

Using NEWA Resources in a Vineyard IPM Strategy

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Historically, control practices for vineyard pests in the eastern United States were made based on the calendar or on a growth stage such as bud break, bloom or veraison using materials with a broad spectrum of activity. This was a fairly straightforward approach to pest management, and for many years this type of spray program was very effective. However, as the nation became more conscious of pesticide use, the Food Quality Protection Act (FQPA) was introduced, and broad spectrum pesticides were either restricted in their usage, grapes were removed from the label, or were banned completely. In the recent past, we have seen more choices in fungicides and insecticides come on the market, but the trend is now toward less toxic and narrower spectrum pesticides.

With the narrower spectrum pesticides came the need to understand the life cycle of vineyard pests, how individual pesticides worked, resistance management, varietal susceptibility, and economic thresholds (treatment thresholds). A critical component of this was knowledge of the combination of environmental factors that promote insect and disease development in a vineyard.

Weather information is a key component of any vineyard IPM strategy. In and of itself, weather information can inform spray decisions, but when combined into an information database that includes pest developmental models weather data is transformed into applications that can assist in determining if there is;

1. A need to spray,
2. A need to tighten up, or extend, spray intervals
3. A need to change materials being used
4. A need to add or eliminate sprays

The best resource available for growers to monitor the weather and its effect on grape pests is the Network for Environment and Weather Applications or NEWA. What is NEWA? Available online for free, NEWA provides web-based weather data and pest forecasts from almost 200 sites in six states in the Northeastern United States. These sites include Sensor Instruments data loggers (the original units used by NEWA), Campbell Scientific weather instruments, airport weather stations and RainWise Inc. weather stations (the most current weather stations used by NEWA). The NEWA home page can be found at newa.cornell.edu.



Upgrades to the insect and disease models displayed by NEWA provide grape growers and members of the grape industry a wealth of information to assist in making the spray decisions listed above for powdery mildew, black rot, Phomopsis, downy mildew and grape berry moth. A location's Station Page on NEWA provides links to the Pest Forecasts shown in Figure 1. In the second column you will see links for Grape Diseases, Grapevine Downy Mildew and Grape Berry Moth.

NEWA is an excellent resource for use in developing and implementing a vineyard IPM strategy for your operation. Information provided on the NEWA website includes, but is not limited to;

1. Weather records
 - a. Daily summary of weather parameters
 - b. Hourly recording of weather parameters
 - c. Historical weather records
2. Pest models and forecasts (grapes)
 - a. Grape berry moth phenology model
 - b. Powdery mildew primary infection events
 - c. Black rot infection events
 - d. Phomopsis infection events
 - e. Downy mildew DMCAst model of infection events by grape cultivar
3. Growing Degree Day (GDD) information (base 50F)
4. National Weather Service forecasts
5. National Weather Service radar

Under Pest Forecasts in the main menu, click on the Grape Diseases link to access infection events for Phomopsis, black rot and powdery mildew to help you determine the number of infection events since your last spray. Used on a regular basis, this can assist in determining whether the spray interval for these diseases should be tightened or extended. The Grape Diseases forecasts operate like mini-expert systems with disease management options developed by Wayne Wilcox (Department of Plant Pathology and Plant-Microbe Biology, Cornell University) and Juliet Carroll and Tim Weigle (NYS IPM Program). You can also choose the phenological stage of your crop to customize the results for all the different varieties in your vineyard.

Portland Weather Station Page

These pest forecasts provide current conditions, using [default biofix dates](#), for this location, as of the last download date and time. **For prior dates and years, and other locations, choose from Pest Forecasts on the horizontal menu.**

Portland Pest Forecasts

Apple Scab	Obliquebanded Leafroller	Onion Disease Forecast
Fire Blight	Apple Maggot	Onion Disease Log
Sooty Blotch/Flyspeck	Grape Diseases	Onion Blight Alert
Leaf Wetness Events	Grapevine Downy Mildew	Onion Modified Blight Alert
Spotted Tentiform Leafminer	Grape Berry Moth	Potato Early Blight
Oriental Fruit Moth	Alfalfa Weevil	Potato Late Blight Blitecast
Codling Moth	Cabbage Maggot	Tomato Diseases, Tomcast
Plum Curculio	Onion Maggot	Tomato Late Blight Blitecast


Figure 1. Screen shot of Pest Forecasts available for CLEREL in Portland, NY

Portland Pest Forecasts

Apple Scab	Obliquebanded Leafroller	Onion Disease Forecast
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Station Location

Lat/Lon: 42.371-79.49
Elevation: 700 ft.



