

Grape Pests and IPM Practices for Cold Climate Cultivars

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The Cold Climate (wine) grape industry is a new and rapidly growing industry in northeastern and upper Midwestern states, based on cold hardy, *Vitis riparia* hybrids. Despite the innate disease resistance of many of these cultivars, insect and disease management is one of the biggest viticultural challenges in the Northeast, partly due to the extremely humid climate. An Integrated Pest Management (IPM) strategy can be used to successfully manage vineyard pests, while minimizing negative impacts such as chemical inputs and pesticide resistance.

What is IPM?

Integrated pest management (IPM) is a sustainable approach to pest management that *combines* cultural, mechanical, biological, and chemical tactics, while *minimizing* economic, human health, and environmental risks. Management decisions are made utilizing all information available including weather, pest pressure, etc. The goal of IPM is to *manage* pest populations and damage within an acceptable level, rather than eliminate them completely. Insects and diseases are carefully monitored, and thresholds are set for unacceptable damage levels. Control measures are employed when it is determined that the thresholds may be breached.

In some cases, pests (especially diseases) may reach the threshold before we can detect them: i.e. spores may be discharged during rain events, spreading inoculum around the vineyard, but symptoms of disease will not be present until much later. In these cases, educated management decisions are made based on other information, such as pressure in previous seasons and weather conditions.

IPM Practices

Cultural

- **Vineyard Site:** Good soil conditions, air drainage, and sun exposure are all things to consider when choosing where to plant. Excellent conditions are the first step to growing healthy vines, which will be less susceptible to many pests.
- **Plant material:** Choose cultivars with pest resistance, suitable for your area. A resistant plant will require less work and few inputs to keep them healthy. Vines with the appropriate hardiness for your site will sustain less winter damage and making them less susceptible to many diseases.

Mechanical

- **Canopy Management:** Most grape diseases thrive in moist, slow drying conditions. Managing the canopy to increase airflow will reduce disease. Canopy management also increases sunlight penetration. The UV radiation is effective at killing many diseases.

- **Sanitation:** Many vineyard diseases overwinter on dried stems or berries from the previous season. Therefore, it is very important to remove as much dead plant material as possible and mow the vineyard floor to chop up debris during the dormant season.
- **Protection:** Vertebrate pests (deer, voles, turkeys) are a serious threat to grape vines. Protecting your valuable investment with fencing is almost a necessity in the northeast. Grow tubes can also be used on new vines to protect from deer browsing.
- **Weed control:** Maintaining good weed control will reduce habitat for insects and diseases. Weeds also act as an ideal food source and habitat for rodents in the winter time; voles and mice will tunnel under the snow to feed on weeds and then girdle vines.

Chemical

Chemical pesticides are an essential part of effective insect and disease control in our area. For the most successful pest control, appropriate materials should be used to target specific diseases at critical life stages. Whenever you are spraying ANY pesticides remember:

- **The label is the law.** Read it before mixing your tank and applying. Only apply as directed, including the site/crop, rates, and personal protective equipment specified.
- **Rotate groups.** Using the same material over and over can lead to resistance. This means the insects and diseases will build up a tolerance to those materials, and you'll have to eliminate them as control options. So use more than one product. Look for the FRAC or IRAC group number and rotate these groups between consecutive applications.

Grape disease overview

Disease pests are one of the biggest challenges of cold climate vineyards in the northeast. Diseases are usually active before symptoms are present, therefore it is important to be proactive (i.e. preventive, instead of reactionary). In the table on the following page is a description of the most economically significant disease pests of vineyards, their biology, and effective control measures.

Resources for Cold Climate Vineyard IPM:

Cornell IPM Fact Sheets for Grapes

<http://nysipm.cornell.edu/factsheets/grapes/default.asp>

New York and Pennsylvania Pest Management Guidelines for Grapes (published annually)

<http://store.cornell.edu/p-189430-2015-new-york-and-pennsylvania-pest-management-guidelines-for-grapes.aspx>

Grape Disease Control, 2015. Dr. Wayne Wilcox (published annually)

http://rvpadmin.cce.cornell.edu/uploads/doc_308.pdf

Cornell Vineyard Spraying Website

<http://web.entomology.cornell.edu/landers/pestapp/grape.htm>

Integrated Pest Management Strategy for Cold Climate Winegrape Growers. Lorraine Berkett

http://www.uvm.edu/~fruit/grapes/gr_ipm/AnInitialIPMStrategy.pdf

Economically significant diseases of cold climate vineyards

Disease	Biology	Control*
Phomopsis	<ul style="list-style-type: none"> - Persists (years) on infected wood - Spores produced early, spread by rain-splashing to a couple feet 	<ul style="list-style-type: none"> - Prune out dead wood - <u>Critical spray time</u>: when clusters first appear, 3-5" shoot growth
Anthracnose	<ul style="list-style-type: none"> - Overwinters primarily in cane lesions on the vine - Spores produced in spring, dispersed by splashing raindrops - Likes it warm (70's and 80's) but infects at colder temps if wet - Young shoots, leaves and stems, and berries are susceptible. 	<ul style="list-style-type: none"> - Remove infected tissue from the vineyard, tilling/mulc diseased berries on ground - <u>Critical Spray Time</u>: 'delayed dormant' Lime-sulfur; early season broad-spectrum fungicides targeting phomopsis will also be effective against anthracnose.
Downy Mildew	<ul style="list-style-type: none"> - First infections come from spores in soil or on fallen leaves - Specific weather conditions required: prefers warm, humid nights (64-72°F) and rain (>0.1") 	<ul style="list-style-type: none"> - Improve air circulation to speed drying time of leaves - <u>Critical Spray Time</u>: apply a protectant 2-3 weeks before bloom, then every 7-10 days
Powdery Mildew	<ul style="list-style-type: none"> - Does NOT require free water (rain or dew) for infection - Warmer temperatures speed sporulation (mid 60s-80s) - Sensitive to direct sunlight (UV) 	<ul style="list-style-type: none"> - Canopy management to improve air circulation and sun exposure - <u>Critical Spray Timing</u>: starting at 3-5" shoot growth and depending on weather conditions. Protection of bloom through pea-sized berries is CRITICAL
Black Rot	<ul style="list-style-type: none"> - Fungus overwinters in mummies, infects during rain 	<ul style="list-style-type: none"> - Sanitation: Remove mummies from vines and trellis - <u>Critical Spray Time</u>: start of bloom through +4 weeks
Botrytis	<ul style="list-style-type: none"> - Many fungus sources, especially old cluster stems - Infection can occur during bloom and remain latent until berries begin to ripen 	<ul style="list-style-type: none"> - Improve air circulation through site selection, canopy management, and loosening clusters - <u>Critical Spray Time</u>: varies by season and is weather-dependent

*Specific recommendations for chemical insecticides can be found in the *New York and Pennsylvania Pest Management Guidelines for Grapes*. (Link to this book is listed above)