berry moth (GBM), Endopiza vitana Clemens (Lepidoptera: Tortricidae), is a major pest of grapes in the Eastern U.S., and is capable of causing serious economic loss to commercial vineyards in the Midwest. It is native to the eastern United States, and can be found as far west as the Rockies. The grape berry moth feeds only on grapes and has two to three generations per year in Minnesota. Damage is caused by larvae feeding on flower clusters and fruit.

Identification

The adult grape berry moth is an inconspicuous, mottled brown-colored moth with a bluish-gray band on the inner halves of the front wings. It is approximately 1.2 cm long, with a wingspan of 0.8 to 1.3 cm. The newly hatched larva is creamy white with a dark brown head and thoracic shield. Later instars are green to purple in color, and are 0.8 cm in length when fully grown.

Biology & Life Cycle

Grape berry moths overwinter as pupae within curled grape leaves and in the leaf litter along the edges of woods and under vines. Adult moths emerge in mid to late May, and mate. Females lay eggs on or near grape flower clusters. Larvae hatch from eggs in 4-8 days, depending on temperature. Emergence of the overwintering

generation peaks in mid-June and continues to mid-July. Larvae that hatch in June make up the first generation. Larvae feed on stems, blossom buds, and berries. Often they feed inside webbing which can cover the entire cluster. Larvae will burrow into berries that are 0.3cm in diameter, and will successively feed on 2-3 berries. When the first generation is mature, larvae either move to a leaf where they cut out a circular flap to construct a pupation chamber or pupate in the fruit cluster where they fed.

First generation adults begin to fly in late July, and the flight peaks in early August, however, adult moths continue to emerge until early September. Second generation larvae usually burrow into berries where they touch or where the berry is connected to the stem. Conspicuous red spots develop on the berries at the point of larval entry, and are referred to as "stung" berries. Larvae of the second generation complete their development in late September and pupate in fallen leaves and debris on the ground. Typically this is the 2nd and last generation of the year but with high summer temperatures a 3rd generation may be possible.

Damage

The larvae cause economic injury in three ways: 1) contamination of fruit, 2) reduction in yield, and 3) entry points for diseases.

Late-instar first generation larvae, and all larval instars of the second generation feed only on the berries. Injured berries ripen prematurely, split open and shrivel (see picture, left). Webbing produced by larvae prevents the berries from dropping. Feeding by GBM larvae not only reduces yield and contaminates the crop, but their feeding creates infection sites for fruit rots and feeding by fruit flies. At harvest, severely infested clusters may contain several larvae. Wine made from this fruit may be poor quality.

Management

Monitoring

Most vineyards have either consistently high or low damage from GBM each year. Because of this, researchers at Cornell have come up with a relatively simple risk assessment that growers can use to assess the potential threat of GBM damage in their vineyard. Three major factors that predict GBM damage severity in a vineyard are 1) whether vineyards are bordered by wooded areas or hedgerows, 2) winter temperature and snow cover in the vineyard and 3) GBM infestation history in the vineyard. See the 1991 publication, Risk Assessment of Grape Berry Moth and Guidelines for Management of the Eastern Grape Leafhopper, for more information http://nysipm.cornell.edu/publications/grapeman/files/risk.pdf

Sticky traps with a pheromone lure can be used to monitor GBM emergence. Traps should be placed in the vineyard in the early spring, prior to bloom (see picture, left). A minimum of 3 traps/10 acre vineyard block should be used. Traps should be hung from the top wire of the trellis, and placed around the perimeter of the vineyard. Check the traps twice a week for the presence of GBM and record the date of the first moth capture.

Visually examining grape clusters is necessary to determine the severity of grape berry moth damage. As a part of the Cornell IPM program, the following sampling protocol is recommended: select four areas in the vineyard to be sampled (two in the center of the vineyard, and two on the edge of the vineyard). Visually inspect, at random, 10 clusters on each of five vines (a total of 50) in each of the four areas. Record the number of GBM-damaged clusters in each area. Compute separate totals for the center areas and the edge areas to determine the percentage of damaged clusters. For the July sampling date, treatment should be applied if the percentage of the clusters with damage exceeds six percent.

Cultural & Physical Control

Destroying dead leaves may reduce grape berry moth emergence in the spring. In addition, burying leaf litter covering leaves with one inch (2.5 cm) of compacted soil will prevent emergence. Both of these actions must be completed three weeks prior to bloom. In light infestations, injured berries can be removed by hand; however this may not be a feasible option for larger vineyards.

Biological Control

Trichogramma spp. (Hymenoptera: Trichogrammatidae), an egg parasitoid, can provide some control of GBM. However, since grape berry moth is not a preferred host, relying solely on the resident population of Tichogramma spp. is unrealistic. Instead, augmenting the population with releases of Trichogramma

sp. may be necessary to provide noticeable control. In New York, Cornell researchers made inundative releases of T. minutum and found significantly lower levels of berry injury from GBM in plots where releases were made, compared to control plots and plots treated with conventional insecticides

Chemical Control
Where grape berry moth is an annual problem, post bloom sprays of insecticides may be necessary, and mid to late summer may be needed to control the second generation. The number of spray applications depends on the amount of infested berries a grower is willing to accept. Several insecticides provide good control of GBM, and can be found in the Midwest Small Fruit Pest Management Handbook [and the New England Small Fruit Pest Management Guide].

Mating Disruption
Mating disruption is based on the principle that when a specific pheromone is released in the air in sufficiently high quantity, the males are unable to orient to the natural source of pheromone, and fail to locate the calling female which prevents reproduction. The strategy is implemented by installing pheromone dispensers (Isomate GBM Plus, http://www.pacificbiocontrol.com/Labels%20&%20MSDS_files/GBMPlus-1PP(2004,Dec).pdf) prior to moth emergence at a rate of 200-400 dispensers per acre (higher rates for high-risk vineyards). The dispensers are easily attached to the upper training wire of the trellis. This strategy has proven effective in both Eastern and Midwestern vineyards.