Last Download

2/23/2012 2 PM

Station Sensors

- Temperature
- Leaf Wetness
- Precipitation
- Relative Humidity
- Wind Speed
- Wind Direction
- Solar Radiation

Figure 2. Cropped Screen Shot of Portland, NY Station page

first is to look at the physical Station Location, which provides you with the latitude and longitude of the station, as well as a Google Map image of the installation. If the station is located at a nearby airport, and the map shows it is between two runways, it may be a red flag that the temperature and humidity may not accurately reflect your vineyard conditions.

While there are a large number of weather instruments on NEWA, they may not be located in vineyards. However, the information they provide can be used in vineyards that are in close proximity, to get a general idea of the pest and weather conditions. By looking at the NEWA map of station locations you can gain an idea of how close a weather station is to your actual location.

Figure 2 is a cropped screen shot of the Portland, NY weather station home page that shows three key components you should be aware of when deciding whether or not a station location will be suitable for use in your operation. The

The section titled “Portland Pest Forecasts” provides you with quick reference links to the various pest forecasts. In this case you can see that Grape Diseases, Grapevine Downy Mildew and Grape Berry Moth models are all available. The main driver of what pest forecasts are available is the range of weather sensors that record weather parameters and feed the information to NEWA. Older weather stations in the network may not have the required set of sensors for the grape forecasts. To have Grape Diseases and Grapevine Downy Mildew listed as available Pest Forecasts, the stations need to have the ability to record temperature, leaf wetness and humidity.

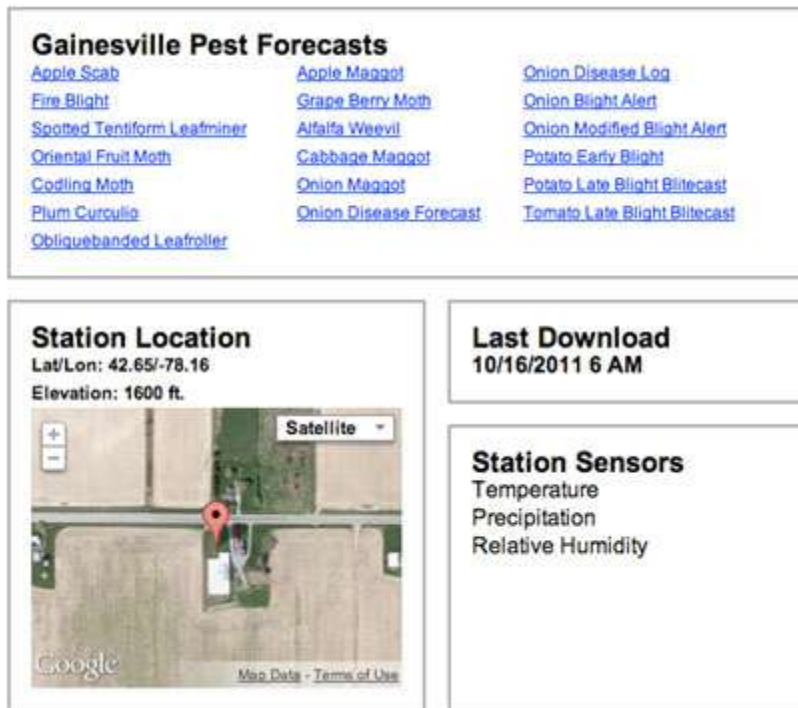


Figure 3. Cropped Screen shot of Gainesville, NY Station Page

Figure 3 shows the Gainesville Station Page. Notice that the station records only temperature, precipitation and relative humidity and the effect that has on the number of Pest Forecasts that are available. If there are any vineyards in close proximity to this machine, the only useful pest model information available will be for grape berry moth. However, new and replacement weather stations are continually being installed, so visit the Home Page and Station Page routinely to find out if an upgrade has occurred.

The ability to interact with the model parameters by inputting vine growth stage is not available from the Station Page Pest Forecasts – click on Pest Forecasts in the main menu and access Grape Forecast Models from there to customize results for your vineyard (Figure 4 below).

The screenshot shows the Ransomville Weather Station Page. At the top, there is a search bar for the NEWA website. Below that is a horizontal navigation menu with items: Weather Data, Pest Forecasts, Station Pages, Crop Management, Crop Pages, and About Weather Stations. On the left side, there is a vertical sidebar menu with categories: Weather Data Quick Links, Daily Summary, Hourly Data, Growing Degree Day, National Weather, and Helpful Links. The main content area is titled 'Ransomville Weather Station Page' and contains a paragraph explaining that pest forecasts use default biofix dates for the current conditions. Below this is a section titled 'Ransomville Pest Forecasts' which contains a grid of 15 links to various pest and disease forecasts, including Apple Scab, Fire Blight, Sooty Blotch/Flyspeck, Leaf Wetness Events, Spotted Tentiform Leafminer, Oriental Fruit Moth, Codling Moth, Plum Curculio, Obliquebanded Leafroller, Apple Maggot, Grape Diseases, Grapevine Downy Mildew, Grape Berry Moth, Alfalfa Weevil, Cabbage Maggot, and Onion Maggot. To the right of the pest forecasts are three boxes: 'Station Location' with coordinates (43.19/-78.9) and elevation (387 ft), a satellite map, and a 'Last Download' timestamp of 1/3/2013 12 PM. Below that is a 'Station Sensors' box listing Temperature, Leaf Wetness, Precipitation, Relative Humidity, Wind Speed, Wind Direction, and Solar Radiation. At the bottom, there is a 'Statewide and Regional Pest Forecasts' section with links for Sweet Corn Stewart's Wilt Forecast and Potato/Tomato Late Blight DSS.

