New England Grape Notes

April 23, 2009, Vol. 4, No. 1

Welcome to the first issue of ***New England Grape Notes*** for 2009. This periodic message will contain information on field observations, weather data and other timely topics of interest to New England Grape Growers. This is the fourth year we have offered this electronic newsletter to interested readers all over New England. You can help support the continued distribution of this newsletter with a voluntary donations of $10 by visiting the UMass Fruit Team website at www.umass.edu and clicking on the link for 'Click here for Newsletter Subscriptions and Program Donations'. Feedback and contributions are always welcome.

General Info - Vines are still dormant but sap is moving most days. Weather forecasts are for very warm temperatures in the coming week. This may push budswell in some varieties and locations. Dormant fungicide applications can be made at this time to help reduce overwintering inoculum and manage several diseases but should be done soon. See more information on this below. Also, there are some new fungicide products available for grapes. Details are also found below. Early season weed management can have a major impact on season long control. Below is a review of current materials for use in grapes.

If you haven't already ordered your reference materials for this year, here are some suggestions:
2008-2009 New England Small Fruit Pest Management Guide
2009 NY/PA Pest Management Guidelines for Grapes

and a tool that we find extremely useful:

Jeannete Smith's The Fungicide, Insecticide & Herbicide Guides in the Vineyard Pest Management Tool Kit. Here are some testimonials:

> "Clear, concise, indispensible..." - Mark Chien, Wine Grape Educator, Penn State University
> "Saves me so much time!..." - Lucie Morton, Consulting Viticulturist

Request for grower input *- I'd like to include periodic reports from the field with observations from various locations around New England as to what's going on in the vineyard. This can be a couple of sentences about growth stages, frost/freeze events, pest problems, or questions that have come up. I'll send out a request for submissions a few days before each issue so you can send something in.*

Finally, here's a link to Bruce Zoecklein's websiteWine/Enology Grape Chemestry Group at Virginia Tech focused on Winery Sustainability. There's some very interesting and useful information there that I hope you enjoy.

Disease Management:

Early Season Disease Management for Grapes

Daniel R. Cooley and Frank L. Caruso, University of Massachusetts

Disease management in grapes starts early. For many diseases, if a grower sees symptoms, it's going to be difficult to keep a disease under control. So, it's best to start disease management before the grapes, and their pathogens, start to grow.

A Short Introduction to Disease IPM. Integrated pest management, IPM, takes an ecological approach to crop production. One of the most important concepts in disease management using IPM is initial inoculum. This is the amount of a pathogen that is around to start an epidemic at the beginning of an epidemic. In temperate climates, the fungi that cause grape diseases have to get through the winter, when there are no grapes to feed on, to the next growing season. To do this, they form survival structures, usually in places on or near the grapes. When the weather turns warmer, and the grapes start to grow, then the pathogens produce spores that will allow them to colonize the new grape tissue. The more of these survival structures, the higher the risk of disease, and
the more difficult it is to manage the disease.

In general, if a grower does nothing to manage a disease, it will slowly build up, then explode and infect a large number of plants, then gradually slow the rate of new infections as most plants are already infected. A graph of the amount of disease over a typical growing season, where no fungicides or other management is done, would typically look like a stylized S, that is, sigmoid.

By reducing the amount of initial inoculum, an epidemic can be delayed. That is, it will take more time for it to build up to the explosive stage. By that time, maybe the plant will be more resistant because it's more mature. Imagine, in our typical disease in the graph, that the grapes are harvested in September. Under standard, no control conditions, disease has infected nearly all plants. But if the initial inoculum is

reduced, the epidemic takes longer, and the whole curve shifts to the right. In the graph below, the gray lines show how the epidemic would develop with decreased amounts of initial inoculum. By September, for the light gray line, the level of disease is not very high. So, reducing initial inoculum before the growing season reduced the amount of disease at harvest!

Of course, in the real world, it is more complicated, but the idea of reducing initial inoculum is a sound one, used often in IPM.

