Subject: Re: New England Grape Notes, June 25, 2010
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Date: Thu, 24 Jun 2010 23:30:17 -0400
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New England Grape Notes

June 25, 2010, Vol. 5, No. 3

Phenology: Grapes are in various stages of bloom and post-bloom now. Shoots on many varieties are quite long and require shoot positioning with catch wires (VSP) or tying to lower wires (HWC and GDC). This is especially important to help spread the shoots and allow air circulation and light and spray penetration into the canopy.

Vine Nutrition: bloom petiole analysis is a key element of verifying and adjusting your fertilizer program. If you haven't taken these samples yet, it's not too late. See the below for more information on grape tissue sampling. Tissue samples can be analyzed at the UMass Soil & Tissue Testing Lab or Brookside Farm Laboratory, New Knoxville, Ohio, Plant Analysis Lab/ICP, Cornell Univ., Ithaca NY, or Agricultural Analytical Service Lab, Penn State Univ., University Park, PA, Spectrum Analytic Labs, Washington Court House, OH.

Any nitrogen applications should be made soon (before mid-July) to avoid stimulating late season growth that will not adequately harden off for winter. A very good discussion on "Optimizing Nitrogen Use in Vineyards" by Jamie Hawk and Tim Martinson can be found at: http://www.vinebalance.com/pdf/newsletters/SustainableViticulture1.pdf. Foliar applications of other nutrients (e.g., epsom salts or Solubor) can be made as needed throughout the season. For some good information on fertilizing grapes visit Spectrum Analytic Library at: http://www.spectrumanalytic.com/support/library/rf/A_Guide_to_Fertilizing_Grapes.htm.

Conservation Practices: The frequent rains this year have pointed out a critical need to implement good soil and water conservation practices to avoid problems within and outside the vineyard. Poor drainage can cause soil saturation which is detrimental to vine health, run-off can cause soil erosion in the vineyard as well as buffer areas around the vineyard. It is best, of course, to address all these issues before planting the vineyard (actually before selecting a vineyard site), but sometimes issues become evident after the vineyard is in place. For an excellent discussion of "Soil and Water Conservation Practices for Vineyards" go to http://www.vinebalance.com/pdf/newsletters/SustainableViticulture2.pdf.

- NEWA Models Available: An excellent new resource for identifying disease infection periods as well as timing for Grape Berry Moth controls based on degree day models can be found at http://newa.cornell.edu/index.php?page=crop-page-grapes.

Resources:
If you haven't already ordered your reference materials for this year, here are some suggestions:
2010-2011 New England Small Fruit Pest Management Guide
2010 NY/PA Pest Management Guidelines for Grapes
Cornell Production Guide for Organic Grapes

and a tool that we find extremely useful:

Jeannete Smith's The Fungicide, Insecticide & Herbicide Guides in the Vineyard Pest Management Tool Kit.

Canopy Management:

Tissue Sampling for Adjusting Fertilizer Program

Joe Fiola, University of Maryland

*S*ome 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/PetioleSampleFSdrafto70505.pdf
(*Source: Maryland Timely Viticulture, Late May 2009*)

Disease Management:

Protect Grape Clusters from all Major Grape Diseases at This Time
Annemiek Schilder, Michigan State University

Powdery mildew and Downy mildew
This past week, we observed the first active downy mildew and powdery mildew infections in unsprayed grapevines in Lansing, Fennville, and Ontario, Canada. Sporulating downy mildew lesions were seen on leaves and tendrils of Chardonnay, on leaves and clusters of Chancellor, and on leaves of wild grapes (*Vitis riparia*). On Niagara vines, sporulating lesions were found on leaves close to the ground, which are subject to splashing soil which contains germinating oospores. Last year, we first observed downy mildew in Chancellor in Fennville during the first week of June. It is safe to assume that these pathogens will continue to be active during the warm, humid weather that is forecast for the coming weeks. Growers are therefore strongly advised to protect flower and fruit clusters from infection using effective fungicides as soon as possible if the vines are not already protected. Also, continue to monitor vineyards for signs of infection. At this stage, the young clusters are highly susceptible to all major diseases, including downy mildew, powdery mildew, black rot and Phomopsis. Black rot and Phomopsis lesions have been seen for several weeks and indicate that the pathogens are active. The risk of infection is especially high if we have multiple or big rain events, like we've had recently, and moderate to warm temperatures during this time. Prolonged wet conditions during bloom can also allow Botrytis to get a foothold in the clusters of susceptible varieties by promoting growth on senescing flower parts.