Figure 4. Cropped Screen Shot of Ransomville, NY Station Page, showing easy access to main menu, interactive Pest Forecasts and Station Page quick reference Ransomville Pest Forecasts.

Using the pest forecast model and weather information found on NEWA you can develop a vineyard IPM strategy that uses resources wisely while managing pest populations to a commercial level. NEWA combines knowledge of the pests' life cycle and how weather conditions affect its development with current and historical weather data to generate infection event and insect development status and predictions or forecasts. You will be able to combine the NEWA model results with knowledge of your vineyard blocks, susceptibility of your varieties and the materials you are using for managing the pests into a better vineyard IPM strategy.

[Weather Data](#) [Pest Forecasts](#) [Station Pages](#) [Crop Management](#) [Crop Pages](#) [About Weather Stations](#)

Grape Forecast Models

NEWA Grape Forecast Models

Select a disease or insect:
Select disease or insect ▾

Weather Station:
Select station ▾

Date of Interest:
1/3/2013

[Calculate](#)

Map Results More info

Map

Click here to save location

Figure 5. Cropped Screen Shot of Grape Forecast Models Page showing how to generate the model output.

NEWA Grape Forecast Models

Select a disease or insect:
 Grape Diseases

Weather Station:
 Portland

Ending Date:
 06/06/2012

[Map](#) [Results](#) [More info](#)

Grape Disease Infection Events for Portland

	Past	Past	Current	Grape Disease 5-Day Forecast			Forecast Details	
	Jun 4	Jun 5	Jun 6	Jun 7	Jun 8	Jun 9	Jun 10	Jun 11
Phomopsis	No	Yes	No	-	-	-	-	-
Powdery Mildew	No	No	No	-	-	-	-	-
Black Rot	No	Yes	No	-	-	-	-	-

Phomopsis - calculates when weather conditions may allow spores to infect susceptible tissue.
Powdery Mildew - runs from bud break until early bloom; calculates when weather conditions may allow overwintered, primary spores (ascospores) to infect susceptible tissue.
Black Rot - calculates when weather conditions may allow spores to infect susceptible tissue.

Phenological stage: 10 inch shoot

Choose the phenology stage for the grape variety of interest to display management messages. Concord grape phenology is estimated by the model from historical records for this variety.

Disease	Disease Management
Phomopsis	At this time, protect against rachis infections and prevent infections that move from berry stems into the fruit later in the season. Monitor infection events and <u>maintain fungicide protection on susceptible varieties</u> , in hedged vineyards, or locations with a history of Phomopsis.
Powdery Mildew	A lot of powdery mildew the previous year = More primary inoculum to cause infections this spring. The model logs potential primary infection events. CAUTION: Prolonged cloud cover (lack of sunshine), high RH (>60%) and warm (63-86F) weather significantly increases the risk of powdery mildew infections. Do not delay sprays beyond the 10 inch shoot growth stage for <u>highly susceptible V. vinifera and hybrid varieties</u> . Do not delay sprays beyond the immediate prebloom stage on Concord and other <u>moderately to slightly susceptible varieties</u> . Fruit is extremely susceptible to powdery mildew from immediate prebloom through fruit set. This is the most critical period to protect from fruit infections. Management programs should be at their peak, emphasizing the use of <u>effective fungicides</u> , full rates, appropriate spray intervals, and superior spray coverage.
Black Rot	If severe black rot developed during the previous year or if the vineyard has a <u>history of consistent black rot development</u> , a <u>spray</u> two weeks before bloom (10 inch shoot growth) may be beneficial, particularly if infection events are being logged.

Disclaimer: These are theoretical predictions and forecasts. The theoretical models predicting pest development or disease risk use the weather data collected (or forecasted) from the weather station location. These results should not be substituted for actual observations of plant growth stage, pest presence, and disease occurrence determined through scouting or insect pheromone traps.



Accuracy of the weather data is the responsibility of the owners of the weather station instruments. NEWA is not responsible for accuracy of the weather data collected by instruments in the network. If you notice erroneous or missing weather data, contact NEWA and we will contact the owner of the instrument.



Figure 6. Cropped Screen Shot of Grape Forecast Models results. Forecasts are generated for current and future dates and therefore do not show on this example for last June.