Reducing Initial Inoculum in Grapes. There are some general rules of thumb that can be useful in reducing initial inoculum of grape diseases. Many grape pathogens, for example, Phomopsis, produce fruiting structureson the old wood of the vines. Notice in the disease cycle below (from J. Pscheidt and R. Pearson, Cornell University) that Phomopsis produces fruiting structures called pycnidia in the dormant canes and rachises. Each growing season, the Phomopsis epidemic starts when rain releases spores from these pycnidia, and the spores land on developing rachises, shoots, leaves and clusters. To stop or delay Phomopsis, growers have to destroy as many of the pycnidia as possible. This process, pruning diseased plant tissue and removing it from the vineyard,
is known as sanitation.

If pruning is done by hand, then much of the infected wood can be pruned off. But the fungal fruiting structures in that pruned wood can still produce spores that cause infections. The prunings that have these fruiting structures should be removed from the vineyard before new growth starts.

In addition, inevitably some pycnidia are left on the vines. To deal with this, an early season application of liquid lime sulfur is very useful. Liquid lime sulfur is toxic to most fungi, and a dilute application on dormant canes will destroy many of the Phomopsis pycnidia. Mike Ellis, pathologist at Ohio State University, has compared dormant sprays of liquid lime sulfur and copper for efficacy, and recommends a spring application of lime sulfur only. Apply at 10 gal. in 100 gal. of water per acre.

This application will also reduce anthracnose inoculum in the vineyard. Currently anthracnose is not a big problem in New England. However, in most moist, relatively warm climates, including the upper Midwest, the disease can be serious.

We aren't sure where the pathogen that causes ripe rot, Colletotrichum, overwinters. However, there's a reasonable chance that it is on the infected berries and other tissue in the vineyard. And it is not clear what, if any, effect lime sulfur may have on the ripe rot pathogen if it is in a vineyard. However, given that some vineyards experienced high levels of ripe rot last year, and given that growers will get some benefit against anthracnose at least, then, as they say, it couldn't hurt.

As with Phomopsis, sanitation will reduce inoculum for ripe rot and anthracnose. Any old, mummified berries, rachises or other tissue that may be on the vines, or lying in the row, should be removed, because that's where the fungus overwinters. It's very hard to get fallen berries out from under vines, though offset rotary hoes may be useful. Whatever cultivation can be done to remove or bury leaves and old fruit in the rows should be done. Failing that, the lime sulfur spray, if it covers debris in the rows, should reduce the fungal inoculum, at least to some extent.

This early season sanitation will also have an effect on black rot. The black rot pathogen overwinters in infected berries, old diseased leaves and diseased canes. The first step in making later fungicide applications more effective is removing or burying tissue infected with the black rot fungus.

Finally, there is one other place that potentially harbors initial inoculum for many grape diseases. That is the wild grapes that may grow near a vineyard. Getting rid of wild grapes is a daunting task, but it can help with many pests, both disease and insect. This time of year, it's a little easier to tackle the wild grapes. Any progress in eliminating them will pay off, even if it takes several seasons to complete the job.

So, as a first step in grape IPM, get rid of the initial inoculum using sanitation, a dormant liquid lime sulfur spray,
and removal of wild hosts.

Fungicide Update for Berries and Grapes

Annemiek Schilder, Michigan State University
(excerpted information for grapes only)

In the past year or two, various new fungicides have been labeled for use in berry crops and grapes; you may already be familiar with some of these, but others will be new. Not all of the new products represent new chemistries. Four major developments have driven new fungicide registrations of late and demonstrate that the disease situation in other crops can affect the availability of fungicides for berries and fruit crops as well. First of all, the threat of soybean rust has pushed

along the review and registration of sterol inhibitor fungicides by the US Environmental Protection Agency (EPA); as a result, we finally received registrations for the fungicides Indar and Orbit for blueberries and cranberries. In addition, Orbit is labeled for a range of other berry crops. Various new sterol inhibitor fungicides are currently in the pipeline as well. Secondly, an outbreak of cucurbit downy mildew has driven the development of downy mildew fungicides, and currently we have three new products, Presidio, Revus, and Tanos, in our downy mildew control arsenal for grapes. Thirdly, patents have run out on a number of proprietary fungicide products and "generic" versions are now available or being developed for some commonly used fungicides. Generic products tend to be more economical, but may not have been separately evaluated and therefore you may not find them specifically recommended in the E-154 Fruit Management Guide. Do read the pesticide label carefully, as generic products may have different labels from brand name products and from each other. Lastly, as competition by generic products in the agrichemical industry increases, some companies are starting to market pre-mix products. Mixtures of two or more active ingredients may extend patent rights if companies can claim novel synergistic effects of the components in the mixture. This has led to the registration of a number of pre-mix fungicides, such as Adament, which is a mixture of Flint and Elite. Below some of the newer fungicides and products with expanded or modified labels:

Adament (tebuconazole and trifloxystrobin) is a mixture of a systemic (tebuconazole) and surface-systemic (trifloxystrobin) fungicide. It is a broad-spectrum fungicide that is labeled for control of multiple diseases on grapes, cherries, peaches, and nectarines. Adament is rainfast when dry, generally within two hours. Adament is effective against cherry leaf spot, brown rot, and powdery mildew on cherries, and powdery mildew in grapes. It has been moderately effective against Botrytis bunch rot. More research is needed to evaluate its efficacy against Phomopsis in grapes. Adament is best used as a protectant. Do not apply this product on 'Concord' grapes, as crop injury may result. Do not make more than two consecutive applications or a total of six (grapes) and four (stone fruit) applications per season.

Nevado (iprodione) has the same active ingredient as Rovral. It is labeled for use in stone fruit, grapes, strawberries, raspberries, blackberries, currants, and gooseberries. The efficacy of this product has not been specifically evaluated in Michigan.

Orius (tebuconazole) has the same active ingredient as Elite. It is labeled for use in stone fruit and grapes and is available as Orius 45DF and Orius 45WP. The efficacy of this product has not been specifically evaluated in Michigan.

Presidio (fluopicolide) is a new systemic fungicide which is active against diseases caused by downy mildews and other oomycetes in grapes and vegetables. This fungicide has a novel mode of action and has protective, curative, eradicative, and antisporulant properties. Presidio is locally systemic and translaminar and moves systemically via xylem tissue. Furthermore, Presidio is compatible with many fungicides and insecticides and is rainfast in two hours. The PHI for grapes is 21 days; no more than two sequential applications are allowed. A tankmix with another fungicide with a different mode of action must be used with Presidio for resistance management.

Revus (mandipropamid) is a new systemic fungicide which is active against downy mildew in grapes and vegetables. It has preventative and limited curative properties. A maximum of four sprays and two sequential sprays is allowed. The addition of a spreading/penetrating type adjuvant such as a non-ionic based surfactant or crop oil concentrate is recommended. The PHI is 14 days for grapes.

Sonata (Bacillus pumilis) is a protectant biofungicide that is OMRI listed and therefore can be used in organic production. Sonata is labeled for use on grapes, blueberries, strawberries, raspberries, blackberries, gooseberries and currants. The label lists control of leaf rust and powdery mildew in berry crops, and powdery mildew in strawberries and grapes. Sonata has a zero-day pre-harvest interval and a four-hour re-entry interval. Sonata has been moderately effective against powdery mildew, downy mildew, and Phomopsis in grape trials in Michigan. Adding a non-phytotoxic spray adjuvant, such as NuFilm is recommended.

Tanos (famoxadone and cymoxanil) is a new, broad-spectrum fungicide for control of downy mildew in grapes and suppression of anthracnose, Pseudomonas blight, and spur blight in raspberries and blackberries. It has curative and locally systemic properties against downy mildews. Tanos rapidly penetrates into plant tissues and is rainfast within one hour of application. It must be tank-mixed with a contact fungicide labeled for that crop (e.g., mancozeb, captan or copper). A maximum of nine applications of Tanos including other group 11 (strobilurin) fungicides is allowed per season. The PHI is 30 days for grapes and zero days for raspberries and blackberries.

Tebuzol (tebuconazole) has the same active ingredient as Elite and is available as Tebuzol 45DF. It is labeled for use in stone fruit and grapes. The efficacy of this product has not been specifically evaluated in Michigan.

Thiophanate Methyl (thiophanate methyl) has the same active ingredient as Topsin M. It is labeled for use in apples, pears, stone fruit, grapes, and strawberries. The efficacy of this product has not been specifically evaluated in Michigan.
(***Source**: Michigan Fruit Crop Advisory Team Alert, April 14, 2009 -- Vol. 24, No. 2*)

Weed Management:

Vineyard Weed Control Update

(The following is excerpted from Rick Dunst and edited for LI by Andy Senesac.)
Some recent label changes and additions are noteworthy for vineyard managers.