If active infections are found, use fungicides with post-infection activity at the highest labeled rate. For downy mildew, Ridomil Gold MZ or Ridomil Gold Copper are the strongest fungicides, followed by phosphorous acid fungicides like Phostrol and ProPhyt. Strobilurin fungicides have limited post-infection activity and should preferentially be used in a preventive mode. New(er) fungicides for downy mildew control are: Presidio, Revus and Revus Top (don't apply Revus Top to Concord or Noiret vines due to phytotoxicity concerns), Gavel (contains mancozeb), Forum, and Tanos. While some of these new fungicides have postinfection (curative) activity, they are best applied on a preventative basis. They are excellent for integration into a fungicide resistance management program as they represent new and different chemistries.

It will be especially critical to protect clusters of susceptible varieties from powdery mildew at this time. Sterol

inhibitor (e.g., Elite, Rally) and strobilurin (e.g., Abound, Flint) fungicides have the ability to cure early infections but will not eliminate already established colonies. JMS Stylet Oil and potassium bicarbonate fungicides (Kaligreen, Armicarb, MilStop) can be used to eradicate visible powdery mildew colonies. Make sure that coverage is thorough (use sufficient spray volume), as only those colonies contacted by the fungicide will be killed. Since strobilurin-resistant powdery mildew isolates have been found in Michigan vineyards (mostly MSU experimental vineyards and wine grape vineyards with a history of strobilurin use) and we have circumstantial evidence for sterol inhibitor resistance, we recommend adding a protectant fungicide like Sulfur or Ziram to the tankmix when using either type of fungicide. Sulfur is the most cost-effective option for nonsulfur sensitive grape cultivars. Over the past two years, we have noticed that Ziram as a tank-mix partner did improve control of powdery mildew in a spray program. Also, alternate with fungicides with different modes of action, for example Quintec, Endura, Serenade, Sonata, Regalia. Revus Top is a new fungicide for powdery and downy mildew and black rot control in grapes. However, the ingredient that is active against powdery mildew is difenoconazole which belongs to the sterolinhibitor class. This fungicide may be phytotoxic on Concord grapes, so do not use on Concords.

Protect clusters for at least 4 to 5weeks after bloom, keeping in mind that due to spring frost injury there are clusters of different ages in many vineyards. Make sure to continue protecting the youngest clusters. As the berries develop, they become naturally resistant to black rot, downy mildew, and powdery mildew and the need for protection diminishes after the susceptible period ends. This happens quite rapidly for downy mildew (2-3 weeks after bloom), whereas for powdery mildew it is about 4 weeks after bloom. Concord grapes become resistant to black rot 4-5 weeks after bloom, but some wine grape varieties may remain susceptible to black rot for up to 8 weeks postbloom. However, be aware that the cluster stem (rachis) and berry stems can remain susceptible longer than the berries in most cases. The only disease to which berries remain susceptible throughout their development is Phomopsis, but the risk of infection diminishes after bunch closure because inoculum levels drop off then. Botrytis is just the opposite in that berries actually become more susceptible as they get closer to harvest, especially in tight-clustered varieties. In general, aim to protect the clusters from the major diseases from immediate pre-bloom until 4-5 weeks after bloom.

Black rot

Small black rot lesions have been seen on grape leaves in various locations. Temperatures in the high 70's and low 80's are perfect for black rot. At these temperatures, only 6-7 hours of wetness are needed for infection. Black rot is a tricky disease because infections can remain latent (invisible) for a long period of time, so you won't know that you have the disease until is it too late to do anything about it. However, one can scout for the small, round leaf spots – a lot of black rot leaf lesions indicate high disease pressure from ascospore inoculum and also contribute to fruit infections. In a field with a history of black rot, old fruit cluster remnants left hanging in the trellis are major contributors to infection. Fruit infections can take place anytime from bloom onwards, but only become apparent sometime between bunch closure and veraison. The period from immediate pre-bloom through early fruit development is crucial to protect grapes against black rot infection.

