

***An Initial Integrated Pest Management (IPM)  
Strategy for New Cold Climate Winegrape Growers***



The University of Vermont

The UVM Grape Program

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Integrated pest management (IPM) is a sustainable approach to managing pests which combines biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. IPM is based on knowledge such as knowledge about the biology of the different pests, how they interact with the crop, and how the environment/weather affects this interaction. IPM is also information-driven including information on the development stage of particular pests, size of the pest population (i.e., whether threshold levels have been reached that require action), and whether there are sufficient natural predators in your vineyard which might manage a pest situation without your intervention. Note that “pests” not only refer to insects but also to other arthropods such as mites, pathogens that cause disease, weeds, and vertebrate pests such as birds, voles, raccoons, deer, etc.

*Is IPM organic?* It can be depending on what management tools and options are used. It is an *approach* to managing pests that is compatible with sustainable agriculture and organic agriculture. However, because some spray materials certified for use in organic systems have lower efficacy than synthetic materials, adequate organic management of certain diseases will require strict attention to vineyard sanitation, and may require more spray applications than an IPM program that does not limit the use of synthetic materials.

IPM is only one area of management, albeit an important one, that will impact vineyard production and profitability. Quality wine requires quality grapes and adequate pest management is an important factor in the production of quality grapes. There are numerous diseases and insect pests which will need to be managed effectively during the growing season.

The following is an initial strategy to manage various diseases and insects that can significantly impact grape production. As the vineyard matures, insect and disease inoculum will likely increase which may increase need for intervention. This guide is thus not a prescription, but rather should be adapted based on vineyard conditions and your experience as a grower. In order to customize this program, keep the following practices in mind:

**1. Read.** IPM concepts include understanding crop and pest life cycles; collecting and applying weather data to biological models; scouting the planting for signs of disease and insect pests; practicing good crop management to reduce pests through physical or cultural means; and properly applying chemical controls when deemed necessary. IPM does not provide a recipe for pest management, but rather demands that growers understand the particular needs of the vineyard and best ways to manage them. A good primer on understanding IPM concepts is available at: <https://ag.umass.edu/landscape/fact-sheets/fundamentals-of-insect-mite-ipm-program>. A grape-specific IPM guide, Elements of IPM for Grapes in New York State, can be found at: <http://hdl.handle.net/1813/42720>

Studying specific grape disease and insect Fact Sheets to become familiar with the various stages of disease and insect development and key times for management are very important -- links to this information can be found at the UVM Fruit website:

[http://www.uvm.edu/~fruit/?Page=grapes/gr\\_ipm.html&SM=gr\\_submenu.html](http://www.uvm.edu/~fruit/?Page=grapes/gr_ipm.html&SM=gr_submenu.html) .

Since grape production will likely involve the use of pesticides, whether they be organic or synthetic, it

is extremely important to become knowledgeable about their safe use and storage to minimize health and environmental risks. A starting point would be to study and obtain your Vermont Pesticide Applicator License ([pss.uvm.edu/pesp/](http://pss.uvm.edu/pesp/)) and to read through the pesticide safety fact sheets that are linked on the Cold Climate IPM webpage.

**2 Attend.** There are numerous opportunities to attend grower-oriented grape conferences and workshops throughout the year in which basic and new information on pest management is presented. These occur in New England, New York, the Mid- Atlantic states, and Minnesota, etc. At these meetings you have the opportunity to interact with university and extension personnel and other growers which can be very informative. Many meetings are listed on the UVM Fruit website. Cornell University's Eastern New York Commercial Horticulture Program also maintains an outreach program for grape producers in the region, and hosts many meetings per year: <https://enych.cce.cornell.edu/>. Also, it would be helpful to subscribe to University and industry listservs which will send out notifications of conferences and workshops. In Vermont, email lists are maintained by the UVM Fruit Program and the Vermont Grape and Wine Council: <http://www.vermontgrapeandwinecouncil.com/>

**3 Ask Questions.** At organized grape meetings or informal gatherings of growers ask questions of people who have experience and who are succeeding in cold climate grape production. Many growers have said that they initially learned from a grower “mentor” who was willing to share insights and knowledge. University and extension personnel are also available to help. Everyone had to start at some point in time and most people are willing to share what they have learned with people who are just starting to grow winegrapes.

**4 Observe.** Nothing substitutes for you getting out into your vineyard *at least* once a week during the growing season to specifically observe vine development and to apply what you have learned about key times to manage specific diseases, insects, and other pests. Through observation, you become the ‘expert’ in your vineyard.