Chateau SW and WDG - Note: Chateau SW and Chateau WDG are identical formulations of the same product with the

same use guidelines, but with different EPA registration numbers. The manufacturer is moving the SW formulation through its sales channels, and will eventually sell only the WDG formulation. Both formulations are now labeled for grapes in NY. Chateau (flumioxazin) is a broad-spectrum herbicide that controls most common annual weeds. However, length of residual control can be a limitation with a single application in early spring. The label permits two applications at least 30 days apart and, in research, this approach resulted in much better weed control at the end of the season.

A successful use of Chateau is delaying application until mid to late May, and tank-mixing with an appropriate post-emergence herbicide for burn down of emerging weeds. Suitable tank-mix partners with Chateau in vineyards during the growing season include Gramoxone (or Aim, primarily for grapevine sucker control). Glyphosate can also be tank-mixed with Chateau. "Do not apply during the period after bud break through final harvest, unless using shielded application equipment and applicator can ensure spray drift will not come in contact with crop fruit or foliage. Shielded applications during this time period should not be made with glyphosate or products containing glyphosate." After discussions with representatives from the manufacturer (Valent USA) and the Cornell Cooperative Extension Pesticide Product, Ingredient and Manufacturer System (PIMS), our interpretation of this statement is it is more of a warning than a use restriction. In other words, if you use Chateau in this manner and incur vine injury, the manufacturer is not liable. Although Chateau is primarily a pre-emergence herbicide, it also has post-emergence activity on many weeds, and it can damage grapevine tissue by direct contact or drift. The combination of glyphosate and Chateau greatly increases damage to contacted fruit and foliage. A few years ago, the product manufacturer asked us to conduct some "simulated drift" studies with Chateau and Chateau tank mixes. Injury or damage to contacted fruit and foliage was apparent, and the addition of glyphosate to Chateau greatly increased the damage.

Prowl H20 - Recently, Prowl H20 (pendimethalin) became labeled for use in bearing vineyards. The "dormant use only" restriction in bearing vineyards was dropped. Current labeling for Prowl H20 includes the following:
For bearing vineyards:

- "DO NOT apply over the top of grape vines with leaves, or buds, or fruit."
- "DO NOT apply within 90 days of harvest of fruit."
- "DO NOT apply more than 6.3 quarts per acre per year (a single growing season)." For newly planted and one year old (year after planting) vineyards:
- "Apply only to dormant grapevines."
- "DO NOT apply if buds have started to swell. Application after buds have started to swell may result in leaf distortion."
- "DO NOT apply to newly transplanted trees or vines until ground has settled and no cracks are present."

Prowl H20 can be applied in a single application, or 2 applications at least 30 days apart. The maximum use rate for a single application in non-bearing vineyards is 4 quarts per acre. If two applications are made, a total of 6.3 quarts per acre is permitted.

So, where might Prowl H20 fit into your vineyard weed management plan? In two experiments at the Cornell Lake Erie Research and Extension Lab in Portland in 2008, 6.3 qts. Prowl H20 provided weed control similar to that obtained with 12 oz. Chateau. Predominant weed species controlled by both herbicides included horseweed and large crabgrass. (A progress report on this project can be viewed at <www.nysaes.cornell.edu/pubs/vitcon/pdf/05.pdf>.) Prowl H20 is in the dinitroanaline family of herbicides, related to oryzalin (the active ingredient in Surflan and generic oryzalin products). Although we encourage growers to rotate herbicides in their programs to reduce the risk of developing resistant weed species and the buildup of herbicide tolerant weeds, these programs require the rotation of herbicides that are unrelated to each other in order to be effective. Rotating Prowl and oryzalin is not a resistance management strategy. Both Prowl and oryzalin control most annual grasses and some broadleaf weeds. In our experience, ragweed is a common weed escape of both. When used for a few consecutive years, we often see a buildup of broadleaf weeds such as wild carrot, dandelion and curly dock. Andy Senesac pointed out that a common occurrence with long-term use of dinitroanaline herbicides is that annual grasses will "break" control earlier in the season. Prowl and oryzalin are best used in a rotational program, and tank mixing with an effective broadleaf herbicide can increase the spectrum of weeds controlled. Diuron (trade name Karmex), and simazine (trade name Princep), are among effective tank mix partners. Rotational programs should utilize herbicides with different modes of action. The risk of buildup of annual grasses can be minimized by rotating among herbicides including Devrinol; by controlling "escape" weeds with a systemic grass herbicide such as Poast, or a broad-spectrum post-emergence herbicide such as glyphosate or Gramoxone; or by incorporating a post-emergence-only strategy into your weed management program every few years to prevent the production of weed seeds that will result in increased weed pressure in future years.