The approach to black rot control now focuses primarily on protecting the clusters from infection. EBDC sprays applied earlier in the season for Phomopsis will also control black rot leaf infections, and therefore no sprays are recommended specifically for black rot on the foliage early in the season. In five years of trials in New York, good black rot control was achieved with one immediate pre-bloom and 1 to 2 post-bloom fungicide sprays. A second post-bloom application is strongly advised if black rot has been a problem in the vineyard the previous year, and should be considered prudent if wet weather is anticipated. During three years of fungicide trials in a 'Concord' vineyard in Fennville, MI, just two post-bloom applications of SI fungicides (Nova, Elite) have provided very good control under high black rot pressure.

Sterol-inhibitor fungicides (e.g., Nova and Elite) continue to provide outstanding control of black rot, and provide several days of post-infection activity. Currently there are various "generic" tebuconazole products on the market, e.g., Orius and Tebuzol that may be more costeffective. When using SI fungicides on a post-infection schedule, use the highest label rates, because postinfection activity is strongly rate-dependent, particularly when extended "kickback" activity is required. The strobilurin fungicides (Abound, Flint, Sovran, Pristine) and Revus Top are also excellent protectants but provide only limited post-infection activity. Flint, Pristine, and Revus Top should not be used on Concord grapes because of potential phytotoxicity.

Phomopsis

Cane and leaf lesions have been showing up in high numbers in susceptible varieties. Each rainfall event will lead to spore dispersal and can also lead to successful infection if the tissue remains wet for a sufficient amount of time. The optimum temperature for infection is 59-68ºF, at which time about 6-10 hours of wetness are needed for infection. The longer the tissue stays wet, the more severe the symptoms will be. At this time we should be concerned with preventing Phomopsis infection of the rachis and fruit, especially in mechanically pruned vineyards and vineyards with a history of the disease. Rachis infections are most closely correlated with yield losses due to berry drop at harvest in Niagara vines, whereas fruit infections are more of a problem in wine grapes.

If at this time you find a lot of lesions on the leaves and canes, infection pressure will be high for the fruit also. It is not too late to apply fungicides for cluster protection from Phomopsis. The best fungicide options for control of Phomopsis during and after bloom are Abound, Sovran, Flint, or Pristine (do not use Pristine on Concord grapes). Phosphorous acid fungicides such as ProPhyt and Phostrol are also good and cost-effective alternatives. These are systemic and will likely provide some kick-back activity. In trials done in Michigan, ProPhyt provided very good control of Phomopsis when sprayed on a 14-day schedule. Tighten the schedule and increase the rate if disease pressure is high. Ziram is a moderate to good protectant against Phomopsis and can be a tank-mix partner with any of the phosphorous acid fungicides. EBDC fungicides and Captan are good protectants but cannot be applied after bloom has started in grapes grown for the National Grape Cooperative. EBDC's have a 66-day pre-harvest interval. (*Source: Michigan Grape & Wine Newsletter, Vol. 1, No. 6, June 18, 2010*)

Insect Management: We do not currently have a degree day model for Grape Berry Moth up and running in New England as they do in Michigan (see below), although we have some access to models for sites withing the NEWA network. We hope to have this more fully developed 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 late season 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: (Source: UMass Landscape IPM Message #16, June 18, 2010)

Region/Location	2010 Growing Degree Days (base 50° from March 1, 2010)	
	1-week gain	total accumulation for 2010
Cape Cod	80	722
Southeast MA	83	730
East MA	84	786
Metro West MA	85	712
Central MA	74	705
Pioneer Valley MA	81	784
Berkshires MA	82	695

Additional Weather Data is available form the following sites:

- UMass Cold Spring Orchard (Belchertown MA), Tougas Family Farm (Northboro MA), and Clarkdale Fruit Farm (Deerfield MA) at http://www.umass.edu/fruitadvisor/hrcweather/index.html
- University of Vermont Weather Data from several sites around the state at http://pss.uvm.edu/grape/2010DDAccumulationGrape.html
- New Hampshire Growing Degree Days at http://extension.unh.edu/Agric/GDDays/GDDays.htm
- Connecticut Disease Risk Model Results at http://www.hort.uconn.edu/ipm/

In addition, we are working on integrating new base stations into the Network for Environment and Weather Applications program run by the Cornell IPM team at http://newa.cornell.edu/. This will include the ability to run disease and insect development models for a wider area. Stay tuned.

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 and students from the University of Massachusetts
and Frank Ferandino 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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