## Disease Management

Diseases are of major concern in grape production and the risk of disease increases if they are not managed in a new vineyard and inoculum levels build up. This presents a problem if you are relatively new to grape growing and you have not had the opportunity to study and know what disease risks you may have in your vineyard this growing season and the most optimal methods to manage the key diseases. Is there a “skeletal” management program that can be followed while you gain more experience and the knowledge needed to “fine tune” and “customize” your program to fit your specific vineyard conditions?

Nothing can substitute for knowing the biological information about the diseases, the stages the pathogens go through, and the factors that impact the development of the diseases. Also, it is important to know the relative susceptibility of the grape varieties which you are growing to the various diseases and the cultural practices that will impact disease development. All of this knowledge will allow you to make informed decisions on the necessity of using a fungicide, what fungicide to use, and when to use it, -- and, thereby, minimize fungicide use. However, if you need some guidance *now* while you gain more knowledge and experience, the following can be viewed as a possible starting point, i.e., a “skeletal” management program to develop, expand, and modify to your specific conditions.

**Note that the program assumes resistance has not developed to certain classes of fungicides. In most relatively new Vermont vineyards or in vineyards where resistance management practices have been used, that is not likely to be the case. This program also assumes that cold-hardy, *V. riparia*- based cultivars are being grown, as such cultivars have lower susceptibility to most diseases native to North America. Relative disease ratings for common cultivars grown in Vermont may be found at:**

[http://www.uvm.edu/~fruit/grapes/gr\\_ipm/RelativeRatingsOfDiseaseMay2011.pdf](http://www.uvm.edu/~fruit/grapes/gr_ipm/RelativeRatingsOfDiseaseMay2011.pdf)

**Fact Sheets to Further your Knowledge about common Grape Diseases:**

**Anthracnose** – \*\* This disease is native to Eurasia and most grapes with *vinifera* in their genetic background are relatively resistant, thus, it is often not included in disease management guides. However, some cold-climate cultivars, especially ‘Marquette’ and ‘LaCrescent’, are susceptible to the disease. Ohio State University has a good fact sheet on its management at: <http://ohioline.osu.edu/factsheet/plpath-fru-15>

**Botrytis Bunch Rot & Blight** - <http://hdl.handle.net/1813/43080>

**Black rot** - <http://hdl.handle.net/1813/43076>

**Downy mildew** - <http://hdl.handle.net/1813/43089>

**Phomopsis** - <http://hdl.handle.net/1813/43104>

**Powdery mildew** - <http://hdl.handle.net/1813/43121>

## **Insect Management**

Insect pests tend to be less of a problem than diseases in Vermont vineyards, but certain ones still must be managed to avoid potentially significant crop damage. Key insects to monitor and manage include the **grape berry moth, leafhoppers**, and the **leaf form of Phylloxera**. These are not the only insect pests that you may encounter but they are the more likely ones.

If you have a problem with **Phylloxera-leaf form** on certain cultivars, an effective time to manage this insect would be when galls are first noticed (**around Immediate Prebloom**) and at the time of **First Post Bloomspray**.

If **grape berry moth and leafhoppers** are above threshold levels or your vineyard is considered at high risk for damage, these insects can be managed by using an effective insecticide(s) in the **1st Post-Bloom spray** and in the **summer**.

There are methods to monitor whether the insect(s) have reached a level which warrants intervention. Like disease management, there are many considerations in choosing an insecticide(s). The ‘ideal’ insecticide would be one which would effectively manage all of these pests, have low toxicity to humans, have a low risk for resistance development, and have no impact on the natural beneficial organisms in the vineyard which contribute to biological control. As so described, that material does not exist. Determining the need for and timing of summer insecticide applications should be based on monitoring. The Risk Assessment protocol developed by Martinson, et. al. for the grape berry moth and eastern grape leafhoppers can be found at: <http://www.nysaes.cornell.edu/pubs/fls/OCRPDF/138a.pdf>

For rates of materials and further details see the New York and Pennsylvania Pest Management Guidelines:

<https://ipmguidelines.org/>

***Fact Sheets to Further your Knowledge about Insect Pests:***

**Grape Phylloxera** - <http://ohioline.osu.edu/hyg-fact/2000/2600.html>

**Grape Berry Moth** - <http://www.nysipm.cornell.edu/factsheets/grapes/pests/gbm/gbm.pdf>

**Grape Leafhopper** - <http://www.nysipm.cornell.edu/factsheets/grapes/pests/gh/gh.pdf>

**Various Insect & Mite Pests** - <http://www.oardc.ohio-state.edu/grapeipm/index.htm>

*A note for organic growers:*

The spray recommendation in the included table reference non-organic certified materials. The use of organic certified materials will make disease management much more challenging, and will require strict vineyard sanitation, a reduced interval between spray applications, and a greater number of applications per season to achieve adequate disease management. More information on organic grape production may be found in the following guides.