Casoron CS - Casoron CS (dichlobenil) is an "older" herbicide in a new formulation. It is a water based liquid product in which crystals of the active ingredient are microencapsulated in a polymer membrane, limiting volatility prior to incorporation. The original Casoron was a granular formulation, to prevent volatility at temperatures above 50 degrees. The new formulation permits application in warmer temperatures. Casoron controls germinating seedlings of most annual and perennial grass and broadleaf weed species including morningglory and bindweed species. Research with this new formulation is ongoing. (Source: Long Island Fruit & Vegetable Update, No. 5, April 10, 2009)

Postemergence Weed Control In Vineyards

Alice Wise and Andy Senesac, Cornell Extension Suffolk County

It is important to address weed control early in the season as it is difficult to clean up a well-established stand of weeds, particularly grasses. In general, weed competition should be minimal from budbreak to veraison, the exception being young vines with shallow, developing root systems. They would be fairly sensitive to anything more than light weed cover. Older

vines with deeper root systems (assuming the vines are not otherwise stressed) can tolerate more weed competition, particularly after veraison. An important point in the quest to reduce herbicide use: it is not viticulturally necessary to maintain a totally clean strip under the trellis all summer long.

Vineyards are taking a hard look at their weed control programs with the aim of reducing herbicide use. This is all the more important given the rapidly rising prices of pesticides this spring. More growers are using mechanical weed control and/or only postemergence materials, thereby reducing or eliminating the use of preemergence materials. As with weed control programs that focus on cultivation, postemergence programs tend to be more labor intensive and thus more expensive than preemergence programs. A rainy season and the use of irrigation will increase the frequency of postemergence applications. These more labor intensive strategies are better suited to smaller vineyards. Larger vineyards just cannot keep up with the labor demands.

Postemergence herbicides are used for control of established weeds. There are two types: those that burn back the above-ground portion but typically do not kill the root and those that are absorbed and translocated through the plant, killing the root as well. It is feasible to eliminate the use of preemergence herbicides and control weeds with several well-timed postemergence applications. The trick is to make sure weeds are no taller than 6". A well-established stand of weeds may require more than one application to achieve decent control. Speaking from experience, dense stands of grasses such as crabgrass and quackgrass are particularly hard to control postemergence.

Glyphosate (Roundup and several other trade names) is a nonselective systemic herbicide which means that the spray must not contact green grapevine tissue. If that were to occur, the active ingredient may be translocated throughout the plant. This is particularly devastating to young grapevines. Note that uptake is enhanced after bloom, thus particular care must be taken in the bloom to late season sprays. Shielded sprayers are fairly effective at preventing contact. Typically about 30 gallons of water/ acre are used in application of these products, except for CDAs (controlled droplet applicators like the Enviromist) which typically apply 5-10 GPA. Glyphosate has low human and mammalian toxicity. Also, once applied, it undergoes rapid degradation by soil microorganisms, resulting ultimately in CO_2 and water. For those trying to avoid use of preemergence herbicides, well-timed applications of glyphosate offer a viable alternative. The down-side is that, with repeated use over time, certain weed species may develop resistance to this material. Thus relying exclusively on glyphosate long term is ill advised.

Aim (carfentrazone) is a postemergence herbicide that is now registered for use in Long Island vineyards. Aim controls several annual broadleaf weed species (actively growing weeds up to 4" tall) but it does not control grasses or sedges. Aim is also an effective suckering agent. Aim is used at a maximum use rate of 2.0 fl.oz./ acre, max of 7.9 fl.oz. per season in a min. of 10 GPA water. In trials conducted by Rick Dunst on Concord and DeChaunac, Aim was more effective than Gramoxone in burning off sucker growth, and a tank mix of the two was more effective than either applied alone. Aim applied alone or in a tank mix with Gramoxone or preemergence herbicides should provide effective burn down of suckers. Use non-ionic surfactant or crop oil concentrate as per label recommendation.