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(***Source**: Grape IPM Guide for Minnesota Producers, http://fruit.cfans.umn.edu/grape/IPM/GrapeIPMGuide.pdf*)

Using the Grape Berry Moth Degree Day Model

Rufus Isaacs, Michigan State University

MSU has developed and released a degree day model to predict the start of generation two and three of grape berry moth. To use this, the date of wild grape bloom should be recorded near vineyards where grape berry moth control is needed later in the season.

Grape berry moth typically has three generations per season in Michigan, and predicting when these occur can help growers target management at the right time to reduce infestation by this pest. The first generation is usually at a low level, but many growers target this generation with a 10-day post bloom insecticide. In vineyards with this pest, berry moth populations build through each generation and can reach high abundance immediately before harvest causing yield loss, disease, and the risk of crop contamination. Prevention of damage by generation two and three is the most economically important for growers, and accurate timing of controls for these generations is an essential aspect of effective management of grape berry moth.

The MSU degree day model for grape berry moth has been developed to predict the start of egg laying in the second and third generations in southwest Michigan vineyards. It uses growing degree days (GDD) accumulated after wild grape bloom, so it is important to record the date of wild grape bloom near vineyards to run this model. This insect takes 810 GDD (base 47°F) to complete a generation, and we have found that egg laying starts to increase at around 810 and 1620 GDD after wild grape bloom for the second and third generations, respectively.

If vineyard pest history and cluster scouting indicate that protection from berry moth is needed, this model can be used to predict when egglaying by the second and third generation are starting. For insecticides that work best when applied just before egg-hatch such as insect growth regulators, application at 810 and 1620 GDD are expected to provide good control of this pest. For example, MSU research trials in high pressure vineyards during 2008 found excellent control of berry moth using Intrepid (8 oz/acre) applied at these GDD timings. If using this insecticide or any other product that requires excellent coverage of the fruit to achieve control, applications should be made with increased water volume as the season progresses. For broad spectrum insecticides that target larvae and with shorter residual control application of these products should be delayed to after the start of egg laying. Based on models for other similar pests, this would likely be about 200 GDD after the predicted start of egg laying.

Running the degree day model

Step 1. Record when wild grape blooms near your vineyard, typically in late May or early June. The date to record is when

approximately 50 percent of the flowers are open on approximately 50 percent of the wild grape clusters. This date will be needed later for running the model.

Step 2. Go to www.enviroweather.msu.edu and select the nearest weather station to your farm. Select "Fruit Pages" and then select "Grape Berry Moth model" in the "Insects" section. Once wild grape bloom is approaching, a new page will appear with a table that has dates and daily degree day totals on the left, and wild grape bloom date across the top.

Step 3. Look across the top of the table for the date(s) when wild grape bloomed on your farm. Look down the table for the row where the table cell turns red, indicating 810 (and later 1620) degree days after wild grape bloom (base 47°F). These red shaded boxes indicate the timing of the start of egg laying by the second and third generations of grape berry moth. In this example (see Figure 1), if wild grape bloom was recorded on June 10, more than 810 degree days have passed as of July 20. The red cell indicates that egg laying of the second generation has begun. If wild grape bloom was recorded on June 16, however, less than 700 degree days have passed since wild grape bloom, and egg laying of the second generation has likely not yet started.

Step 4. Make management decisions. The model provides information on timing for the start of mid- and lateseason berry moth generations, but not on the need for treatment. Based on pest scouting and vineyard history, make decisions about the need for an insecticide application. *(**Source**: Michigan Fruit Crop Advisory Team Alert, June 2, 2009 -- Vol. 24, No. 8)*

Weather data: compiled from various sources for 6/2/09

Region/Location	2009 Growing Degree Days		Precipitation 1-week gain
	1-week gain	total accumulation for 2009	
Cape Cod	60	383	0.40"
Southeast MA	50	411	0.38"
East MA	44	453	0.30"
Metro West (Waltham) MA	63	450	0.50"
Metro West (Hopkinton) MA	44	484	0.55"
Central MA	49	402	0.65"
Pioneer Valley MA	45	444	0.66"
Berkshires MA	53	443	0.97"
South Hampton, NH	39	376	1.55"

Vermont Weather Data can be found at: http://pss.uvm.edu/grape/2009DDAccumulationGrape.html.
Connecticut Weather Data can be found at: https://www.hobolink.com/s/d0696313715dd96f86b25f3552cc1f47

FYI - check out the newly formed Massachusetts Farm Winery and Growers Association and New Hampshire Winery Association and the Vermont Grape and Wine Council. These associations are of, by and for you! Join today!!

For Massachusetts residents, check out the new Massachusetts "Ag Tag" license plate. Each purchase can yield $15 for the Massachusetts Farm Winery and Grower's Association through a check-off plus pooled funds available for various programs or competitive grants. Get yours today!

This message is compiled by Sonia Schloemann from information collected by:
Arthur Tuttle, Dan Cooley, Hilary Sandler, Bill Coli and students from the University of Massachusetts
and Richard Kiyomoto from the University of Connecticut. We are very grateful for the collaboration with UConn.

We also acknowledge the excellent resources of Michigan State University, Cornell Cooperative Extension of Suffolk County, and the University of Vermont Cold Climate Viticulture Program. See the links below for additional seasonal reports:

University of Vermont's Cold Climate Grape Growers' Newsletter
UConn Grape IPM Scouting Report

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