ATTRA Guide to Organic Grape Production:

<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=5>

2016 Cornell Organic Production & IPM Guide for Grapes

<http://hdl.handle.net/1813/42888>

*Sample* simplified disease management spray schedule for cold-climate grapes grown in Vermont or similar climates.

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Timing	Target pest <sup>z</sup>	Chemical family	Example Material <sup>y</sup>	Efficacy rating <sup>x</sup>	FRAC / IRAC code <sup>w</sup>
5-8" shoot growth	PH, BR, DM	mancozeb	Manzate 75	3-4	N/A
<b>Immediate pre-bloom to early bloom (10-14 days from last spray)<sup>v</sup></b>	PM, BR BR, DM, AN	DMI + mancozeb	Rally Manzate 75	3-4	3 N/A
<b>1st post-bloom (10-14 days from last spray)<sup>v</sup></b>	PM, BR BR, DM, PH, AN	DMI + mancozeb <b>or</b> captan	Rally Manzate 75, Captan 80WDG	3-4 2-4	3 N/A
2nd post-bloom 10-14 days from last spray)	BR,DM, PM	strobilurin or SDHI <b>or</b> captan + sulfur	Flint, Luna Experience Captan 80 WDG, sulfur	3-4 1-4	11, 7 N/A
Additional summer sprays	Bot	SDHI, dicarboximide	Luna Experience, Rovral	3-4	11, 2
As needed, dependent on weather or physical injury (hail, etc.)	DM PM	Mandipropramid, phos acid sulfur, stilet oil	Revus, Prophyt sulfur, JMS stilet oil	3-4 3	40,33 N/A

Insecticides, as needed determined by scouting, and suggested timing. VT vineyards likely need only one insecticide per year targeted at grape berry moth, although other insect pests may be problematic in certain vineyards, especially on young vines.

Immediate Pre-bloom to early bloom	Phylloxera	NNI, TAD	Assail, Movento	2-3	4A, 23
1st post-bloom, summer	grape berry moth	BT, IGR, Oxadiazine, carbaryl	Dipel, Intrepid, Avaunt, Sevin	2-4	11, 18, 22A, 1A
1st post-bloom, summer	grape leafhopper Japanese beetle	NNI, carbaryl, pyrethroid	Assail, Sevin, Danitol	3-4	4A, 1A, 3A

<sup>z</sup> AN= anthracnose; Bot= botrytis; BR= black rot; DM= downy mildew; PH= phomopsis cane & leaf spot; PM= powdery mildew

<sup>y</sup> Not all materials will be registered for use in all states

<sup>x</sup> Efficacy rating based on 2016 NY & PA Pest Management Guidelines for Grapes

<sup>w</sup> Rotate materials after no more than two applications of the same FRAC or IRAC code to deter against development of resistance to pesticides in target

<sup>v</sup> Immediate pre-bloom and 1st post-bloom sprays are the most critical timings for seasonal disease management.

*Where trade names or commercial products are used for identification, no discrimination is intended and no endorsement is implied. Always read the label before using any pesticide. The label is the legal document for the product use. Disregard any information in this article if it is in conflict with the label. This is a suggested guide only— all spray decisions should be based on individual pesticide labels in concert with a comprehensive management guide.*

For rates of materials and further details see the New York and Pennsylvania Pest Management Guidelines

Note: If your vineyard had a Phomopsis or Black Rot problem last year, the first spray should go on earlier, at 3"- 5" shoot growth.

**ALWAYS READ PESTICIDE LABELS VERY CAREFULLY— THE LABEL IS THE LAW ON HOW THE MATERIAL CAN BE USED.**

## Pesticide Safety

Grape production involves the use of pesticides, whether they be synthetic or organic pesticides. Anyone using pesticides needs to be knowledgeable about their safe use and storage. Pesticide applicators who use *restricted use* materials are required to hold a valid private or commercial pesticide applicator's license from their state department of agriculture; however, anyone who apply *any* pesticide should become licensed in order to receive training on safe use of agrichemicals.

The following fact sheets from the University of Missouri explain important pesticide safety information that you should know:

Understanding the Pesticide Label:

<http://extension.missouri.edu/explorepdf/agguides/agengin/g01911.pdf>

Pesticide Application Safety: <http://extension.missouri.edu/explorepdf/agguides/agengin/g01916.pdf>

Personal Protective Equipment for Working with Pesticides:

<http://extension.missouri.edu/explorepdf/agguides/agengin/g01917.pdf>



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Where trade names or commercial products are used for identification, no discrimination is intended and no endorsement is implied. Always read the label before using any pesticide. **The label is the legal document for the product use. Disregard any information in this article if it is in conflict with the label.**

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