Paraquat is a nonselective contact herbicide. There are currently two formulations: Gramoxone Inteon (2 lbs./gal a.i.), use 2.5 to 4.0 pts/a, & Gramoxone Max (3.0 lbs./gal). Use rates range from 1.7 to 2.7 pts./acre in a minimum of 10 gal./acre water. Use of an NIS or COC is recommended. Paraquat materials must not contact green grapevine tissue (unless sucker control is intended, a practice more common in native variety vineyards). Short distance translocation through grapevine shoots is possible, though less likely. The contacted tissue however will be killed. Paraquat products are restricted use chemicals, meaning only licensed applicators may use them.

Sethoxydim (Poast, PoastPlus) is a selective postemergence herbicide that will control annual grasses very well up to 12 inches tall. Sethoxydim is labeled for use in nonbearing AND bearing vineyards (50 days PHI). Best success is usually obtained with early intervention on annual grasses not more than 6" tall. Weeds that are drought-stressed are much more difficult to control. Usually a COC (1% v/v) is added for optimal control. Broad-
leaf weeds and nutsedge are not controlled by sethoxydim.

Scythe is a postemergence herbicidal soap (pelargonic acid) that ruptures the cells within green tissue. The initial effect on weeds is seen rapidly (within minutes), but the ultimate level of control may not be known for several days. As with the other products, green grapevine tissue should not be contacted. For effective control with Scythe, grasses should be very small (<3") and broad-leaves should also be small. Do not expect to apply Scythe to a dense, well-established carpet of weeds and get adequate weed control. For best results, use ≥ 60 GPA water. Consequently, it will not perform well when used with low volume CDA sprayers. No additional surfactants are necessary for Scythe. Last year, the company was attempting to secure OMRI approval for Scythe. No word on this.

Acetic acid and clove oil products have been tested in vineyards with varying success. Matran EC, a clove oil product, is OMRI approved and does not have an EPA number as the company feels it qualifies as a minimum risk product. It is best applied to weeds <6" with volumes of water sufficient to thoroughly cover plant surfaces (>30 gpa). There may be control of top growth but it is not translocated so weeds will regrow. The need for relatively high rates/frequent reapplication makes these types of materials a more expensive option. Their best use might be in combination with other weed control techniques such as cultivation and under trellis mowing. Also, be clear on the registration status of such products; make sure agriculture is a stated use on the label. To our knowledge, there is no acetic acid herbicide product labeled for ag use in NY. (Source: Long Island Fruit & Vegetable Update, No. 6, April 17, 2009)

Weather data: compiled from various sources for 4/20/09

Region/Location	2009 Growing Degree Days		Precipitation 1-week gain
	1-week gain	total accumulation for 2009	
Cape Cod	15	38	2.25
Southeast MA	11	38	2.20
East MA	9	18	0.71
Metro West (Waltham) MA	14	26	1.05
Metro West (Hopkinton) MA	14	21	0.78
Central MA	8	13	0.65
Pioneer Valley MA	24	56	0.19
Belchertown MA	12	24	1.96
Berkshires MA	22	51	0.09
South Hampton, NH	8	10	

Meetings:

The Vermont Grape and Wine Council is Sponsoring a Conference on May 20 - The Vermont Grape and Wine Council has posted the Agenda and the Registration Form for their First Annual Conference on their website at: http://www.vermontgrapeandwinecouncil.com/. The Conference will be held at The Three Stallion Inn in Randolph, VT, on May 20. Directions to the Inn can be found at: http://www.3stallioninn.com/directions.htm. It should be a very interesting and informative conference ! Dr. Anna Katharine Mansfield of Cornell University is a featured speaker. There will also be a grower/winemaker panel and a wine tasting. Seating at the Inn is limited and registrations will be accepted on a "first-received" basis. Deadline for discounted registration is May 6. Please see registration form for details.

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

Support for this work comes from UMass Extension, the UMass Agricultural Experiment Station, University of Connecticut Cooperative Extension, USDA-CSREES.